Confronting "Death on Wheels":
Making Roads Safe in the Russian Federation

“The national economy lost US$175 billion from traffic accidents over the past five years. That is comparable with overall health care expenditures of the same period.”

– Dmitry Medvedev,
President of the Russian Federation,
August 6, 2009

Diagnosis of the problem

Transport is central to development (World Bank 1996). It facilitates the movement of people, goods, and services; enhances employment opportunities; and improves access to essential services. The transport sector is affected by policy decisions in many sectors, and these, together with the transportation options available, facilitate or discourage the use of private cars and otherwise influence the choices people make for traveling. While enhancing social welfare, transport investments can also expose people to hazards or risks with possible acute and chronic health effects, including road traffic injuries (RTIs), the subject of this note.

The rapidity with which the risk of road traffic injuries grows depends on the rate of growth of motorization and the rate of change in fatalities per vehicle (Kopits and Cropper 2005). In many transition countries of Eastern Europe and Central Asia, vehicle ownership grew faster than the rate of fatalities per vehicle declined, while policy and governance did not keep pace with the booming motorization. The decrease in the quality of public transport, due to limited or reduced public financing, has pushed many people to meet their own mobility needs through private cars or informal public transportation, such as informal networks of minibuses.

Since the 1990s, due to rising income levels in the Russian Federation, the motor vehicle fleet in Russia increased by 260 percent: cars account for more than 70 percent of all motor vehicles (ECMT 2006). However, improvements in road infrastructure to accommodate the increased number of cars, and enforcement of traffic safety regulations, have lagged behind. As a result, RTIs involving car drivers and occupants, pedestrians, and cyclists, have become one of the major public health burdens.

In 2008, according to Ministry of Internal Affairs data, nearly 30,000 road traffic deaths and about 271,000 non-fatal road traffic injuries occurred in Russia. While these figures represent a drop of 10 percent and 7.3 percent, respectively, from 2007, road safety in Russia is still worse than in any European country (Box 1).

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1 This note was prepared in September 2009 by Patricio V. Marquez, Lead Health Specialist, Europe and Central Asia Region, the World Bank, with contributions from Sevil Kamalovna Salakhutdinova, Health Officer, Moscow Office, the World Bank. It benefited from technical guidance and comments on a larger report on the situation in Europe and Central Asia (ECA) provided by leading road safety experts at the World Health Organization and the World Bank. Comments were also provided by Igor Sheiman, Higher School of Economics, Moscow.
What are the Vulnerable Regions and Population Groups?

About 72 percent of all car crashes in Russia occur in urban areas; Moscow and the Moscow region together contribute to more than 12 percent of the country’s car crashes, injuries, and fatalities. Data for 2007, presented in Figure 1, show that the majority of traffic deaths are among car occupants (62 percent, followed by pedestrians at 36 percent). The high percentage of pedestrian deaths, in sharp contrast with the experience of other European countries, is evidence of the Russian transport system’s limited ability to cope with rising traffic levels and the needs of vulnerable road users.

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2 By comparison, in France and Germany, pedestrian deaths account for about 12 percent of total road fatalities.
RTIs disproportionately affect economically productive age groups in Russia. Over 50 percent of road traffic deaths are among those aged 15–44, and about 75 to 80 percent of such deaths are among males. Children and the elderly are particularly vulnerable, especially as pedestrians, and are seven to nine times more likely to be killed in a car crash than car occupants. On average, a child is injured in every eighth road traffic crash in Russia. Older people—frequently as pedestrians and often more frail—have a higher fatality rate if injured, because their injuries tend to be more severe. As population aging accelerates in Russia, identifying new strategies that address the mobility and safety needs of the elderly becomes more urgent.

There are several main contributory factors to RTIs. An estimated one-third of car crashes in Russia are caused by speeding vehicles, a factor that is particularly dangerous for pedestrians. The possibility of a pedestrian being killed increases eightfold as the speed of impact with a car increases from 30 kilometers per hour (km/h) to 50 km/h. Drunk driving, accounting for 10 percent of all road crashes, is another important risk factor, and young drivers and riders aged 18–25 are particularly at risk of crashing. Other important risk factors are poor road conditions and poor driving that result in head-on collisions. A looming factor is the growing problem of distracted driving while using cell phones and sending text messages.

