

SUSTAINABLE AND REPLICABLE ROAD SAFETY SOLUTIONS FOR THE LOWER- AND LOWER MIDDLE-INCOME COUNTRIES BASED ON THE VIET NAM MODEL FOR INCREASING MOTORCYCLE HELMET USE

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ABSTRACT

Viet Nam's experience in increasing motorcycle helmet use offers a replicable model for countries seeking to decrease the high and rising costs of road traffic accidents. Achieving universal helmet use was a critical step to reducing high fatality rates in a country where motorcycles represent 95 per cent of personal vehicles. Helmet use rates in Viet Nam rose from between 3-30 per cent in 2007 to over 95 per cent in 2008; during the same period accident fatalities declined 12.2 per cent, despite the rise in motorization rate. This paper outlines the model for successfully increasing helmet use in Viet Nam. The model addressed (1) market failures that made helmets unaffordable and unappealing; (2) weak legislation and enforcement; and (3) public ignorance of the safety benefits of helmets. The sustainable and replicable Vietnamese model is useful for the consideration of policymakers and public health advocates in low- and lower-middle income countries, particularly where motorcycles compose a large part of personal vehicles and road accidents.

Keywords: Viet Nam road accident, motorcycle accident, helmet use

INTRODUCTION

Low- and lower-middle income countries (LICs and LMICs)¹ face a growing crisis from road traffic accident fatalities and injuries. All such countries must seriously improve road safety to avert major loss of life and of economic productivity.² To do so, developing countries should and will be

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¹ According to the World Bank definition, low income is \$935 or less and lower middle income is \$936 - \$3,705 per capita. See www.worldbank.org.

² Road traffic accidents, unlike many causes of premature death, strike the most economically active segment of the population. For example, in 2000, RTAs were the second killer worldwide of those 5-29 and third of those 30-44 (Peden et al., 2002). They also incur significant costs on society, often 1-3 per cent of GDP (ADB, 2005a).

looking for model strategies that address the particular challenges of rapid motorization in the developing world. Increasing motorcycle helmet use is a key road safety intervention in developing countries because: motorcycles are often a large proportion of personal vehicles; high helmet use quickly reduces fatalities and high-cost brain injuries; and helmet use is an affordable, high return investment (see WHO, 2004 and 2006). This paper draws on the experience of Asia Injury Prevention Foundation³ and presents Viet Nam's path to achieving near-universal helmet use on motorcycles as a best-practice model that can be replicated in other developing countries to decrease high and rising costs of road traffic accidents (RTAs).

For the people of Viet Nam, the explosion of motorcycles on the streets symbolizes a new kind of freedom and represents the country's vibrant future. The country has seen a more than 330 per cent increase in the number of registered motorcycles from 1999 to 2008 (NTSC, 2008). The increase is a result of factors that include: (i) the increase in purchasing power and market access to products such as motorcycles that have occurred during the *doi moi* period of economic opening; and (ii) a very dense, growing population.

Motorcycles likely emerged as the dominant personal vehicle because: (i) they are less expensive than cars;⁴ (ii) the country's climate is tropical or temperate, on average, making motorcycles comfortable year round; and (iii) there are still portions of Vietnamese cities that are unreachable by car because of the narrow residential alleyways. As of 2004, motorcycles accounted for an estimated 95 per cent of personal vehicles (NTSC, 2008).

The mobility brought by motorcycles unfortunately puts a generation of riders at considerable risk. Motorcycles are involved in a large percentage of the RTAs that lead to fatalities and serious injuries. In South-East Asia, an estimated two thirds of RTA fatalities are motorcyclists (Cable, 2008). For example, in Cambodia, road traffic accidents are the country's largest non-communicable health burden⁵ (Hassan, 2008), and motorcycles the greatest source of RTA deaths and injuries, within which unhelmeted riders are a significant at-risk group (Ouellet and Kasantikul, 2006).

³ Asia Injury Prevention Foundation (AIP Foundation or AIP) is an internationally operating nonprofit organization dedicated to combating the epidemic levels of road accident casualties in South-East Asia. The Foundation was established in 1999 and is a United States-registered 501(c)3 charitable organization. In addition, AIP Foundation owns Vietnam Safety Products and Equipment Company (VSPEC) which produces Protec-brand helmets distributed in Viet Nam and neighbouring countries.

