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PUTTING THE BRAKES ON ROAD TRAFFIC FATALITIES IN AFRICA

Mark Eshbaugh, Greg Maly, Jonathan D Moyer and Erin Torkelson

EXECUTIVE SUMMARY

Road traffic accidents in Africa are expected to rapidly increase over the next four decades, becoming a major public health challenge across the continent. However, our forecasts show that if policy interventions in the continent effectively put the brakes on road traffic accidents, then, cumulatively through 2050:

- **4,2 million road traffic deaths would be prevented**
- **144 million years of productive, healthy life would be saved**
- **US$ 234 billion would be added to the continent's GDP**

INTRODUCTION

Currently, road traffic accidents worldwide are estimated to claim the lives of 1.4 million people per year and injure an additional 20–50 million. By 2050 the International Futures (IFs) forecasting model anticipates that global traffic deaths will surpass 3 million people per year. This forecast shows that Africa will be particularly hard hit and will account for over 1 million of these deaths, or 35 per cent of the global total. To put this in perspective, ***by 2050, traffic accidents in Africa will kill almost the same number of people annually as now die from HIV/AIDS in East and Southern Africa combined. And, for every 20 Africans who die in 2050, one will be killed in a traffic accident.*** In response to this growing public health threat, UN Secretary General Ban Ki-moon launched the Decade of Action for Road Safety 2011–2020, calling on UN member states, international agencies, civil society organisations, businesses and community leaders to promote efforts to curb rising traffic injuries and fatalities.

This is not the first time the UN has taken up this issue. Since the mid-20th century, Europe and North America have experienced a sharp increase in vehicle ownership and a similar rise in traffic accidents. The first UN report on the nature and dynamics of road safety was published in 1962 and was followed by a traffic accident prevention resolution in 1966. The following decades saw the proliferation of national traffic safety institutions, regulations and strategies in the developed world. The success of such interventions has led Europe and North America to experience an overall improvement in road safety, while still increasing the number of vehicles on the road.

However, what began as a problem in the developed world, now affects most low-income countries. Due to increasing motorisation and lagging infrastructure development, road traffic injuries in Latin America, Asia and especially Africa are now a serious cause for concern. For example, Nigeria ranks among the worst in the world for road traffic accidents (at 191 of 192 countries), according to a World Health Organisation (WHO) survey. However, despite the significant numbers of Africans being injured or killed in this way, road traffic accidents do not receive the same coverage as other public health issues such as HIV/AIDS, tuberculosis and malaria.

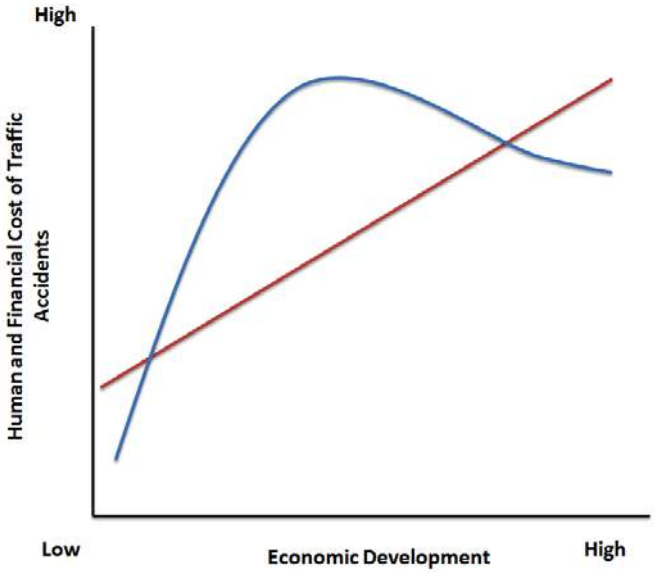
As such, the push by the UN Secretary General for all countries to implement national traffic strategies and build monitoring institutions is a good step toward dealing with traffic-related mortality. The Decade of Action for Road Safety 2011–2020 could succeed in directing attention and resources toward road safety in the developing world. This policy brief explores what could happen if initiatives like this were to have a significant impact in Africa. Using the IFs forecasting model, we examine the positive economic and social effects of reduced traffic injuries and deaths by comparing our ***base case forecast*** with an ***improved scenario***. For the latter scenario, we assume that all African countries are able to stabilise death rates from traffic accidents at or near the current continental average (32 per 100 000 people). The first part of this policy brief attempts to understand traffic fatalities as a development issue, analysing the risk factors that contribute to accidents and suggesting interventions that address these risks. The final part focuses on scenario development, exploring the social and economic value of increasing road safety in Africa.

