



# Road Safety Project - Consulting Services for Communications Consultant

KAP Report

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CLIENT PROJECT REPORT



# Traffic Injury Research Foundation (TIRF)



## PROJECT REPORT

**Communications Consultant, Belize**

**KAP Report**

**By Dr. Ward Vanlaar, Robyn Robertson, Leanna Ireland, Dr. Marisela Mainegra Hing and Jan-Michael Charles**

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## EXECUTIVE SUMMARY

The Traffic Injury Research Foundation (TIRF) has been commissioned by the Ministry of Finance and Economic Development in Belize to serve as a communications consultant to develop a communication strategy that can be used to organize biannual road safety awareness campaigns. Ultimately, the goal of these campaigns is to help improve road safety in Belize, notably along the Demonstration Corridor of the Belizean road safety project. The Demonstration Corridor includes the Western Highway, between its junction with Central American Boulevard in Belize City to its junction with the Hummingbird Highway in Belmopan; the Hummingbird Highway, from its junction with the Western Highway to its junction with Constitution Drive in Belmopan; Constitution Drive; and the Belmopan Ring Road. The project is supported by the Caribbean Development Bank (CDB).

To support the development of the communications strategy, TIRF organized a Knowledge, Attitudes and Practices (KAP) survey and focus groups such that relevant data can be obtained. The final product of this consultancy consists of a strategy that can be operationalized by the Client to guide the delivery of road safety campaigns. This report describes the results from the focus groups and the KAP survey and begins with a literature review about road safety, in particular road safety in Belize, normative behaviour, and factors contributing to the problem. Then, the methodology for the KAP survey, focus groups and key-informant interviews is described. This is followed by the results of the data analysis and a conclusions and recommendations section.

The literature review revealed that the magnitude of the road crash problem and its consequences for Belize make it a priority for the Belizean government and a broad range of stakeholders in the country. This conclusion is justified based on the number of deaths and injuries among road users generally, as well as youth and young males specifically, and the associated economic, health and social consequences for the country. It has been recognized that strong efforts are needed to strengthen the transportation system and to improve road user behaviour, particularly among youths aged 16-29, with a focus on the Belize District specifically as well as at a national level. Conclusions from the literature review informed the development of the data collection methods in this project. The following three methods were used:

- > Knowledge, Attitudes, Practices (KAP) Survey: a survey among a representative sample of Belizeans collecting data about their knowledge, attitudes and practices with respect to road safety;
- > Focus groups with Belizeans: several focus groups with members from the public to collect in-depth data about their knowledge, attitudes and behaviour with respect to road safety;
- > Focus groups and key informant interviews with road safety stakeholders: several focus groups and semi-structured interviews with representatives of relevant stakeholders in Belize about road safety.

The research design of the KAP survey consisted of a cross-sectional design to collect information from a representative sample of 966 members of the general public in Belize as well as in



communities and schools along the Demonstration Corridor (DC). Data collection by Great Belize Productions Ltd. commenced on April 10 through to April 30. The response rate to his survey was 91%. Weights were calculated by TIRF using 2010 census data and were used by TIRF when analyzing all data.

Focus group discussions with Belizeans took place between April 10 and April 24, 2015. Discussions were recorded and electronic recordings as well as verbatim transcribed discussions (in Word) were provided to TIRF by Great Belize Productions Ltd. The focus groups were organized as follows:

- > One focus group with ten men, with an age of 30 or older within the Demonstration Corridor;
- > One focus group with ten men, with an age of 30 or older outside of the Demonstration Corridor;
- > One focus group with ten women, with an age of 30 or older within the Demonstration Corridor;
- > One focus group with ten women, with an age of 30 or older outside the Demonstration Corridor;
- > One focus group with ten young males, with an age of at least 16 but not older than 29 within the Demonstration Corridor;
- > One focus group with ten young males, with an age of at least 16 but not older than 29 outside the Demonstration Corridor;
- > One focus group with ten young females, with an age of at least 16 but not older than 29 within the Demonstration Corridor; and,
- > One focus group with ten young females, with an age of at least 16 but not older than 29 outside the Demonstration Corridor.

Qualitative data in the form of focus group transcriptions were examined and synthesized by TIRF according to thematic analysis techniques. A hybrid process of coding was established according to deductive and inductive methods to synthesize the data.

The study population in this project further included road safety stakeholders who play a crucial role with respect to road safety in Belize, and who were interviewed either in focus groups or as key-informants by TIRF on April 8-11, 2015. The purpose was to collect a variety of data and information regarding agency knowledge, experiences and operational systems that can be used to inform the communications strategy.

Based on this three-pronged approach, several important findings from the literature are confirmed and some – perhaps somewhat surprising – findings emerged. With respect to the former, the data that were collected clearly support the notion that there are some priority issues with respect to road safety that need addressing. This includes the problem of speeding, drinking and driving, low



use of seatbelts, distracted driving and not using reflective clothing when walking down the street or riding a bicycle in the dark. This conclusion is supported by evidence obtained in each of the three, independent sources of information and is bolstered by crash data from Belize described in the literature review. While other dangerous behaviours occur in Belize, it appears that in terms of priorities, these are the behaviours that need immediate attention. The following results from the KAP survey illustrate this:

- > Of all respondents, 52.8% report often not wearing their seatbelt when driving a car in the city and 50.3% when driving a car on the highway; 61.6% report often not wearing a seatbelt in the backseat.
- > Approximately 48% of the respondents reported often speeding at least 15 miles faster than the speed limit when driving a car and 31% reported doing so when riding a motorcycle.
- > Specific to drinking and driving, 36.7% reported often riding as a passenger with a driver who has had more than 2 glasses of alcohol to drink, 28.6% reported often driving a car after drinking more than 2 glasses of alcohol and 26.2% reported doing so when riding a motorcycle.
- > Often not wearing reflective gear when walking or bicycling in the dark was reported by 49.3% while walking and 45.2% while biking.
- > With respect to talking on a phone and texting while driving, 40.9% reported often talking on a cell phone while driving a car, and 40.1% reported often texting while driving a car
- > With respect to talking on a phone and texting while riding a motorcycle, 24.1% reported often talking on a cell phone while riding a motorcycle; and 29% reported often texting while riding a motorcycle.

Data from the focus groups with the public as well as the stakeholders corroborate these findings. For example, speeding, drinking and driving and distracted driving have been consistently identified by participants as priority issues of great concern.

In terms of who is engaging in these dangerous behaviours, while some findings were as expected, there were also some findings that are more surprising, especially in relation to gender. For example, females were found to be more likely not to wear their seatbelt as a passenger in the backseat than males. Equally concerning, but perhaps more unexpected, females were found to be more likely to drive a car after drinking more than 2 glasses of alcohol compared to males. This finding challenges well-established research that shows that males are more likely to engage in this behaviour. However, we also noted in the literature review that there is some evidence that suggests that drinking among females has increased in the past three decades in several countries and this may lend credence to the possibility that females may also be at high risk of engaging in this dangerous behaviour.

The data collected in this study also provides insight into possible avenues to address the issues. For example, one of the main reasons why people do not wear their seatbelt is because they simply

forget about wearing it. Another important finding suggests that the reason why they speed is because they are over-confident in their own abilities. Detailed data from this study about knowledge and attitudes in relation to these priority road safety issues are available and can be used to tailor the biannual campaigns accordingly and target the specific reasons people engage in risky behaviours.

Finally, with respect to how to communicate with Belizeans, and whether there is support for corrective measures, our data clearly and demonstratively show that Belizeans care deeply about road safety and are supportive of increased levels of enforcement, increased levels of education, enhanced licensing procedures as well as the use of mass and social media. Overall, levels of concern about a variety of dangerous behaviours among Belizeans and levels of support for several measures were consistently high. Such high levels of concern and support are indicative of the opportunities that exist in Belize to improve road safety. It is therefore recommended that the data from this report are used to inform the development of the communications strategy. In particular, the following recommendations are formulated:

- > To focus on the priority issues identified in this report when designing and delivering the road safety campaign strategy;
- > To use the detailed results about demographic information to inform the choice of target audiences;
- > To use the detailed results about knowledge and attitudes to inform the choice of pathways to correct bad behaviour;
- > To use the detailed results about levels of concern and support and preferences for particular media to inform the design of the communications strategy.



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## INTRODUCTION

TIRF has been commissioned on behalf of the Government of Belize by the Ministry of Economic Development to serve as a communications consultant to develop a communications strategy to organize biannual awareness campaigns to improve road safety in Belize, notably along the Demonstration Corridor. The Demonstration Corridor includes the Western Highway, between its junction with Central American Boulevard in Belize City to its junction with the Hummingbird Highway in Belmopan; the Hummingbird Highway, from its junction with the Western Highway to its junction with Constitution Drive in Belmopan; Constitution Drive; and the Belmopan Ring Road. The project is supported by the Caribbean Development Bank (CDB).

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## LITERATURE REVIEW

Across the globe, road crashes have been identified as one of the leading causes of death. The victims of crashes are diverse and represent drivers, passengers, motorcyclists, bicyclists, and pedestrians; they also represent males and females of all ages. Of concern, some types of road users are over-represented in crashes, meaning that they are proportionally much more involved in road crashes as compared to other types. In particular, males and young persons aged 16-29 are more likely to be crashed-involved. Moreover, the consequences of road crashes are profound, not just in terms of fatalities and injuries, but also in relation to the economic, health and societal costs that pose a significant burden on countries. For these reasons, road safety has emerged as an important priority for governments, industry, associations and communities, and a strong focus has been placed on developing comprehensive and coordinated strategies to improve road safety.

Worldwide, more than one million people are killed, with another 20 to 50 million being seriously injured each year (WHO 2014a). Although many countries have achieved progress in reducing the number of road deaths, the numbers remain unacceptably high (WHO 2014a). In particular, Latin America and the Caribbean region has one of the highest road crash mortality rates per capita, according to the World Health Organization (WHO), and the estimated average rate of road deaths among regional members of the Caribbean Development Bank<sup>1</sup> is 17.49 per 100,000 people (WHO 2014a).