⁴ For example, a new Honda Wave (a popular model in Viet Nam) costs in the range of \$800.

⁵ Deaths and injuries.

Head injuries represent the most devastating injury subcategory (Peden, 2004). Victims who survive a head injury often suffer brain damage that impedes their ability to continue as a breadwinner, and in fact may require a lifetime personal care that can drain resources from already impoverished families (Hanh et al., 2008 cited in Hill et al., 2009). The logic for using helmets to address this issue is straightforward.

Helmet use makes a difference. The recently released Cochrane study recognized that helmets can reduce the risk of fatality by an average of 42 per cent and of severe injury by 69 per cent (Liu et al., 2008). A crash-case study of motorcycle accidents from Los Angeles and Thailand similarly found that unhelmeted riders were two to three times as likely to be killed and three times as likely to suffer a “disastrous outcome”. Universal helmet use would prevent about 80 per cent of fatalities and brain injuries in survivable crashes (Ouellet and Kasantikul, 2006). By extension, high rates of helmet use lead to fewer deaths, shorter hospital stays, and speedier recoveries (Peden, 2006), all of which reduce the economic burden on society and the emotional burden on families.

Despite these simple truths, helmet use remains low in many countries. Until December 2007, only 3-30 per cent of Vietnamese riders wore a helmet when on a motorcycle (AIP Foundation, 2007). This was not due to lack of exposure to the devastating impacts of RTA head injuries. A survey conducted in preparation for the Asia Injury Prevention (AIP) Foundation public awareness campaign found that all respondents had been involved in some form of motorcycle accident in the past 18 to 24 months and knew of someone who had been killed or seriously injured in a motorcycle accident. Despite their exposure to the consequences of being involved in a motorcycle accident and the prevalence of accidents, none of the respondents felt it was necessary to wear a helmet when driving anywhere other than on major highways.

This research indicated that variations on simple, everyday excuses were the nearly ubiquitous reasons given for helmet non-use. They included: (i) wearing a helmet is uncomfortable and hot; (ii) you look stupid wearing a helmet when no one else is; (iii) it won't happen to me; (iv) I drive very slowly in the city, so it's not necessary; and (v) I can't hear when I'm wearing a helmet; it's like wearing a rice-cooker on your head.⁶ Notably, these excuses continued to dictate behaviour despite laws that were supposed to increase helmet use. RTAs continued to kill people on the order of 13,000 people a year and to leave another 30,000 injured, some to face the life-altering consequences of severe head trauma or disability (NTSC, 2008).

⁶ See also Craft (2008).

Then overnight, on 15 December 2007, Viet Nam's millions of motorcyclists began wearing helmets, with nearly 100 per cent compliance. That date, 15 December, marked the first day of a new helmet use law. Immediately, adult peak⁷ helmet use rates in Viet Nam rose from 3-30 per cent to 98-100 per cent (AIP Foundation, 2008a). Over the course of 2008, Viet Duc Hospital⁸ reported seeing 700 fewer cases of brain trauma patients than during 2007—a 10 per cent decline (Ministry of Health, 2008b). The number of head trauma patients arriving who had been wearing helmets increased 196.7 per cent, while head injuries themselves declined 75.2 per cent (Ministry of Health, 2008a). During the course of 2008, RTA fatalities dropped 12 per cent and RTA injuries dropped 24 per cent relative to the previous year (National Traffic Safety Committee, 2008).

Viet Nam's conversion to nearly universal helmet use is remarkable. Why was it so effective where previous attempts had failed?

AIP Foundation found the model for successfully increasing helmet use in Viet Nam was one that addressed: (i) the market failures that made helmets unaffordable and unappealing; (ii) weak legislation and enforcement; and (iii) public ignorance of the safety benefits of helmets. In addition, a holistic approach achieved through the collaboration of cross-sector partners at all levels was key. Piecemeal solutions to address helmet use had been attempted since 1994, but they had all been unsuccessful. The difference in 2007 was that all stakeholders were mobilized and coordinated to address this multifaceted problem in a multifaceted way.

