



Capacity Development
for Road Traffic Injury Research in
Low and Middle Income Countries

**Supporting Junior
Researchers**

April 2010

With support from the Global Road Safety Facility of the World Bank



The vision of the Road Traffic Injuries Research Network is to reduce the burden of road traffic injuries, particularly in low- and middle-income countries through the promotion, conduct and utilisation of research

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Foreword

Building a cadre of young researchers with expertise in road traffic injuries, especially in low and middle-income countries, is essential if we are to address the current and growing global burden of road traffic injuries. While our knowledge about how best to prevent and minimise the impact of road traffic injuries continues to grow, there is a vital need to develop the capacity and capability in low and middle-income countries which experience a disproportionate share of this burden. In the absence of young men and women with the research skills and expertise to find the solutions to these problems and advocate for their implementation, our ability to address the global burden will be limited.

The Road Traffic Injuries Research Network undertook this project – aimed at supporting junior researchers – as part of their broader mission to address the burden of road traffic injuries in low and middle-income countries through the conduct of high quality relevant research. The Network is grateful to the Global Road Safety Facility of the World Bank for providing the financial resources to support the researchers and their projects described in this report. We are equally grateful to their supervisors and mentors and to the young people themselves, for engaging in this initiative.

I recommend this report to all those interested in addressing the global burden of road traffic injuries and in particular urge you to support these and other young road safety researchers, as they are an essential component of the global agenda aimed at making the world a safer place.

Robyn Norton
Chair Emeritus, Road Traffic Injuries Research Network

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Executive Summary

The mission of Road Traffic Injuries Research Network (RTIRN) is to promote and support road traffic injury prevention research in low-and middle-income countries (LMICs). In 2009, RTIRN awarded a series of 'Junior Researcher' grants for a period of one year each. These targeted young researchers from LMICs aged 35 years of age or younger, and Masters /PhD students working in the field of injury prevention, road safety, or public health in their country of origin.

This report profiles the work of eight Junior Researchers who received these grants from RTIRN with funding support from the Global Road Safety Facility of the World Bank. The researchers used these grants to undertake important projects relevant to road traffic injuries (RTIs) in their countries of residence in Asia, Africa and South America, supervised by local experts in injury prevention and safety promotion.

The range of topics explored by the researchers included: the perception of the risks of cycling and bicycle injuries, chronic alcohol consumption and road traffic crashes, perceptions and risk of drinking and driving, driving behaviours of commercial drivers, crash prediction models, first-aid training for RTI victims, and the economic impact of RTIs.

Each of these projects has provided important new insights regarding context-specific risk factors and a greater appreciation of the burden of RTIs in these countries. Collectively, the studies have yielded a significant body of research evidence and scientific input for policy- and decision-makers that is relevant for RTI prevention in the countries where these research projects were conducted as well as for others with similar patterns of RTIs.

In the course of undertaking these projects, the researchers were able to progress or successfully complete postgraduate qualifications at Masters or doctoral level. Importantly, they also gained invaluable skills and experience in the complex and challenging process of facilitating the translation of research to action by engaging with multiple stakeholders in the road safety context in their countries.

The scope of the projects, the policy-relevant recommendations that have resulted, and the achievements of these researchers indicate that this capacity development initiative has succeeded in its primary objective. Specifically, the young researchers who were supported by these awards and their local supervisors are well-positioned to initiate and conduct much needed injury prevention and safety promotion research that can facilitate the implementation of interventions that will reduce the burden of RTIs in LMICs.

Introduction

RTIs are a serious public health problem in many regions of the world. However, more than 90% of deaths from RTIs occur in LMICs, which have only 48% of the world's vehicles. Well conducted, scientifically rigorous research on the burden and cost of RTIs, associated risk factors, and the effectiveness of interventions, are among the many elements necessary to progress the agenda to prevent and control of RTIs.

To support research activities on RTIs in LMICs, RTIRN awarded competitive grants of \$6,000 each in 2009 to eight junior researchers from these countries for the duration of one year.