### Road Safety in Belize

#### Road crashes in Belize

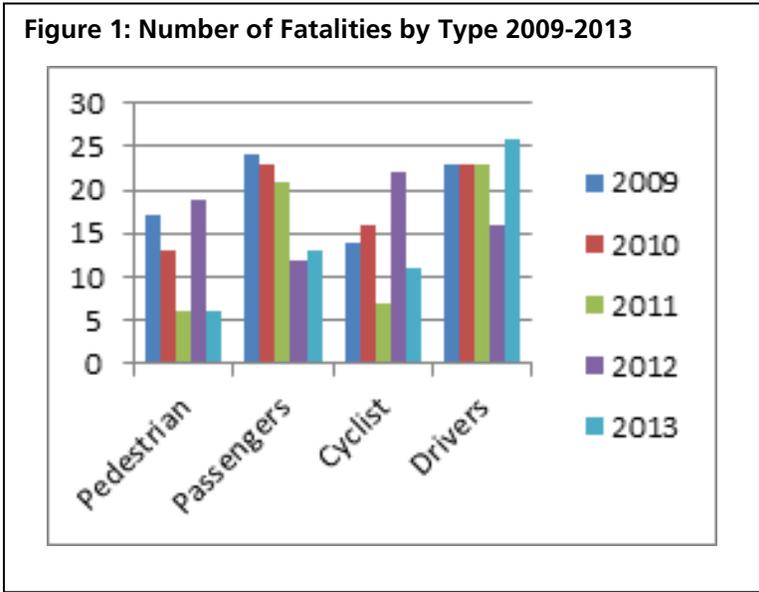
In Belize, road crashes account for a significant proportion of deaths and injuries each year. In 2013, 59 people were killed and an additional 476 persons were injured in road crashes. According to the World Health Organization (WHO), Belize has the fifth highest estimated rate of road deaths at 16.4 per 100,000 people (WHO 2014a) in comparison to other regional members of the Caribbean Development Bank<sup>2</sup>. A substantial majority of fatalities resulting from road crashes involve drivers and passengers who account for 70% of all reported road deaths, most of which occurred within the Belize District in 2007 (Perez-Nunez et al. 2010). This suggests that actions focused on this area of the country are a priority to improve road safety. More concerning, the rate of fatalities from road crashes is predicted to increase in Belize to 31 per 100,000 people by 2020. Of note, this estimate accounts for potential under-reporting of these fatalities (Kopits and Cropper 2003).

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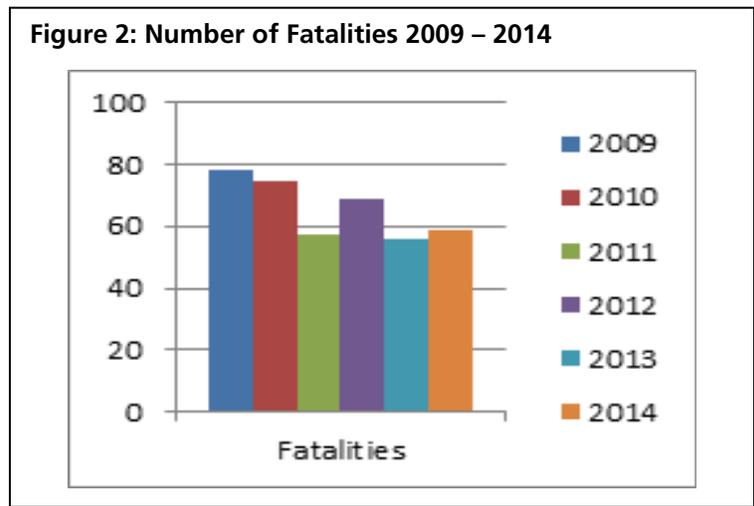
<sup>1</sup> This rate is based on regional members of the Caribbean Development Bank for which the World Health Organization has available statistics. This includes Barbados, Belize, Dominica, Guyana, Jamaica, Suriname, The Bahamas, Trinidad and Tobago, and Colombia, Mexico and Venezuela (WHO, 2014).

<sup>2</sup> The ranking is based on the calculations of the World Health Organizations rates per 100,000 for the eleven available CDB countries.

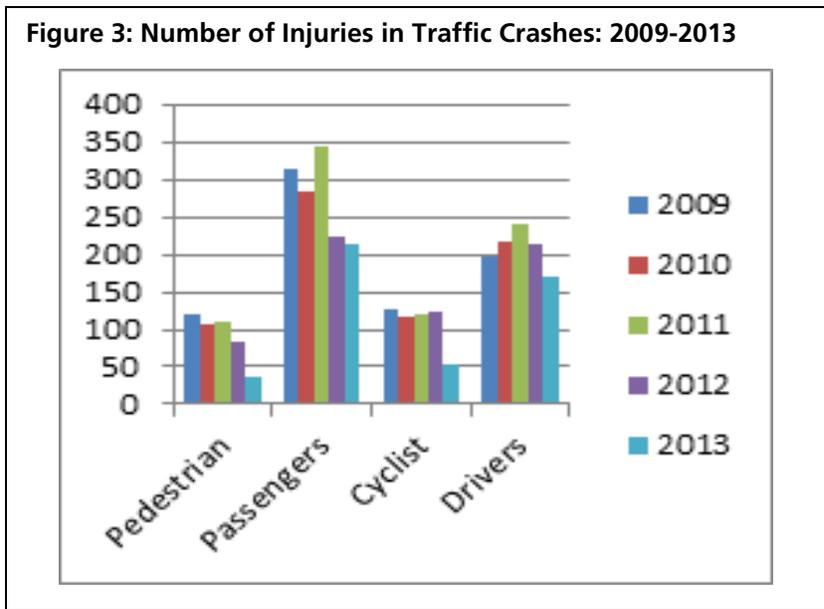
Although the death rate of road crashes in Belize is substantial, it is important to recognize that the number of fatalities from traffic crashes has steadily decreased from 2001 to 2010 (WHO 2014a), with pronounced declines in more recent years as illustrated in Figures 1 and 2. For example, between 2009 and 2014, the number of road fatalities was reduced by approximately 23%, and a significant proportion of this decline occurred among passengers and pedestrians.



