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Consumer products are implicated in at least 60% of injuries. Continuing the Hazard focus on product related injury this edition examines the regulatory changes concerning two products associated with moderately severe, yet preventable, injuries: elastic luggage straps and vaporiser units. This edition also discusses the recent changes to the International Classification of Diseases (ICD) coding system culminating in ICD-10-AM for Australian use.

Redesigning For Injury Prevention: Products and Data Systems

Summaries

Elastic Luggage Straps (pg 2-6)

Elastic luggage straps are commonly used to secure loads and are readily available from a variety of retail outlets costing as little as $2.00. While utilised for their convenience, the straps fail under a variety of conditions and are associated with eye injury. It is estimated that up to 640 injuries from elastic luggage straps require hospital treatment each year in Australia, with approximately 20% requiring hospital admission. New regulations, effective from November 1999, address the labelling requirements for these straps, without considering the inherent design faults that contribute to injury. Alternative designs incorporating snap hooks or cloth strap fasteners and stretch limiting cord are considered.

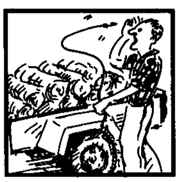
Vaporiser Units (pg 7-8)

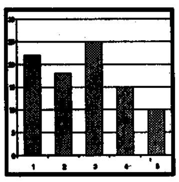
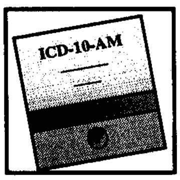
Ingestions and burns from vaporiser units have been well documented, particularly to children aged less than 2 years. From July 1, 2000 a new mandatory safety Standard for vaporisers will be introduced which deals with electrical hazards that may occur during operation of a vaporiser. The revised Standard however, neglects to address the more common injury causes of ingestions and burns. Further design modifications to vaporiser units are required to prevent such injuries.

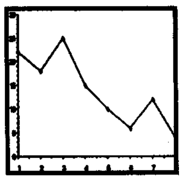
Application of the ISO/IEC Guide 50: "Safety aspects – Guidelines for child safety" to all reviews and revisions of Standards would ensure that all hazards to children are addressed.

ICD-10-AM (pg 8-13)

The International Classification of Disease and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM) was implemented on 1st July 1998 and replaced ICD-9-CM, changing the coding methods from a numeric to alphanumeric system. ICD-10-AM represents a significant improvement in several areas, providing greater scope for detail. However, it still does not meet some essential injury prevention and research needs. Continued use of a single code to represent mechanism and intent disguises the significance of some mechanisms of injury regardless of intent. The inability of ICD-10-AM to distinguish causes of falls also needs to be rectified.



Injuries Associated with Elastic Luggage Straps

Maria Corbo

Introduction

In 1989 a consumer product safety Standard[1] was introduced, which required elastic luggage straps or 'octopus straps' to carry a label warning of possible eye injury caused by such straps. Despite this, injuries associated with elastic luggage straps continue to be reported. In 1996, an elastic luggage strap was implicated in the death of a 13 year old boy. The Standard was reviewed, (Trade Practices, Consumer Product Safety Standards, 1999) and implemented in November 1999. Both the original and the revised labelling Standards are lawful until June 1, 2001. From this date all labelling must comply with the revised Standard, which will remain in effect until November 2004. At the end of this period the effectiveness of the revised standard in reducing injury will be reviewed.

Original Label:
red writing on a white background

WARNING. Avoid eye injury.
Do not overstretch.
Strap may rebound.

Revised Label:
black writing on a yellow background

WARNING. Avoid eye injury.
DO NOT overstretch.
ALWAYS keep face and body out of recoil path.
DO NOT use when strap has visible signs of wear or damage.

Data on injuries associated with elastic luggage straps were obtained from the Victorian Emergency Minimum Dataset (VEMD). The VEMD is an ongoing surveillance database of injury presentations to 25 Victorian public hospital emergency departments, representing approximately 80% of statewide emergency department presentations (details on page 8). The available literature was also reviewed.

Background

Typically, elastic luggage straps are comprised of an elastic or rubber cord with an outer woven nylon covering to which is connected a metal or plastic connector at each end (Figure 1). The design of straps may vary, particularly in the type of connector used. The connector is commonly a metal hook with rubber end. Elastic luggage straps may also be referred to as bungee cords or straps. The term 'octopus strap', also known as a 'spider strap' comes from the design where a number of elastic cords are fastened together with a central metal ring. However, the term 'octopus' strap or 'okie' strap is commonly used to refer to elastic straps in general. Elastic straps are designed so that they may be used for a large number of purposes, such as securing luggage to roof racks or loads in trailers.

Elastic luggage straps are available from a number of retail outlets including hardware, automotive, disposal, supermarket, discount and department stores. Price, along with design and country of manufacture varies. A large proportion of straps are manufactured in China and Taiwan. Straps generally retail between $2 and $10 depending on place of purchase and quality. It is also possible to purchase the materials, elastic cord with nylon covering, by the metre for approximately $5, and hooks for approximately $1 each from hardware stores.

Commonly used elastic luggage strap — Figure 1

Data

Emergency Department Presentations: VEMD

There were 85 cases of injury associated with elastic luggage straps recorded on the VEMD from October 1995 to December 1999. Based on the finding by Stokes et al., (in press) that only 14.1% of VEMD narratives contained a valid description ie. identified products, national estimates were calculated from 1999 VEMD and Australian Bureau of Statistics population data. Estimates of elastic strap injuries suggest that between 92 to 640 cases occur nationally per year, the true estimate being located within this range.

The majority of VEMD injuries were to adults aged 20-49 years, accounting for 70.6% (n=60) of all presentations. Close to ninety percent of injuries (89.4%, n=76) were to males (Figure 2).

Injuries most commonly occurred at home (61.2%) or at a trade or service area (22.4%). The activity most frequently reported when injured was 'leisure' (43.5%), 'work for income' (27.1%) or 'other work', including domestic duties (15.3%). A greater proportion of injuries were recorded during the summer months (40%) and on weekends (76.4%), specifically Friday to Monday.

Most injuries (97.6%, n = 83) were to the head, face or eyes. Eye injuries accounted for 85.9% of all cases. Non-eye injuries were mostly open wounds to the head or face (10.8%) or superficial wounds to the hand, including fingers (1.2%). Twenty-one percent of injuries required hospital admission, all of which were due to eye injury.

Many (95.3%) of the VEMD narratives were not sufficiently descriptive to identify the circumstances of injury. Text narratives of six elastic strap injuries recorded on the original, more detailed VISS database (details on page 8), were also reviewed.