PART 1: TRAFFIC ACCIDENTS ARE A DEVELOPMENT ISSUE

Over the past two decades the burden of communicable disease – HIV/AIDS, tuberculosis and malaria – has been widely recognised as a development issue that disproportionately affects low-income countries. While the relationship is not as immediately obvious, road traffic accidents are also a development issue. Generally speaking, as gross domestic product (GDP) per capita rises and households earn more disposable income, countries experience a dramatic increase in the number of vehicles on the road. Very often, such increases in road traffic are not matched by adequate improvements in infrastructure and road safety legislation. This results in a lag between private expenditure on vehicles and the public expenditure necessary to accommodate increased motorisation. During this lag, countries typically experience the largest increase in traffic injuries and fatalities, demonstrating that this is an issue that should be understood through a developmental lens.

Figure 1 depicts the human and financial costs of traffic accidents in relation to a country's level of development. The blue line represents the loss of human life and generally outlines the situation discussed above. Here we see how low-income countries with few vehicles on the road have a small number of traffic accidents. Then we see traffic fatalities grow rapidly during the middle-income stage of development. Thereafter, countries experience a drop in traffic accidents, as infrastructure improves to accommodate motorisation, road rules become embedded norms and fewer dangerous, unmaintained vehicles stay in operation.

Figure 1: Relationship between development and traffic accident burden



Blue line: loss of life at different levels of development

Red line: cost of traffic accidents at different levels of development

The red line represents the loss of material resources and the impact of traffic accidents on economic growth at various stages of development.[1] It shows that while the death rate declines at certain levels of development, the economic burden does not – traffic accidents in higher-income countries have a hugely negative effect on GDP. A study of road accidents in 21 developed and developing countries found that the annual cost of such accidents was about 1 per cent of GDP in developing countries, 1.5 per cent in transitioning countries and 2 per cent in highly motorised developed countries.[2] According to the WHO, these estimates set the annual economic cost of traffic accidents globally at US$ 518 billion, representing proportions of national GDP ranging from 0,3 per cent to almost 5 per cent.[3] These estimates could be significantly lower than the actual global total due to under-reporting and the exclusion of indirect costs. Even in terms of these figures, however, the estimated annual cost of traffic accidents in low-income countries (US$ 65 billion) exceeds the total amount of development assistance these countries currently receive, raising questions as to the best way to pay for road safety improvements.[4] In order to explore where Africa is currently situated along this line graph, we have to understand the

continent's vehicle ownership and development trajectory. While global vehicle ownership per 1 000 people increased from 41 in 1960[5] to nearly 150 in 2010, this happened unevenly across African countries. Rapidly developing low-income countries experienced the greatest increases in motorisation during this period. Current vehicle ownership in Africa stands at around 100 licensed vehicles per 1 000 people, but is forecast to grow to 170 by 2050.[6]

Table 1: Road traffic injury fatality rates (per 100,000)[7]

WHO Region	High-Income	Middle-Income	Low-Income	Total
Africa	..	32.2	32.3	32.2
Americas	13.4	17.3	..	15.8
South East Asia	..	16.7	16.5	16.6
Eastern Mediterranean	28.5	35.8	27.5	32.2
Europe	7.9	19.3	12.2	13.4
Western Pacific	7.2	16.9	15.6	15.6
World	10.3	19.5	21.5	18.8

Already, as seen in Table 1, African countries have considerably higher road accident fatality rates than most other regions, in some cases more than double.[8] Despite accounting for only 48 per cent of the world's registered vehicles,[9] 91 per cent of annual traffic fatalities and 90 per cent of disability-adjusted life years (DALYs[10]) lost occur in low- and middle-income countries. Research shows that per vehicle accidents tend to decline only after annual per capita income rises past US$ 17 500 in 2005 dollars.[11] Given this information, it is apparent that Africa fits squarely along the increasing side of the blue line in Figure 1. This means that unless road safety institutions are constituted and strategies developed, Africa's traffic-related mortality rate could still grow before starting to decrease.