At the same time, there has also been a strong and steady decline in the total number of road injuries of approximately 39% between 2009 and 2013. While these declines have positively affected drivers, passengers and cyclists during this period, the largest reductions in injuries have occurred among pedestrians.



Conversely, a substantial number of the road injuries in Belize were incurred by passengers between 2009 and 2013, with this category of road users having a larger number of injuries as compared to drivers, cyclists and pedestrians (Figure 3). For example, in 2013, passengers accounted for approximately 45% of all reported road injuries, although drivers also represented a considerable proportion (36%).



As is the case internationally, rates of fatalities and injuries vary in relation to such characteristics as sex and age. In Belize, in 2007, a majority (79.4%) of road fatalities involved males and individuals aged 15 to 49 (Perez-Nunez et al. 2010). To illustrate, in 2011, almost one-quarter (23.5%) of deaths among Belizean youth and young adults aged 15-29 were the result of road injuries (Ministry of Health 2014), and young males represented approximately two-thirds of all road fatalities between 2001 and 2007. For these reasons, young people generally, and young males specifically, require targeted strategies to reduce road crashes among them. As such, this population has been identified as a high priority in many countries, including Belize.

Additionally, road crash data from 2011 through to 2013 were analyzed as part of a recent study to investigate gaps in crash data. This analysis included data captured through the Belize Health Information System (BHIS) and the Joint Intelligence Coordinating Center (JICC). Data from the Belize Health Information System (BHIS) revealed 181 road deaths during the three-year period from 2011 to 2013, whereas the Joint Intelligence Coordinating Center reported a slightly lower figure at 178 road deaths. Of concern, the two most recent years (2012, 2013) accounted for the highest number of fatal road deaths, 65 and 64 respectively.

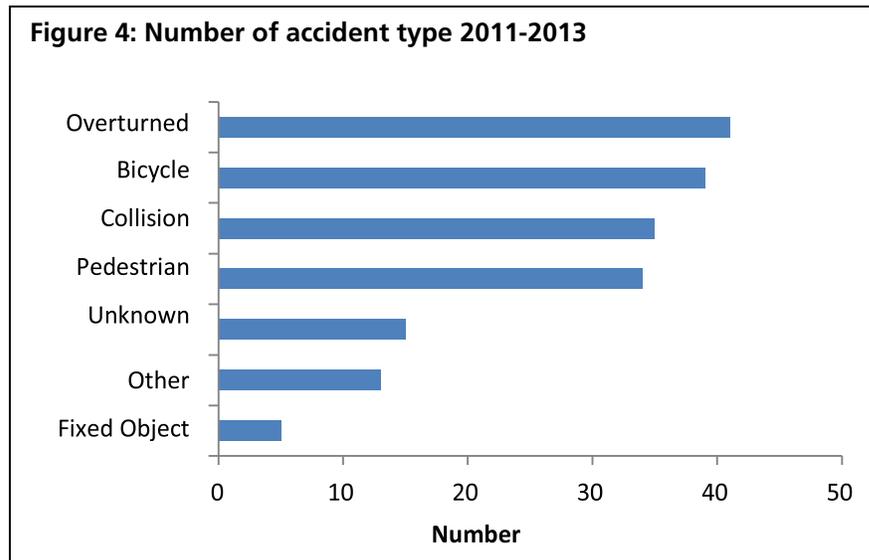
According to these analyses, the average mortality rate each year during this period was 20 persons per 100,000 population, wherein males were substantially more affected than females at a ratio of 6:1. Persons aged 55 and older as well as individuals aged 25 to 34 years were most affected.

Regions with the highest fatality rates included Belize District and the Stann Creek District. Of concern, most crashes occurred on the Phillip Goldson Highway, and this was also the location of the most fatal crashes which involved pedestrians and bicyclists (52%) and overturned vehicles (28%).

The most substantial factor identified as a cause of crashes in the analysis of the data described above (i.e., from 2011 to 2013) was careless conduct on the part of drivers, cyclists, and pedestrians, which accounted for almost three-quarters of crashes (73%). Drunk driving was also a top factor but represented just 11% of crashes. Of importance, due to inconsistent training of police officers with regards to impaired driving detection, low levels of enforcement, and the low availability of roadside testing devices (i.e., use of blood tests in alcohol impaired road crashes), there is the suspicion that current estimates are possibly subject to underreporting. It is important to underscore that crash data are limited by differences in collection practices across agencies which can make interpretation of results challenging. The following provides a tabled summary of estimated findings according to BHIS and JICC findings.

<b>Cause</b>	<b>No.</b>	<b>%</b>
Careless conduct	132	72.5
Drunk driving	21	11.5
Hit and run	1	0.5
Mechanical problems	4	2.2
Negligent cyclist	9	4.9
Negligent pedestrian	1	0.5
Others	3	1.6
Unknown	11	6.0
Total	182	100

Furthermore, findings also suggest that crashes most often involved overturned vehicles. In particular, crashes most often involved vulnerable road users (i.e., bicyclists and pedestrians).



Hence, while road crash data can provide important insight into road safety problems and can help guide the identification of priorities in Belize, it is acknowledged that existing gaps in data are a barrier to intimately understanding the magnitude and characteristics of different road safety issues.

