Priorities in young and novice driver research in Australasia and the Asia Pacific region

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Abstract

Despite international advances in research and intervention, young and novice drivers continue to be overrepresented in road trauma. In 2008, the US Transportation Research Board’s Young Driver Subcommittee held an expert workshop to identify the research priorities to address this issue. The focus was from a high income country perspective; however, three-quarters of the world’s road fatalities occur in low and middle income countries, many situated in close proximity to Australia. This paper summarises and extends the workshop findings to identify and include local priorities and thereby promote a novice driver research agenda for the Australasian and Asia Pacific region. Identified priorities are to: improve surveillance and database collections; advance the science of young driver programs and policies; improve understanding of mechanisms underlying how driving competence develops; gain accurate and reliable data on novice driving exposures; and to improve understanding of risk factors for novice driver crash risk in the varied settings across the region.

Keywords

Young Drivers, Novice Drivers, Road Traffic Injury, Road Crashes, LMIC, Intervention

Introduction

Road traffic injuries are the leading cause of death for 15-19 year-olds worldwide.[1] In low and middle income countries (LMIC) the majority of casualties are vulnerable road users – pedestrians, cyclists, motorcyclists – whereas in high income countries, the majority of casualties are vehicle occupants. These include a substantial number of passengers of young drivers as well as the young drivers themselves.[1, 2] The latter has been the focus of increased research and targeted initiatives in recent years, yet despite this, young and novice drivers continue to be over-represented in motor vehicle crashes relative to older, more experienced drivers.[3-5]

This overrepresentation led to the United States Transportation Research Board (TRB) Operator Education and Regulation Committee launching the Young Driver Subcommittee in 2007.[6] The Subcommittee’s mission is to undertake activities designed to improve and extend research on the nature of teen driving, including broad social, psychological, cultural, and biological issues; teenage driver crash causation; the role of parents and peers in teenage driving; and the effective translation of broad scientific understanding into policies and programs to reduce teenage driver crash rates. One of the primary goals of the subcommittee is to reach beyond the road safety research community to the numerous disciplines in the broader scientific community, whose perspectives, theories and methods can contribute to greater understanding of pertinent aspects of young driver competence, behavior and risks. During 2008, the Subcommittee convened an expert workshop to identify the top research priorities needed to guide efforts to reduce young driver crashes and injuries. The consensus of the participants was summarised in a subsequent report.[6]

The recommendations of this report are of direct relevance to Australia and also to New Zealand. However, over 90% of the world’s 1.3 million road fatalities occur in LMIC,[7] including neighbouring countries in the Pacific and Southeast Asia. While Australia still has cause to improve its road safety record, it is one of the better records on the international scale.[8] As a dominant high income country in the region, local knowledge and capabilities are available to help extend this success to neighbouring countries. This paper seeks to build on the TRB workshop findings, to identify local priorities and thereby promote a novice driver research agenda for the Australasian and Asia Pacific region.
The Subcommittee held a 1½ day workshop in Woods Hole, Massachusetts, US in July 2008. Prior to the workshop, Subcommittee members were asked to provide their ideas about the most pressing research needs for advancing our understanding of young drivers’ driving behavior, crash risks, crash causation factors, and approaches that might reduce crashes and injuries. All responses were collated and provided to participants prior to the workshop, grouped into two general categories:
1. Basic understanding of teen driving (e.g., learning to drive; improved measurement; driver risk factors; parental role).
2. Intervention and policy (e.g., approaches to training; graduated licensing; technology).

In total 23 Subcommittee members and invited participants attended the workshop, which included several of the world’s leading authorities on teenage driving issues. On the first day, research ideas within the two categories were first discussed in a facilitated open session then in small groups, with each group providing its chosen priorities within each category. On the second day, attendees first listed their individual choices then small group discussions followed with the explicit goal of producing within-group agreement. These issues were shared with, and discussed by, the full group. Individual participants were then asked to provide a final listing. Both the group consensus positions and individual priorities were later collated and refined into problem statements and specific suggestions for research in the priority areas identified. There was substantial consensus on five top research priorities, in brief:
1. Advancing the science of teenage driving.
2. Learning to drive safely – how competence develops.
3. Teenage driving exposure issues.
5. Passenger issues – how passengers influence teenage driving and crash risk.

