MONASH University
Accident Research Centre

CONSUMER PRODUCT-RELATED INJURY

IN

AUSTRALIA :

DIRECT

HOSPITAL & MEDICAL COSTS

TO

GOVERNMENT

Project funded by the Australian National Audit Office

CONSUMER PRODUCT-RELATED INJURY IN AUSTRALIA : HOSPITAL & MEDICAL COSTS TO GOVERNMENT

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Abstract:
This study was carried out on behalf of the Australia National Audit Office to determine an estimate of the direct treatment costs of consumer product-related injury to government in Australia.

Estimates include costs associated with hospitalisation, Emergency Department attendances, General Practitioner, specialist and allied health professional attendances and coronial services in so far as these can be ascertained from the available data. Costs associated with nursing home accommodation and pharmaceuticals were derived from a preliminary costing study currently being undertaken by the Australian Institute of Health & Welfare and the NHMRC Health Economics Unit of the Centre for Health Program Evaluation.

The direct treatment of all non-intentional consumer product-"related" injury in Australia is estimated to cost at least $1,364.1 million annually while treatment for non-intentional consumer product-"caused" injury is estimated to cost at least $252.9 million.

It is estimated that the range within which total government outlays on the direct treatment of consumer product-caused injury might reasonably be expected to lie is between $194 and $238 million annually. The Commonwealth government bears most of this burden through its support of State hospital systems and Medicare. The report concludes that the high cost of medical and hospital treatment of consumer product-related injury indicates the need to undertake a program aimed at reducing the frequency and severity of such injury and makes several recommendations particularly in relation to data collection and the dissemination of information in the area of consumer product safety.

Key Words:
(IRRD except when marked*)
Consumer product safety, unintentional injury, cost of injury, Australia

Disclaimer:

This report is disseminated in the interests of information exchange. The views expressed are those of the authors, and not necessarily those of Monash University.

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EXECUTIVE SUMMARY

This study was commissioned by the Australian National Audit Office to establish the direct cost to government of hospital and medical treatment associated with consumer product-related non-intentional injury. It was conducted by Monash University Accident Research Centre (MUARC), a multidisciplinary research centre, which undertakes injury prevention research and data collection on consumer product safety, road safety, injury in the workplace, at home, in schools, and in rural settings as well as sport and recreational injury. The National Injury Surveillance Unit (NISU) provided national morbidity and mortality data as well as invaluable assistance in developing the conceptual and methodological framework that enabled the project to be undertaken.

For the purpose of this study a consumer product was defined (in accordance with the European Economic Community General Product Safety Directive) as any manufactured, processed or agricultural product supplied in the course of business and likely to be used by consumers. Motor vehicles are included in this definition but because of the requirements of the sponsors and the lack of information in most databases, alcohol has been excluded from the costing. The adverse effects of prescribed medication (except in accidental poisoning) are also excluded because of difficulties in interpreting the available data.

It should be noted that hospital and medical costs represent only a small proportion of the real cost of injury. Other costs such as lost earnings, family and community losses, property damage and pain and suffering account for the major part of the total cost of injury but are not included in this study.

METHOD

While data is available regarding the number of injury deaths and hospitalisations (including bed-day counts) for Australia as a whole through the National Injury Surveillance Unit, there is no Australia-wide data collection which allows the identification of consumer product involvement in injury. It is possible to identify consumer product involvement in injury surveillance systems which record information about Emergency Department (E.D.) attendances resulting from injury. However, these systems only collect data from a limited number of hospitals and operate primarily in capital cities. There are also no national databases that collect information regarding General Practitioner (G.P.) attendances for injury or the long-term outcomes of severe injury in terms of nursing home admissions and rehabilitation services.

Given these difficulties, it was decided that the detailed study would focus on Latrobe Valley region in Victoria, for which comprehensive injury data is available, in order to establish the degree of consumer product involvement in injury and to establish relevant proportions between hospital admissions, Emergency Department and General Practitioner attendances. The ratio of non-hospitalised Emergency Department and General Practitioner attendances to hospital admissions established using data from the Latrobe Valley was then applied to the national hospital separations figures to estimate national E.D. and G.P. attendance figures.

A five category coding relating to the degree of product involvement in injury was developed.
The categories were :

1. No product identified or product incidental to injury.
2. Product involved due to proximity.
3. Product identified but description of event inadequate to enable a judgement.
4. A design solution or safety equipment is currently available which may have prevented, or reduced the severity, of the injury.
5. A malfunction or failure of the product contributed to the injury.

Proportions relating to the degree of product involvement in injury and death were derived from narratives contained in the Victorian Injury Surveillance System (VISS) collected at Latrobe Regional Hospital for Emergency Department attendances (and subsequent admissions) and in the Coronial Services (Victoria) database. The proportions for deaths and hospital admissions were then applied to the national data.

Cost estimates have been confined to the direct hospital, medical and coronial costs of consumer product-related injury in so far as these can be ascertained given the limitations of the available data. Costings for hospital inpatient and Emergency Department services were derived from the *Hospital Utilisation and Costs Study 1991-92* (Cooper-Stanbury, Solon & Cook, 1994) and for medical services from the Medicare & Pharmaceutical Statistical Tables contained in the Health Insurance Commission's *Annual Report 1993-94.* The costing of a fatality was confined to the coronial costs involved which were estimated from information provided by Coronial Services (Victoria). This is one or two orders of magnitude less than the "societal costs" normally used when costing road trauma deaths.

Because of the requirements of the sponsors and the limitations of the project in terms of the availability of reliable data, time and resources, costing decisions have been based on justifiable minimum costs to produce an estimate of the cost of hospital and medical treatment of injury. They are based on data currently available for Australian injury fatalities, hospitalisations and estimated non-hospitalised cases and include costs associated with hospitalisation, Emergency Department attendances, General Practitioner, specialist and allied health professional attendances in so far as these can be ascertained from the available data.

In order to establish the estimated total direct cost of hospital and medical treatment of injury, costs from other available sources which provide estimates of outlays beyond the scope of this study were combined with estimates established here. Using the methodology developed in this study, a conservative estimate of the cost of private hospital admissions and associated Emergency Department and other medical attendances for Victoria and New South Wales was established. Cost estimates associated with nursing home accommodation and pharmaceuticals were derived from a preliminary costing study currently being undertaken by the Australian Institute of Health & Welfare and the NHMRC National Centre for Health Program Evaluation.

RESULTS

The results of this study and the additional costs described above are presented in the following table :

ESTIMATED DIRECT TREATMENT COSTS OF NON-INTENTIONAL INJURY
(excluding medical misadventure, complications and adverse effects of prescribed medication.)

AUSTRALIA (1991-92) Combined costs from available sources

	MUARC study estimates [(a)] (Coronial, hospital inpatient, E.D. & G.P. attendances) ($ million)	+	**Extra private hospital cost estimates**[(b)] (N.S.W. & Victorian private hospital admissions) ($ million)	+	**Extra AIHW/NCHPE cost estimates**[(c)] (Nursing home accommodation & pharmaceuticals) ($ million)	=	**TOTAL DIRECT TREATMENT COSTS** ($ million)
ALL NON-INTENTIONAL INJURY	1,323.2	+	105.5	+	361.2	=	1,789.9
Consumer product-related injury (Categories 2-5)	1,006.8	+	77.7	+	279.6	=	1,364.1
Consumer product - "caused" injury (Categories 4 & 5)	194.4	+	15.3	+	43.2	=	252.9

(a) based on national injury mortality and morbidity data (supplied by NISU) and estimates of Emergency Department and General Practitioner attendances (derived from data collected in the Latrobe Valley, Victoria, through VISS and ELVIS).
(b) based on estimates of N.S.W. and Victorian private hospital injury admissions for 1991-92.
(c) estimates derived from the AIHW/NCHPE study (in progress) of nursing home and pharmaceutical costs associated with injury.

Total outlays for the direct hospital and medical treatment of all non-intentional injury in Australia in 1991-92 is estimated at $1,789.9 million. Expenditure on direct treatment for all non-intentional consumer product related-injury (Categories 2-5) is estimated at $1,364.1 million while treatment costs for non-intentional consumer product-"caused" injury (Categories 4 & 5) is estimated at $252.9 million.

Because of the inclusion of private hospital admissions (except in the case of Victoria and N.S.W.) in the hospital admissions data and the complex relationship between government services and injury compensation systems that operate in different states (motor vehicle traffic accident insurance schemes work-related injury insurance schemes), it is difficult to provide a definitive estimate of total government outlays on the treatment of injury. However, **the range within which total government outlays on the direct treatment of consumer product-"caused" injury might reasonably be expected to lie is between $194 million and $238 million.** This range excludes Victorian and N.S.W. private hospital costs. It does include some compensable costs such as motor vehicle injury costs but because only a small percentage of these fall into this category (3.7% of bed-days attributed to motor vehicle accidents or 0.5% of total bed-days) no attempt has been made to exclude them given the possible understatement of these estimates and the complexities of the different systems in each State.

CONCLUSION

The total direct cost of hospital and medical treatment of non-intentional consumer product-"caused" injury to is quite significant at $253 million. While government total outlays on treatment are estimated at between $194 million and $238, the Commonwealth bears most of this burden through its support of State hospital systems and Medicare.

It should be noted, however, that hospital and medical costs represent only a small proportion of the real cost of injury. For example, estimates by the Bureau of Transport and Communication Economics (1992) suggest that medical, hospital and rehabilitation costs account for only 2.4% of the total cost of all road accidents. Of the total estimated crash cost in 1993 of $6.1 billion (BTCE, 1994), which accounts for 90% of transport-related accidents in Australia, hospital and medical treatment (including rehabilitation) accounted for $256.2 million.

In comparison, lost earnings of victims accounted for $829.1 million (14%), family and community losses for $587.8 million (10%), vehicle damage $1868.3 million (30%), pain and suffering(24%), insurance administration $571.1 million (9%) and other $816.4 million (13%)[1].

While property losses in relation to motor vehicle accidents account for a significant proportion of the costs, other categories of accident such as structure fires also result in considerable property damage.

[1] *The 'other' category (BTCE, 1992) comprises costs relating to hospitalisation and rehabilitation (2.4%), medical treatment (1.8%), legal and court costs (2.9%), traffic delay (4.5%), accident investigation (0.9%), losses to others (0.3%), ambulance and rescue (0.1%).*

According to the Australian Consumers Association (A.C.A., 1989, pp.42-43), the main economic cost of injury to consumers is loss of income. For injured adults, a serious injury will often result in loss of earnings that can run into tens of thousands of dollars while serious injury to a child often requires at least one parent to stop working to look after the child at home or visit them in hospital.

Other examples of costs to individuals and their families provided by A.C.A. include :

damage to property;
employing someone else to run a business;
loss of promotion due to considerable time off work;
special tutoring for a brain-damaged child (after choking between cot bars);
cost of child-minding after death of spouse in product-related fire;
funeral expenses;
the cost of legal representation at an inquest;
legal expenses in seeking compensation.

The A.C.A. notes that while the cost of a defective product is usually low, the economic cost of a serious injury is very large. The manufacturer generally bears only a very small proportion of the cost since compensation for lost earnings, medical treatment or pain and suffering are rarely obtained with the vast bulk of costs incurred being borne by the injured person's family and by Medicare.

RECOMMENDATIONS

The cost of injury provides important baseline information necessary for establishing benefits-cost estimates for intervention strategies. It is also necessary to determine appropriate resourcing of the research and intervention effort in this area.

The high cost of even the medical and hospital costs of consumer product-related injury indicate the need to undertake a program aimed at reducing the frequency and severity of such injury.

To this end, the following recommendations are made as a result of this study :

1. Establishment of a centralised clearing house to integrate and analyse data from all available sources (nationally and internationally) to identify potentially dangerous products and to disseminate information to regulators and other responsible bodies. It is clear from the difficulties encountered in developing the methodology for this project that there is a need for such a centralised data collection facility with a coordinating function.

2. Development of a system similar to that operated by the Consumer Product Safety Commission in the United States where representative injury surveillance data is utilised as the basis of in-depth specific product-related injury studies.

3. Commissioning of an in-depth study to establish the total cost of consumer product-related injury. As evidenced in estimates established by the BTCE for the cost of road traffic accidents, the cost of hospital and medical treatment represents only a small proportion of the total cost of injury. A large-scale study is necessary in which individual cases are followed up to establish the true cost of consumer product-related injury to the health care sector, to the individual, their family and the community.

4. Improvement to the coding systems used in the various databases to facilitate a more consistent identification of consumer product involvement in injury. This is particularly the case for hospital admission data. While hospital inpatient costs account for the major part of treatment estimates, information relating to the cause of injury is confined to E-codes and it is therefore not possible to distinguish (from morbidity databases) the level of consumer product involvement in hospitalised injuries.

5. Estimation of the cost of other types of injury, eg. sports injury and child injuries to provide baseline data for benefit-cost estimates of intervention programs. The current trend towards casemix costing based on AN-DRGs (Australian National Diagnosis Related Groups) for other medical conditions is inappropriate for the costing of injury because most injury categories (based on external cause of injury) are subsumed within AN-DRG categories based on anatomical systems. However, the methodology developed in this study has direct applicability to the costing of other types of injury.

6. Clarification of the extent, and nature of, the injury classifications of medical misadventure, complications due to surgery and the adverse effects of prescribed medication by :

   (a) Undertaking fieldwork to validate the classifications and to determine whether they are applied consistently.

   (b) Conducting a study in the form of a rigorous mass data analysis to breakdown these classifications and to establish their characteristics.

   (c) Conducting a study to determine product involvement in this area.

   It was not possible, using the available data, to provide reliable estimates of the cost of medical misadventure, complications due to surgery or the adverse effects of prescribed medication yet these categories of injury account for 106,622 cases recorded in the 1991-92 national hospital morbidity data (compared to 267,931 non-intentional injury hospitalisations for the same period). These cases generally involve persons who have been hospitalised for other medical conditions but whose records are assigned an E-code when there are complications resulting from surgery or adverse effects of medication. However, the number of bed-days recorded for such cases refer to the entire period of hospitalisation for the original condition rather than for the additional days that may be attributed to the medical misadventure, etc. Consequently, there can be no reliable bed-day count or subsequent costing based on the current coding system. These cases clearly represent a poorly understood, yet significant sector of recorded injury hospitalisations in terms of numbers, consumer product involvement and cost.

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1. INTRODUCTION

This study was commissioned by the Australian National Audit Office to establish the direct cost of hospital and medical treatment to government for consumer product-related injury in Australia. It was conducted by Monash University Accident Research Centre (MUARC), a multidisciplinary research centre, which undertakes injury prevention research and data collection on many issues including consumer product safety, road safety, injury in the workplace, at home, in schools, and in rural settings, and sport and recreational injury. The National Injury Surveillance Unit (NISU) provided national morbidity and mortality data as well as invaluable assistance in developing the conceptual and methodological possibilities that enabled the project to be undertaken.

Because of the requirements of the sponsors and limitations of the project in terms of the availability of reliable data, time, and resources, decisions have been based on justifiable minimum costs. The costings derived from the data available to this study therefore represent the absolute minimum cost of medical and hospital treatment that can be attributed to consumer product-related injury. To establish a more realistic estimate, costs from other sources, which provide estimates of outlays beyond that derived from the data available to this study, have been added.

It should be noted that hospital and medical costs represent only a small proportion of the real cost of injury. Estimates by the Bureau of Transport and Communication Economics (1992) suggest that medical, hospital and rehabilitation costs account for only 2.4% of the total cost of road accidents. Other costs such as lost earnings, family and community losses, property damage and pain and suffering account for the major part of the total cost of injury. Little has been published on the total cost burden of injury in Australia. A 1986 figure of $11 billion per year is still quoted as the best available estimate (Better Health Commission, 1986).

2. OBJECTIVE :

To quantify the estimated cost to government of medical and hospital treatment of **consumer product-related** injuries and deaths. This will be achieved by identifying a range of estimated **total government outlays on hospital and medical costs**, within which actual total government annual costs would reasonably be expected to lie.

Definitions :

A **consumer product** is defined as any good which is available for sale on the public market or is provided to a consumer as part of a service regardless of value. This definition encompasses the concept of product under the European Economic Community General Product Safety Directive (COM(90)259) which is very broad, incorporating any manufactured, processed or agricultural product supplied in the course of business and likely to be used by consumers. It applies irrespective of whether the product is new, used or reconditioned. (Page, Lee & Powell, 1993, see Appendix 1) [1]

For the purposes of this study, the definition of a **consumer product-related injury** shall be confined to cases of acute injury where the injury is immediate and the link between the product and the injury can be directly inferred. The injury may be related to physical failure of the product, inadequate design of the product, inadequate instructions for the use of the product or not influenced by any actual deficiencies of the product (ACA, 1989). Coding of existing databases does not allow distinction between **product-related** and **product-caused injury**. However, through a sampling of case narratives from the Victorian Injury Surveillance System and Coronial Services Victoria, an attempt will be made to establish the degree of consumer product involvement in injury.

To overcome difficulties in apportioning costs, particularly in relation to hospital treatment, the **cost to government** refers to costs incurred by both State and Commonwealth governments.

[1] It should be noted that motor vehicles are included in this definition and are therefore included in the study. However, in response to the requirements of the sponsors and the lack of information in most databases alcohol has not been included in the coding or costing (except in cases of alcohol toxicity where cases have been coded to Category 3 - see definitions in Appendix 3). The adverse effects of prescribed medication, complications due to medical procedures and medical misadventure have also been excluded because of difficulties in interpreting the available data.

3. SCOPE OF THE STUDY

The study includes all **non-intentional,** injuries and poisonings defined by E-codes E800-E929 (ICD-9-CM coding) and excluding medical misadventure (E870-E876) and complications resulting from medical or surgical treatment (E878-E879). These codes and those relating to the adverse effects of prescribed drugs (E930-E949), have been excluded from the study because it is not possible to assign accurate bed-day counts in these categories and their level of relevance is arguable. **Intentional injuries** including self-inflicted and cases of unknown intent (E950-E999), are considered separately as an appendix to this study (see Appendix 5).

A complete range of data covering all levels of injury severity was not available for any one calendar or financial year. Because the vast bulk of costs in this area are due to hospitalisation, it was decided to use the most recent hospital separations and bed-day data available and therefore attempt to cost the 1991-92 financial year[2]. It is beyond the scope of this report to estimate 1995 costs. The simple application of an inflationary factor based on CPI increases would be misleading due to the complexities of changes to the costs of health care.

Estimates have been confined to the direct hospital, medical and coronial costs of consumer product-related injury in so far as these can be ascertained given the limitations of the available data.

[2] The bulk of the costing (hospital bed-days and Emergency Department attendances) used figures for 1991-92. However, costings for G.P. and specialist attendances were taken from 1993-4 Medicare average payments.

