The Health Benefits of Transport Projects: A Review of the World Bank Transport Sector Lending Portfolio

Background Paper for the IEG Evaluation of World Bank Support for Health, Nutrition, and Population

Peter Freeman
Kavita Mathur
ENHANCING DEVELOPMENT EFFECTIVENESS THROUGH EXCELLENCE
AND INDEPENDENCE IN EVALUATION

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Background paper for the IEG evaluation of World Bank support for health, nutrition, and population

February 12, 2008

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Table 5.1: TSB-managed transport projects and commitments approved in FY97-06, by region ................................................................................................................................ 12
Table 5.2: TSB-managed projects and commitments approved in FY97-06, by country income group .................................................................................................................................................................................... 13
Table 5.3: TSB-managed projects approved in FY97-06 justified by health benefits .................................................................................................................................................................................... 13
Table 5.4: TSB-managed projects with explicit objectives to improve health outcomes (FY97-FY06) .................................................................................................................................................................................... 14
Table 5.5: Health Related Components Supported by TSB Projects approved, FY97-06 .................................................................................................................................................................................... 16
Table 5.6: TSB-managed Projects with a Health Focus (FY97-FY06) .................................................................................................................................................................................... 18
Table 5.7: Among TSB Projects with a health focus, inclusion of health benefits in ex ante economic analysis .................................................................................................................................................................................... 19
Table 5.8: TSB-managed Projects Proposing to Collect Health Outcome Indicators (FY97-06) .................................................................................................................................................................................... 20
Table 5.9: TSB Projects Proposing to Collect Health Output Indicators (FY97-06) .................................................................................................................................................................................... 20
Table 5.10: Planned and implemented health-related components in closed TSB projects (approved in FY97-06) .................................................................................................................................................................................... 22
Table 5.11: Health outcome indicators – planned and collected .................................................................................................................................................................................... 23
Table 5.12: Improvements in transport safety among completed projects .................................................................................................................................................................................... 25
EXECUTIVE SUMMARY

The transport sector plays a crucial, overarching role in the global economy: it facilitates access to jobs, education, health care, markets as well as for social and leisure activities. Yet, transport also has detrimental impacts on the environment and on human health, and this can result in conflicts in the formulation and application of transport policy. While traffic injuries, fatalities, and annoyance from transport-related noise have long been identified as negative externalities, there has been increasing evidence in the past decade of direct effects of transport-induced air pollutants on mortality and respiratory disease. The adverse impacts of transport on health are worse in developing countries than in industrial countries, as resources are more limited, regulatory controls are often inadequate and poorly enforced, the transport fleet tends to be older and technically more inefficient, the population is generally less educated, and transport-related law enforcement is frequently inadequate.

This paper reviews the contribution of the World Bank’s transport lending portfolio to health outcomes, as background for the Independent Evaluation Group’s (IEG) evaluation of the Bank’s support for health, nutrition and population (HNP). Over the past decade (FY97-06), the World Bank committed nearly $28 billion to 229 new transport projects managed by the Transport Sector Board (TSB). Specifically, the paper reviews the extent to which these projects: cite potential health benefits or risks in design documents; include specific objectives with respect to improving health outcomes or mitigating health risks; propose environmental improvements that are likely to provide health benefits; target transport services and both health and behavioral outcomes to the poor; and plans to collect evidence on changes in health outcomes as a result of transport interventions. For completed projects, it assesses the extent to which expected health benefits or objectives have been achieved.

Half of TSB-managed projects in the last decade have had a health focus, defined as those that cited anticipated health benefits or mitigating a health hazard, that had explicit health objectives for which they were accountable, or financed components or activities with plausible health benefits; this share rose from a third of projects in the first half of the period to two-thirds in the second half. The benefits cited most frequently were safety-related, primarily road safety; improvements in air quality and a reduction in harmful emissions and prevention of HIV transmission along transport corridors were cited in a minority. Transport projects in middle-income countries were more likely to have a health focus that those in low-income countries. A quarter of TSB projects planned to collect health outcome indicators, but very few planned to collect health output indicators that would help to establish attribution between the activities financed and health outcomes.
Among the 105 projects approved from FY97-06 that had closed, a quarter (28) had explicit health objectives or financed components with potential health benefits. All of the planned road safety, waterway and port safety components were implemented, while more HIV/AIDS components were implemented than planned at project appraisal. Closed projects with explicit health objectives were more likely to plan to collect health indicators and to actually collect them than were projects with health components absent from these objectives.

All fifteen TSB-managed projects that measured health outcomes had to do with transport safety (13 of them road safety), and in all but one case the indicators suggest an improvement in road safety. The attribution of these outcomes to the projects’ outputs was not always clear, however, because of: inadequate documentation of outputs; failure to consider other factors that might have affected the accident rate; and lack of specificity of the data to the areas covered by the project interventions. Addressing these issues would help to assess with greater certainty the effectiveness of these safety efforts.

The reason why a minority of road projects has explicit objectives to minimize health hazards remains unclear. Any road project that leads to faster travel speeds also has the potential to increase the severity of accidents that occur. It would be sensible for all road projects during appraisal to address this issue and to implement and monitor any mitigation measures.

None of the small number of closed transport projects with HIV/AIDS components collected data on health outcomes, so the effectiveness of these activities is unknown. A recent update on the implementation of the Bank’s Global HIV/AIDS Program of Action notes, however, that more than half of the projects in the active transport lending portfolio include HIV/AIDS activities, most of them ‘retro-fitted’ after the projects were approved. Thus, these projects are unlikely to have an explicit HIV/AIDS objective for which they are accountable; it remains to be seen whether they will actually collect and report output and outcome data that would yield insights into their effectiveness. The experience in the rest of the transport portfolio suggests that health indicators are rarely collected in the absence of explicit health objectives.

Finally, this review of project documents has not yet led to insights on the operational linkages between the transport and health sectors that may help to explain why some projects succeed in reporting and achieving improvements in health outcomes and others do not, or whether intersectoral collaboration in implementation has any impact on the effectiveness of these interventions. However, the next step would be to learn more about the reasons for the data patterns uncovered by follow-up interviews with transport staff, as the basis for recommending how the performance of health components of transport projects can be improved.
## List of Acronyms and Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>AFR</td>
<td>Africa region</td>
</tr>
<tr>
<td>DALY</td>
<td>Disability-adjusted life years</td>
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<tr>
<td>EAP</td>
<td>East Asia and the Pacific region</td>
</tr>
<tr>
<td>ECA</td>
<td>Eastern Europe and Central Asia region</td>
</tr>
<tr>
<td>FY</td>
<td>Fiscal Year</td>
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<tr>
<td>GEF</td>
<td>Global Environment Facility</td>
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<tr>
<td>HNP</td>
<td>Health, Nutrition and Population</td>
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<tr>
<td>ICAO</td>
<td>International Civil Aviation Organization</td>
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<tr>
<td>ICR</td>
<td>Implementation Completion and Results Report</td>
</tr>
<tr>
<td>IEG</td>
<td>Independent Evaluation Group</td>
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<tr>
<td>LIC</td>
<td>Low income countries</td>
</tr>
<tr>
<td>LCR</td>
<td>Latin America and Caribbean region</td>
</tr>
<tr>
<td>LMIC</td>
<td>Lower middle income countries</td>
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<tr>
<td>MAP</td>
<td>Multi-Country AIDS Program</td>
</tr>
<tr>
<td>MNA</td>
<td>Middle East and North Africa region</td>
</tr>
<tr>
<td>OED</td>
<td>Operations Evaluation Department (now IEG)</td>
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<tr>
<td>PAD</td>
<td>Project Appraisal Document</td>
</tr>
<tr>
<td>PPAR</td>
<td>Project Performance Assessment Report</td>
</tr>
<tr>
<td>SAR</td>
<td>South Asia region</td>
</tr>
<tr>
<td>TSB</td>
<td>Transport Sector Board</td>
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<tr>
<td>UMIC</td>
<td>Upper middle income countries</td>
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<td>WHO</td>
<td>World Health Organization</td>
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1. INTRODUCTION

1.1 The transport sector plays a crucial, overarching role in the global economy: it facilitates access to jobs, education, health care, markets as well as for social and leisure activities. Yet, transport also has detrimental impacts on the environment and on human health, and this can result in conflicts in the formulation and application of transport policy. While traffic injuries, fatalities, and annoyance from transport-related noise have long been identified as negative externalities, there has been increasing evidence in the past decade of direct effects of transport-induced air pollutants on mortality and respiratory disease.\(^1\)

1.2 Poverty and poor health continue to be mutually reinforcing conditions and there are substantial grounds to demonstrate that the negative impacts of transport on health are worse in developing countries than in industrial countries. In developing countries where resources are more limited, regulatory controls are often inadequate and poorly enforced, the transport fleet tends to be older and technically more inefficient, the population is generally less educated, and transport-related law enforcement is frequently inadequate.\(^2\) Improving traffic safety is an evolutionary process linked to income. In this regard it is worth noting that in the case of road safety the trend from low to high income status seems to follow the same pathway as environmental improvements, in the form of an environmental ‘Kuznets curve’.\(^3\) Road crash fatalities per capita increase until around US$8,000 per capita, then begin to decline, presumably as awareness of the problem becomes sufficient for concerted management measures to be taken.

1.3 This paper reviews the contribution of the World Bank’s transport lending portfolio to health outcomes, as background for the Independent Evaluation Group’s (IEG) evaluation of the Bank’s support for health, nutrition and population (HNP). Over the past decade (FY97-06), the World Bank committed nearly $28 billion to 229 new transport projects managed by the Transport Sector Board (TSB). Specifically, the paper reviews the extent to which these projects: cite potential health benefits or risks in design documents; include specific objectives with respect to improving health outcomes or mitigating health risks; propose environmental improvements that are likely to provide health benefits; target transport services and both health and behavioral outcomes to the poor; and plans to collect evidence on changes in health outcomes as a result of transport interventions. For completed projects, it assesses the extent to which expected health benefits or objectives have been achieved.

1.4 The paper is organized into six sections. Following this short introduction, an overview of transport-related health impacts is given, followed by a short overview of Bank sector strategies on health and transport. The fourth section describes the scope of the review and the methodology used, the fifth section presents the detailed findings for

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\(^1\) WHO 2000  
\(^2\) WHO 2004  
\(^3\) Kopits and Cropper, 2003
all approved projects as well as closed projects, and the last section summarizes the findings and concludes by raising issues for further study.

2. THE HEALTH IMPACTS OF TRANSPORT PROJECTS

2.1 Transport projects can produce important health benefits in terms of improved access to health care and emergency responses. In rural areas lack of access to all weather roads prevents some communities from easily reaching health care facilities. Transport is clearly essential for the distribution of drugs, blood and other medical supplies. Better transport can also play a critical role in terms of access to emergency obstetric care, which can have an important impact on reducing maternal and infant mortality.

2.2 Moreover, better access to markets can lead to greater income, and improved nutrition and health. However, better access to health care facilities is a necessary, but insufficient condition for better health outcomes. For example, it is possible to travel quickly to a health facility, only to receive bad care. In such a case better access due to improved roads may have no health benefits whatsoever.

2.3 Improved transport can also pose considerable health risks (see Table 2.1). These health risks include: transport accidents (both of vehicle users and pedestrians); air, water and noise pollution; facilitating the spread of communicable disease; and a more sedentary lifestyle as fewer people walk or bike to their destinations.

2.4 There are potential synergies arising from reducing potential health risks. Lower network speeds will produce lower road deaths and injuries, and also reduce emissions. More walking and cycling will also reduce emissions, but will require more attention to road safety risks to ensure that appropriate protective features are provided in the road network. Both policies will reduce energy consumption (a non-health related bonus).
<table>
<thead>
<tr>
<th>Potential health risks</th>
<th>Policies and interventions to prevent or mitigate health risks</th>
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<tbody>
<tr>
<td><strong>Transport safety</strong></td>
<td></td>
</tr>
<tr>
<td>Accidents (all transport modes)</td>
<td>Rectification of hazardous locations; traffic management improvements; public transport priority measures; behavior change measures such as attitudes to seat belt usage and alcohol use when driving; vehicle safety improvements.</td>
</tr>
<tr>
<td>Security-related incidents</td>
<td>Improvement of terminal security (ports, rail and bus stations, airports); reduction of risk of aviation and maritime accidents through upgrading navigational aids and improved enforcement of safety standards.</td>
</tr>
<tr>
<td><strong>Pollution</strong></td>
<td></td>
</tr>
<tr>
<td>Air pollution</td>
<td>Reduction of emissions and particulates to provide cleaner air; establishment of policies to ameliorate air pollution such as standards for exhaust emissions.</td>
</tr>
<tr>
<td>Noise pollution</td>
<td>Reduction of noise pollution through noise barriers or compensation of affected citizens; establishment of policies to ameliorate noise pollution such as introducing standards for permissible engine noise.</td>
</tr>
<tr>
<td>Water pollution</td>
<td>Proper handling and prevention of ships’ waste; Prevention of marine oil spills; Reduction in run-off from roads and streets into natural water systems.</td>
</tr>
<tr>
<td><strong>Spread of communicable diseases</strong></td>
<td></td>
</tr>
<tr>
<td>Disease transmission</td>
<td>Awareness, behavior change communication, promotion of condoms along roadways and at border crossings to prevent HIV/AIDS transmission. Prevention of the spread of infectious diseases, like SARS and avian influenza, via air travel.</td>
</tr>
<tr>
<td><strong>Promotion of sedentary lifestyle</strong></td>
<td></td>
</tr>
<tr>
<td>Reduced physical activity, increasing risks of heart ailments, cancer and diabetes.</td>
<td>Encourage more walking and cycling, less use of motorized vehicles especially for short trips. Changes in planning and land use to curb the use of private motor vehicles.</td>
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</table>

**Transport Safety**

2.5 Accidents occur in all modes of transport, but the extent of road traffic accidents caused the World Health Organization (WHO) in 2004 to declare that road traffic injuries constitute a major public health and development crisis. Every year, 1.2 million people are known to die in road accidents worldwide (over 3,000/day) and as many as 50 million more are injured, with some suffering permanent disabilities. Projections indicate that these figures will increase by about 65 percent over the next 20 years unless there is a radical commitment to widening the reach of prevention. The public, however, has become inured to these statistics, and the figures attract less mass media attention than other less frequent but more spectacular types of accident, such as aircraft crashes.