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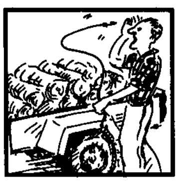
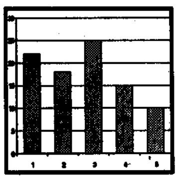
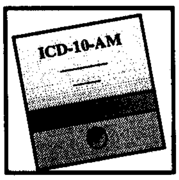
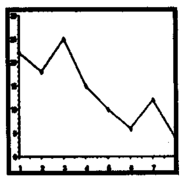
1 *Trade Practices (Consumer Product Safety Standards), 1989 No. 375.*

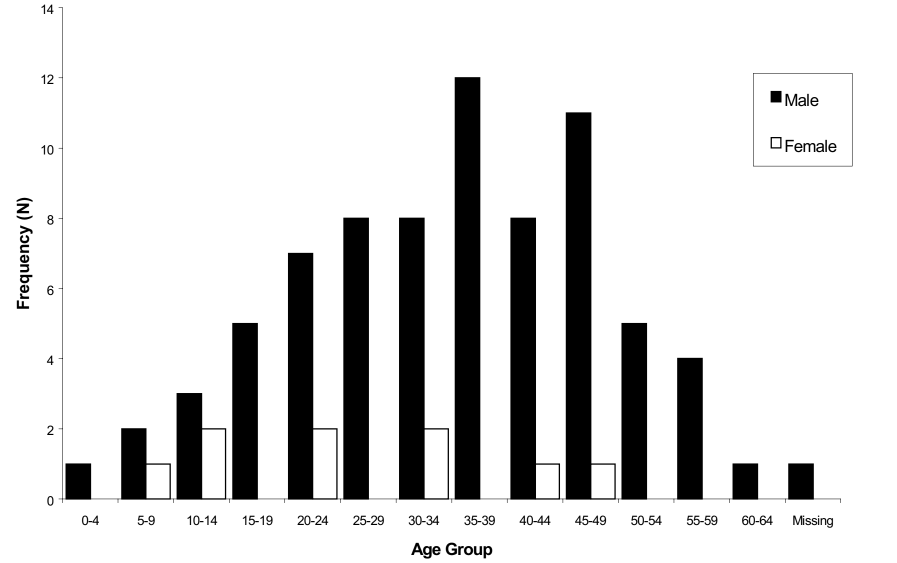








Elastic luggage strap injuries by age group and gender Figure 2



Cases were categorised into two groups; appropriate (for purposes designed) and inappropriate use (play).

Examples of appropriate strap use:

- *"tying piece of wood to trailer with octopus strap, strap broke and hit eye"*
- *"struck by octopus strap used to tie down car load"*
- *"loading car onto trailer, octopus strap slipped off car, hit in face"*
- *"loading trailer at home, octopus strap flung onto patient's nose"*
- *"right eye struck by octopus strap, slipped off case, complaining of black spot in vision"*
- *"metal hook from octopus rope holding trailer load down snapped and hit patient on head"*
- *"hit self with octopus strap whilst fastening wood onto trailer".*

Examples of inappropriate strap use:

- *"playing, octopus strap popped up and the hook hit patient in the eye"*
- *"lying on the couch, thought to have sniffed a plastic cap from luggage strap"*
- *"trying to undo octopus straps, hit in the eye by straps".*

Fatality

In 1996, a 13 year old Western Australian boy died while collecting shopping trolleys from a shopping centre. He was using an elastic luggage strap to keep five trolleys together. Three trolleys separated placing excessive force on the strap which caused the hook at one end to straighten and release. The strap rebounded and hit the victim in the throat, killing him. "Charges against three companies accused of contributing to the death of a supermarket trolley boy [were] thrown out of court on a technicality" (Herald Sun, April 16, 1998, page 24).

Discussion

A number of studies have investigated injuries caused by elastic straps, in particular ocular trauma. Ocular trauma of varying severity is reported ranging from blunt to perforating trauma which may be followed by secondary complications such as cataract, glaucoma (increasing pressure within the eye leading to blindness if untreated) and retinal detachment. More commonly reported eye injuries included haemorrhage within the eye, tearing of the iris, perforation of the cornea and vitreous haemorrhage. Many eye injuries from elastic straps resulted in reduced visual acuity with the most severe cases resulting in complete loss of vision and the removal of blind eyes due to pain (Cruysberg et al., 1995; Riddington et al., 1997).

Like VEMD cases, injuries reported in the literature were typically to males with an average age of 38 years. The length of hospital stay varied, as did the number of follow-up visits and treatment procedures. Hospital stay ranged from 1 to 28 days with an average of 7 days. Patients averaged 1.7 admissions for the one injury. One patient was admitted 5 times and required 4 operations (Gray et al., 1988). The majority of injuries occurred whilst securing loads to vehicle roof racks, strapping loads across trailers and keeping luggage closed (Gray et al., 1988; Nichols et al., 1991; Litoff and Catalano, 1991; Cruysberg et al., 1995; Cooney and Pieramici, 1997; Riddington et al., 1997; Chorich et al., 1998). Riddington et al. (1997), in a case series of 42 injuries, reported that all were a direct result of the hook striking the eye. Elastic luggage straps fail without warning. Typically, straps fail when the hook that has been attached first, slips while the cord is being tightened and the second hook attached (Nichols et al., 1991).

A detailed investigative report prepared by Dr Leonard Cubitt[2] (1998) for the Consumer Affairs Division of The Treasury, identified a number of ways in which elastic luggage straps may fail and consequently rebound:

1. Failure of the connector
2. Failure of the elastic cord or
3. Inappropriate use of the strap.

The connector, particularly the metal hook design, may fail by a) the hook not being properly secured and sliding off the surface to which it was being connected, b) the hook straightening out or c) the connector becoming detached from the elastic cord.

2 Dr Cubitt, an engineer at Engsoft Computer and Engineering Consultants Pty Ltd tested elastic luggage straps to assist in the development of a product safety standard under the Trade Practices Act 1974.

The elastic cord may rupture. Because of wear and damage, it is important to inspect cords prior to use for visible signs, such as fraying of the nylon covering.

Inappropriate use of elastic luggage straps involves overstretching, trying to secure top heavy loads, restraining items that can move after containment, use with items that can apply an aerodynamic loading such as planks of wood or surfboards and loads that can cause damage to the strap.

The amount of stored energy contained within elastic straps when in use is very high. In the event of failure, elastic straps may rebound at velocities of up to 270 kph (Litoff and Catalano, 1991; Cubitt, 1998). Elastic straps are not suitable for use by children who may not be strong enough to control the stretch of the elastic strap when either securing or releasing the strap. Also, due to their shorter stature, children are more likely than adults to be hit in the head and face in the event of the strap rebounding.

Recommendations proposed in the literature include: changing the design of the hooks (Cubitt, 1998), e.g. using a spring loaded metal clip (Gray et al., 1988); wearing safety goggles whilst securing and releasing elastic straps (Nichols et al., 1991; Litoff and Catalano, 1991; Cooney and Pieramici, 1997; Riddington et al., 1997; Cubitt, 1998); increasing community awareness of the danger of elastic straps in order to reduce strap misuse (Nichols et al., 1991; Chaudhry et al., 1999) and; keeping onlookers away when straps are being secured and released (Litoff and Catalano, 1991). The recommendation of wearing safety goggles whilst using elastic straps however, is thought to be impractical (Cruysberg et al., 1998). Safety goggles may reduce the potential for eye injury but “a full-facial mask would be required to protect a person from the impact of the elastic strap” (Cubitt, 1998, p28). Additionally, the likelihood of goggle use when straps are used, often to obtain a rapid load securing solution, would appear unlikely.

