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Progress and current issues in child injury prevention

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Introduction

Internationally, paediatricians clearly identified child injury as an issue worthy of attention during the nineteen seventies. In Australia, John Pearn and Leycester Meares argued a case for the development of a specific focus on child injury prevention in Australia. This culminated in government support for the formation of the Child Accident Prevention Foundation (now Kidsafe) in 1979. The focus prompted interest from a new group of professionals, and private enterprise. Very little of the literature available on child injury in Australia was published before 1975.

This bulletin cannot determine if the initiatives commenced since 1979 have caused changes in the rate of child injury in Australia. It does, however, seek to document the major interventions that were put in place from 1979 to 1996 and to detail the trends in child injury patterns over that period. It is apparent that injury patterns among children have changed. The available data are used to consider possible priorities for further work.

Some examples of child injury interventions in Australia

Table 1 provides a brief overview of the range of child injury prevention interventions that occurred during the period. There are many others. Those chosen reflect only the actions that occurred at State or national level which are well documented. There has been no attempt to be comprehensive, nor to include the myriad of regional and local interventions.

Trends in child injury death

Overview

For the purpose of this bulletin, child injury deaths are defined as all external cause deaths excluding medical misadventure to persons aged under 15 years. All accidents, poisoning and violence are therefore included.

Over the period since 1979, the total number of children in each age group has remained relatively constant. Table 2 shows child injury counts and rates by major age group for the period 1979-1994. It can be seen that counts and rates show similar patterns.

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Acknowledgment The authors wish to acknowledge the contribution of Ian Scott, KIDSAFE Australia, who provided historical information and constructive review of earlier drafts.

Australian Injury Prevention Bulletin No 15: Errata

A printing error has resulted in several inaccuracies. The following amendments should be made to ensure the integrity of the information contained in *Bulletin 15*:

Page 2:

First paragraph at end of page, line 2: "(Figure 3)" should read "(Figure 1)".

Page 3, Table 2:

Lines 2 and 16 should read (respectively) as follows:

1980	329	173	212	644	29.06	13.24	16.66
1994	163	75	92	303	12.64	5.86	7.22

Page 4, Table 4:

The last line should read as follows:

All causes excluding medical misadventure	163	12.64	75	5.86	92	7.22

Page 12, Table 7:

Age group 6, line 2, column 1 should read as follows:

2	Drowning	20	18.2

Page 13, Table 7:

Age group 12, line 2, column 1: Delete the word "Poisoning".

Table 1 Selected examples of interventions that illustrate the range and scope of child injury prevention activities 1979-1994.

Issue	Timing	Action
Motor vehicle traffic safety		
Restraints	1960	Seat belt anchorages in cars
	1970	Compulsory wearing of restraints by persons older than 8 years
	1973	Introduction of mandatory Australian Standard for child restraints
	1981	First legislation requiring back seat passenger to use available seat belts or child restraints
	1988	The first State introduced compulsory installation and use of child restraints for children of all ages
Bicycle helmets	1977	Australian bicycle helmet standard developed
	1981	Helmets available
	1982	Major programs in Victoria to promote helmet use
	1990-92	Introduction of mandatory cycle helmet wearing legislation in all States (level of enforcement varied from State to State)
	1994	Compulsory helmet wearing regulations withdrawn for persons older than 17 in the NT
Other Road safety strategies		Improvement in road design including traffic calming and pedestrian protection, black spot analysis and interventions
		Random breath testing and widespread use of speed measuring equipment
		Australian Design rules for motor vehicles
		Promotion of road safety
		Bicycle rider education programs
		Media and education campaigns focussing on a number of road safety issues
Drowning in swimming pools	1970-72	Clear identification of the rate of drowning in domestic swimming pools. A few local governments required separate fencing of the pool
	1976	Some States required fencing of properties with swimming pools
	1983	Australian Standard on swimming pool fencing
	1989	Second wave of concern at continuing problem
	1993-4	States introduce mandatory fencing of all new pools but do not act uniformly on existing pools
	1996	Only Queensland requires fencing of all existing pools
		Victoria requires fencing of all existing pools by July 1997
Choking on toys	1987	Mandatory standard for all products for children under the age of three years to conform to the Australian Toy Standard. All toys with small parts labelled. State authorities check novelty show bags and develop practical guidelines on packaging
Fire deaths	1978	Labelling of children's nightwear to indicate flammability introduced locking in place changes that had occurred since public attention to deaths from this cause were raised in 1972
	1990	Victorian Building Code requires all new and altered residential buildings to install smoke alarms
	1995	Similar regulations in place in most States and Territories
Scalds	1995	New Australian Standard on domestic hot water temperatures in ablution areas. Lead by NSW, this requirement affects all new hot water services. Some States have introduced regulations for all new dwellings
Poisoning	1981	Therapeutic Goods Act used to ensure that pharmaceuticals at higher schedules are packaged in a way that reduces the risk of access to young children. The first list named six products regarded as high risk
	1996	By 1996 the practice of packaging pharmaceuticals, including those not listed, in blister or other forms of child resistant packaging has become widespread

Details supplied by Ian Scott Kidsafe Australia

A clear downward trend can be seen for all age groups (Figure 3). Table 3 shows the percentage reduction in injury counts and rates for each age group and for children as a whole. All age groups show approximately a halving of the death rates and numbers in the period under study. Overall, the number of deaths among children aged under fifteen declined by 51.3 per cent. The decline has been greater than for persons over the age of fifteen.

Table 2 Child injury deaths counts and rates by age group Australia 1979-1994

Count	0-4 yrs	5-9 yrs	10-14 yrs	Total 0-14	0-4 yrs	5-9 yrs	10-14 yrs
					Rate per 100,000		
1979	336	184	180	622	29.42	13.90	14.37
1980	329	173	212	644	29.06	13.2	416.66
1981	261	178	152	535	22.90	14.02	11.55
1982	342	165	207	651	29.60	13.36	15.28
1983	294	142	175	553	25.12	11.74	12.76
1984	252	116	156	481	21.29	9.78	11.43
1985	265	142	140	497	22.09	12.08	10.36
1986	270	123	145	504	22.34	10.43	11:05
1987	254	113	153	464	20.85	9.45	12.02
1988	252	127	144	470	20.49	10.42	11.51
1989	239	109	132	438	19.21	8.79	10.64
1990	238	129	121	441	18.92	10.22	9.80
1991	184	104	107	360	14.47	8.17	8.62
1992	210	104	92	365	16.41	8.13	7.36
1993	218	92	105	372	16.95	7.20	8.32
1994	163	75	92	303	12.64	5.8	67.22