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4 WHO 2004
5 Kopits and Cropper, 2003
2.6 A disturbing aspect of these data is that 80 percent of the deaths and 90 percent of losses because of road traffic injuries occur in low and middle-income countries. The economic cost of road crashes and injuries is estimated to be 1 percent of gross national product in low income countries and 1.5 percent in middle income countries. This is $65 billion more than these countries receive in development assistance. One good reason to expect that the negative impacts on health will be worse in developing countries is that they are facing traffic conditions with far higher levels of vulnerability in terms of pedestrians and non-motorized road users. Compounding this vulnerability is the rapid rate of motorization that is predicted, far outstripping our historical experience so far.

2.7 Historically, motor vehicle “accidents” have been viewed as random events that are unpredictable and cannot be managed, but in recent years there has been a shift in perception as it has become increasingly recognized that the accident rate can be lowered through rational analysis and remedial action. Successes have been achieved in several industrialized countries including Australia, Canada, France, Japan, New Zealand, UK and the United States in reducing the fatality rate, but at the same time fatality rates in many developing countries experiencing rapid motorization, such as China, Colombia, India and Malaysia, have been increasing dramatically. The successful industrialized countries reported that improvements followed an integrated, multi-facetted approach to road safety issues.

2.8 While a decrease in deaths due to road traffic accidents of around 30 percent is forecast between 2000 and 2020 in high-income countries, this will be more than offset by a huge increase in traffic-related deaths expected in the rest of the world during the same period; if no action is taken, road traffic injuries could become the sixth leading cause of the global burden of disease and injury by 2015, measured in disability-adjusted life years (DALY). There are a number of interventions and policies (broadly listed in Table 2.1) that can be utilized to mitigate these health risks.

2.9 Elimination of hazardous locations. Typically the elimination of hazardous locations occurs when a road is rehabilitated or upgraded. The traffic authorities have knowledge of the most dangerous sections of road and minor infrastructure improvements are carried out to make the road safer. Often this involves improving sight distance, reducing the incidence of sharp curves, replacing unsafe structures and improving road signage. The idea is that the accident rate will improve. However, sometimes the higher vehicle speeds resulting from the improvements lead to increased severity of collisions, so it is not a foregone conclusion that such project components will lead to improved safety in all cases.

2.10 Improvements in road traffic management, bus priority, and risk behavior. This category covers a wide range of improvements, including installation and coordination of computer-controlled traffic signals, lane markings, warning signs and

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6 Losses are calculated in terms of annual disability-adjusted life years
7 Jacobs, Aeron-Thomas, and Astrop 2000
8 WHO mortality database
9 In 1990, road traffic accidents were ranked 9th WHO 2004; in a later work, WHO 2005, Mathers and Loncar predict an upward ranking to 6th by 2015. The impact on men and on children is particularly severe.
studs, pedestrian crossings, sidewalks, underpasses, bicycle paths, street lights, traffic calming measures, and speed limits.

2.11 For public transport, priority bus-bays, segregated busways, and bus priority lanes are typical features. Schemes to promote public transport usage and reduce private vehicle usage also result in safety enhancement because public transportation is generally a safer means of travel.

2.12 Some interventions target human behavior and involve enforcement of regulations to ensure seat belts are worn, drunk-driving limits are respected, and helmets are worn by motorcyclists. The literature gives examples of the effect of such measures; for example in Malaysia, where legislation was introduced in 1973, it was estimated that the introduction of a helmet law led to a 30 percent reduction in motorcycle deaths.\(^{10}\) In Sweden and the United States research has shown that seat belt reminders with audible warnings are an effective means of increasing seat belt use. In Sweden it was estimated that the introduction of such systems contributed to a reduction in car occupant deaths of 20 percent.\(^{11}\) An international review of the effectiveness of random breath testing found that alcohol-related crashes reduced by about 20 percent.\(^{12}\)

2.13 While the interventions described above have measurable outcomes, there are also a number of components with important outputs, but whose impact is less easily assessed. These components are aimed at strengthening the institutional capacity for road safety which could include training, the setting up of coordinating bodies, improving legislation pertaining to traffic laws, improving enforcement capability, streamlining road safety into road work design activities, and improving response to assist at the accident scene and to ensure injured persons receive urgent emergency treatment. Good data are also essential to measure performance and this entails the setting up of systems to record and analyze information about road accidents including data capturing, definitions,\(^{13}\) and analysis. WHO reports that only 75 countries fully complete the vital information returns pertaining to road traffic injuries, while a further 35 countries submit incomplete data; some countries have no workable systems at all.\(^{14}\)

2.14 Other transport safety interventions Other transport modes experience much lower numbers of accidents. Some components of such projects relate to port and inland waterway safety, aviation safety and safety on public transport. In this review only one component was identified directly relating to the improvement of health facilities (in the Chile Santiago Urban Transport Project).

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\(^{10}\) Supramaniam and others 1984  
\(^{11}\) Larsson and others 2000  
\(^{12}\) Elder 2002  
\(^{13}\) Since not all fatalities occur at the scene of the accident and some people die of their injuries only some time later, rules need to be set about what to include in the accident data. There is growing acceptance that deaths occurring within 30 days of the accident are recorded as road fatalities, and that deaths at railway crossings are counted as road deaths. WHO 2004  
\(^{14}\) WHO 2004
2.15 Aviation safety has become an important and even controversial topic because certain developing country airlines with poor safety records have been banned from the airspace of industrial countries. In recent years there has been a trend to try to upgrade both aviation safety in developing countries (mainly through improved navigational aids) and transport security globally, especially at airports, following various terrorist incidents and threats.

**Pollution**

2.16 Concern about transport-related pollution has also been growing, especially in the urban environment where road traffic congestion prevails. Air quality has also assumed new importance in the context of greenhouse gas emissions;\(^\text{15}\) road transport alone accounts for nearly a quarter of man-made gases believed to be contributing to climate change. Fine particles are emitted from vehicle exhaust systems as a product of combustion, especially from diesel engines. In developing countries this may be worsened because of poorly maintained or badly adjusted engines. Non-exhaust particulate matter also results from tire wear as well as dust from brake pads and shoes. The WHO estimates that suspended particulate matter leads to the premature death of over 500,000 people per year.\(^\text{16}\)

2.17 Much of the growth in the world’s population for the foreseeable future will take place in the cities and towns of the developing world and this has significant implications in respect of likely vehicle emissions. Already almost half of the world’s population, or some 3.3 billion people, live in urban or peri-urban areas\(^\text{17}\) and 600 million additional people are expected to migrate from rural areas to cities in the next ten years. To put this in perspective, this urbanization trend is equivalent to 60 additional cities roughly the size of London or Moscow. The volume and spatial distribution of the emissions, as well as dispersal conditions, affect pollution levels. Urban planners also have a crucial role to play that can affect the degree of exposure of the population to pollution.

2.18 Other kinds of transport-related pollution focus mainly on aviation emissions, pollutants in water run-off from transport infrastructure, and the effects of noise, especially near airports and busy highways. In the maritime sector oil spills and disposal of waste from ships are important issues.

**Facilitating Disease Transmission**

2.19 Transport corridors can be a conduit for the transmission of diseases. HIV/AIDS in particular is known to be spread along major transport routes by transport workers, especially truck drivers, and their sexual partners. Transport construction sites can also be the foci for HIV/AIDS transmission. These risks are addressed through interventions that provide information, promote behavior change (fewer partners, safe sex, condom use), and provide STD treatment along transport routes and at construction sites. The outbreak of severe acute respiratory syndrome (SARS) in 2002-3 highlighted the potential role of

\(^{15}\) Stern 2006

\(^{16}\) WHO 2002

\(^{17}\) Economist 2007 (49.2% of world’s population is urbanized); UN Population Fund Report 2007
air transport in international disease transmission. The potential for occurrence of a pandemic caused by avian influenza, for example, is being closely monitored by the United Nations System Influenza Coordination Group, while standards aimed at preventing disease transmission via aircraft (as far as is practically possible) are enforced by the International Civil Aviation organization (ICAO).

**SEDENTARY LIFESTYLES**

2.20 Linked to the growth of cities and increasing use of motorized transport, is the increased likelihood of sedentary lifestyles by urban dwellers. Reduced physical activity is estimated to be responsible for some 1.9 million deaths globally every year as a result of disease such as heart ailments, cancer and diabetes.\(^{18}\)

### 3. THE EVOLUTION OF WORLD BANK SECTORAL POLICIES ON TRANSPORT AND HEALTH

3.1 Strategies emanating from both the transport and the health sectors have highlighted policies to improve the health benefits or mitigate the health risks with respect to transport interventions. They focus on three main concerns – transport safety, harmful emissions, and the spread of HIV/AIDS.

**Transport safety**

3.2 Two transport sector strategy documents have helped shape the Bank’s approach to transport in relation to health issues during the review period of this study. The first, entitled *Sustainable Transport* (1996)\(^{19}\), advocated substantial changes in the role of government in transport, reducing its function as a supplier, but increasing its function as a regulator. It viewed sustainability in a comprehensive sense, covering economic, financial, environmental and social sustainability. The second, called *Cities on the Move* (2002)\(^{20}\), focused specifically on urban transportation.

3.3 *Sustainable Transport* accorded a higher priority to moving people rather than vehicles, ensuring greater safety in transport, and minimizing adverse effects on health. It recommended benchmarked safety programs and the adoption of cleaner fuels as well as encouraging a more systematic estimation of the impact of transport programs on safety and air pollution. Moreover, it highlighted three road-related areas where the Bank could improve its advice and reduce the accident rate, namely: the separation of motor vehicles from pedestrians and non-motorized traffic such as bicycles; improvements in driver behavior through better education, regulation, and enforcement; and the introduction of geometric road designs that would take into account the large number of vulnerable road users in developing countries.

\(^{18}\) WHO 2002  
\(^{19}\) World Bank 1996a  
\(^{20}\) World Bank 2002
3.4 *Cities on the Move* estimated that up to 15 million people are injured annually in urban road accidents in developing countries. It recommended that a key first step to improving traffic safety was the development of a national road accident data collection and analysis capability, supported by institutional arrangements to ensure that such data were transmitted to those who needed them for policy purposes. It endorsed the viewpoint that accident frequency and severity can be reduced by improved road design and traffic management measures. Furthermore, it recognized that poor people tend to be the most vulnerable to the effects of air pollution and that our understanding of the environmental impacts of urban transport is deficient.

3.5 Both strategy papers focus mainly on the road mode of transport when referring to health issues and both flag road safety and air pollution as areas to receive greater attention. In practice, improving air quality received much less attention, possibly because this area requires specialist knowledge beyond road design and traffic management, which are the comfort zones for most task managers in the transport sector. Nevertheless, some indirect amelioration of poor air quality is likely to have been achieved through better urban planning, installation of centralized traffic management systems, and the development of less polluting vehicle fuels.

3.6 The building of countrywide data systems is included as part of this strategy. An early example of this approach was the Road Improvement and Traffic Safety Project in Turkey. The road safety objective of this project was substantially achieved, but its full potential was not realized because follow up was impacted by the financial crisis affecting Turkey at the time. Nevertheless, between 1996 and 2000 the number of accidents declined from 3,635 to 921 annually and the number of fatal injury accidents nationally also declined, although a number of exogenous factors could have also contributed to this result. Recently a stand-alone road safety project has been launched in Vietnam, which experiences problems worsened by a high percentage of two-wheeled traffic.

3.7 Following publication of the Bank’s *Cities on the Move*, a road safety specialist was appointed in the transport anchor and collaborative work with the World Health Organization (WHO) was launched.