The primary objective of this initiative was to enable young researchers from LMICs who were undertaking postgraduate training or at a relatively early stage of their career, to conduct appropriate road safety projects in their country of origin, supervised by a local expert with relevant practical or academic experience. Additionally, the eligibility criteria required applicants to be less than 35 years old at the time of application and to be affiliated with an accredited university as a student or research fellow. At an individual level, the grant supported the attainment of a professional degree or equivalent (Master, Diploma) with a focus on road safety. At the global level, this effort aimed to expand the pool of young experts trained in road traffic injury prevention that can lead future RTI prevention efforts in LMICs.

The following pages summarise the contributions and project work undertaken by eight junior researchers awarded these grants. Detailed reports for each researcher are available from RTIRN. Since these reports were submitted, these young professionals have been developing many of these reports into scientific papers and disseminating their research findings to inform policy and action.

Crash prediction model - Ghana

<i>Title of the Study</i>	<i>Crash prediction model for two-lane rural highways in the Ashanti region of Ghana</i>
<i>Researcher</i>	<i>Ackaah Williams, Building and Road Research Institute, Ghana</i>
<i>Supervisor</i>	<i>Professor Mohammed Salifu</i>

Ackaah Williams graduated with a Bachelor of Science in Civil Engineering in 2003 from the Kwame Nkrumah University of Science and Technology, Ghana. He is an Assistant Research Scientist at the Building and Road Research Institute, Ghana, and is pursuing a postgraduate programme in Roads and Transportation Engineering.

Crash Prediction Models (CPMs) have been used elsewhere as a useful tool by road engineers and planners. There is however no study on the prediction of road traffic crashes on rural highways in Ghana. The main objective of the study was to analyse and develop a prediction model for road traffic crashes occurring on the rural sections of the highways in the Ashanti Region of Ghana. During the period 2005-2007, the Ashanti Region alone accounted for more than one-fifth of all road traffic fatalities in Ghana and the majority (67.3%) of these fatalities occurred on the rural highways. The model was developed for all injury crashes occurring on selected rural highways in the Region over the three year period 2005-2007. Data were collected from 76 rural highway sections and each section varied between 0.8 km and 6.7 km. Data collected for each section comprised injury crash data, traffic flow and speed data, and roadway characteristics and road geometry data. The Generalised Linear Model (GLM) with Negative Binomial (NB) error structure was used to estimate the model parameters. Two types of models, the 'core' model which included key exposure variables only which in this case were traffic flow and segment length and the 'full' model which included a wider range of variables were developed. The results show that traffic flow, highway segment length, junction density, terrain type and presence of a village settlement within road segments were found to be statistically significant explanatory variables ($p < 0.05$). Adding one junction to a 1 km section of road segment was found to increase injury crashes by 32.0% and sections which had a village settlement within them were found to increase injury crashes by 60.3% compared with segments with no settlements. The model explained 61.2% of the systematic variation in the data set. Road and traffic engineers and planners can apply the crash prediction model as a tool in safety improvement works and in the design of safer roads. It is recommended that to improve safety, highways should be designed to by-pass village settlements and that the number of junctions on a highway should be limited to carefully designed ones. In addition there is the need to develop separate crash prediction models for specific crash types and to conduct a similar study on a countrywide scale.

Commercial driver crash research survey - Pakistan

Title *Commercial driver crash research survey: assessing driving behaviours and prevalence of factors associated with road traffic crashes in commercial drivers in Rawalpindi, Pakistan*

Researcher *Umer Mir, Aga Khan University, Pakistan*

Supervisor *Dr. Junaid Razzak*

Umer Mir received his undergraduate medical education from King Edward Medical College, Lahore. He is currently enrolled in the Master of Science in epidemiology and Biostatistics programme at Aga Khan University.

The objective of this study was to assess the driver-related causes that were contributing to the occurrence of RTIs involving commercial vehicles in Rawalpindi, Pakistan.