This paper outlines key steps that created the success of the 2007 helmet use increase. It concludes with a summary of lessons learned for other developing countries. Viet Nam's experience demonstrates that, without a clear understanding of the different facets of the problem, solutions will be ineffective and unsustainable. Another key resource and guide for this process is the World Health Organization report, *Helmets: A road safety manual for decision-makers and practitioners* (WHO, 2006).

⁷ Adult indicates over age 14 and peak indicates during weekdays.

⁸ A major hospital and trauma center in Hanoi.

I. MARKET FAILURE: MAKE MORE AND MORE APPROPRIATE HELMETS

In 2000, helmets available to Vietnamese consumers were hot, heavy, uncomfortable to wear, and most helmets did not allow ventilation. The majority were imported rather than being produced locally. Low helmet use continued through the early 2000s, during which time the motorcycle fleet in Viet Nam surged, putting more people at risk. Changing this situation meant creating comfortable, fashionable helmets that were affordable.

First, revision of the helmet standard was necessary to bring comfortable helmets to the market—a process for which AIP Foundation provided technical assistance to the Government. The new Vietnamese helmet standards are comparable to other international level standards, but they endorse features for a “tropical helmet” regarding head coverage areas, open hearing areas, allowance for peripheral vision and ventilation slots for air flow. Not all international standards allow for ventilation, for example. This was critical for public acceptance of a helmet in a hot climate. The Viet Nam Motorcycle Standard for Adults TCVN 5756-2001 was approved on 11 May 2001.

Second, safe, quality helmets needed to be widely available. AIP Foundation established a subsidiary, Vietnam Safety Products and Equipment (VSPEC or Protec), the world’s first helmet factory owned by a non-profit organization. The Protec helmet company sells TCVN-compliant helmets, produced in a factory whose workforce is 20-30 per cent in wheelchairs, and AIP Foundation dedicates all profits of VSPEC to advocacy work and helmet donation to children. This socially entrepreneurial model was made possible by financial support from corporations and charities that enabled the helmet factory to be constructed with minimal debt.

In May 2002, the non-profit Protec factory opened to produce high quality, affordable helmets. A helmet testing lab was installed where special equipment tested safety elements ranging from the strength of helmets’ chin straps right through the ability to withstand side-impact collisions. Specifically designed for the unique climate and traffic conditions of Viet Nam and Asia, Protec “tropical” helmets are lightweight, well-ventilated and do not obstruct hearing or peripheral vision. The tropical helmet quickly caught on, and there are now several reputable producers of these helmets, which continue to be the most common model seen on the streets of Viet Nam today.

Reducing the cost of helmets was critical to sustain high helmet use as sustainability is enhanced when people purchase their own helmets without subsidies. Similarly, helmets must be inexpensive enough so that people will wear them every day, instead of saving them for special occasions, and will be able to replace them as often as necessary, especially

after an accident or after 2-3 years of use.⁹ People must be able to afford a “real”, high-quality helmet—if those helmets are too expensive then people will likely opt for cheaper “fake” helmets that do not protect them.¹⁰

A. Legislation and coordinated, collaborative government involvement

Successive laws were passed in the 1990s and early 2000s to increase helmet use, and yet were ineffective.¹¹ In 1995, Decree 36/CP (29 May 1995) provided no penalty for riders without helmets, leaving the legislation with no enforcement mechanism. With Resolution 02/2001/NQ-CP (02/3/2001), the Government regulated that helmet wearing on motorcycles was compulsory on certain roads starting June 2001. Covered roads included national highways but not inner city or provincial roads. In 2003, Decree 15/2003/ND-CP (19/2/2003) regulated that police could either impose a warning or a fine of 10,000-20,000 dong for people who did not wear a helmet on the regulated roads. The fine was moderately increased in 2005. The triviality of the fine along with limited enforcement resulted in low compliance.

When limited coverage legislation was introduced, many international stakeholders, including AIP Foundation, Global Road Safety Partnership, UNICEF and WHO, began advocating a universal mandatory helmet law that covered all riders and passengers on all segments of the road network.