RISK FACTORS AND PREVENTION STRATEGIES

In order to address this rise in car accidents at certain levels of development, it is important to understand the risk factors at play. Vehicle and road densities, speed limits, alcohol use, public transportation and healthcare systems are important considerations.[12] Similarly, in developing countries, poor infrastructure, minimal regulation, inadequate oversight and inconsistent research also exacerbate road traffic injuries.[13] Furthermore, in the absence of regulated public transportation, most Africans rely on unregulated taxis or buses, which often incentivise fast driving ('a slow taxi driver makes fewer trips and therefore less money'), utilise under-serviced vehicles and flout extant traffic safety regulations.

Additionally, poor road networks with no dedicated space for pedestrians or non-motorised vehicles contribute to many fatalities. A significant portion of the world's road fatalities involve what are known as 'vulnerable road users' (VRUs), which include pedestrians, cyclists, bikers and even public transport riders (particularly where public transport is unsafe and unregulated).[14] VRUs account for 46 per cent of the world's traffic-related deaths because they often lack any sort of physical protection.[15] Even so, most interventions made to reduce traffic accidents are targeted at private vehicles rather than VRUs.[16]

Often, developing countries lack the physical and social infrastructure needed to prevent vehicle collisions. Lack of resources and capabilities are at the heart of this issue. This is where the Decade of Action for Road Safety 2011–2020 could make a big difference. UN Secretary General Ban Ki-moon, in line with best practice from around the world, is advocating the creation of institutions that monitor and evaluate traffic-related mortality rates and the implementation of national road safety strategies. A survey of UN member countries in 2007 reported that while 153 states (86 per cent) had lead agencies for road safety, only 58 per cent reported having a national strategy. For those countries with such a national strategy, only 48 per cent had government endorsement and only 34 per cent had government endorsement plus precise targets and funding for implementation. Although these statistics are somewhat bleak, many African countries are among those that have implemented strategies to prevent and mitigate the consequences of road traffic accidents.

Below are a number of African 'best practice' examples that correspond with the Haddon Matrix (Table 2), which offers a useful way of categorising traffic-related interventions. The matrix suggests that, when creating policies to reduce road traffic deaths, there are three time periods to consider (pre-crash, crash and post-crash) against four types of factors (human, vehicle, environmental and social). The Global Plan for the Decade of Action for Road Safety 2011–2020[17] promotes this integrated approach.

Table 2: Haddon Matrix[18]

	Pre-Crash	Crash	Post-Crash
Human Factors	Licensing, training, driver attitude, impairment, distractions	Personal protective equipment	Crash research, education/ training, evaluation
Vehicle Factors	Braking, vehicle design, maintenance, passengers/loads, safety equipment	Vehicle safety equipment, personal safety equipment (i.e. seatbelt use)	Automatic collision notification systems, crash research
Environmental Factors	Regulation, enforcement, hazards, natural hazards, driver distractions, built environment, road design/maintenance	Other vehicle design, road 'furniture'	Emergency medical service response, health infrastructure
Social Factors	Enforcement, awareness, insurance incentives, rider peer pressure	..	Safety community attitude/ involvement, medical community attitude/involvement, political will

EXPERIENCES ON THE GROUND

Nigeria (pre-crash)

In Nigeria road traffic fatality rates peaked in 1981, showing a 400 per cent increase in the number of annual deaths in the period 1971–1981. However, increased safety awareness and slowed motorisation due to an economic downturn, saw accidents drop over the following decade. Improved economic performance in the late 1990s meant road traffic fatalities increased again, an upward trend that still continues.[19] The Nigerian government took steps to improve access to alternate methods of transportation and in 2002 implemented the Lagos Metropolitan Transport Authority (LAMATA). In 2009 LAMATA launched a bus rapid transit system to limit the number of vehicles on the road. Results from this programme are not yet available.[20]

Ghana (pre-crash)

Traffic accident mortality rates doubled in Ghana between 1994 and 2004,[21] increasing public awareness of the issue and prompting the government to take action. To curb the rise in death rates, the government implemented both structural and behavioural plans aimed at crash prevention. Structural plans took the form of speed bumps and rumble strips, while a behavioural plan used informational TV advertisements to educate citizens about drunk driving and speeding.

