Summary of the NIOSH Promoting Global Initiatives for Occupational Road Safety Research White Paper: Review of Occupational Road Safety Worldwide

Note: The full white paper is currently being finalised. Please contact us for a copy of the draft

Authors

Dr Will Murray *, Interactive Driving Systems
Stephanie Pratt, NIOSH
Ed Dubens, Interactive Driving Systems

* Contact for correspondence (via telephone: +44 (0) 7713 415454 or email: will.murray@virtualriskmanager.net)

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Summary of key findings on occupational road safety

This section provides an executive summary of the main findings, recommendations and lessons from the project, and is relevant to researchers, policy makers and practitioners.

S1 Background and aims

Around the world, available data and estimates suggest that work-related incidents contribute to as much as 25% of the road toll, rising to 50% if commuting is included – with the figures significantly higher in middle and low income regions, due in part to lower levels of personal car ownership and travel. Driving is also a factor in about 50% of all worker fatalities in occupational safety or workers compensation data.

In response to this, the US National Institute for Occupational Safety and Health (NIOSH) and partners instigated a Global Road Safety for Workers project with eight aims, which are set out in detail in Section 1 of the report.

1. Summarise the current state of knowledge and research on occupational road safety for a diverse audience of policy makers, safety practitioners, corporate representatives and researchers.
2. Identify relevant resources for inclusion in the online GeoLibrary (www.geolibrary.org).
3. Generate first draft literature review summarising the current state of knowledge and a listing of resources to be added to the online library.
4. Review, synthesise and assess the quality and comprehensiveness of information on interventions and good practices.
5. Interpret the literature to bring out common themes, contrasting high, middle and low income regions and identifying gaps or lack of information on particular topics.
6. Identify the role of government, emphasis areas for employer-led initiatives, practices suitable for small and medium sized enterprises (SMEs), agreement on ‘good practice’, availability of evaluated outcomes, potential to adapt existing programs for other jurisdictions and the role of multi-national organisations in middle and low income regions.

7. Identify research gaps and issues, synthesise good practices and provide a succinct summary of critical issues.
8. Feed into an international conference on occupational road safety to be held in Washington, February 16-18 2009.

S2 Literature and internet review

To meet these aims, the following steps were undertaken:

- Literature and document review covering over 180 sources.
- Informal discussions with a wide range of people around the world.
- Key word internet searches covering all regions.
- A review of widely recognised good practice cases.

The following themes emerged from the literature, described in detail in Section 2 of the report:

- There are many **societal, business, legal and financial reasons to focus on occupational road safety**. Unlocking which of these motivates action on a case-by-case basis is essential to persuading organisations and individual managers to invest time and resources on reducing the risks.
- Globally, the most work on occupational road safety appears to been undertaken in some parts of Europe, Australia, New Zealand and the US. In such countries **government has begun to address the risks through varying levels of surveillance, research, regulation** - particularly of large/heavy vehicles - and supporting voluntary initiatives as the full extent of the problem has began to emerge. Other countries around the world appear to have paid much less attention to the issue.
- Employer-led road safety policies and procedures have traditionally focused on managing single issues, such as vehicle maintenance, changing driver behaviours, data collection or loss control. Although all important issues in their own right, there is **increasing agreement on good practice following a systems-based approach supported by detailed pilot studies, implementation and rigorous evaluation**.
- It is difficult for driver, vehicle or journey-based interventions to be successful if the culture and management of the organisation does not lead on the issue. Appropriate **management leadership, policies, programs, procedures and day-today processes** need to be embedded in organisations.
- A multi-disciplinary approach, applying a **systems-based framework** such as the Haddon Matrix, appears to be the most appropriate way to make sustainable long-term improvements.
- Several multi-national companies, particularly in the oil and pharmaceutical industries, have developed global, regional and local programs that can filter down internally, as well as to suppliers, contractors, sub-contractors and the public in the communities in which they operate. This appears to be an area of opportunity, where **organisations purchasing services from third party suppliers can set down standards for them and their sub-contractors to adhere to** as part of their terms of business.
- Successful case studies of early adopters are important. Several of the cases identified involve small organisations, and transportation companies in the informal sector. The majority, however, are larger more brand conscious organisations that recognise the corporate social responsibility (CSR) and other benefits of engaging in road safety. To date, few such cases, nor the commonly used 'good practices' have been **formally evaluated/published under peer review**.
- **Government agencies and non-governmental organisations** (NGOs) make up or generate a significant proportion of work-related travel around the globe, and should be seen to **lead by example** through the effective review, gap analysis, risk assessment and management of their own systems, management, vehicles, drivers and journeys.
- Organisations such as the Global Road Safety Partnership (GRSP) and the Fleet Forum have been proactive in middle and low income regions, particularly forging **partnerships between local agencies, civic society and large 'close to the road' multi-national organisations operating locally**. The Shell India case described in Section 3 of the report is a good example. Useful free tools are available from