Further recommendations proposed by Cubitt (1998) include: testing imported batches and rejecting those where the connector fails under a load of 180kg applied for at least 2 minutes; reducing the amount of stored energy within the strap when it is stretched; reducing the rebound of the strap and attaching a more detailed warning label to the strap. The warning label should highlight the danger of using damaged or worn straps, the potential of the strap to rebound if the connector is not properly secured and not using the strap to restrain loads on vehicles where the load may move or exert an aerodynamic load onto the strap causing it to loosen during transit (Cubitt, 1998).

It has been suggested that unless the design of the hooks is changed, elastic luggage straps in their current form should be withdrawn from sale (Riddington et al., 1997) and that the ‘octopus’ or ‘spider’ designed elastic strap should not be used under any circumstances (Cruysberg et al., 1995).

See page 6 for a discussion of the physics of elastic strap injury.

Regulation

The sale of products that do not comply with the mandatory Standard is an offence under the Trade Practices Act, 1974. Infringement of the Act may result in fines of up to $200,000 for corporations and $40,000 for individuals (Australian Competition and Consumer Commission, 2000).

The revised Standard amends elastic strap labelling requirements. A regulatory impact statement produced by the Consumer Affairs Division of The Treasury (1999), reviewed the options for the regulation of elastic straps. A new mandatory Standard incorporating constructional and labelling requirements was proposed. The main argument used against this option was that constructional changes to elastic straps would result in the manufacture of a more expensive item. Moreover, redesigning straps to increase safety, for instance by reducing the stretch of the cord, would effectively reduce the strap’s utility. Neither of these changes however, address the large number of straps already in the market (Regulatory Impact Statement, 1999). The options of removing the mandatory Standard or leaving the old Standard in place were dismissed, as they would not contribute to reducing injuries.

The banning or compulsory recall of elastic straps was not considered feasible as it was believed that there was insufficient evidence to suggest that the current design of elastic luggage straps causes injury. This implies that injuries are the result of improper use of elastic straps. Furthermore, it was considered that the number of injuries associated with the use of elastic straps is relatively low and that a total ban of these items is not warranted (Regulatory Impact Statement, 1999). The number of elastic straps imported annually into Australia is unavailable as the ‘import tariff number’ used by the Australian Bureau of Statistics encompasses all ‘other articles of vulcanised rubber except hard rubber’, it is not specific for elastic straps. The ‘Tariff Concession Order’ number which identifies elastic straps is Customs-specific and the number of straps imported under this number is not available to MUARC. Regardless, we believe that the reported injuries caused by these straps are sufficiently severe to justify design and performance regulation.

The argument dismissing the regulation of strap design and performance on the basis of increased manufacturing costs, is questionable. Currently, elastic straps are sold at very low prices. In comparison to the cost of alternatives such as, non-elastic straps with hooks and buckle, which retail for approximately $20 to $30, the current low cost of elastic straps make them an attractive, yet less safe, option for consumers. Mandatory design and performance regulations would be expected to control the importation of cheaply manufactured straps of poor quality and low safety standard.

Recommendations

Design

- Revise the Standard to incorporate design specifications and performance requirements
- Test random batches of straps and reject entire batches not meeting strap design and performance requirements (Cubitt, 1998)
- Devise a method of reducing stored energy within the strap and rebound (Cubitt, 1998)
- Investigate alternate connector devises (e.g. lightweight spring loaded 'snap' hooks or 'D clips' with sprung wire or cloth strap fasteners)
- Test all new designs to meet specification and performance requirements
- Ensure that connector strength exceeds the tension strength of the strap in that the connector should
  - maintain its basic shape
  - not straighten out

Practice

- Ensure that;
  - plastic caps over hook ends are in place
  - there are no signs of metal fatigue of the connectors, for instance cracks or distortion of connector
  - connectors show no signs of rust
  - the strap shows no signs of damage or wear eg. no fraying of the nylon cover, exposed interior structure, broken internal cords

Behaviour

- Do not join straps together (Cubitt, 1998)
- Do not overstretch strap, stretch should not exceed 50% of original strap length (Cubitt, 1998)
- Ensure connectors are in place prior to securing other end
- Do not permit children to play with straps
- Use alternatives eg. rope or non-elastic straps to secure loads which may be subject to aerodynamic lift
- Improve public awareness of alternatives and inform the public of the dangers of elastic straps

Data

- Hospital emergency departments should specifically identify products causing injuries, such as elastic luggage straps, in case narratives
- Data regarding product-specific import figures should be made readily available for injury risk assessment purposes

Proposal

Elastic straps may falsely give the impression that a load has been secured, particularly where, additional forces applied to loads may further stretch the straps. Loads such as lengths of wood or surfboards tied to vehicle roof racks or trailers may obtain aerodynamic lift, placing excessive force on the straps reducing load security when either the straps stretch further or the connectors fail (Cubitt, 1998).

In the majority of cases however, harm is caused from the hook failing and striking the user at high velocity. Hooks, therefore are not a reliable method for securing elastic straps. We propose that alternatives to hook connectors be investigated, eg. using light weight spring loaded 'snap' hooks or 'D clips' as first suggested by Gray et al., (1988) or cloth strap fasteners. Cloth fasteners would greatly decrease the weight of the connectors and the dissipation of forces if connectors strike an object. In addition, as a means of reinforcement and protection from wear caused by friction, we also propose that a sprung wire binding, positioned below the connector and around the cord, be investigated (Figure 3).

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Proposed spring loaded 'snap' hook and sprung wire connector Figure 3

Artwork by author

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The physics of elastic strap injury

*Jerry Moller**

In order to seek solutions to this problem there is a need to consider the factors that influence the way that energy is generated and dissipated. The end of the strap or fastener striking the victim causes the injury. The severity of the injury is influenced by:

- The energy generated by the elasticity of the strap
- The speed of the end of the strap which is a function of the energy generated and the inertia of the strap
- The weight of the end of the strap
- The area of the end or fastener that strikes the victim
- The ability of the part of the body being hit to resist the forces generated.

Two basic equations need to be kept in mind:

1. The total energy of the strap that is released on striking the victim is proportional to: (*the amount of energy stored in the strap, which increases with stretching* x *the weight of the fastener*) less (*the inertia dissipated in the strap + the drag of the air*)
2. The force applied to the victim is proportional to the total energy divided by the area over which the force is dissipated.

Strategies that change these factors might be combined to produce a reduction in elastic strap injury incidence and severity. This suggests several feasible solutions to the problem (Table 1).

Each of the strategies individually offers some benefits. Combining either of the fastening methods with the stretch control mechanism provides a further benefit.

The greatest benefit is achieved by combining a lightweight secure fastener with a large surface area with the stretch limitation mechanism.