Although limited in scope, an initial assessment of the structural changes showed a 35 per cent reduction in crashes and a 55 per cent reduction in fatalities.[22] An assessment of the TV advertise ments measured the reach of the campaign, but lacked evidence as to their effectiveness.[23]

Kenya (during crash)

In early 2002 the Kenyan government reprioritised road safety and placed it on the national agenda. The minister of transport appointed a committee to put together a National Transport Policy document, which re-examined safety requirements for all modes of transportation in Kenya. Since then a law on the mandatory use of seatbelts and speed governors in public service vehicles, which had been shelved since 1987, has been implemented. This policy intervention resulted in a significant drop in road accidents (approximately 35 per cent) in the first two months of its application, highlighting the importance of political will in road safety initiatives.[24]

Tanzania (post-crash)

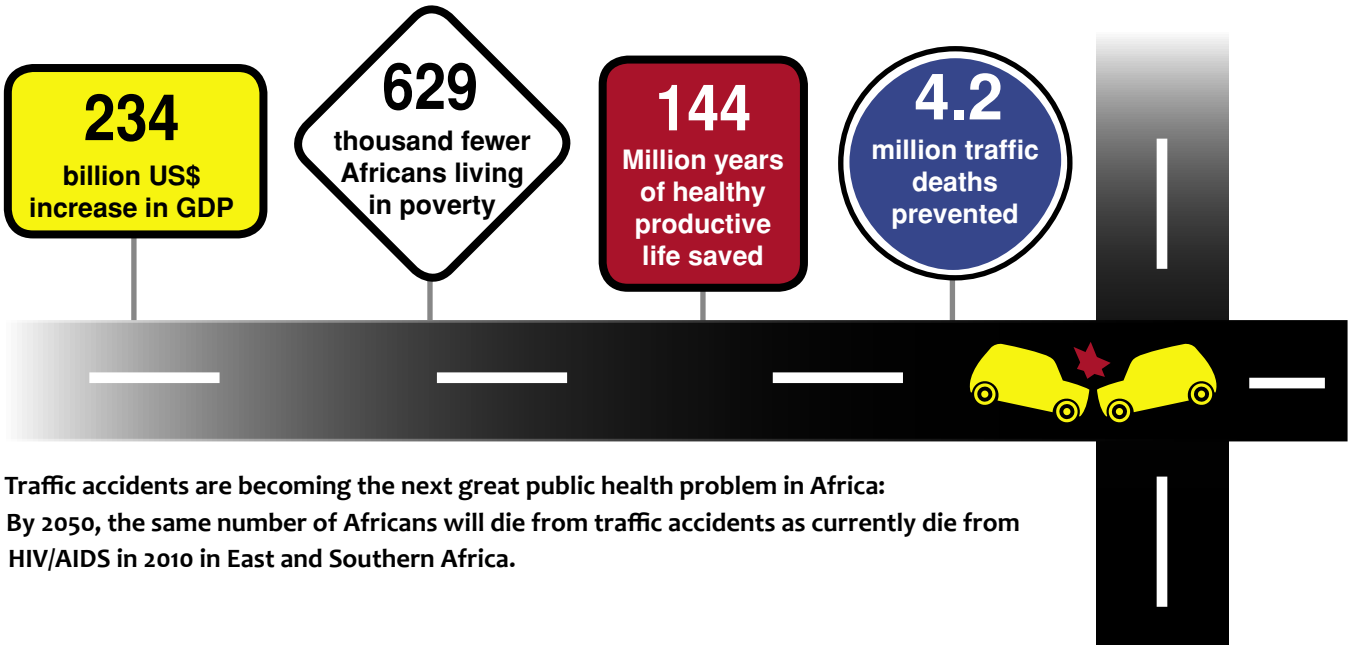
From 2000 to 2005 road traffic deaths in Tanzania increased by nearly 50 per cent. In an effort to improve response mechanisms, a trauma-team training programme was offered to help nurses and physicians assess and assist victims of traffic accidents. An evaluation of this programme showed a positive response by students and a post-training simulation showed an overall improvement in response capabilities. However, widespread implementation is necessary for countrywide improvement in post-crash response capability.[25]

Clearly, many governments in Africa are making efforts to implement road safety mechanisms. Targeted interventions directed at reducing road traffic injuries should be expanded and, if not yet in place, pursued.