Economic and social consequences of RTIs are severe. Globally, RTIs have a significant negative impact on society. The economic or “human capital” cost components for motor vehicle crashes and injuries include direct and indirect costs to individuals and to society as a whole from the decline in the general health status of those injured in motor vehicle crashes (NHTSA 2002). In estimating the total

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3 As blood alcohol content (BAC) increases, so does the likelihood of crashing, particularly above a BAC of 0.04 grams per deciliter (g/dl). A recent study assessing the impact of alcohol on the high and fluctuating mortality rates found among adult men in Russia shows that RTIs are one of the three main causes accounting for alcohol-related deaths (Zaridze and others 2009).

4 Direct costs include emergency treatment, initial medical costs, rehabilitation costs, long-term care and treatment, insurance administration expenses, legal costs, and employer/workplace costs. Indirect costs are productivity costs in the workplace due to temporary and permanent disability and decreases in household productivity due to these disabilities. Property damage and travel delay, crash costs other than those directly attributable to an injury, are estimated for injury and non-injury crashes as well (NHTSA 2002).
economic cost of RTIs, the value of the decreased production and consumption of injured individuals is included, as are the resources consumed as a result of any injury or crash that might otherwise be used for increasing societal well-being. Recent data from the United States, where the total economic cost of motor vehicle crashes in 2000 was estimated at US$230.6 billion, illustrate how the total social costs of RTIs are computed. The most significant costs were lost market productivity due to the level of disability documented for crashes involving injury and death, and property damage due to the high incidence of minor crashes in which injury does not occur or is negligible, each of which accounted for 26 percent of the total economic costs; medical care costs and emergency services (which includes police and fire services), which were responsible for about 15 percent of the total; travel delay caused by congestion at the crash site, which accounts for 11 percent; and the value of household productivity, which accounts for 9 percent of total costs (NHTSA 2002). Similar estimations conducted by the Russian Ministry of Internal Affairs in 2005 indicate that the cost of road crashes in Russia absorbs 2.5 percent of gross domestic product (GDP) or about US$26 billion annually.5

The impact on the Russian health system is large. RTIs are a major burden on health systems worldwide, both in terms of placing excessive demands on already overburdened facilities and straining limited budgets. Estimates in Russia indicate that road traffic victims are seven times more likely to need hospitalization compared with victims of other types of trauma, and RTIs account for 75 percent of all types of injury, with victims of road traffic crashes representing more than 60 percent of the total number of severe trauma cases. The provision of medical services for traffic injuries and other external causes absorbed approximately 0.27 percent of GDP in 2003, or about US$1.2 billion (World Bank 2005).

How is Russia responding to this challenge? The Government of the Russian Federation is implementing the “Federal Targeted Program for Ensuring Road Traffic Safety 2006–2012,” aimed at decreasing the number of people killed on the country’s roads by a factor of 1.5. The Department of Road Traffic Safety within the Ministry of Internal Affairs (MIA) is coordinating this program with the participation of the Transport, Emergency Situations, Health and Social Development Ministries, other federal agencies, and regional and municipal governments.

Main components of the government’s program are roads modernization and education and information campaigns. Recently adopted, promising measures include: increasing tenfold the fines for driving without a seat belt; enactment of a law to make crossing into an oncoming lane an offense punishable by license revocation; and anti-alcohol campaigns, in some cases with the participation of the Russian Orthodox Church (Partitt 2009). These efforts, as noted, resulted in a positive trend in RTIs during 2007–08.

However, road conditions in Russia are still very dangerous. As President Medvedev emphasized in a national speech on August 6, 2009, poor roads infrastructure, bad organization of road traffic, and insufficient efforts at the regional and local levels hinder further improvements. Exacerbating the situation are the absence of effective education programs for drivers, particularly young drivers, and limitations on the purview of road police that concentrates on the collection of penalties and not on the prevention of road accidents. Poor emergency medical and rehabilitation services further account for road fatalities and disability among car crash victims.

What additional actions can be taken in Russia? Countries that have successfully reduced the burden of RTIs such as Australia, Great Britain, the Netherlands, New Zealand, Sweden, and the United States, have adopted a “safe systems approach,” anchored in a long-term vision, and embracing improvements in road infrastructure, vehicle safety, and legislation and enforcement of laws to ensure compliance of

5 The estimation of the cost of a death due to road traffic accidents in Russia values years of life lost before retirement at EUR70,000, a much lower amount than those used in other countries (ECMT 2006).
road users with safety measures (OECD/ECMT 2006). Key ingredients underlying these efforts are sustained political support and funding for system-wide strategies, targeted action plans, and delivery mechanisms involving multiple institutions at all levels of government.