4. METHOD

In order to establish the cost of hospital and medical treatment for consumer product-related injury it is first necessary to determine the number of consumer-product related injury cases that occur annually in Australia and then apply appropriate costs. While data relating to hospitalisations and deaths as a result of injury are available for the whole country, at present there is no Australia-wide data collection which allows the identification of consumer product involvement in injury. It is possible to identify consumer products in injury surveillance systems which record information about Emergency Department attendances resulting from injury. However, these systems only collect data from a limited number of hospitals and operate primarily in several capital cities.

Given these difficulties, it was decided that the detailed study would focus on a defined geographic area for which comprehensive injury data were available in order to establish relevant proportions between hospital admissions, Emergency Department attendances and General Practitioner attendances. These proportions would then be applied to the Australian hospital separations data to estimate the number of Emergency Department and General Practitioner attendances Australia-wide.

4.1 AUSTRALIAN DATA

The latest Australia-wide data available for hospital separations and bed-days is for the 1991-92 financial year. For injury fatalities, Australia-wide data is available for the 1991 and 1992 calendar years.

4.1.1 INJURY FATALITIES

The National Injury Surveillance Unit (NISU) in Adelaide provided data collected by the Australian Bureau of Statistics on injury fatalities for the calendar years 1991 and 1992. In order to reconcile the timeframe with the other data available, the figures were averaged over the two years. The data for non-intentional injury deaths was aggregated into nine E-code categories which broadly define the type of injury event. Proportions relating to the degree of product involvement were derived from narratives in the Coronial Services (Victoria) database and applied to the national data.

4.1.2 INJURY HOSPITALISATIONS

Hospital separations and bed-day data for 1991-92 was also provided by NISU for all States and Territories except the Northern Territory. The data includes both public and private hospital separations for all States except N.S.W. and Victoria which, at that time, only collected data from public hospitals. As such the total number of injury-related hospital separations for Australia will be somewhat understated. It is not possible to separate the data, as supplied, into public and private categories. The data is supplied to NISU by State and Territory health departments and should be considered preliminary since, at the time of this report, the data had been checked by internal processes at NISU, but the figures produced had not been checked by the States.

Because data for the Northern Territory was unavailable for 1991-92, hospital separation figures for 1988 (Plant, A.J., Condon, J.R. & Durling, G., 1995) were used. While total hospital separations for non-intentional injury were available, as were those for motor vehicle traffic accidents (E810-E819), accidental falls (E880-E888) and accidents caused by fire and flames (E890-E899), the number of hospital separations for the other E-code groupings used in this study were estimated using the available figures and relevant proportions derived from the rest of Australia. Bed-day figures were also not available from the Northern Territory in a form that could be used in this study, so estimates were established based on the hospital separations data and the average bed-day counts for each E-code grouping for the rest of Australia.

Bed-day data, disaggregated into broad E-code categories, was used to establish injury hospitalisation costs for each State and for Australia as a whole. The data was also disaggregated on the basis of proportions relating to the degree of product involvement derived from VISS admissions in the Latrobe Valley (see 4.2.2).

The hospital separation figures were used as a basis for establishing the number of non-hospitalised Emergency Department attendances nation-wide using the adjusted Injury Surveillance Information System (ISIS) admission rate (see 4.2.2).

It should be noted that the Australia-wide hospital separations data provided by NISU contains all injury hospitalisations for the year (including re-admissions) and this would be slightly greater than the actual number of injury cases. A comparison with the subset of Victorian Inpatient Minimum Dataset (VIMD) held by MUARC (which contains only the first instance of hospitalisation for an injury, ie. the number of cases of injury) for 1991-92 for Victoria suggests that the difference between the total number of cases recorded in the VIMD subset (n = 69,419) and the total number of injury hospitalisations in the NISU database (n = 72,018) is in the order of 3.6% (ie. re-admissions account for 3.6% of the NISU data). While this does not affect the costing of the total hospital bed-days, it will affect the estimates of the number of Emergency Department and General Practitioner attendances. However, because the total number of attendances at these services is clearly understated, because of a lack of data on follow-up visits, no adjustment has been applied.

4.2 LATROBE VALLEY PATIENT DATA BASES

The Latrobe Valley region in Gippsland, Victoria has been the focus of a major injury surveillance project (Valuri & Routley, 1994; Day, 1994) and is the only region in Australia where data is available for all levels of medical treatment relating to injury. Information about injuries treated by General Practitioners is collected through the Extended Latrobe Valley Injury Surveillance (ELVIS) system and attendances at the Emergency Department of Latrobe Regional Hospital are recorded through the Victorian Injury Surveillance System (VISS). Details of injury admissions to the Latrobe Regional Hospital are recorded through the Victorian Inpatient Minimum Dataset (VIMD) and information regarding injury deaths is available through Coronial Services (Victoria). While the Latrobe Valley area is the only region in Australia from which comprehensive injury data is available, it should be noted that it may not be representative of the rest of Victoria or of the rest of Australia. Scaling up from the Latrobe Valley injury data purely on the basis of population was considered inappropriate

because Victoria appears to have a lower injury rate[3] than other States and the Latrobe Regional Hospital has a much lower admission rate than major Melbourne metropolitan hospitals (9% vs. 18%)[4].

Data from the Latrobe Valley has therefore been used in this study to establish the degree of product involvement in injury and to establish the proportion of non-hospitalised injury cases that attend Emergency Departments and General Practitioners for treatment.

Study Region

For the purpose of this study then the Latrobe Valley is defined as the area confined to postcodes of residence 3869, 3870, 3825, 3840, 3842 and 3844. The study area was defined on the basis of postcode since this is a common variable by which data may be extracted from each of the databases. These postcodes relate closely to the municipalities of Moe and Morwell and the City and Shire of Traralgon. In 1991 the population of this area was 74,230 (A.B.S.).

4.2.1 INJURY FATALITIES

Information on injury fatalities in Victoria is available through a mass data collection managed by Coronial Services, Victoria. The ascertainment rate of this collection is close to 100%. Variables available in the database include coroner's case number, primary E-code (external cause of injury), sex, date of birth, date of accident, date of death, postcode of residence. The data also includes a short narrative regarding the circumstances surrounding the death which allows coding into categories relating to the degree of product involvement.

4.2.2 INJURY HOSPITALISATIONS

[3] There are several possible reasons why Victoria appears to have a lower injury rate in terms of hospital separations. It may be that :

a) Victoria has a genuinely lower rate of injury than other states. In fact, the non-intentional injury fatality rate is about 14% lower than the national rate per 100,000 population at 22.87 vs. 26.61 (1991-92 : NISU).

b) Victoria has had a different admission policy than other states resulting in less severe cases not being admitted to hospital. The fact that the number of cases admitted to public hospitals has been rising steadily over the last few years (from 69,419 in 1991-92 to 92,063 in 1993-4) without a concomitant rise in bed-days suggests that the advent of casemix funding may be affecting admission policy in Victoria.

c) The lower Victorian hospital separation rate for injury may reflect differences in inpatient data recording between the states. The 1991-92 hospital separations data provided by NISU represent the first attempt to collate national hospital separations data which is collected independently by the states. In the 1991-92 data, a primary E-code was only recorded if it appeared in the first five diagnosis fields. Preliminary work on the 1992-93 hospital separations data by NISU using 12 diagnosis fields suggests that the injury rate for Victoria for that year may actually be closer to the other states.

[4] According to VISS (Valuri & Routley, 1994, p.2), injuries presenting to the Latrobe Regional Hospital tend to be less severe than those presenting to Melbourne hospitals since the proportion of admissions to Emergency Department presentations at LRH is lower than at other all age Melbourne hospitals (LRH : 9%; metropolitan Melbourne - Western Hospital :18%, PANCH :18%) suggesting that residents regard the Latrobe Regional Hospital as a general practice as well as an emergency hospital. This may also reflect different admission policies to the other metropolitan hospitals in the collection. It is clear also that LRH is not representative of Australian hospitals generally in that the admission rate from the Emergency Department is much lower than the overall Injury Surveillance Information System (ISIS) admission rate of 14.68%, suggesting that the E.D. is being used to treat more minor injury cases which would otherwise attend a G.P. If this is the case, the ratio of G.P. to E.D. attendances in the Latrobe Valley would also not be representative of the country as a whole.

Data on all separations from Victorian public hospitals has been collected since about 1985 by the Department of Health & Community Services (Victoria) into the Victorian Inpatient Minimum Dataset (VIMD).

A subset of the VIMD is held at the Monash University Accident Research Centre for research purposes. The subset contains information about injury hospitalisations in Victoria and data is currently available for the eight financial years from 1986-87 to 1993-4. Variables in the subset include primary E-code (external cause of injury), an encrypted admission number, sex, date of birth, date of admission, date of separation, a principal diagnosis (N-code) and up to four further diagnosis codes, postcode of residence, and a separation code (discharge destination). The data does not allow the identification of consumer product involvement in any reliable way because there is no detail about the circumstances surrounding the injury

Since the VIMD subset has close to a 100% ascertainment rate, it was used to derive the number of admitted non-intentional injury cases in the Latrobe Valley for 1991-92 (n = 627). This figure was then used to establish the expected number of non-hospitalised Emergency Department attendances for the Latrobe Regional Hospital (LRH).

4.2.3 NON-HOSPITALISED INJURY CASES

Emergency Department Attendances

Information about injury cases which attend the Emergency Department of the Latrobe Regional Hospital (LRH) at Traralgon and Moe is recorded through the Victorian Injury Surveillance System (VISS). The ascertainment rate for the VISS Latrobe Valley collection is 95% (Day, 1994, p.10).

The expected number of E.D. attendances, if the Latrobe Valley was representative of the rest of the country, was established by applying the adjusted national Injury Surveillance and Information System (ISIS) admission rate of 13.8% (which takes into account the bias towards children in the collection) to the number of non-intentional injury admissions derived from the VIMD (n = 627). The expected number of E.D. attendances was 4540. Cases beyond this number (n = 2710) were then assigned to the G.P. attendances.

The VISS collection records details about injuries from patients (or their parent) and their attending doctor. VISS collects detailed information about the injury and the circumstances surrounding the injury event. Variables collected include postcode of residence, location of injury event, sex, date of birth, context of the injury occurrence, breakdown events, mechanism of injury causation, description of injury, treatment, intent and whether or not the injury was work-related. Data is currently not E-coded making direct comparison with VIMD and NISU hospitalisation data difficult.

General Practitioner Attendances

The collection of data regarding General Practitioner attendances for cases of injury in the Latrobe Valley is still in the early stages. Data is available, however, for cases of injury which presented to General Practitioners in the Latrobe Valley for the six-month period from November 7, 1994 to May 6, 1995 through the ELVIS (Extended Latrobe Valley Injury Surveillance) system. The collection records information about injuries from patients (or their parent) and their attending doctor and contains similar variables to those in the VISS database. ELVIS data is also E-coded.

The ascertainment rate for cases in the collection, based on a practice audit process, is estimated to be around 70%. Adjustments were made to take into account the ascertainment rate and the data was scaled up to establish estimates for one year. It should be noted that no adjustment was made for seasonal variations which may affect this figure. The final estimate for G.P. attendances in the Latrobe Valley (n=10,760) also includes an adjustment for those cases which attended the Emergency Department at LRH but which were in excess of the expected E.D. attendances.

Based on these adjusted estimates a more representative ratio of Emergency Department to G.P. attendances was established (1 : 2.37).

4.3 PRODUCT INVOLVEMENT CATEGORIES & E-CODE GROUPINGS

4.3.1 PRODUCT INVOLVEMENT CATEGORIES

The degree of consumer product involvement in injury was established from one line case narratives provided in the Victorian Injury Surveillance System database[5] and the Coronial Services Victoria database. From these systems it was possible to establish consumer product involvement for non-hospitalised, hospitalised and fatal injury cases.[6]

The categories for consumer product involvement were :

1. No product identified or product incidental to injury.
2. Product involved due to proximity.
3. Product identified but description of event inadequate to enable a judgement.
4. A design solution or safety equipment is currently available which may have prevented, or reduced the severity, of the injury.
5. A malfunction or failure of the product contributed to the injury.

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[5] It should be noted that, in the VISS collection, the details about the circumstances surrounding an injury are usually reported by the patient (or their parent) and may not always be entirely accurate, particularly in situations where liability or illegal activity may be involved.

[6] Although one-line case narratives are available from the ELVIS database no attempt was made to code the G.P. attendances in relation to product involvement because of the time constraints and the fact that G.P. costs represent only a small proportion of the total costs for the medical and hospital treatment of injury. The proportions derived from the VISS non-hospitalised Emergency Department attendances were applied instead. It is possible that that this may have resulted in some bias given the different pattern of injury cases that present to Emergency Departments and General Practitioners (see Section 5.1).

Operational definitions for each of these categories are contained in Appendix 3. Examples of the main types of injury involved in each category are briefly described for each E-code grouping and for each level of injury severity : fatalities, hospitalised and non-hospitalised, in Appendix 4.

For ease of description, consumer product-related injury refers to all cases in Categories 2-5 while consumer product "caused" injury refers to Categories 4 and 5.

Injury Fatalities

Because the annual number of unintentional injury deaths in the Latrobe Valley so small (1991-92, n=11, Coronial Services, Victoria), it would not be useful to use these cases as the basis for any analysis of product involvement. It was therefore decided to code non-intentional injury death data for the whole of Victoria for 1991-92 (n=794) to establish the degree of consumer product involvement in accidental injury deaths. The proportions arrived at were then applied to the Australia-wide fatality data.

Injury Hospitalisations

In order to establish the degree of product involvement for hospitalised cases, it was necessary to extract the narratives for admitted cases at the Latrobe Regional Hospital in 1991-92 from the VISS database. Narratives were available for 496 admitted cases or approximately 80% of admissions in that year. The proportions derived for each product involvement category were then applied to the morbidity data for each State and costed on the basis of bed-days.

Non-hospitalised Injury Cases

Three years of data (from July 1991 to June 1994), consisting of 23,321 cases, are currently available for the Latrobe Valley study region. A sample of 2332 cases (10 per cent) was randomly derived from this collection. Intentional injury and admitted cases were later removed and a sample of 1786 non-hospitalised cases remained. These were then coded, from the one-line case narratives, into nine E-code groupings (see Appendix 2) and five categories relating to the degree of product involvement (see Appendix 3). The proportions relating to product involvement were then applied to the national estimates for Emergency Department attendances and to General Practitioner attendances.

4.3.2 E-CODE GROUPINGS

In all the databases accessed except VISS, the external cause of injury is assigned a 4-digit E-code between E800.0 and E999.9 from the Annotated International Classification of Diseases, 9th. Revision, Clinical Modification (ICD-9-CM) (1986). The national hospital morbidity and mortality data available from NISU was available in particular E-code groupings and it was necessary to aggregate some of these to simplify the analysis. Appendix 2 details this aggregation into nine non-intentional injury cause groupings and three intentional groupings. VISS data was also coded using these groupings to allow comparison between the different levels of data.

4.4 COSTING

4.4.1 COST OF FATALITIES

The medical and hospital costs of fatalities in this study are included in the General Practitioner, Emergency Department and hospitalisation costings because it is not possible to match cases in the separate databases. The cost of a fatality applied in this study is the estimated cost to State governments through their Coronial systems and is based on costs in Victoria. Because of the huge variation in the costs associated with individual deaths a crude estimate of the average coronial costs of an injury fatality of $2500, based on the number of deaths investigated annually[7] and the total budget of Coronial Services Victoria (including The Institute of Forensic Pathology), was applied. This is one or two orders of magnitude less than the "societal costs" normally used when costing road trauma deaths.

Estimates by the Bureau of Transport and Communication Economics (BCTE) are based, not on the cost of individual lives, but on the cost associated with individual road accidents. It was estimated that each fatal road crash in 1993 cost $752,000 (BCTE, 1994). While representing just over 0.3% of an estimated 500,000 road accidents annually, fatal crashes accounted for 23% of the total $6.1 billion cost of all crashes (or $1.4 billion). This estimate includes costs for lost earnings of victims, family and community losses, vehicle damage, pain and suffering, insurance administration and other costs (including hospital and medical treatment). In a summary of ex-post estimates of the cost of a road fatality appearing in the road accident research literature, Cameron (1995) arrived at an average of Australian opportunity cost estimates of $608,900 (1991$A) per fatality.

4.4.2 HOSPITAL COSTS - INPATIENT AND EMERGENCY DEPARTMENT CASES.

Information on the costing for the treatment of hospital inpatients was derived from the *Hospital Utilisation and Costs Study (H.U.C.S.) 1991-92 (Volume 1)* produced by the Australian Institute of Health & Welfare. Costs were established for each State using the NISU data on hospital bed-days and the relevant average occupied bed-day (OBD) cost.

Because it was not possible to split costs between inpatients and non-inpatients directly for many hospitals, the HUC Study adjusted the number of inpatient services to compensate for non-inpatient activity using the Health and Advisory Council (HASAC) formula. This formula equates 5.753 non-inpatient[8] treatments with one OBD.

The average recurrent expenditure per occupied bed day for acute care public hospitals in Australia is $427 (*H.U.C.S.*, 1994, p.81). Based on this figure the average cost of non-inpatient services would be $74.22 per service. Because we have no way of knowing how many services each attendance for an injury at an Emergency Department may require (eg. X-ray, pharmacy, etc.) each attendance was costed as only one service. The database does provide some information as to whether or not the patient was referred to another practitioner

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[7] Some 2,000 deaths are investigated in Victoria annually resulting in a total of around 1,500 deaths being attributed to unintentional or intentional injury.

[8] Non-inpatients are patients who are treated on the hospital site and include Emergency Department patients, outpatients and day program patients. The attendance by a person to each non-inpatient clinic was counted as one occurrence of service or a treatment for the purpose of the formula.

or service for follow-up but this information is limited to one subsequent visit and these have been costed accordingly. Given these limitations the estimate will represent an understatement of the total cost of non-hospitalised Emergency Department cases.

In costing the Emergency Department component of hospitalised cases, the estimate may be slightly overstated in that it is based on the number of hospital separations, not the number of cases. A small proportion of these separations (3.6% for Victoria) represent re-admissions which may not have required Emergency Department attendance. Furthermore, data from ELVIS suggests that a very small percentage of separations may have resulted from direct admission to hospital after a General Practitioner consultation rather than an Emergency Department attendance. Because the number was so small, it was not meaningful to break these into different consumer product involvement categories and so all hospitalisations were assigned one Emergency Department attendance.

4.4.3 GENERAL PRACTITIONER COSTS

Costs relating to General Practitioner and specialist attendances were derived from the *Medicare & Pharmaceutical Benefits Statistical Tables* (Table 8, p.16) in the *Health Insurance Commission Annual Report 1993-4.* An average cost of $22.18 was applied for each General Practitioner attendance and $47.90 for a specialist attendance.

As is the case with Emergency Department attendances, the total estimate will be understated because the database only records the first G.P. attendance and one subsequent visit or referral to another service or specialist.