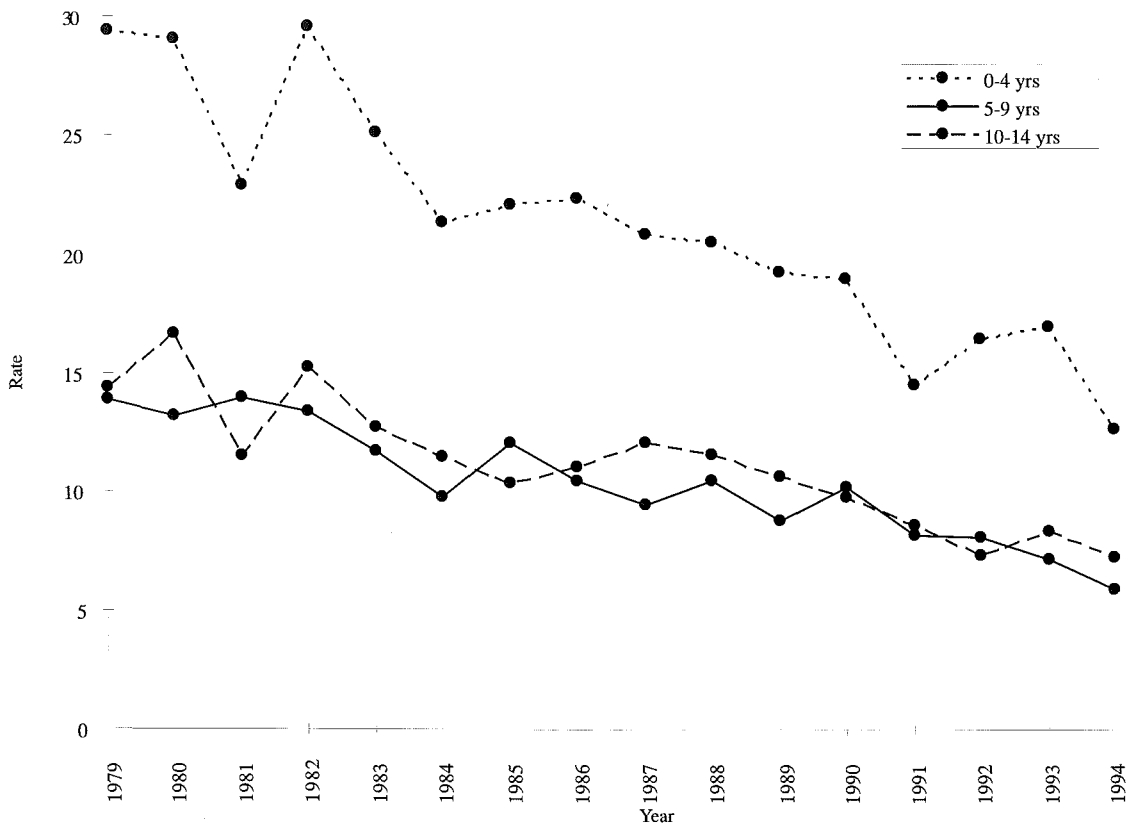

Figure 1: Child injury death rate per 100,000 persons by age group Australia 1979-1994

Table 3 Percentage reduction in child injury deaths by age group Australia 1979-1994

Age group	0-4	5-9	10-14
Reduction in numbers	51.5%	59.2	%48.9%
Reduction in rates	57.0%	57.8%	49.8%

Major causes

It is important to consider whether the improvements are made up of changes to a number of causes or can be attributed to large changes in one or two causes. Table 4 Shows the distribution of major causes of child injury death by age group in 1994.

The total burden of child injury death can be seen to be made up of a range of causes that vary in significance for the different age groups. The trends in these causes for the age groups where they are of particular significance have been plotted in Figure 2 to Figure 6. Once deaths are considered for individual causes, single age groups, and by sex, a lot of variability is experienced because small differences from year to year are large relative to the base. For this reason the figures that follow, chart three year moving average rates per 100,000 persons. They are labelled according to the third year of the series. Thus the period 1979-1981 is labelled as 1981. For the sake of simplicity, counts are used in these figures.

Table 4 Child injury deaths (excluding medical misadventure) Australia 1994 Counts and rates per 100,000 persons by major cause group

	0-4 yrs		5-9 yrs		10-14 yrs	
	count	rate	count	rate	count	rate
Motor vehicle driver	1	.	1	.	1	.
Motor vehicle passenger or unspecified occupant	31	2.40	17	1.33	25	1.96
Motor cycle driver	0	.	0	.	1	.
Motor cycle passenger or unspecified	0	.	0	.	0	.
Pedal cyclist or passenger	0	.	6	0.47	11	0.86
Pedestrian	16	1.20	15	1.17	18	1.41
Animal related	1	.	0	.	0	.
Other transport	0	.	2	.	2	.
Fall	1	.	1	.	3	.
Drowning, incl. pool, quenching tank	35	2.70	5	0.39	0	.
Drowning other	13	1.00	6	0.47	5	0.39
Other threat to breathing	17	1.30	4	0.31	6	0.47
Fire flames smoke	14	1.10	8	0.63	5	0.39
Hot drink food steam etc	0	.	0	.	0	.
Hot object or substance	0	.	0	.	0	.
Poisoning drugs and medicinals	2	.	0	.	3	.
Poisoning other or unspecified substance	2	.	1	.	1	.
Firearms	2	.	3	.	2	.
Cutting, piercing object	7	0.50	1	.	2	.
Strike/struck by object or person	5	0.40	0	.	3	.
Machinery in operation	3	.	2	.	2	.
Electricity	2	.	0	.	2	.
Hot conditions	0	.	0	.	0	.
Cold conditions	0	.	0	.	0	
Other specified external cause	6	0.43	3	0.23	0	
Unspecified external cause	5	0.40	0	.	0	
All causes excluding medical misadventure	**163**	**12.64**	**75**	**5.86**	**9**	**27.22**

Note: Rates are suppressed where number of cases on which they are based is less than 4.
See Data Issues section for definition of major cause groups.