3.8 Further impetus to the road safety theme was given by the publication of the *World Report on Road Traffic Injury Prevention*—jointly issued by WHO and the World Bank in 2004—which highlighted the growing public health burden of road deaths and injuries in low and middle income countries, and represented a collaborative effort from

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21 There is an active project, however, on air transport safety and security for West and Central Africa.
22 World Bank 1996b
23 OED 2005b
24 World Bank 2005b. The outcome of this project is expected to yield many lessons and thus is being closely monitored. It comprises three components: institutional and capacity building, road safety demonstration and awareness program, and a road safety monitoring and evaluation program. Since its inception the project has doubled in scale with an infusion of funds from the Japanese Bank for International Cooperation.
25 WHO 2004
staff in both the health and transport sectors. In a follow up note\textsuperscript{26} the Bank summarizes the findings and provides guidelines to assist with the implementation of its recommendations. These guidelines require both countries and donor agencies to substantially scale-up and refocus their activities, with a strong emphasis on managing results. The first step should be a country capacity review to build a multisectoral framework for dialogue between counterparts in different ministries, between Bank staff working in different sectors, and between Bank staff and their client agencies.

**Air pollution and harmful emissions**

3.9 *Reducing Air Pollution from Urban Transport*, published by the Bank in 2004\textsuperscript{27}, was triggered by the growing concern about air pollution from road transport. It was not a product solely of the TSB, but rather of the Thematic Group on Air Quality and was duly approved by the then Environment, Transport, Energy and Mining Sector Boards. It proposed a framework for selecting and implementing policies, drawing lessons from international experience, and was especially directed towards cities in developing countries. It placed a special emphasis on how to coordinate policies across several sectors closely linked to the mitigation of air pollution from road transport—and how to reconcile the sometimes conflicting objectives and demands of these sectors to achieve environmental improvements. This document was clearly a seminal reference work in this field; it is unclear as to the extent it has been used by the Bank and its clients since publication, although it is often cited in the literature.\textsuperscript{28}

3.10 *A Decade of Action in Transport*, an IEG evaluation issued in 2007\textsuperscript{29} recommended that safety, energy efficiency and climate change receive much more attention in the future and this proposal is also incorporated in the Bank’s draft updated transport sector strategy\textsuperscript{30}. The absence of international coordination by an accountable agency with a clear leadership role is also addressed. This updated transport sector strategy\textsuperscript{31} focuses on the need for more complex projects including more projects on road safety, more attention to urban traffic congestion and air pollution reduction, and more effective public transport systems. Recently, a World Bank Global Road Safety Facility has been established to generate increased funding to reduce accident rates in developing countries. It is working with the Harvard Initiative for Global Health to improve the estimates of health losses from road deaths and injuries, with a view to arriving at comparable country by country data. Recently, a first consultative meeting was held at the World Road Congress in Paris in September, 2007.

\textsuperscript{26} Bliss 2004
\textsuperscript{27} Gwilliam and others 2004
\textsuperscript{28} The Bank has been actively participating in the ICAO discussions on aviation emissions, with the objective of gathering all available information on the environmental impacts and its relevance to developing countries. Thus far this has not translated into project support, however.
\textsuperscript{29} IEG 2007
\textsuperscript{30} World Bank external consultation draft 2006
\textsuperscript{31} Currently in preparation
Transport and the prevention of HIV/AIDS

3.11 The Bank’s health sector considers transport a priority sector for HIV/AIDS interventions, both because of the risk of contracting and spreading HIV at construction sites and because people engaged in transport (truckers, taxi-drivers, railway and port workers, for example) travel a great deal away from their families and are at high risk of contracting and spreading HIV along transport routes. The Africa region strategy, *Intensifying Action Against HIV/AIDS in Africa* (1999), committed to “mainstreaming” HIV/AIDS in all sectors, including transport. It also advocating “retrofitting” HIV/AIDS activities into ongoing projects in priority sectors like transport. The 2005 *Global HIV/AIDS Program of Action* commits to including HIV/AIDS in all construction contracts with World Bank funding and to adding HIV/AIDS activities to all new transport projects in India and Africa and all existing projects in Africa during mid-term review.

3.12 In December 2003, following greater awareness of the link between transport and the spread of HIV/AIDS the Abidjan-Lagos transport corridor project was launched with the objective of increasing access along the corridor to HIV/AIDS prevention, basic treatment, support and care services for underserved, vulnerable groups—including transport sector workers and their clients. This project was discussed in a paper published in 2005, which also listed other transport corridors with similar initiatives.

4. METHODOLOGY

4.1 This review systematically assesses the objectives or outcomes of Bank-supported transport projects with respect to any identified and anticipated health benefits and health risks that require prevention or mitigation. The transport projects reviewed include all active and closed projects approved over a ten year period between fiscal years 1997-2006 (FY97-06). Only those projects managed by the transport sector board have been included and for the purposes of the review this covers projects with financial commitments under the sector codes TA (roads and highways), TP (ports, waterways and shipping), TV (aviation), TW (railways) and TZ (general transportation – which includes urban transport). Supplemental credits and projects approved under emergency procedures are excluded. Transport projects managed by other sector boards were excluded because the resources needed to track down the relatively small number of such projects were not warranted. An omission in this regard was transport projects related

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32 The priority of the transport sector is amply demonstrated by its emphasis in the HNP lending portfolio. Among the 54 freestanding AIDS projects or projects with AIDS components approved between FY97-06 and managed by the HNP sector, all but five identified transport workers as a high-risk group. In most projects in the Africa region Multi-Country AIDS Program (MAP), the transport sector is a prioritized sector for multisectoral involvement. (Source: Portfolio Review, IEG evaluation of HNP)
33 World Bank 2005a, p. 39
34 Managed by the HNP board
35 Brushett and Osika 2005
36 In the Transport Sector Review (IEG 2007), only 16 percent of all transport projects were managed under sector boards other than the TSB.
to improvements of air quality that fell either under the environment sector board or were funded through the Global Environmental Facility (GEF).

4.2 In total, 229 projects were reviewed: 126 projects approved from FY97-01 and 103 projects approved between FY02-06. One hundred and twenty four projects remain active while 105 have already closed (Table 3-1)\textsuperscript{37}. A list of the projects reviewed is given in Annex 1.

<table>
<thead>
<tr>
<th>Fiscal Year of Approval</th>
<th>Active</th>
<th>Closed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997-2001</td>
<td>28</td>
<td>98</td>
<td>126</td>
</tr>
<tr>
<td>2002-2006</td>
<td>96</td>
<td>7</td>
<td>103</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>124</strong></td>
<td><strong>105</strong></td>
<td><strong>229</strong></td>
</tr>
</tbody>
</table>

4.3 The review assesses the design of transport projects on specific questions or themes in order to determine the extent to which health outcomes played a role in the rationale for the design and implementation of the projects approved over the past ten years. The Staff Appraisal Report or Project Appraisal Document (PAD) was reviewed for each project to answer the following questions:

(a) Were potential health benefits cited as a justification or a benefit of the project? Were potential health risks mentioned, in terms of the need to prevent or mitigate them?

(b) Did the project include explicit objectives with respect to improvements in health outcomes in general and, if so, what were they?

(c) Did the project finance any health components? If so, what kinds of activities and how much was committed to them? (This includes components to set up new institutions).

(d) Did the project propose to collect health indicators in general and/or among the poor and, if so, what indicators were supposed to be collected?

(e) Did the project specifically target behavior change interventions (in objectives or components) to improve health and, if so, what type of behavior change?

4.4 For completed projects, the following was recorded based on the Implementation Completion Reports (ICR) and the IEG Project Performance Assessment Reports (PPARs):

a) Were specific planned health components implemented including transport safety improvements, (especially road and aviation safety), the containing of the spread of infectious diseases along transport corridors, and the reduction of harmful vehicle emissions causing respiratory problems?

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\textsuperscript{37} The cut-off date for data download is from Business Warehouse is June 25, 2007.
b) Did the project actually collect data on health outcomes (even if not planned)? If so, did health outcomes improve and can they be linked to the project’s activities?

c) For projects that had an explicit health objective, was it achieved?

5. FINDINGS

5.1 Approved World Bank commitments in the transport portfolio managed by the TSB between FY97-06 totaled US$27.02 billion, as shown in Table 5.1. For the period in question, 76 percent of transport projects were classified as road or road-related, rising from 75 percent in FY97-01 to 79 percent in FY02-06. Thus it is hardly surprising that road safety features so prominently in transport-related health components.

<table>
<thead>
<tr>
<th>Region</th>
<th>FY97-01</th>
<th>FY02-06</th>
<th>Total: FY97-06</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nbr</td>
<td>Projects</td>
<td>Commitments</td>
<td>Nbr</td>
</tr>
<tr>
<td>EAP</td>
<td>35</td>
<td>28</td>
<td>4,813</td>
</tr>
<tr>
<td>SAR</td>
<td>14</td>
<td>11</td>
<td>2,928</td>
</tr>
<tr>
<td>LCR</td>
<td>21</td>
<td>17</td>
<td>2,763</td>
</tr>
<tr>
<td>AFR</td>
<td>18</td>
<td>14</td>
<td>1,290</td>
</tr>
<tr>
<td>ECA</td>
<td>32</td>
<td>25</td>
<td>1,902</td>
</tr>
<tr>
<td>MNA</td>
<td>6</td>
<td>5</td>
<td>192</td>
</tr>
<tr>
<td>Total</td>
<td>126</td>
<td>100</td>
<td>13,889</td>
</tr>
</tbody>
</table>

Source: World Bank data

5.2 Over the past decade, TSB-managed transport commitments in the Africa (AFR) and South Asia (SAR) regions have risen dramatically, while they have declined in other large regions. The Africa region is in fact the only region with a significant increase in the number of transport projects approved; there was a significant drop in the number approved in the East Asia and Pacific (EAP) and Eastern Europe and Central Asia (ECA) regions, while the number remained more or less unchanged elsewhere. The highest commitments in the last five years were in the SAR and EAP regions at 28 and 25 percent, respectively, followed by AFR with 17 percent. EAP and AFR had the greatest share of projects (23 and 22 percent, respectively) followed by the Latin America and Caribbean (LCR) region (18 percent).

5.3 Moreover, from Table 5.2 it can be seen that transport lending has been predominantly to low-income (LIC) and lower-middle income (LMIC) countries and that over time the percentage of commitments to upper-middle income (UMIC) countries has declined to just 12 percent.

38 In practice, the percentage of roads may be as high as 80 percent because urban roads and streets are classified under general transport.
Table 5.2: TSB-managed projects and commitments approved in FY97-06, by country income group

<table>
<thead>
<tr>
<th>Country income group</th>
<th>FY97-01</th>
<th></th>
<th>FY02-06</th>
<th></th>
<th>Total: FY97-06</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Projects</td>
<td>Commitments</td>
<td>Projects</td>
<td>Commitments</td>
<td>Projects</td>
<td>Commitments</td>
</tr>
<tr>
<td></td>
<td>Nbr</td>
<td>(%)</td>
<td>US$m</td>
<td>(%)</td>
<td>Nbr</td>
<td>(%)</td>
</tr>
<tr>
<td>LIC</td>
<td>47</td>
<td>37</td>
<td>5,085</td>
<td>41</td>
<td>6,215</td>
<td>47</td>
</tr>
<tr>
<td>LMIC</td>
<td>55</td>
<td>44</td>
<td>5,890</td>
<td>47</td>
<td>5,344</td>
<td>41</td>
</tr>
<tr>
<td>UMIC</td>
<td>24</td>
<td>19</td>
<td>2,913</td>
<td>13</td>
<td>1,573</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>126</td>
<td>100</td>
<td>13,889</td>
<td>100</td>
<td>13,131</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: World Bank data

A. APPROVED PROJECTS

Anticipated health benefits

5.4 About a quarter of all TSB projects (28 percent) approved from FY97-06 justified themselves (at least partially) by health benefits or by mitigating or preventing a health hazard (Table 5.3). The share of projects justified by health benefits or reduction in health risks has risen over time, from 26 to 31 percent. The cited benefits for the most recent five-year period also show greater diversity. Overwhelmingly, the benefits cited most frequently were safety-related, and of these the majority indicated an expected improvement in road safety, with a few related to improved safety in other transport modes. The remaining projects were either focused on improvements in air quality due to a reduction in harmful vehicle emissions, or on the prevention of the transmission of HIV/AIDS along road transport corridors by truck drivers.

