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Progress in Reducing Road-Related Deaths and Injuries in Irish Children

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Abstract

The aim was to study road-related injuries and fatalities in under 15 year olds in two time periods (1996-2000 and 2004-2008 inclusive) to assess whether progress has been made via cross-sectoral efforts to reduce this injury toll in Ireland. For pedestrian and car-related accidents, police assistance is required and at the time a detailed CT 68 form is completed by the attending officer and sent to the Road Safety Authority for analysis. Details re the severity of injury, light and road conditions and safety measures such as seat belt or car restraint use, seat position and helmet use if a cyclist were recorded. Injuries were sub-classified as fatalities, serious (detained in hospital, fractures, severe head injury, severe internal injuries or shock requiring treatment) or minor. All data for the two time periods was entered onto an SPSS database. A concerted national campaign re road safety media allied to random breath testing, penalty points for driving offences, on the spot fines for speeding and far greater police enforcement took place between the two time frames and continues to this day. When looked at as most likely estimates of death ratios the results were found to be statistically significant with an overall p value of <0.0001 CI [0.39, 0.69]. When broken down into specific age ranges all were significant apart from the 0-3 age range with a p value of 0.69 CI [0.26, 1.1]. The most significant changes were found in the 7-9 years, 10-12 and 13-15 year age ranges with p values of < 0.0001, 0.0002 and 0.0007 respectively. When results were compared between the two cohorts, car occupant fatalities between both groups dropped by 36%. Pedestrian injuries dropped from 1719 to 1232, pedestrian fatalities decreased by almost 50% as did serious pedestrian injuries from 261 down to 129. Cyclist fatalities saw the most significant fall (76%) with a dramatic reduction in cyclist injuries from 25 down to 6 (63%). The 13-15 year old age group had the highest mortality and morbidity in both cohorts. Documented restraint use was less than 70% in both cohorts. A national road safety campaign, greater police enforcement and a cultural change has seen road-related injuries in children drop very significantly (by 50%) over the two time periods and this campaign should continue.

Introduction

Road traffic injuries are a major public health problem, requiring concerted efforts for effective and sustainable prevention. 96% of all children killed worldwide as a result of road traffic injuries occur in low- and middle-income countries¹⁻⁴. The required strategy to reduce the road toll involves the identification of the problem, the formulation of a strategy, setting targets and thereafter the monitoring of performance. Efforts must be evidence-based, cost efficient, properly resourced and sustainable. Two of the countries with the best safety records in the world, Sweden and the Netherlands have models that use effective partnerships as key, set ambitious targets (Sweden's 'vision zero') and use safety performance indicators. Effective road safety policy should put vulnerable road users at its centre. In Sweden, the main focus has been on reducing speed overall, greater separation of road users where speeds exceed 60-70 Km /hour and to improve pedestrian safety by restricting vehicle speeds to 30 Km per hour in urban areas. Our aim with this study was to assess the rates of road related fatalities and injuries in a paediatric population over two 5 year time periods. We hoped to assess the differences, if any, in the injury and fatality rates and to assess the likely causes associated with these results.

Methods

All road and traffic accidents requiring police assistance occurring on public roads in Ireland in two separate time periods spanning five years (1996-2000 and 2004-2008) were included. As per protocol accident details are recorded by the attending police officer on the CT [68] form. This form collects information on severity of the accident, road user category, contributing factors such as road factors, vehicle factors, environmental factors and also what safety precautions were in place at the time of the accident (such as seatbelt use, bicycle helmet use and pedestrian data such as arm band wearing). The information was then entered into an SPSS database and accident trends were analysed and reviewed by the Research Section of the Road Safety Authority. Injuries were sub-classified as fatalities, serious [those admitted to hospital, fractures, severe head injuries, severe internal injuries or shock requiring treatment] and minor. From this database we sought information pertaining to those children and adolescents aged fifteen years and younger. We then compared the results from 2004-2008 versus those from 1996-2000. We also looked at policy changes, publicity campaigns and legislation changes in the intervening period.

Table 1

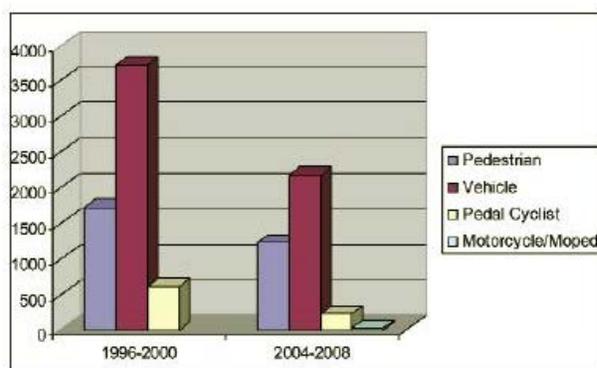
Age	96-00	04-08	MLE for death ratio	CI	P Value
0-3	25	17	0.68	0.26, 1.1	0.067
4-6	22	14	0.64	0.21, 1.06	0.047
7-9	29	9	0.31	0.08, 0.54	<0.0001
10-12	27	12	0.44	0.14, 0.75	0.0002
13-15	52	30	0.58	0.32, 0.84	0.0007
TOTAL	155	82	0.53	0.39, 0.67	<0.0001

Results

Looking at the results (as shown in Table 1) in terms of most likely estimates of death ratios (MLE death ratio) we can see that overall, there was a statistically significant reduction between the two time frames (p value <0.0001 (CI 0.39, 0.67) These results show uniformly significant reductions in MLE death ratios for all age categories except the 0-3 year group. The most

significant results were seen in the older age groups. Looking at the results in terms of road user category Figure 1 shows that vehicle occupants remain as the main category responsible for injuries and fatalities in both time periods.