4.4.4 OTHER COSTS

Because of the requirements of the sponsors and the limitations of the project in terms of the availability of reliable data, time and resources, costing decisions have been based on justifiable minimum costs to produce an estimate of the cost of hospital and medical treatment of injury. They are based on data currently available for Australian injury fatalities, hospitalisations and estimated non-hospitalised cases and include costs associated with hospitalisation, Emergency Department attendances, General Practitioner, specialist and allied health professional attendances in so far as these can be ascertained from the available data.

In order to establish the estimated total direct cost of hospital and medical treatment of injury, costs from other available sources which provide estimates of outlays beyond the scope of this study were combined with estimates established here. Using the methodology developed in this study, a conservative estimate of the cost of private hospital admissions and associated Emergency Department and other medical attendances for Victoria and New South Wales was established. Cost estimates associated with nursing home accommodation and pharmaceuticals were derived from a preliminary costing study currently being undertaken by the Australian Institute of Health & Welfare and the NHMRC National Centre for Health Program Evaluation.

5. RESULTS

5.1 LATROBE VALLEY STUDY AREA

Data from the Latrobe Valley study area (postcodes 3869, 3870, 3825, 3840, 3842 and 3844) was used to establish the degree of consumer product involvement in injury and to establish proportions for the number of non-hospitalised injury cases attending hospital Emergency Departments and general practitioners.

5.1.1 INJURY PROFILE

A summary of the estimated number of non-intentional injuries, at different levels of severity (the level of treatment is often used as a rough guide to the severity of an injury), in the Latrobe Valley study area for 1991-92 appears in Table 1.

TABLE 1 : LATROBE VALLEY STUDY AREA

INJURY PROFILE 1991-92
NON-INTENTIONAL INJURY

Injury severity	Frequency	Ratio
FATALITIES	11	1
HOSPITALISATIONS	627	57
NON-HOSPITALISED CASES	15,300 *	1391
TOTAL NON-INTENTIONAL INJURIES	**15,938**	

Sources : Fatalities - Coronial Services Victoria Database
Hospitalisations - Victorian Inpatient Minimum Dataset (MUARC subset)
Non-hospitalised Cases - Victorian Injury Surveillance System (VISS)
- Extended Latrobe Valley Injury Surveillance (ELVIS)

* Estimate based on 1991-92 VISS Emergency Department attendances adjusted for 95% ascertainment rate and 6 months of ELVIS G.P. attendances (7/11/94-6/5/95) adjusted for 70% ascertainment rate.

Charts 1-3 show the injury profile (by E-code group) for each type of treatment service for the Latrobe Valley study region : General Practitioner attendances, Emergency Department attendances and hospital admissions respectively . Since the number of non-intentional injury deaths in the Latrobe Valley study region is small (n=11, 1991-92), Chart 4 shows the profile for unintentional injury deaths in Victoria for comparison with the other injury profiles for the Latrobe Valley.

It is clear that falls, 'other', 'hit/struck & crush' and 'cutting & piercing' injuries are the predominant causes of non-hospitalised, non-intentional injuries (general practitioner and Emergency Department attendances). Falls (45%) also account for the single greatest cause of unintentional injury hospitalisation followed by 'other' (18%), 'hit, struck & crush' (9%), 'non-traffic or non-motor vehicle' (9%) and 'motor vehicle traffic' accidents (8%) . The greatest cause of death, however, was 'motor vehicle traffic' accidents which accounted for 61% of all unintentional injury fatalities in Victoria in 1991-92 (see Chart 4). This was followed by 'non-traffic/non-motor vehicle' (9%) accidents, 'threat to breathing' (7%), poisoning (7%) and falls (7%).

5.1.2 CONSUMER PRODUCT INVOLVEMENT

5.1.2.1 Injury fatalities

Table 2 shows the breakdown of Victorian non-intentional injury fatalities into product involvement categories. Ninety four percent of all unintentional injury deaths in 1991-92 were consumer product-related (Categories 2-5) while in 11% of cases (Categories 4 & 5), consumer products may have directly contributed to the death.

The most common cause of non-intentional injury death in Victoria is motor vehicle traffic accidents followed by falls and threat to breathing. An analysis of Victorian fatalities (see Table 2) indicates that in 1.24% of all motor vehicle traffic accident fatalities, the vehicle in which the decedent was travelling was unroadworthy which may have contributed to their death. In a further 5.38% of all motor vehicle traffic fatalities (including motorcyclists, cyclists and pedestrians) a design solution or safety device was available which may have prevented the death. In most cases, this involved a failure to wear a seat-belt.[9] The presence of automatic seat-belts or airbags in such situations may have prevented some of these deaths. Although airbags are becoming an increasingly common safety feature of cars in Australia, it was beyond the scope of this study to estimate the number of cases in which such a device may have prevented or reduced other motor vehicle traffic injuries or deaths. [10]

Although the use of alcohol as a contributing factor in injury or death has not been costed in this study, because of the difficulty or impossibility of deriving reliable information about its use from the available databases, it should be pointed out that Victorian Coronial data suggests that over 21% of motor vehicle traffic fatalities involved BAC readings over 0.05 in 1991-92. Overall, high alcohol consumption was implicated in 19% of all non-intentional injury deaths.

The cause of death with the highest percentage of product failure/malfunction is fire/flames. In this study, the failure or malfunction of a consumer product (Category 5) accounted for 29% of all fire-related deaths. Another 37% of these deaths may have been prevented if

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[9] Other studies have indicated that the proportion of non-seat-belt wearing occupants amongst front seat occupants killed in crashes in Australia is an alarming 37% (Fildes et al. 1991; Ryan et al. 1988).

[10] It is likely that the incorporation of driver and front passenger airbags in motor vehicles would reduce significantly the severity of injury in certain types of crashes. Fildes et al. (1994) concluded that the incorporation of a full-size driver airbag into the national fleet would result in an annual reduction in vehicle occupant trauma costs in Australia of 15% or $476 million ($A 1991). Studies in the United States report that "Relative to comparable cars with manual belts only, driver fatalities in frontal crashes were reduced in airbag cars by 28 percent." (The Insurance Institute for Highway Safety cited in Zador and Ciccone, 1991) Furthermore, the Highway Loss Data Institute (1991) suggests drivers in airbag cars experienced 28% lower severe injury rates and 24% lower hospital inpatient rates than drivers of automatic-belt cars, standardised for differences in car size.

known design solutions had been implemented. In all, 66% of fire-related deaths could be said to be consumer product "caused" (Categories 4 & 5). It is also likely that some of the fire-related fatalities assigned to Category 3 (Feature contributed but degree unclear) should have been assigned to Category 4 (Design solution or safety device available) assuming that smoke detectors were not installed if they were not mentioned in the text. Given the brevity of the description, however, it was not possible to make this assumption.

Although overall, fire-related deaths accounted for only 3.24% of Australian non-intentional injury fatalities in 1991-92 (see Table), it should also be noted that extensive property damage is often associated with fire deaths. Although the majority of fires do not result injury or death, they do cost the community an enormous amount in property damage and, according to the Melbourne Metropolitan Fire Brigade (personal communication) the majority of residential structure fires are caused by consumer product malfunction or misuse.

In 1994-95, the Melbourne Metropolitan Fire Brigade attended approximately 9,000 fires (all types) which accounted for a total of almost $478 million in property damage alone. Figures from 1993-94 suggest that almost 18% of all fires were started by electrical equipment and over 21% by children playing with matches or other ignition sources. Fifty-four percent of these (or over 10% of all fires) involved cigarette lighters.

Brief examples of the type of injury events causing death are provided in Appendix 4, Table 1 in a matrix containing injury type (E-code group) by product involvement.

5.1.2.2 Injury hospitalisations

Table 3 shows the breakdown of non-intentional injury hospitalisations from the 1991-92 VISS Latrobe Regional Hospital admissions (n=496) into product involvement categories. Eighty per cent of all unintentional injury hospital admissions were product-related (Categories 2-5) while sixteen percent were considered to be product-caused (Categories $ & 5). Six percent were identified as caused by a product malfunction or failure (Category 5) and almost 10% of injury admissions may have been prevented, or the severity of injury reduced, if known design solutions had been implemented or appropriate safety equipment used (Category 4). Brief examples of the type of injury events causing hospitalisation are provided in Appendix 4, Table 2 which shows injury type (E-code group) by product involvement.

5.1.2.3 Non-hospitalised injury cases

Table 4A shows the breakdown of a sample of non-hospitalised injury attendances (n=1786) at the Latrobe Regional Hospital Emergency Department over a three year period (1991-94) into E-code categories by product involvement. Table 4B provides a breakdown of product involvement by treatment type for the same cases for the purpose of costing. Brief examples of the type of injury events causing attendance at an Emergency Department are provided in Appendix 4, Table 3 in a matrix containing injury type (E-code group) by product involvement.

TABLE 2 : **NON-INTENTIONAL INJURY DEATHS**
VICTORIAN FATALITIES 1991-92

E-CODE CATEGORY X PRODUCT INVOLVEMENT

	E-Code Category	PRODUCT INVOLVEMENT					TOTAL			
		1 None or incidental	2 Involved due to proximity	3 Involved but unclear	4 Design solution available	5 Failure/ malfunction contributed	No. of cases	% of unintentional fatalities	ALCO-HOL	Other drugs
1	**Motor vehicle traffic**			**451**	**26**	**6**	**483**	60.83%	**102**	**9**
	% of category			93.37%	5.38%	1.24%			21.12%	1.86%
2	**Motor Vehicle Non-traffic & Other Transport**			**60**	**4**	**5**	**69**	8.69%	**4**	**3**
	% of category			86.96%	5.80%	7.25%			5.80%	4.35%
3	**Threat to Breathing**	**22**	**3**	**23**	**8**	**3**	**59**	7.43%	**8**	**2**
	% of category	37.29%	5.08%	38.98%	13.56%	5.08%			13.56%	3.39%
4	**Poisoning**			**54**	**2**		**56**	7.05%	**29**	**35**
	% of category			96.43%	3.57%				51.79%	62.5%
5	**Falls**	**17**	**7**	**25**	**2**	**3**	**54**	6.80%	**6**	
	% of category	31.48%	12.96%	46.30%	3.70%	5.56%			11.11%	
6	**Fire/flames/heat (burns)**			**13**	**14**	**11**	**38**	4.79%	**2**	
	% of category			34.21%	36.84%	28.95%			5.26%	
7	**Hit/Struck/Crush**	**4**	**1**	**9**		**3**	**17**	2.14%		
	% of category	23.53%	5.88%	52.94%		17.65%				
8	**Cutting/piercing**						**0**	0.00%		
	% of category									
9	**Other**	**1**		**16**		**1**	**18**	2.27%		
	% of category	5.56%		88.89%		5.56%				
NON-INTENTIONAL INJURY DEATHS		**44**	**11**	**651**	**56**	**32**	**794**	100%	**151**	**49**
% of non-intentional fatalities		5.54%	1.39%	81.99%	7.05%	4.03%	100%		19.02%	6.17%

Source : Coronial Services Victoria Database

TABLE 3 : **HOSPITALISED NON-INTENTIONAL INJURIES (1991-92)**
Latrobe Regional Hospital (VISS admissions)

E-CODE CATEGORY X PRODUCT INVOLVEMENT

	E-Code Category	PRODUCT INVOLVEMENT 1. None or incidental	2. Involved by proximity	3. Involved but degree unclear	4. Design solution available	5. Failure/ malfunction	Admitted injury cases	% of injury admissions
1	**Motor vehicle traffic**			**44**	**8**	**2**	**54**	10.9%
	% of category			81.48%	14.81%	3.70%		
2	**Motor Vehicle Non-traffic & Other Transport**		**1**	**26**	**8**	**2**	**37**	7.5%
	% of category		2.70%	70.27%	21.62%	5.41%		
3	**Threat to Breathing**			**6**	**1**		**7**	1.4%
	% of category			85.71%	14.29%			
4	**Poisoning**			**8**	**5**	**2**	**15**	3.0%
	% of category			53.33%	33.33%	13.33%		
5	**Falls**	**46**	**69**	**79**	**15**	**6**	**215**	43.3%
	% of category	21.40%	32.09%	36.74%	6.98%	2.79%		
6	**Fire/flames/heat (burns)**	**2**	**4**	**5**	**2**	**2**	**15**	3.0%
	% of category	13.33%	26.67%	33.33%	13.33%	13.33%		
7	**Hit/Struck/Crush**	**24**	**18**	**25**	**4**	**7**	**78**	15.7%
	% of category	30.77%	23.08%	32.05%	5.13%	8.97%		
8	**Cutting/piercing**	**2**	**6**	**16**	**4**	**5**	**33**	6.7%
	% of category	6.06%	18.18%	48.48%	12.12%	15.15%		
9	**Other**	**25**	**5**	**7**	**1**	**4**	**42**	8.5%
	% of category	59.52%	11.90%	16.67%	2.38%	9.52%		
	ADMITTED INJURY CASES	**99**	**103**	**216**	**48**	**30**	**496**	100.0%
	% of injury admissions	20.0%	20.8%	43.5%	9.7%	6.0%	100.0%	

TABLE 4A : **NON-HOSPITALISED, NON-INTENTIONAL INJURY EMERGENCY DEPT. ATTENDANCES**
Latrobe Regional Hospital (sample of VISS cases, 1991-94, n=1786)

E-CODE CATEGORY X PRODUCT INVOLVEMENT

	E-Code category	DEGREE OF PRODUCT INVOLVEMENT					Non-hospitalised E.D. cases (sample)	% of non-hospitalised E.D. attendances
		1. None or Incidental	2. Involved by proximity	3. Feature contributed but degree unclear	4. Design solution/safety equipment available	5. Product failure/ malfunction		
1	**Motor vehicle traffic**			**68**	**9**	**7**	**84**	4.70%
	% of category			80.95%	10.71%	8.33%		
2	**Motor vehicle non-traffic & other transport**			**47**	**7**	**3**	**57**	3.19%
	% of category			82.46%	12.28%	5.26%		
3	**Threat to breathing**			**9**			**9**	0.50%
	% of category			100.00%				
4	**Poisoning**	**2**		**13**	**2**	**2**	**19**	1.06%
	% of category	10.53%		68.42%	10.53%	10.53%		
5	**Falls**	**124**	**157**	**103**	**49**	**10**	**443**	24.80%
	% of category	27.99%	35.44%	23.25%	11.06%	2.26%		
6	**Fire/flames/heat (burns)**		**8**	**33**	**24**	**7**	**72**	4.03%
	% of category		11.11%	45.83%	33.33%	9.72%		
7	**Hit/struck/crush**	**103**	**189**	**66**	**19**	**20**	**397**	22.23%
	% of category	25.94%	47.61%	16.62%	4.79%	5.04%		
8	**Cutting/piercing**	**14**	**66**	**142**	**27**	**15**	**264**	14.78%
	% of category	5.30%	25.00%	53.79%	10.23%	5.68%		
9	**Other**	**270**	**38**	**67**	**17**	**49**	**441**	24.69%
	% of category	61.22%	8.62%	15.19%	3.85%	11.11%		
Non-hospitalised E.D. cases (sample)		**513**	**458**	**548**	**154**	**113**	**1786**	100.00%
% of non-hospitalised E.D. attendances		28.72%	25.64%	30.68%	8.62%	6.33%	100.00%	

TABLE 4B : **NON-HOSPITALISED, NON-INTENTIONAL INJURY EMERGENCY DEPT. ATTENDANCES**
Latrobe Regional Hospital (sample, VISS cases, 1991-1994)

PRODUCT INVOLVEMENT X LEVEL OF TREATMENT

	Product Involvement	Minor treatment			Significant treatment					TOTAL SAMPLE CASES	
		Assess-ment only	No referral	**sub-total**	Referral				**sub-total**	n	%
					O.P.D.	G.P.	other	Casualty review			
1	**None or incidental**	31	201	**232**	7	126	16	132	**281**	**513**	28.72%
2	**Proximity**	37	199	**236**	7	108	10	97	**222**	**458**	25.64%
3	**Involved but unclear**	27	212	**239**	7	157	20	125	**309**	**548**	30.68%
4	**Design solution**	13	45	**58**	4	35	0	57	**96**	**154**	8.62%
5	**Failure/Malfunction**	7	29	**36**	0	24	4	49	**77**	**113**	6.33%
	TOTAL*	115	686	**801**	25	450	50	460	**985**	**1786**	100.00%
	% of all unintentional injury E.D. cases	6.44%	38.41%	44.85%	1.40%	25.20%	2.80%	25.76%	55.15%	100.00%	

5.2 COST OF INJURY IN AUSTRALIA

5.2.1 ALL INJURY

5.2.1.1 Deaths

In 1991-92, the annual average frequency of non-intentional injury fatalities in Australia was 4,630 (62% of all injury deaths excluding medical misadventure and adverse effects of prescribed medication.) accounting for an estimated $11,575,000 in coronial costs alone (see Table 5). Because this study is confined to estimating the direct cost of hospital and medical treatment of injury, costs to the consumer such as funeral expenses and loss of family earnings have not been considered nor have possible costs to government such as supporting benefits and loss of income tax revenue.

5.2.1.2 Hospitalisations

In 1991-92 in Australia, there were 267,931 hospital separations due to unintentional injury. These accounted for almost $911 million in hospital inpatient costs based on hospital bed-days (see Table 6) and almost $20 milion in Emergency Department attendance costs (see Table 7) or a total of almost $931 million.

5.2.1.3 Non-hospitalised Injury Cases

Emergency Department Attendances

Using the adjusted NISU admission rate of 13.8%, the expected number of non-hospitalised, injury cases attending Emergency Departments in Australia in 1991-92 (based on 267,931 hospital separations) was 1,941,529.

The total annual cost of non-hospitalised Emergency Department cases of non-intentional injury in Australia is estimated at almost $197 million. This figure includes the cost of a single follow-up visit or referral to a specialist or other service in 55% of cases. It does not include further visits which may have been required or the cost of diagnostic tests. (Based on the treatment profile of cases attending the Latrobe Regional Hospital's Emergency Department, the 1,941,529 cases are estimated to account for at least 3,012,305 attendances at Emergency Departments, Outpatient Departments, general practitioners and/or other health professionals.)

General Practitioner attendances

Based on adjusted estimates of General Practitioner presentations and Emergency Department attendances for the Latrobe Valley study area, the ratio of G.P. : E.D. attendance was established as 2.37 : 1. Applying this ratio to the expected number of Australian E.D. attendances results in an estimated 4,597,541 non-hospitalised, non-intentional injury general practitioner cases.

The total estimated cost for G.P. attendances is just over $184 million. This figure includes the cost of a single follow-up visit or referral to a specialist or other service in 35.75% of cases. It does not include further visits which may have been required. (Based on the

treatment profile of injury cases attending general practitioners in the Latrobe Valley, the 4,597,541 cases accounted for 6,234,135 attendances at general practitioners, specialists, Emergency Departments and/or other health professionals).