Table 5.3: TSB-managed projects approved in FY97-06 justified by health benefits

<table>
<thead>
<tr>
<th>Project justified by health benefits/mitigation of health risks?</th>
<th>FY97-01</th>
<th></th>
<th>FY02-06</th>
<th></th>
<th>Total, FY97-06</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Projects</td>
<td>(%)</td>
<td>Number of Projects</td>
<td>(%)</td>
<td>Number of Projects</td>
<td>(%)</td>
</tr>
<tr>
<td>Yes</td>
<td>33</td>
<td>26.2</td>
<td>32</td>
<td>31.1</td>
<td>65</td>
<td>28.4</td>
</tr>
<tr>
<td>Of which:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improved Road Safety</td>
<td>30</td>
<td>23.8</td>
<td>27</td>
<td>58.2</td>
<td>57</td>
<td>24.9</td>
</tr>
<tr>
<td>HIV/AIDS Prevention</td>
<td>2</td>
<td>1.6</td>
<td>6</td>
<td>5.8</td>
<td>8</td>
<td>3.5</td>
</tr>
<tr>
<td>Air Quality</td>
<td>2</td>
<td>1.6</td>
<td>4</td>
<td>3.9</td>
<td>6</td>
<td>2.6</td>
</tr>
<tr>
<td>Public Transport Safety</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>1.0</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Waterway Safety</td>
<td>1</td>
<td>0.8</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>No</td>
<td>93</td>
<td>73.8</td>
<td>71</td>
<td>68.9</td>
<td>164</td>
<td>71.6</td>
</tr>
<tr>
<td>Total Projects</td>
<td>126</td>
<td>100</td>
<td>103</td>
<td>100</td>
<td>229</td>
<td>100</td>
</tr>
</tbody>
</table>

Note: The number of justifications exceeds the number of projects because in some cases more than one benefit is cited.

Explicit objectives to improve health outcomes

5.5 Just under a quarter of TSB-managed projects in the review period had explicit objectives to improve health outcomes (Table 5.4). Again, the number of road safety projects predominates. There was no statistically significant difference between the
period FY97-01 (23.0 percent) and FY02-06 (25.2 percent), showing that the incidence of health objectives has been roughly unchanged.  

<table>
<thead>
<tr>
<th>Explicit objectives to improve health outcomes/mitigate health risks?</th>
<th>FY97-01</th>
<th>FY02-06</th>
<th>Total, FY97-06</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>29</td>
<td>26</td>
<td>55</td>
</tr>
<tr>
<td>Number of Projects (%)</td>
<td>23.0</td>
<td>25.2</td>
<td>24.0</td>
</tr>
<tr>
<td>Of which:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve road safety, of which</td>
<td>27</td>
<td>18</td>
<td>45</td>
</tr>
<tr>
<td>Reduce the rate of accidents, injury, and death associated with road transport</td>
<td>1</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>0.8</td>
<td>4.9</td>
<td>2.6</td>
</tr>
<tr>
<td>Improvement of safety at selected accident &quot;black spots&quot;</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Development of institutional capacity for road safety</td>
<td>3</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Establishing a safer public transport system</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Improve aviation safety</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Improve waterway safety</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>HIV/AIDS prevention</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Enhance social inclusion through improved access to health facilitiesb</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Improve air quality</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>97</td>
<td>77</td>
<td>174</td>
</tr>
<tr>
<td>Total Projects</td>
<td>126</td>
<td>103</td>
<td>229</td>
</tr>
</tbody>
</table>

Note: The number of objectives exceeds the number of projects because in some cases more than one objective is cited.

a. Of these projects, four had objectives exclusively focused on improved management or institutional capacity of the road safety program, with no explicit objective of improving road safety

b. Chile Santiago Urban Transport Project

5.6 The share of projects citing health benefits and the share with explicit health objectives is not much different – 28 vs. 24 percent, respectively, over the whole period (Tables 5.3 and 5.4). However, certain types of benefits are less likely to appear as explicit objectives and others more so. For example, while appraisal reports for 8 projects referred to the benefits of HIV/AIDS prevention, only in one case did this become a formal objective. Similarly, in only one instance does air quality become an explicit objective, although mentioned as a benefit in appraisal documents for 6 projects. Conversely, aviation safety does not feature in the benefits table based on appraisal information, yet a formal objective appears in a project.

5.7 The likelihood that TSB projects have a health objective rises with country income (Annex 2). Projects in UMIC were much more likely to have a health objective (41 percent) than in LMIC or LIC (24 and 17 percent, respectively). While the share of

39 The objective of improving access to health care is not included in the table, as virtually any road would be expected to contribute to improved physical access to health and a host of other services; better access may or may not improve health outcomes. There were only three such projects with explicit objectives of improving access to health care: Chile Santiago Urban Transport Adjustment (2006), Albania Road Maintenance Project (2002), and Guinea National Rural Infrastructure (2005).
projects with health objectives in LMIC and LIC remained constant over the decade, there was a marked increase in the share of UMIC with health objectives (Figure 5.1).

Figure 5.1: Trend in the share of projects with explicit health objectives, by country income and region

![Graph showing trend in share of projects with explicit health objectives by country income and region](image)

**Note:** MNA had no projects with explicit health objectives.

**Source:** Annex 2

5.8 **TSB projects in East Asia and the Pacific region are the most likely to have a health objective** (37 percent)\(^{40}\), and in SAR and MNA the least likely (7 and 0 percent, respectively, Annex 2).\(^{41}\) The share of TSB projects with explicit health objectives has risen over time in ECA and LCR (Figure 5.1). It would thus appear that road safety, despite its importance, is accorded less priority in some regions.

**Project components with plausible health benefits**

5.9 **While only about a quarter of TSB-managed transport projects have an explicit health objective, nearly half (46 percent) have components or activities with potential health benefits** (Table 5.5). The share with health components has increased over time – from 36 percent in the first half of the decade to 59 percent more recently.

5.10 In fact, forty-two percent of TSB projects had *transport safety components*, including activities such as improving management of traffic or road safety,\(^ {42}\) improving

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\(^{40}\) Within EAP projects in China predominate, with 53 percent of the projects and 70 percent of financial commitments. Substantially more Chinese projects also have health objectives, 77 percent compared with 23 percent for the rest of EAP.

\(^{41}\) This explains in part why 40 percent of all TSB projects with health objectives are in EAP.

\(^{42}\) These components could include training, setting up coordinating bodies, improving traffic legislation, improving enforcement capability, streamlining road safety into road work design, and improving response to assist at the accident scene and to ensure injured persons receive emergency treatment.
hazardous sections, improving accident data collection or analysis. All but a handful of projects with these safety components were for road safety; a few projects had components related to port and inland waterway safety, aviation safety and safety on public transport. None of the safety components explicitly mentioned behavior change. The share of projects with transport safety components has risen dramatically over the 10-year period, from 33 percent in FY97-01 to 52 percent in FY02-06. The total value of the road safety components is in the order of $414 million.

Table 5.5: Health Related Components Supported by TSB Projects approved, FY97-06

<table>
<thead>
<tr>
<th>Did the project finance any health components?</th>
<th>FY97-01</th>
<th>FY02-06</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Projects (%)</td>
<td>Number of Projects (%)</td>
<td>Number of Projects (%)</td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>45</td>
<td>61</td>
<td>106</td>
</tr>
<tr>
<td><strong>Of which</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any safety component</td>
<td>42</td>
<td>53</td>
<td>95</td>
</tr>
<tr>
<td>• Traffic management</td>
<td>37</td>
<td>35</td>
<td>72</td>
</tr>
<tr>
<td>• Road safety management</td>
<td>33</td>
<td>35</td>
<td>68</td>
</tr>
<tr>
<td>• Improvement of hazardous sections</td>
<td>21</td>
<td>21</td>
<td>42</td>
</tr>
<tr>
<td>• Accident data collection/analysis</td>
<td>15</td>
<td>16</td>
<td>31</td>
</tr>
<tr>
<td>• Port safety</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>• Aviation safety</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>• Railway safety</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>• Inland waterway security</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>HIV/AIDS prevention</td>
<td>4</td>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td>Air quality</td>
<td>7</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Rehabilitation of health centers</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>No</strong></td>
<td>81</td>
<td>42</td>
<td>123</td>
</tr>
<tr>
<td><strong>Total Projects</strong></td>
<td>126</td>
<td>103</td>
<td>229</td>
</tr>
</tbody>
</table>

a. No components were identified that involved building health facilities, but three components mentioned the improvement of emergency services and response time.

5.11 About 8 percent of all projects had components for *HIV/AIDS prevention*, substantially higher than the share with explicit objectives on HIV/AIDS. Components in this category include assistance with the formulation of an appropriate policy, the distribution of condoms and AIDS prevention material to transport workers, counseling assistance to roadside populations and road workers including at border crossings on the prevention of HIV/AIDS, and identification of health centers where HIV/AIDS related health services can be strengthened. The share of projects with HIV/AIDS components has increased over time, from only 3 percent of projects in the first half of the decade to 15 percent in the second half. In fact, this may be an undercount, as Table 5.5 is based only on review of appraisal documents and excludes components that were added after

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43 This includes setting up of systems to record and analyze information about road accidents including data capturing, definitions, and analysis. Since not all fatalities occur at the scene of an accident and some people die of their injuries some time later, rules need to be set about what to include in the accident data.
appraisal. About two-thirds of the 19 projects with HIV/AIDS prevention components are in Sub-Saharan Africa. The HIV/AIDS prevention components over the 10-year period amounted to about $8 million in commitments.

5.12 Only 4 percent of TSB-managed projects had components to improve air quality. They involved the development of a motor vehicle emission control strategy, the implementation and supervision of an urban air quality management strategy, and equipment and training for vehicle inspections.

5.13 There has been a leap in the share of TSB projects with health components in countries of all income levels and all regions, except MNA (Figure 5.2). The greatest increase has been among LICs and LMICs, and in three regions – LCR (from 19 to 68 percent), ECA (from 31 to 60 percent), and AFR (from 44 to 74 percent).

Figure 5.2: Trend in the share of projects with health components, by country income and region

5.14 Altogether, half of all TSB projects in the past decade have had a health focus, defined as those that anticipated health benefits, had explicit health objectives, or including components with plausible health benefits (Table 5.6). The

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44 IEG’s 2005 evaluation of the Bank’s support for HIV/AIDS control identified 16 transport projects approved between FY97-04 that had incorporated HIV/AIDS activities, of which 13 were in Sub-Saharan Africa (OED 2005, p. 115, 117). Among the 24 African countries that had approved MAP projects by mid-2004, half also had projects managed by the transport sector that had HIV/AIDS components (Ibid, p. 157).
45 This is an underestimation of the number of projects with emissions components, as most are managed by other sectors.
46 Over the 10-year period, nearly half of projects in low and middle-income countries have health components, but there are differences across regions. More than half of TSB projects in AFR (61 percent) and EAP (54 percent) have health components, compared with about 40 percent in ECA, LCR, and SAR, but only 15 percent in MNA. See Annex 2.
share with a health focus in the past five years (two-thirds), is nearly twice the share of projects in the first five years with a health focus (37 percent). This parallels the Bank’s increased awareness, especially of road safety issues, resulting from the collaborative work with the WHO issued in 2004.

Table 5.6: TSB-managed Projects with a Health Focus (FY97-FY06)

<table>
<thead>
<tr>
<th>Projects with a health focus</th>
<th>FY97-01</th>
<th>FY02-06</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Projects (%)</td>
<td>Number of Projects (%)</td>
<td>Number of Projects (%)</td>
</tr>
<tr>
<td>Safety</td>
<td>47 37</td>
<td>69 67</td>
<td>116 51</td>
</tr>
<tr>
<td>HIV/AIDS Prevention</td>
<td>4 3</td>
<td>5 5</td>
<td>103 45</td>
</tr>
<tr>
<td>Air quality improvement</td>
<td>7 6</td>
<td>5 5</td>
<td>19 8</td>
</tr>
<tr>
<td>Projects without a health focus</td>
<td>79 63</td>
<td>34 33</td>
<td>113 49</td>
</tr>
<tr>
<td>Total projects</td>
<td>126</td>
<td>103</td>
<td>229</td>
</tr>
</tbody>
</table>

Inclusion of health benefits and costs in the economic analysis

5.15 The health benefits of transport projects were usually not reflected in the project’s *ex ante* economic analysis. About 17 percent of the 116 projects with a health focus included health benefits in the calculation of economic benefits (Table 5.7), and all were road-safety related. The benefits were mainly defined in terms of a reduction in injuries, death, and property damage due to a reduction in accidents. Three-quarters of the projects with a health focus that did not include health benefits in the economic analysis did not explain why they were excluded. None of the 126 transport projects without safety components factored in any *adverse* health outcomes in their economic analysis.
Table 5.7: Among TSB Projects with a health focus, inclusion of health benefits in *ex ante* economic analysis