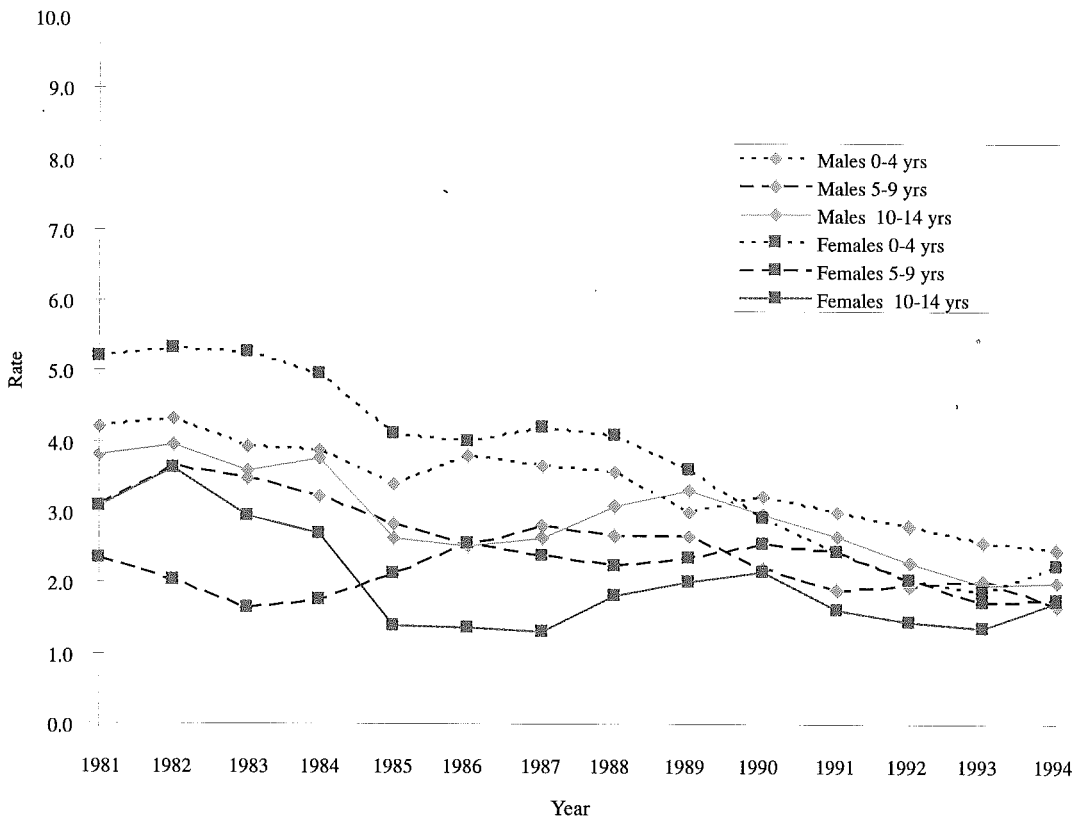

Figure 2 Trends in child motor vehicle occupant deaths by age and sex Australia Three year moving average rate 1979-1994

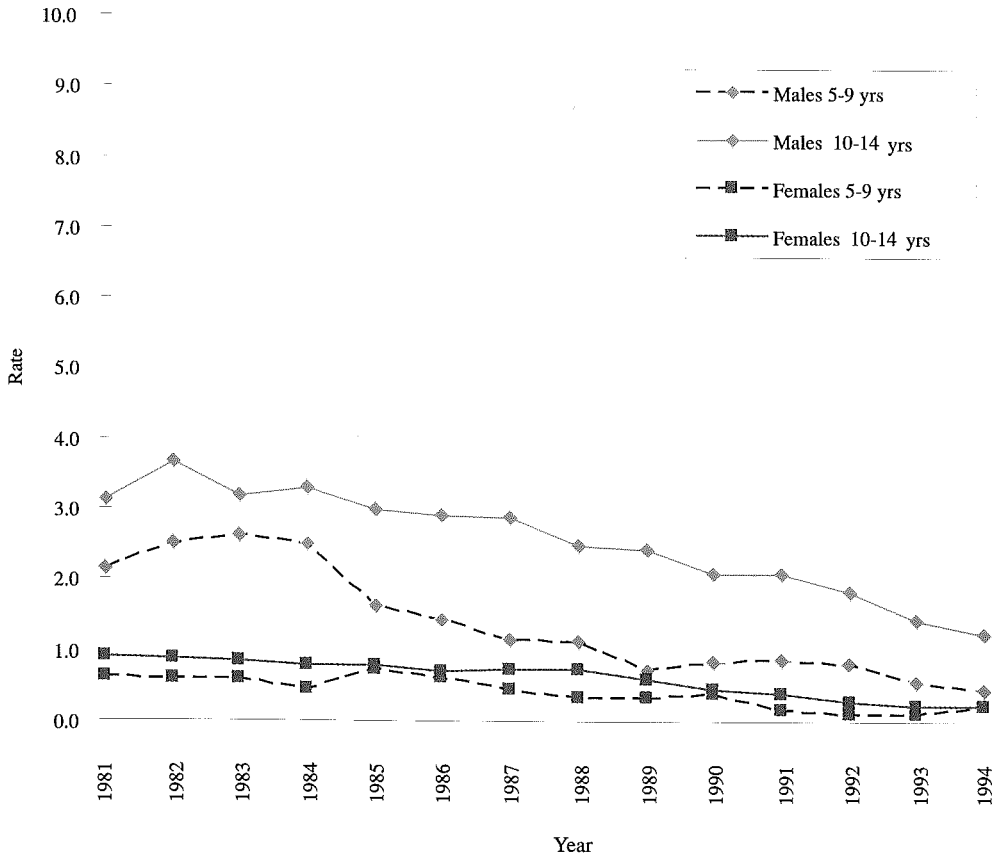

Figure 3 Trends in child pedal cycle deaths by age and sex Australia Three year moving average rate 1979-1994

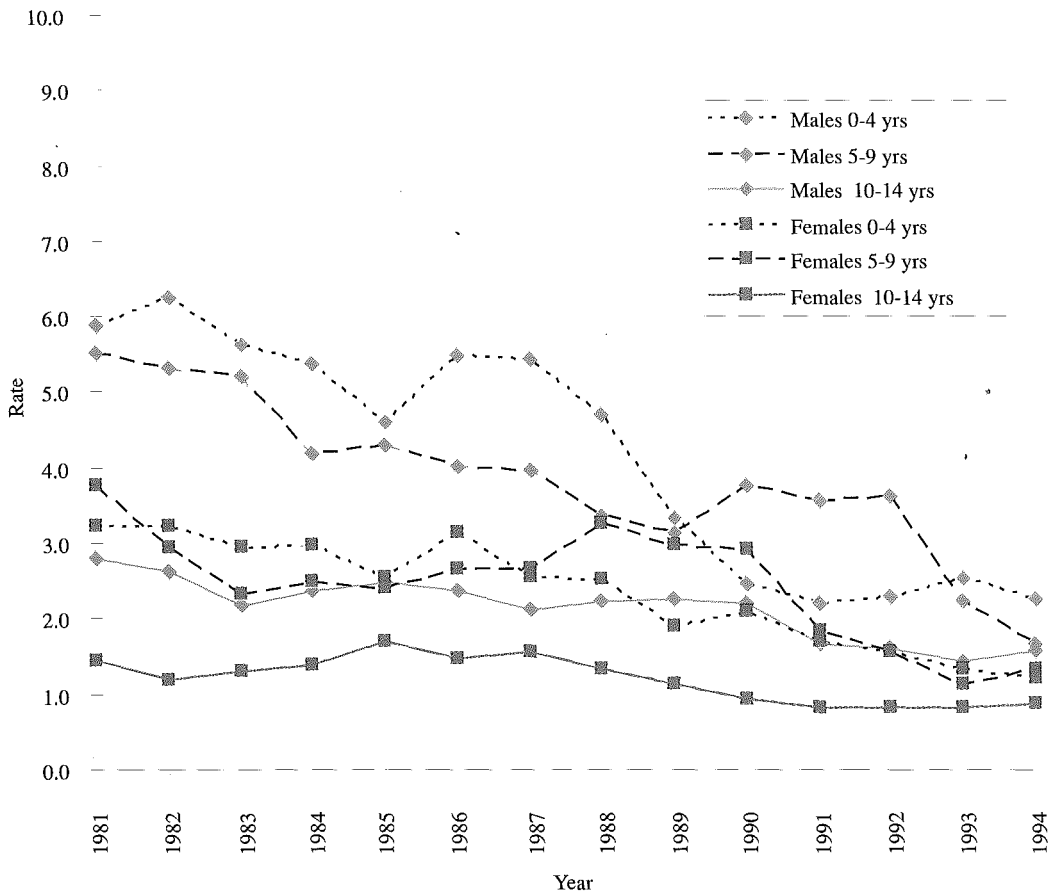

Figure 4 Trends in child pedestrian deaths by age and sex Australia Three year moving average rate 1979-1994