Overall, there was an estimated 6,539,070 non-hospitalised, non-intentional injury cases in 1991-92. These accounted for at least 9,246,440 attendances at hospital Emergency Departments, General Practitioners, hospital outpatient services, specialists and other health professionals at an estimated cost of some $380 million.

5.2.2 CONSUMER PRODUCT-RELATED INJURY

5.2.2.1 Deaths

Table 5 applies the percentages from each product involvement category from Table 2 to the number of Australian fatalities in each E-code grouping to establish the number of cases for Australia that fall into each product involvement category and their respective cost.

Total coronial costs associated with consumer product-related injuries (Categories 2-5) in Australia in 1991-92 were estimated at $10.335 million. Coronial costs associated with consumer product failure or malfunction (Category 5) were estimated at almost $500,000 while those in which a design solution or safety device was available (Category 4) accounted for a further $725,000. Overall, consumer product "caused" injury (Categories 4 & 5) accounted for $1.225 million.

5.2.2.2 Hospitalisations

The percentages from each product involvement category from Table 3 were applied to the number of bed-days in each E-code grouping to establish the costs for each State for each product involvement category. Total bed-days for Australia and the costs derived from the sum of State totals are presented in Table 6.

Based on the Latrobe Valley VISS hospital admissions, total costs hospital inpatient costs for consumer product-related injury (Categories 2-5) for 1991-92 in Australia amount to almost $710 million with Emergency Department costs accounting for a further $15 million (see Table 7). The total cost for hospitalisations related to consumer product injury is therefore around $725 million.

Around 6% of hospital separations resulting from non-intentional injury were considered to be due to a product failure or malfunction (Category 5). The estimated cost of these injuries was almost $48 million in inpatient bed-days and $1.35 million in Emergency Department attendances making a total of just over $49 million. A further 9.7% of non-intentional injury hospital separations were attributed to situations in which a design solution or safety device may have prevented, or reduced the severity of, the injury (Category 4). The estimated cost of this group was almost $82.5 million in hospital bed-days and $2 million in Emergency Department attendances or $84.5 million in total. The estimated cost of consumer product "caused" injury hospitalisation (Categories 4 & 5) was just over $133.5 million.

5.2.2.3 Non-hospitalised Injury Cases

Emergency Department Attendances

By applying the percentages from Table 4 to the estimated annual number of Australian Emergency Department attendances (n=1,941,529), a table was generated to establish the number of cases for Australia that fall into each product involvement category. Costs applied to these figures are presented in Table 8.

The total cost of non-hospitalised Emergency Department attendances for consumer product-related injury (Categories 2-5) in Australia is estimated at over $140 million annually. Costs associated with product failure or malfunction were estimated at almost $14 million (4.31%) with another $18 million (5.38%) attributed to situations in which a design solution or safety device may have prevented, or reduced the severity of, the injury. Overall, the cost of consumer product "caused" (Categories 4 & 5), non-hospitalised Emergency Department attendances and referrals was estimated at just over $32 million.

General Practitioner Attendances

Table 9 shows the estimated costs for each consumer product involvement category for all non-hospitalised, non-intentional injury G.P. attendances.

The total cost of non-hospitalised, consumer product-related injury cases (Categories 2-5) attending general practitioners was estimated at just over $140 million annually. Costs associated with product failure or malfunction were estimated at just over $11.6 million with another $15.9 million attributed to situations in which a design solution or safety device may have prevented, or reduced the severity of, the injury. Overall, the cost of consumer product "caused" (Categories 4 & 5), non-hospitalised General Practitioner attendances and referrals was estimated at $27.5 million.

5.2.2.4 Summary

A summary of costs derived from the available data appears in Table 10. It is clear from the table that over 75% (just over $1 billion) of the direct medical and hospital costs of injury in Australia are consumer product-related (Categories 2-5).

Hospital and medical costs associated with a product malfunction or failure (Category 5) was estimated at $75,237,727 while a further $119,065,791 was attributed to cases in which a known design solution exists or safety equipment is available but was not used (Category 4). Direct hospital and medical costs for consumer product "caused" (Categories 4 & 5) therefore totals $194,372,655.

It should be noted that there will be a proportion of cases within Categories 2 and 3 for which preventative measures such as design solutions or safety equipment may also apply. These categories account for the bulk of treatment costs for consumer product-related injury with a total of almost $812.5 million.

TABLE 5 : **NON-INTENTIONAL INJURY DEATHS**
AUSTRALIA, 1991-92 (Annual Average)
ESTIMATED CORONIAL COSTS

	E-Code category	DEGREE OF PRODUCT INVOLVEMENT					*Annual Average Number 1991-92*	Total cost ($)*
		1. None or Incidental	2. Involved by proximity	3. Feature contributed but degree unclear	4. Design solution/ safety equipment available	5. Product failure/ malfunction		
1	**Motor vehicle traffic**			2002	115	27	***2144***	**5,360,000**
2	**Motor vehicle non-traffic & other transport**			275	18	23	***316***	**790,000**
3	**Threat to breathing**	162	22	170	59	22	***435***	**1,087,500**
4	**Poisoning**			215	8		***223***	**557,500**
5	**Falls**	298	123	439	35	53	***948***	**2,370,000**
6	**Fire/flames/heat (burns)**			51	55	43	***149***	**372,500**
7	**Hit/struck/crush**	17	4	38		13	***72***	**180,000**
8	**Cutting/piercing**			10			***10***	**25,000**
9	**Other**	19		295		19	***333***	**832,500**
	ALL UNINTENTIONAL INJURY	***496***	***149***	***3495***	***290***	***200***	***4630***	
	(annual average number 1991-92)							
	Total cost ($)*	**1,240,000**	**372,500**	**8,737,500**	**725,000**	**500,000**		**11,575,000**

* Costing equals number of cases multiplied by an average $2500 per death. A rough estimate of the direct cost of death to government was established by dividing the annual budget of the Victorian Coroner's Office (approx. $5,000,000 annually) by the number of deaths investigated (approx. 2,000).

Source of death data : National Injury Surveillance Unit.

TABLE 6 : **NON-INTENTIONAL INJURY HOSPITALISATIONS**
AUSTRALIA, 1991-92
ESTIMATED HOSPITAL INPATIENT COSTS

	E-Code category	DEGREE OF PRODUCT INVOLVEMENT						
		1. None or Incidental	2. Involved by proximity	3. Feature contributed but degree unclear	4. Design solution/ safety equipment available	5. Product failure/ malfunction	*ALL NON-INTENTIONAL INJURY (total bed-days)*	Total cost ($A)*
1	**Motor vehicle traffic**			195504	35531	8877	***239912***	**132,191,512**
2	**Motor vehicle non-traffic & other transport**		1845	48011	14771	3696	***68323***	**37,645,973**
3	**Threat to breathing**			5188	865		***6053***	**3,335,203**
4	**Poisoning**			24449	15280	6116	***45844***	**25,260,044**
5	**Falls**	187679	281431	322212	61215	24468	***877005***	**483,229,755**
6	**Fire/flames/heat (burns)**	6686	13378	16723	6686	6686	***50160***	**27,638,160**
7	**Hit/struck/crush**	25075	18808	26118	4180	7310	***81491***	**44,901,541**
8	**Cutting/piercing**	2700	8101	21607	5401	6751	***44560***	**24,552,560**
9	**Other**	142757	28542	39982	5732	22833	***239847***	**132,155,697**
ALL UNINTENTIONAL INJURIES (total bed-days)		***364,897***	***352,104***	***699,794***	***149,662***	***86,737***	***1,653,195***	
Total cost ($)*		**201,058,494**	**194,009,426**	**385,586,482**	**82,463,740**	**47,792,303**		**910,910,445**

* Figures include private hospital bed-days for all States and Territories except Victoria and N.S.W.
Source of bed-day data : National Injury Surveillance Unit.

TABLE 7 : **HOSPITALISED EMERGENCY DEPARTMENT INJURY ATTENDANCES**
AUSTRALIA, 1991-92
ESTIMATED EMERGENCY DEPARTMENT COSTS

E-Code category		DEGREE OF PRODUCT INVOLVEMENT					*Number of hospitalised cases*	Total cost ($A)
		1. None or Incidental	2. Involved by proximity	3. Feature contributed but degree unclear	4. Design solution/safety equipment available	5. Product failure/ malfunction		
1	**Motor vehicle traffic**			24840	4516	1129	***30486***	**2,262,671**
2	**Motor vehicle non-traffic & other transport**		453	11776	3623	906	***16758***	**1,243,779**
3	**Threat to breathing**			1777	296		***2073***	**153,858**
4	**Poisoning**			9296	5810	2324	***17430***	**1,293,655**
5	**Falls**	20371	30557	34985	6643	2657	***95213***	**7,066,709**
6	**Fire/flames/heat (burns)**	783	1566	1957	783	783	***5871***	**435,746**
7	**Hit/struck/crush**	8202	6152	8544	1367	2392	***26657***	**1,978,483**
8	**Cutting/piercing**	1087	3261	8697	2174	2718	***17938***	**1,331,358**
9	**Other**	33039	6608	9251	1322	5286	***55505***	**4,119,581**
Number of hospitalised cases		*53478*	*55639*	*116680*	*25929*	*16206*	***267,931***	
Total cost ($A)		**4,711,630**	**3,606,799**	**8,247,578**	**1,969,382**	**1,350,449**		**19,885,839**

* Based on Australian hospital separations 1991-92 (NISU) multiplied by $74.22 (average cost on "non-inpatient service", H.U.C.S., 1991-92. p73).

TABLE 8 : **NON-HOSPITALISED, NON-INTENTIONAL INJURY CASES**
EMERGENCY DEPARTMENT ATTENDANCES*
AUSTRALIA
ESTIMATED ANNUAL COST

Product involvement	Minor treatment			Significant treatment					TOTAL ESTIMATED	
	Assess-ment only	No referral	**sub-total**	Referral				**sub-total**	***Number***	**Cost ($)**
				O.P.D.	G.P.	other	Casualty review			
1 None or incidental	33,700	218,504	**252,203**	7,610	136,972	17,393	143,495	**305,470**	***557,673***	**56,476,665**
2 Proximity	40,222	216,329	**256,551**	7,610	117,405	10,871	105,447	**241,332**	***497,884***	**48,468,739**
3 Involved but unclear	29,351	230,461	**259,813**	7,610	170,672	21,742	135,885	**335,908**	***595,721***	**59,691,537**
4 Design solution	14,132	48,919	**63,051**	4,348	38,048	0	61,964	**104,360**	***167,411***	**18,190,800**
5 Failure/Malfunction	7,610	31,525	**39,135**	0	26,090	4,348	53,267	**83,705**	***122,840***	**13,857,647**
Number of cases	*125,014*	*745,738*	***870,753***	*27,177*	*489,187*	*54,354*	*500,058*	***1,070,776***	***1,941,529***	
Total cost ($)	9,278,574	55,348,709	**64,627,282**	4,034,162	47,157,630	6,637,725	74,228,589	**132,058,106**		**196,685,389**

* based on NISU hospital separation figures and assuming rate of 13.8% hospitalisations to emergency department attendances.

* NOTE : Costings are based on first and subsequent visit (ie. referral, review) only since database does not record further visits in relation to the injury.

All "minor treatment" is costed as one "non-inpatient treatment" of $74.22 (Hospital Utilisation & Costs Study, 1991-92, p. 73)

"O.P.D. referral" & “E.D. review" are costed at as 2 "non-inpatient treatments".

"G.P. referrals" are costed as one "non-inpatient treatment" ($74.22) and one average G.P visit ($22.18, H.I.C., p.16).

"Other referrals" are costed as one "non-inpatient treatment" ($74.22) and one "specialist attendance" ($47.90, H.I.C., p16).

TABLE 9 : **NON-HOSPITALISED, NON-INTENTIONAL INJURY CASES**
GENERAL PRACTITIONER ATTENDANCES
AUSTRALIA
ESTIMATED ANNUAL COST

Product Involvement#	Minor treatment			Significant treatment							Unknown	TOTAL ESTIMATED	
	Assess-ment only	No referral	**Minor treatment total**	Observ-ation in practice	Referral spec-ialist	Referral emerg-ency	Referral other	Review without	Review following investigation	**Significant treatment total**	disposal	***Number***	**Cost ($)**
1 None or incidental	200,681	628,769	**829,450**	2,344	31,415	8,440	28,602	245,225	156,137	**472,163**	19,224	***1,320,837***	**52,881,912**
2 Proximity	179,165	561,357	**740,523**	2,093	28,047	7,535	25,535	218,934	139,397	**421,541**	17,163	***1,179,227***	**47,212,311**
3 Involved but unclear	214,373	671,668	**886,041**	2,504	33,558	9,016	30,553	261,955	166,790	**504,377**	20,536	***1,410,953***	**56,489,839**
4 Design solution	60,243	188,753	**248,997**	704	9,431	2,534	8,586	73,615	46,872	**141,741**	5,771	***396,509***	**15,874,882**
5 Failure/malfunction	44,205	138,501	**182,705**	516	6,920	1,859	6,300	54,016	34,393	**104,005**	4,235	***290,945***	**11,648,452**
Number of cases	*698,667*	*2,189,048*	***2,887,716***	*8,162*	*109,371*	*29,383*	*99,576*	*853,745*	*543,589*	***1,643,827***	*66,928*	***4,598,471***	
Total cost ($)	15,496,434	48,553,085	**64,049,519**	181,033	7,664,720	2,832,521	4,417,209	37,872,139	65,605,783	**118,573,405**	1,484,472		**184,107,396**

* NOTE : Costings are based on first and subsequent visit (ie. referral, review) only since the database does not record further visits in relation to the injury.

All "minor treatment", "observation in practice" & "unknown disposal" G.P attendances are costed at a minimum $22.18 per visit being the average value of benefit per G.P. service (H.I.C. Annual Report , 1993-94, Medicare & Pharmaceutical Benefits Statistical Tables, p.16)

"Specialist referral" cases are costed by adding the average specialist attendance cost of $47.90 to the average G.P. attendance cost of $22.18.

"E.D. referral" cases are estimated by adding the cost of average cost of an E.D. attendance of $74.22 (H.U.C.S., 1991-92, p.73) to the average cost of a G.P. attendance ($22.18)

"Other referral" & "review without investigation" are costed at 2 average G.P. visits (ie. 2 x $22.18)

"Review with investigation" is costed at 2 average G.P visits ($44.36) plus the average cost of diagnostic imaging ($76.33).

"Product involvement" based on a sample of 1786 non-hospitalised Emergency Department attendances at Latrobe Regional Hospital.

TABLE 10 : **ESTIMATED DIRECT HOSPITAL & MEDICAL COSTS CONSUMER PRODUCT-RELATED INJURY AUSTRALIA, 1991-92**

INJURY LEVEL X PRODUCT INVOLVEMENT

		PRODUCT INVOLVEMENT					
			CONSUMER PRODUCT-RELATED				
					CONSUMER PRODUCT-"CAUSED"		
	INJURY LEVEL	**1**	**2**	**3**	**4**	**5**	**TOTAL**
		None or Incidental ($ million)	**Involved by proximity** ($ million)	**Involved but degree unclear** ($ million)	**Design solution available** ($ million)	**Failure/ malfunction** ($ million)	**UNINTENTIONAL INJURY** ($ million)
1	**FATALITIES**						
	Coronial costs	1.240	0.373	8.737	0.725	0.500	**11.575**
2	**HOSPITALISATIONS**						
	Bed-day costs	201.058	194.009	385.586	82.464	47.792	**910.910**
	E.D. Attendance	4.712	3.607	8.248	1.969	1.350	**19.886**
	NON-HOSPITALISED						
3	**E.D. Attendances**	56.477	48.469	59.692	18.191	13.858	**196.687**
4	**G.P. Attendances**	52.882	47.212	56.490	15.875	11.649	**184.108**
	TOTAL UNINTENTIONAL INJURY	**316.369**	**293.670**	**518.753**	**119.224**	**75.149**	**1,323.164**

Note : Totals subject to rounding error.

5.3 UNDERSTATEMENT OF STUDY ESTIMATES

5.3.1 VICTORIAN TRANSPORT ACCIDENT COMMISSION COSTS

The degree to which these estimates of direct cost of treatment for injury may be understated is revealed by comparing the estimated cost of medical and hospital treatment for motor vehicle traffic injuries and deaths in Victoria with the actual cost of claims paid out by the Transport Accident Commission (TAC) for the same period, 1991-92. All Victorian residents are covered for transport accidents in Victoria and also for interstate accidents where a Victorian registered vehicle is involved, regardless of fault.

Using the methodology described in this study, the cost of medical and hospital treatment for motor vehicle traffic injuries in Victoria in 1991-92 is estimated to be $27,358,661. The cost of hospital and medical treatment paid out by the TAC for that period was actually $35,983,472 (or 31.5% more than the study estimate).

Some of this difference will be accounted for by the fact that the TAC figures represent the total cost of medical and hospital treatment relating to an injury. In this study, however, because of the limitations of the databases, it was only possible to cost total hospital bed-days and one Emergency Department attendance for each hospitalised case. For non-hospitalised cases only the first and a single subsequent visit for medical treatment, where appropriate, are recorded in the database. Coronial costs of $1,207,500 were attributed to motor vehicle traffic accident fatalities in this study bringing the total estimate for costs associated with motor vehicle traffic injury and death in Victoria in this study to $28,566,161 in 1991-92.

The TAC paid out a further $3,261,868 for ambulance transport, $410,120 for rehabilitation, $3,175,593 for paramedical treatments and $1,444,682 in funeral expenses by the TAC in 1991-92. These costs were not included in the current study because of the difficulties inherent in establishing these costs across the entire range of injury causes. In total, the TAC paid out $44,275,736 for treatment and funeral costs associated with injuries and deaths caused by motor vehicle traffic accidents in Victoria in 1991-92 (almost 55% more than the total estimate in this study).

It should also be noted that TAC cases under-represent the number of motor vehicle accident cases in the health sector databases. In 1991-92, TAC claims did not include "journey to work" or work-related cases. (The TAC assumed direct responsibility for "journey to work" claims for accidents that occurred on or after 1 December, 1992.) The TAC also does not cover the first $378 of health care expenses (Brennan & Deeble, 1993, p.24), so many minor injuries that attend Emergency Departments or G.P.s would not be recorded.

Motor vehicle traffic accidents that occurred in 1991-92, accounted for a further $16,095,965 in 1992-93 and $8,467,837 in 1993-94 in treatment costs paid out by the TAC indicating the extent of ongoing hospital and medical costs associated with certain types of injury. Over the last six years of the TAC's operation, 71% of all no-fault claims receive treatment and/or compensation for three months or less, a further 13% for 4-18 months and 6% for 19-36 months. Ten per cent of claimants were still receiving treatment and/or compensation 3 years or more after their accident.