The study used a cross-sectional survey. Time location cluster sampling was used to select 857 eligible subjects: commercial vehicle drivers. Pre-tested questionnaires were administered after obtaining informed consent. The drivers were interviewed by trained data collectors and were asked questions on driving behaviours, sleep and fatigue, use of marijuana and alcohol while driving, vehicle maintenance/condition and some health related questions (for example drivers' vision status, and a known diagnosis of diabetes). Drivers were also asked if they had been involved in a crash within the last five years.

Drivers that reported the use of marijuana and alcohol had higher odds of having crashes, while cautious drivers and drivers with a confident mind-set had lower odds for having crashes - adjusted for other behaviours. Prevalence of substance abuse was high; reported alcohol use was 9.9% in truckers while reported marijuana use was common in 22.9% of the sample. Poor vehicle maintenance (e.g., vehicles not equipped with a functional speedometer, improperly functioning brakes and indicator lights) was apparent in 65.1% of the vehicles, while seat belts were never used by 51.4% of the sample. Alcohol use by the drivers was positively associated with poor vehicle maintenance. Drivers who reported driving while under the influence of alcohol, or who drove a badly maintained vehicle were at a higher risk of being involved in a road traffic crash. Seat belt use, on the other hand, was negatively associated with crash involvement.

This study showed that a high proportion of commercial drivers engage in unsafe driving habits on the roads of Rawalpindi. The study recommended a multi-sectoral approach for effective control of RTIs and further research towards more objective assessments of these factors so that appropriate interventions can be designed, implemented and assessed.

This research project focused on an important problem related to road traffic injuries. The major limitation of the study is the validity of self-reported information on drivers' risky behaviour.

Risky driving behaviours and driving style - Argentina

Title: Risky driving behaviours and driving style: their relation to alcohol drinking habits

Researcher: Fernando Poo, Universidad Nacional de Mar del Plata, Argentina

Supervisor: Dr Mariana Cremonte

Fernando Poo graduated with honours in Psychology from the Universidad Nacional de Mar del Plata, and is currently undertaking his PhD training.

The objective of this study was to assess if drinking patterns are associated with driving styles (defined as the way drivers habitually chose to drive) and specific risky driver behaviours.

Participants were 650 subjects drawn using a convenience sampling method from the general adult driving population in Mar del Plata, Argentina. Inclusion criteria consisted of: being at least 18 years of age, having a valid driver's license, and having driven at least once a week over the previous two months. Drinking habits, alcohol use disorders, driving style and traffic crashes during the last twelve months were assessed through a self-reported structured questionnaire. Driver social desirability bias was also evaluated. Four mutually exclusive drinking patterns plus one category for abstainers were created. They were (1) non-binge/non-heavy, (2) non-binge/heavy, (3) binge/non-heavy, (4) binge-heavy, and (5) abstainers. The associations were investigated using logistic regression analyses.

Results showed that heavy drinkers (either binge or not) were more likely to engage in speeding and running red lights ($p < 0.001$). This association was observed even after adjusting for impulsive sensation seeking and driver social desirability. Heavy drinkers (either binge or not) were also more likely to present an aggressive driving style and less likely to present an anxious driving style ($p < 0.001$).

These findings contribute to the identification of groups of drivers who tend to engage in risky driving behaviours, allowing a better allocation of the resources and prevention efforts.

One of the strengths of this study is that the measures used were locally validated and showed good psychometric properties. However, the use of self-reports measures could potentially generate underreporting of some socially sensitive behaviours like quantities of drinking, number of traffic crashes, traffic code violations or fines. Another limitation of this study is the use of a convenience sample, which might be at risk of selection bias. However, this is the first study that assessed if drinking patterns are associated with driving styles and specific risky driver behaviours in Argentina. Results of this study inform efforts to identify groups of drivers who are more likely to engage in risky behaviours, and therefore be at greater risk of being involved in road traffic crashes.

Capacity building of drivers on provision of first aid for crash victims - Nigeria

Title: *Capacity building of drivers employed in the University of Ibadan on provision of first aid for accident victims*

Researcher: *Adesola Sangowawa, University of Ibadan, Nigeria*

Supervisor: *Dr. Eme T. Owoaje*

Adesola Sangowawa is a Consultant Public Health Physician and Medical Research Fellow at the Institute of Child Health, University of Ibadan. She received the Oladele Ajose Prize at the National Postgraduate Medical College of Nigeria (Faculty of Public Health) in 2003.



