News

Rwanda's road-safety transformation

Ten years ago Rwanda had one of the worst road-safety records in the world. But once the government recognized that making roads safer could help with the rehabilitation of a nation traumatized by the 1994 genocide, its efforts have won international acclaim.

Christmas 2006 was a special event in Rwanda. Just a decade after being ranked as one of the worst countries for road safety, Rwanda's police force watched over the country's first accident-free festive season, a time for reckless driving in many countries.

This transformation has been far from easy to achieve, however. A World Bank situation report, commissioned in 1996, concluded that one accident was taking place every two and a half hours on Rwanda's roads, almost all of which left people injured and 10% of which resulted in deaths.

Urban centres, such as the capital Kigali, saw frequent violent collisions, sometimes because drivers refused to respect others' right of way, according to Dominique Rurangirwa, who works on transport and road safety in Rwanda's Ministry of Infrastructure. Night-times were particularly hazardous "because of the excess speed resulting generally from alcohol consumption," he recalled. In rural areas, where roads are in a far worse condition than those in urban centres, drivers regularly went too fast to maintain control on the uneven carriageway surface.

Rurangirwa said the number of road deaths in Rwanda for a country of some nine million people was found by the World Bank to be among the world's highest in 1996.

But, according to Rurangirwa, the severity of the situation also presented an opportunity. "After the genocide which plunged Rwanda into mourning in 1994, the country knew that one method of rehabilitation was [improving] its road infrastructure, which was damaged during the genocide, leading to many road traffic deaths," he explained.

The 1996 World Bank report echoed this view that Rwanda's incentive for improving road safety was about moving the country forward from responding to a humanitarian crisis after the genocide to efforts focused on development, of which improving infrastructure and road safety were key parts. The desire for post-genocide rehabilitation and development were the major factors behind the big push on road safety.

After reviewing the World Bank situation report, the Rwandan government started a new road-safety programme, financed by the World Bank, and embarked on a complete revision of the country's laws on road conduct. Ministers re-examined the regulations governing the traffic police and the requirements for drivers, consulting widely among transport stakeholders, including unions and regular road users. "We also spoke to pedestrians, in particular the schoolboys and students, to make sure that we consulted at the level of communities," said Rurangirwa.

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New regulations, which started to be strictly enforced after 2001, included mandatory wearing of seatbelts, speed limits, vehicle inspections to ensure standards of roadworthiness and limits on blood-alcohol concentrations. These legislative changes were followed up in 2003 by a public awareness campaign and a law introducing further penalties for lack of seatbelt use or failure to wear helmets on motorcycles.

WHO/Riccardo Gangale

Rwandan policeman helps children crossing the road in Kigali. Police supervision of school crossings and visits to schools to teach children about road safety are important elements of the campaign.

Since 2004, the World Health Organization (WHO) has been working with the Rwandan government to help raise community awareness of road safety, according to WHO Country Health Information Officer Jean Busco Gasherebuka. He said that WHO has negotiated with schools and unions through a campaign organized by the ministries of health and infrastructure, the police force and WHO. "We have held conferences in the secondary schools through the country and distributed material on the road safety," he said.

The new laws had an almost immediate effect, as the number of deaths dropped by about 30%: "Before the strict observation of the law, 1995–2001, the number of deaths per annum reached between 450 and 550 people," explained Rurangirwa. "But under the new law, the deaths dropped to between 320 and 370."

The types of accidents also changed. Before the new law came into force, excessive speed resulted in high rates of pedestrian injuries and deaths. But speed limits and penalties for drunk-driving reduced these incidents. "The installation also of pavements and crossings for pedestrians also contributed to the reduction in these types of accidents," Rurangirwa added.

Enforcement of these substantial changes was a challenge for Rwanda's under-resourced police force. Early success was accompanied by fears that corruption would increase among traffic police, with individuals attempting to bribe their way out of paying harsh fines (the fine for not wearing a seatbelt is equivalent to 20% of a civil servant's monthly salary). Combating these rumours, the government instigated a parallel crackdown on police corruption in 2004, in which more than 100 officers were sacked for taking bribes.