STOP TRAFFIC DEATHS

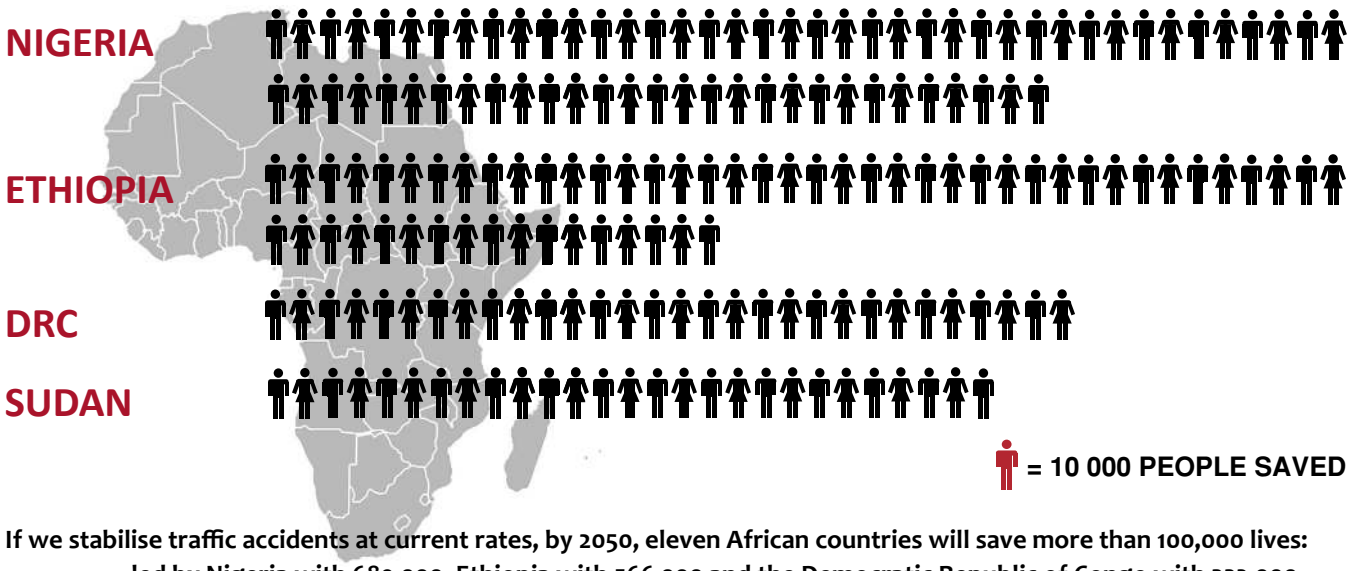
What social and economic benefits will Africa see by decreasing traffic accidents?

BY 2050: ROAD MAP FOR HUMAN DEVELOPMENT



Traffic accidents are becoming the next great public health problem in Africa:
By 2050, the same number of Africans will die from traffic accidents as currently die from HIV/AIDS in 2010 in East and Southern Africa.

BY 2050: REDUCTION IN TRAFFIC DEATHS



If we stabilise traffic accidents at current rates, by 2050, eleven African countries will save more than 100,000 lives:
led by Nigeria with 689 000, Ethiopia with 566 000 and the Democratic Republic of Congo with 332 000.