The objective of this study was to determine the effect of first aid education on the capacity of drivers employed by the University of Ibadan to provide first aid for crash victims. Qualitative (in-depth interviews) and quantitative research methods were utilised. A quasi-experimental (group-randomised) study was conducted among 176 drivers (98 in the intervention and 78 in the control groups) selected using a cluster sampling method.

The intervention comprised of two days' training on provision of first aid for crash victims in order to allow adequate time for the didactic lectures and hands-on aspect of the training. Training on HIV/AIDS and the workplace was conducted for control drivers. The drivers' knowledge of road safety and first aid, and their first aid skills were measured at baseline, immediately and four months post-intervention. Respondents' road safety and first aid knowledge were assessed using a multiple item questionnaire.

The drivers who participated in the in-depth interviews were willing to and actively engaged in assisting road crash victims. Some mentioned that the staff they were assigned to drive did not always permit them to park and render assistance. Some had also been accused of having caused the crash leading to trouble with law enforcement agents. At baseline, respondents in both the intervention and control groups had a high knowledge of road safety measures with practically all of them assenting to the fact that use of seatbelts (100%), obeying traffic signs (100%), reducing speed while driving in bad weather (92.9%) and regular servicing of one's vehicle were good road safety practices (98%).

The first aid knowledge and skills of the intervention drivers improved significantly following the training where as scores for the controls remained about the same. Median scores for first aid knowledge before and immediately after the intervention were 12 and 15 ($p < 0.05$) for intervention and 12 and 14 for control drivers ($p > 0.05$). Median scores for first aid skills were 11 and 15 ($p < 0.05$) for intervention drivers and 9 and 8 ($p > 0.05$) for controls. In the 4th month post intervention period, median scores for first aid knowledge and skills reduced slightly among intervention drivers [14 and 19] and remained about the same/slightly increased among controls [14 and 10]. Also, 4 months after the training, 13 of the

intervention drivers came across at least one road crash, 10 (76.9%) of whom utilized the skills acquired.

The intervention resulted in meaningful improvement in road safety knowledge, first aid knowledge and skills of the intervention drivers. However, their scores reduced in the fourth month post-intervention period emphasising the need for periodic refresher trainings to sustain the level of knowledge and skills acquired.

In addition, many of those who came across road crashes after the training utilised the skills they had learnt. In view of the fact that drivers are likely to be onsite at a crash scene, it is recommended that they be given first aid training to enable them to provide this service to crash victims. However, laws to protect them after rendering this service must be put in place.

The study showed the importance of drivers' education on first aid knowledge. The focus and findings of the study are consistent with some previous studies conducted elsewhere. The strengths of the study included the training methodology, which utilized didactic lectures and hands-on practice.

Probability model to identify black spots - Vietnam

Title: Building a probability model to identify black spots in Vietnam

Researcher: Tu Anh Trinh, Vietnam Aviation Academy, Vietnam

Supervisor: Dr. Vu Van Vuong

Tu Anh Trinh graduated with a Master of Engineering from the Asian Institute of Technology and is now a lecturer in the Faculty of Transport, Vietnam Aviation Academy and a PhD student in the Hasselt University of Belgium with a major in Traffic Safety.



The objective of this study was to develop and apply a probability method for identifying black spots on a variety of road and intersection categories in Vietnam.

The probability model – incorporating six steps – was built with a view to incorporating the traffic characteristics of Ho Chi Minh City (Vietnam’s largest city). Binh Thanh district was selected as a case study given the very high crash-case ratio in the past and

the different types of roads and intersections within this region. The information relating to the road network including traffic flow, road length, type of road and traffic crashes were obtained from a fact-finding survey, the Department of Road Management, the Police Office, various hospitals and the Road Safety Organization. The intersections were classified in five groups as Y intersection, T intersection, normal leg (+) intersection, roundabout with signs, and roundabout with no signs. Random surveys were conducted in some routes and intersections to explore the traffic characteristics of road users. The road model was built on the assumption that crash density is dependent on traffic flow.