Consideration of the nature of the problem, the main objective and identified important research questions pertaining to each of these priorities were detailed and are summarised in Table 1. A full report, including details of attendees and contributors, can be found in the resulting TRB e-circular.[6]

Relevance of Findings to the Australasian and Asia Pacific region

These key findings provide important guidelines for countries such as Australia and New Zealand. Although both perform well on international comparisons of road statistics, they continue to lag other high income nations, including the United Kingdom.[8] In addition, young driver successes in Australia are more evident in urban and regional areas and less so in rural and remote communities. Progress is also limited among disadvantaged populations, such as low socioeconomic and Indigenous communities.[9-11] Within the framework of the identified research priorities, these differentials need better understanding to advance the science base for targeted programs and policies. It is also possible that different parenting roles, styles and actions contribute to some of the differences. However, uniform linked databases that allow documentation of road crash incidence and character at the national level and enable jurisdictional comparisons must, of necessity, take precedence over more refined inquiry into fundamental questions specific to teen driver crashes. Although this has been achieved in the United States with database such as the Fatality Analysis Reporting System, prevalence estimates can be limited in Australia by a lack of uniform reporting and recording protocols across States and Territories and by a lack of linkage between road crash, injury and fatality databases. The lack of recording of Aboriginal and Torres Strait Islander status in licensing and other databases also limits the ability to identify Indigenous specific issues, hindering development of appropriate programs and policies.

In neighbouring countries, such as Papua New Guinea and Southeast Asian countries, the road safety situation is more dire.[1] Many jurisdictions in these countries have yet to develop adequate surveillance systems. Consequently, local crash prevalence and risk factors are poorly understood. This precludes an informed consideration of which internationally successful interventions might best be adapted, or new programs developed, to address local conditions as well as cultural considerations. There have been demonstrable failures and some successes.[12] For example, introduction of laws requiring mandatory fitting of front seat belts and wearing by drivers and front seat passengers in China in 1993 resulted in an observed wearing rate below 10% and a self-reported wearing rate of 22%.[13, 14] A recent targeted
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<td>Advancing the science of teenage driving</td>
<td>Programs and policies to reduce teen driving risk need to be based more heavily on solid scientific evidence. Some current strategies lack meaningful conceptualisation or are incongruent with established theoretical or empirical principles. Graduated licensing most effective known approach, but need to improve some current systems, maximise compliance, understand long-term effects.</td>
<td>Determine effectiveness of new and existing strategies to reduce young driver crashes.</td>
<td>Can better integration of accepted principles of adolescent development and behaviour improve effectiveness of strategies to reduce teenage driving risk? How does safe driving behaviour develop and can the rate at which this occurs be increased? What are the mechanisms by which graduated licensing influences teenage driving? What are the unintended effects of young driver improvement programs, such as “advanced skill” training? Are technology-based monitoring approaches effective in reducing teenage driving risk? Do vehicle-based and/or carry-in technologies influence teenage drivers differently from adults?</td>
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<td>Learning to drive safely – how competence develops</td>
<td>Need to determine what novice drivers learn, and how, that sharply reduces crashes during initial months of unsupervised driving. Effortful focused practice/rehearsal, time devotion and automaticity essential for mastery of complex set of skills. Multiple issues, including but not limited to behavioural, cognitive, affective, psychosocial factors and contextual elements; role of self-regulation; transfer of knowledge/capabilities into actual driving.</td>
<td>Understand the nature of learning to drive to inform evidence-based interventions and programs.</td>
<td>What aspects of safe driving are learned and which represent behavioural dispositions that cannot be taught, but may be influenced in other ways? Do pre-existing factors, such as age, sex, personality and maturity, influence the rate and types of improvement in teenage driving? What individual changes occur during the first years of independent driving that influence teenage driving behaviour and crash rates? What contextual factors, such as parental involvement, peer behaviour, socioeconomic status, urban/suburban/rural residence, influence improvements in driving, and the rate at which those improvements occur during the first years of driving? Which methods or approaches to licensing, driving supervision, practice driving, training, or other aspects of learning to drive – if any – increase the rate of improvement in teenage driving?</td>
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<td>Teenage driving exposure issues</td>
<td>Presently, the only reliable denominator in the U.S. is population, existing national count of licensed teens is unreliable; miles driven needed and by various driving conditions. Self-report data needed specific to single year of age, time since independent driving, licence type, and residential location; could be enhanced with concurrent objectively measured information.</td>
<td>Develop objective measures of young drivers’ exposure to conditions thought to be risky.</td>
<td>What are the most valid and useful methods for measuring various types of exposure among young drivers? What is the nature of young driver exposure and how does this vary across important categories (e.g., time since licensure, urban vs. suburban vs. rural residence, driver age, sex, socioeconomic status, family structure, jurisdictions with varying proscriptions on particular behaviours – such as night driving, carrying multiple young passengers)? How are the nature, progression, and variability in exposure related to young driver safety?</td>
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Table 1. Priority young and novice driver research needs identified by the TRB Young Driver Subcommittee adapted from Foss (2008)[6]
Table 1 (cont.) Priority young and novice driver research needs identified by the TRB Young Driver Subcommittee adapted from Foss (2008)[6]