Of course, interventions such as these need time and money to be implemented. The Decade of Action for Road Safety 2011–2020 suggests that national funding for road safety activities be raised to US$ 200 million per year, or US$ 2 billion for the entire decade for all countries.[26] Other researchers have suggested that low-income countries should devote 3–5 per cent of road budgets to safety initiatives.[27] Additionally, the World Bank has measured the cost of improvements to figures for DALYs lost from road traffic accidents. Currently, the price for Africa is quite low, meaning that it costs only US$ 12 to save one year of life for one African. However, the cost of intervention is likely to rise after the most preventable crashes are reduced. Early interventions will consist of the placement of speed bumps, traffic rule enforcement and other relatively low-budget solutions. Secondary interventions, such as infrastructure improvements (i.e. separate roadways for vehicles and VRUs), are much more expensive. Over time, the cost per lost DALY averted could rise to levels seen in Latin America (US$ 169) and Europe (US$ 137). Using these figures, analysis with the International Futures (IFs) modelling system suggests that the price of these interventions in Africa could range between US$ 1,7 billion and US$ 24 billion.[28]

PART 2: SCENARIO ANALYSIS

Now that we have explored the overall context of road safety, the second part of this brief uses the IFs modelling system to simulate a reduction in traffic-related casualties and investigate some of the positive affects such a reduction could have for Africa.[29] Using this model, the researchers were able to develop and compare the ***base case*** with an ***improved scenario***. The ***base case*** includes a treatment of nine critical global systems, including the economy, education, health, governance, infrastructure, energy, agriculture, technology and the environment. It is a 'central drift' scenario that continues many of the policies and trends of the past two decades, but also contains new structural constraints, such as climate change, peak oil and government spending.[30] In the IFs model, the key driver of traffic fatality rates is deaths per vehicle, calculated using Smeed's Law,[31] which is a function of vehicles per capita and population.

The ***improved scenario*** uses the number of deaths per vehicle and GDP per capita for 183 countries to find the expected relationship between the two variables.[32] The researchers then intervened (i.e. adjusted the forecast) so that all African countries would not exceed the expected death rate per vehicle given their level of GDP per capita by 2100.[33] In other words, African death rates per vehicle would not follow the blue line indicated in Figure 1. As many African countries are currently underperforming in this area – i.e. their deaths per vehicle are higher (and sometimes much higher) than expected, given their level of GDP per capita – many show fairly rapid improvements as a result of this intervention. The improved scenario prevents death rates from exceeding 32 per 100 000 people (the current continental average) until 2050, despite significant increases in vehicular traffic over the period.

FINDINGS

The IFs base case expects that for every 100 000 people in Africa, 48 will die in traffic accidents in 2050. However, by simulating best practices in road traffic policies, our improved scenario expects that, for every 100 000 people in Africa, only 32 will die in traffic accidents in 2050. By comparing the base case to the improved scenario, we see that Africa can save up to 4,2 million lives (between 2010 and 2050) by increasing road safety and reducing traffic fatalities. Eleven African countries will experience cumulative reductions in traffic deaths of more than 100 000 people through 2050, led by Nigeria (689 000), Ethiopia (566 000) and the Democratic Republic of Congo (DRC) (332 000). The improved scenario also shows a major relative reduction in years of life lost from traffic accidents, falling by 119,8 million years (cumulatively) across Africa through 2050. This is mirrored by the reduction in DALYs lost of 144 million years across the continent from now until 2050.

The improved scenario also leads to a nearly US$ 234 billion increase in GDP over our base case (as a cumulative discounted measure) by 2050, increasing rapidly at the end of the time horizon. This figure more than makes up for the estimated cost per DALY averted that adds up to between US$ 1,73 billion and US$ 24,35 billion, discussed above. Overall, 21 countries achieve an increase in GDP of US$ 1 billion or more by 2050, with the top five all improving by more than US$ 20 billion. The largest percentage improvements in GDP occur in Mozambique (4 per cent), Tanzania (3 per cent), Sudan (3 per cent) and Uganda (3 per cent). GDP per capita also rises across the continent by US$ 29.[34]

Table 3 highlights those countries that gain most in the improved scenario as compared with the base case. Values are cumulative from 2010 to 2050, except for GDP per capita at purchasing power parity (PPP).