<table>
<thead>
<tr>
<th>Did project have an economic analysis (ERR, NPV, CE analysis)?</th>
<th>FY97-01</th>
<th>FY02-06</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Yes, of which:</strong></td>
<td>No.</td>
<td>(%)</td>
<td>No.</td>
</tr>
<tr>
<td>Projects that included health benefits in ERR/NPV/CE analysis</td>
<td>9</td>
<td>19 (%)</td>
<td>11</td>
</tr>
<tr>
<td><strong>Assumptions on health benefits are explicit</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health benefits defined as:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost savings due to reduction in accidents</td>
<td>8</td>
<td>17 (%)</td>
<td>11</td>
</tr>
<tr>
<td>- Imputed value of life</td>
<td>4</td>
<td>9 (%)</td>
<td>1</td>
</tr>
<tr>
<td>- Cost of injury</td>
<td>3</td>
<td>6 (%)</td>
<td>1</td>
</tr>
<tr>
<td>- Reduction in property damage</td>
<td>1</td>
<td>2 (%)</td>
<td>1</td>
</tr>
<tr>
<td>Reduction in accidents</td>
<td>5</td>
<td>11 (%)</td>
<td>0</td>
</tr>
<tr>
<td>Reduciton in number of deaths</td>
<td>1</td>
<td>2 (%)</td>
<td>0</td>
</tr>
<tr>
<td>Projects that excluded health benefits in ERR calculation</td>
<td>37</td>
<td>79 (%)</td>
<td>56</td>
</tr>
<tr>
<td><strong>Reasons for excluding health benefits:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reasons not discussed</td>
<td>24</td>
<td>51 (%)</td>
<td>42</td>
</tr>
<tr>
<td>Lack of data</td>
<td>12</td>
<td>26 (%)</td>
<td>11</td>
</tr>
<tr>
<td>Safety impacts uncertain</td>
<td>6</td>
<td>13 (%)</td>
<td>3</td>
</tr>
<tr>
<td>Benefits from the component cannot be calculated because subprojects have not been identified</td>
<td>1</td>
<td>2 (%)</td>
<td>1</td>
</tr>
<tr>
<td>No economic analysis.</td>
<td>1</td>
<td>2 (%)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total TSB Projects with health focus</strong></td>
<td>47</td>
<td></td>
<td>69</td>
</tr>
</tbody>
</table>

**Health indicators**

5.16 About a quarter of the TSB projects proposed to collect health outcome indicators (Table 5.8), roughly the same share as had health objectives. The road safety outcome indicators included the number of accidents, injuries, and fatalities, and accident, injury, and fatality rates. Other indicators included access time to health care facilities, HIV/AIDS awareness, and emission control. *No projects proposed to collect health indicators specifically among the poor.*
Table 5.8: TSB-managed Projects Proposing to Collect Health Outcome Indicators (FY97-06)

<table>
<thead>
<tr>
<th>Proposes to collect health outcome indicators</th>
<th>FY97-01</th>
<th>FY02-06</th>
<th>Total FY 97-06</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Projects (%)</td>
<td>Number of Projects (%)</td>
<td>Number of Projects (%)</td>
</tr>
<tr>
<td>Yes</td>
<td>29 23.0</td>
<td>31 30.1</td>
<td>60 26.2</td>
</tr>
<tr>
<td>Number of accidents</td>
<td>10 7.9</td>
<td>9 8.7</td>
<td>19 8.3</td>
</tr>
<tr>
<td>Severity of accidents</td>
<td>1 0.8</td>
<td>3 2.9</td>
<td>4 1.7</td>
</tr>
<tr>
<td>Number of fatalities</td>
<td>9 7.1</td>
<td>9 8.7</td>
<td>18 7.9</td>
</tr>
<tr>
<td>Number of injuries</td>
<td>3 2.4</td>
<td>0 0.0</td>
<td>3 1.3</td>
</tr>
<tr>
<td>Accident rate</td>
<td>5 4.0</td>
<td>6 5.8</td>
<td>11 4.8</td>
</tr>
<tr>
<td>Fatality rate</td>
<td>11 8.7</td>
<td>10 9.7</td>
<td>21 9.2</td>
</tr>
<tr>
<td>Injury rate</td>
<td>1 0.8</td>
<td>2 1.9</td>
<td>3 1.3</td>
</tr>
<tr>
<td>Number of fines for drunk driving, speeding.</td>
<td>0 0.0</td>
<td>1 1.0</td>
<td>1 0.4</td>
</tr>
<tr>
<td>HIV/AIDS awareness</td>
<td>0 0.0</td>
<td>2 1.9</td>
<td>2 0.9</td>
</tr>
<tr>
<td>Travel time to health facilities</td>
<td>0 0.0</td>
<td>2 1.9</td>
<td>2 0.9</td>
</tr>
<tr>
<td>Use of health services (# clinic visits by groups, gender)</td>
<td>0 0.0</td>
<td>1 1.0</td>
<td>1 0.4</td>
</tr>
<tr>
<td>Access of transport officials to HIV/AIDS treatments</td>
<td>0 0.0</td>
<td>1 1.0</td>
<td>1 0.4</td>
</tr>
<tr>
<td>Use of condoms</td>
<td>0 0.0</td>
<td>1 1.0</td>
<td>1 0.4</td>
</tr>
<tr>
<td>No</td>
<td>97 77.0</td>
<td>72 69.9</td>
<td>169 73.8</td>
</tr>
<tr>
<td>Total Number of Projects</td>
<td>126</td>
<td>103</td>
<td>229</td>
</tr>
</tbody>
</table>

5.17 Even fewer projects – only one in 20, or 5 percent – planned to collect health output indicators (Table 5.9). This is significant, because without information on project outputs related to transport safety or health activities, it is difficult to confidently attribute any change in health status or accident rates to the interventions of the project.

Table 5.9: TSB Projects Proposing to Collect Health Output Indicators (FY97-06)

<table>
<thead>
<tr>
<th>Proposes to collect health output indicators</th>
<th>FY97-01</th>
<th>FY02-06</th>
<th>Total FY 97-06</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Projects (%)</td>
<td>Number of Projects (%)</td>
<td>Number of Projects (%)</td>
</tr>
<tr>
<td>Yes</td>
<td>5 4.0</td>
<td>6 6.0</td>
<td>11 4.8</td>
</tr>
<tr>
<td>Number of road safety campaigns</td>
<td>1 0.8</td>
<td>0 0.0</td>
<td>1 0.4</td>
</tr>
<tr>
<td>No. of traffic signs/signals installed; no. of road safety hazard sites treated; line markings.</td>
<td>4 3.2</td>
<td>3 2.9</td>
<td>7 3.1</td>
</tr>
<tr>
<td>Number HIV/AIDS awareness campaigns</td>
<td>0 0.0</td>
<td>2 1.9</td>
<td>2 0.9</td>
</tr>
<tr>
<td>Greenhouse gas emissions</td>
<td>0 0.0</td>
<td>1 1.0</td>
<td>1 0.4</td>
</tr>
<tr>
<td>No</td>
<td>121 96.0</td>
<td>97 94.2</td>
<td>218 95.2</td>
</tr>
<tr>
<td>Total projects</td>
<td>126</td>
<td>103</td>
<td>229</td>
</tr>
</tbody>
</table>
B. Closed Projects

5.18 Among the 105 completed projects (as of June 25, 2007), only 28 (27 percent) had a health focus – that is, had explicit health objectives and/or components with potential health benefits. The list of these projects, their health objectives, benefits, components, and indicators, and evidence of changes in health outcomes, are provided in Annex 3. All except one were approved in the first five years of the period under review (FY97-01).

Implementation of health components

5.19 All 28 completed projects with a health focus had health components – although for three projects, health components were added after approval. Most health-related components involved road safety, including improvement of hazardous sections (accident black spots improvement), implementation of traffic measures (lane markings, crash barriers, reflective studs, traffic signs/lights), improving road safety management, or setting up functioning accident data systems (Table 5.10). Safety components for other modes were comparatively rare. In most cases the roads under improvement were rehabilitated roads, but in a few instances (mainly in China) the roads were newly constructed highways. In most cases of new construction the reduction in the accident rate in comparison to the rate on the original “old” road was significant. Only in the case of the National Highway III project in Hubei Province was this questioned when it was noted that while the absolute number of accidents had declined, the fatality rate had actually increased, suggesting that there was a higher likelihood of death associated with higher speeds.

5.20 In a few cases there was an attempt to adopt a comprehensive approach to road safety improvement. For example, in Latvia a new Road Traffic Law was promulgated and a company was set up to deal with the issuing of drivers licenses and the testing of vehicles. In Lithuania, there were traffic safety campaigns, an improved accident reporting system was established, and road safety education for school children was introduced into the curriculum. On the other hand, in Zambia a Road Safety Action Plan could not be pursued because of lack of capacity and in Togo an Office of Road Safety was established, but did not become operational because of budgetary constraints.

5.21 All of the planned physical road safety components, as well as waterway and port safety components were at least partially implemented. However, components relating to traffic management, road safety management and accident data collection were less likely to be implemented, with the lowest implementation rate (only 25 percent) for components to improve air quality.

5.22 In contrast, more HIV/AIDS components were implemented than had been planned. Projects in Ethiopia, Malawi, and Niger implemented HIV/AIDS prevention

47 Closed projects with Implementation Completion Reports (ICR) available for assessment
48 An HIV/AIDS component was added to the Ethiopia Road Sector Development Program Support Project and the Niger Transport Infrastructure Rehabilitation Project after approval. (The latter already had a road safety component.) Road safety was added to the India Andhra Pradesh State Highway Project.
In Malawi, the National Roads Administration held a sensitization workshop for the senior management in the transport sector. The Implementation Completion Report (ICR) notes that HIV/AIDS activities are now part of tender documents for major development partner funded projects, but it does not specify which activities. The Ethiopia Road Sector Development Program Support Project initiated an HIV/AIDS strategy for the transport sector. The target groups were the staff of the Ethiopian Roads Administration, contractors, consultants and local communities at the project sites. The Niger Transport Infrastructure Rehabilitation Project implemented an information, education and communications program to reduce the risk of HIV/AIDS among transport workers.

### Table 5.10: Planned and implemented health-related components in closed TSB projects (approved in FY97-06)

<table>
<thead>
<tr>
<th>Type of health component</th>
<th>Number of projects with planned health components</th>
<th>Number of projects that implemented health components</th>
<th>Actual/Planned (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any safety component(^b)</td>
<td>23</td>
<td>23</td>
<td>100</td>
</tr>
<tr>
<td>Improvement of hazardous sections</td>
<td>12</td>
<td>12</td>
<td>100</td>
</tr>
<tr>
<td>Traffic management</td>
<td>20</td>
<td>15</td>
<td>75</td>
</tr>
<tr>
<td>Road safety management</td>
<td>18</td>
<td>16</td>
<td>89</td>
</tr>
<tr>
<td>Accident data collection/analysis</td>
<td>9</td>
<td>7</td>
<td>78</td>
</tr>
<tr>
<td>Inland waterway safety</td>
<td>1</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>Port safety</td>
<td>1</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>Air quality component</td>
<td>4</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>HIV/AIDS components</td>
<td>1</td>
<td>3</td>
<td>300</td>
</tr>
<tr>
<td><strong>Total – Any health component</strong></td>
<td><strong>26</strong></td>
<td><strong>28</strong></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) Includes components that were fully or partially implemented. In many cases, the lack of reported output indicators for the health components made it difficult to assess the extent to which they were fully implemented.

\(^b\) Among the projects approved in FY97-06, none with planned railway or aviation safety components had been completed.

**Inclusion of health benefits in ex post economic analysis**

5.23 Of the twenty projects that included health benefits in their ex ante economic analysis at the time of appraisal, only four have closed for which ICRs have been prepared. Only one of these projects, the China Anhui Provincial Highway Project (approved in FY99) included health benefits in the economic analysis. While the ICR for one project (Romania Second Roads, approved in FY97) gave no reason for the omission of health benefits in its ex post economic analysis, the ICRs for the other two (Latvia Highways and Lithuania Highways Projects, both FY97) explained that the actual net present values and economic rates of return for the road safety component cannot be calculated yet because there has not been enough time to observe the results of the black spot improvements in terms of reduced accidents.

**Collection of health indicators**

5.24 Projects with explicit health objectives were far more likely to plan to collect health outcome data and to actually collect it, than were projects with health
components absent these objectives. Of the eighteen projects with explicit objectives to improve health outcomes, twelve (two-thirds) intended to collect health outcome data (Table 5.11). Ten of those that planned to collect health outcome data actually collected it, as did three other projects that had not planned to collect it. Among the ten additional projects with health components in the absence of explicit health objectives, only two planned to collect health outcome data and only one project actually did so. Another project which did not plan to collect data on health outcomes actually did collect it. All of these projects collected health outcome data related to road safety improvements such as the accident rate/fatality rate. None of the projects with HIV/AIDS components collected data on HIV/AIDS outcomes (including proxy indicators, like behavior change).49

<table>
<thead>
<tr>
<th>Type of health focus</th>
<th>Planned to collect health outcomes</th>
<th>Actually collected health outcomes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
</tr>
<tr>
<td>Projects w/explicit health objective</td>
<td>12</td>
<td>67</td>
<td>13</td>
</tr>
<tr>
<td>Projects w/health component, no objective</td>
<td>2</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>50</td>
<td>15</td>
</tr>
</tbody>
</table>

Source: Annex 3.