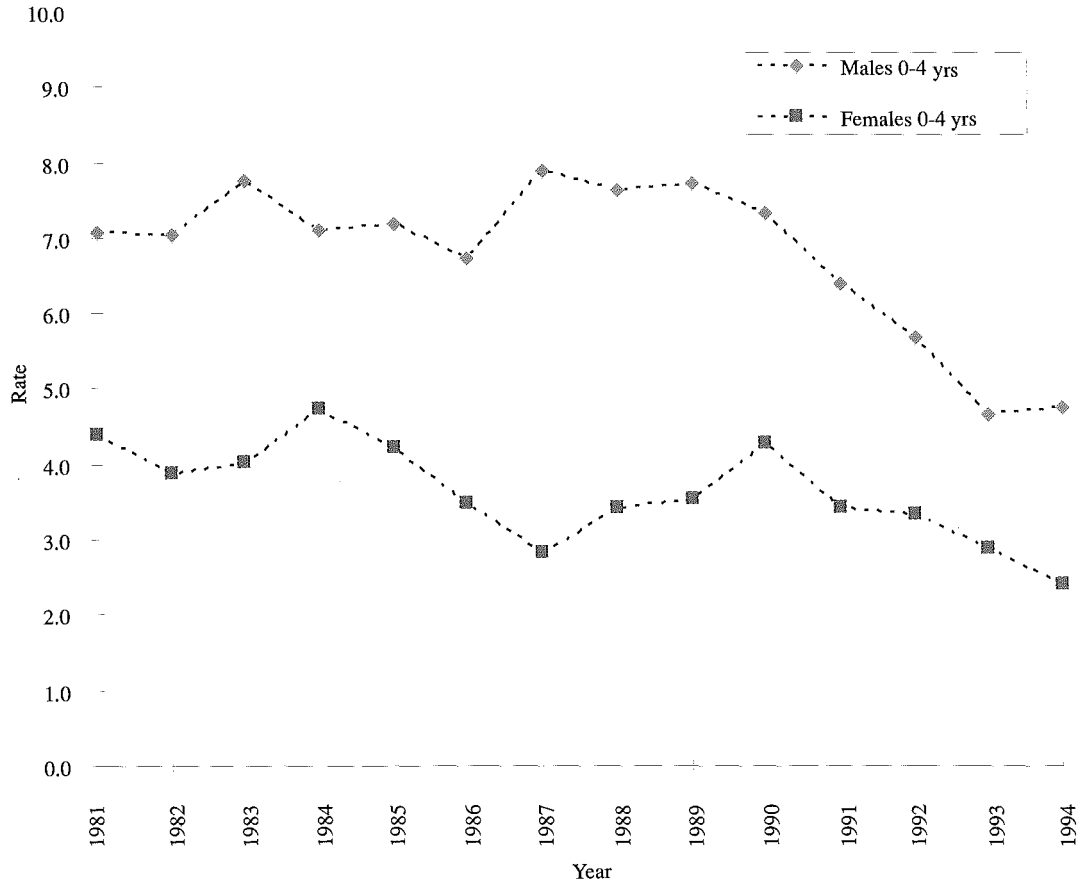

Figure 5 Trends in child drowning deaths by age and sex Australia Three year moving average rate 1979-1994
Note: Includes all drowning. Accurate differentiation of drowning into the two classes as shown in Table ,4 viz (1)Drowning including pool or quenching tank and (2) Other drowning, was shown to be problematic by drowning codes introduced nationally in 1992. The two categories are therefore combined for this time series.

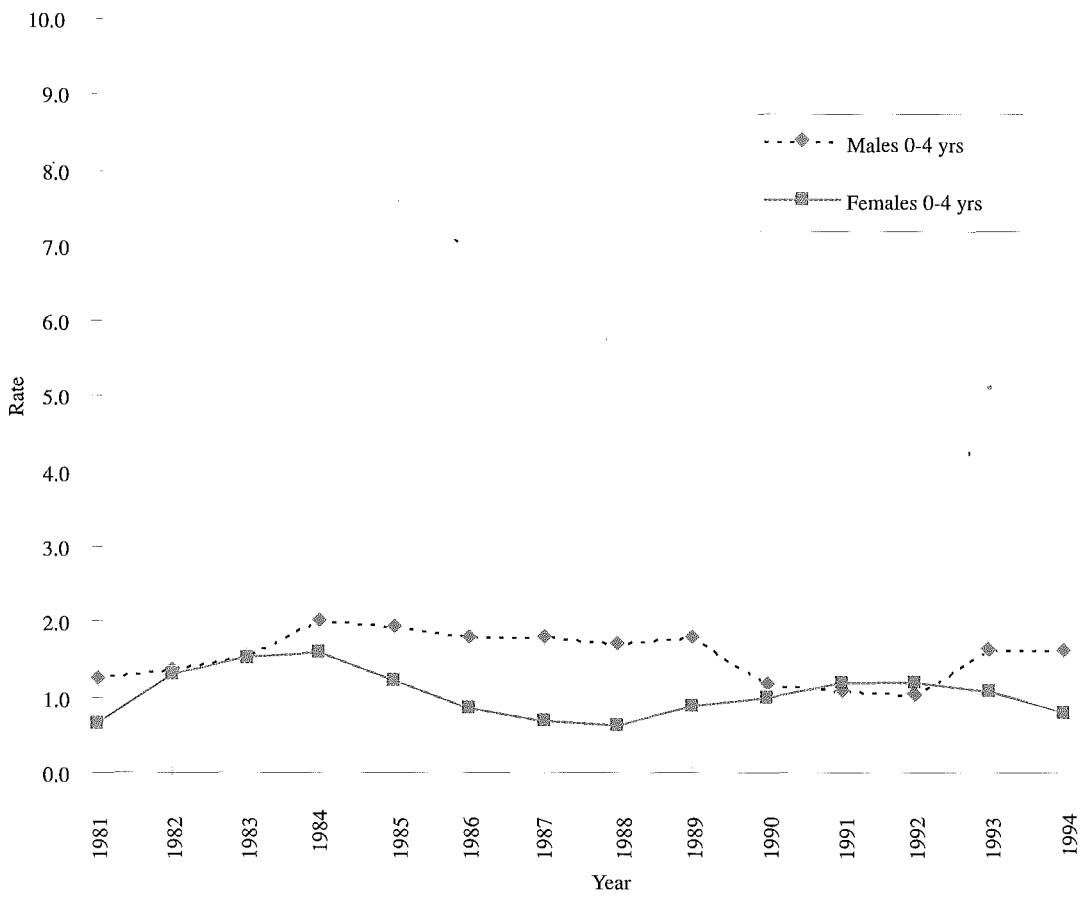

Figure 6 Trends in child fire and flame related deaths by age and sex Australia Three year moving average rate 1979-1994

With the exception of fire and flame, all major cause and age combinations have trended downward over the period. The changes have varied for different age groups and have not been uniform across time. For example, the reduction in drowning deaths among very young children accelerated in the late nineteen eighties, coinciding with the public debate about pool fencing and the introduction of increased safety standards in some States.