the Fleet Forum (www.fleetforum.org) focusing on middle and low income regions, and the UK-based Fleet Safety Benchmarking project (www.fleetsafetybenchmarking.net). Driving for Better Business (www.drivingforbetterbusiness.com) provides an interesting business-to-business model that could be adopted more widely. As yet, however, there is limited evaluation data on the extent to which 'good practices' commonly in place can be replicated elsewhere, or can be transferred from high to middle and low income locations and a cautious research-led approach to this transfer process is recommended, based on a detailed understanding of and empathy for local requirements.

- CSR has an important role to play as an enabler for organisations to focus attention on road safety in the markets in which they operate. This appears to be particularly the case for large 'close to the road' multi-nationals in the oil, vehicle supply and logistics sectors. It is important, however, to be aware of, and to **guard against, the risks of the corporatisation of road safety**.
- As well as the lack of program evaluation described, the main research gap identified appears to be the limited surveillance data. At the national or policy level the **true extent of the occupational road safety problem, particularly involving light vehicles, remains incomplete or at best an estimate** in many jurisdictions. In middle and low income regions the risk is probably greater due to lower levels of personal car ownership. **Commuting is also an issue requiring further surveillance**. At the organisational level, much more could be done to review, benchmark and learn from collision or vehicle insurance data.
- **Better surveillance** in this way allows the full extent of the problem to be evaluated, relevant interventions to be developed, a clearer understanding of the extent to which hypothesised risk factors (such as organisational safety culture, speeding, alcohol, distraction, fatigue, training and mobile phone use) are relevant to occupational driving, and for interventions to be effectively evaluated.

S4 Outcomes from the NIOSH conference

The NIOSH International Conference on Road Safety at Work held February 16-18, 2009 was the first international conference focusing on the occupational aspects of road safety and drew 220 delegates from 44 countries. The event provided a forum for business, labour, policy makers, and the research community to discuss strategies to prevent road traffic crashes in the workplace, based on sessions covering:

- Context setting by NIOSH and partners.
- Case studies of global good practice from Shell and Nestlé.
- The status of occupational road safety globally, covering high, middle and low income regions.
- Policy perspective presented by Swedish Road Administration, focusing particularly on Road Safety Traffic Management Systems ISO 39001.
- Break-out sessions covering: Policy; Management and interventions; Middle and low income regions; Legal perspectives; Driver-based interventions; Protecting drivers in emerging markets; Labour relations and union perspectives; Crash analysis and benchmarking; Regional focus on Russia, Southeast Asia, India, China Africa and Latin America; Corporate Social Responsibility; Technology-based interventions; Using research to promote policy change; and, Driver management.

The full conference proceedings, including all available presentations and written papers, videos of main speakers and posters are available online via www.cdc.gov/niosh/programs/twu/global

Since the conference, it appears that:

- Many participant **organisations have reviewed and developed their occupational road safety programs**; and have continued to benchmark their processes and outcomes both internally and externally.
- The conference 'energy' is, at least to some extent, being harnessed to maximise the potential of occupational road safety initiatives to be a **conduit for both road and worker safety**. Occupational

road safety and commuting make up a substantial proportion of the road toll and of occupational injuries and deaths; and, can play a significant role in improving both road and worker safety around the globe.