Table 3: Selected results in most-improved African countries

Country	Reduction in traffic fatalities	Country	GDP Improvement (US$ billion)	Country	Increase in GDP per capita at ppp in 2050 (US$)
Nigeria	689 000	Tanzania	51,62	Tanzania	203
Ethiopia	566 000	Mozambique	34,02	Sudan	121
DRC	332 000	Sudan	27,01	Uganda	92
Sudan	297 000	Uganda	24,01	Zambia	64
Tanzania	297 000	Egypt	21,56	Egypt	48

The main contribution to GDP growth occurs from a relative increase in the size of the labour force. Reducing traffic fatalities leaves a larger share of the work force for producing and consuming. Additionally, there are also small gains to productivity from a decreased overall burden of disease. Sensitivity analysis shows that approximately 80 per cent of the growth that occurs from this intervention is attributable to the increase in the labour supply and 20 per cent is the result of improvements in productivity.

This growth in GDP leads to important positive contributions to other key sectors and systems. When compared with the base case, government revenues grow by US$ 53,47 billion cumulatively across Africa by 2050. Governments are thus able to increase investment in critical sectors like healthcare and education. In our improved scenario, spending on healthcare increases by an additional US$ 7,2 billion over the base case, while education spending rises by US$ 11,1 billion across the continent by 2050. Other impacts include a reduction in those living on less than US$ 1,25 per day in 2050 by 629 000, most from East Africa. Reducing traffic-related deaths has a very positive affect on both human development and economic growth, which confirms the need for African leaders to pay more attention to this issue.

CONCLUSION

Traffic accidents are becoming a major issue in developing countries, especially in Africa, where rapid growth is driving steady increases in the number of motor vehicles purchased. The human cost of traffic accidents is forecast to rise substantially in the coming decades. This policy brief shows that the emphasis placed on reducing traffic accidents by the UN, WHO, World Bank and others is well founded. Aggressive, but feasible reductions in traffic deaths can yield economic benefits that will offset the initial costs of intervention. By investing now in reducing the number of traffic accidents, Africa can save millions of lives over the coming decades and reap significant economic and social benefits.

NOTES

[1] The current level for Africa is 32.2 per 100 000 people per year. See Tami Toroyan, *Global status report on road safety: time for action,* Geneva: World Health Organisation, 2009, 13, http://www.who.int/violence_injury_prevention/road_safety_status/2009 (accessed January 2012).

[2] See Margie Peden, Richard Scurfield, David Sleet et al., *World report on road traffic injury prevention*, Geneva: World Health Organisation, 2004, 51, http://www.who.int/violence_injury_prevention/publications/road_traffic/world_report/en/ (accessed January 2012).

[3] Ibid., 5.

[4] Ibid.

[5] Joyce Dargay, Dermot Gately and Martin Sommer, *Vehicle ownership and income growth, worldwide: 1960–2030*, Leeds: Institute for Transport Studies, University of Leeds, 2007.

[6] Emmanuel Lagarde, Road traffic injury is an escalating burden in Africa and deserves proportionate research efforts, *Public Library of Science – Medicine* 4(6) (2007), 967–71.

[7] Toroyan, *Global status report on road safety*, 13.

[8] Andrew Downing, Chris J Baguley and Brian L Hills, *Road safety in developing countries: an overview*, Crowthorn: Overseas Centre Transport Research Laboratory, 1991.

[9] Toroyan, *Global status report on road safety*.

[10] DALYs are a health-gap measure that combines information on the number of years lost from premature death with the loss of health from disability. See Peden, Scurfield, Sleet

et al., *World report on road traffic injury prevention.*

[11] Estimates from Elizabeth Kopits and Maureen Cropper, Traffic fatalities and economic growth, *Accident Analysis and Prevention* 37 (2005), 169–78, 169.

[12] Ibid.

[13] Global research and development (R&D) spending on road traffic injuries in 1996 was between US$ 24 million and US$ 33 million, while R&D spending on HIV/AIDS in 1996 was over US$ 900 million. See Lagarde, Road traffic injury is an escalating burden.

[14] Ibid.

[15] Toroyan, *Global status report on road safety*.

[16] Ibid.

[17] UN Road Safety Collaboration, *Global Plan for the Decade of Action for Road Safety 2011–2020*, Geneva: World Health Organisation, 2010, http://www.who.int/roadsafety/decade_of_action/plan/en/index.html (accessed January 2012).