The child injury death rate has improved significantly over the sixteen year period presented here. Further reductions may be achievable. It is, therefore, important to consider the current injury pattern. Unfortunately, times series hospitalisation data have not been available. More recently, however, some data have become available and these will be used in conjunction with deaths data to explore patterns of child injury.

Current patterns of child injury

Key ways of thinking about child injury

It is apparent from the patterns of childhood injury that risks change with stages of development. As children grow their abilities and activities change. There is a constant pattern of exposure to hazard associated with new tasks, adaptation to the risk, and the development of risk management and avoidance skills, and the gaining of mastery. Injury patterns, therefore, show rapid rises for specific causes as children enter a period of rapid developmental change (eg learning to walk or becoming an independent cyclist) followed by a plateau at a high level as the cohort at this stage of development learns to manage risk and then a decrease in frequency as either the task becomes routine and well managed or the exposure to risk passes with development.

This suggests that injury data should be looked at, not only in terms of broad age groups, but also in narrow ranges that reveal these developmental patterns. There are clear differences between the injury patterns of males and females. These emerge as early as the first year of life, and are accentuated during late childhood with a rapid increase in risk emerging for both sexes at adolescence. These gender differences cannot be considered in detail here but are worthy of further exploration.

Broad Patterns

The broad patterns of child injury as indicated by deaths were presented in Table 4. Hospitalisation data appear in Table 5.

Table 5 Child injury hospitalisation (excluding medical misadventure) Australia (excl NT) 1992-93 financial year. Counts and rates per 100,000 persons by major cause group +

	0-4 yrs		5-9 yrs		10-14 yrs	
	count	**rate**	**count**	**rate**	**count**	**rate**
Motor vehicle driver	6	0.5	7	0.6	51	4.1
Motor vehicle passenger or unspec occ	391	30.8	398	31.5	443	35.7
Motor cycle driver	13	1.0	146	11.6	600	48.3
Motor cycle passenger or unspecified	20	1.6	56	4.4	80	6.4
Pedal cyclist or passenger	299	23.6	1169	92.7	1681	135.3
Pedestrian	367	28.9	465	36.9	435	35.0
Animal related	987	77.8	1035	82.0	1422	114.5
Other transport	271	21.4	540	42.8	1242	100.0
Fall	6442	507.7	8927	707.5	6391	514.4
Drowning, incl. pool, quenching tank	163	12.8	17	1.4	4	0.3
Drowning other	117	9.2	31	2.5	28	2.3
Other threat to breathing	594	46.8	110	8.7	75	6.0
Fire flames smoke	232	18.3	140	11.1	194	15.6
Hot drink food steam etc	1228	96.8	166	13.2	104	8.4
Hot object or substance	289	22.8	42	3.3	34	2.7
Poisoning drugs and medicinals	2460	193.9	133	10.5	679	54.7
Poisoning other or unspecified substance	1107	87.2	113	9.0	183	14.7
Firearms	2	.	7	0.6	40	3.2
Cutting, piercing object	1069	84.3	1030	81.6	1074	86.5
Strike/struck by object or person	1749	137.8	1519	120.4	2269	182.6
Machinery in operation	131	10.3	76	6.0	133	10.7
Electricity	37	2.9	22	1.7	51	4.1
Hot conditions	5	0.4	5	0.4	4	0.3
Cold conditions	1	.	1	.	3	.
Other specified external cause	1741	137.2	1204	95.4	2208	177.7
Unspecified external cause	677	53.4	552	43.8	724	58.3
All causes excluding medical misadventure	**20398**	**1607.5**	**17911**	**1419.7**	**20152**	**1622.3**

Note: Rates are suppressed where number of cases on which they are based is less than 4.
+ See Data Issues section for definition of major cause groups.

More detailed analysis

Deaths data for the five year period 1990-1994, and hospitalisation data for 1992-93 have been used in Table 6 to rank cause and single year of age combinations. The analysis uses more specific injury categories than those reported in previous tables to gain a better understanding of the nature of events leading to injury. This identifies frequent age-cause combinations and the priority risks within each age. (See Data Issues for a discussion on how priority setting is affected by the way that the data are aggregated.) These data are used to assess the importance of each combination in terms of number of deaths, number of hospitalisations, number of bed-days, and average length of stay. In this way frequency and severity can be taken into account in assessing priorities.

In terms of death, the priority areas are motor vehicle traffic causes and drowning. Mechanical asphyxiation of children before their first birthday also ranks in the top 20 combinations. The priority for drowning is focussed on one and two year olds, while the motor vehicle traffic causes are important across a wider age span, with older children being more likely to die. For deaths, the top 20 combinations cover 53 per cent of deaths.

Patterns of injury to young pedestrians: a case study

In our emergency department data, we found 84 cases in which one-year-old children were injured as pedestrians. We found two types of incident that shed light on the risks posed by traffic for very young children who have only recently become mobile, but have not yet developed the necessary perceptions and skills to avoid a dangerous situation. These were pedestrian/vehicle contact and where injuries were caused during a near miss with a vehicle.

In 35 of the selected cases (42%), the child was struck by a vehicle. The proportion of cases in which young pedestrians were actually struck by a vehicle rose steeply with age: 75 per cent of two year olds; 88 per cent of three year olds; and 91 per cent of four year olds. Typically, the collision occurred when a child was struck by a reversing vehicle (n=11); ran across the road and/or into the path of an oncoming vehicle (n=10); or was in the process of crossing the road, in some cases accompanied by an adult (n=9). The resultant injuries were often severe, 60 per cent requiring admission to hospital. The incidents involving reversing vehicles most often occurred in driveways, and occasionally in car parks. By the age of two years, the proportion of cases involving reversing vehicles had declined to 4 per cent and, by four years of age, no such cases were recorded.

The remaining 49 cases (58%), represent incidents in which the child had the potential to be struck by a vehicle, but where this outcome was avoided. As expected, the injury consequences of these cases were generally less severe, none resulting in admission to hospital. The circumstances surrounding the cases were two-fold: the child being injured when falling onto the road surface (sometimes from the kerb) (n=19) or when being pulled by the hand or arm in an attempt to remove it from danger (n=30). Cases of injury resulting from arm pulling most often resulted in a dislocated or sprained elbow and were confined to a very narrow age range (from 12 months to 38 months). The pattern of risk changes as children grow. As children become mobile, they are able to move around vehicles at increasing speed. Parents are often unaware of their rapidly increasingly capabilities. As children grow older they show signs of recognising hazards and are given a little more freedom. Their judgement, however, is inconsistent and parents often need to intervene to prevent a disaster.

Prevention strategies are not simple because close supervision at all times is impossible. Environmental control strategies that separate the child from the traffic flow on both road and driveway or provide a means of actively controlling unexpected movements by the child when in high risk areas are more likely to be reliable than behavioural control strategies.

