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Occupational Light Vehicle-Use: A research driven strategy to improve surveillance and inform policy.

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Abstract

Background: Occupational light vehicles (OLV) are light passenger and load-shaped vehicles used for work. The OLV-associated injury burden is as great as that of heavy vehicle users, but has been largely ignored by occupational health and safety (OHS) regulators. Contingent employment growth has accentuated existing gaps in the policy framework between OHS and road-safety. Frequent burden shifting from OHS to road-related health systems undermines the evidence base necessary to inform policy development.

Aims: To provide evidence-based recommendations for the collection of OLV-user surveillance data and to underpin OHS procedures and policies for OLV-users.

Method: The literature was systematically analyzed to identify OLV-user OHS policy and practice gaps. Strategies to improve and co-ordinate surveillance systems were developed to address the identified limitations.

Results: Gaps were identified in OLV-user legislation, data collection, and risk-management. These require strategies to improve identification of all OLV-users and to co-ordinate surveillance and OHS practice.

Discussion: Contemporary reform of road and OHS, policy, provides a timely opportunity for the implementation of strategic responses to this serious road safety and occupational, public health problem.

Background

Road vehicles are not only driven for social or domestic purposes but, are used by workers in many occupations and industries. In the past few years there has been an increased recognition internationally of work-road Occupational Health and Safety (OHS) issues. On March 31, 2008 the United Nations General Assembly adopted Resolution A/62/L.43 on “Improving Global Road Safety” which: “Encourages organizations in both the private and the public sector with vehicle fleets, including agencies of the United Nations system, to develop and implement policies and practices that will reduce crash risks for vehicle occupants and other road users” (United Nations General Assembly, 2008). This United Nations resolution notes the importance of fleet operations internationally to worker and public safety, and promotes action by corporations, governments, and other stakeholders to improve road safety for workers (NIOSH, 2008). A 2009 Road Safety at Work conference attended by delegates from 44 countries, and organized by the United States National Institute of Occupational Safety and Health (NIOSH) with World Health Organisation, International Labour Organisation and the World Bank, demonstrated a growing international interest in the subject. People driving
for work use light and heavy vehicles, with injury and fatality among heavy vehicle users having been the subject of research for many years (Parliament of New South Wales, 1997; Quinlan, 2001). Occupational light vehicles (OLV) are light vehicles used by drivers and or passengers while working. Time spent commuting (journeying between their homes and their workplaces on unpaid time) is not considered to be work-use of an OLV. OLVs include passenger-shaped (cars) and load-shaped (light trucks) vehicles used for work purposes, weighing less than 4.5 tons and seating up to 12 persons including the driver (VicRoads, 2002). OLV shapes include sedans, station-wagons, vans, pick-up trucks and utilities.

Almost half the successful Australian work-fatality compensation claims related to any vehicle use between July 1999 and June 2001 were from OLV-users (ASCC, 2008). Safe Work Australia’s 2009-2010 Notified Fatalities report describes equal numbers of heavy and light vehicle on-road work related fatalities. However, the report acknowledges that OLV reports are likely to be under-reported as many OLV-related fatalities such as those of the self-employed, may not be included (Safe Work Australia, 2011). Despite this, research into factors behind OLV injury has been limited, the focus of most occupational road research being heavy vehicles. Unlike OLV, heavy vehicles are designed specifically for road transport use and the road freight transport industry safety is regulated within a trucking-specific legal framework (Johnstone, 2002). Road-work injury generally is likely to be underestimated as work-road injury and accidents have been poorly documented in traditional OHS reporting systems (Driscoll et al. 2003). Recent work pattern changes mean that workers are now less likely to operate within traditional work arrangements as permanent employees with entitlements, including access to compensation insurance cover. In 1994, 23.7% of the employed Australian workforce undertook work activities in precarious work arrangements, whereas by 2005 this proportion had risen to 27.7% (Australian Bureau of Statistics, 2005). Many of these workers use OLV, eg. self-employed tradespersons, farmers, contract taxi drivers. Precarious and non-traditional work arrangements (eg. contractors or sole-traders) have been shown to be associated with increased OHS and other health-related risks (Driscoll et al., 2003).