In the spring of 2007, the Minister of Transport Mr. Nghia Ho Dung committed to the promulgation of a mandatory universal helmet law.¹² A new law might easily have gone the way of the ignored and poorly enforced previous mandates. However, by 2007 education, awareness-raising, and advocacy around helmet use was substantial, which created an enabling environment for change. Nevertheless, securing that all relevant government agencies became invested stakeholders was critical. This time the new law

⁹ Over the course of a helmet’s lifetime, heat, exposure, and the natural process of wear and tear mean that the expanded polystyrene (EPS) lining’s shock absorbing impact will decline.

¹⁰ Viet Nam’s high helmet compliance rate is currently inclusive of imitation helmets. One report by the Saigon press indicated that 78 per cent of checked sample helmets in Ho Chi Minh city did not meet the TCVN Standard (Saigon Giai Phong, 2007).

¹¹ 29 May 1995—Decree No. 36/CP, Item c.34. Helmets must be used outside populated areas; in 2001, Decree 36/2001/ND-CP, Item 3.28 managed universal helmet use and a 20,000 dong fine, with the fine increased in 2003 and 2005.

¹² For a more detailed history of helmet legislation in Viet Nam see: Passmore, J. et al. (unpublished) *the implementation of Vietnam’s national mandatory helmet law*. (WHO, Viet Nam), forthcoming.

had that strong support from multiple ministries, coordinated by the National Traffic Safety Committee (NTSC).

The NTSC played a critical role in Viet Nam's success, and as similar coordinating body should be considered in other countries. The NTSC created clarity at a national level about road safety policy. Working with a variety of groups, it brought key national players into the process of drafting and preparing for enactment of the legislation, including the Prime Minister, the police, and the army. Similarly, it facilitated collaboration with international non-governmental organizations such as AIP Foundation, the Global Road Safety Partnership, the World Health Organization, national aid programmes and others including private sector partners. Government commitment was effective because it was created through multilateral cooperation within different ministries and outside bodies. The NTSC achieved this because it had strong leadership and was appropriately positioned to engage decision makers within relevant agencies.

On 29 June 2007, the Government established Resolution 32/2007/NQ-CP on urgent solutions to limit traffic accidents and traffic jams. Resolution 32 regulated that from 15 September 2007, all motorcycle riders and passengers on all highways had to wear helmets, and from 15 December 2007, helmet wearing would be compulsory *on all roads*. An accompanying decree in September established a 100,000-200,000 dong fine for not wearing a helmet, followed up by a Ministry of Police instruction to enforce the decree.

The initial legislation still left some loopholes open. First, it did not explicitly require helmets to be buckled, which created difficulty for enforcement. Second, there were conflicts with previous legislation preventing monetary fines against children; hence legislation provided no means to penalize adults carrying unhelmeted children. Those two loopholes, as well as the need for more stringent rules regarding helmet quality, have been, or are being, addressed. This carries lessons for other countries to address such details in the initial legislation.

II. EDUCATION AND AWARENESS

A key difference in the implementation of the 2007 helmet legislation, as opposed to earlier legislation, was the undertaking of significant education and awareness activities. Viet Nam is a young country, with 25.6 per cent of the current population under the age of 14 (United States Central Intelligence Agency, 2008). That context provides Viet Nam the opportunity to train a large section of its future drivers now with primary and secondary school programmes.

Traffic safety education programmes in Vietnamese primary schools have been phased in over the course of the past 15 years, with the support and cooperation of the Ministry of Education and Training (MoET). Basic traffic safety education was first implemented in 1993-1994 and books were first introduced in 1999 without any supporting materials.

