

Guest editorials

Following in father's footsteps: a commentary on 'Theory and methods of epidemiologic study of home accidents'

I have spent a number of years following in my father's footsteps as an epidemiologist. When I began my professional career, I didn't really plan to become involved in injury research. Therefore discovering this particular article (reproduced on p 55) did not direct me in any specific way toward the study of injuries. My interest in this 'classic' was in its application of epidemiologic methods and the example it provided of a cross classification scheme. These demonstrated the creative use that can be made of data when there is an underlying principle to the analysis.

I am not even certain that most injury epidemiologists have seen this article with the certain exception of Julian Waller. In any case, my pleasure with the decision to republish this work is twofold. It provides an organizing framework for analyzing data obtained in epidemiologic studies that focuses attention on analyses useful for the development of prevention efforts. These efforts extended well beyond the normal analysis of descriptive epidemiologic studies. Further, this publication provides a definition of injury that is more specific than the definition commonly used at the time — that proposed in the United States Public Health Service publication *Uniform Definitions of Home Accidents*.

Epidemiology has many strengths and many weaknesses, as the paper points out. Its strengths are derived from the method, the theory, and the application of a systemic approach to understanding causes of disease. Ironically, perhaps, its weaknesses clearly stem from many of the same areas. Sampling of certain injuries from the entire spectrum of injuries continues to provide researchers with a dilemma. The desire to understand the entire spectrum (from near misses to fatalities) is hampered by our ability to consistently and reliably identify all injuries that fall into the categories of interest.

Critics of the epidemiologic method abound, and those of us who are epidemiologists are often too timid in our defense of the discipline because, we too, are aware of its methodological pitfalls. From where I sit, I find it is often easier to criticize than create. And yet, it is through creative application of established methods that we have made such great strides in the protection of children from harm, including the reduction of injuries.

Another issue this paper raises that may be worth discussion is that of classification of injuries. We have developed a number of surveillance systems that focus on causes (firearms), specific types of injuries (head injuries), or the nature of the injury (burns) and yet, by doing this we are fragmenting other aspects of the injury as presented in this paper.

For example, head injuries occur as the result of recreation, motor vehicle crashes, and suicide attempts. When designing prevention programs for head injuries, the ability to define the population at high risk of head injury is important, and yet the prevention program design becomes extremely difficult because each of the events may require a totally different approach. Therefore, we often hamper our ability to 'permit the development of programs' for prevention that are scientifically sound, administratively feasible, and capable of evaluation'. We must continue to develop new and creative ways to assess injuries so as to provide the best information that will lead to prevention programs.

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Tractors, motorcycles, ATVs: inconsistencies in legislation for child safety. Examples from New Zealand

Recent research in New Zealand has drawn attention to an unacceptable number of child fatalities and injuries due to tractor, motorcycle, and all terrain vehicle (ATV) off-road crashes, especially on farms. Inconsistencies in legislation aimed at protecting children from harm from using these vehicles are identified, and approaches to addressing these discussed. Although the examples given in this editorial are taken from experience in New Zealand, I suspect they apply to many other countries as well.

Fatalities and injury due to tractors, motorcycles, and ATVs

In the 1980s there were, on average, two children (< 15 years of age) killed and 24 hospitalised each year as a result of tractor crashes on New Zealand farms.¹ Reliable information on the number of children who were driving tractors at the time they were injured was not available. During this period there were also, on average, 100 children hospitalised each year as a result of off-road motorcycle/ATV

crashes, 61% of which occurred on farms.² In 77% of all cases the child was the driver of the motorcycle/ATV.

Inconsistencies in agricultural occupational legislation

In New Zealand, unlike the United States, 'the predominant use of ATVs is as a light tractor'.^{3,4} ATVs are used for many of the farming tasks previously undertaken using tractors on farms (for example feeding out to stock). Many of these functions involve towing a trailer or some other piece of farm equipment behind the ATV. So common is this practice that most new ATVs sold in New Zealand have towbars fitted as standard equipment. However, towing equipment with these machines can be hazardous.

Houghton and Wilson's 1994 farm safety survey results show that 12% of children aged between 4–11 and 27% aged 12–15 years 'sometimes' or 'always' 'operate tractors'.⁵ They also found that 27% of children aged between 4–11 and 36% aged 12–15 years 'sometimes' or 'always' 'operate ATVs'.