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<td>Parenting issues – how parents influence teenage driving</td>
<td>• Potential for parents to influence young driver behaviour and performance, but research is limited on current nature of influence or ways to increase effective parent behaviours&lt;br&gt;• Parents have key role in supervising teen; unclear what this should involve or how it affects driving outcomes&lt;br&gt;• Parents support (including financially) teen through licensing process; can favour laws but unclear how enact or set limits; potential to increase effective involvement</td>
<td>Understand the nature of parental influence and involvement in the early stages of teenage driving</td>
<td>• Do parents’ driving styles influence their teenagers’ driving? If so, what are the causal mechanisms that transmit parental driving styles to their children?&lt;br&gt;• What is the progression and variability of parent involvement in (a) teaching and supervision of practice driving; (b) determining readiness for licensure; and (c) managing the early driving experience (including vehicle access, adherence to GDL provisions, and driving privileges)?&lt;br&gt;• How does variability in parental involvement in supervised practice driving, driver education and provisional licensure relate to young driver behaviour, performance?&lt;br&gt;• How are parental adherence to jurisdictional requirements for supervised driving and expectations that their teenagers adhere to licensing restrictions related to young driver behaviour?&lt;br&gt;• What approaches to improving parental involvement during the supervised driving period and/or management of the early driving experience improve teenage driver safety?</td>
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| Passenger issues – how passengers influence teenage driving and crash risk | • Presence of adolescent passengers associated with higher teen crash risk but protective for adult drivers; unknown whether effect is causal<br>• Risk increases by number of passengers and there are age and sex differentials<br>• Mechanisms underlying increased risk unknown (e.g., distraction, other intentional/unintentional impacts on certain behaviour, performance) | Understand the nature of passengers’ influence on teenage driving and crash risk | • What aspects of teenage driving are influenced (positively or negatively) by passengers? Do influences vary by age, sex, and relationship to driver and, if so, how?<br>• How do teenage passengers increase crash risk for teenage drivers? How do these effects vary by context, including time of day, number of passengers, and trip purpose?<br>• How do the characteristics of passengers, including but not limited to age, sex and relationship of passenger to driver, affect teenage driving?<br>• Can teenage drivers be trained to manage effects of passengers’ presence and, if so, how?<br>• Can teenage passengers be trained to enhance the safety of teenage driving, and, if so, how? |
intervention in one province to enhance police training and enforcement coupled with a publicity campaign showed some success, effecting an absolute increase in observed wearing rates of 20%.[12] Introduction of laws mandating motorcycle helmet use in Thailand in 1993 increased wearing rates five-fold, but from just 4.5% to 22.6%.[15] In contrast, introduction of a mandatory motorcycle helmet law in Vietnam in December 2007, with strong Government and Non-Government Organisation support and extensive policing, was associated with near 100% compliance.[16]