### Economic and social costs of road crashes in Belize

The substantial proportion of deaths and injuries that occur each year in Belize due to road crashes also has a significant impact on the country that is felt far beyond the transportation system; it equally poses a costly economic and social problem that affects citizens. To this end, the economic cost of road crashes in Belize has been estimated at \$11,062,544 (USD) in 2007. To place these costs in context, this represents approximately 1.0% of the gross domestic product (GDP), 2.8% of the total government budget, and 25.6% of the Ministry of Health budget (Perez-Nunez et al. 2010), with the majority of these costs being attributed to fatal injuries (i.e., productivity loss).

In particular, road crashes are a significant burden on the health care system that negatively impacts the availability of medical and emergency services and increases demands for hospital beds. The health care system incurred approximately \$163,503 (USD) in costs in 2007 for pre-hospital care, ambulatory medical consultations, hospitalization, rehabilitation, and emergency room services (Perez-Nunez et al. 2010). Those hospitalized, for example, spent an average of five days in the hospital which translates to \$76 (USD) each day. In addition, among those injured who sought medical attention in Belize, the majority had surgical services performed (Perez-Nunez et al. 2010).

Costs of road crashes also include the loss of life in terms of earning potential and the corresponding economic loss. In 2007, an estimated 2,501 years of earning potential was lost as a result of premature deaths due to road crashes in Belize. While the cost of life can vary according to the model that is applied, (e.g., willingness to pay, deferred earnings), the social cost of those 2,501 years for which lost productivity was calculated equaled \$8,116,917 (USD) (Perez-Nunez et al. 2010). Of course, families ultimately must cope with the loss of primary wage earners or



caregivers, or must provide long-term care as a result of crashes. Again, the Belize District accounted for the majority of years of potential life lost and, therefore, incurred the largest portion of loss productivity (Perez-Nunez et al. 2010), and based on the portion of loss productivity for the Belize District and the average wage, this amount totaled \$7,949,376 (USD) in lost wages (Perez-Nunez et al. 2010). However, it must be underscored that while models have attempted to grasp the economic and social cost of road crashes to provide a more complete picture for road safety intervention measures, the value of each life is incalculable, and no methodology can truly measure the long-term physical and emotional consequences that afflict victims and those around them.

Of greatest concern, it has been noted that the high rate of young persons that are killed and injured in road crashes in Belize significantly contributes to the high economic cost associated with road crashes in this country. The premature deaths and injuries incurred by Belizean youth in road crashes has important implications for the amount of time calculated, and therefore the costs resulting from medical treatment and loss of productivity. To this end, placing a strong emphasis on high-risk populations such as youths can help to reduce not only the economic and social costs of road crashes, but, more importantly, it can help save lives that represent the future of Belize.

In summary, the magnitude of this problem and its consequences for Belize in relation to not only deaths and injuries among road users generally, as well as youth and young males specifically, but also in relation to the economic, health and social consequences for the country, make it a priority concern for governments and a broad range of stakeholders. It has been recognized that strong efforts are needed to strengthen the transportation system and to improve road user behaviour, particularly among youths aged 16-29, with a focus on the Belize District specifically as well as at a national level.

### **Normative behaviour**

Social norms are the behaviours that are viewed as appropriate or normative for particular groups, such as cultural or gender groups. Research has shown that these norms play an important role in shaping the behaviour of road users (Yanovitzky 2004; Linkenbach & Perkins 2005). In light of the substantial impact of road crashes in Belize, an increased understanding of the perceptions, attitudes, and behaviours of different groups of road users is essential to improve road safety in the country. A better understanding of the interpersonal influences of social groups and the environment can help identify opportunities to leverage social norms as a catalyst for behavioural change.

In particular, positive behavioural change is most needed in relation to high-risk road users, such as young males, due to their over-representation in road crashes. Research has shown that the behaviour of young males is often influenced by social perceptions of masculinity and peer influences. These factors, in turn, can negatively affect the participation of young males in high-risk behaviours such as aggressive driving and impaired driving. As such, strategies to positively shape social norms among young male road users in Belize are an important feature of education and awareness initiatives to improve road safety.

### **Masculinity and perceptions of risk**

The social construct of masculinity<sup>3</sup> varies across cultures and can influence the perceptions and behaviours of young males. Masculinity refers to a set of practices or behaviours associated with and perceived as normative for men (Lewis 2003); it often represents power and authority. This perception of masculinity is common in many parts of the world, including the Caribbean region (Lewis 2003). Of importance, many of the attributes associated with masculinity, such as competitiveness, risk-taking, and aggressiveness, often conflict with safe road user behaviours. Similarly, visual displays or projections of masculinity by young males may increase their risk in relation to road crashes.

Research has shown that Caribbean male youths display physical toughness and social dominance to enhance their masculine status (Plummer et al. 2008). To illustrate, male youths in Belize were documented as using violence in urban schools to show their masculinity (Gayle et al. 2010). Similarly, displays of risk-taking were seen as a way to increase or prove one's "manhood" to their peers among youths in Trinidad and Tobago (Plummer & Geofroy 2010). As such, risk-taking or aggressive behaviour on the road such as speeding or aggressive driving could also be displayed to earn masculine credentials among peers.