Furthermore, when loss of earnings and other losses are included the total TAC payments for no-fault claims for motor vehicle traffic accidents in Victoria have been over $150 million annually and slowly rising since 1991-2 (due to the increasing pool of permanently disabled cases). In addition, common law claim payments topped $70 million in 1991-92 rising to over $120 million in 1993-94.

5.3.2 OTHER SOURCES OF UNDERSTATEMENT

The total estimate for the cost of hospital and medical treatment of injury in Australia is also understated because of the exclusion of **intentional** injury cases at all levels of severity. Using the same methodology as that described in Section 4, the minimum cost of hospital and medical treatment for intentional injury in Australia in 1991-92 was estimated at over $93 million (see Appendix 5).

The estimate for the treatment cost of consumer product "caused " injury is also understated because, for the purposes of this study and due to the limitations of the available data, the definition of consumer product "caused" has been confined to Categories 4 and 5 (as described in Appendix 2.

5.4 ADDITIONAL TREATMENT COSTS

In order to establish a range within which total outlays on hospital and medical treatment of injury might lie costs from other available sources which provide estimates of outlays beyond the scope of this study have been combined with estimates established here to provide the upper limit of the range.

5.4.1 PRIVATE HOSPITAL COSTS - NEW SOUTH WALES & VICTORIA

The Australian hospitals separations data supplied by NISU includes both public and private hospital separations for all States except N.S.W. and Victoria which, at that time, only collected data from public hospitals. As such the total number of injury-related hospital separations for Australia will be somewhat understated. It is not possible to separate the data, as supplied, into public and private categories.

In order to establish a more complete estimate of the number of injury cases and the associated treatment costs for Australia in 1991-92, an estimate of the number of private hospital admissions in New South Wales and Victoria was required. Based on the proportion of public to private hospital injury admissions (approx. 4:1) recorded in the VIMD in 1993-94, a conservative ratio of 5:1 was applied to the total number of N.S.W. and Victorian public hospital separations for 1991-92 (n=144,214) to establish private hospital separations of 29,643 at an estimated inpatient cost of $59.2 million and $2.2 million in Emergency Department attendances.

Using the methodology developed in this study, it was estimated that a further $43 million could be attributed to non-hospitalised cases for medical treatment. In total, an extra $105.5 million dollars could be added to the original estimate of hospital and medical treatment costs for non-intentional injury. Of this, almost $78 million could be attributed to consumer product-related injury (Categories 2-5) with just over $15 million attributable to consumer product "caused" injury.

5.4.2 OTHER TREATMENT COSTS

The Australian Institute of Health and Welfare (AIHW) and the NHMRC National Centre for Health Program Evaluation (NCHPE) are currently working on a project to estimate direct costs to the health sector attributable to various classes of medical condition (Carter & Penm, 1993). Injury is one of the general types of condition currently being costed.

Direct health service costs were estimated for six parts of the health sector : public hospitals, private hospitals, nursing home, medical (ie. general practitioner and specialist costs), pharmaceutical costs and allied health professional costs. Estimates were based on information about numbers of services, global costs of service provision (based on the national accounts), and some assumptions about cost allocation.

While the AIHW/NCPHE study does not include the cost of Emergency Department attendances, it does include costs relating to nursing home accommodation and pharmaceuticals. The extra costs attributed to these areas in 1989-90 for all non-intentional injury totalled $361.242 million . Using proportions derived from this study, it is estimated that almost $280 million of this could be attributed to consumer product-related injury with just over $43 million attributable to consumer product-"caused" injury.

5.5 SUMMARY

5.5.1 TOTAL HEALTH SECTOR EXPENDITURE ON UNINTENTIONAL INJURY

Table 11 summarises the estimated direct hospital and medical treatment costs for unintentional injury in Australia in terms of consumer product involvement. The MUARC study estimates are the costs derived from the available data in this study as summarised in Table 10. These figures represent the cost of medical and hospital treatment that can be derived from the available injury related databases. To establish an estimate for total health sector expenditure, estimated costs of private hospital treatment in Victoria and New South Wales and estimates of nursing home accommodation and pharmaceutical costs from the AIHW/NCHPE study have been added (see Table 11).

It is estimated that the total health sector expenditure for **all non-intentional injury** in Australia in 1991-92 is **$1.79 billion** while total outlays on treatment for **all consumer product related injury** is estimated at **$1.364 billion** Total health sector expenditure for **consumer product “caused” injury** was estimated at **$253 million**.

TABLE 11 : **ESTIMATED DIRECT TREATMENT COSTS OF NON-INTENTIONAL INJURY**
(excluding medical misadventure, complications and adverse effects of prescribed medication.)
AUSTRALIA (1991-92) Combined costs from available sources

Consumer product involvement	**MUARC study estimates** (Coronial, hospital inpatient, E.D. & G.P. attendances) ($ million)	+	**Extra private hospital cost estimates** (N.S.W. & Victorian private hospital admissions) ($ million)	+	**Extra AIHW/NCPHE cost estimates** (Nursing home accommodation & pharmaceuticals) ($ million)	=	**TOTAL DIRECT TREATMENT COSTS** ($ million)
ALL NON-INTENTIONAL INJURY	1,323.2	+	105.5	+	361.2	=	1,789.9
Consumer product-related injury (Categories 2-5)	1,006.8	+	77.7	+	279.6	=	1,364.1
Consumer product -"caused" injury (Categories 4 & 5)	194.4	+	15.3	+	43.2	=	252.9
Government outlays on the direct cost of consumer product-”caused” injury	194.4	+			43.2	=	237.6

5.5.2 GOVERNMENT OUTLAYS ON CONSUMER PRODUCT-"CAUSED" INJURY

Because of the inclusion of private hospital admissions (except in the case of Victoria and N.S.W.) in the hospital admissions data and the complex relationship between government services and injury compensation systems that operate in different states, it is difficult to provide a definitive estimate of total government outlays on the treatment of consumer product "caused" injury**.** However, the range within which total government outlays might reasonably be expected to lie is **between $194 million and $238 million.** This range excludes Victorian and N.S.W. private hospital costs. It does include some costs such as motor vehicle injury and work-related injury costs which are compensable. Work-related injury could not be identified in the hospital separations data and therefore could not be separated out. Motor vehicle injury costs were identifiable but, because only a small percentage of these fall into the consumer product "caused" category (3.7% of bed-days attributed to motor vehicle accidents or 0.5% of total bed-days), no attempt has been made to exclude them given the possible understatement of these estimates and the complexities of the different systems in each State.

6. CONCLUSION

The total direct cost of hospital and medical treatment of non-intentional consumer product-"caused" injury to is quite significant at $253 million. While government total outlays on treatment are estimated at between $194 million and $238, the Commonwealth bears most of this burden through its support of State hospital systems and Medicare.

It should be noted, however, that hospital and medical costs represent only a small proportion of the real cost of injury. For example, estimates by the Bureau of Transport and Communication Economics (1992) suggest that medical, hospital and rehabilitation costs account for only 2.4% of the total cost of all road accidents. Of the total estimated crash cost in 1993 of $6.1 billion (BTCE, 1994), which accounts for 90% of transport-related accidents in Australia, hospital and medical treatment (including rehabilitation) accounted for $256.2 million.

In comparison, lost earnings of victims accounted for $829.1 million (14%), family and community losses for $587.8 million (10%), vehicle damage $1868.3 million (30%), pain and suffering(24%), insurance administration $571.1 million (9%) and other $816.4 million (13%)[11].

While property losses in relation to motor vehicle accidents account for a significant proportion of the costs, other categories of accident such as structure fires also result in considerable property damage.

According to the Australian Consumers Association (A.C.A., 1989, pp. 42-43), the main economic cost of injury to consumers is loss of income. For injured adults, a serious injury will often result in loss of earnings that can run into ten of thousands of dollars while serious injury to a child often requires at least one parent to stop working to look after the child at home or visit them in hospital. Other examples of costs to individuals and their families provided by A.C.A. include :

damage to property;
employing someone else to run a business;
loss of promotion due to considerable time off work;
special tutoring for a brain-damaged child (after choking between cot bars);
cost of child-minding after death of spouse in product-related fire;
funeral expenses;
the cost of legal representation at an inquest;
legal expenses in seeking compensation.

The A.C.A. notes that while the cost of a defective product is usually low, the economic cost of a serious injury is very large. The manufacturer generally bears only a very small proportion of the cost since compensation for lost earnings, medical treatment or pain and suffering are rarely obtained with the vast bulk of costs incurred being borne by the injured person's family and by Medicare.

[11] The 'other' category (BTCE, 1992) comprises costs relating to hospitalisation and rehabilitation (2.4%), medical treatment (1.8%), legal and court costs (2.9%), traffic delay (4.5%), accident investigation (0.9%), losses to others (0.3%), ambulance and rescue (0.1%).

6.1 RECOMMENDATIONS

The cost of injury provides important baseline information necessary for establishing benefits-cost estimates for intervention strategies. It is also necessary to determine appropriate resourcing of the research and intervention effort in this area.

The high cost of even the medical and hospital costs of consumer product-related injury indicate the need to undertake a program aimed at reducing the frequency and severity of such injury.

To this end, the following recommendations are made as a result of this study :

1. Establishment of a centralised clearing house to integrate and analyse data from all available sources (nationally and internationally) to identify potentially dangerous products and to disseminate information to regulators and other responsible bodies. It is clear from the difficulties encountered in developing the methodology for this project that there is a need for such a centralised data collection facility with a coordinating function.

2. Development of a system similar to that operated by the Consumer Product Safety Commission in the United States where representative injury surveillance data is utilised as the basis of in-depth specific product-related injury studies.

3. Commissioning of an in-depth study to establish the total cost of consumer product-related injury. As evidenced in estimates established by the BTCE for the cost of road traffic accidents, the cost of hospital and medical treatment represents only a small proportion of the total cost of injury. A large-scale study is necessary in which individual cases are followed up to establish the true cost of consumer product-related injury to the health care sector, to the individual, their family and the community.

4. Improvement to the coding systems used in the various databases to facilitate a more consistent identification of consumer product involvement in injury. This is particularly the case for hospital admission data. While hospital inpatient costs account for the major part of treatment estimates, information relating to the cause of injury is confined to E-codes and it is therefore not possible to distinguish (from morbidity databases) the level of consumer product involvement in hospitalised injuries.

5. Estimation of the cost of other types of injury, eg. sports injury and child injuries to provide baseline data for benefit-cost estimates of intervention programs. The current trend towards casemix costing based on AN-DRGs (Australian National Diagnosis Related Groups) for other medical conditions is inappropriate for the costing of injury because most injury categories (based on external cause of injury) are subsumed within AN-DRG categories based on anatomical systems. However, the methodology developed in this study has direct applicability to the costing of other types of injury.

6. Clarification of the extent, and nature of, the injury classifications of medical misadventure, complications due to surgery and the adverse effects of prescribed medication by :

(a) Undertaking fieldwork to validate the classifications and to determine whether they are applied consistently.

(b) Conducting a study in the form of a rigorous mass data analysis to breakdown these classifications and to establish their characteristics.

(c) Conducting a study to determine product involvement in this area.

It was not possible, using the available data, to provide reliable estimates of the cost of medical misadventure, complications due to surgery or the adverse effects of prescribed medication yet these categories of injury account for 106,622 cases recorded in the 1991-92 national hospital morbidity data (compared to 267,931 non-intentional injury hospitalisations for the same period). These cases generally involve persons who have been hospitalised for other medical conditions but whose records are assigned an E-code when there are complications resulting from surgery or adverse effects of medication. However, the number of bed-days recorded for such cases refer to the entire period of hospitalisation for the original condition rather than for the additional days that may be attributed to the medical misadventure, etc. Consequently, there can be no reliable bed-day count or subsequent costing based on the current coding system. These cases clearly represent a poorly understood, yet significant sector of recorded injury hospitalisations in terms of numbers, consumer product involvement and cost.

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GLOSSARY

- **AIHW** Australian Institute of Health and Welfare
- **AN-DRG** Australian National Diagnosis Related Group
- **BAC** Blood alcohol content
- **BTCE** Bureau of Transport and Communication Economics
- **CPI** Consumer Price Index
- **E-CODE** Mechanism of injury code from the ICD-9-CM
- **EHLASS** European Home and Leisure Accident Surveillance System
- **ELVIS** Extended Latrobe Valley Injury Surveillance
- **GPSD** General Product Safety Directive
- **HASAC** Health and Safety Advisory Council
- **ICD-9-CM** Annotated International Classification of Diseases, 9th. Revision, Clinical Modification (ICD-9-CM).
- **ISIS** Injury Surveillance Information System
- **LRH** Latrobe Regional Hospital
- **MUARC** Monash University Accident Research Centre
- **NHMRC** National Health & Medical Research Council
- **NCHPE** National Centre for Health Program Evaluation
- **NISU** National Injury Surveillance Unit
- **OBD** Occupied bed-day
- **PANCH** Preston and Northcote Community Hospital
- **TAC** Transport Accident Commission
- **VIMD** Victorian Inpatient Minimum Dataset
- **VISS** Victorian Injury Surveillance System

APPENDICES

APPENDIX 1

DEFINITION : European Economic Community General Product Safety Directive

Excerpt from :

Page, M., Lee, V. & Powell, L. (1993) Adaptation of the classification of consumer products in the European Home and Leisure Accident Surveillance System (EHLASS) to support the General Product Safety Directive (GPSD). In ECOSA, European Consumer Safety Association *Proceedings International Conference on Product Safety*, Amsterdam, 22-23 November, 1993

WORKING CONCLUSIONS

Consumer products: the EC intends the Directive to cover any new, used or reconditioned product placed on, or offered to, the marked which is not restricted effectively and exclusively for use or consumption in any form by a business or by persons in the course of their work. It has been necessary to establish whether the product is *likely to be used by consumers* and consider the product's likely alternative use and misuse. Having carried out this exercise it suggests that any feature to which the public have legitimate access should be covered by the Directive. We have therefore concluded that apart from the obvious consumer products the following categories of products are also considered to be consumer products within the scope of the Directive:

- items in public places for use by consumers
- industrial products used by consumers in domestic settings or public facilities
- work clothes that are not confined exclusively to use at work
- constructional features of buildings, whether permanently installed in buildings or not domestic and public buildings themselves
- money
- food, including harvested agricultural products made available to the consumer
- domesticated animals in a domestic or publicly accessible setting
- artificial sources of ignition and materials ignited
- man-made features of the environment accessible to the public
- private transport vehicles and Public Service Vehicles
- fireworks
- component parts of products and instructions

Commercial supply: the EC intends the Directive to cover any new, or reconditioned products supplied for use by consumers, by any organisation acting in a commercial way. There is no requirement for the products to have been supplied directly to the consumer and neither is it necessary for money to have been paid for the products. Apart from features of the natural environment, the only products specifically excluded are those produced by private individuals carrying out that production in a non-commercial way, which means not on a regular basis with the intention of profiting from the sale.

Normal and reasonably foreseeable use: the EC intends the Directive to cover not only the specific designed use of the product but other aspects of its use that can be reasonably foreseen by a responsible and competent producer. Of particular concern in this context is the use of products by children under the age of 10 since they frequently use products in ways that the producer never intended but which he must nevertheless guard or warn against. Other vulnerable groups such as the physically and mentally handicapped and elderly people must also be treated as special groups when behaviour with the product is being considered. Unreasonable behaviour by adults in cases where the product was **adequately** protected by warnings or guarding should not be the responsibility of the producer.

A high level of protection: the EC intends the Directive to ensure that products placed on the market are safe. It requires a high level of safety that ensures that only products that present a minimal level of risk, compatible with use, are placed on the market. It is inextricably linked to the concept of foreseeable use and safety, and is determined by compliance with national or Community legislation and standards.

Use of a product: the EC intends the Directive to cover all aspects of use of a product in the same way as it requires producers to anticipate foreseeable use. Use is therefore concluded to cover active use, both in accordance with the producer's intentions and other foreseeable uses, passive use in which the user is not making any physical contact with the product, and non-use in which the user is injured by a product that he or she is not using at all but to which he or she is simply adjacent.

Injury and damage to health: the EC intends the Directive to cover both short term injury and longer term damage to health. Although not specifically stated it is also assumed that the Directive is concerned about the long term damage to unborn children as is the case with the Product Liability Directive. Accidents involving consumer products both at work and on the roads are also assumed to be included as are accidents involving products in which there was no actual effect on safety or health but where there was a risk of such an effect.

Levels of risk: the EC intends the Directive to take account of as many as possible, if not all, of the risks associated with a product. However, it would appear that for those products in which an inherent risk is an essential feature, manufacturers are still required to reduce that risk to a minimum and ensure the protection of users by means of instructions and other safeguards. In particular the safety of at-risk groups needs to be carefully considered and catered for. It is also clear that the provision of warnings about risks does not remove the requirements to reduce those risks to a minimum.

Second-hand products: the EC intends the Directive to specifically exclude antiques, when the consumer is informed by the supplier to this effect. Furthermore the Directive excludes second-hand products requiring reconditioning or repair only when the specific nature of that repair has been made clear to the consumer. Vague information regarding the need for repair is not considered to be adequate grounds for exclusion from the Directive.

APPENDIX 2

E-CODE CATEGORIES

UNINTENTIONAL INJURY

	Category Label	Cause of Injury	ICD E-codes
1	**Motor Vehicle Traffic**		
		Motor vehicle traffic accident	810 - 819
2	**Motor Vehicle Non-traffic & Other Transport**		
		Motor vehicle non-traffic accident	820 - 825
		Non-motor road vehicle accident	826 - 829
		Railway transport accident	800 - 807
		Water transport accident	830 - 838
		Air transport accident	840 - 845
		Vehicles accident not elsewhere classified	846 - 848
3	**Threat to Breathing**		
		Drowning	910
		Aspiration, food & non-food	911- 912
		Suffocation	913
4	**Poisoning**		
		Pharmaceuticals	850 - 858
		Alcoholic beverages, ethanol	860/.0 - .1
		Petroleum products, solvents	862
		Agricultural & horticultural chemicals	863
		Foodstuffs, poisonous plants	865
		Motor vehicle exhaust	868.2
		Other/unspecified substance	860/.2-.9, 861, 864, 866, 867, 868/.0-.1, 868/.3-.9, 869
5	**Falls**		
		Stairs	880
		Ladder/scaffold	881
		Building/structure	882
		Playground equipment	884.0
		Different level	884/.1, .2, .9
		Same level : slip, trip, stumble	885
		Same level : in sport	886.0

APPENDIX 2, cont.