Priorities based on hospitalisation show more diversity. More causes are involved. Falls emerge as a common issue for the under fives with falls from playground equipment featuring for older groups. The top 20 combinations only account for 18 per cent of hospitalisations and 24 per cent of bed-days. The influence of severity of injury can be seen by comparing numbers of hospitalisations, number of bed-days, and average number of bed-days per hospitalisation (LOS). Motor vehicle traffic related injuries are much more important in terms of bed-days than they are in terms of numbers of hospitalisations. Playground falls, on the other hand, are relatively frequent but do not rank highly on bed-days or average length of stay. Relatively rare injuries such as water transport accidents, firearm missile incidents, and clothing ignition rank high in terms of average length of stay. Hospitalisation data show the importance of burns and scalds, and recreation and leisure based injuries.

The priorities within each single year age group have also been considered in Table 7. It can be seen that the most frequent three causes with each age group account for a significant proportion of the injury for that group. This reflects the way in which important risks change from age to age and that, at each age, a relatively smaller subset of causes is of importance

Prevention planning needs to take into account the specific hazards for each age group in order to anticipate the need for prevention as children develop.

In order to move toward preventive strategies, there is a need for further analysis. During our analysis of the death and hospitalisation data, we noted the importance of motor vehicle related injury to very young children. A review at the finest level of the data, individual ecodes, and study of more detailed

descriptions of cases presenting to emergency departments, revealed that the issues were different for children under one year and their one year old counterparts. In the first year of life, injuries occur as passengers, whereas among the one year olds, a significant part of the problem is related to the children becoming mobile in and near vehicles, commonly classified as pedestrian injuries, although this does not properly describe the activity.

The literature focuses on pedestrian injuries among older children, usually omitting the study of the youngest age groups because their rôle is not that of a formal pedestrian. In order to illustrate the value of the more in-depth qualitative information to understand the patterns shown above, we have explored our emergency department data base to obtain more detail about the type of pedestrian injury experienced by one year old children.

Conclusions

Significant achievements have been made.

The trends in child injury death indicate that significant achievements have been made. The data and processes used here cannot provide evidence for a causal link between the strategies used over the past decade and the reduction in injury. Much more detailed methods would be required. What is certain is that advances have been made and that these advances have occurred in important priority areas.

A number of priority issues remain. At each stage of development there are specific risks that require attention. As each new generation develops it will be necessary to assist parents to identify risks and to modify environments to reduce them

Current priority issues

The priority ranking presented above indicates the continuing priority of

- drowning among the younger age groups
- the range of motor vehicle and road related causes across the age range including very young children
- burns and scalds from both hot water and house-fires
- recreation and leisure related injury especially falls
- the need to tackle the rise in injury rates as children enter adolescence.

Priorities that focus on the key injuries at each stage of development are more likely to cover a greater proportion of injuries overall than those that set priorities based on issues that occur across the age range 0 to 14, or even in five year age groups.

*Table 6 Rank ordering of detailed cause + and single year of age combination for child injury **

Rank	Deaths				Hospitalisations				Bed-days				Average LOS per injury		
	Age	*Cause*	*N*	*%*	*Age*	*Cause*	*N*	*%*	*Age*	*Cause*	*N*	*%*	*Age*	*Cause*	*Mean LOS*
1	1	Drowning	128	6.3	1	Hot substance or object, steam	525	1.4	1	Hot substance or object, steam	2751	3.0	0	Water transport	49.0
2	2	Drowning	96	4.7	14	Strike/struck by object or person in sports	463	1.2	14	Motor vehicle traffic	1410	1.6	11	Firearm missile	42.0
3	14	Motor vehicle traffic	91	4.5	2	Poisoning other/unspecified drug, etc	456	1.2	11	Motor vehicle traffic	1347	1.5	13	Clothing ignition	30.0
4	9	Motor vehicle traffic	57	2.8	6	Fall, different level: playground equipment	420	1.1	8	Motor vehicle traffic	1237	1.4	7	Clothing ignition	27.3
5	5	Motor vehicle traffic	56	2.8	7	Fall, different level: playground equipment	400	1.0	10	Motor vehicle traffic	1222	1.3	9	Clothing ignition	26.0
6	3	Drowning	54	2.7	5	Fall, different level: playground equipment	391	1.0	0	Hot substance or object, steam	1048	1.2	7	Aspiration, food	24.0
7	6	Motor vehicle traffic	53	2.6	8	Fall, different level: playground equipment	377	1.0	7	Motor vehicle traffic	1041	1.1	6	Explosion	22.0
8	4	Motor vehicle traffic	50	2.5	13	Strike/struck by object or person: in sports	351	0.9	13	Non-motor road vehicle	1010	1.1	8	Explosion	19.7
9	8	Motor vehicle traffic	50	2.5	2	Fall, different level: other	345	0.9	12	Motor vehicle traffic	993	1.1	14	House-fires	19.0
10	10	Motor vehicle traffic	49	2.4	1	Fall, different level: other	335	0.9	0	Child battering/maltreatment interpersonal violence	980	1.1	14	Undetermined intent	18.2
11	3	Motor vehicle traffic	48	2.4	12	Non-motor road vehicle	328	0.8	13	Motor vehicle traffic	942	1.0	13	Water transport	17.5
12	1	Motor vehicle traffic	47	2.3	13	Non-motor road vehicle	318	0.8	9	Motor vehicle traffic	916	1.0	7	Poisoning other/unspecified thermal	17.3
13	2	Motor vehicle traffic	46	2.3	11	Non-motor road vehicle	313	0.8	13	Strike/struck by object or person: in sports	915	1.0	3	Same level: collision in sport	17.0
14	7	Motor vehicle traffic	46	2.3	12	Strike/struck by object or person: in sports	311	0.8	2	Hot substance or object, steam	911	1.0	6	Child battering/maltreatment	16.0
15	13	Motor vehicle traffic	42	2.1	4	Fall, different level: other	309	0.8	12	Non-motor road vehicle	893	1.0	13	House-fires	16.0
16	12	Motor vehicle traffic	40	2.0	0	Fall, different level: other	303	0.8	0	Fall, different level: other	836	0.9	2	House-fires	15.8
17	0	Motor vehicle traffic	38	1.9	3	Fall, different level: other	303	0.8	14	Strike/struck by object or person: in sports	827	0.9	8	Undetermined intent	15.0
18	11	Motor vehicle traffic	37	1.8	1	Poisoning other/unspecified drug, etc	300	0.8	6	Motor vehicle traffic	815	0.9	10	Poisoning other/unspecified thermal	14.8
19	0	Mechanical suffocation	32	1.6	6	Fall, different level: other	296	0.8	11	Non-motor road vehicle	808	0.9	3	House-fires	14.6
20	0	Drowning	27	1.3	5	Fall, different level: other	281	0.7	14	Motor vehicle non-traffic	749	0.8	5	Clothing ignition	14.0
		Priority injury total	**1087**	**53**		**Priority injury total**	**7125**	**18**		**Priority injury total**	**21651**	**24**			
		Total	2034	100		Total	38843	100		Total	90715	100		Overall average LOS	2.3

* Deaths are based on child injury deaths Australia 1990-1994 . Hospitalisations are based on hospital separations occurring in States for which single year of age data were available for 1992-1993 (NSW Vic SA Tas ACT) + See Data Issues section for definition of major cause groups.