Six years on from the tightening of regulations, most Rwandan citizens are used to the new rules. Now, Rwanda's traffic police, whose ranks have swelled to between 450 and 500 officers, is turning its attention to foreign coach companies, which are frequently involved in crashes in Rwanda. Coach drivers ferrying passengers to Kigali from Kenya and Uganda object to Rwanda's recently introduced national speed limits of 60 kilometres an hour, which is 20 kilometres an hour lower than in neighbouring east African countries.

Countries in WHO's African Region have 40% more road deaths per 100 000 population than other low- and middle-income countries and 50% more than the world average. The worst rates of road traffic deaths in the WHO Region are among the under-25s, according to WHO's *Youth and road safety* report.

WHO's 2006 *African Regional Health Report* held up Rwanda as an example of how African countries can improve road safety. "Rwanda has very good, focused leadership in road safety – political will is key," said Dr Olive C. Kobusingye, regional advisor on violence, injuries and disabilities at WHO's Regional Office for Africa.

Rwanda's plans for extending its success in road safety include further reinforcements for the traffic police to better enforce the law, as well as more public education about how to prevent accidents and observe good road conduct. Gasherebuka believes Rwanda's continued commitment to road safety – exemplified by its signing of the Accra declaration on road safety in Africa in February – shows its determination to further reduce road casualties and deaths. ■

Hannah Brown, *London*

New vaccines to boost child care in developing countries

Two rotavirus vaccines recently entered the market but to make a difference where they are most needed they must show efficacy and become affordable in developing countries.

By the age of three years, most children in the world have been infected with rotavirus.

In the developed world, many cases need nothing more than attentive treatment and rest at home, but in about 5–10% of cases children become so dehydrated due to gastro-enteritis they may need hospital care.

The picture is more grim in developing countries, where three-quarters of infants have had their first clinically serious rotavirus infection by their first birthday.

Worldwide, rotavirus accounts for an estimated two-fifths of all severe diarrhoea cases and causes up to a third of the 1.9 million deaths a year among under-fives due to diarrhoea. Ninety percent of these deaths occur in the developing countries, where access to lifesaving treatment is limited and where a vaccine would offer the best hope for preventing countless deaths.

Finding a safe and effective rotavirus vaccine has been a priority for the World Health Organization (WHO) in the 1990s. But the search got off to a false start. In mid-1998, Wyeth's RotaShield was licensed for sale in the United States of America (USA) and rapidly introduced into routine childhood vaccination programmes. Within nine months, cases of vaccine-related intussusception, a serious condition that causes bowel obstruction, were reported among some one million children who had been vaccinated. The manufacturer voluntarily withdrew the vaccine and the US Advisory Committee for Immunization Practices withdrew its recommendation for its use.

It took several years for another rotavirus vaccine to reach the market in 2004, GlaxoSmithKline's (GSK) Rotarix, followed by Merck's RotaTeq in 2006.

A 2006 WHO recommendation indicated that the two vaccines could be introduced in regions and countries where they had been evaluated in clinical trials. This includes Latin America and Europe. Safety and efficacy data from over 63 000 infants tested with Rotarix showed that two oral doses conferred 85–100% protection against mild-to-severe rotavirus infections respectively. Similarly, Merck has evaluated RotaTeq in a study population of 70 000 infants in Europe and the USA, and found that a three oral dose regimen prevented 98% of severe rotavirus cases.

In February 2007, Rotarix attained WHO pre-qualification status, a critical step for international procurement of the vaccine by United Nations agencies for poor countries, with the caveat that more data would be needed on the vaccine's safety and efficacy for children in Africa and Asia before the vaccine would be recommended for global use. Merck expects RotaTeq will also receive WHO pre-qualification status in due course.

GSK and Merck are working with the PATH Rotavirus Vaccine Program to evaluate the vaccines' efficacy in developing countries. Together with WHO and PATH, formerly known as the Program for Appropriate Technology in Health, GSK is doing an efficacy trial in Malawi and South Africa, while PATH and Merck are doing efficacy trials in Bangladesh and Viet Nam in Asia and in Ghana, Kenya and Mali in Africa. The resulting data, due to be available in 2009, could pave the way for routine immunization against rotavirus in Africa and Asia by 2010.

All this is good news, but for the vaccines to make a difference in developing countries, they must avoid the fate of hepatitis B vaccines, which

entered the market in the 1980s at US$ 100 a dose and took 20 years to become affordable.