Along with other work pattern changes, the work-driving component of road-use is growing. In the 12 months ending 31st October 2010, Australian road vehicles totalled more than 78 million kilometers travel for business use, an increase from 62 million kilometres in the year 2000 (Australian Bureau of Statistics, 2001; Australian Bureau of Statistics, 2011). Within this work-use component, OLV-use is a substantial and growing subset. In 2009-10 light commercial vehicles travelled almost 24 million of these business-use kilometers, and passenger vehicles travelled almost 32 million kilometers, OLV therefore jointly accounting for 77% of all annual work kilometers (Australian Bureau of Statistics, 2001).

Technology is increasingly used to manage and monitor contemporary work-road vehicle and worker activity (EASHW, 2011). Increasingly, the vehicle is being used as a mobile office as well as a means of personnel or freight transport. Mobile phones offer some safety advantages however their use (along with that of other technological applications) can increase cognitive demands and hence increase related OHS risks (Nevile & Haddington, 2010). In addition to the demands of working within the vehicle, the external road environment has become more congested. Other road users
are part of the occupational road user’s work environment and also present potential hazards.

Despite the ongoing improvement in general road trauma management, OLV-use continues to be a significant and growing occupational health issue, complicated in terms of risk management by its position straddling two regulatory regimes – road safety and work safety (Stuckey & LaMontagne, 2005). It appears that OLV-user health and safety has been neglected because it is a familiar activity and often a secondary work task. This paper aims to provide evidence based recommendations for the development of a systematic and strategic response to the need for improved injury surveillance data on OLV-users, and to optimise OLV-use OHS procedures/policy.

Methods.

This study used a document analysis methodology to systematically explore the literature to identify policy and practice gaps related to the themes of OLV-user OHS policy, surveillance and risk management. An extensive literature review of existing Australian policy and practice used bibliographic databases including Medline, Ovid, ProQuest, Science Direct, APAIS health, Informit, Applied Science, and Tech Plus. Search terms included work driving, occupational driving, light vehicles, work vehicles, fleet vehicles, OHS frameworks, compensation data, work arrangements, precarious and contingent work, road injury, motor vehicle injury, work fatalities, work–road injuries, and work–vehicle insurance and OHS regulation. Secondarily, relevant sources cited in publications were identified through bibliographic database searches.

Web-based searches for data sources and existing policy and practices included the SafeWork Australia (NOSI) compensation statistics, Australian Bureau of Statistics (ABS) statistics, Australian Transport Safety Bureau (ATSB) statistics, the New South Wales Roads and Traffic Authority (RTA), the Victorian WorkCover Authority, the Transport Accident Commission (TAC), Australasian Legal Information Institute (AustLII), Australian Road Research Board; Monash University Accident Research Centre; the National Research Centre for OHS Regulation; and OHS regulators including NIOSH (US) and Health and Safety Executive (UK) and ACC (NZ). Strategies to improve and co-ordinate surveillance systems were developed to address the identified limitations.

Results

Systemic gaps were identified in OLV-user policy and legislation, and OLV surveillance and risk management, suggesting the need for strategies to improve identification of all OLV-users, and co-ordination of crash and injury data collection.

Policy gaps

There is a lack of common definitions for OLV users in OHS and road regulatory organisations, across all jurisdictions (Murray, 2007). Although Australian legislative frameworks recognise the work-vehicle as a workplace and road-work related claims have been accepted under Workers Compensation legislation, current definitions do not include all OLV-use, and do not acknowledge changes from traditional work
arrangements, including the increasing use of the light vehicle as a mobile workplace (Nevile & Haddington, 2010; WorkSafe Victoria & TAC, 2008; Stuckey & LaMontagne, 2005). The focus of current OHS policy is limited to employees driving corporate vehicles without recognition and support of all OLV users, regardless of their work arrangements or vehicle ownership (Driscoll et al., 2003). Unlike heavy vehicle users, the expected ‘standard’ for OLV-users is simply the possession of a current driving licence, regardless of driving competence, experience, or the work context (WorkSafe Victoria & TAC, 2008). Driver impairment requiring formal assessment of Fitness to Drive is undertaken according to medical standards prescribed for private (including OLV) driver standards, and commercial (heavy or licensed passenger) vehicle driver standards (Austroads, 2011). Obligations under all Australian OHS Acts require workers are fit to drive, both cognitively and physically and the reporting of any ongoing illness likely to affect the ability to drive safely (Austroads, 2011; Murray, 2007). Work-road users must comply with jurisdictional road safety legislation, however some OLV-use workers were identified as having work-related exemptions eg. NSW taxi drivers are exempt from wearing seat belts, despite the known safety benefit of such strategies (Roads and Traffic Authority 2009).