The research outcome is a probability model that is capable of predicting black spots in each type of road and intersection in the Binh Thanh district. It is expected that this model will be very helpful for decision makers in local government and related authorities engaged in implementing road safety strategies. The results of this project suggest that crashes in almost all the recorded roads in the region will increase over the next five years

The research developed a new approach to identify and predict black spots and high-crash locations in Ho Chi Minh City, by using the probability model for Vietnam as a whole.

Perceptions and risks of driving after drinking - Vietnam

Title: Driving after drinking among males in Vietnam: perceptions and risks

Researcher: Tam Minh Nguyen, Hue University, College of Medicine and Pharmacy, Vietnam

Supervisor: Dr. Michael Dunne

Tam Minh Nguyen holds a medical degree from the Hue College of Medicine and Pharmacy and a Master of Public Health from the University of Queensland, Australia. He is now Head of Department of Family Medicine at Hue University, College of Medicine and Pharmacy and a PhD student at Queensland University of Technology, Australia.



The objective of this study was to measure the level of intoxication among males injured in traffic crashes and to examine the perceptions of male victims toward drunk driving.

Male patients admitted to Hue Central Hospital (Central Region of Vietnam) following traffic injuries (n = 676) were interviewed and their breath alcohol concentration was measured.

Main outcome measures in this study of traffic injuries were the nature of crashes, extent to which alcohol was involved in these traffic injuries, acute alcohol consumption by the victims, perceived risk and demographic factors of the victims. The risk of traffic injuries after drinking was estimated using case crossover analysis.

More than half the male traffic injury patients had a blood alcohol concentration (BAC) over the legal limit (0.08 g per 100 ml) and 45.6% were above 0.15 g per 100 ml. The odds ratio of traffic injuries for patients who drank alcohol within six hours prior to injury was 8.5. The odds ratios were 8.8 and 13.4 for patients who drank four to five drinks and six or more drinks during the six hour period, respectively. The majority of the subjects in both groups perceived that their friends and families would not disapprove their drink-driving behaviour.

The study indicated that a high proportion of male crash victims have a BAC substantially higher than the legal limit, and confirmed that risk of injury follows a dose response function. The study recommended that programmes to raise community awareness and to increase effective legal enforcement against drunk driving are necessary and urgent.

In this study an estimation of the risk of road traffic casualties for drinking and driving has been measured. The frequency of drinking and driving in Vietnam is quite high particularly among male drivers. With scant reliable and current information on this topic previously, the present study provides valuable evidence regarding the risk of traffic injuries after drink driving in this country

Adolescents' perceptions of bicycle injury risks - China

Title: Adolescents' perceptions of bicycle injury risks: causes and prevention

Researcher: Yanru Ye Shantou University, China

Supervisor: Prof. Liping Li

Yanru Ye Shantou completed her Bachelor in Public Health with honours from Guangdong Pharmaceutical University, China in 2007, winning first prize for best student. She is now a postgraduate student of Epidemiology and Medical Statistics at Shantou University Medical College, China.



The objective of this study was to investigate the perceptions of bicycle injury risks among three groups (students, parents and teachers) and to explore opportunities for effective interventions that can prevent bicycle injuries among middle school students in the southern rural area of China.

A self-administered questionnaire collected data regarding the knowledge of bicycle injury risks and history of bicycle injuries. In addition, focus group interviews were conducted in five schools.

Among 2,617 students, 75% were seldom or never aware of the risk of being involved in RTIs when cycling. Overall, 28.4% of all respondents did not express an interest in how to prevent RTIs. More than one third of students did not know that a rule prohibits children under 12 years from using bicycles on roads but 83.0% of students expressed an interest in road safety classes, if these were offered. Some students, parents and teachers considered injuries to be not preventable, revealing poor awareness regarding the opportunities to prevent injuries.

The study results suggest that the perception of injury risk among adolescent cyclists in this rural area of China is low. There is an urgent need to raise awareness among students, parents and teachers to prevent RTIs, using appropriate evidence-based interventions which may include health promotion and education strategies.