- There has been an upsurge in interest in occupational road safety. Examples include the PRAISE project launched across Europe, including events in Brussels and Poland; continuing GRSP and Fleet Safety Forum projects; further growth of the Driving for Better Business program in the UK; ongoing UNRSC and PSRSC meetings and discussions; the Irish government holding its first conference on occupational road safety – collaboration between the country' agencies for both road and worker safety attended by over 220 people from business and government; and, major road safety conferences in Australia, Holland and New Zealand all including occupational road safety themes. **Funding and other support is required for such initiatives, and a series of regional conferences, to be effectively implemented in Asia, Africa, Latin America and other middle and low income regions** where there is limited existing regulation, policy, documented good practice or existing case studies. This is important to generate political will, as well as to advance the applicability of occupational road safety tools in different risk environments.
- **Business case and cost models** remain as important as ever, as does engaging the occupational safety health and environment community. One way to achieve this is for worker road safety to be legislated for, regulated and managed as an occupational health and safety issue. Another is for more research and projects focusing on the links between safety, efficiency and the environment. There are also opportunities for 'clever' applications of workers compensation, social or general fleet insurance data and resources to be used to target risks more effectively at both work-related and commuting-based incidents.
- At the organisational level there is need to encourage the adoption of a systems-based approach such as the Haddon Matrix to occupational road safety, supported by rigorous and ongoing evaluation. The in-development **ISO standard 30091 provides an opportunity to engage organisations widely** based on a tried and tested format.
- At the macro or government level **better surveillance data** is required to identify purpose of journey in road safety statistics and include on-road incidents in health and safety datasets to guide and evaluate policy, regulation and enforcement. **Leadership by governments and NGOs to manage the safety of their own people travelling to and for work purposes** is also important. Some government agencies, including the US federal ban on texting, Australian States producing guidance, and UK national and regional good practice projects, have started to show leadership on occupational road safety – but much more work is required.
- One way to achieve this in the charitable and NGO sector is for funding donors to be encouraged to **make occupational road safety a criteria for funding eligibility**, in a similar way to which transport and other contractors should be encouraged to **include safety in their tender documents** in the private sector.
- Further efforts are required to **link research and practice more closely**, and continue to engage governments, researchers, practitioners and NGOs. This is ongoing through several PhD and other research projects on occupational road safety around the world.
- More case studies, and internet-based resources for occupational road safety, are coming into the public domain. Examples include the Driving for Better Business, Fleet Forum, GRSP and Fleet Safety Benchmarking programs, the NIOSH conference proceedings and other more recent conferences and publications. Many of these cases, and resources, include detailed performance indicators and at least some evaluation methodology. More work is required in this area, however, particularly to **make the evaluation process as rigorous as possible and able to stand up to peer review**. How this good practice is turned into research is very important. This issue is reflected in the differences between the road safety agencies that require scientific peer reviewed evidence, typically based on injuries and fatalities, and the private sector which aims to improve business and uses financial and efficiency based measures.
- The tools and case studies described throughout this report also need to be **available, accessible and useable in an appropriate form for middle and low income regions** – including the participatory development and sustainability of relevant policies, tools, performance measures and evaluation methodologies. Projects involving the Fleet Forum and GRSP, provide interesting models for using worker road safety as a conduit for general road safety in such regions. Private sector projects, typically involving large multi-nationals, for example in working with local contractors, setting up 'safe

transportation corridors' and engaging direct employees and their families in road safety, are also important.

Overall, based on the outcomes since the conference, it appears that **quantum is growing in research, policy and practice on occupational road safety, but there is still much more to do**. Both research to practice (R2P) and practice to research (P2R) are important, and governments, NGOs, business and researchers should be encouraged to focus attention on worker road safety, including the important single issue such as speed, driver behaviour, fatigue and vehicle safety - but also acknowledging the importance of all the interdependencies and adopting an integrated, systems-based, approach.