The experience of several OECD countries suggests possible options to scale-up and intensify road safety efforts in Russia in the medium and longer terms. One such option would be to focus on the implementation of a combined set of effective interventions on selected major/high-volume road corridors and highways around urban centers. The objective would be to test an optimized road safety improvement strategy that could later be replicated sequentially in other regions of the country on the basis of accumulated experience during an initial phase. Hence, a multisectoral approach is more necessary than before to effectively address the road safety challenge in Russia.

Under the multi-sectoral option, effective interventions to address all “4Es” of road safety—engineering, education, enforcement, and emergency medical services—could be supported to:

(a) strengthen cross-sectoral institutions and governance capacity for RTI prevention;
(b) enhance nationwide RTI surveillance systems,
(c) improve the road infrastructure,
(d) strengthen road safety enforcement,
(e) launch public education campaigns, and
(f) strengthen emergency medical services, including the provision of safe blood transfusion services, which are critical to saving lives.

What is the international evidence on effective interventions to reduce RTIs?

Engineering technologies and road designs that improve infrastructure, such as intersection control, safety or crash barriers, signs, markings, and maintenance are effective intervention strategies (World Bank 2003). For example, collapsible lighting columns and other devices that break away on impact are widely used, and cable barriers have been used cost-effectively in Denmark, Sweden, Switzerland, and the United Kingdom (European Transit Safety Council 1998). Traffic-calming measures, such as speed bumps, reduce RTIs, especially pedestrian injuries (Afukaar, Antwi, and Ofosu-Amaah 2003), and speed cameras led to a 14 percent reduction in fatal crashes and a 6 percent reduction in non-fatal crashes in developed countries (Elvik and Vaa 2004).

Vehicle design and safety equipment. Strategies focusing on safer vehicles include improving the visibility of vehicles, (for example, daytime running lights, including on motorcycles) (Elvik and Vaa 2004; Radin Umar, Mackay, and Hills 1996; Yuan 2000), promoting further development of “intelligent” vehicles, and incorporating crash protective design into vehicles (for example, seat belts and airbags).

Laws, regulations, and enforcement. Intervention strategies aimed at improving road user behavior increasingly focus on the introduction and enforcement of relevant legislation rather than on educational efforts alone. Notable success in the United States has been achieved by graduated driving permits for teens, requiring six months with a learner’s permit and a curfew prohibiting driving between midnight and 5:00 a.m., and passenger restrictions for the first year after getting a license.6

Research shows that using seat belts is the most effective strategy for reducing traffic deaths and serious injuries once a crash has occurred, and there is strong evidence that laws requiring the use of seat belts

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6 A new report by the Texas Transportation Institute noted that the state’s rate of fatal teen crashes has dropped faster than anywhere else in the United States over five consecutive years after the adoption of these measures (Dallas Morning News 2009). Media coverage, increasing fines, and suspending drivers’ licenses have helped reduce RTIs and deaths in Brazil (Poli de Figueiredo and others 2001).
and child restraint laws reduce occupant deaths and injuries.\(^7\) Motorcycle and bicycles helmets also provide a significant level of protection against injuries.\(^8\)

**Measures to control speeding, drunk driving, and cell phone use while driving.** Excess speed can contribute to both the frequency and severity of motor vehicle crashes because additional time is required to stop a vehicle and more distance is traveled before corrective maneuvers are made. Setting and enforcing speed limits reduces RTIs by up to 34 percent, particularly among vulnerable road users (pedestrians, cyclists, and motorcyclists). RTIs are also reduced by setting and enforcing legal blood alcohol limits and minimum drinking-age laws, using checkpoints to randomly stop drivers to detect alcohol, and running mass media campaigns aimed at reducing drinking and driving (Peden and others 2004). Random breath testing has been found to be twice as effective as having predetermined checkpoints (Henstridge and others 1997). Other measures such as license revocation and suspension have been enacted in numerous countries, resulting in a marked decrease in the number of fatalities resulting from alcohol-related crashes. Measures adopted at the state level in the United States to outlaw the use of cell phones and texting devices by young drivers are starting to reap positive results. Peer influence programs have also reinforced the rules and contributed to the success of Texas in reducing fatal crashes involving teen drivers (Dallas Morning News 2009).

**Traffic management and reducing risk exposure to RTIs.** The least-used and least-evaluated road safety intervention strategies are those that aim to reduce exposure to risk of RTIs. It has been estimated in high-income countries that under certain conditions, for each 1 percent reduction in distance traveled, there is a corresponding 1.4 to 1.8 percent reduction in crash incidence (Litman 2000; Edlin 2002). Thus, policies that improve transport networks and efficient land use to reduce distances and the necessity to travel are effective in reducing RTIs.