Several factors need consideration when considering the applicability of novice driver laws for the region. In rapidly motorising countries such as China, novice drivers tend to be older and of higher socioeconomic status, as only they are able to afford the costs of licensing and vehicle ownership. Many of the issues associated with novice driver risks in North America are intertwined with adolescence. These can be targeted by the extended learner and provisional licence holding periods in graduated driver licensing (GDL) systems. Such approaches may be less relevant and less practical for novices in these countries. Supervised driving requirements may not be feasible, or effective, for most novices in countries where the majority of novices would not have parents/others who are experienced fully-licensed drivers. However, other parental involvement interventions might have increased utility due to shared living practices. Without the availability of supervised practice, driver education and training programs may also have much greater utility than in high income countries. Overcrowding of vehicles is also common and passenger restrictions may be less effective or unrealistic. Moreover, the majority of youth road casualties in these countries are neither drivers nor passengers of other young drivers, but vulnerable road users – pedestrians, motorcyclists and cyclists.[1] Building local capacity and harnessing local road safety expertise is very likely to be essential for maximum effectiveness.

In its 2007 report, *Youth and Road Safety*,[1] the World Health Organization (WHO) identified key issues for LMIC, including the difficulty obtaining reliable data on road traffic injuries and deaths. Underreporting is widespread, particularly for youth. In addition to key contributing factors of inexperience, risky driving behaviour and the other developmental factors that characterise adolescence identified in the Subcommittee report, the WHO report highlights the more significant role of the road environment in these countries. Rapid motorisation, urban development and inadequate planning of road transport systems often prioritise the needs of motorists, failing to adequately accommodate other, more vulnerable road users. Reducing youth exposure to road traffic risks was highlighted as a needed intervention. This would include separation of motorists and vulnerable road users, as well as adaptation of systems such as graduated licensing. Parental guidance was also viewed as crucial, as were targeted initiatives to increase seatbelt use by motor vehicle occupants, helmet use by motorcyclists and bicycle riders, conspicuity of vulnerable road users. Enhanced emergency response and programs to reduce speeding and alcohol use were also noted.

**Conclusions**

Overall, priority issues in the Australasian and Asia Pacific region, including for local LMIC, are generally commensurate with the top five priorities identified by the Subcommittee in those countries with well-developed roadway systems and widespread motor vehicle use. However, in many regions these are superseded by the need for better surveillance systems and accurate data on the nature of the problem. As these systems are developed, provision for adequately documenting exposure should be included. Basing efforts to address young driver risks on a sound understanding of the nature of these risks as well as broadly understood principles of human behavior are essential. Understanding how driving competency develops can benefit intervention development not only among young novice drivers but across the full age spectrum. The potential influences of parents and passengers may be less relevant to developments in LMIC although this is itself an issue for research.

The Subcommittee report[6] highlights that the needed volume of quality research cannot be achieved without adequate funding. Despite the magnitude of the problem – as the primary killer of young persons in most industrialised societies – there is a lack of dedicated funding for scientifically rigorous research in this field (which contrasts with other research fields in youth health such as alcohol use and smoking). There is potential for good research to address some important questions without large budgets for original data collection, especially in countries where existing crash databases, trauma registries and hospital discharge records are readily available at little or no cost. For many of the research questions identified, expensive large-scale randomised controlled trials many not be necessary, but rather rigorous
observational and cross-sectional analyses can provide much needed insight into areas that are currently seriously understudied. Rigorous research to better understand novice driver burden, risk and interventions in LMIC is urgently needed and there is an urgent need for both research funding and capacity building in this context. The enormous expertise in policy, practice and research in Australia and New Zealand could and should be harnessed to enable the significant gains in road safety in the region that are available, but have yet to be achieved.

The Subcommittee also noted the recent increase in new researchers in the field and hoped the workshop deliberations would provide both new and veteran researchers with a guide to research of particular importance in this field. The present paper seeks to achieve the same aims for the Australasian and Asia Pacific region, to initiate local discussion and debate to promote a regional research agenda, and to encourage appropriate allocation and direction of funding in this field. Without such efforts a reduction in the current unacceptably high rate of young and novice driver road trauma in the region is unlikely to change.

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References