Other than these generic vehicle requirements for roadworthiness and registration, and specific responsibilities for the transport of Dangerous Goods, there are no specific standards prescribed for OLV (Department of Infrastructure and Transport, 2010; Worksafe Victoria, 2000). Vehicles are classified as mobile plant under Australian OHS legislation. As well as general plant regulations, specific guidelines are provided by OHS regulators for the implementation of identification, assessment and risk control measures (Worksafe Victoria, 2000). The Australian Design Rules (ADR) administered under the Motor Vehicle Standards Act 1989, include national standards for vehicle safety and require all road vehicles to comply with the relevant ADRs as at the time of manufacture (Department Of Infrastructure and Transport, 2011). Although employer and employee OHS obligations apply to work involving OLV-use, frequently these are not applied in a manner consistent with their application at more traditional employer controlled workplaces (Driscoll et al, 2003; Murray, 2007; Stuckey et al., 2007).

Surveillance and data gaps.

Up to a third of NSW OLV are registered for use by sole-traders who are unlikely to be insured by workers’ compensation systems (Stuckey et al., 2010c). Consequently, the responsibility for management of the OLV-related injury burden shifts from workers’ compensation to motor accident insurance and public health systems (Driscoll, 2003). OLV-users are a significant sub-set of the total light vehicle-use population and the labour force (Stuckey et al., 2010a). OLV-users work across many industries and occupations making identification of both the user population and fatalities in this population difficult (Macdonald et al., 2012).

The true risk of OLV-use is underestimated as the use of labour force survey data as denominator data includes all workers, regardless of whether or not they use OLV (Stuckey et al., 2010b). By using OLV registration data as a proxy for the size of the OLV-user labour force, the accuracy of risk estimates can be improved, and the results suggest OLV registration-based fatality rates are up to 15 times higher than estimates based on workers’ compensation data (Stuckey et al. 2010b).

Risk Management Gaps
Most past studies focus only on company car drivers, neglecting OLV-users in non-traditional employment arrangements and those using other vehicle types (Stradling et al., 2001; Symmons & Haworth, 2005; Stuckey & LaMontagne, 2005). This highlights significant gaps in understanding the problem of OLV-use in the broad context of OHS, public health, insurance, and road safety regulatory environments (Quinlan, 2001; Stuckey & LaMontagne, 2005). Environmental exposures, work design factors and risk and protective factors for the wider OLV-user population have been inadequately researched (Murray et al., 2012; Newman et al., 2012; Stuckey et al., 2007). A systematic approach to OLV OHS is needed to identify relationships between the users, their vehicle and road environments, work arrangements, and the complex mix of OLV-relevant social, legal and economic policy (Murray et al., 2012, Stuckey et al., 2010c).

The OLV user population comprises a considerably larger and more diverse population than previously described (Chapman et al, 2001; Symmons & Haworth, 2005; Stuckey et al., 2010a). OLV-users exhibit characteristics road safety research has shown are likely to increase the risk of crash and severity of crash outcome (Stuckey et al., 2010c). OLV characteristics include a greater proportion of load-shaped rather than passenger vehicles with generally poorer crashworthiness ratings than cars. Load vehicles are frequently used by sole traders for activities previously identified as having increased OHS risks, including farming and taxi use (ANCAP, 2010; Stuckey et al., 2010a). OLV crash data analysis identified that OLV-users who crashed were at increased risk from both recognised road risks, such as speeding and not wearing seat belts, and also hazards specific to OLV-use, such as use by particular groups such as farmers. Risk and protective factors were identified for both injury and fatality outcomes at user, vehicle, road environment and work organization levels of the OLV-user work systems (Stuckey et al. 2010c). These findings extend the previous mainly road-safety OLV-user focus on user behaviours, to risk related to work purpose and arrangements, underlining the need for a systems approach to expanding the purview of OLV injury preventive strategies (Stuckey et al, 2010c; Symmons & Haworth, 2005).