"Right now rotavirus vaccines are very expensive, and neither manufacturer has announced prices for developing countries yet," said Dr Manju Rani, regional focal point for new vaccines at WHO's Western Pacific Regional Office. "Based on the price offered in Brazil, Rotarix is US$ 7 a dose for a two-dose regimen. In some countries in WHO's Western Pacific Region that exceeds the total per capita spending on health, including donor money and government expenditure: US$ 3–5 a year in Cambodia and the Lao People's Democratic Republic, for example."

Fortunately for the world's poorest countries, the GAVI Alliance, formerly known as the Global Alliance for Vaccines and Immunisation, is committed to providing financial support for rotavirus vaccines.

In November 2006, GAVI's board unanimously agreed to add rotavirus vaccines to GAVI's portfolio. "The pledge of support by GAVI demonstrates that the global community is moving quickly to save the lives of millions of children at greatest risk from rotavirus," said Dr John Wecker, director of the PATH Rotavirus Vaccine Program.

If countries have to procure the vaccine on their own for about 3% of the population that is newborn every year, the US$ 1 per capita cost is a huge expense.

"Rotarix is a very good example of GSK's business model of parallel availability, but we also need some help to make the vaccine affordable," said Dr Philippe Monteyne, the company's vice president for global vaccine development.

"Prequalification status with WHO will allow UN agencies to meet their goal of 85% coverage with a rotavirus vaccine by 2015. We will offer tiered pricing, so for example, the public market price in low-income countries will be less than one-tenth of the private price in developed countries," Monteyne said.

In October 2006, Merck launched a routine rotavirus vaccine programme in Nicaragua, in collaboration with the country's Ministry of Health and WHO's Regional Office of the Americas, to supply universal coverage of newborns with RotaTeq for three years and conduct a cost-effectiveness study.

PATH/George Armah, Noguchi Memorial Institute for Medical Research, Ghana

Child being vaccinated against rotavirus in Ghana.

"One of the key issues is demonstrating that a GAVI-eligible country can successfully implement a vaccination programme with RotaTeq and have demonstrable success," explained Dr Mark Feinberg, vice president for policy, public health and medical affairs at Merck Vaccine Division.

"This is the first time a vaccine has become available in the US and in a GAVI-eligible country in the same year and that project is moving along well. Merck is committed to making RotaTeq available to GAVI-eligible countries at prices at which we do not intend to profit," Feinberg said.

The crucial task of surveillance is done through networks. Since its formation in 2000, the Asian Rotavirus Surveillance Network has generated and disseminated invaluable data on the percentage of children with rotavirus-caused diarrhoea admitted to hospital, as well as on the epidemiology and clinical features of rotavirus infection and the diversity of the strains circulating. Surveillance networks have been established in every WHO Region with support and funding from WHO, the PATH Rotavirus Vaccine Program and the US Centers for Disease Control and Prevention.

Surveillance includes the identification and characterization of the various rotavirus genotypes circulating in different regions and at different times, explained Dr Duncan Steele from WHO's Department of Immunization, Vaccines and Biologicals. "It is important to know whether the vaccines will have the same effectiveness against different rotavirus types and in different paediatric populations in different regions," Steele said.

Professor Lau Yu-lung, a principal investigator on one of GlaxoSmith-Kline's Asian trials, said it was essential to test the vaccines in parts of the region and in Africa, where there may be efficacy issues.

"There is uncertainty as to whether the vaccine will work in some Asian populations, as Asia is extremely heterogeneous in terms of economic development and genetic background," said Lau, who is also head of the Department of Paediatrics and Adolescent Medicine at the University of Hong Kong, Li Ka Shing Faculty of Medicine.

There is no doubt that rotavirus infection is a public health problem for both rich and poor communities, and that the advent of safe, effective rotavirus vaccines is important for controlling this infection and, in turn, preventing deaths from diarrhoea.

But Rani, of WHO's Western Pacific Region, said that these vaccines need to be used alongside other methods of reducing diarrhoea in infants.

"We still have to take care of the rest of the diarrhoea cases," said Rani: "Vaccination needs to be part of integrated childhood disease management that entails promotion of hand washing, breastfeeding and use of oral rehydration therapy, as well as the training of clinicians in the management of these diseases." ■

Jane Parry, *Hong Kong SAR*