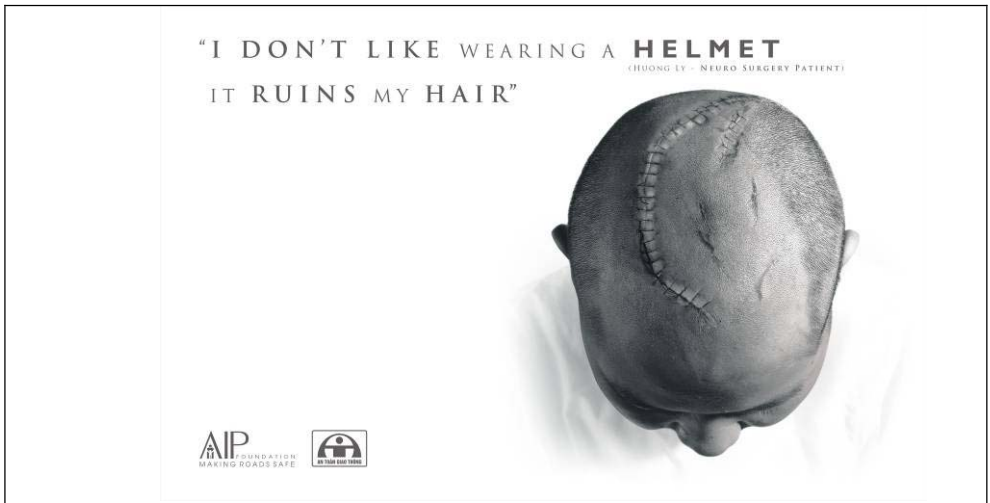
In 2001, AIP Foundation developed, in coordination with MoET, an active teaching methods training manual and designed a traffic safety curriculum for students. Parts of this curriculum were then adopted by the Vietnamese education system and made mandatory. This curriculum consists of 4.5 hours of age-specific activities related to road traffic safety each year, at each grade of primary school.

AIP Foundation has continued its engagement with primary schools nationally, including a full traffic safety curriculum, complete with interactive teaching methodology training, non-class activities, and additional school supplies. Over the past 10 years it has provided nearly 450,000 helmets to children throughout the country through school-based programmes. The Government is also continuing to stress the issue, evidenced by their issuing of Resolution number 32/2007/NQ-CP on 29 June 2007 regarding urgent solutions for restraining traffic accidents and congestion, in which MoET was assigned to be responsible for working out a suitable traffic safety education programme in schools. Other foundations, such as Toyota Foundation, have taken note and also begun to provide resources to support traffic education programmes.

In addition to school-based programmes, in 2007, AIP Foundation initiated the Viet Nam Helmet Wearing Coalition (VHWC),¹³ which launched a public awareness campaign before the announcement of the new legislation. It was designed to target quotidian excuses that were threatening people's lives. In response to the striking importance of debt to family in Vietnamese culture, the campaign highlighted family members who were indirectly affected by an accident and emphasized the burden victims could inadvertently place on their entire family. The emotional texture of the campaign was designed to appeal to Viet Nam's young population. The look of the campaign changed over its three phases. For instance, phase one began with black and white images of road traffic victims juxtaposed with a common excuse for not wearing a helmet. In a second phase, Vietnamese celebrities were shown wearing helmets in their daily lives, as an ironic reminder to wear helmets at all times.

¹³ The VHWC is chaired by AIP Foundation and members include the Royal Danish Embassy, the Australian Embassy/AusAID, the United States Embassy, the World Bank, the Asian Development Bank, Intel Product Viet Nam, Michelin Asia, the FIA Foundation for the Automobile and Society, the World Health Organization, Talisman Energy, UNICEF Viet Nam and Safe Kids Worldwide.

Figure 1. Viet Nam Helmet Wearing Coalition phase I billboard image in English



Initially, the VHWC campaign met several challenges. First, a comprehensive multimedia national campaign demanded considerable funding to reach a significant part of Viet Nam's 86 million people. Second, the country's culture and government infrastructure had not created an enabling environment for such a campaign. Until recently, any critique of the status quo in the public arena was tantamount to directly criticizing the Vietnamese Government. Additionally, public service announcements continued to rely on painted-poster aesthetics and lecture-like radio broadcasts popularized during the 1970s and 1980s. A public education campaign run by a non-State organization with a stylish, marketing edge had not been conducted before.

VHWC campaign activities included concerts with appearances by road traffic safety victims to give testimonials, billboards, bus-side advertisements, television commercials, and newspaper advertisements. VHWC campaign evaluations found the campaign images had high recognition rates in Can Tho, Danang, Hanoi, and Ho Chi Minh City. AIP Foundation evaluations found that people who attended concerts or saw billboards repeatedly mentioned that they identified with the "excuses" or behaviour of traffic victim spokespeople, and the campaign made them aware that they were also exposed to the same risks as those who had already suffered traffic accidents. Surveys found that the campaign's television advertisements were widely considered to be "appropriate" by the Vietnamese public, despite being drastically different than any previous public education campaign (AIP Foundation, 2008b). In follow-up surveys,

people with exposure to the campaign were more likely to cite “safety” as the reason for wearing a helmet.