E-CODE CATEGORIES

Category Label	Cause of Injury	ICD E-codes
5. Falls cont.		
	Fracture - cause unspecified	887.0
	Other/unspecified fall	883, 886.9, 888, 884/.3-.8, 886.9
6 Fire/Flames/Heat (Burns)		
	Housefires	890
	Clothing ignition	893
	Hot substance, object, steam	924/.0, .8, .9
	Other/unspecified thermal	891, 892, 894-899
7 Hit/Struck/Crush		
	Struck by falling object	916
	Collision in sport	917.0
	Other collision	917/.1-.9
	Caught/crushed	918
8 Cutting/Piercing		
	Cutting/piercing	920
9 OTHER :		
	Excessive heat	900
	Excessive cold	901
	Exposure/neglect	904
	Dog bite	906.0
	Firearm	922
	Machinery	919
	Explosion	921, 923
	Electric current	925
	Other/unspecified non-intentional	902, 903, 905, 906/.1-.9, 907, 908, 909, 924.1, 926-929

APPENDIX 2, cont.

E-CODE CATEGORIES

	Category Label	Cause of Injurys	ICD E-codes
10	**MEDICAL MISADVENTURE, etc.**		
		Medical misadventure, complications, etc.	870-879, 930-949
	INTENTIONAL		
11	**Suicide**		
		Motor vehicle exhaust (suicide)	952.0
		Hanging (suicide)	953.0
		Firearm (suicide)	955/.0-.4
		Poison, solids/liquids (suicide)	950
		Cutting/piercing (suicide)	956
		Other/unspecified (suicide)	951, 952/.1-.9, 953/.1-.9, 955/.5-.9, 957-959
12	**Interpersonal violence**		
		Unarmed fight/brawl	960.0
		Firearm	965/.0-.4
		Cutting/stabbing	966
		Child battering/maltreatment	967
		Other/unspecified (interpersonal violence)	960/.1-.9, 961-964, 964/.5-.9 968-978, 990-999
13	**Undetermined Intent**		
	69	Undetermined Intent	980-989

APPENDIX 3

DEGREE OF PRODUCT INVOLVEMENT IN INJURY

Operational definitions for the categories of product involvement are :

1. **No product identified or product incidental to injury.**

   No consumer product was identified in the case narrative or the product mentioned in the narrative was incidental to the actual injury event.

2. **Product involved due to proximity.**

   This category mainly involves cases in which the person was injured by falling over or against a manufactured object or architectectural feature or falling onto a manufactured surface or an object was dropped onto the person causing injury. In some cases the injury may have been prevented if the object were designed differently or a surface or object was manufactured from softer materials. Features could be modified to be less hazardous, e.g. the height of coffee tables is hazardous to small children in that it allows access to often dangerous items e.g. hot drinks. The height of coffee tables is also a factor in causing injury to this same age group should they fall since toddlers often hit their head on furniture at this height. Surfaces such as flooring and walls and edges of furnishings and fittings may also be modifed to provide a safer living environment.

3. **Product identified but description of event inadequate to enable a judgement.**

   A consumer product was identified as involved in the injury event in the case narrative but the description of the event did not allow a judgement to be made as to the degree of involvement of the product in the aetiology of the injury. Most motor vehicle have been assigned to this category because it was not possible to assess from the available information whether or not the injury was due to a feature or failure on the part of the vehicle or whether certain safety devices currently available (e.g. airbags) may have prevented or reduced the resulting injuries. In cases such as these, it is not possible to make a judgement about the degree of product involvement without an extensive study of the specific situation in which an injury occurred by safety experts in the fields of engineering, epidemiology and consumer safety. Such a study was beyond the scope of this project.

4. **A design solution or safety equipment is currently available which may have prevented, or reduced the severity, of the injury.**

   Cases in which there is a known design solution or safety equipment available were assigned to this category. In some cases (e.g. some trampoline injuries) safety equipment (such as padding for the metal frame) are not provided as standard equipment by the manufacturer. In others, safety equipment such as seat belts are provided but not worn.

5. **A malfunction or failure of the product contributed to the injury.**

This category involves cases where a malfunction or failure of a consumer product contributed to the injury. It is difficult to know from the one-line narrative whether such malfunctions are the result of a fault on the part of the product, or misuse or lack of maintenance on the part of the user. Misuse of a product by the consumer may result from inadequate instructions on the part of the manufacturer. However, in many cases it should be possible to design a product to prevent (or at least greatly reduce) the possibility of its misuse.

APPENDIX 4

Examples of Injuries : Product Involvement by Injury Type (E-Code group)

Table 1 : Deaths (Victorian Coronial Services, 1991-92)

Table 2 : Hospitalisations (Victorian Injury Surveillance System, Latrobe Regional Hospital, 1991-92)

Table 3 : Non-Hospitalised Emergency Department Attendances (Victorian Injury Surveillance System, Latrobe Regional Hospital, sample 1991-94)

TABLE 1 : DEATHS 1991-92

E-code Group	Product incidental or no product involvement 1	Product involved in injury event due to proximity 2	Product involved but inadequate description of injury event 3	Design solution or safety equipment available which may have prevented injury 4	Product failure/malfunction contributing to injury 5
			Product Involvement		
1 Motor vehicle traffic accidents			• Most vehicles involved resulted from loss of control.	• Not wearing seat belt (Airbag or automatic belts may have prevented death). • Not wearing helmet. • Train level crossing not controlled by gates or warning signals.	• Unroadworthy vehicle. • Inflatable boat ruptured and sank.
2 Motor vehicle non-traffic & other transport accidents			• Yacht overturned. • Most other transport accidents involved planes, trains and boats. • Walking/lying on railway tracks. • Flying in bad weather.	• Tractor overturned (roll bars/cabin available).	• Leaky boat sank.
3 Threat to breathing	• Drowning in sea/river/etc..	• Drowned attempting to recover boat.	• Drowned in bath tub/pool. • Drugs/alcohol-related. • Asphyxia. • Choked on food (meat).	• Slipped and drowned in spa/pool (non-slip surfaces available for wet areas).	• Failure of pool fencing. • Asphyxiation due to cot design.
4 Poisoning			• Drug overdose/toxicity. • Alcohol toxicity. • Drug and alcohol overdose/toxicity.	• Carbon monoxide poisoning (design change to car exhaust).	
5 Falls	• Fell from higher ground (eg. cliff). • Fell into quarry. • Collapsed and fell.		• Fell from moving vehicles. • Fell from ladder/stairs. • Fell from horse/bed.	• Dragged by horse. Foot caught in sirrups (safety stirrups available).	• Ceiling/verandah collapsed. • Parachute failed.

Source : Coronial Services Victoria Database

TABLE 1, cont. : DEATHS 1991-92

Product Involvement

E-code Group	Product incidental or no product involvement 1	Product involved in injury event due to proximity 2	Product involved but inadequate description of injury event 3	Design solution or safety equipment available which may have prevented injury 4	Product failure/malfunction contributing to injury 5
6 Fire/Flames/Burns	• Smoke inhalation.		• Burns from lighting wooden oven - spilt fat/sparks. • Smoke inhalation from caravan fire.	• Clothes caught fire from smouldering cigarette. • Cigarette-related fires causing burns (self-extinguishing cigarettes would prevent).	• Fire started by faulty appliances (eg. radio, lamp, electric blanket, toaster). • Faulty wiring.
7 Hit/Struck/Crush	• Struck/crushed by tree.		• Struck/hit/crushed by falling tree/tyre/machinery /structure/furniture.		• Struck/hit by collapsing brick wall.
8 Cutting/Piercing					
9 Other non-intentional injuries			• Electrocution from trimming trees/repairing electrical appliances/ maintenance. • Heat stroke in car. • Kicked by horse, causing cardiac failure.		• Faulty wiring of junction box causing electrocution.

Source : Coronial Services Victoria Database

TABLE 2 : HOSPITALISATIONS, Latrobe Regional Hospital, 1991-92

Product Involvement

E-code Group	Product incidental or no product involvement 1	Product involved in injury event due to proximity 2	Product involved but inadequate description of injury event 3	Design solution or safety equipment available which may have prevented injury 4	Product failure/malfunction contributing to injury 5
1 Motor vehicle traffic accidents			• Lost control of vehicle.	• No seat belt worn.	• Poor road surface.
2 Motor vehicle non-traffic & other transport accidents		• Child fell off stationary motorcycle.	• Lost control of bicycle. • Lost control due to unstable/poor road conditions.	• Tractor rolled (Roll bars?) • No bicycle helmet.	• Bike brakes failed. • Front of bicycle broke.
3 Threat to breathing			• Choked on food/food stuck in throat.	• Choked on peanut (No warning on packaging of peanuts of danger to children under 5 years).	
4 Poisoning			• Accidental overdose of medication/alcohol.	• Child-resistant caps on bottled medication. • Better/safer packaging of blister/capsule medication packets.	• Accessed tablets from locked cupboard. • Failure of child resistant caps.
5 Falls	• Slipped/fell over grass/lawn/ground • Lost balance. • Climbed and fell.	• Slipped/tripped and fell off/over fence/machinery /structure /bed/floor.	• Slipped/tripped over/lost footing on stairs, mat, cord, skates, floors. • Fell from playground/sporting equipment. • Horse shied. • Lost balance and fell.	• Fell off swing/monkey bars (soft/bark surface and height of equipment). • Fell/rolled out of bunk/bed/cot (bed/cot protection/barrier and height of bed/cot). • Fell out of shopping trolley (child restraint available).	• Strap/chain came undone. • Tripped on sprinkler spike. • Chair collapsed.

Source : Victorian Injury Surveillance System Database

TABLE 2, cont. : HOSPITALISATIONS, Latrobe Regional Hospital, 1991-92
Product Involvement

E-code Group	Product incidental or no product involvement 1	Product involved in injury event due to proximity 2	Product involved but inadequate description of injury event 3	Design solution or safety equipment available which may have prevented injury 4	Product failure/malfunction contributing to injury 5
6 Fire/Flames/Burns		• Used petrol to ignite fire. • Accidental tipping of hot liquids by toddlers.	• Smoke and gas inhalation during firefighting. • Hot oil burn. • Cement burns.	• Clothes caught alight by stray welding spark exploding petrol tank (non-flammable work clothes).	• Hot water heater ignited in front of face. • Burnt by car backfire.
7 Hit/Struck/Crush	• Caught under rolling limbed log (protective clothing worn).	• Hit by sporting equipment. • Foot caught on furniture/metal. • Hit head on furniture/machinery/ product.	• Kicked by horse. • Jarred/caught/slammed finger in furniture/ structure/ machine.	• Cricket/baseball ball hit eye (no helmet with shield worn). • Hinge-side of door finger jam injuries (protective shield available).	• Failed machinery/product.
8 Cutting/piercing injuries	• Pushed onto a stick.	• Trod on sewing needle. • Hand cut by knife whilst washing/cleaning. • Finger injured by nail/brick wall whilst working.	• Cut by saw, glass, tools whilst working with products.	• Architectural glass injuries. (Higher glass/window grade).	• Saw/chainsaw kicked-back (safety shield, guards, apron did not prevent injury).
9 Other non-intentional injuries	• Bitten/stung by insect, spider, snake. • Over-exertion, over-stretched. • Injured knee playing basketball.	• Swallowed money. • Foreign body flew into eye.	• Electrical shock from picking up broken lamp/repairing electrical problem. • Choked on fishbone. • Electrocuted when removing metal panel off some switches (safety boots, hat, apparel worn).	• No head/eye protection used for hobby/task.	• Electrical shock due to faulty wiring (isolator did not latch).

Source : Victorian Injury Surveillance System Database

TABLE 3 : NON-HOSPITALISED EMERGENCY DEPARTMENT ATTENDANCES, Latrobe Regional Hospital, sample 1991-94.

Product Involvement

E-code Groups	Product incidental or no product involvement 1	Product involved in injury event due to proximity 2	Product involved but inadequate description of injury event 3	Design solution or safety equipment available which may have prevented injury 4	Product failure/malfunction contributing to injury 5
1 Motor vehicle traffic accidents			• Lost control of vehicle - slipped/skidded/rolled. • Wet/slippery road surface.	• Not wearing seat belt (airbag or automatic belts available). • Impact with dashboard (airbag). • Touched motorcycle exhaust pipe during a fall off bike (leg pads/boots).	• Petrol fumes ignited car whilst driving. • Car tyre blew, car spun. • Truck side door flew opened. • Motorcycle throttle stuck, causing loss of control.
2 Motor vehicle non-traffic & other transport accidents			• Lost control of bike - fell. • Bike slipped/skidded on wet/slippery surface. • Uneven road/pavement surface. • Boat flipped at high speed, burnt by exhaust.	• Pants caught in bicycle causing fall (chainguard). • Not wearing bicycle helmet.	• Trailbike brake failure. • Toe/foot caught in pedal/under linkage of vehicle.
3 Threat to breathing			• Fish bone stuck in throat. • Food/fruit stuck in throat.		
4 Poisoning	• Toddler ate toadstools whilst playing outdoors.		• Syphoned petrol - swallowed petrol. • Drank too much alcohol.	• Ingested disinfectant/all purpose cleaner (child resistant caps). • Ingested cough syrup/ medicine (CRCs). •	• Child drank bottle of panadol (failure of child resistant cap). • Inhaled escaping ammonia.

Source : Victorian Injury Surveillance System Database

TABLE 3, cont. : NON-HOSPITALISED EMERGENCY DEPARTMENT ATTENDANCES, Latrobe Regional Hospital, sample 1991-94.

Product Involvement

E-code Groups	Product incidental or no product involvement 1	Product involved in injury event due to proximity 2	Product involved but inadequate description of injury event 3	Design solution or safety equipment available which may have prevented injury 4	Product failure/malfunction contributing to injury 5
5 Falls	• Playing sport - tripped/ slipped and fell/landed awkwardly (ankle/knee guards available). • Fell into hole on ground. • Lost balance, fell over. • Slipped on rocks/uneven surfaces/loose items. • Fell from tree climbing.	• Slipped/fell off/over fence/loose items on floor/wood/ furniture/toys. • Cut leg in grass roller-skating. • Slipped and fell on to tiles/concrete surface. • Tangled in bedclothes/bed linen/blankets - fell out of bed. • Fell off kitchen bench. • Toy hit eye during fall. • Hit head on table edge.	• Slipped on slippery/wet surfaces/floor. • Fell/tripped on roller skates. • Slipped/fell down stairs. • Caught foot on trailer edge. • Fell from horse. • Fell/slipped off furniture/ structure/stairs/playground equipment/ladder. • Lost control of skateboard and fell. • Rollerblading - fell. • Foot caught on step of log conveyor, causing fall. • Slipped on kitchen floor.	• Fell out of high chair/bunk bed/shopping trolley (harness available). • Fell off trampoline and hit edge/bar (safety pads available). • Fell on slippery/wet floor/surface (non-slip surfaces for wet areas). • Tripped over shoelace (safety laces available). • Fell from horse, foot caught in (safety stirrups available). • Tripped/fell over on roller skates (no helmet/knee pads/stirrup wrist pads). • Pram tipped over.	• Babywalker tipped over - hit head on window sill (Childsafe walker). • Slipped whilst climbing monkey bars - landed on tan bark. • Ladder buckled & twisted whilst climbing - fell. • Walker fell down back steps onto concrete. • Tripped over uneven surface.
6 Fire/Flames/Burns		• Brushed hot barbeque. • Burnt arm/hand against hot appliance/element.	• Splashed by hot fat. • Slipped and fell on hot tray/hot. • Burnt by hot food/liquid/ steam/hot lime. • Burnt by ignited chemicals.	• Eye flash burns from welding (tinted safety shield). • Radiator burns to eyes/face (design change prevents) from boiling water. • Burnt by wood heater/heater (safety screens available).	• Burnt by faulty steamer which exploded during use. • Faulty crockery / mechanical parts causing burns. • Burns from exploding fumes of engine parts/gas burner.

Source : Victorian Injury Surveillance System Database

TABLE 3, cont. : NON-HOSPITALISED EMERGENCY DEPARTMENT ATTENDANCES, Latrobe Regional Hospital, sample 1991-94.

	Product Involvement				
E-code Groups	**Product incidental or no product involvement 1**	**Product involved in injury event due to proximity 2**	**Product involved but inadequate description of injury event 3**	**Design solution or safety equipment available which may have prevented injury 4**	**Product failure/malfunction contributing to injury 5**
7 Hit/Struck/Crush	• Collided/attacked by opponent in sports (mouth guard, shin pads, boots worn some of the time). • Over-exerted playing sport. • Accidental injury to self/ limbs playing sport. • Washed away by flood.	• Hit/kicked/collided against protruding furniture/ structure/ machinery/tool /sporting equipment/ vehicle. • Missed hit with hammer (gloves worn).	• Fell off playground equipment, hitting equipment on fall. • Hit by sporting equipment. • Finger jammed/caught in closing car door. • Hit bottom of pool. • Gate shut on ankle heel. • Slipped off structure, recreational equipment	• Finger/hand jammed in door hinge (door hinge protection available). • Eye hit by cricket ball (helmet/shield protection available).	• Seat in boat collapsed. • Bed settee collapsed. • Car fell off jack/stands. • Bike chain came undone, ejecting bicyclist over handle bars. • Chainsaw chain came undone during use. • Safety harness broke during abseiling. • Hit/crushed by car engine when hoist broke.

Source : Victorian Injury Surveillance System Database

TABLE 3, cont. : NON-HOSPITALISED EMERGENCY DEPARTMENT ATTENDANCES, Latrobe Regional Hospital, sample 1991-94.

Product Involvement

E-code Groups	Product incidental or no product involvement 1	Product involved in injury event due to proximity 2	Product involved but inadequate description of injury event 3	Design solution or safety equipment available which may have prevented injury 4	Product failure/malfunction contributing to injury 5
8 Cutting/piercing injuries	• Splinter in finger. • Fell/brushed on blackberry bush thorns.	• Nail on stray piece of wood hit head when it fell off fence. • Hit by falling glass. • Climbing wall/fence, cut by chipped tile/wire. • Glass slipped off hand during washing and cut foot. • Landed on/cut by/stood on broken glass. • Fork prong punctured finger during attempt to prevent its fall. • Stepped on needle left in sewing bag on floor.	• Cut by power/hand tools during hand/tool slips or loss of control. • Cut finger on protuding metal on letter box/ protruding wirefence. • Cut by household appliances eg. knives during food preparation or outdoor work. • Thumb cut by sword during sword fighting. • Fish hook cut face. • Garden appliances/tools (ie secateurs) hit foot when accidentally dropped. • Fingers caught under car bumper bar while pushing car. • Finger cut by broken tile during tile removing (gloves, glasses used). • Cut by sharp edge of staple while opening bag of rags. • Slipped whilst moving roofing iron - was cut. Cutting bale bands when they flung upwards.	• Upper extremities involved in lawnmower blade cuts (faster cut-out of mower). • Architectural glass injuries (higher grade/glass available). • Boning knife/carving knife slipped (mesh gloves available for work situations). • Cut by sheetmetal - machine switch out of reach.	• Power saw/chain saw jammed. • Finger slipped and cut by meat slicer (safety guard on appliance failed). • Screwdriver broke when used, and hit lip. • Blade in Stanley knife jammed in protective hood.