S3 Main conclusions and recommendations

- Road collisions involving workers make up a **significant proportion of the road toll** (approximately 20-30%); and of **workplace fatalities** (in the region of 30-50%) in jurisdictions where the data is available. These figure increase substantially if commuting is included, and in regions where personal car ownership levels are lower. For this reason, as a subject area, occupational road safety has gained increasing attention from researchers, practitioners, NGOs and policy makers in recent years.
- Some Governments have recognised the potential of occupational road safety to impact on the overall road toll and are more advanced than others in identifying the level of risk and taking actions to mitigate it. Such actions include regulation, particularly of large/heavy vehicles such as trucks and buses. Voluntary initiatives, mostly good practice guidance from national and local governments is also common. In other nations, particularly middle and low income regions, occupational road safety does not appear to be so advanced. Even in the countries with these initiatives in place, there are still **gaps in government-level surveillance**, particularly of purpose-of-journey data for on-road incidents including vehicles other than trucks and buses; and for OSH data involving vehicles in at-work incidents.
- At the organisational level, agreement on the emphasis areas for employer-led initiatives appear to be increasingly around **reviewable organisational policies, procedures and processes** that focus on key areas such as driver, journey and vehicle management – both internally and for transportation contractors to ensure coverage along the full supply chain from 'field to fork', or 'seed to stomach'. Codes of conduct that managers and drivers sign are also increasingly common. Despite data from several organisations being in the public domain, and a few exceptions that are cited throughout the paper, the main gap in the research with regards to good practice is the lack of detailed outcomes evaluations undertaken or published in the peer-reviewed literature.
- Although take-up has been greater in some areas than others, much of the good practice described is suitable for SMEs and the informal transport sector. This is particularly true when such organisations can be encouraged or supported in some way, for example to understand the business case, with benchmarking and tools, or with assistance from their insurer, vehicle leasing company, local authority or larger organisations buying their services. The latter includes multi-national organisations, typically supported by NGOs and local agencies in middle and low income regions. **Global companies can take responsibility in countries were the State and the institutional structures are less established**, for example through capacity building and initiating research and projects that can result in models that suit the local environment. It is important to be mindful, however, of being seen as engaging in the corporatisation of road safety, which may not always be in the best interests of society locally. Detailed research, planning, understanding of local need and capacity building are all important steps in the process of adapting 'good practices'.
- In-part because they show up in national level surveillance data, 'professional' drivers of commercial vehicles such as large/heavy trucks and buses receive most attention at both the government and organisational level. Much regulation and many of the good practices described are focused on this group. Although they are more difficult to target, an increasing number of organisations are also focusing on the **road safety of workers whose primary occupation is something other than 'driving' and typically use smaller commercial or passenger vehicles for work purposes**. Despite the large scale of the problem, identified in several European countries, less attention is paid to road safety while **commuting** to and from work. Given the significant scale of this problem, and the burden that it causes

to workers compensation systems, employers and society, there is a very strong argument for more research, policy and practice to be focused on reducing the risks involved in commuting.

- Similarly, limited focus is given to **workers who are pedestrians**, particularly roadside workers, although some guidance is available from government agencies. Such incidents often appear to be on the 'cusp' of work sites and the road and are not always identifiable in on-road or OSH surveillance data.
- Several employer-led road safety initiatives have been targeted at **families of workers**, and local communities, which typically appear to be implemented by organisations aware of the impact of road safety on their key workers, to the local community, and of the importance of CSR. Such an approach offers the opportunity for **occupational road safety to be a conduit for community road safety**.

Overall, the research suggests that an all-encompassing systems-based framework that incorporates all the good practice identified throughout the report is required. Several such models were identified, including the **Haddon Matrix** shown in the table below which provides an all-encompassing pre-crash, at-scene and post-crash **systems-based framework that incorporates all the good practice identified in the report** and is supported by a small, but increasing body of published evaluation data, and many as yet unpublished outcomes.

As well as classifying improvement interventions to be piloted, implemented and embedded, it can be used as a self-review, gap analysis or post-collision investigation tool by asking: '*Do we have the following in place?*' for each of the statements in the Matrix. *'No'* responses indicate gaps in the occupational road safety system.