Changes in health outcomes

5.25 All fifteen TSB-managed projects that measured health outcomes had to do with transport safety – 13 with road safety, one with the safety of inland waterways, and one with the safety of public transport. The 13 road safety projects were concentrated in two regions – East Asia (five projects, all of them in China) and Eastern Europe (five projects). In addition, there were two projects that measured health outcomes in South Asia (Bangladesh, India) and only one project in the Africa Region (Zambia). Thus, the vast majority of projects reporting changes in health outcomes are in middle-income countries.50

5.26 In all but Zambia, the indicators suggest an improvement in road safety, although it is not clear whether all of these improvements are statistically significant (Table 5.12). Although it was not an explicit objective, the Zambia Road Sector Investment Program aimed to reduce road accidents by 20 percent. However, the number of accidents and fatalities actually increased, despite the establishment of a Road

49 This lack of data on the outcomes of HIV/AIDS components in transport projects mirrors the experience of transport components in HIV/AIDS projects. Among five recently completed HIV/AIDS projects managed by the health sector with activities aimed at transport workers or Ministry of Transport civil service, none reported baseline or end-point data on risk behavior or condom use among transport workers. In none of the ICRs of closed projects was information provided on the impact of the transport sector interventions. The only achievements reported tend to be process indicators or planning activities (Portfolio Review, IEG evaluation of HNP). A recent review of Bank-supported HIV/AIDS interventions in the Africa transport sector came to the same conclusion – that M&E were largely absent (do Sacramento).  
50 As noted earlier, projects in middle-income countries were more likely to have an explicit health objective and those with objectives are more likely to collect data on outcomes.
Transport and Safety Agency (RTSA), responsible for road safety, traffic management, and motor vehicle licensing.51

5.27 Accidents were also reduced in inland waterways in Vietnam and in public transit in urban Senegal.52 No TSB-managed projects approved in FY97-06 that had closed documented improvements in HIV/AIDS outcomes or in air quality. A groundbreaking TSB-managed project in Mexico approved prior to the period under review showed a reduction of transport emissions (Box 5-1).

<table>
<thead>
<tr>
<th>Box 5-1: Reducing Harmful Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>The $220 million Mexico Transport Air Quality Management Project (FY93-99) aimed to reduce high vehicle emissions in the Mexico City Metropolitan Area and was the first Bank operation anywhere to integrate transport and air quality. The project involved revising emissions standards, stricter vehicle inspections, replacement of old vehicles, gasoline vapor recovery, an alternate fuel pilot, preparation of a Transport and Air Quality Management Strategy, procurement of scientific equipment for better air quality measurement, and technical assistance for improved monitoring and environmental audits.</td>
</tr>
<tr>
<td>In-depth field work by IEG found that despite an increasing number of vehicles and traffic, there was a significant decrease in the ambient concentration of pollutants from vehicle operations and emissions. Over the project period, there were reductions in lead (by 98 percent), ozone (by 48 percent), and carbon monoxide (by 27 percent). The decline in ozone levels reduced the number of “pollution emergency days”, from 103 days/year in 1993 to 13 in 2001, and contributed to fewer respiratory illnesses and other acute syndromes due to poor air quality.</td>
</tr>
</tbody>
</table>

51 The ICR suggests that the Road Safety Action Plan was developed, but its actions were not effective due to a lack of capacity. The project procured traffic patrol vehicles, road safety education, publicity materials, speed traps, and first aid kits.

52 The decline in accidents by 4 percent in Senegal may not have been statistically significant, however.
Table 5.12: Improvements in transport safety among completed projects

<table>
<thead>
<tr>
<th>Country</th>
<th>Indicator</th>
<th>Baseline</th>
<th>Year</th>
<th>Final</th>
<th>Target</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Road safety results</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Armenia (P040818)</td>
<td>Road fatalities/10,000 vehicles</td>
<td>12.1</td>
<td>1999</td>
<td>10.5</td>
<td>2004</td>
<td>11.0</td>
</tr>
<tr>
<td>Bangladesh (P037294)</td>
<td>Road fatalities/10,000 vehicles</td>
<td>76</td>
<td>1998</td>
<td>60</td>
<td>2005</td>
<td>50</td>
</tr>
<tr>
<td>China (Xinjiang) (P003643)</td>
<td>Accidents w/fatalities/10,000 vehicles</td>
<td>25</td>
<td>1999</td>
<td>21</td>
<td>2003</td>
<td>19</td>
</tr>
<tr>
<td>China (Hunan) (P003654)</td>
<td>Accidents w/fatalities/10,000 registered vehicles</td>
<td>18</td>
<td>1999</td>
<td>5</td>
<td>2003</td>
<td>10</td>
</tr>
<tr>
<td>(Guangdong)</td>
<td></td>
<td>20</td>
<td>1999</td>
<td>12</td>
<td>2003</td>
<td>10</td>
</tr>
<tr>
<td>China (Hubei) (P036949)</td>
<td>Accidents w/fatalities/10,000 vehicles</td>
<td>40</td>
<td>1998</td>
<td>12</td>
<td>2003</td>
<td>25</td>
</tr>
<tr>
<td>China (Anhui) (P050036)</td>
<td>Accidents per 100 million vehicles along National Highway G206</td>
<td>124</td>
<td>1998</td>
<td>56</td>
<td>2005</td>
<td>None</td>
</tr>
<tr>
<td>China (Liaoning) (P041890)</td>
<td>Pedestrian and bicycle accidents</td>
<td>6,498&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1998</td>
<td>2,948&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2004</td>
<td>15% reduction</td>
</tr>
<tr>
<td></td>
<td>Pedestrian and bicycle fatalities</td>
<td>897&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1998</td>
<td>698&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2004</td>
<td>15% reduction</td>
</tr>
<tr>
<td>India (P00755)</td>
<td>Fatalities per 10,000 vehicles</td>
<td>52</td>
<td>1999</td>
<td>39</td>
<td>2003</td>
<td>None</td>
</tr>
<tr>
<td>Latvia (P008532)</td>
<td>Fatalities per 10,000 vehicles</td>
<td>19.9</td>
<td>1995</td>
<td>8.4</td>
<td>2000</td>
<td>20% reduction</td>
</tr>
<tr>
<td>Lithuania (P008551)</td>
<td>Fatalities per 10,000 vehicles</td>
<td>7.5</td>
<td>1996</td>
<td>6.6</td>
<td>1999</td>
<td>20% reduction</td>
</tr>
<tr>
<td>Poland (P008593)</td>
<td>Reduction in road crashes</td>
<td>66,586</td>
<td>1997</td>
<td>51,069</td>
<td>2004</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Reduction in road fatalities</td>
<td>7,310</td>
<td>1997</td>
<td>5,712</td>
<td>2004</td>
<td>None</td>
</tr>
<tr>
<td>Romania (P039250)</td>
<td>Fatalities per 10,000 vehicles</td>
<td>9.2</td>
<td>1997</td>
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<td>Annual fatalities</td>
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<td>Number of accidents by public transport in sub-urban areas</td>
<td>2318</td>
<td>1995</td>
<td>2225&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2000</td>
<td>20% reduction by 2000</td>
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</table>

Notes: a. According to the ICR, these data are not specific to the areas where the project was implemented, so attribution is questionable. b. The number of accidents involving public transport declined by 4 percent.

Source: Annex 3.
While reported health outcomes almost universally improved in these projects, the attribution of outcomes to the projects’ outputs was not always clear. In most cases it is plausible that the project interventions and the safety improvements were directly linked, but attribution was often weak due to: (a) inadequate documentation of outputs; (b) failure to consider other factors that might have affected accident reductions (for example, fuel prices, which can affect the amount of driving and the miles traveled); and (c) a lack of specificity of the data to the areas covered by the project interventions. On the other hand, to the extent that the projects improved the reporting of transport accidents, injuries, and fatalities, these statistics may in fact understimate the impact of improved safety measures.

6. CONCLUSIONS

6.1 The distribution of TSB projects varies according to region and country income level, but only fifteen projects among the 28 closed projects with a health focus actually measured health outcomes. Health objectives are most likely in EAP, but least likely in MNA. In general the likelihood that a project will include a health objective rises with country income and projects with specific health objectives are more likely to identify health outcome data needs and to actually collect such data. There have been more transport projects with health components in recent years; the emphasis of the updated Bank transport sector strategy and joint initiatives with the WHO and others may have influenced this trend.

6.2 This review of health benefits in the transport lending portfolio over the past decade shows that in the majority of the cases the focus has been on improvements in road safety, as measured by a reduction in the fatality or injury rates. Among the 55 projects with health-related objectives, 82 percent had objectives to improve road safety, while only 7 percent had objectives to improve safety of other modes of transport and only 2 percent each had HIV/AIDS prevention or air quality improvement objectives.

6.3 Clearly, any road project that leads to faster travel speeds also has the potential to increase the severity of accidents that occur. Consequently, it would be sensible for all road projects during appraisal to address this issue and that any mitigation measures proposed should be implemented and monitored. This appears to be a major weakness in Bank evaluation procedures and tools—a point recognized by the Transport Anchor.

6.4 Many road safety interventions supported by the Bank were limited in scope to a reduction in the accident rate on specific stretches of infrastructure under improvement and likely to have only localized benefits. This is because road safety was often an add-

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53 Lack of specificity was an issue in China Liaoning Urban Transport Project (P041890). According to the ICR there was a reduction in accidents in all three cities (Fushun, Anshan, and Shenyang) but it was not location specific and therefore not completely attributable to the project.

54 Some exceptions include certain projects in China where a more comprehensive approach was used.
on component to a road construction or rehabilitation project and not designed to improve overall road safety.\textsuperscript{55}

6.5 Although a reduction in road traffic accidents is used as an indicator to demonstrate the result of road safety countermeasures, there is an attribution problem, since such improvements can also be due to other factors. The attribution of outcomes to the projects’ outputs is not always clear. The lack of reported output and outcome indicators for the health components of closed TSB-managed projects makes it difficult to assess the extent to which they are fully implemented. Measuring the benefits remains a problem, because of the inadequacy of proper accident reporting systems in many countries. The quality and reliability of data vary between surveillance systems in different countries and even between systems in the same country.\textsuperscript{56} Where basic data are not available, community surveys have sometimes been conducted as a proxy (e.g., Ghana, Pakistan, and Uganda). The updated transport sector strategy (close to finalization) acknowledges the need for better monitoring and evaluation.

6.6 Not one of the completed transport projects with HIV/AIDS components have reported on HIV/AIDS outcomes or proxies for them. Thus it is not possible to say whether any of the HIV/AIDS activities or interventions included in transport projects was effective. A recent update on the implementation of the World Bank’s \textit{Global HIV/AIDS Program of Action}\textsuperscript{57} notes that more than half of the projects in the current transport lending portfolio now incorporate HIV/AIDS activities, yet the update provides no evidence of their effectiveness in improving health outcomes, including healthier behavior.\textsuperscript{58} Most of these HIV/AIDS components were ‘retro-fitted’ into projects after they were approved, thus HIV/AIDS related outcomes are not included as an explicit objective. As seen in the case of road safety projects, projects without an explicit health (or in this case HIV) objective are far less likely to collect health outcome data.

6.7 The portfolio review has pointed to a number of interesting patterns, but the reasons behind them and how performance can be improved remain unclear. The next step would be to learn more on the “why” and “how” by follow-up interviews with transport staff, as the basis for recommending how the performance of health components of transport projects can be improved. Among the remaining questions:

\textsuperscript{55} In the Malawi Road Rehabilitation and Maintenance Project, for example, road safety and HIV/AIDS activities were added on during implementation.

\textsuperscript{56} WHO 2004 Only 75 countries fully capture the necessary data, while a further 35 submit incomplete data. Some of the poorest countries have no workable recording systems.

\textsuperscript{57} World Bank Human Development Network, 2007 According to Annex 3, p. 56, twenty-five of the 39 projects in the current transport sector portfolio includes HIV activities.

\textsuperscript{58} OED’s 2005 evaluation of the Bank’s HIV/AIDS support found that among 16 ongoing transport projects with HIV/AIDS components, only one mentioned AIDS in its development objectives, four reported the status of AIDS activities in supervision reports, and five had AIDS indicators. When activities are “retro-fitted” into an ongoing project, there is often little documentation of the objectives or performance when the project closes. The activities are rarely large enough to become a formal component. Supervision resources are often too tight to be able to enlist a technical expert for these small and specialized activities for which the sector itself has little expertise.
• Why, if there are so many projects with transport safety and HIV/AIDS components, do so few of them: (a) have explicit objectives on transport safety and HIV/AIDS; and (b) propose to collect data to document whether safety/health improves or risks are mitigated?

• Among TSB projects with explicit health objectives, what accounts for the fact that some succeed in reporting health outcomes and others do not? Are there important operational linkages between the transport and health sectors that are key? Are the statistics being collected from within the transport sector, or in collaboration with health or local government?

• On the issue of improving attribution of outcomes to the project, (a) Why do so few projects propose to collect health outputs? (b) What additional information can be taken into consideration to improve attribution?