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Potential safety strategies for elastic straps **Table 1**

Safety strategy	*Lockable end hook†‡*	*Light weight 50 mm wide cloth strap fastener†*	*Stretch limiting centre cord*
Reduce the likelihood of sudden uncontrolled release due to failure	✓	✓	
Limit the energy stored in the stretched strap by preventing overstretching			✓
Reduce the weight of the fastening mechanism to lower rebound energy		✓	
Increase the area of the fastening mechanism to spread the load on the victim	✓	✓	

NB: † Does not reduce risk related to accidental release by user.
‡ May increase the overall energy load if heavy fastener is used.

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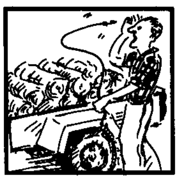
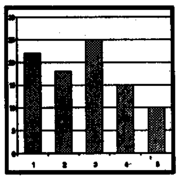
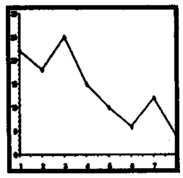


Safety opportunity in new vaporiser unit designs

Karen Ashby, Joan Ozanne-Smith

Vaporiser units are commonly used in the home to treat upper respiratory tract illness in children. There is a lack of evidence, however, regarding the efficacy of inhalants used in vaporisers in the treatment of such illness (Tibballs & James, 1995). There are several vaporiser units, alternatively known as humidifiers, on the market with prices ranging between $29.95 and $49.95 (Australian dollars). Vaporiser units are available for purchase from pharmacies, some of which also hire units on a weekly basis for approximately $10.

Vaporiser units humidify room air by evaporating or atomising water to produce steam that blows over a reservoir of vaporiser solution. Steam is formed when an electrical current is passed between two stainless steel electrodes immersed in water. Vaporiser solutions commonly contain eucalyptus oil, the potential toxicity of which is well documented within a wide range of doses. Ingestion normally requires medical assessment even for relatively small doses (Day et al., 1997). Other potentially toxic vaporiser agents implicated include menthol, camphor and fragrant oils.

From July 1, 2000 Standards Australia will introduce a new mandatory safety Standard for humidifiers, AS/NZS 3350.2.98:98. This Standard supplements or modifies the corresponding clause in AS/NZS 3350.1 Safety of household and similar electrical appliances. The objective of this new Standard is to deal with electrical hazards that may occur during operation of a humidifier.

The Standard addresses the safety of electrical humidifiers for household and similar use with a rated voltage of not more that 250V. In particular, reference is given to the usage of electrodes in water and labelling requirements for units which reach temperatures in excess of 60°C .

While the Standard specifically stipulates electrical requirements, there is little evidence of electrical injuries associated with vaporiser units in the available data. This is not to question the importance of electrical hazards, or their prevention, but to say that the common causes of identified injury, burns and poisoning, are not directly addressed in the Standard. The Standard does require labelling of vaporisers if the temperature of the water or steam exceeds 60°C, with cautions indicating “hot steam” or “hot water”. In addition, the Standard does not, in general, account for children playing with these units despite use in areas where children rest and sleep and where supervision is at a minimum.

Emergency Department Presentation Data

Emergency department (ED) surveillance data has been collected in Victoria since 1989, under two systems, the original Victorian Injury Surveillance System (VISS) and, since October 1995 the Victorian Emergency Minimum Dataset (VEMD). Injuries directly associated with vaporiser units have been identified in both.

Original VISS

From 1989 to 1993 a cluster of ED’s reported 21 injuries associated with vaporiser units as part of the original VISS database. Eighty-one percent of VISS cases were children aged 2 years or less and more than two-thirds occurred in the child’s own home sleeping/living area. Most injuries (57%) resulted from ingestion of vaporiser fluid or residue from the vaporiser unit, 19% scalds from hot fluid, 14% were steam burns and the remaining 10% contact burns from touching a hot unit. The admission rate for VISS cases was 43%.

VEMD

A further 15 cases of injury associated with vaporiser units have been identified in the less detailed VEMD data collection from 25 public hospital ED’s in the 4 years 1996 to 1999. The VEMD relies upon a good descriptive text narrative for case identification purposes. At present, text narratives are poorly completed, hence this figure probably represents an underestimate of the true frequency.

As in the VISS data, children aged 2 or younger were over-represented in VEMD injuries associated with vaporiser units. Fifty-three percent of injuries were burns; mostly scalds from hot fluids and steam burns. Ingestions of vaporiser fluid from the unit were again notable accounting for 47% of VEMD vaporiser cases. The admission rate was 20% for VEMD vaporiser cases.

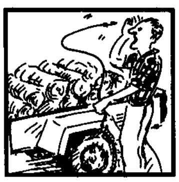
MUARC phone survey

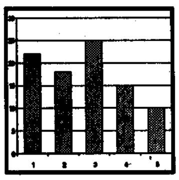
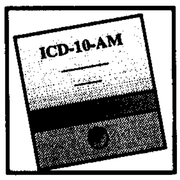
Day et al. (1997) interviewed the parents of 109 young children who ingested eucalyptus oil, reporting to either the Victorian Poisons Information Centre or presenting to a participating hospital in the original VISS collection. Results of the phone survey indicated that three-quarters of ingestions were accessed directly from the vaporiser unit. The vaporiser had most often been used on the previous night, but was not in use at the time of the incident (68%). Frequently the unit was in the bedroom of the child or family member (60%) and was accessed at floor level (75%; Day et al., 1997).

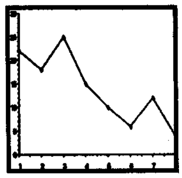
Discussion

Data on injuries associated with vaporiser units indicate that ingestions and burns are the most common causes of injury, with children aged 2 years or younger over-represented in the data. Children most often access units left on the floor in the room of use, usually a bedroom, and for ingestions, access the fluid directly from the well of the vaporiser unit. In their study of eucalyptus oil, Day et al. (1997) found that events involving vaporiser units were less severe than ingestions directly from a bottled source. Minor depression of conscious state could be anticipated after ingestion of 2-3mls (Tibballs, 1995).

Potential design solutions, to reduce the incidence of ingestion and scald injuries, were identified at a Monash University



Accident Research Centre (MUARC) consultative workshop. Placement of a physical barrier over the vaporiser well was proposed to prevent access to fluids, hence reducing the opportunity for ingestions or scalds. A potential barrier to this design change concerned the possibility that the covering of the well would cause condensation and may result in an electrical hazard.

The new mandatory requirements have prompted at least one manufacturer of vaporiser units to investigate design changes to current units. Another manufacturer is marketing a newly designed electric 'waterless vaporiser'. Using concepts of "heat activation" and "aromatherapy" these units do not have a well for fluid but use stick like pads infused with a blend of menthol and eucalyptus oils. Pads are slotted and secured into the units and heated air blows onto the pad to release aromatic vapours. These units are one-third of the size of traditional units thus allowing safer placement of the unit within the home. The absence of heated water would appear to reduce the opportunity for burn injuries. Further evaluation of the safety of such units is required.

Given the apparent willingness of at least one manufacturer to consider design changes it seems opportunistic to pursue an adequate design solution which will eliminate reported injuries to young children from all of the major mechanisms.