People additionally began to be increasingly informed about helmets by the national media. Once the legislation was announced, newspaper media included coverage of implementation, justifications, helmet quality, purchasing helmets, and other benefits (Hill 2009). Though the impacts of the VHWC campaign and the general media coverage are difficult to disaggregate, it was observed that helmet use increased before the legislation was enacted. Within four months of the campaign’s launch—and before the legislation was enacted—the percentage of people wearing helmets tripled from roughly 3 per cent of motorcycle users to 10 per cent. Within Hanoi and Ho Chi Minh City, helmet wearing rates doubled from 10.8 per cent to 19.1 per cent (AIP Foundation, 2007). On highways, there was a measured increase of 15.7 per cent.¹⁴ Those figures indicate that increased public awareness can change behaviour. However, in conjunction with legislation, helmet wearing rates tripled again, underlining the fact that government support and enforceable legislation may be necessary to achieve very high helmet use rates.

III. RESULTS AND BENEFITS

There is no true natural experiment with which to test the efficacy of universal helmet use in Viet Nam. Directly measuring its impact is complicated by the fact that other factors which may have connections to motorcycle RTA fatalities and injuries continued to change over time in Viet Nam. These include GDP per capita, population, number of vehicles registered and the number of accidents. See table 1 for a summary of the trends over time in some of these variables.

¹⁴ Sample size: 800 motorcycle users.

Table 1. Yearly data for Viet Nam

	1999	2000	2001	2002	2003	2004	2005	2006	2007
Accidents per 1 000 000 population				15.9	16.4	19.0	20.3	36.6	52.8
Motorcycles per 100 population	7.7	9.0	11.3	13.6	14.9	17.3	20.4	23.2	26.5
Population (millions)	76.6	77.6	78.7	79.7	80.9	82.0	83.2	84.4	85.6
GDP per capita (hundreds of purchasing power parity (PPP) dollars)		14.2	15.3	16.5	17.8	19.5	21.4	23.6	26.0
Fatalities per 100 000 population	9.1	9.7	13.3	16.1	14.0	14.3	13.4	14.7	15.0

Source: National Traffic Safety Committee, IMF.

In addition, many accidents that once would have been serious or fatal (and therefore reported), might now be minor (and therefore go unreported). Evidence exists that this may have occurred as reporting by the Ministry of Health comparing the first quarter of 2007 (pre-campaign, pre-helmet law) to the first quarter of 2008 (post-campaign, post-helmet law) revealed that traffic injury patients arriving at hospitals declined by 89.5 per cent (Ministry of Health, 2008a). The decline in the number of traffic patient admissions implies that existing data collection systems in Viet Nam may be unable to capture a non-biased before and after sample.

To generate a basic sense of what Viet Nam's RTA fatality rate might have been under a business as usual (BAU) scenario in 2008, AIP Foundation generated three counter-factual projections. The first one was based on the number of motorcycles per 100 population; the second one was based on the number of accidents per 1,000,000 population; and the final one was based on GDP per capita. Using a simple correlation, this generates the following predicted values for 2008.

Table 2. Alternative projections of 2008 fatalities under business as usual

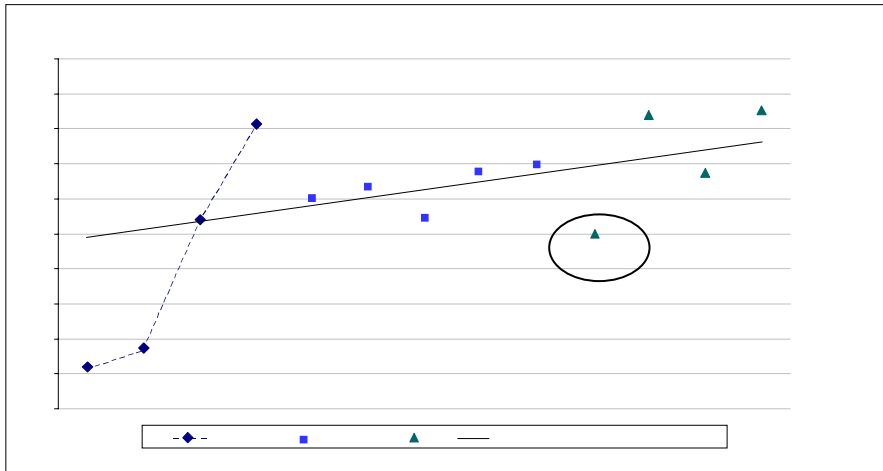
	RTA fatalities per 100 000	R-squared	Difference	Percentage different from actual
Actual in 2008	12.95			
2008 Projection (based on GDP per capita)	16.45346	0.4072	-3.37894334	-26.1%
2008 Projection (based on accident rate)	14.80041	0.0229	-1.84837334	-14.3%
2008 Projection (based on motorcycle density)	16.59608	0.4581	-3.64085683	-28.1%