TABLE 3, cont. : NON-HOSPITALISED EMERGENCY DEPARTMENT ATTENDANCES, Latrobe Regional Hospital, sample 1991-94.

	Product Involvement				
E-code Groups	**Product incidental or no product involvement 1**	**Product involved in injury event due to proximity 2**	**Product involved but inadequate description of injury event 3**	**Design solution or safety equipment available which may have prevented injury 4**	**Product failure/malfunction contributing to injury 5**
9 Other non-intentional injuries	• Foreign body blew into eye. • Bitten by insect/animal. • Twisted ankle during a dive. • Stepped into hole/landed incorrectly after jumping. • Strained/over-exerted self during sport participation. • Tree branch poked eye. • Jarred back.	• Swallowed battery/coin/keys/ other material during play. • Fish spike snapped off during fishing. • Cotton bud/concrete chip/foreign body stuck in ear. • Split hand webbing during football.	• Bitten/attacked by dog/cat. • Sprayed detergent/air freshener onto face accidentally. • Dangerous/flammable solvents splashed into eyes.	• Squash ball hit eye (safety glasses available). • Metal/grinding fragments flew into eye during grinding/metal working (safety goggles available).	• Safety glasses/Head shields worn during welding/grinding/ metal/woodwork failed to prevent foreign body going into eyes.

Source : Victorian Injury Surveillance System Database

APPENDIX 5

INTENTIONAL INJURY

DEATHS

Intentional injury deaths accounted for 38% of all injury deaths (excluding medical misadventure and adverse effects of prescribed medication) in Australia in 1991-92. The number of deaths during this period that were intentional (or of undetermined intent), was 2859 (see Table 1).

Just over 80% of these deaths were suicides (2327). This was more than all the motor vehicle traffic fatalities for the same period. The most common causes of death by suicide were hanging (23%), followed by firearms (21%), motor vehicle exhaust (20%) and poisoning or drug overdose (18%). An analysis of Victorian mortality data indicates that the consumption of alcohol was indicated in 11% of suicide cases (See Table 2).

Interpersonal violence accounted for a further 12% of intentional injury deaths (345) with the main causes of homicide being stabbing (33%), firearms (26%) and other/unspecified (29%).

A further 187 deaths were of undetermined intent. An analysis of Victorian intentional injury deaths for 1991-92 indicates that the majority of deaths classified as 'undetermined intent' relate to drug overdose (See Table 2).

HOSPITALISATIONS

Intentional injury accounted for ten percent of all injury hospitalisations (excluding medical misadventure and adverse effects of prescribed medication) and seven percent of injury hospital bed-days in 1991-92. The number of hospitalisations during this period that resulted from intentional injury or unjury of undetermined intent was 30,996 (see Table 3). Fifty-five percent (17,082) of all intentional injury hospitalisations were due to interpersonal violence with the majority of these (58%) resulting from unarmed fights or brawls. Almost eight percent of hospitalisations attributed to interpersonal violence resulted from stabbing.

Forty-one percent of intentional injury hospitalisations were self-inflicted with the majority of these (81%) resulting from drug overdose or poisoning. Another ten percent of self-inflicted injury hospitalisations were due to cutting or stabbing.

Four percent of all "intentional" injury hospitalisations were of undetermined intent.

NON-HOSPITALISED CASES

Based on the number of non-hospitalised, intentional injury cases recorded in the Latrobe Valley study area, it is estimated that there were 279,800 non-hospitalised, intentional injury cases in Australia in 1991-92 (see Table 4). Of these, an estimated 187,511 (67%) presented at hospital Emergency Departments with the remainder (92,289 or 33%) attending General Practitioners.

Ninety-three percent (260,408) of all non-hospitalised, intentional injury cases were the result of interpersonal violence, five percent (12,782) were self-inflicted and the remaining two percent (6,610) were of undetermined intent.

DIRECT TREATMENT COSTS

All intentional injury

The estimated total direct cost of treatment (Coronial Services, hospitalisation, Emergency Department and General Practitioner attendances) for all intentional injury and death in Australia in 1991-92 was $93 million. Self-inflicted injury accounted for some $41 million while interpersonal violence cost over $48 million. Injury of undetermined intent is estimated to have cost $3.6 million (see Table 4).

Consumer product-related intentional injury

While it is often argued that a person intent on harming themselves or someone else will use whatever means is available, research suggests that this may not necessarily be the case. Harrison & Choi (1995), in their analysis of suicide in Australia from 1922 to 1992, have shown that, in at least two instances (toxic pharmaceuticals and coal-based domestic gas), restriction of access appears to have been followed by reductions in the incidence of suicide. While environmental measures alone will clearly not eliminate suicide, the potential of environmental controls as an approach to suicide prevention should not be overlooked.

For example, the widespread availability of firearms in the United States has had the result that they are used in nearly sixty percent of suicides there (Henderson, 1992). In Australia, while firearms account for 21% of suicide deaths, they are the second most common means of suicide, and are the most likely means to be effective when the attempt is made. Although the estimated direct treatment costs (coronial costs & hospital treatment only) of intentional firearm related injury and death in Australia is only about $2.5 million annually, the annual average number (1991-92) of intentional firearm-related deaths is unacceptably high at 587 (497 suicides and 90 homicides). More stringent firearms control has the potential to reduce this figure.

Further control of toxic pharmaceuticals also has the potential to reduce suicide deaths. According to Henderson (1992), in Victoria (1989-90) only 3% of illegal drug overdose deaths were intentional whereas pharmaceutical products were far more likely to be used for suicide : 50% of deaths through pharmaceutical use were self-inflicted with a further 23% of unknown intent). It is estimated that the the direct cost of treatment (coronial costs and hospital treatment only) for intentional drug overdose in Australia in 1991-92 was at least $20 million. These costs incude 559 deaths (417 self-inflicted, 142 unknown intent) and 11,248 hospitalisations.

Another area of potential suicide prevention is that of carbon monoxide poisoning from car exhaust fumes. The annual average (1991-92) number of suicide deaths in Australia through CO poisoning is 472. One hundred and ninety-nine persons were hospitalised[1] in 1991-92 for self-inflicted CO poisoning. Although the estimated direct treatment cost of theses

[1] It was beyond the scope of this study to determine how many hospitalisations resulted in death so the aggregate of death and hospitalisation figures will be higher than the actual number of cases.

injuries and death is only about $1.7 million annually, this does not include long-term care and rehabilitation of surviving cases who are likely to suffer varying degrees of brain damage (as is also likely with self-inflicted firearm injury).

According to Routley (1994), design solutions are possible for the prevention or minimization of car exhaust carbon monoxide poisoning. One that is already available and retails in the United States for around $60, is a monitor which automatically shuts off the car's engine when it senses dangerous levels of carbon monoxide in the vehicle's passenger compartment. This has the added advantage of detecting leaks of carbon monoxide through unsealed boots and rusted holes which can lead to unintentional poisoning. There is also a need to investigate the most efffective and cost efficient modification to vehicles which will impede common methods of carbon monoxide poisoning. Further improvements could also be made to engine design and in catalytic conversion techniques to complete the combustion process and thereby virtually eliminate carbon monoxide emissions. If such modifications were made mandatory through incorporation into the Australian Design Rules for motor vehicles it would make suicide by carbon monoxide poisoning from car exhaust emissions particularly difficult.

Table 1 : INTENTIONAL INJURY DEATHS AUSTRALIA, 1991-92

		AUSTRALIA '91-'92 AVERAGE	
	total count	**% of all intentional**	
SELF-INFLICTED			**% of all suicides**
Motor vehicle exhaust	**472.0**	16.51%	20.28%
Hanging	**535.5**	18.73%	23.01%
Firearm	**496.5**	17.37%	21.34%
Poison, solids/liquids	**416.5**	14.57%	17.90%
Cutting/piercing	**41.5**	1.45%	1.78%
Other/unspecified	**365.0**	12.77%	15.69%
Self-Inflicted	**2327.0**	**81.41%**	100.00%
INTERPERSONAL VIOLENCE			**% of all IPV**
Unarmed fight/brawl	**34.0**	1.19%	9.86%
Firearm	**90.0**	3.15%	26.09%
Cutting/stabbing	**113.5**	3.97%	32.90%
Child battering/maltreatment	**6.0**	0.21%	1.74%
Other/unspecified	**101.5**	3.55%	29.42%
Interpersonal Violence	**345.0**	**12.07%**	100.00%
UNDETERMINED INTENT			
Undetermined Intent	**186.5**	**6.52%**	
ALL INTENTIONAL INJURIES	**2858.5**	**100.00%**	

Source : NISU

Table 2 : **INTENTIONAL INJURY DEATHS**
VICTORIA, 1991-92

		Persons total count		% of all intentional deaths	Alcohol involvement		
SELF-INFLICTED			% of all suicides		total cases	% of category	% of all suicides
Motor vehicle exhaust		144	25.13%	23.45%	17	11.81%	2.97%
Hanging		125	21.82%	20.36%	10	8.00%	1.75%
Firearm		105	18.32%	17.10%	10	9.52%	1.75%
Poison, solids/liquids		95	16.58%	15.47%	16	16.84%	2.79%
Cutting/piercing		13	2.27%	2.12%	1	7.69%	0.17%
Other :	*drowning*	*22*	*3.84%*	*3.58%*	*2*	*9.09%*	*0.35%*
	hit by train	*21*	*3.66%*	*3.42%*	*3*	*14.29%*	*0.52%*
	jumped	*18*	*3.14%*	*2.93%*	*2*	*11.11%*	*0.35%*
	asphyxiation	*13*	*2.27%*	*2.12%*		*0.00%*	
	crashed/hit by vehicle	*8*	*1.40%*	*1.30%*	*1*	*12.50%*	*0.17%*
	fire	*6*	*1.05%*	*0.98%*	*1*	*16.67%*	*0.17%*
	electrocuted	*3*	*0.52%*	*0.49%*			
		91	15.88%	14.82%	9	9.89%	1.57%
Self-Inflicted		**573**	100.00%	**93.32%**	**54**		**10.99%**

Source : Coronial Services Victoria Database

cont. overleaf

Table 2, cont. : **INTENTIONAL INJURY DEATHS**
VICTORIA, 1991-92

INTERPERSONAL VIOLENCE		% of all IPV	
Unarmed fight/brawl	14	35.00%	2.28%
Firearm	10	25.00%	1.63%
Cutting/stabbing	12	30.00%	1.95%
Child battering/maltreatment	0	0.00%	0.00%
Other	4	10.00%	0.65%
Interpersonal Violence	**40**	100.00%	**6.51%**

UNDETERMINED INTENT		% of all unknown intent	
Poison, solids/liquids	*29*	*76.32%*	*4.72%*
Carbon monoxide	*2*	*5.26%*	*0.33%*
drowning	*2*	*5.26%*	*0.33%*
hit by train	*2*	*5.26%*	*0.33%*
car fire	*1*	*2.63%*	*0.16%*
cause unknown	*2*	*5.26%*	*0.33%*
Undetermined Intent	**38**	*100.00%*	**6.19%**

ALL INTENTIONAL INJURIES	**614**	**100.00%**

Source : Coronial Services Victoria Database

TABLE 3 INTENTIONAL INJURY HOSPITALISATIONS AUSTRALIA 1991-92

Type of Injury	Separations	Total bed-days
SELF-INFLICTED		
Motor vehicle exhaust	199	1,092
Hanging	129	1,527
Firearm	108	1,664
Poisons (drugs)	10,291	38,539
Cutting/piercing	1,295	7,429
Other/unspecified	532	6,502
N.T. all self-inflicted*	101	457
All self-inflicted	**12,655**	**57,210**
INTERPERSONAL VIOLENCE		
Unarmed fight/brawl	9,985	27,978
Firearm	83	761
Cutting/stabbing	1,301	5,469
Child battering/maltreatment	266	2,110
Other/unspecified	4,852	17,242
N.T. all interpersonal violence*	595	1,933
All interpersonal violence	**17,082**	**55,493**
Undetermined Intent	**1,259**	**5,969**
ALL INTENTIONAL INJURY	**30,996**	**118,672**

Source : NISU, Adelaide

* Total Northern Territory intentional injury hospitalisations (1988) were derived from Tables 20.19 & 20.23 in Plant, Condon & Durling (1995, pp. 193 & 195). Hospital bed-days were estimated based on the average length of stay for the rest of Australia

TABLE 4 : INTENTIONAL INJURY AUSTRALIA, 1991-92 ESTIMATED NUMBER OF CASES

	FATALITIES	HOSPITALISED *	NON-HOSPITALISED *Estimated*		TOTAL
			E.D. cases	G.P. cases	
Self-inflicted	2,327	12,655	*8,985*	*3,797*	***25,437***
Interpersonal Violence	345	17,082	*174,749*	*85,659*	***277,490***
Undetermined Intent	187	1,259	*3,777*	*2,833*	***7,869***
TOTAL	**2,859**	**30,996**	***187,511***	***92,289***	***310,796***

* Hospitalised cases will include fatalities where the death occurred during hospitalisation for injury so the total number of cases will be slightly overstated.

TABLE 5: INTENTIONAL INJURY AUSTRALIA, 1991-92 ESTIMATED COST

	FATALITIES	HOSPITALISATIONS		NON-HOSPITALISED		TOTAL
	Coronial Services	Inpatient	Emergency Dept.	Emergency Dept.	General Practitioner	
	($)	($)	($)	($)	($)	($)
Self-inflicted	5,817,500	24,428,670	9,392,912	926,648	542,500	**41,108,230**
Interpersonal Violence	862,500	23,695,511	1,267,826	18,020,233	4,488,644	**48,334,714**
Undetermined Intent	467,500	2,548,763	93,443	389,510	104,739	**3,603,955**
TOTAL	**7,147,500**	**50,672,944**	**10,754,181**	**19,336,391**	**5,135,883**	**93,046,899**

APPENDIX 6

CASE STUDIES

INTRODUCTION

While the direct cost of hospital and medical treatment for consumer product-related injury falls mainly to the Commonwealth government through Medicare, the main cost of injury events is borne by the consumer and the community at large.

The case studies outlined here attempt to quantify some of these costs. The details of events surrounding each incident have been derived from the files of Coronial Services Victoria. This source of information was chosen because it is possible to identify consumer product involvement through the case narratives available in the data base and because the circumstances surrounding each death have been thoroughly investigated through a Coronial inquest and/or other independent authorities (such as the Victoria Police or the Melbourne Metropolitan Fire Brigade's (MFB) Fire Investigation Unit).

The costings presented here have been supplied by the MFB, Ambulance Services Victoria and Coronial Services Victoria and rough estimates of police involvement have been established based on the record of investigation contained in the Coroner's files. Funeral costs have been estimated based on the average 1991-92 payments for such by the Transport Accident Commission, Victoria.

While the focus is on the direct economic costs of each incident, the human tragedy of each event and the subsequent suffering of family and friends cannot be understated. Details of less severe cases of consumer product-related injury are outlined in the Australian Consumers Association (1989) publication *An Arm and a Leg : The Human and Economic Cost of Unsafe Products.* The Occupational Health and Safety Authority (1995) have also recently published a booklet titled *A Dangerous Bloody Job* which demonstrates how farming accidents have affected the lives of eight Victorian families.

CASE NO. 1

HOUSE FIRE (Cigarette lighter)

On an August morning in 1989, a mother of five was at home in suburban Melbourne with her two youngest children, twin boys aged three years. The two boys were with her in the lounge room, when she telephoned her mother-in-law just before 11 am. While she was on the phone the boys began to run around and left the room. A few minutes later, the boys came running into the lounge screaming "Fire! Fire!". The woman said to her mother-in-law, "Mum! Fire! Help!" and dropped the phone as she ran to investigate.

She ran into the main bedroom to discover a small fire in the sprung base of her double bed. She then ran back to the lounge and tried to phone for help but the line was dead. She went back to the bedroom, grabbed a blanket to try to put the fire out but it had spread to the mattress. Unable to smother the fire, she grabbed the mattress and dragged it towards the nearby front door. While she was doing this, she yelled to the twins to run out the back door and to stay in the back yard.

Despite being burnt on the arms and legs, she managed to drag the mattress out onto the front lawn. By this time, a passerby, who had noticed the smoke from several streets away, had arrived. As he got out of his car, he heard the woman screaming something about her kids. He then ran to alert neighbours to ring the Fire Brigade. Despite the fact that only a few minutes had passed, the front of the house was already engulfed in flames and a strong westerly wind (20 knots) was fanning the fire through the ceiling space along the length of the house where the bedrooms were situated.

Meanwhile the woman had gone back into the house to search all the bedrooms and make sure the boys had gone outside, all the while screaming to them to answer her, but there was no reply. She went right through the house to the back door to see if she could see them in the yard, but they weren't there. She went back inside again to look for them, all the time calling to them but the house was full of thick, black smoke. She was unable to get any further than the middle bedroom in the passageway so she had to leave the house through the back (kitchen) door.

By this time the woman's mother-, father- and brother-in-law had arrived. The woman was in a state of panic, screaming "My kids, my kids!" and had to be restrained from entering the house again. Her brother-in-law ran to the back of the house but the kitchen was now full of black smoke and the flames were leaping through the ceiling. There was now no way into the burning house so he gained access to the children's bedrooms by breaking the window and climbing in. He quickly checked the room and under the beds for the children but they weren't there. He came out again and was helped into the next bedroom where the window was already broken. He again checked the room but there was no-one in there.

Between 30-40 people had gathered at the front of the house by now and the first two-man fire brigade unit had arrived (only 5 minutes after receiving the call). Many of the people were screaming and yelling that there were children trapped inside. The fire officer quickly checked the house and, as he could not gain access, ran back to the front of the house and established a hose line into the lounge room area which was held by bystanders. He then put on breathing gear and tried to gain access to the house through the rear kitchen door but was driven back by flames. He then ran another hose line down the driveway to the kitchen area with the help of bystanders. The fire officer then entered the kitchen and tried to get into the hallway. As he was fighting the fire, fire officers from other units arrived and began to attack the largest part of the fire in the front half of the house.

As the flames subsided, the first fire officer left his hose line and ran into the middle bedroom which was untouched by smoke and flames. He searched the room but couldn't find the children. As he moved back towards the kitchen he saw a movement from something across the doorway of the bathroom. He yelled out that he had found the children and moved into the doorway and removed a towel and debris that was across the child's body. He picked the child up and handed him to another fire officer who had come to his aid. Then moving further into the bathroom, he found the second child who was lying face up part-way under the vanity. He was also covered in plaster and debris. Picking the child up, he rushed him out of the house. The child was not breathing and, as he was laid on the driveway, another firefighter commenced cardio-pulmonary resuscitation. Although his clothing did not seem to be badly burnt, the child was burnt on the cheeks of his face. The firefighters obtained an oxygen unit from the fire rescue unit in attendance and administered oxygen to the child. By

this time, the ambulance had arrived and an ambulance officer began to assist in treating the child. The first child was being attended to by another two firefighters and an ambulance officer. He was also unconscious, but breathing, and his clothing appeared to be slightly burnt. There was skin peeling off his right arm and hand.