Recommendations

- Investigate electrically safe design solutions to cover vaporiser wells
- Evaluate new designs of waterless vaporiser units for safety
- Remove units from children's sleeping areas immediately after use
- Emergency departments recording surveillance data should record detailed narratives that will allow for accurate identification of products associated with injury
- Apply ISO/IEC Guide 50: "Safety aspects – Guidelines for child safety" to all reviews and revisions of standards to ensure that all hazards to children are addressed

Acknowledgments

Prof. Jim Tibballs, Deputy Director ICU, Royal Children's Hospital Melbourne and Dr Lesley Day, Senior Research Fellow, Monash University Accident Research Centre for valuable editorial comment and Mrs Wendy Adams, Brian Davies Pharmacy, Blackburn South for background information.

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Database descriptions

- ***Victorian Emergency Minimum Dataset (VEMD)***

The electronic VEMD database records details of injuries treated at the emergency departments of 25 major public hospitals, 23 of which cover a general adult community (see page 15). The total number of cases on the database to May 2000 was approximately 792,500. For most hospitals the period 1996-99 is covered. The injury variables collected include injury cause, location, activity, nature of main injury, body region, human intent and a narrative describing the injury event. VEMD hospitals represent approximately 80% of statewide emergency department presentations. The data provided to MUARC does not include all ED presentations, only injury specific cases. Hence it is not possible to analyse any VEMD data which may have been re-categorised to a non-injury grouping. A MUARC study found that the VEMD captured only 82% of possible VEMD presentations. Products or activities receive idenitifcation from the narrative. A survey of 4 sites found descriptive narratives complete and useful in only 14.1% of narratives (Ozanne-Smith, Ashby, Stathakis and Chesterman, 1999).

- ***Original VISS database (VISS)***

The original VISS database collected detailed injury data from the emergency departments of 7 campuses of 5 Victorian public hospitals between 1988 & 1996. Data is based on information provided by the injured person (or proxy) and the attending doctor. Collection periods were as follows: Royal Children's Hospital 1988-1993; Western Hospital and the former Preston and Northcote Community Hospital 1989-1993; Royal Melbourne Hospital March 1992 to February 1994; and Latrobe Regional Hospital July 1991 to June 1996.

From ICD to ICD-10-Am: A Brief Overview of the Classification of Diseases, Injuries and Related Health Problems

Voula Stathakis[1]

Introduction

The International Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM) was implemented by NSW, ACT, NT and Victorian hospitals on 1st July 1998, followed by the hospitals in the remaining states on the 1st July 1999 thus replacing ICD-9-CM. Notably ICD-10-AM differs greatly from ICD-9-CM and for that matter, all other previous versions of ICD in that the coding method has changed from a numeric to an alphanumeric system (World Health Organisation (WHO), 1993).

This article describes the inception and development of ICD to its present form, ICD-10, with particular reference to ICD-10-AM and its classification of injuries, poisoning and external cause codes. World Health Organisation (WHO) ICD codes for the classification of external causes of injury and poisoning (E-codes) are the most commonly used coding system for classifying health data regarding injury and poisoning throughout the world (WHO, 1977).

Definitions

Disease classification is qualified by WHO as,

"A classification of diseases may be defined as a system of categories to which morbid entities are assigned according to established criteria. The purpose of the ICD is to permit the systematic recording, analysis, interpretation and comparison of mortality and morbidity data collected in different countries or areas at different times. ICD is used to translate diagnoses of diseases and other health problems from words into an alphanumeric code, which permits easy storage, retrieval and analysis of the data." (WHO, 1993: p2)

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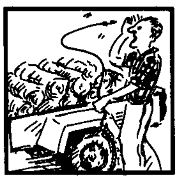
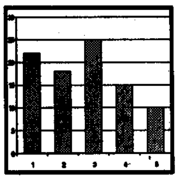
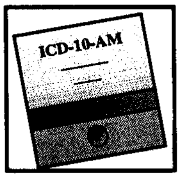
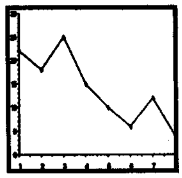




ICD has earned the reputation of being the international standard diagnostic classification for numerous health information management systems and general epidemiological purposes (WHO, 1993).

Early History

The statistical classification of disease and other health related problems dates back to the eighteenth century where it originated as the Bertillon Classification of Causes of Death and then renamed the International List of Causes of Deaths, adopted in 1893 by the International Statistical Institute (WHO, 1977). In 1899 the Institute also decided to revise the classification at 10-year intervals. The ICD is known as a variable-axis classification and its basic structure was originally proposed by William Farr (WHO, 1993) who suggested that statistical data on diseases should be grouped by:

- epidemic diseases
- constitutional or general diseases
- local diseases arranged by site
- developmental diseases
- injuries

The basic structure of ICD involves a numerical coding system of three-character categories, each of which can be further divided into up to ten four-character subcategories (WHO, 1993).

Although originally designed for mortality statistics, its scope was extended to include classifications relating to morbidity at the Sixth Revision Conference in 1948 (WHO, 1977). This was in response to several requests from public health administrators, health care managers, social security authorities and researchers from various health fields for a classification system to accommodate the coding of morbidity data as well as mortality data.

The Seventh and Eighth Revisions saw several changes and corrections, however, the basic structure of the classification remained unchanged (WHO, 1993). The Ninth Revision of ICD incorporated significant changes while, once again, maintaining the basic structure of coding. Fourth character subdivisions were expanded to accommodate the extra detail requested by ICD users (WHO, 1993). ICD-9-CM is a US clinical modification of the WHO's ICD-9 which was deemed necessary for classifying specific details concerning morbidity data and other health statistics regarding the patient's medical care (NCHS, 1979).

Some time before the Ninth Revision Conference took place, WHO began making plans in September 1983 for a complete overhaul of the current structure of ICD (WHO, 1992). Changes were also made regarding the accustomed 10-year interval between revisions as they were considered too brief a period to allow adequate evaluation and consultation with collaborating countries and organisations (WHO, 1993). In the meantime, the WHO Collaborating Centres for Classification of Diseases were asked to develop alternative classification structures for the upcoming Tenth Revision of ICD.

ICD-10

Development

Development of the Tenth Revision of the ICD led to the introduction of a new coding system consisting of 4-character alphanumeric codes with a letter in the first position and numbers in the second, third and fourth positions thus replacing the previous system of purely numeric codes. The fourth character is preceded by a decimal point and the codes range from A00.0 to Z99.9 The letter U has deliberately been left vacant to accommodate future additions or changes and for interim classifications needed to account for any difficulties encountered between revisions (WHO, 1992 & 1993). The Australian modification goes one step further in that a fifth character is added to the code to provide further detail.

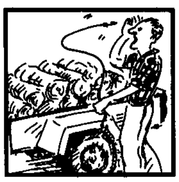
It is believed that this new way of classifying data allows for greater scope in coding and provides opportunities for future modifications without adversely affecting the numbering system as was the case with previous ICD versions (WHO, 1992). Although it was originally suggested that an alternative coding structure was required, the traditional single-code method was retained. Although several other models were evaluated, however, it was decided that these were not appropriate and not likely to be accepted by the majority of users (WHO, 1992).