This is one of the first comprehensive analyses focusing on the perception of bicycle related injury among school-aged children in a rural area of China. However, the results need to be interpreted acknowledging some limitations. For example, as the survey asked about the experience of injuries within the last one year, there might have been some recall bias. Some students could have been absent from class due to other reasons. The actual number of cycling injuries might have been underestimated in this study. A range of further analyses are on-going, including information from parents and teachers, findings from the focus groups, and an intervention study.

Economic impact of road traffic injuries - Mexico

Title: *Economic impact of road traffic injuries for individuals and households in Guadalajara, Jalisco, Mexico, during 2007-2008*

Researcher: *Ricardo Pérez-Núñez, Instituto Nacional de Salud Pública Escuela de Salud Pública de México, Mexico*

Supervisor: *Dr. Martha Hajar- Medina*

Ricardo Pérez-Núñez studied medicine at the Universidad de Guadalajara, Mexico and completed his Master of Science in Health System Research and Analysis with honours at the National Institute of Public Health of Mexico. He was working for his PhD in Public Health at the National Institute of Public Health.

This study aimed to explore the household economic consequences of the expenditure associated with medical care, and the consequences of RTI on individuals and their households.

The study objectives were addressed using an incidence-based cost of illness analysis from a household perspective employing a bottom-up approach. It covered direct medical and non-medical costs, and indirect tangible cost or productivity loss. Productivity loss covered costs of work absence and premature death due to RTI and was estimated using the human capital approach. All people injured in a road traffic crash that sought care during a one month period in four different medical facilities were surveyed just before discharge from emergency and hospitalization services. Those who were hospitalized were also followed up at eight weeks after discharge to obtain more detailed information. Multivariate linear models adjusted total costs by relevant characteristics. An analysis of simple multivariate sensibility was conducted to evaluate whether variations in parameters of the principal assumptions (epidemiologic data, discount rate, salaries, etc.) changed estimations drastically.



In addition, a qualitative approach identified and characterised intangible costs associated with fatal and non-fatal RTI, impact on personal health, family life and the household's economy. Using a phenomenological approach, the lived experience of 24 individuals (12 injured and 12 relatives of individuals who had died from an RTI) was documented. Semi-structured interviews obtained information which were subjected to a discourse critical analysis.

This study showed that RTIs have significant impact on individuals' health, personal life, family life and household finances, affecting the life of the individual and the family. A large part of the changes could not be measured in monetary terms. Total cost estimated in the quantitative sample, was 1,084,457 pesos, 53.6% were direct costs and 46.4% were indirect costs.

For indirect costs, approximately 83% of the calculated time was for injured victims while the remainder was for their companions/caregivers. For direct costs, about 64% related to medical costs and 34% was for non-medical cost. As a result, total economic cost (direct and indirect) was estimated in \$1,769,544,455 pesos for Guadalajara Metropolitan Area, nearly 44% of the state figure (\$3,997,007,186). This represents 0.73% of the GNP of Jalisco.

While there are some limitations in this study (the patients treated and discharged from emergency rooms without hospitalisation were not followed up in this study, and some other costs were not considered), this is one of few studies that directly estimates the economic impact of RTIs from the perspective of households. In addition it includes indirect cost associated to time lost of caregivers and companions cost category seldom estimated in similar studies and costs that hospitalized injured people face after eight weeks of hospital discharge.

By documenting the economic cost and impact of road crashes on people's lives and family circumstances in Mexico, this study raises public awareness and draws policy attention to the vital need to prioritise road safety interventions.

Methodological proposal for an intervention to prevent pedestrian injuries, Mexico

Title *Methodological proposal for an intervention to prevent pedestrian injuries, a multidisciplinary approach: the case of Cuernavaca, Morelos. México*

Researcher *Jorge Martin Rodriguez Hernandez, National Institute of Public Health, Mexico*

Supervisor *Dr. Martha Híjar*

Jorge Martin got his degree in Medicine in 1994 from the National University in Bogotá Colombia and in 2002 completed his Master in Epidemiology. Since 2006, Jorge Martin worked as doctoral student at the National Public Health Institute in Mexico where he is closely linked to the International Research Center for the Study and Prevention of Injuries. His research interests are related to intentional (violence) and unintentional (traffic accidents) injuries.