Table 7 Rank ordering of detailed cause + within single year of age for child injury

Age	Rank	Deaths			Hospitalisations			Bed-days		
		Cause	*N*	*% of cases in age group*	*Cause*	*N*	*% of cases in age group*	*Cause*	*N*	*% of cases in age group*
0	1	Motor vehicle traffic	38	19.7	Fall, different level: other	303	18.6	Hot substance or object, steam	1048	18.8
	2	Mechanical suffocation	32	16.6	Hot substance or object, steam	240	14.7	Child battering/maltreatment interpersonal violence	980	17.6
	3	Drowning	27	14.0	Other non-intentional (incl. unspecified, late effects)	89	5.5	Fall, different level: other	836	15.0
1	1	Drowning	128	41.8	Hot substance or object, steam	525	15.1	Hot substance or object, steam	2751	33.9
	2	Motor vehicle traffic	47	15.4	Fall, different level: other	335	9.6	Fall, different level: other	570	7.0
	3	Motor vehicle non-traffic	24	7.8	Poisoning other/unspecified drug, etc	300	8.6	Motor vehicle traffic	523	6.4
2	1	Drowning	96	42.1	Poisoning other/unspecified drug, etc	456	13.1	Hot substance or object, steam	911	12.5
	2	Motor vehicle traffic	46	20.2	Fall, different level: other	345	9.9	Fall, different level: other	721	9.9
	3	House-fires	14	6.1	Other non-intentional (incl. unspecified, late effects)	249	7.2	Motor vehicle traffic	490	6.7
3	1	Drowning	54	31.4	Fall, different level: other	303	11.9	Motor vehicle traffic	700	13.8
	2	Motor vehicle traffic	48	27.9	Poisoning other/unspecified drug, etc	207	8.1	Fall, different level: other	618	12.1
	3	House-fires	13	7.6	Cutting/piercing	195	7.6	Hot substance or object, steam	382	7.5
4	1	Motor vehicle traffic	50	43.9	Fall, different level: other	309	13.4	Fall, different level: other	449	10.5
	2	Drowning	19	16.7	Fall, different level: playground equipment	246	10.7	Motor vehicle traffic	435	10.2
	3	House-fires	10	8.8	Other/unspecified fall	211	9.1	Fall, different level: playground equipment	368	8.6
5	1	Motor vehicle traffic	56	49.1	Fall, different level: playground equipment	391	16.2	Motor vehicle traffic	707	13.8
	2	Drowning	22	19.3	Fall, different level: other	281	11.6	Fall, different level: layground equipment	609	11.9
	3	House-fires	7	6.1	Other/unspecified fall	238	9.8	Non-motor road vehicle	437	8.5
6	1	Motor vehicle traffic	53	48.2	Fall, different level: playground equipment	420	17.3	Motor vehicle traffic	815	16.3
	2	Drowning	21	8.2	Fall, different level: other	296	12.2	Fall, different level: playground equipment	566	11.3
	3	House-fires	6	5.5	Other/unspecified fall	280	11.6	Other/unspecified fall	564	11.2
7	1	Motor vehicle traffic	46	53.5	Fall, different level: playground equipment	400	16.6	Motor vehicle traffic	1041	17.8
	2	Drowning	11	12.8	Fall, different level: other	259	10.8	Fall, different level: playground equipment	618	10.5
	3	House-fires	4	4.7	Other/unspecified fall	249	10.3	Non-motor road vehicle	560	9.6

Table 7 - continued

Age	Rank	Deaths			Hospitalisations			Bed-days		
		Cause	*N*	*% of cases in age group*	*Cause*	*N*	*% of cases in age group*	*Cause*	*N*	*% of cases in age group*
8	1	Motor vehicle traffic	50	53.2	Fall, different level: playground equipment	377	16.0	Motor vehicle traffic	1237	21.1
	2	Drowning	10	10.6	Fall, different level: other	253	10.7	Non-motor road vehicle	681	11.6
	3	Motor vehicle non-traffic	4	4.3	Other/unspecified fall	229	9.7	Fall, different level: playground equipment	494	8.4
9	1	Motor vehicle traffic	57	57.0	Other/unspecified fall	250	10.8	Motor vehicle traffic	916	17.6
	2	Drowning	8	8.0	Fall, different level: playground equipment	243	10.5	Non-motor road vehicle	549	10.5
	3	Motor vehicle non-traffic	7	7.0	Non-motor road vehicle	236	10.2	Fall, different level: playground equipment	386	7.4
10	1	Motor vehicle traffic	49	59.8	Other/unspecified fall	270	11.3	Motor vehicle traffic	1222	21.5
	2	Drowning	6	7.3	Non-motor road vehicle	268	11.2	Other/unspecified fall	546	9.6
	3	Motor vehicle non-traffic	5	6.1	Same level: slip, trip, stumble	188	7.9	Non-motor road vehicle	487	8.6
11	1	Motor vehicle traffic	37	47.4	Non-motor road vehicle	313	12.4	Motor vehicle traffic	1347	21.5
	2	Drowning	10	12.8	Other/unspecified fall	238	9.4	Non-motor road vehicle	808	12.9
	3	Motor vehicle non-traffic	4	5.1	Strike/struck by object or person: in sports	221	8.7	Other/unspecified fall	433	6.9
12	1	Motor vehicle traffic	40	47.6	Non-motor road vehicle	328	12.4	Motor vehicle traffic	993	15.2
	2	Poisoning other/unspecified interpersonal violence	5	6.0	Strike/struck by object or person: in sports	311	11.7	Non-motor road vehicle	893	13.7
	3	Drowning	5	6.0	Other/unspecified fall	216	8.1	Strike/struck by object or person: in sports	736	11.3
13	1	Motor vehicle traffic	42	42.9	Strike/struck by object or person: in sports	351	12.6	Non-motor road vehicle	1010	14.2
	2	Mechanical suffocation	8	8.2	Non-motor road vehicle	318	11.4	Motor vehicle traffic	942	13.2
	3	Motor vehicle non-traffic	6	6.1	Other non-intentional (incl. unspecified, late effects)	251	9.0	Strike/struck by object or person: in sports	915	12.8
14	1	Motor vehicle traffic	91	52.0	Strike/struck by object or person: in sports	463	15.0	Motor vehicle traffic	1410	18.2
	2	Drowning	11	6.3	Other non-intentional (incl. unspecified, late effects)	281	9.1	Strike/struck by object or person: in sports	827	10.7
	3	Hanging suicide	9	5.1	Non-motor road vehicle	278	9.0	Motor vehicle non-traffic	749	9.7

* Deaths are based on child injury deaths Australia 1990-1994 . Hospitalisations are based on hospital separations occurring in States for which single year of age data were available for 1992-1993 (NSW Vic SA Tas ACT) +
See Data Issues section for definition of major cause groups.