**Emergency medical care systems to deal with crash victims.** Effective post-crash medical care and treatment can prevent deaths and limit the severity of injuries. France’s Service d’Aide Médicale d’Urgence (Emergency Medical Assistance Service, SAMU) and the U.S. experience in this area are noteworthy, since better outcomes and survival rates among road traffic victims have been achieved by improving emergency medical systems to get people to hospital more quickly after an accident, and by enhancing in-hospital quality of care (Haider 2007).

**Are the proposed interventions cost-effective?** Recent research indicates that while the most cost-effective strategies vary by region, a combined intervention strategy that simultaneously implements multiple road safety interventions produces the most health gain for a given amount of investment (Chisholm and Naci 2008). Figure 2 shows the results of cost-effectiveness estimations of selected interventions\(^8\) to counter the exposure to risk factors associated with RTIs in Russia, other Former Soviet

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\(^7\) Wearing a seat belt, for example, can reduce 45 to 55 percent of traffic-related injuries (WHO 2004). Mandatory seat belt use laws accompanied by strict enforcement are the most successful in preventing deaths, as demonstrated in a 30-year study in Finland and the United Kingdom (European Transport Safety Council 1996; Ashton, Mackay, and Camm 1983). European Union (EU) countries have seat belt enforcement laws allowing the police to stop a motorist for not wearing a seat belt (primary enforcement), which increases the laws’ effectiveness (Dinh-Zarr and others 2001).

\(^8\) For example, in Malaysia and Thailand, the enactment and enforcement of helmet laws have led to a 56 percent and 30 percent reduction in road traffic fatalities, respectively (WHO 2002; Ichikawa, Chadbunchachai, and Marui 2003; Supramaniam, Belle, and Sung 1984). Similar results have been observed in recent years in Vietnam after the introduction of mandatory helmet laws in 2007 (Passmore 2009).

\(^9\) Road traffic injury prevention inputs include engineering and design of roads and vehicles, safety devices, technology, and ambulance and trauma care services. The intervention costs in the World Health Organization study are those that are not incurred at the health facility level but at a more programmatic level, including the resource costs associated with legislation, and program management and law enforcement, coupled with the
Union countries, Hungary, and the Baltics, that have high adult mortality rates. These results clearly show that roadside enforcement strategies—in relation to alcohol-impaired driving, speeding, and non-use of seat belts, for example—can offer major synergies on the cost side, making them a good, cost-effective investment option for the Russian Government (that is, the investment for a year of healthy life is less than the respective per capita income in these countries, which is an internationally used threshold to determine whether an intervention is cost-effective).

Figure 2: Cost-effectiveness of Road Traffic Injury Prevention Strategies in Europe and Central Asia (International dollars per DALY saved, 2005)

Note: Countries in the WHO European region with low child and adult mortality (EurB): Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Georgia, Kyrgyzstan, Poland, Romania, Slovakia, Tajikistan, the Former Yugoslav Republic of Macedonia, Turkey, Turkmenistan, and Uzbekistan. Countries in the WHO European region with low child/high adult mortality (EurC): Belarus, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, the Republic of Moldova, the Russian Federation, and Ukraine. Source: Chisholm and Naci (2008).

A “window of opportunity” for advancing the road safety agenda under current economic recovery programs in Russia. As shown by efforts in the United States supported under the Recovery and Reinvestment Act signed by President Obama in February 2009 (FHWA 2009), these types of programs that are being funded by governments in different countries to reanimate economic growth and employment offer a “window of opportunity” to scale-up and improve road safety in Russia. In the United States, investment is now being directed to roads and highways incorporating safety features into planned projects and encouraging local governments to implement existing highway safety plans. The goal is to support the development and promotion of programs and technologies to reduce the number of RTIs on U.S. roadways that in 2008 caused 37,261 deaths.

privately borne cost to bicycle and motorcycle owners of buying helmets, and the cost of fitting front and rear seat belts in cars that do not already have them.
Conclusion

Accumulated worldwide experience offers options and lessons on how to scale-up ongoing road safety efforts in the Russian Federation. The time to act has arrived. *This challenge has now acquired added importance since the Russian Government is preparing to host the first-ever global ministerial conference on road safety, to be held in Moscow on November 19-20, 2009.* Investing in effective interventions under a safe systems approach will reap gains for Russian society.