Low perceptions of risk have also been associated with risk-taking behaviours (Styles et al. 2005; Wickman et al. 2008) and increases in the likelihood of participating in risky driving behaviours (Ivers et al. 2009; Hoare 2007). Youths often distinguish risky behaviours from dangerous behaviours by the uncertainty of harm and anticipated positive benefits (Wickman et al. 2008). This uncertainty of harm and anticipated positive benefits is reported by youths as motivation for risky driving behaviour. Youths reported engaging in risky driving behaviours (e.g., burnouts and speeding) for fun and excitement and due to the perceived absence of negative consequences (i.e., being caught or harmed) (Styles et al. 2005). For example, focus groups among youths in Haiti and Trinidad and Tobago revealed that they indeed recognized the severe or serious consequences attached to risk-taking (i.e., loss of life); however, they still associated risk-taking with feelings of invincibility (i.e., not getting caught or harmed), pleasure and excitement, and rebelliousness (Brathwaite 2009). There is also evidence that these feelings of invincibility were consistent in young males in Belize. A survey of young boys in Belizean schools showed that one-quarter of them claimed they feared nothing (Gays et al. 2010).

Of concern, these low perceptions of risk in young males also are evident in relation to their over-confidence and optimism regarding their driving skills. Such perceptions and risk-taking behaviours are detrimental on the road, and low perceptions of risk and road safety are also associated with an increased likelihood of road crashes (Ivers et al. 2009). In Belize, for example, young drivers with lower perception of risks of being involved in a crash were more likely to adopt riskier driving behaviour than young drivers with higher perception of risks (Hoare 2007). Of importance,

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<sup>3</sup> The term 'social construct' refers to a social phenomenon that is developed by society; in other words, how groups or ideas are perceived can be constructed through social and cultural practices (Hacking 1999).

Wahlberg (2001) has noted that the belief of being in control of one's own behaviours could reduce the perception of risk and, thus, provide a false sense of security on the road. In other words, an important feature of interventions is an emphasis on lowering youths' risk taking attitudes and perceptions to reduce risky driving behaviours.

Initiatives to reduce risk-taking attitudes in young males could be strengthened by an understanding of the construction of masculinity. For young males, defining masculinity plays an integral role in the construction of their sense of identity during adolescence. Their definitions of masculinity and associated behaviours are constructed from their social environments. This means that contact with and observation of older boys and men directly influences the definition of masculinity formed by young Caribbean youths. Plummer et al. (2008) refer to this as "rolling peer pressure" which explains how norms are passed from older to younger boys: "boys emulate[ed] the ways "real men" are supposed to act according to the culture they grew up in" (p. 7). In other words, young males will emulate the observed behaviours and attitudes that are associated with masculinity in their culture, and this could, therefore, include the emulation of risky driving behaviours by older boys.

More importantly, this emulation of behaviours has also been linked to a reduction in risk-taking attitudes of drivers. In a Canadian survey of drivers, Vanlaar et al. (2008) found that the concern of others influenced respondents' own level of concern for risky driving behaviours, such as drinking and driving, speeding excessively, using a cell phone while driving, fatigued or drowsy driving, and drug impaired driving. This effect, referred to as 'the bandwagon effect' demonstrated that a person's belief is strengthened when they are convinced that others share that belief (McAllister & Studlar 1991). In addition, the model of risk perception reported by Vanlaar et al. (2008) further suggested that the respondents' level of concern is also influenced by how risky they believe the behaviour is and how risky they believe it is perceived to be by others. In other words, strategies to reinforce positive levels of concern and address misperceptions of social norms (e.g., everyone speeds) can help motivate safer behaviours among road users.

In summary, masculinity can indirectly influence the risk-taking behaviours of young males and their perceptions of risk associated with road safety. First, young males may use unsafe road practices to demonstrate their masculinity. Second, feelings of toughness and invincibility associated with masculinity can create a low-perception of risk and, consequentially, over-confidence in young male drivers. Third, young males frequently emulate "masculine" behaviours of older boys or men and therefore could imitate the unsafe road practices of others. These associations with masculinity could increase young males' risk of being involved in road traffic accidents; however, if targeted correctly, strategies to shape these associations could be a tool to help to decrease their risk of involvement in road crashes.

### **Alcohol consumption**

Social norms about masculinity as well as cultural norms<sup>4</sup> can influence alcohol consumption. In particular, these norms affect the frequency, the volume and the locations where males and

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<sup>4</sup> The term 'cultural norms' refers to a set of behaviours that are typical of specific cultures (Branine 2011).

females consume alcohol. Since alcohol is widely recognized worldwide as a major contributor to road crashes (Mayhew et al. 2013), a better understanding of the characteristics of persons who consume alcohol in Belize can provide a foundation for behavioural change, not only among alcohol-impaired drivers, but their passengers as well. In other words, knowledge regarding alcohol consumption in Belize can provide important context for the role of social and gender norms<sup>5</sup> that are linked to the prevalence of alcohol consumption, and the ways that these factors can shape road safety awareness strategies.

It is important to acknowledge relevant legislation related to alcohol consumption and enforcement strategies in Belize in order to provide important context for the consumption of alcohol and its prevalence in relationship to road safety. The age of majority, or legal drinking age, for alcohol consumption is 18 years in Belize. However, similar to other parts of the world, as well as other Caribbean countries, the drinking age is rarely enforced and alcohol consumption among youth under the legal age is socially acceptable and not uncommon (WHO 2014b). In addition, no restrictions exist for the on or off premise sales of alcoholic beverages to intoxicated persons or the sale of liquor at petrol stations (WHO 2014b).