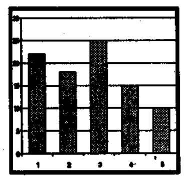
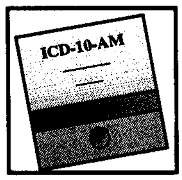
The ICD-10 classification is divided into 21 chapters with each chapter representing the first letter of the code, except for the letters D and H, which are used in more than one chapter. Four chapters, namely Chapters I, II, XIX and XX represent more than one letter in each chapter (WHO, 1993). According to WHO, there are currently enough 3-character categories in each chapter to encompass all necessary information while still allowing for future changes and inclusions as not all available codes are used (WHO, 1993).

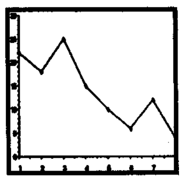
Basically, Chapters I to XVII describe diseases and other morbid conditions, and Chapter XIX represents injuries, poisoning and other consequences of external causes. Subsequent chapters cover other information regarding the diagnosis, such as Chapter XX, External causes of morbidity and mortality. These codes traditionally accompany injuries and poisoning and now also include external causes of diseases and other morbid conditions (WHO, 1993).

The major changes to ICD-9 to form ICD-10 include (NCCH, 1998):

- change of title
- alphanumeric coding scheme
- four new chapters
- relocation of diseases and conditions
- dagger and asterisk convention
- 'sequelae' rather than 'late effects'
- change of axis for land transport accidents
- change of axis for injuries
- new fifth characters for activity at time of injury



ICD-10-AM

Development

The International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM) was developed to replace the second edition of the Official National Coding Centre (NCC) Australian Version of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM); (NCCH, 1998).

The Australian Modification of ICD-10 as well as Australian Coding Standards for the coding of clinical data, were developed by the National Centre for Classification in Health (NCCH) under the guidance of the NCCH Coding Standards Advisory Committee and the Clinical Coding and Classification Groups. It is largely an adaptation of the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10), published by WHO and is completely comparable which is an imperative feature, as cause-of-death coding in Australia is based on ICD-10 rather than ICD-10-AM coding (NCCH, 1998). Cause-of-death coding is conducted by the Australian Bureau of Statistics (ABS) and it is most likely to adopt the WHO version of ICD-10 due to its obligation to provide mortality data to WHO (Roberts et al., 1998).

In a meeting in late 1995, the Australian Health Ministers' Advisory Council (AHMAC) approved ICD-10-AM along with a new Australian classification of procedures, based on the Medicare Benefits Schedule - Extended (MBS-E), as the Australian standard for morbidity coding in health services, effective from 1 July 1998 (NCCH, 1998). WHO ICD-10 did not produce a set of procedure classifications and so it was necessary for Australia to develop its own system based on MBS-E (Kearsey, 2000). Since 1968, most Australian hospitals and health services have been using ICD coding to classify diagnoses and procedures (Roberts et al., 1998). The requirement for an Australian standard for morbidity coding in health services stems from Casemix funding which necessitates reliable and valid coding of health data (Roberts et al, 1998).

Implementation

A Dual Coding Study, funded by the Commonwealth Department of Health and Family Services (DHFS) and analysed by Coopers & Lybrand Consultants (1997) was conducted to confirm the date of implementation of ICD-10-AM as 1 July 1998 (NCCH, 1997). The study had 3 objectives:
1. To assess the impact on resource levels by quantifying the time taken to code in ICD-9-CM and ICD-10-AM
2. Assess concordance between ICD-9-CM and ICD-10-AM

3. Provide an indication of the wider impact of the change in classification.
The study concluded that, overall, ICD-10-AM should proceed with the proposed implementation date of July 1998 which was not in accordance with the intentions of some states and territories (NCCH, 1998a). The Commonwealth Department of Health and Family Services then recommended that national implementation of ICD-10-AM be deferred to July 1999 while recognising that some states and territories (NSW, Victoria, ACT & NT) would go ahead with the earlier date of July 1998. This difference in the dates of implementation is problematic in that it affects the uniformity of national data sets (NCCH, 1998a).

Injury & External Cause Codes

ICD-10-AM Chapter XIX represents injury, poisoning and certain other consequences of external causes namely codes S00 to T98 (NCCH, 1998; Table 1). The 'S' section is used to code different types of injuries pertaining to single body regions while the 'T' section is used to represent injuries to multiple or unspecified body regions. The 'T' section also covers poisoning and certain other consequences of external causes (NCCH, 1998). The difference between ICD-9-CM injury coding and ICD-10-AM injury coding is the change from coding injuries initially by type or nature of injury and then by body region to a structure based firstly on body region and then further broken down by type of injury.

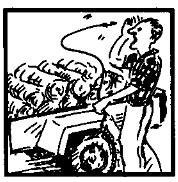
External causes of morbidity and mortality are described in Chapter XX of ICD-10-AM and range in value from V01 to Y98 (NCCH, 1998; Table 1). This chapter, the largest in ICD-10-AM, classifies environmental events and circumstances as the cause of injury, poisoning and other adverse effects. Late effects or 'sequelae' of external causes of morbidity and mortality are represented by Y85 to Y89 (NCCH, 1998).

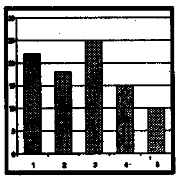
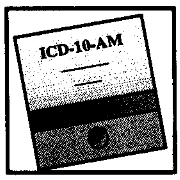
In ICD-10-AM the place of occurrence of the external cause is given by the fourth-character of the external cause code and is only used with codes W00 to Y34, excluding Y06.x and Y07.x, V00 to V99 (Transport accidents) & Y35 to Y98, largely made up of medical injuries and adverse effects; (NCCH, 1998). In ICD-9-CM the location of the injury event was represented by the fifth character of the E-code and was used for all categories. Table 2 highlights the significant changes in definitions of various places of occurrence codes for ICD-10-AM and ICD-9-CM. The codes in Table 2 are not listed in an equivalent order as codes and labels have been changed, i.e., in ICD-9-CM farm location was represented by '1', however, in ICD-10-AM it is represented by '7'. This lack of equivalence between location codes

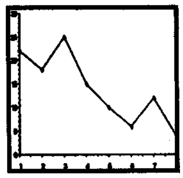
ICD-10-AM & ICD-9-CM Injury & External Cause Codes Table 1

ICD-10-AM	ICD-9-CM
Injury, poisoning and certain other consequences of external causes:	
S00 – T98	**800 – 999**
External causes of morbidity and mortality:	
V01 – Y98	**E800 – E999**

Source: (NCCH 1998, NCHS 1979)



presents some difficulty when comparisons are made with previous years of ICD-9-CM coded data. Further complications are observed with the re-defining of some categories such as *residential institutions*. ICD-9-CM included hospitals in the *residential institution* category whereas ICD-10-AM does not as it is now listed under the *Schools & other institutions* category.

The 5th character of the ICD-10-AM external cause code is used to represent the activity of the injured person at the time of the injury event and is used with codes V01-Y34 (NCCH, 1998). Table 3 lists 7 activity codes & their descriptions.