• Why do so many fewer TSB projects in low-income countries have health components and objectives?
REFERENCES


## ANNEX 1. LIST OF PROJECTS REVIEWED

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<th>Project ID</th>
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<th>Closing Date</th>
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<td>2004</td>
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<td>10/31/2009</td>
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<td>11/30/2010</td>
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Source: World Bank
### ANNEX 2A. TSB PROJECTS WITH A HEALTH FOCUS (FY97-06), BY REGION

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<th>FY02-06</th>
<th>Total: FY97-06</th>
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<td>No. with health objectives</td>
<td>No. with health components (%)</td>
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Source: World Bank

### ANNEX 2B. TSB PROJECTS WITH A HEALTH FOCUS (FY97-06), BY INCOME

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<td>No. with health objectives</td>
<td>No. with health components (%)</td>
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<td>LMIC</td>
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<td>UMIC</td>
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<td>8</td>
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Source: World Bank
### ANNEX 3. ACHIEVEMENT OF HEALTH OUTCOMES AND OBJECTIVES

<table>
<thead>
<tr>
<th>Country, project, and FY of approval</th>
<th>Loan/credit amount (US$ million)</th>
<th>Health component (US$ million)</th>
<th>Explicit objective to improve health outcomes</th>
<th>Justified in project documents by health benefits?</th>
<th>Intended to collect health outcome data?</th>
<th>Were any specific components on road safety or health implemented? What activities?</th>
<th>Collected data on health outcomes?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Albania</strong></td>
<td>17</td>
<td>0.2</td>
<td>Yes. Improve port safety.</td>
<td>No</td>
<td>No</td>
<td>Yes. The navigation aids component, comprising the replacement of buoys at the entrance channels was deleted from the project and undertaken by the Italian navy. Quays 1 and 6 were repaired.</td>
<td>No.</td>
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<tr>
<td><strong>Armenia</strong></td>
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<td>5.0</td>
<td>Yes. To improve the main road network, with commensurate reductions in total transport costs, to improve road safety, and to increase the operational efficiency of Armenia Roads.</td>
<td>Yes. Road safety conditions are deplorable, with accident rates and fatalities at much higher relative levels than in Europe. The project would preserve the country’s considerable investments in transport infrastructure, improve traffic safety, enhance reliability of transport to and from Armenia, and generate employment.</td>
<td>Yes. Road fatalities per 10,000 vehicles</td>
<td>Yes. A National Road Safety Council with a permanent Secretariat was established in 2001 to provide an institutional framework for improving road safety. An accident data system was introduced to identify the nature of accident black spots. Armenia Roads staff and Police received road safety training. Police enforcement was enhanced with the use of speed radar, equipment, and educational campaigns.</td>
<td>Yes. Road fatalities declined from 12.1 per 10,000 vehicles at appraisal (1999) to 10.5 at completion (2004). The target was 11.0 per 10,000 vehicles by 2004.</td>
</tr>
<tr>
<td><strong>Bangladesh</strong></td>
<td>273</td>
<td>11.6</td>
<td>Yes. To improve road safety by developing the institutional capacity in RHD to identify hazardous locations and to design and implement physical measures to reduce road accidents at these locations</td>
<td>No</td>
<td>Yes. Fatalities per 10,000 vehicles</td>
<td>Yes. 33 out of a target of 41 black spots were eliminated; road markings and traffic signs were upgraded, while a road safety study and various road safety activities and projects including the setting up of a highway patrol and the creation of separate lanes for non-motorized traffic on the N-H-B road were completed. The new highway patrol did not fully follow the</td>
<td>Yes. Fatalities per 10,000 vehicles declined from 76 in 1998 to 60 in 2005, though short of the target of 50 at project completion (2005).</td>
</tr>
<tr>
<td>Country, project, and FY of approval</td>
<td>Loan/credit amount (US$ million)</td>
<td>Health component (US$ million)</td>
<td>Explicit objective to improve health outcomes</td>
<td>Justified in project documents by health benefits?</td>
<td>Intended to collect health outcome data?</td>
<td>Were any specific components on road safety or health implemented? What activities?</td>
<td>Collected data on health outcomes?</td>
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<td><strong>Benin</strong>&lt;br&gt;Transport Sector Investment Program (P000117) 1997</td>
<td>40</td>
<td>1.2</td>
<td>Yes. Improve road safety conditions.</td>
<td>Yes. Safety and traffic management activities will reduce the cost of traffic accidents, in terms of human life and productivity and damage to vehicles.</td>
<td>No</td>
<td>Yes. Technical assistance was provided to improve the database on road safety as well as to develop and implement a road safety policy. Eleven priority intersections were improved, including traffic management and signalization.</td>
<td>No. There is no evidence presented in the ICR for reduced loss of life.</td>
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<tr>
<td><strong>China</strong>&lt;br&gt;Second Xinjiang Highway Project (P003643) 1997</td>
<td>300</td>
<td>3.5</td>
<td>Yes. Increase highway safety.</td>
<td>Yes. Road safety is an important issue in the development of China's road sector, as traffic continues to grow rapidly on all roads and a high-speed, national highway network is developed. The frequency and numbers of people involved in traffic accidents have reached serious proportions in China.</td>
<td>Yes. Number of accidents with fatalities per 10,000 vehicles.</td>
<td>Yes. Black spot identification and improvement, development of methods for measuring the economic losses due to traffic accidents, and development of safety audit procedures. Progress was made in improving traffic safety. A report on Safety Audit Procedures was completed leading to a proposal for black spots improvement which is being considered under the follow-on project. A report on &quot;Methods for Measuring of Economic Losses due to Traffic Accidents&quot; was completed. It is being used for formulating future traffic safety policies and plans.</td>
<td>Yes. Number of accidents with fatalities per 10,000 vehicles was reduced from 25 in 1999 to 21 in 2003. The appraisal target was 19/10,000 in 2005.</td>
</tr>
</tbody>
</table>

However, the quality of these statistics may also be in doubt; some safety experts have suggested that road safety in some parts of Bangladesh may have worsened.
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<tr>
<td>China National Highway 2/Hunan- Guangdong (P003654) 1997</td>
<td>400</td>
<td>0.3</td>
<td>Yes. Improve the safety of road transport.</td>
<td>Road safety is an important issue in the development of China's road sector, as traffic continues to grow rapidly on all roads and a high-speed, national highway network is developed. The frequency and numbers of people involved in traffic accidents have reached serious proportions in China.</td>
<td>Yes. Number of accidents with fatalities per 10,000 vehicles.</td>
<td>Human Province: All road safety sub-components were implemented satisfactorily. These included identification of blackspots, design and implementation of remedial measures, and development of traffic accident data collection system and analysis. In addition, a number of road safety manuals were prepared and provincial road safety seminars were held. Guangdong Province: Black spot eradication program was implemented.</td>
<td>Yes. Hunan Province: Accidents involving fatalities decreased from 18 per 10,000 registered vehicles in 1999 to 5 in 2003, below the 2005 target of 10. Guangdong Province: Accidents involving fatalities decreased from 20 per 10,000 registered vehicles in 1999 to 12 in 2003; the 2005 target was 10.</td>
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<tr>
<td>China National Highway 3-Hubei (P036949) 1998</td>
<td>250</td>
<td>n.a.</td>
<td>Yes. Improve the safety of road transport.</td>
<td>Yes. Road safety is a serious problem in Hubei Province, as elsewhere in China. In Hubei, while the absolute number of accidents and injuries has declined since 1987, as has the fatality rate per 10,000 vehicles, the proportion of fatalities has been increasing, suggesting more serious accidents with higher frequency of death. The magnitude of losses is likely to accelerate in the future if...</td>
<td>Yes. Number of accidents with fatalities per 10,000 vehicles. <strong>Output Indicator</strong>: Number of black spots of the highway safety program completed (out of identified)</td>
<td>Yes. A Road Safety Unit was established and is operational. Its main tasks were to carry out road safety audits, road accident analysis and statistics collection, give recommendations on safety measures and activities, and monitor the safety measures taken during and after the construction of civil works. A series of workshops were held on the study of road safety. A road safety pilot plan, safety procedures at...</td>
<td>Yes. Accidents with fatalities per 10,000 vehicles were reduced from 40 in 1998 to 12 in 2003, far lower than the appraisal target of 25 for 2005.</td>
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<td><strong>China Anhui Provincial Highway (P050036) 1999</strong></td>
<td>200</td>
<td>3.1</td>
<td>Yes. To improve the safety of road transport.</td>
<td>Yes. Traffic accidents are now a major problem in China and by most measures has the 'world's highest road accident rate. Under the proposed highway safety component, these issues will be addressed both through civil works (improvement of blackspots) and analyses of traffic accidents.</td>
<td>No</td>
<td>Yes. Black spot improvements were carried out as planned. The studies and intergovernmental work with the police led to better information base on traffic crashes and an expanded program road traffic safety in the follow-on project.</td>
<td>Yes. The number of accidents per 100 million vehicles along National Highway G206 was halved (reduced from 124 in 1998 to 56 in 2005).</td>
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<tr>
<td><strong>China Liaoning Urban Transport (P041890) 1999</strong></td>
<td>150</td>
<td>n.a.</td>
<td>Yes. Improve operational efficiency and safety of the road system.</td>
<td>No</td>
<td>Yes. Reduced fatalities, including pedestrian and bicycle deaths.</td>
<td>Yes. Pedestrian barriers, safety islands/medians were constructed. Traffic signs and markings, signals, were provided. A traffic management committee was established in each municipality. However, there were an number of shortcomings. In many locations, the available road width or motorized traffic was increased, while the space allocated to non-motorized vehicles and, specifically, pedestrians was reduced; for example: (i) in Shenyang, several approved designs for street improvements were changed so that pedestrian sidewalks were shared with bicyclists who were forced off the roadways to worksites, identification and remedy of accident black spots and road safety audits were implemented.</td>
<td>Yes. Pedestrians and bicycle accidents declined from 6,498 in 1998 to 2,948 in 2004 and deaths declined from 897 to 698. There was a reduction in accidents in all three cities (Fushun, Anshan, Shenyang), which exceeded the target.</td>
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<td>make way for motorized vehicles; (ii) in Anshan, an old concept of junction channelization was employed, which focused on increasing capacity for motor vehicles by adding extra lanes; and (iii) in Fushun, there were no safety islands for pedestrians and junctions were not designed properly either to protect pedestrians or guide flows of bicycles and motor vehicles. Even where safety islands for pedestrians were provided at the marked crossings cars did not give way to bicyclists/ pedestrians crossing between the road edge and the safety islands, creating dangerous conditions, the marked refuge islands did not provide pedestrians with adequate safety. The absence of any guidance from central government such as the recent National Road Safety Law (issued January 1, 2005) also meant that the success of any TM program in China would have been limited.</td>
<td>reduction of 15%, but this was not location-specific, and therefore is not evidence of a reduction that is attributable to the project.</td>
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<td>Latvia Highway (P008532) 1997</td>
<td>20</td>
<td>6.0</td>
<td>Yes. Improve road safety conditions in Latvia.</td>
<td>The road safety situation in Latvia is one of the worst in Europe, with 19.9 fatalities per 10,000 vehicles in 1995</td>
<td>Yes. Number of fatalities for 10,000 vehicles. Fatalities on treated accident black spots; accidents with injured on treated accident black spots.</td>
<td>The physical improvements in accident black spots were implemented. The construction of underpasses on major routes, made access to facilities on both sides of the roadway more accessible. In October, 1997, the Road Traffic Law was passed, on the basis of which road traffic regulations, normative documents for vehicle technical control, vehicle registration regulations, drivers’ qualification regulations, regulations for road signs, vehicle marking, emergency vehicle coloring and equipment, road marking and other state standards have been developed. On October 25, 1991, the Road Traffic Safety Directorate was established at the Ministry of Transport and Communications. It is responsible for vehicle registration, administering of qualification examinations for drivers and issuing of driving licenses, securing technical inspection of vehicles, surveillance of roads for safe traffic, and developing and maintaining a vehicle and drivers’ register and data base. Reporting on traffic safety conditions has improved, including availability of road safety data.</td>
<td>Yes. Fatalities per 10,000 vehicles fell from 19.9 in 1995 to 8.4 in 2000.</td>
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| **Lithuania**  
Highway (P008551)  
1997 | 19                              | 5.0                           | Yes. Improve road safety conditions in Lithuania. | Yes. The road safety situation in Lithuania is poor by international standards, with 1,094 fatalities in 1991 (2.9 per 10,000 population). | Yes. Fatalities per 10,000 vehicles | Yes. The design and construction of improvements in portions of the national road network that had a high incidence of accidents (accident black spots) were carried out. Coordination and planning for the establishment of an accident reporting system, education for school children in road safety, national road safety information campaigns, training for traffic police, and development of traffic safety design standards for road and street infrastructure, including road signs and road markings, were delayed. Education for school children is included in the school curriculum, but the expanded program envisioned at project preparation was not undertaken. A Road Safety Conference with broad representation and high level participation was held in May 2000. No special training for the traffic police was carried out, but significant improvements were made in the development of road signs and markings for the national road network. | Yes. The number of fatalities per 10,000 vehicles has declined from 7.5 to 6.6 (a 12 percent drop) between 1996 and 1999. |
| **Poland**  
Roads 2 (P008593)  
1998 | 300                             | 12.7                          | Yes, (a) Improve the road safety situation; and (b) advise on the operation, management, and administration of road safety and its coordination with the | The number of road accidents in Poland is very high; some 57,911 accidents with 6,359 fatalities and 71,419 serious injuries were recorded in 1996. The main causes of traffic accidents: speeding; consumption of alcohol; poor | No | Yes. Road safety initiatives were undertaken: (a) treatment of hazardous locations; (b) black spots elimination (seven out of eleven contracts were completed); (c) installation of cats eyes and rumble strips; (d) adoption of National Road | |