Alcohol consumption by Belizeans has steadily increased from 2003 to 2010 (WHO 2014b) and the age of onset of drinking is before age 15 (Jernigan 2001; Briceño-Perriott et al. 2014). Of importance, early onset of alcohol and drug use and abuse is predictive of adult impaired driving (Hingson et al. 2002; Hingson et al. 2003). Specifically, early onset drinking is a predictor of several relevant behaviours including: future driving after any drinking, driving after five or more drinks, riding with an intoxicated driver, and involvement in alcohol-related crashes (Hingson et al. 2003).

In 2005, a survey revealed that the majority of young people in Belize (18-29 years) considered themselves to be either abstainers, light drinkers, or moderate drinkers, and few people considered themselves to be hazardous or harmful drinkers (PAHO 2007). However, the average recorded alcohol consumption in Belize for the population aged 15 and older increased from 2003-2005 to 2008-2010 (WHO 2014b). In addition, Belize had the third highest rate of alcoholism in Latin America and the Caribbean in 2014 (WHO 2014b). Indeed, the people of Belize reported the highest consumption of alcohol among drinkers in Latin America and the Caribbean at 29.8 liters of pure alcohol per year. Of note, the majority of the population in Belize also reported that they had never driven after drinking within the last year (WHO 2014b).

Similar to other countries around the world, there are important differences with regard to alcohol consumption among men and women, with consumption being more prevalent among men than women in Belize (WHO 2014b; Wilsnack et al. 2009). According to data from the Multinational Genacis Project, the ratio of male to female drinkers aged 15 and older in Belize is 2.57 (Wilsnack et al. 2009); a larger portion of women also reported abstaining from alcohol compared to men, 78% and 46% respectively in 2005 (PAHO 2007). Similarly, in 2010, more females than males

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<sup>5</sup> The term 'gender norms' refers to a set of beliefs about appropriate social and behavioural practices for each gender and are determined by societies and cultures (Lorber 1994).



aged 15 and older identified themselves as lifetime abstainers from alcohol, 81.3% and 41%, respectively (WHO 2014b).

Of concern, not only is the prevalence of alcohol consumption greater among men, but also the volume of alcohol consumed is larger. According to face-to-face interview results in urban and rural areas, young men in Belize drank approximately three times more alcohol than young women. To illustrate, the average volume of alcohol consumed per day by young men is approximately 26 grams whereas young women consumed approximately 8.5 grams (PAHO 2007). Moreover, men who drank more frequently, and consumed larger quantities of alcohol also more often reported an alcohol use disorder. As evidence of this, in 2010, Belizean males aged 15 and older were more likely to have an alcohol use disorder, including alcohol dependency and harmful use of alcohol, as compared to females aged 15 and older (WHO 2014b).

An important consequence and growing problem associated with the consumption of large quantities of alcohol is heavy episodic drinking. This type of drinking, often referred to as binge drinking, is used to describe the heavy consumption of alcohol in one sitting or episode. An age trend of heavy episodic drinking is noticeable in Belize, and the majority of Belizeans aged 18-44 reported participating in heavy episodic drinking in 2005. Although Belizeans aged 30-44 reported the highest prevalence of heavy episodic drinking (54.37%), the prevalence of heavy episodic drinking among young men and women (aged 18-29) was comparable (53.16%). Heavy episodic drinking then decreased with age, and this finding is similar to experiences in other countries (PAHO 2007).

Heavy episodic drinking is also more often reported by young males than females in Belize. Young males aged 18-29 in 2005 in Belize engaged in heavy episodic drinking approximately four times more often than young women (PAHO 2007). More recently, in 2010, men heavy episodic drank 9.5 times more often than women aged 15 and older in Belize (WHO 2014b). In particular, these results demonstrate a concerning increase in the frequency of heavy episodic drinking among males in Belize.

Differences between men and women regarding the frequency and volume of alcohol consumption are also evident in relation to drinking locations. In 2005, both men and women in Belize reported drinking in private settings (e.g., homes) more often than in public settings (e.g., bars or restaurants). However, a larger proportion of men than women drank frequently in public settings (Bond et al. 2010). In addition, drinking in public settings, such as bars, has been associated with elevated risks for negative behaviours, including driving while impaired (Perrine et al. 1997).

**Alcohol consumption and gender norms.** Social and cultural norms about alcohol consumption are important because they can provide an understanding on the observed gender differences of alcohol consumption between men and women. As discussed above, men in Belize more often consumed alcohol, in larger volumes, and in public places as compared to women (WHO 2014b). Although little to no research has been conducted specifically regarding social and cultural norms related to alcohol consumption in Belize, research from Caribbean countries and others worldwide can provide some insight into the role of social norms regarding alcohol consumption in Belize.

In most countries, including those in the Caribbean, alcohol consumption is traditionally a masculine social practice (Lemle & Mishkind 1989; Pyre et al. 2002), and intoxication in men continues to be a socially acceptable due to its association with masculine traits, such as risk-taking (deVisser & McDonnell 2012). This association between masculinity and drinking contributes to heavy drinking patterns among males because it is a tool to construct and define masculinity (Bond et al. 2010). As mentioned previously, men adopt measures to display their masculine identity, and excessive alcohol consumption, for example, is used to signify greater masculinity as compared to lighter drinking (de Visser & McDonnell 2012). In addition, in some Latin American and Caribbean cultures, daily consumption of alcohol is not common practice and instead, alcohol consumption typically occurs as infrequent, heavy binge drinking<sup>6</sup> at festivals or carnivals (Pyne et al. 2002).