Alternative external cause classification: International Classification of External Causes of Injuries (ICECI)

The World Health Organisation Working Group for Injury Surveillance Methodology Development and its Technical Group have produced a draft International Classification of External Causes of Injuries (ICECI). ICECI is described as a multi-axial code set which is pertinent to injury research and prevention data needs (NCCH, 1998b). Further drafts of ICECI have been updated and released since the initial May 1998 version. The June 1999 draft is currently being tested and it is hoped that the results will lead to further revision and development (RCIS, 1999a). ICECI was developed as a response to the inadequacies and limits of ICD external cause codes (E codes; RCIS, 1999b). The heads of WHO Collaborating Centres have shown interest in further developing ICECI and perhaps considering replacing the ICD External Cause Code structure with a refined version of ICECI (RCIS, 1999b).

Critique of ICD-10 and ICD-10-AM

It is beyond the scope of this article to systematically critique each change in ICD-10-AM injury and external cause coding. Instead, issues raised by users and injury researchers will be presented:

• Sports activity in ICD-10-AM is not afforded the same level of detail it briefly had in ICD-9-CM (E889.x). The NCCH has made recommendations to the National Health Data Committee of the need to address this issue (NCCH, 1998b). Information describing the type of sports activity is vital for use in injury research and prevention. These recommendations have been addressed as the activity code relating to sport in the 2nd edition of ICD-10-AM has been revised and now includes a 4th character subdivision for several different sports (NCCH, 2000a).

Langley and Chalmers (1999) addressed several issues concerning ICD-10-AM prior to its implementation in New Zealand and found the following:

• ICD-10-AM continues to use a single-code to represent two axes of cause, namely mechanism and intent. Combining intent with mechanism disguises the significance of some mechanisms of injury, regardless of intent. The authors believe that this can be rectified by adopting separate codes for mechanism and intent of injury.

• Another issue concerns the use of the outdated term 'accident' to describe unintentional causes of injury.

• Transport related injury codes in ICD-10-AM have been reversed in comparison to ICD-9-CM in that the external cause code describes the road-user and crash type at the 3-character level and the fourth character represents victim type and traffic or non-traffic event. Langley and Chalmers argue that this, although an improvement on ICD-9-CM, "is an inefficient way of coding transport crashes" because it involves too many codes, some of which are open to misinterpretation. The authors suggest a 3-level modular framing

ICD-10-AM & ICD-9-CM Non-equivalent place of occurrence codes **Table 2**

Code	ICD-10-AM* Label	ICD-9-CM Label
0	Home	Home
1	Residential institutions (excl. hospitals)	Farm
2	School, other institution & public administrative area (inc. hospitals)	Mine and quarry
3	Sports and athletics areas	Industrial place and premises
4	Street and highway*	Place for recreation and sport
5	Trade and service area	Street and highway
6	Industrial & construction areas (incl. mines & quarries)	Public building (inc. school, trade & service areas, excl. hospitals)
7	Farm	Residential institution (inc. hospitals)
8	Other specified places	Other specified places
9	Unspecified place	Unspecified place

** ICD-10-AM external cause codes V01-V99 (Transport) do not require a place code, as do Y06 and Y07 and Y35 to Y98.*
(Source: NCCH 1998 & NCHS 1979)

ICD-10-AM Activity Code **Table 3**

Code	Description
0	While engaged in sports activity
1	While engaged in leisure activity
2	While working for income
3	While engaged in other types of work
4	While resting, sleeping, eating or engaging in other vital activities
8	While engaged in other specified activities
9	During unspecified activity

Source: (NCCH, 1998)

system representing the type of road user, traffic or non-traffic crash and the type of crash.

• The opportunity to increase and separate various causes of falls has not been taken up significantly by ICD-10-AM.

• Loss of specificity regarding type of firearm is seen in ICD-10-AM, however, this issue has been addressed in the second edition (table 4).

• Near drowning and submersions in ICD-9-CM were not restricted to a particular E-code group as they could also be found under water transport E-codes. ICD-10-AM, unfortunately uses the same approach. Also with regard to near drowning and submersions the emphasis is now on body of water type, rather than activity. Activities such as swimming, diving and water skiing, which had their own E-code in ICD-9-CM, have now been re-coded in ICD-10-AM according to body of water type thus losing this important information regarding the circumstances surrounding the injury event.

• Codes for intentional injury are still insufficient in comparison to transport injuries that allow for greater detail.

• The authors conclude that ICD-10-AM does represent a significant improvement over ICD-9-CM in several areas, however, it still does not meet essential injury prevention and research needs. Alternative injury and external cause coding systems need to be developed and adopted.

ICD-10-AM, 2nd edition

ICD-10-AM, 2nd edition will be effective from 1 July 2000. In November of 1998, a public submission process provided users with an opportunity to submit proposals for changes and modifications to ICD-10-AM. Some were supported and included in the second edition including changes to External Cause Codes to introduce new codes relating to firearms and improved codes for sporting injuries (NCCH, 2000). Some of these changes are quite substantial while others clarify previous codes' ambiguities (Table 4). The Year 2000 public submission process took place in February 2000 and subsequent submissions are planned for February each year hereon. The NCCH plans to revise ICD-10-AM every second year with the 3rd edition expected to take effect from 1st July 2002, based on recommendations from various ICD-10-AM users provided during the annual public submission process (Kearsey, 2000). However, it should be noted that the NCCH is constrained by WHO ICD-10 to maintain international consistency and therefore is limited in the amount or type of changes it can make to ICD-10-AM (Kearsey, 2000). Further information regarding these submissions can be obtained from the NCCH website (http://www.cchs.usyd.edu.au/ncch/).

Conclusion

The greatest advantage of using a statistical classification with a hierarchical structure to code diseases and injuries is that it allows for different levels of detail by way of its subdivisions (WHO, 1993). This type of classification allows for identification of specific diseases and injuries while also allowing for presentation of the data in broader groups (WHO, 1993).

According to the World Health Organisation, *"the ICD has developed as a practical, rather than a purely theoretical classification, in which there are a number of compromises between classification based on aetiology, anatomical site, circumstances of onset, etc. There have also been adjustments to meet the variety of statistical applications for which the ICD is designed, such as mortality, morbidity, social security and other types of health statistics and surveys."* (WHO, 1993: p12). This is contrary to the experience of several injury researchers upon examination of the Tenth Revision of ICD. Perhaps upcoming editions will attempt to address the above-mentioned shortcomings or alternative injury and external cause classifications systems will have to be developed.

Acknowledgments

Irene Kearsey and Shannon Watts, Health Information Management Advisors, Health Data Standards & Systems Unit, Acute Health Division, Department of Human Services, Victoria for valuable editorial comment.