The objective of this study was to propose an intervention to prevent pedestrian injuries in Cuernavaca, Mexico, through a multidisciplinary approach.



This paper shows the use of various multidisciplinary tools to develop a proposed intervention to prevent pedestrian injuries in urban areas, which in this case, used as an example Cuernavaca City. It has two phases, with several stages. The first phase involved five stages: the first characterized and compared the deaths associated with pedestrian injuries between Cuernavaca and the rest of Morelos

state, with records of 1998/2007; the second stage geo referenced pedestrian injuries with pre-hospital records from Cuernavaca 2008/2009; the third stage describes the techniques used to select the places where there was a concentration of events, the fourth stage characterized and analyzed the clusters through road audit and the fifth stage described the statistical techniques used to analyze the baseline records. The second phase to guide the proposed intervention was conducted in three stages; the first reviewed the literature to select the "best evidence" that contributes to the intervention, the second stage described the techniques of group randomization, and the third stage explored some statistical techniques to evaluate the possible effects of the intervention.

The study results suggests that using epidemiological and geostatistical tools, sites where pedestrian injuries were clustered were selected for study; such places were characterized and analyzed by road audits, which generated the possible characteristics associated with the occurrence of these injuries; these analysis generated evidence that will guide interventions in areas identified to be at increased risk; this information combined with the results of the systematic literature search, helped develop the proposed intervention. Between 2008/2009, in Cuernavaca city there were 620 records of pedestrian injuries,

59.4% were men, mean age was 36.3 years, 70% occurred during daylight hours, 55% had mild severity, and there weren't differences by sex ($P > 0.05$).

It could be concluded that a combination of strategies and disciplines makes it possible to comprehensively address a public health problem, making it possible to develop an intervention that has the potential to strengthen aspects of pedestrian road safety. It is essential to promote specific local measures, which are low cost and have a high impact, involving modifications to the road infrastructure, and are able to generate changes in the behaviour of drivers, taking into account the vulnerability of pedestrians.

Implications for Researcher conducted by Junior Researchers

All the research projects undertaken by the Junior Researchers addressed important issues relating to RTIs in LMICs, many focusing on particularly vulnerable groups in terms of age, location of residence, and road user categories. Key areas investigated included risk perception relating to bicycle injuries as well as drinking and driving, chronic alcohol consumption and road traffic crashes, driving behaviours by commercial drivers, crash prediction models, education of first aid providers for RTI victims, and the economic impact of RTIs.

Each of these projects presented clear strategies to address the defined problems, and the results and recommendations provided valuable policy-relevant evidence. In particular, the research findings relating to these projects inform scientific tools for policy and decision makers in the countries where the research projects were conducted, as well as countries with similar patterns of road traffic injuries.

Importantly, the scholarships provided resulted in a cadre of well mentored and promising researchers with an interest in RTI prevention in LMIC to enhance their research skills, and advance their careers through postgraduate qualifications. By strengthening their relationships with relevant stakeholders in the road safety environment, each of the Junior Researchers is now positioned to actively influence road safety initiatives in their countries. In addition to well-targeted local (national) dissemination, several of the reports are being developed for submission to international scientific journals.

It is clear from the outputs of this project and the capacity development that has resulted that a modest investment in research grant funding for young researchers in LMICs can reap rich rewards in terms of the potential to decrease the inequitable burden of RTIs in these settings. The imperatives to enhance this agenda with continuing and sustainable endeavours of this type are obvious, and strongly recommended.

In conclusion, the Board and wider membership of the Road Traffic Injury Research Network congratulate and salute the Junior Researchers and their mentors / supervisors for advancing the mission of the Network. We are especially grateful to the Global Road Safety Facility of the World Bank for providing the financial resources to support the researchers and their projects

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