Data Issues

Two aggregated injury classifications are used in this Bulletin. Major External Cause groups follows the chapter groupings of ICD9 External Causes codes. It permits a broad assessment of patterns of childhood injury causes. The Detailed Groups, have been developed by NISU to provide a more detailed picture.

The priority setting process used is affected by the aggregations. Broader aggregations will tend to encompass more cases and therefore may be seen as having a greater priority. This may be an artefact of the broader definition. On the other hand, a category that only contains a single problem may contain relatively few cases because it is counted on its own. It may, however, be important. It is useful to consider, in detail, what each aggregated category covers, and to determine if the aggregation has inadvertently promoted or down-played a particular issue.

MAJOR EXTERNAL CAUSE GROUPS

Row labels	ICD-9 E-Codes
Motor vehicle - driver.	E810-E825/0
Motor vehicle - passenger or unspecified occupant	E810-E825/1
Motorcycle - driver	E810-E825/2
Motorcycle - passenger or unspecified whether driver or passenger	E810-E825/3
Pedal cyclist or cycle passenger	E800-E807/3, E826-E829/1, E810-E825/6
Pedestrian	E800-E807/2, E810-E825/7, E826-E829/0
Other transport related circumstances • Includes railways, water transport, air transport • Includes drowning associated with watercraft • Excludes machinery accident in watercraft	E800-E807/0, 1,8,9, E810-E829/4,8,9 E958/5,6, E988/5,6, E830-E835 E837-E848
Animal related	E810-E825/5, E826- E829/.2,.3, E905 all except .7, E906
Fall - • Includes fall, jump, being pushed from high place • Excludes fall in/on/from transport and falls resulting in drowning	E880-E888, E957, E968.1, E987
Drowning, submersion - swimming pool (See note 3)	E910.8
Drowning, submersion - other than swimming pool (See note 3) • Includes drowning in unspecified place • Excludes drowning associated with watercraft	E910/0-7,9, E954, E964, E984
Other threat to breathing • Includes inhalation of food, suffocation in enclosed space, strangulation, etc	E911-E913, E953, E963, E983
Fire, flames, smoke • Includes asphyxiation or poisoning related to fires, explosion related to conflagration • Excludes transport related	E890-E899, E958.1, E968.0, E988.1, E990
Exposure to hot drink, food, water, other fluid, steam, gas, or vapour • Includes scalds	E924.0 , E958.2 , E968.3 , E988.2
Exposure to hot object or solid substance • Includes contact burns, etc • Includes burn if unspecified whether due to solid, liquid or gas	E924.8
Poisoning - drugs and medicinal substances • Includes adverse effects of medication in normal use	E850-E858, E930.0-E950.5, E962.0, E980/0-5
Poisoning - other substances • Includes poisoning if unspecified whether medication or other subset.	E860-E869, E950.6-E952.9, E962.1-E962.9, E980.6-E980.9, E972 , E981-E982, E997.2
Firearms • Excludes explosives	E922, E955/0-4, E965/0-4, E970, E985/0-4, E991/0-2
Cutting, piercing object • Excludes machinery, power tools or appliances	E920/3,4,8,9, E956, E966, E974, E986

Row labels	ICD-9 E-Codes
Struck by object or person • Excludes: pinching or jamming between objects; machinery in operation; firearm projectile; cutting object	E916-E918, E958.0 , E960.0 , E968.2 , E973 , E988.0
Machinery in operation • Includes power tools, appliances • Includes machinery in context of watercraft • Excludes machinery in the context of other transport	E836, E919, E920/0-2
Electricity	E925, E958.4, E988.4
Hot conditions (natural origin), sunlight	E900.0
Cold conditions (natural origin)	E901.0, E958.3
Other specified external cause (including late effects)	E870-E879, E900/1,9, E901/1,8,9, E902-E904, E905.7, E907-E909, E914-E915, E921, E923, E924/1,9, E926, E927, E928/0-8, E929, E955/5,9, E958/7,8, E959, E960.1, E961, E965/5-9, E967, E968/4-8, E969, E971, E975-E978, E985.5, E988/3,7,8, E989, E991/3,9, E992-E999
Unspecified external cause	E928.9, E958.9 , E968.9, E988.9

DETAILED INJURY CAUSE GROUPS

Accidental Injuries

TRANSPORT

Motor vehicle traffic	E810-E819
Motor vehicle non-traffic	E820-E825
Non-motor road vehicle	E826-E829
Railway transport	E800-E807
Water transport	E830-E838
Air transport	E840-E845
Vehicles not elsewhere classified	E846-E848

Row labels	ICD-9 E-Codes
DROWNING	
Drowning	E-Code 910
POISONING	
Opiates & related	E850/0-2
Other specified analgesics	E850/3-8
Barbiturates	E851
Non barbiturate sedatives/hypnotics	E852
Tranquillisers	E853
Anti-infectives	E856, E857
Other/unspecified drug, etc.	E850/9, E854, E855, E858
Alcoholic beverages, ethanol	E860/0-1
Petroleum products, solvents	E862
Agricultural & horticultural chemicals	E863
Foodstuffs; poisonous plants	E865
Motor vehicle exhaust gas	E868/2
Other/unspecified substance	E860/2-9, E861, E864, E866, E867, E868/0-1, E868/3-9, E869
FALLS	
Stairs	E880
Ladder/scaffold	E881
Building/structure	E882
Playground equipment	E884/0
Different level	E884/1-2,9
Same level: slip, trip, stumble	E885
Same level: collision in sport	E886/0
Fracture - cause unspecified.	E887
Other/unspecified fall	E883, E884/3-8, E886/9, E888

Row labels	ICD-9 E-Codes
FIRE & FLAMES	
House-fires	E890
Clothing ignition	E893
Hot substance or object, steam	E924/0,8-9
Other/unspecified thermal	E891, E892, E894-E899
OTHER UNINTENTIONAL	
Firearm	E922
Excessive heat	E900
Excessive cold	E901
Exposure/neglect	E904
Aspiration, food	E911
Aspiration, non-food	E912
Suffocation	E913
Foreign body	E914-E915
Struck by falling object	E916
Dog bite	E906/0
Collision in sport	E917/0
Other collision	E917/1-9
Caught/crushed	E918
Machinery	E919
Cutting/piercing	E920
Explosion	E921, E923
Electric current	E925
Other/unspecified non-intentional	E902, E903, E905, E906/1-9, E907, E908, E909, E924/1, E926-E929

Intentional Injuries

Row labels	ICD-9 E-Codes
SUICIDE	
Motor vehicle exhaust	E952/0
Hanging	E953/0
Firearm	E955/0-4
Poison, solids/liquids	E950
Cutting/piercing	E956
Other/unspecified	E951, E952/1-9, E953/1-9, E954, E955/5-9, E957-E959
INTERPERSONAL VIOLENCE	
Unarmed fight/brawl (Interpersonal violence)	E960/0
Firearm (Interpersonal violence)	E965/0-4
Cutting/stabbing (Interpersonal violence)	E966
Child battering/maltreatment (Interpersonal violence)	E967
Other/unspecified (Interpersonal violence)	E960/1-9, E961-E964, E965/5-9, E968-E978, E990-E999

Other categories

Other injuries	E980-E989 E870-E879, E930-E949