As the children were brought out, their mother began to wail loudly. Family and friends were trying to console her and prevent from going to her children. A policeman went to see if she was all right and whether she was in need of medical attention because her hair was singed and her lips and hands appeared to be burnt. She was unable to answer him because of her hysterical state. A family friend indicated that she was all right and the police then proceeded to clear a path for the second ambulance as there were numerous media and other vehicles parked in the street. Ambulance and fire officers were still working on the child who was not breathing as the first ambulance left with his brother for Monash Medical Centre. As the second ambulance left with the other child, the children's father arrived on foot. He was intercepted by a police sergeant who explained the situation and then escorted the family to the hospital.

An hour later the child who had failed to respond to emergency treatment at the scene was pronounced dead by a doctor at Monash Medical Centre. His body was identified by his uncle and was escorted to the Coronial Services Centre by attending police constables. The other child was in a serious condition and was transferred later that day to the intensive care unit at the Royal Children's Hospital where he also died two days later.

The Fire Investigation Unit of Melbourne Metropolitan Fire Brigade attended the fire scene two hours after the initial call. The officer conducting the investigation determined that the fire started in the base of the double bed in the master bedroom. That the children themselves reported the fire at what appears to have been its initial stages and that a cigarette lighter was found inside the door on the floor of the second bedroom (as if it had been thrown in and the door shut) suggested that the children played a direct role in starting the fire. He concluded that the fire was caused by children playing with a cigarette lighter. This finding was supported by the Coroner at the inquest into the children's death.

DIRECT ECONOMIC COSTS

The direct economic costs involved in such an incident are quite considerable. In this case the house was gutted by the fire resulting in property losses of $80,000-90,000. The attendance of the fire brigade and ambulance cost approximately $12,000. Police attendance and subsequent investigation is estimated to run to several thousand dollars. Costs associated with the deaths of the children include Coronial Services, inquest and funeral costs which are estimated at $10,000. Other costs involved included Emergency Department treatment and hospitalisation at $5,500[2]. The total cost of this incident which can be estimated on the available information is at least $135,000. Other costs which are likely to have been incurred in this case include medical costs for the children's mother who sustained burns during the incident, counselling for family members, rental accommodation, loss of income of the children's parents and possibly other family members.

MAGNITUDE OF THE PROBLEM

[2] Figures supplied by Dr. Terry Nolan, Royal Children's Hospital, Melbourne, estimated on the basis of treatment notes supplied from the Coroner's file.

Each year in the Melbourne metropolitan region alone there is an average of almost 1700 fires (around 20% of all fires attended by the MFB.) caused by children involved in some form of fire play. In 1993-94, it was estimated that over fifty percent of these (or 850 fires) involved cigarette lighters. It is estimated that the number of smaller unreported fires caused by children using cigarette lighters in the Melbourne metropolitan area may be in the region of 19,000 annually (R. Ross, MFB, personal communication).

In the three years from 1989/90 to 1991/92, there were four deaths recorded in Victoria as a result of fires started by children with cigarette lighters (Coronial Services Victoria database). All the fires were started by children aged two to three years and resulted in the deaths of themselves and/or their sibling. There has been at least two other deaths of young children in similar circumstances since (T. Hunter, MFB, personal communication). While the data on injury caused by cigarette lighters is limited, information from the Victorian Injury Surveillance System (VISS) suggests that most of these injuries (41%) occur to children under five, particularly two year olds and that these injuries are quite severe with an admission rate of 51%. In almost half of these cases the victims were playing with the cigarette lighter when the injury occurred and half of these involved a child lighting a piece of clothing or soft furnishings (Valuri, 1994).

PREVENTION

While it has been common wisdom that children light fires by playing with matches, the Melbourne MFB, through its Juvenile Fire Awareness and Intervention Program (JFAIP), has established that young children (aged two to four years) have difficulty in actually lighting matches. They found that young children viewed cigarette lighters as toys and they were able to run them along the floor on carpet creating a spark wheel (Valuri, 1994). It is clear from the previous section the majority of fires started with cigarette lighters which result in serious injury or death are caused by children under the age of five. Clearly cigarette lighters in the hands of young children are a far greater hazard than matches yet there is currently no Australian safety standard for cigarette lighters. In the United States, a mandatory safety standard has been set requiring that all disposable lighters sold are child resistant. A child resistant lighter has been available in Australia since early 1993, however, regulation may also be required to ensure the widespread uptake in this country. Tests conducted in the U.S. among children under the age of five showed that 90% could not operate the childproof lighter even after being shown how. The difference in cost between the child resistant lighter and other disposable models is around 40-50 cents, an extremely small price to pay for a child's life.

The majority of fires lit by children that result in mainly property damage (rather than serious injury) are caused by older children. Data gathered in 1994 by the JFAIP program suggests that the average age of children who light fires is eight years; 97% are boys, 70% have a smoker in the family and the average number of fires lit by each child is 12.5 (MFB, 1995). While it is estimated that 80% of these fires involve the inappropriate use of cigarette lighters (MFB, undated), it is clear that the child resistant property of a lighter would be relatively ineffective with this age group. An educational and behavioural approach as practiced by the Melbourne MFB through its Juvenile Fire Awareness and Intervention Program seems to be particularly effective with older children. The JFAIP reports that, of families followed up

after contact with the program had ceased, only 5.6% reported continued fireplay by their child and of these, there had been a marked reduction in terms of the number of fires lit.

CASE NO. 2

HOUSE FIRE (Electric blanket)

At about 4 am. on a cold July morning, a woman was woken by the sound of fire in her home. She went to investigate and noticed smoke coming from beneath the closed door of her mother's bedroom. She opened the door to find her mother face down on the floor, hitting it with her arms which were on fire. They managed to extinguish the flames and the woman then dragged her mother from the room. Because of the extent of the burns to the arms, the woman was unable to gain a firm hold of her mother and was only able to drag her to the nearby front door and onto the porch. The fact that the woman was five months pregnant also made it difficult for her to handle her mother. When her mother out was out of direct harm from the fire, she sought assistance from neighbours who called the Fire Brigade.

The woman was treated for shock and premature labour at the scene. Her mother also received treatment at the scene for burns and cuts sustained when the front window shattered as a result of the fire. She was then transported by ambulance to Monash Medical Centre and later transferred to the Burns Unit at the Alfred Hospital where she died two weeks later as a result of her injuries.

Although the fire was largely contained in the bedroom in which it started, the rest of the house was extensively damaged by smoke, heat and water. The Fire Investigation Unit of the Melbourne Metropolitan Fire Brigade were called in and their examination of the scene revealed that the fire was started by the electric blanket on the mother's bed which had overheated and ignited the bedding.

DIRECT ECONOMIC COSTS

Damage to the family home was estimated by the MFB at $50,000. The attendance of Emergency Services (fire brigade, police and ambulance) is estimated in this instance to total $17,000. Treatment costs including Emergency Department attendance and hospitalisation was approximately $17,000[3]. Costs associated with the death of the woman include Coronial Services and funeral costs which are estimated at $4,500. The total cost of this incident which can be estimated on the available information is at least $88,500. Other costs which are likely to have been incurred in this case include medical costs for the daughter, rental accommodation for the family and the costs associated with a carer or special accommodation for the woman's husband who was an invalid whom she had been caring for at home.

MAGNITUDE OF THE PROBLEM

A search of the Coronial Services database (3 years : 1989/90-1991/92) indicates two deaths in Victoria in house fires attributed to electric blankets with another two as the possible cause.

[3] Based on a proportion of the average cost of AN-DRG 911 : Extensive burns with operating room procedure (Table 10, p.55) from *National Costing Study* by KPMG Management Consulting for the Commonwealth Department of Human Services and Health.

Over the last two financial years, an annual average of 17 fires caused by electric blankets were attended by the MFB in the Melbourne metropolitan area (G.Martin, MFB, personal communication). These ranged in severity from spot fires in electric blankets to full house fires.

PREVENTION

Fires are generally started by overheating in part of the blanket which may be the result of a malfunction or poor maintenance. An electric blanket should be tested annually before use, particularly if it has been stored, by spreading it on the bed, turning it on and checking for heat spots. Free electrical testing by an accredited service-person through local councils or electricity supply authorities would also be helpful.

It is also recommended that the electric blanket only be used to warm the bed prior to retiring and that it should not be left on while sleeping.

Recent design changes to electric blankets which incorporate an electrical cut-out mechanism in case of overheating may resolve this problem. Such a system has been available for approximately four years and its efficacy in preventing such fires has yet to be determined.

The installation of smoke detectors is also recommended to provide early warning in case of fire.

CASE NO. 3

TODDLER DROWNING (Faulty gate latch on safety fence)

It was a Sunday in February and a young mother was at home with her two-year old son. Her husband and five year old son had gone out for the day and the woman was taking the opportunity to get some household chores done. In the early afternoon, she hung out the washing on the clothesline located inside the safety fence which enclosed the in-ground swimming pool. Her son was with her while she did this and left the enclosure with her when she had finished.

About an hour later the woman decided to clean the family car which was parked in the carport in the front yard. Her son came with her and spent some twenty minutes in the car playing while she washed it. While she was still cleaning the car, her son went inside and looked at a book in his bedroom. He then came outside eating an ice-cream. His mother went inside for a short time and returned to the front yard by the front door. During this time, the child walked up the side path to the backyard and entered the pool enclosure where he played around the edge of the pool with some of his toys.

His mother was still cleaning the car when she noticed that the child was not in the front yard. She went to the back yard to discover her son facedown on the bottom of the pool. It appeared that one of the child's toys had fallen into the pool and he had fallen in trying to retrieve it. His mother jumped into the pool and dragged him out. She ran round to the front of the house, carrying him and screaming for help. The next door neighbour and a doctor who lived round the corner came to her assistance. The neighbour rang the ambulance. As the doctor tried to revive the child, the child mother pleaded with him not to let her son die.

He gave mouth-to-mouth resuscitation to the child for several minutes until the arrival of the intensive care ambulance. Further attempts by doctor and ambulance officers to revive the child were unsuccessful and he was taken to the Alfred Hospital where he was pronounced dead on arrival.

The investigating police officer discovered that the locking mechanism on the gate was defective and was unable to be secured correctly to prevent a child from opening the gate. The child's parents were unaware of this until the death of their son.

DIRECT ECONOMIC COSTS

The attendance of Emergency Services (police and ambulance) is estimated in this instance to total $2,000. Costs associated with the child's death include Emergency Department attendance, Coronial Services and funeral costs which are estimated at $5,800. The total cost of this incident which can be estimated on the available information is at least $6,800. Other costs which may have been incurred in an incident such as this include medical and/or counselling costs for family members and loss of income of the children's parents and possibly other family members.

MAGNITUDE OF THE PROBLEM

Drowning is a major cause of child injury death. In the three years from 1990 to 1992 an average of almost 100 Australian children drowned annually. It is also likely that for every child drowned there are four or five admitted to hospital for near-drowning. Children under five years of age are at most risk, representing 75% of all children drowned. Of these children, those aged one to three years have the highest risk with drowning still the leading cause of injury death.

Home swimming pools are the single most common place for children to drown. Of those who drown in private pools, nearly all are under five years of age and most drown in their own home pool or in that of family or friends. Drowning tends to occur when they temporarily escape supervision and gain access to a pool that is unfenced or insufficiently protected. (Scott, 1994)

PREVENTION

The main methods of pool drowning prevention are :

1. Installation of a fence and self-closing gate that separates the pool from the house and other play areas. The fence and gate should be constructed to the Australian Standard and is most effective when it completely isolates the pool.

   The main features of a pool fence that conforms to Australian Standard Swimming Pool Safety, AS1926-1993 are :

   - height of 1.2 metres,
   - self-closing, self-latching child resistant gate,
   - resistant to climbing,
   - vertical members no more than 100mm apart,

- horizontal members at least 900mm apart.

The (interim) section of the Standard on Location of Fencing for private swimming which gives options for the location of fencing clearly states that that direct access from the building to the pool area offers greatly reduced safety and should be used in limited circumstances.

2. Maintain existing fencing and gates. The key requirement is to ensure that self-closing, self-latching child-resistant gates continue to operate correctly over time.

3. Supervise children in the pool at all times.

4. Learn what to do in an emergency.

There is currently no national umbrella regulation for fencing of swimming pools. Rather it is controlled by state or local council regulations informed by the Australian Building Code and the Australian Standard. There are two forms of regulation which apply in each State or Territory . 'New pools' include those currently under construction and those constructed after a specified date and 'existing pools' include pools constructed prior to that date. As there were an estimated 600,000 pools in Australia prior to the introduction of the first effective pool fencing laws in the early 1990s, it is obvious that existing pools are a major hazard for young children. The 1994 Summer edition of *Kidsafe* and the Autumn edition of *Safeguard* provide updates on pool fencing legislation in each State and Territory. It should be noted that while most States appear to be moving towards regulating both 'new' and 'existing' pools in relation to safety fencing, Western Australian has revoked previous legislation requiring new pools to have isolation fencing.

Information from Queensland (Pitt, 1995) , where 'new' pools have had to be fully fenced since 1/1/91 and 'existing' pools partially fenced since 1/4/92, suggests that the combination of pool fencing and high public awareness can dramatically reduce toddler pool drownings. In the first two years after pool fencing became mandatory there were only 3 toddler drownings, compared to 65 in the previous five years. While the number of toddler drownings has increased since (suggesting that publicity and promotional activities are required to remind parents and carers of the danger of backyard pools to toddlers), the figures show that 66% of all pool drownings occur in the estimated 25% of pools that are unfenced or which allow direct access from the house. Most of the remaining drownings occur when a pool gate is left open, indicating that fully fenced pools are only as safe as the pool gate (which must self-close from any position and have an effective child-resistant self-locking latch).

CASE NO. 4

HOUSE FIRE (Toaster malfunction)

Around 3 am in the morning, a couple in an affluent Melbourne suburb noticed that the house opposite theirs was on fire. While the man crossed the street and tried to alert the occupants, the woman rang the fire brigade. At this stage the fire was well alight and, although other neighbours, had arrived there was little they could do to assist. Flames and smoke were billowing from the roof and through the front windows when the first fire brigade units arrived and, with the exception of rooms along one side of the house, the whole building was totally engulfed in fire. The house was locked, as was the gate which gave access to the backyard, so firefighters had to force entry through the front door.

Searching the house was difficult due to the heavy smoke and falling debris. However, the body of a pregnant woman was found in the nursery shortly after the search commenced. It was not until after the arrival of the Fire Investigation Unit, some 45 minutes later when the fire had been contained, that the body of a man was found in the kitchen. It was believed at this stage that a young child might also be in the house and a thorough search was commenced by everyone involved in the investigation. Around midday the body of a two year old boy was discovered in the debris of the kitchen. The search had been hampered by the severe fire damage which had resulted in debris up to 0.5 metres deep on the floor. The bodies of the man and the child could were not readily identifiable and, in the case of the man, a forensic dontological examination was required to identify the body.

While the chain of events which lead to the father and child being in the kitchen at that time are unclear, evidence provided at the inquest suggested that the child had a history of playing with the toaster and that there had been problems with the toaster prior to the tragedy. Investigations by the Arson squad, the State Forensic Science Laboratory and the Fire Investigation Unit of the Metropolitan Fire Brigade lead the Coroner to conclude that the fire was caused by the toaster which was left plugged in with the power outlet switch on. The Fire Investigation Unit concluded that the fire started through an undetermined electrical malfunction in the toaster which caused overheating and eventual ignition of the bench-top. The fire had then smouldered for some time burning down through the cupboards. Once venting of the fire occurred it spread rapidly through the rest of the house. It appeared to the fire investigator that the family, or at least the parents, had been asleep at the time of the fire and had not woken till the fire was well advanced.

DIRECT ECONOMIC COSTS

The direct economic costs involved in this incident was considerable. The house was severely damaged by the fire resulting in property losses of $180,000. The attendance of the fire brigade including nine appliances, the District Officer and the Fire Investigation Unit, in this instance, cost approximately $25,000. A major investigation was conducted by the Victoria Police involving the Arson squad and the State Forensic Science Laboratory to clear up initial questions relating to intent and the involvement of other persons in the incident. This was conducted over several months and would have involved tens of thousands of dollars of police time. Costs associated with the deaths of the family include Coronial Services, inquest and funeral costs are estimated at $20,000. The total direct economic cost of this incident is estimated at approximately $250,000 or more.

MAGNITUDE OF THE PROBLEM

Fire brigade call-outs attributed to toasters total around 400 per year in the Melbourne metropolitan area alone. However, this figure includes false alarms accidentally triggered by smoke detectors responding to burning toast.

The Fire Brigade's electrical investigator noted in his report on this particular incident that this was the second fire involving a toaster under similar circumstances. The publicity generated by the inquest resulted in numerous phone calls and several letters to the Coroner's Office describing events where fires have been caused by toasters.

PREVENTION

While the circumstances leading up to the fire and subsequent deaths of the three occupants of the house are not clear, it is apparent from the investigations that the fire started in the toaster and was due to an electrical malfunction. Given that the fire appears to have smouldered for some time, had smoke detectors been installed the early warning may have provided the extra time necessary for the family to escape safely.

In summarising his findings, the Coroner went into some detail in outlining what appears to be a severe design fault in modern toasters. According to the Coroner, modern toasters operate solely on a timer system and not the achievement of a pre-specified heat. They are therefore incapable of making any adjustment for the moisture content of the item being toasted, unlike the older system which operated on the basis of heat generated. Consequently, the setting required to toast fresh bread to perfection on Monday is sufficient to set the same (now two-day old) bread on fire in the toaster on Wednesday. Graphic evidence of this was shown in a video to the Coroner, indicating that, at times, flames one to one and half times the height of the toaster can be generated. On other occasions, burning toast can be ejected from the toaster onto a bench top when the timing mechanism is finally tripped. The risks associated with such events are obvious. There is no guard on top of the toaster to contain flames and soft furnishings or paper could easily be set alight. There is also the additional risk of injury or fire caused by the ejection of a burning object.

As a result of this incident and the subsequent Coronial investigation, all toasters sold in Australia now carry a warning attached to the cord to the effect that the toaster must not be placed near curtains or other flammable items or be left unattended. The warning, however, only appears in English and can be easily removed.

However, the provision of warning labels should be seen as an interim measure. As the Coroner pointed out, the real problem lies in the design of the product. "The modern toaster has inherent in its design a crucial fault. It is not fail-safe" (McLennan, unpub., p.8). Manufacturers should "give consideration for another ultimate heat control to be built in to counter the obvious dangers inherent in their product as now produced." (ibid.)

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