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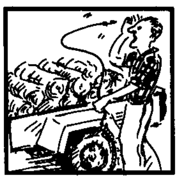
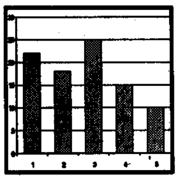
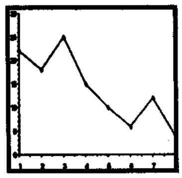


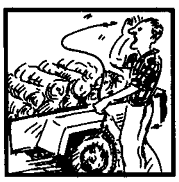



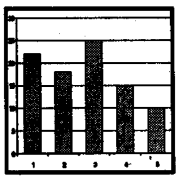
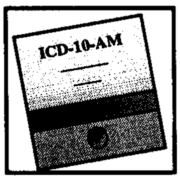



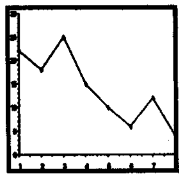
ICD-10-AM, 2nd edition revisions **Table 4**

Code	*Action*
Place of occurrence code	▪ Completely revised ▪ 4th character structure replaced with new 3-character alphanumeric codes (Y92.0 – Y92.9) and relocated to section entitled *"Supplementary factors related to causes of morbidity and mortality classified elsewhere (Y90-Y98)"*. ▪ New codes are to be used with categories V01-Y89. ▪ 5th character for Schools & other institutions category (Y92.2x) distinguishes between schools (Y92.21), health service areas (Y92.22) and other specified institutions (Y92.29). ▪ All other codes categorised in the same way as the 1st edition. However, greater scope with 4-characters for extra detail. Also, these codes are required for all External Cause Codes unlike the previous edition, where transport, medical misadventures and adverse effects were exempt.
Activity code	▪ Completely revised ▪ 4th character structure replaced with new 3-character alphanumeric codes (Y93.0 – Y93.9) and relocated to section entitled "Supplementary factors related to causes of morbidity and mortality classified elsewhere (Y90-Y98)". ▪ New codes to be used with categories V01-Y34. ▪ Sport activity codes (Y93.0x) further supplemented with 4-character subdivisions to represent different types of sport, i.e. Y93.05 – Basketball. Remaining groupings are the same as previous version.
External Cause Codes W32-W34 (Unintentional firearm related)	▪ Revised codes for unintentional firearm injuries. ▪ W32 – handgun discharge further clarified to include all action types, ie. Air, gas, powder and spring. Sawn-off rifles and shotguns also added to this category. ▪ Code W33 removed and W34 expanded to 4-th character level to distinguish between different types of firearms other than handguns such as air rifles (W34.1), shotguns (W34.2), small calibre (≤.22) rifles (W34.3), large calibre (>.22) rifles (W34.4) and other non-specific types (W34.9).
External Cause Codes X23 (Contact with hornets, wasps & bees)	▪ Code expanded to distinguish between contact with hornets (X23.1), wasps (X23.2) and bees (X23.3) and unspecified (X23.9).
External Cause Codes X72-X74 (Intentional self-harm, firearm related)	▪ Revised codes for intentional self-harm firearm injuries. ▪ X72 – intentional self-harm by handgun discharge further clarified to include all action types, ie. Air, gas, powder and spring. Sawn-off rifles and shotguns also added to this category. ▪ Code X73 removed and X74 expanded to 4-th character level to distinguish between different types of firearms other than handguns such as air rifles (X74.1), shotguns (X74.2), small calibre (≤.22) rifles (X74.3), large calibre (>.22) rifles (X74.4) and other non-specific types (X74.9).
External Cause Codes X93-X95 (Assault, firearm related)	▪ Revised codes for assaultive firearm injuries. ▪ X93 – assault by handgun discharge further clarified to include all action types, ie. Air, gas, powder and spring. Sawn-off rifles and shotguns also added to this category. ▪ Code X94 removed and X95 expanded to 4-th character level to distinguish between different types of firearms other than handguns such as air rifles (X95.1), shotguns (X95.2), small calibre (≤.22) rifles (X95.3), large calibre (>.22) rifles (X95.4) and other non-specific types (X95.9).
External Cause Codes Y22-Y24 (Undetermined intent, firearm related)	▪ Revised codes for undetermined intent firearm injuries. ▪ Y22 – injury of undetermined intent by handgun discharge further clarified to include all action types, ie. Air, gas, powder and spring. Sawn-off rifles and shotguns also added to this category. ▪ Code Y23 removed and Y24 expanded to 4-th character level to distinguish between different types of firearms other than handguns such as air rifles (Y24.1), shotguns (Y24.2), small calibre (≤.22) rifles (Y24.3), large calibre (>.22) rifles (Y24.4) and other non-specific types (Y24.9).
External Cause Codes Y35.0x (Legal intervention, firearm related)	▪ Revised codes for legal intervention firearm injuries. ▪ Y35.01 – injury involving legal intervention by handgun discharge further clarified to include all action types, i.e. Air, gas, powder and spring. Sawn-off rifles and shotguns also added to this category. ▪ Y35 expanded to 5-th character level to distinguish between different types of firearms other than handguns such as air rifles (Y35.02), shotguns (Y35.03), small calibre (≤.22) rifles (Y35.04), large calibre (>.22) rifles (Y35.05) and other non-specific types (Y35.09).

Source: (NCCH, 2000a)



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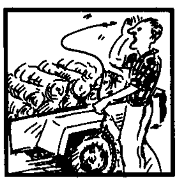
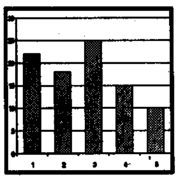
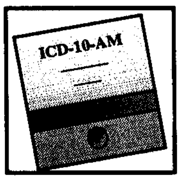
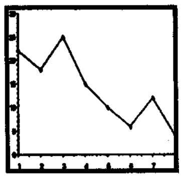
* Special edition



General Acknowledgements

Participating Hospitals

From October 1995
Austin & Repatriation Medical Centre
Ballarat Base Hospital
The Bendigo Hospital Campus
Box Hill Hospital
Echuca Base Hospital
The Geelong Hospital
Goulburn Valley Base Hospital
Maroondah Hospital
Mildura Base Hospital
The Northern Hospital
Royal Children's Hospital
St Vincents Public Hospital
Wangaratta Base Hospital
Warrnambool & District Base Hospital
Western Hospital
Williamstown Hospital
Wimmera Base Hospital

From November 1995
Dandenong Hospital

From December 1995
Royal Victorian Eye & Ear Hospital
Frankston Hospital

From January 1996
Latrobe Regional Hospital

From July 1996
Alfred Hospital
Monash Medical Centre

From September 1996
Angliss Hospital

From January 1997
Royal Melbourne Hospital

Coronial Services

Access to coronial data and links with the development of the Coronial's Services statistical databse are valued by VISS.

National Injury Surveillance Unit

The advice and technical back-up provided by NISU is of fundamental importance to VISS.

How to Access VISS Data:

VISS collects and tabulates information on injury problems in order to lead to the development of prevention strategies and their implementation. VISS analyses are publicly available for teaching, research and prevention purposes. Requests for information should be directed to the VISS Co-ordinator or the Director by contacting them at the VISS office.

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Recent issues of *Hazard*, along with other information and publications of the Monash University Accident Research Centre, can be found on our internet home page:

http://www.general.monash.edu.au/muarc

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