45
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<td>Romania Roads 2 (P039250) 1997</td>
<td>150</td>
<td>24.1</td>
<td>Yes. Improve traffic safety and the fitness of the vehicle fleet.</td>
<td>Yes. Road traffic accidents have become a serious problem since the political changes of 1989/90. The annual number of traffic accidents, now exceeding 150,000, is growing rapidly, and growth in motorization is expected to make a trend reversal difficult.</td>
<td>No</td>
<td>Yes. In 2000 the Ministry of Transport established a Global Road Safety Partnership (GRSP) Committee with key stakeholders from Governmental agencies, insurance companies, automobile clubs, road haulers associations, etc. for implementing road safety measures. The year 2002-03 was declared the year of traffic safety and education campaigns were conducted through various media and in the schools. 38 black spots were treated under the project. The police were provided with equipment to control driving under the</td>
<td>Yes. The number of fatalities per 10,000 vehicles decreased from 9.2 in 1997 to 5.8 in 2003. The number of seriously injured people declined from 7,451 in 1997 to 5,538 in 2003.</td>
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<td>Senegal Urban Transport Reform Technical Assistance (P044383) 1997</td>
<td>7</td>
<td>n.a.</td>
<td>Yes. To assist in the provision of more affordable, reliable and safer public transport services in the Dakar metropolitan area.</td>
<td>No</td>
<td>Yes. Reduction in accidents by public transport in the sub-urban areas in Dakar, Thies et Kaolack.</td>
<td>Yes. The project assisted in development and implementation of a road safety action plan, provided training to about 6,000 bus drivers; and created road safety awareness through media campaigns. Minor adjustments were made to the six most dangerous intersections in Dakar metropolitan area.</td>
<td>Yes. The number of accidents involving public transport declined marginally (by 4% compared to the target of 20% in 2000). (Note: In 1995, a total of 2,318 traffic accidents were reported in Dakar metropolitan area).</td>
</tr>
<tr>
<td>Togo Road Transport Project (P002875) 1998</td>
<td>50</td>
<td>1.0</td>
<td>Yes. Improve road safety.</td>
<td>Yes. Improvements in road safety will reduce the cost of traffic accidents in terms of human life and productivity, and damage to vehicles.</td>
<td>Yes. Number of accidents per 10,000 vehicles.</td>
<td>No. The Office of Road Safety was established, and the construction of the Center for Automotive Technical Control (CCTA) headquarters was completed, but both offices have not been operational because of</td>
<td>No. The target was to reduce the accidents per 10,000 vehicles by 10% in 1999 and 3%</td>
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<td>Uruguay Transport II (P049267) 1999</td>
<td>65</td>
<td>5.3</td>
<td>Yes. Strengthen road sector management through the carrying out of a road safety program.</td>
<td>No</td>
<td>Yes (outcome indicators)? Output indicator: 2,500 km of roads to have pavement markings and road signs that meet Mercosur standards.</td>
<td>Yes. Road safety improvements such as placement of road signs and pavements markings were carried out. The study to analyze options to modernize DNV and the road safety pilot did not take place, nor did road safety works at the crossing of (old) Route 1 with the village of Relcon de la Bolsa.</td>
<td>No. No evidence was provided on the strengthening of capacity for road safety thereafer.</td>
</tr>
<tr>
<td>Vietnam Second Highway Rehabilitation (P004842) 1997</td>
<td>196</td>
<td>1.0</td>
<td>Yes. Improve road traffic safety.</td>
<td>Since 1990, traffic accidents and fatalities in Vietnam have doubled and injuries tripled. The factors responsible for the high accident rate include inappropriate design of some road segments, poor vehicle condition, unsafe driver behavior, but most importantly the broad mix of vehicles on roads.</td>
<td>Yes. Reduction in accidents and fatalities.</td>
<td>No. The road safety component was not implemented.</td>
<td>No. The ICR notes that Data collected for sections of National Highway 1 (for the first and second Highway Rehabilitation Projects) showed that accidents did not decrease and the rate per number of vehicles increased. However, no specific numbers are provided. The target was to reduce the</td>
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<td><strong>Vietnam Inland Waterways (P004843)</strong> 1998</td>
<td>73</td>
<td>n.a.</td>
<td>Yes. Enhance the safety and traffic carrying capacity of the two main inland waterway routes connecting the Mekong Delta with Ho Chi Minh City.</td>
<td>Yes. Waterway safety has declined in recent years due to inadequate navigation aids (navaids), sharp bends and other obstacles. Inadequate navaids make day navigation treacherous and night navigation unsafe for barge convoys.</td>
<td>Yes. Annual number of accidents per 100 vessels.</td>
<td>Yes. Rehabilitation or installation of navaids was carried out. 72 lattice towers, 830 buoys, 266 poles, 661 masts, 498 signboards. The main waterways from Ho Chi Minh City to Kien Luong to Ha Tien and from Cho Lach to Ca Mau to Nam Can (a total of 626 km) and a feeder section from Ganh Hao to Gia Rai (40 km) were dredged and widened to a depth of 3m and a width of 26 to 30m.</td>
<td>Yes. Accidents on project waterways dropped from 0.0034 per hundred vessels in 2000 to 0.0023 in 2005, a 32% decline.</td>
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<td><strong>Projects with no explicit health objectives but with health components that were implemented</strong></td>
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<td><strong>Brazil Goias State Highway Management (P055954) 2002</strong></td>
<td>65</td>
<td>n.a.</td>
<td>No</td>
<td>Yes. The rehabilitation and resurfacing, and the paving components of the project will reduce vehicle operating costs, travel time and accidents, thus benefiting road users, and producers and consumers of goods transported by road.</td>
<td>Yes. The ICR notes that the planned safety works were carried out. However, it does not provide evidence on the type of work that were undertaken by the project</td>
<td>No</td>
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<tr>
<td><strong>Dominican Republic National Highway (P035722) 1997</strong></td>
<td>75</td>
<td>n.a.</td>
<td>No</td>
<td>No.</td>
<td>Yes. Injuries per vehicle km; Fatalities per vehicle km.</td>
<td>Yes. Road safety works such as road signalization, installation of safety barriers &quot;black spots&quot; improvements were carried out to improve road safety. An accident information system was also developed.</td>
<td>No</td>
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<tr>
<td><strong>Ethiopia Road Sector Development Program Support (P000755) 1998</strong></td>
<td>309</td>
<td>n.a.</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes, unplanned HIV/AIDS activities were added. The project initiated an HIV/AIDS strategy for the sector. The target groups were the staff of Ethiopia Roads Authority (ERA), contractors, consultants, and the</td>
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<td><strong>India</strong> Andhra Pradesh State Highway (P009995) 1997</td>
<td>350</td>
<td>n.a.</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes, road safety activities not in the PAD. The Roads and Buildings Department (RBD) conducted safety audits on all 1,400 km of roads and implemented road safety engineering measures such as improved lane marking, crash barriers, and reflective studs, which significantly improved the road safety and driving comfort during night driving. These measures have significantly reduced the head-on collisions during night driving and other types of road accidents.</td>
<td>Yes. The fatalities in the six project roads declined from 52 in 1999 to 39 in 2003 while on one project road increased from 9 to 18.</td>
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<tr>
<td><strong>Malawi</strong> Road Rehabilitation and Maintenance (P001666) 1999</td>
<td>30</td>
<td>n.a.</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes. Road Safety and HIV/AIDS activities (not in the PAD) were implemented. Strengthening the Road Safety Commission, through the baseline survey and road safety database developed under the project has led to identification of black spots and timely interventions to minimize road accidents. The statistics collected helped identify interventions with a high economic rate of return. Road safety initiatives through public information and education enforcement and control and physical improvement to the road environment have been made.</td>
<td>No. Road accident costs dropped by 47% over a three year period – an intermediate outcome that could be due to fewer accidents. No outcome data on HIV/AIDS collected.</td>
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<td>Nicaragua Transport II (P053705) 1998</td>
<td>47</td>
<td>0.3</td>
<td>No</td>
<td>Yes. There will be significant road safety benefits due to the provision of wider shoulders to allow easier access for motorists in locations with high roadside vending activity and also to separate bicycle traffic.</td>
<td>No</td>
<td>Yes. The project supported a pilot road safety improvement study in key zones with high levels of accidents. Also, training was provided on traffic safety analysis.</td>
<td>No</td>
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<td>Niger Transport Infrastructure Rehabilitation (P035608) 1998</td>
<td>28</td>
<td>0.12</td>
<td>No</td>
<td>Yes. Benefits expected from the road transport component are: improved road safety and better protection of road assets.</td>
<td>No</td>
<td>Yes. A Road Safety Action Plan was drawn up and initial actions, such as a data base on road accidents and several road safety campaigns, were implemented. An unplanned (in the PAD) information, education and communication program was implemented to reduce the risk of HIV/AIDS along transport corridors and among transport workers.</td>
<td>No, neither on road safety, nor on HIV/AIDS outcomes.</td>
</tr>
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<td>Zambia Road Sector Investment Program Support (P003236) 1998</td>
<td>70</td>
<td>n.a.</td>
<td>No</td>
<td>Yes. Road accidents cause both tangible and intangible costs to the economy. Tangible costs include direct costs such as: (i) direct damage to the vehicles (replacement of parts); (ii) policing and administration costs; (iii) medical treatment and indirect costs of injury; (iv) reduction in output due to injury and death; and insurance costs.</td>
<td>Yes. Reducing road accidents by at least 20%.</td>
<td>Yes. Establishment of a Road Transport and Safety Agency (RTSA) and functions were defined as responsible for road safety, traffic management, and motor vehicle licensing. Equipment was procured to enhance road safety. A Road Safety Action Plan was compiled, but its actions were not effected due to a lack of capacity. Support to the National Road Safety Council (NRSC) included procurement of traffic patrol vehicles, road safety education, publicity materials, speed traps, and first aid kits.</td>
<td>Yes. By project closing (2005) road accidents per year increased to 9,588 from 8,200 in 1998 and were much higher than the target of 7,000. Also the number of fatalities per year increased to 1,046 from 870 in 1998 and were much higher than the target of 750. The target of reducing road accidents by at least 20% was not met.</td>
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<tr>
<td>Georgia Roads (P040556) 2000</td>
<td>40</td>
<td>n.a.</td>
<td>No</td>
<td>Yes. In spite of improvements in recent years, traffic safety remains a problem in the road sector. This is due to speed, lack of road markings, inadequate road design and lack of coordination between the responsible organizations. Improvements to traffic safety will be sought by studying the prevailing road safety situation and trends based on available data;</td>
<td>No</td>
<td>No. The consultants developed a comprehensive traffic safety program involving the participation of different agencies, including education and enforcement, and their coordination. The Borrower accepted the recommendations of the consultants, but considers them theoretical for Georgian conditions. The ICR does not suggest that any of the proposed improvements were</td>
<td>No</td>
</tr>
<tr>
<td>Country, project, and FY of approval</td>
<td>Loan/credit amount (US$ million)</td>
<td>Health component (US$ million)</td>
<td>Explicit objective to improve health outcomes</td>
<td>Justified in project documents by health benefits?</td>
<td>Intended to collect health outcome data?</td>
<td>Were any specific components on road safety or health implemented? What activities?</td>
<td>Collected data on health outcomes?</td>
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<td>Indonesia East. Indonesia Regional Transport (P040578) 2002</td>
<td>200</td>
<td>4.2</td>
<td>No</td>
<td>Yes. Roadside communities and non-motorized road users are expected to benefit from improved shoulders, planting, drainage, and accident blackspots.</td>
<td>No. <strong>Output indicators:</strong> Number of accident blackspots treated.</td>
<td>No. The accident blackspots component was not implemented. Accident Blackspots improvement, was a purely &quot;physical” component, which one would expect could be implemented fairly easily, proved to be difficult to implement due to the institutional barriers and various lines of responsibilities.</td>
<td>No</td>
</tr>
</tbody>
</table>

Note: n.a. = Not Available

Source: Implementation Completion Reports