Discussion

Surveillance strategies developed using a systems framework are necessary to more completely capture the extent of the problem and to understand OLV-use OHS, and to thereby provide an evidence base to inform policy and practice.

Formal recognition of OLV-use OHS

The duty of care required under OHS legislation persists regardless of where, when or how the vehicle is being used, the user’s work arrangement or their eligibility for injury compensation should a crash occur. The identified systemic gaps in OLV-user legislation, data collection, and risk-management necessitate practical action at each level of influence within the OLV-use systems model to improve and inform OLV-use health and safety.

The introduction of the Model OHS Act (Safe Work Australia, 2009) provides a timely opportunity for the implementation of consistent policy strategies across all Australian jurisdictions including:
- Formal and overt statements within OHS policy that the OLV is a workplace when being used for work purposes;
- The implementation of inclusive and consistent OLV-user definitions encompassing all types of users regardless of work arrangement or work purpose;
- The development of clear OHS duty of care obligations and responsibilities for OLV-users, employers and others, similar to the heavy-vehicle chains of responsibility, compliance and enforcement, including fitness for task (Johnstone, 2002); and,
- The introduction of OHS related vehicle standards for all OLV with particular attention to load-shaped vehicles, many of which lack basic safety systems such as airbags, ABS and stability control systems, generally considered standard in passenger vehicles.

**Improved OLV-user surveillance.**

One of the most significant themes which has emerged from this research is the need for identification of all OLV-users regardless of work arrangement or vehicle type as gaps in injury surveillance and related OHS policy have masked the extent of the risks to OLV-users. The demonstrated inappropriateness of the use of surveillance systems based on insurance data to assess risks for workers, and the contemporary work arrangements of many of these workers which exclude them from those very systems, underlines the urgent need for different approaches to data collection for all types of OLV-users. OLV-use OHS and workers’ compensation appear to exclude all but corporate OLV users using company cars. The injury burden of OLV-users is underestimated because of failure of the regulatory apparatus and public information systems to identify OLV–related accidents. This fragmentation and underestimation of OLV-user crash and injury data should be addressed by OHS legislators.

Strategies to improve identification of OLV-users and to co-ordinate surveillance systems should be implemented at the point of vehicle registration and at the crash event. They could include linked vehicle, police, OHS, workers’ compensation, coroners’ data.

Measures to assist this should include:
- The introduction of consistent journey purpose questions at each crash investigation regardless of the jurisdiction or agency involved e.g. police, coroner, OHS;
- Reporting requirements at all OLV related casualty crashes for police, OHS inspectors or any others crash investigators to OHS agencies, regardless of the eligibility of the OLV-user for workers’ compensation, road safety or other insurance;
- The development of OLV-user specific coding in all surveillance systems including police, OHS and coroners’ reports, to capture OLV-user crash outcomes and include vehicle type, work arrangement and journey purpose data;
- The development of links between reporting systems including Compulsory Third Party insurance schemes; Notified Fatality reporting systems, workers’ compensations schemes; NCIS;
- The collection of hospital admission data for OLV injury related hospitalizations with identification of work-related cases using ICD-10-AM activity codes and compensation status variables, and identification of vehicle type by ICD-10-AM external cause codes; (Australian Institute of Health and Welfare, 2012);
- The introduction of formalised work-use categories to all vehicle registration systems to improve OLV identification; and,
- The use by OHS researchers of vehicle crash data in combination with coronial and insurance data for OLV casualty estimates, and the use of OLV registration data as a proxy for the OLV-labour force.

**Improved OLV-user risk-management**
The importance of using the OLV-use systems model is illustrated when considering the risk factors identified for OLV injury and death. Some of the identified risks such as speeding are known injury risk-factors but had not previously been identified as risks for some OLV users such as farmers, and while farmers have been previously identified as having increased OHS risks, these risks had not been identified as related to their OLV-use. OLV-users both share and have different crash risk and protective factors from those of other vehicle users because their driving is a mixture of road-exposures and their particular work-related imperatives such as journey purpose and time schedules. OLV-injury-prevention strategies require action from all relevant stakeholders, including manufacturers, industry and worker representatives, road and work-related data collectors, and OHS regulatory agencies, and need to specifically address the occupational aspects of work-road-use demands.