Source: Data on fatalities, accidents and number of motorcycles from National Traffic Safety Committee (NTSC, 2008); Data on population, GDP per capita (purchasing power parity (PPP) dollars) from the International Monetary Fund (IMF, 2009).

This table indicates the number of recorded road traffic accident fatalities per 100,000 population during 1999-2008. Using time-series data on the number of motorcycles per unit population, accidents per unit population, and GDP per capita (PPP dollars), simple linear correlations were used to generate three different business as usual counterfactual projections of fatalities per 100,000 population in 2008.

The figure below charts three series of RTA fatalities per 100,000 population: (i) 1999-2002, until a new definition was adopted; (ii) 2003-2007, including with a linear projection for these values; and (iii) 2008 actual values and the three projected values. By all three projections, 2008 RTA fatalities per 100,000 were lower than expected under a business as usual scenario (ranging from 14.3-28.1 per cent lower). The actual number of recorded fatalities was 11,243.

While none of these projections should be taken as a robust BAU estimate, they do corroborate the fact that expected RTA fatalities in 2008 were higher than the observed RTA fatalities, and that no trend in GDP per capita, motorization, or the number of accidents immediately explains the differential. This further supports on-the-ground assessments that the increase in helmet wearing in 2008, as the key road safety shift from 2007 to 2008, is likely responsible in large part for the decline in RTA fatalities.

Figure 2. Projected and actual RTA fatalities in 2008 in Viet Nam

Source: Data on fatalities, accidents and number of motorcycles from National Traffic Safety Committee (NTSC, 2008); Data on population and GDP-PPP per capita from the International Monetary Fund (IMF, 2008).

Note: This figure graphs the number of recorded road traffic accident fatalities per 100,000 population during 1999-2002, under the first definition used by the Government and separately graphs the same statistic for 2003-2007. A third series shows three counterfactual projections for 2008 fatality rates as well as the actual 2008 fatality rates. Counterfactual projections were made using simple linear correlations with the number of motorcycles per unit population, accidents per unit population, and GDP per capita (PPP dollars).

IV. LESSONS LEARNED AND BEST PRACTICES

From the Viet Nam model, several lessons emerged:

- Universal and complete.* Some of the difficulties that emerged early on were the result of covering only certain cities or roads. Ongoing difficulties occurred because of the differences in enforcement between children and adults, as well as the fact that enforcement is generally lower in the evenings and on weekends. Similarly, some countries have passed laws covering only motorcycle drivers, but not passengers. These practices may initially be justified as politically necessary and expedient, but measures must be in-built to expand the coverage. Without doing that, people begin to perceive a health-related justification for the restriction (for example, drivers are at greater risk than passengers, children are too weak to wear helmets). This undermines people's comprehension of the safety need for helmets and the protection they offer. Finally, the law should

specify that the helmet should be buckled or otherwise fixed to the person's head so that it will remain on during an accident.

- *Quality.* Standards should be put into place immediately to control helmet quality and a plan should be put in place to eliminate fake or low-quality helmets from the market, as they give the appearance of compliance without actually providing any health benefit. Cost is a major factor in this issue; if a standard helmet is very expensive when a law comes into effect, then fake helmets are likely to be popular. This issue has implications for industrial intellectual property protection that should be discussed in advance inasmuch as possible.
- *Coordination.* There is a role for multiple sectors to play in creating success, yet these steps must be coordinated because, in isolation, they are unlikely to generate much improvement. As with many road safety issues, a multitude of actors are involved—for example, the ministries of education, health, industrial standards, and transport, and police. A strong coordinating body in the National Traffic Safety Committee with the power to advise the Prime Minister on the issue was able to galvanize these governmental and non-governmental actors into coordinated action.