The starting point lies firmly at the top of the Management culture column of the matrix, as follows:

1. **Identify, obtain and analyse available data (eg insurance, health, risk assessment and telemetry) on the extent of the problem.**
2. **Use this to make a business case to relevant senior managers in the organisation.**
3. **Once the business case is accepted, focus on the other areas shown under Management culture first to ensure appropriate systems are in place, and set outcomes and process based targets and key performance indicators (KPIs).**

Summary of occupational road safety program interventions in the Haddon Matrix framework

	Management culture	Journey	Road/ site environment	People - drivers and managers	Vehicle	External/ societal/ community/ brand
Pre-crash or pre-drive	Business case Legal compliance Safety review, claims analysis, risk assessment & focus group discussions Benchmarking Board level champion Pilot studies & trials Goals, policies & procedures Safety culture/climate Management structure Fleet safety committee Safety leadership by example and commitment Communications program Contractor standards Grey fleet (own vehicle) policy	Travel survey Travel policy Purpose Need to travel Modal choice Journey planning and route selection Route risk assessment Journey scheduling Emergency preparedness Shifts/working time Fatigue management Commuting	Risk assessment Observation Guidelines & rules Site layouts & signs Work permits Delivery & collection procedures Road improvement Hot-spot mapping and hazard assessments Engage local and national agencies	Select Recruit Contract Induct Appropriate licence Relevant qualifications Handbook Risk assess Train Work instructions Engage & encourage Equip eg high viz Communicate Driving pledge/rules Health & wellbeing Monitor Correct	Risk assessment Selection Specification Active and passive safety features Standards Servicing Maintenance Checking Use policy and legal compliance eg loading Mobile communication and navigation policy Telemetry to monitor Wear and tear policy Grey fleet standards	Regulator/policy engagement Insurer engagement CSR External benchmarking External communications Commuting Family members program Community involvement Engaging other road users Road safety weeks/days Safety/Eco groups European Road Safety Charter Road safety conference presentations Media/outreach/PR Safety & environmental achievement awards
At scene	Emergency support to driver	Engage local investigators	Manage scene	Known process and 'crash pack/bumpcard' to manage scene	Reactive safety features Crashworthy Telemetry data capture	Escalation process Emergency response
Post-crash	Policy and process to report, record &investigate incidents Change management process Ongoing claims data analysis Data warehousing & linkages Evaluation, KPI benchmarking & program development	Debrief and review Review journey elements of collision data Ongoing journey management review	Investigate and improve Review site/road elements of collision data	Reporting and investigation process Driver debrief and corrective action Review people elements of collision data Counselling, trauma management & support Reassess/train	Strong openable doors Investigate telemetry data Vehicle inspection & repair Review vehicle elements of collision data Review vehicle selection & use	Manage reputation and community learning process Community-based trauma management

S4 Project limitations and areas for ongoing and future work

Although the project has met all its aims, several limitations can be acknowledged in the research, which lead into the following recommendations and lessons for policy makers, researchers and practitioners.