OLV-use OHS risk should be addressed through integrated OHS risk-management processes. Identification of risks and related hazards, and the implementation of appropriate control strategies should be based on a hierarchical approach, recognising that the vehicle is work equipment and the road is the work environment. Engineering controls should include the use of evidence-based vehicle selection using resources such as the Australian New Car Assessment Program (ANCAP, 2010), and the implementation of managed maintenance and procurement programs. As well as vehicle safety ratings, the vehicle selection and implementation process should consider user anthropometrics, vehicle purpose and the environment in which the vehicle will be used, based on sound ergonomics practice and a systems or ecological model. Many organisations have developed Safe Driving Policies within their OHS program. However, these are unlikely to be effective if they rely on the expectation of changing driver behaviour, unless they are supported by practical engineering controls (e.g. using safer vehicles on safer roads), with strategically supported trip management (e.g. accommodation on long trips, rather than continued driving). The use of in-vehicle equipment (e.g. mobile telephones), should be restricted unless there is an evidence base for its safe use with active controls implemented to prevent the activity from taking place while the vehicle is being driven. Programs to address occupational road use as a component within a broader OHS program have been developed by, for example, WorkSafe and the Traffic Accident Commission in Victoria (Worksafe Victoria & TAC, 2008) and the NSW Roads and Traffic Authority (NSW RTA, 2011). At the OLV-user workplace, (regardless of whether this is a larger employer which provides OLV for staff to use in the course of their employment, or a single vehicle used by a sole-trader as a tool of trade), strategies should be implemented to improve OLV-user health and safety, including:

- Formal recognition within the employer’s workplace OHS policy and practice, that duty of care to all workers includes OLV-users, and all work-related vehicle use is considered work;
- The implementation of OLV-use risk management systems by employers using evidence based risk control strategies including road-safety and OHS requirements. Exemptions for convenience should not be permitted if they increase OHS risks, e.g. taxi drivers should not be exempt from wearing seat belts (Roads and Traffic Authority 2009),
- The introduction of formal risk investigation processes within workplaces for all OLV- related hazards and incidents as per risk assessments required for any other work-related hazards. Traffic infringements (speeding or other driving offences) should be considered OHS incidents and managed through the same injury-management system as any other identified risk or hazard; and,
- The management of ‘fitness to drive’ should be managed in the same way as any other aspect of fitness to work and use of complex equipment, with particular regard to the task demands and the hazards and exposures of the OLV-use activity.

**Strategies for further research**

There is a need for further research which articulates public health, insurance, and road safety responses to the variables that operate at each level in the OLV-use model, and their contribution to OLV-user crashes, injuries and fatality outcomes. This approach provides an analytical structure for working back from adverse outcomes to identify the important protective and risk factors. Although the quantity and quality of research into occupational road use has increased in the last decade, particularly in Australia and the UK, there continues to be a dearth of OLV-user intervention evaluation. Gregerson (1996) and Salminen (2008) demonstrated that the use of group discussion combined with senior management commitment to the risk-management process, provided the most successful risk-management intervention for OLV-drivers in selected workforces. Intervention research, involving all vehicle types and work arrangements, is required to identify effective strategies to reduce the factors found to increase the risk of OLV-crash severity outcome; and then evaluate the impact of strategy implementation.

Further research is needed with large population groups over time, across all OLV types and work arrangements including the use of exposure data such as annual kilometres travelled, and data related to criminal behaviours including drug and alcohol use. All this data should be available from recent vehicle datasets combined with coroners’ findings. More investigation is also needed into the influences identified of underlying factors including the impact of work arrangement type, and the particular risks for farmers and taxi drivers and OLV-use in smaller fleets.

**Conclusion**

OLV-user risks reflect a complex and unique mixture of legislative, environmental and organisational factors. In 1981, Barry Jones wrote:

“Car driving and flying were born in the same decade. By a fateful social choice flying was made the subject of extreme, safety conscious licensing and regulation while car driving was let rip to become the big domestic killer of the twentieth century” (Jones 1982).

Currently we are seeing the implementation of nationally consistent OHS policy, providing an opportunity for strategic change. Without informed policy, OLV-use risks are likely to continue to be overlooked although light vehicles are used regularly within many contemporary work roles in Australia and internationally. Without action, this serious contemporary public health problem will continue to impact as a major traumatic cause of injury and death for working people.

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