In addition to these three lessons, a follow-up study of the history of the Viet Nam helmet success, led by Mary McDonnell, Van Bich Thi Tran and Nina R. McCoy of the Social Science Research Council, identified the following as some of the key factors that enabled the success of the 2007 legislation:

- Credible evidence built government commitment to the issue of road safety and to helmets as a means of responding to it.
- Public education and communication complement legislation, without which there can be little to no expected additional conformity to the law that is not generated from enforcement mechanisms alone.
- Regulations and regulatory changes must be clearly emphasized to the public and to all relevant government agencies; they should be timed in conjunction with education and awareness efforts.
- Adequate fines or sanctions are essential to changing risky behaviour.
- Sustaining change demands a planned approach for which it can be more difficult to generate resources once it seems a problem has been solved.

- Shared knowledge and information between sectors and actors enables successful collaboration, despite being difficult to accomplish; this is one area in which coordinating bodies are particularly critical.
- Social conformity generates major challenges. Cultural practices may be the root cause of conformity, in which case they must be addressed carefully. Be aware of the underlying motivations that can dictate a behaviour.

These best practices were also included in the WHO helmet manual framework.

CONCLUSION

In summary, RTAs are the second leading cause of death for young people between the ages of 5 and 29, and around the globe, they kill 1.2 million people each year—the majority in the developing world. Lost output, combined with property damage, administrative costs, medical and human cost, are taking a toll on developing economies.¹⁵ This jeopardizes the public health systems of developing countries, undermines their efforts to fight poverty, and destroys families. The injury or death of a primary breadwinner can drop a family into poverty, with fewer opportunities for the second generation.

Innovative solutions are urgently needed so that countries can begin planning now to enable interventions to take effect as soon as possible. Wealthy countries have had decades to develop expertise and infrastructure, and these experiences will certainly be amongst the models that are looked to. However, many of these interventions can be quite costly and may not all be suited to the average stage of infrastructure development or driver awareness in developing countries. Viet Nam's experience demonstrates one example of how developing countries can tackle road safety issues that involve changing individual and institutional behaviour, in this case motorcycle helmet use.

Behavioural change strategies as a means to deal with public health challenges exhibit a non-linear relationship between beneficiaries and benefits. As Resnicow and Page discuss, public health-related behavioural change: (i) is often a quantum event rather than a linear one; (ii) is sensitive to initial conditions, highly variable and difficult to predict; and (iii) occurs

¹⁵ In Viet Nam, Asian Development Bank (ADB) estimated the costs of RTA fatalities and injuries at 2.7 per cent of Viet Nam's GDP in 2002 (ADB, 2005b). The impact can be unevenly distributed; for example Ho Chi Minh City, which has a high volume of RTAs, may bear a burden equivalent to 6 per cent of the city's economic output (Anh, 2005).

within a complex system of multiple components that interact in a non-linear fashion and which, through adaptation, lead to results that are greater than the sum of their parts. An example of non-linearity in behavioural change campaigns is “tipping points”—dramatic changes in social behaviour that arise unexpectedly and can be started off by something as simple as a jingle or slogan (Resnicow and Page, 2008).

Viet Nam’s experience with helmet use is an example of such a tipping point. For almost a decade, work had been done piecemeal and had not been reflected by the number of helmets on the road. Finally, on 15 December 2007, Viet Nam clearly reached the other side of a tipping point when helmet use skyrocketed to nearly 100 per cent. What developing countries can glean from Viet Nam’s experience is that success is possible, though it may not be possible to observe it incrementally. Countries should begin with a solid assessment of the extent of the problem of helmet non-use and a survey of institutions; identify the required actions needed to address gaps in these areas; and then continue building awareness and enforcement of helmet use. In Viet Nam, even up until the day before the new helmet regulation took effect, expectations were not very high for resulting helmet use rates. However, the groundwork laid ahead of time generated dramatic and sudden results on day one.

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