- The searches used for the project were comprehensive. They were, however, all undertaken in English which almost certainly biased the results towards English speaking locations – which is reflected in the bulk of the findings being based on English speaking regions. **A more diverse use of language for the searches could have identified further initiatives in other jurisdictions. With hindsight, a better-resourced international research group would have provided more comprehensive, multi-lingual, findings.** Since the conference, information from several countries including Bangladesh, Mexico, the Netherlands, France, Spain and Germany has been added.
- Using the International Road Federation, World Road Statistics as a framework to undertake country by country reviews was effective for structuring the research. It appears, however, to have **excluded several regions, most notably Middle Eastern countries and Japan**. Further research could be undertaken to make the report more inclusive of those locations. Using such a **regional structure worked reasonably well, however it did not cater for pan-global programs**, such as those of multi-national organisations or agencies such as the Fleet Forum – which is described under Denmark as this was the origin of a major element of its project funding, similarly GRSP as it is based in Switzerland, and Sweden for ISO 39001, as that is where it was first proposed.
- The internet-based research used to support the literature review is likely to have **biased the results towards 'CSR-led information from news-savvy' organisations**. This means that some of the gritty 'reality' may have been missed. For example, in many middle and low income regions drivers are paid by the load or journey which does not appear to encourage safe practices. Even in high income regions there remain issues for example with excess working hours, people on 'job and finish' contracts rushing to complete their work and the growth of the un-regulated home delivery or courier sector in recent years, operating vehicles that fall outside of the existing large/heavy vehicle regulatory and licensing system. Further detailed research and guidance on the structure of particularly the transport industry and the nature of working conditions, where contracting, sub-contracting and use of temporary labour are common, would help to understand the extent of the problem, and potential improvement interventions covering the full supply chain from 'crop to cupboard'. More could also have been done to **utilise more research-based search engines** such as the Transportation Research Information Services (TRIS) or Research and Innovative Technology Administration (RITA - www.rita.dot.gov) US National Transportation Library to facilitate the literature review, although it is important not to overlook practice-led initiatives.
- As the research has focused on a system's based approach to occupational road safety some important **'single issue' risk factors, such as driver fatigue, behaviour and stress, which all have extensive literature bases, have not been covered** in great detail. All are worthy and important issues in their own right, but beyond the scope of this report – and in the occupational road safety context need to be seen as important elements of the overall system.
- Lack of surveillance data for occupational vehicles other than large/heavy trucks and buses at the government level is one limitation of the research. In an ideal world, transportation data would include a purpose-of-journey field and OSH data would include and clearly code on- and off-road incidents involving vehicles. This data would match up with hospital, insurer/workers compensation data and coroner's records via common codes. Until such a time, one area for further study would be to **collate what is known already on the extent of the problem in different jurisdictions around the world to build a fuller picture of the extent of the problem**. For example, UK transportation data suggests that about a quarter of road fatalities involve workers and European/Australian OSH data suggests that over 50% of worker fatalities involve vehicles. Commuting is also a high risk factor.
- Another limitation of the research is the **differences in regulatory regimes around the world**. Typically, in high income regions there is a great deal of regulation of large/heavy trucks and buses. This includes Chain of Responsibility, Accreditation and Fatigue Management in Australia and New Zealand; Operator Licencing and Intelligence-led enforcement in the UK; Driving hours and driver training via the CPC in Europe; and Hours of Service in the US. There is **much less regulation of light vehicles being driven for work purposes**. In middle and low income regions, where a higher proportion of the journeys

made are likely to be work-related, there appears to much less regulation in place, for both large/heavy and light vehicles. **Further research is required to review the regulatory regimes around the world, and identify gaps and areas of opportunity**.

- There is a gap between research and practice, with very little research focused on evaluation. As a result there are very **few successful outcomes-based case studies in the peer-reviewed literature**. Linked to this, research funding is required to support further detailed experimental research projects to replicate the Swedish Televerket study undertaken over 20 years ago. More detailed evaluations should also be undertaken by agencies running existing good practice projects (such as GRSP, Fleet Forum, Fleet Safety Benchmarking, NETS and Driving for Better Business). Assuming such programs can be successfully evaluated, they provide a starting point and portals for good practice transfer. Similarly, behind the wheel training suppliers should be encouraged to focus more attention on peer-reviewed evaluation studies based on road safety outcomes.
- Managers of government vehicles, and government workers using their own vehicles on work business, are responsible for some of the largest fleets in the world, and should be seen to lead by example. To date, however, there have only been limited pockets of research, policy and practice on this important group of workers. **Government agencies** should be encouraged to develop integrated occupational road safety programs. Similarly **NGOs** and agencies, especially those promoting road safety, should also ensure they **lead by example, and have appropriate well-evaluated systems and policies in place**.
- Although fuel prices have reduced in recent months, and economic activity around the world has declined, there remains a growing interest in the **relationship between safety, efficiency, fuel use and the environme**nt. This suggests the need for detailed research and evaluation of the link between fuel use and road safety. Anecdotal, and often sales-based, evidence suggests that a safe driving culture reduces fuel costs by up to 10%. If proven, this could help organisations make the road safety business case more compelling, as it saves money on fuel, and is good for the environment, as well as any road safety benefits. Similarly, road safety can be part of the business case for environmental projects.
- Several other issues have also emerged during the research that are worthy of further exploration, including: driver health and wellbeing; infrastructure, particularly how to engage government agencies in improving local road layouts at hot-spots; local challenges in middle and low income regions such as workers using two and three wheeled vehicles; and, the link between OSH, which often seen to stop the factory gate, and road safety. **More detailed research is required in all these, and a range of other areas to help shape policy and practice**.

An obvious final limitation and area for further work is that some research and good practice may have been overlooked. Any readers who have identified gaps in the discussion are encouraged to contact the authors via email (will.murray@virtualriskmanager.net). We appreciate, and look forward to, your feedback.