Figure 1: road user categories involved in road-related injuries in childhood and adolescence



When we compared both study periods (Table 2) we found that there was a 38% decrease in the total number of children injured or killed on our roads from 5928 to 3659. Minor injuries fell by from 5063 to 3230, serious injuries fell from 712 to 347 and fatal injuries by from 153 to 82. In no area was there an increase in the number of injuries or fatalities.



Table 2

Car passenger fatalities

Car passenger fatalities fell by 38% from 69 to 44. The majority of these children were travelling in the rear seat however a large number continue to travel in the front passenger seat.

Pedestrian Injuries

There were 1232 pedestrian injuries from 2004-2008 which accounted for 34% of the total injury toll. Of these 32 were fatal [2%], 129 were seriously injured [10%] and 1071 [88%] suffered minor injuries. When we compared the two time periods we found that pedestrian fatalities had fallen by 48% and serious injuries had fallen by 50%.

Cyclist Injuries

The most dramatic results were found in our cyclist population. Cyclist fatalities fell by 76% and injuries by 68%. In contrast to previous years none of the fatalities in this category were under the age of 10. There was no information available on the use of helmets in any of the fatalities. There were only two confirmed cases of helmet usage in the cyclist injury category. Both these children suffered minor injuries.

Discussion

We have found that across all categories there has been a marked reduction in childhood injuries and fatalities on Irish roads in the years 2004-2008 in comparison to 1996-2000. Over the intervening years we have seen a concerted road safety educational campaign, significant legislative change (penalty points, on the spot fines, reduced blood alcohol permitted levels and random breath testing) and far greater police enforcement. A national television advertisement campaign has focussed on speed, alcohol and the young driver. Few of these campaigns are targeted at child safety however it would appear an increased focus on road safety has had an added effect in helping to contribute to the reduction in mortality and morbidity amongst children on Irish roads. This is reflected in other countries where similar national campaigns have been waged. Comprehensive and clear legislation, enforced with appropriate penalties and accompanied by public awareness campaigns, has been shown to be a critical factor in reducing road fatalities associated with speed, drink driving and the failure to use appropriate restraints in cars¹⁻⁶.

Research has shown that the perceived risk of being caught is considerably more effective than the severity of the penalty in discouraging driving while under the influence of alcohol. Widespread random breath testing – applied to at least 1 in 10 drivers every year – achieves the highest compliance with laws setting BAC levels⁷. Enforcement should be unpredictable as to time and place (not just holiday periods!) so drivers cannot avoid being tested. Enforcement is the most effective at reducing the frequency of BAC exceeding legal limits if it is accompanied by mass media campaigns that increase public perception of the risk of being caught, reduce public acceptance of drinking and driving and increase public acceptance of enforcement. In general, harsh penalties such as imprisonment have not been found to deter people from driving after drinking¹⁰⁻¹². More effective is swift and certain punishment after failing a breath test or refusing to submit a test. We know that speed kills and safe speed thresholds vary according to different types of road, weather and light conditions and that pedestrians have a 90% chance of surviving if knocked down by a car travelling at 30 km/hour and this drops to less than 50% if car speed is 45 km/hour or above¹³⁻¹⁵. Speed limits on urban roads should not exceed 50 km/hour.

Mandatory seat belt use has been one of the great successes of road safety initiatives and has saved countless lives. We know that wearing a seat belt reduces the risk of fatality by 50-75% in both front and back seat passengers but enforcement is weak in many countries¹⁶. Mandatory child restraint laws and their enforcement leads to an increase in their use. Good protection for child passengers requires that the child restraint used is appropriate for the age and weight of the child. Effective interventions to increase child restraint use include laws mandating use of child restraints, public information and enhanced enforcement campaigns, public education programmes to support enforcement and child restraint loan schemes. In order to avoid lap belt

syndrome¹⁷, booster cushions are required in the 6-11 year old age group. While most cars in high income countries are fitted with adult restraint systems, child restraint use requires an informed decision on the part of parents regarding the design, availability and correct fitting. Standardized anchorage points in cars would help to resolve many of these problems.

The use of bicycle helmets has been found to reduce the risk of head and brain injuries by between 63% and 88%^{18,19}. Ireland has an extremely low rate of bicycle helmet use and this is reflected in both our cohorts. A meta-analysis of studies has shown that the mandatory wearing of bicycle helmets reduced the number of head injuries among cyclists by 25%¹⁹. Many countries have introduced legislation making bicycle helmets mandatory and in most countries this legislation is directed at under 18 year olds. Evaluation of bicycle helmet legislation has been encouraging and there is now unequivocal evidence that helmets reduce the incidence and severity of head, brain and upper facial injuries in children. In Ireland we have made considerable strides over the past 5 years³ (road deaths now down to 8.5 per 100,000) but still have a long way to go to match top – performing countries such as Sweden (5.2), the United Kingdom (5.4) and Switzerland (4.9). Switzerland has very high levels of enforcement and consequently the best road safety in the world. Traffic speed and use of seatbelts and age-appropriate car restraints are known to be effective in reducing road deaths. Road traffic injuries in children are predictable and therefore preventable and to reduce the injury toll further requires a coordinated and collaborative effort across many sectors. The success of the past 10 years should act to spur us all on to further reduce this toll in our vulnerable road users.

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