[18] Table adapted from the Haddon Matrix, which was developed by William Haddon in 1970, and looks at factors related to personal and environmental factors before, during and after injury or death. The specific table referenced was from the US Department of Transportation, National Highway Traffic Safety Administration, http://www.nhtsa.gov/people/injury/pedbimot/motorcycle/00-nht-212-motorcycle/about3.html (accessed January 2012).

[19] Toroyan, *Global status report on road safety*, 157.

[20] Ibid.

[21] Ibid.

[22] See Francis K Afukaar, Speed control in developing countries: issues, challenges and opportunities in reducing road traffic injuries, *Injury Control and Safety Promotion* 10(1–2) (2003), 77–81, 77.

[23] Jones Blantari, Godfried Asiamah, Noble Appiah and Charles Mock, An evaluation of the effectiveness of televised road safety messages in Ghana, *International Journal of Injury Control and Safety Promotion* 12(1) (2005), 23–29.

[24] *Proceedings of the First African Conference on Traffic Injury Prevention: The African Challenge*, 2004, 20, http://www.fiafoundation.org/Documents/Road%20Safety/windhoek_report.pdf (accessed February 2012).

[25] Simon Bergman, Dan Deckelbaum, Ronald Lett et al., Assessing the impact of the trauma team training program in Tanzania, *Journal of Trauma: Injury, Infection, and Critical Care* 65(4) (2008), 879–83.

[26] UN Road Safety Collaboration, *Global Plan*, 17.

[27] Gunter Zietlow, The road safety cent: Management and financing of road safety in low-income countries, GTZ, Germany, 2006, 11, http://www.zietlow.com/gtz/GTZ-RoadSafetyCent0107.pdf (accessed January 2012).

[28] To reach these numbers, we calculated the following: the improved scenario (introduced below) saves 144,1 million DALYs relative to the base: 144,1 million * US$ 12 (sub-Saharan Africa) = US$ 1,73 billion; 144,1 million * US$ 169 (Latin America and the Caribbean) = US$ 24,35 billion.

[29] The IFs modelling system analyses trends across a wide range of key global systems and provides forecasts for 183 countries to 2100. IFs is housed at the Frederick S Pardee Center for International Futures at the Josef Korbel School of International Studies at the University of Denver. Further details on the model structure and assumptions are available from the website (http://www.ifs.du.edu/ifs) and other IFs publications. Version 6,53 of the model was used for the development of this report.

[30] For an extended explanation of the base case, see Barry B Hughes, Mohammod T Irfan, Jonathan D Moyer et al., Forecasting the impacts of environmental constraints on human development, Human Development Reports Research Paper 2011/08, New York: United Nations Development Programme, 2011.

[31] Smeed's Law: D = .0003(np^2)^(1/3); where D is annual road deaths, n is number of registered vehicles, p is population; see Reuben J Smeed, Some statistical aspects of road safety research, *Journal of the Royal Statistical Society Series* A, 112(1) (1949), 1–34, 6.

[32] Y = 1 000.00/(1+e^(4.8969+0.1072*(x))); R^2= 0.5322.

[33] The target used was -0,0001 standard errors below the calculated function of deaths per vehicle (DEATHTRPV) and GDP per capita (GDPPC).

[34] See http://www.issafrica/futures for tables of all African countries.

AFRICAN FUTURES PROJECT

The African Futures Project (www.issafrica.org/futures) is a collaboration between the Institute for Security Studies (www.issafrica.org) and the Frederick S Pardee Center for International Futures (www.ifs.du.edu) at the Josef Korbel School of International Studies at the University of Denver. The Institute for Security Studies is a widely recognised Pan-African think tank specialising in issues of human security. The Pardee Center is the home of the International Futures modelling system, which is an integrated approach to exploring and understanding human development and the broad implications of policy choices. These organisations leverage each other's expertise to provide forward-looking, policy-relevant material that frames uncertainty around human development in Africa.

Series editors: Jonathan D Moyer (jmoyer@du.edu) and Erin Torkelson (etorkelson@issafrica.org)

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