In October 1995 regulations to support the Health and Safety in Employment Act 1992 came into effect. These regulations require that an *employer* take all practicable steps to ensure that an *employee* under the aged of 15 years does not drive or ride on: (a) any tractor, (b) 'self propelled mechanical plant, other than a car, a truck, a motorcycle, or machinery that has a mass of 700 kilograms or less' (regulation 57). Exactly the same restrictions apply to non-employees (regulation 60). There is, however, one significant exception to this regulation pertaining to tractors. Regulation 61 permits non-employees 12–14 years of age to drive a tractor, provided it is being used in conjunction with agricultural work, and that the person has been fully trained in the safe operation of the tractor. (There is no similar exception to regulation 57 for employees.) Presumably, regulation 61 was written to permit the common practice of allowing children of farmers to operate these machines.

In summary, there are no age/employment restrictions for driving cars and trucks on farms, and because most motorcycles and ATVs weigh less than 700 kg there are, in effect, no age/employment restrictions on their use.

It has been suggested by the Occupational Safety and Health Service that the machinery regulation (regulation 56) would allow a charge to be brought against an employer who allows an employee under the age of 15 years to ride an ATV on a farm. For such a charge to be successful it would require that the Crown convince the court that an ATV was 'machinery'. Unfortunately, 'machinery' is undefined in the regulations. Irrespective, children who are non-employees would definitely not be covered by this regulation.

At present there is no other specific legislation relating to young children driving and riding cars, trucks, tractors, motorcycles, ATVs and similar self propelled vehicles in places other than public roads. This is at odds with most current, road traffic, and motorsport regulations.

Child safety policy in the wider context

Under present New Zealand law, persons less than 15 years are not permitted to drive cars, motorcycles, ATVs, or light (less than 4000 kg) tractors on public roads. One has to be 18 years of age to drive heavy (4000 kg or more) tractors on public roads.⁶ Presumably the rationale for these regulations is that children are not considered psychologically or physically mature enough and do not have the skills required to perform this task safely. While the serious consequences of error on public roads are potentially

greater than off-road (for example collision with another moving motor vehicle), the maturity and skill of young riders remains unchanged. It is also of interest to note that the Road Code states 'You must not let anyone less than 12 years drive a tractor'.

The New Zealand Auto-cycle Union (NZACU), the governing body for motorcycle motorsport, appears to have a more liberal policy with respect to young riders. It has a 'mini motocross' category which is for riders from 4–10 years of age (rule 28-12). Most of the riding in this class is restricted to small capacity motorcycles (80 cc maximum) as well as clutchless vehicles. There is also a Junior class: Junior competitors 'shall be from and including their eighth birthday' (rule 28-3-5).⁷ The 'mini motocross' category was developed in direct response to growing interest in this class of motorcycle and reflected NZACU's view that some form of skills training would be desirable (E Conaghan, vice president of NZACU, personal communication, 1993). There are no scientific studies which support or refute this view. Nevertheless, one has to question the merit of such categories, given that they encourage children to pursue motorcycling at an early age when most of their exposure to riding will be outside the sanction of the NZACU.

Physical limitations of children

There are sound ergonomic reasons why there should be an age restriction on drivers of vehicles in off-road situations. In most cases the machines have not been designed for children, who have difficulties reaching and operating the controls effectively. ATVs are of particular concern in this regard. They are 'rider active' vehicles, which means that stability and control is dependent on body movements and weight shifts of the rider, as opposed to simple hand controls on two wheel motorcycles. Under the consent decrees developed by the United States Government and the ATV industry, ATVs designed for adults (those having engines with more than 90 cc displacement), are not recommended for use by children. ATVs recommended for use by 12–15 year old children are limited to those with 70–90 cc engines.⁴ Most ATVs sold in New Zealand for farm use are over 90 cc.

Consistent policy

One obvious method of achieving consistency in the law would be to adopt road safety criteria. Namely, no person under the age of 15 years be allowed to drive any tractor, car, truck, motorcycle, or ATV (over a certain capacity) in an off-road situation, irrespective of whether or not it is being used in a farming context and irrespective of whether or not the person is an employee. The Accident Prevention Committee of the Canadian Paediatric Society recommended such an approach for motorcycles and ATVs with the age limit set at under 14 years.⁸ Riding on or in vehicles in an off-road situation could also be restricted to those vehicles (for example cars and motorcycles) that have a specific seating provision for passengers. Before embarking on such a strategy, consideration needs to be given to all of the benefits and costs of such an approach. There may well be, for example, public health benefits to off-road driving. Consider, for example, those wishing to obtain a licence to ride a motorcycle on the road.

At present, those wishing to obtain a motorcycle licence in New Zealand must first obtain a learner licence. One of the requirements for the learner licence is that one must learn to ride at a motorcycle school and obtain a certificate to say 'you can control a motorcycle . . .'.⁶ Essentially, the learner has to demonstrate that he/she has basic riding

skills. In reality, many riders learn some basis skills off-road before attending such schools. Given that some 15 year olds will exercise their legal rights as soon as they turn 15, it may be unwise to suggest that riding motorcycles off-road be prohibited for all younger persons. A preferred solution would be to allow driving by persons under 15 years only under the supervision of a registered instructor or in an event sanctioned by the NZACU.

Conclusion

Whatever is finally decided, policy should be influenced primarily by a recognition of the child mortality and morbidity associated with these vehicles, and the physical limitations of children, as drivers and as passengers. While consistent legislation represents a step in the right direction, it needs to be supported by enforcement and complemented by other strategies. Legislation relating to children using tractors has existed in New Zealand since 1960, but the work of Houghton and Wilson suggests that it continues to be ignored by a significant number of farmers.⁵ A similar law in Great Britain has also apparently been widely disregarded.⁹ This could be related to difficulties in monitoring, a lack of willingness to prosecute, or small fines. Although attention to such matters may assist in this and similar situations, experience in other areas (for example drunken driving) suggests that it will take more than enforcement to reverse existing attitudes and behaviour and that this is especially the case for farming where sociocultural aspects are considered to be of particular significance.^{10,11} Although the examples given here relate to the New Zealand situation there is evidence that similar situations exist in other western countries.¹² Much

of the debate elsewhere is based on inconsistencies in child labour law between farms and non-farms. Despite the fact that removal of such inconsistencies has the potential to reduce childhood injury and deaths on farms there are potentially greater gains to be made for developing consistency in child safety law irrespective of the environment and work relatedness.

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- 1 Clarke JA, Marshall SW, Langley JD, Cryer C. *Epidemiology of injuries occurring on New Zealand farms*. Occasional Report No 9. Dunedin: Injury Prevention Research Unit, 1995.
- 2 Langley JD, Marshall SW, Clarke JA, Begg DJ, Reeder AI. Motorcycle/ATV crashes on farms. *Journal of Occupational Health and Safety — Australia and New Zealand* 1995; 11: 387–94.
- 3 Brown R. *All terrain vehicles (ATVs): a perspective on their use and associated hazardous incidents in the farming industry*. Invercargill: Occupational Safety and Health Service, Department of Labour, 1993.
- 4 Rodgers GB. All-terrain vehicle injury risks and the effects of regulation. *Accid Anal Prev* 1993; 25: 335–46.
- 5 Houghton RM, Wilson AG. *The prevention of injury among farmers, farm workers, and their families: a programme for the development of interventions for rural communities: farm survey findings*. Dunedin: University of Otago Consulting Group, 1994.
- 6 Land Transport Safety Authority. *The road code*. Wellington: Land Transport Safety Authority, 1994.
- 7 New Zealand Auto-cycle Union. *General competition rules 1992/1993*. Wellington: NZACU, 1993.
- 8 Accident Prevention Committee, CPS. Two-, three- and four-wheel unlicensed off-road vehicles. *Can Med Assoc J* 1987; 136: 119–20.
- 9 Cameron D, Bishop C, Sibert JR. Farm accidents in children. *BMJ* 1992; 305: 23–6.
- 10 Clarke L, Wolfenden K. Community organisation to reduce injury on Australian farms. *Health Promotion Journal of Australia* 1991; 1: 17–22.
- 11 Elkind PD. Correspondence between knowledge, attitudes, and behavior in farm health and safety practices. *J Safety Res* 1993; 24: 171–9.
- 12 Rivara FP. Fatal and nonfatal farm injuries to children and adolescents in the United States. *Pediatrics* 1985; 76: 567–73.

New rules of the road

A contributor to the CCSN BBS from the US writes: 'Foremost is the safety of bikers who must share the roads with automobiles. Just as disconcerting is the high incidence of accidents on paths restricted to use by pedestrians, skateboarders, and other bikers. Teaching riding etiquette and designating roads as multivehicle highways are inexpensive and practical and can alleviate the majority of hazards bikers face'.

'You want irony? Try this: in a city which sponsors three annual cycling events and supports the county's alternative transportation program, there is not a single bike lane. We need to think about doing something to reverse the current situation. And now that we have the name of a giant corporation [unspecified] back us, there's no reason to remain silent regarding the lack of bicycle and pedestrian facilities in our community.

'Although the city is drafting a transportation plan, There isn't one provision to accommodate bikers. Perhaps its an oversight. Or perhaps it's the lack of bikers in the city council. We can safely assume that the director of the planning organization doesn't bike (at least, not outdoors). So if it's someone with legislative pull we need, we can go straight to the governor's office and find a state bicycle coordinator. With some pressure she will work with local governments to apportion some road money to non-highway programs. But unless we speak up, we'll go unnoticed' (from CCSN BBS).