Moreover, drinking at public venues defined as male events, such as sporting events, reaffirms that drinking alcohol is more masculine than not drinking alcohol (Lemle & Mishkind 1989). Public events that are defined as male reaffirm the belief that certain drinking spaces are highly masculine (Hey 1986), and men who do not meet the standards that define masculinity, such as those involving excessive drinking and risky behaviour, are considered less masculine or feminine (Lemle & Mishkind 1989).

Conversely, in many countries, including Belize, the consumption of alcohol by women in a public setting has historically been viewed as socially unacceptable and was associated with negative perceptions of women who engaged in this behaviour. For generations, women have been viewed as “protectors of the home” and, therefore, it was believed that women had a moral responsibility to control the drunken behaviour of men. In this regard, femininity was associated with beliefs about sobriety and morality (Eriksen 1999). In particular, women who consumed alcohol were often met with social scrutiny. As evidence of this, women who drank were often subject to negative societal reactions and perceived to neglect maternal responsibilities, to promote promiscuity, and abandon their femininity (Eriksen 1999).

In the past three decades, economic and socio-economic changes have influenced the role of females in society and resulted in more women seeking employment outside the home and attending educational institutes. This change in social roles provides women with more opportunity and, also, pressure to socialize for work and school, similar to men, and research has documented this higher prevalence of alcohol consumption among women. In addition, cultural changes have redefined the female role and, consequently, have contributed to an increase in alcohol consumption and drinking among women with it becoming more acceptable for women to consume alcohol both at home and in public (Gudrais 2011). Research has indeed revealed that

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<sup>6</sup> Binge drinking can be defined as the consumption of large amounts of alcohol within a short period of time with the primary goal of becoming heavily intoxicated. In other words, binge drinking is a heavy, single occasion of drinking. According to the Canadian Medical Association, a binge drinking episode consists of five or more standard drinks for men and four or more standard drinks for women on a single occasion. Binge drinking can overlap with social drinking and is a growing concern among youth, particularly college/university students.



women in younger generations are drinking more alcohol and at higher rates than women in past generations (Keyes et al. 2011).

This trend of higher rates of alcohol consumption is not unique to women; however, both younger men and women are increasing consuming higher rates of alcohol over a short period of time (Keyes et al. 2011). The daily consumption of alcohol tends not to be a common practice among female and male youths and, instead, alcohol consumption typically occurs as infrequent, heavy binge drinking at social events, such as festivals or carnivals (Pyne et al. 2002). In particular, heavy binge drinking is common among students worldwide and in the Caribbean (Keyes et al. 2011; Pyne et al. 2002). Research has found that binge drinking has become so commonplace in the lives of some youths that these young men and women cannot fully explain their engagement in heavy episodic drinking (Engineer et al. 2003).

Although men and women both binge drink, differences exist among men and women for their reason to engage in binge drinking. Focus groups with women have revealed that women's heavy episodic drinking was influenced by pressure to make an impression on their male peers. This impression was not to demonstrate equality but to demonstrate their sexuality. The consumption of alcohol at comparable rates as men was believed to gain women positive attention from their male peers (Young et al. 2005). Similarly, young males also associated higher consumption of alcohol with impressing the opposite sex. However, for young males, the demonstration of masculinity was also noted as important. In focus groups with both men and women, young men discussed that it was easier for women to slow down their drinking or switch to water because, as one young male explains, "it's the ego, a male thing, you don't want to act dainty with other males" (Engineer et al. 2003, p.12). The different reasons by men and women to binge drink can provide insight in order to target these risky drinking behaviours.

In summary, cultural and social norms about alcohol consumption influence the frequency and volume of alcohol consumed by men and women. The traditional association between masculinity and alcohol-consumption influences the use of alcohol by men to demonstrate their masculinity. This association also provides context for the higher prevalence of alcohol consumption among men than women. In addition, changes in social and cultural norms have provided both opportunity and pressure for women to consume alcohol at similar rates as men. Perhaps of greatest concern, there is a concerning rise of heavy episodic drinking among both young men and women. The high prevalence rate of alcohol consumption by men and, increasingly, by women increases their risk of being involved in risky behaviours, such as being impaired while driving or as being a passenger of an impaired driver. These social and cultural norms provide context to the drinking behaviours of men and women and can provide important insight to help shape road safety awareness strategies about alcohol-impaired driving.

## Factors contributing to the problem

Driver knowledge and education, or lack thereof, is associated with many human factors that contribute to road crashes worldwide. Low levels of knowledge, can contribute to drivers engaging in risky behaviours including drinking and driving, non-use of seatbelts, speeding and aggressive driving, and distracted driving. Lack of road safety knowledge among other types of road users, such as pedestrians, cyclists and motorcyclists also plays a significant role in crash involvement. In addition, this lack of knowledge, when combined with poor quality roads and related environmental facts, can amplify the risk of fatalities and injuries.

To date, limited research from Belize is available regarding contributing factors in road crashes as a consequence of data collection limitations. An important first step to develop a road safety strategy for Belize is to better understand driver knowledge, attitudes, perceptions and behaviours as this information is needed to build a foundation to pursue behavioural change. As such, the data gathered from the KAP survey are essential to increase understanding of existing knowledge, attitudes and behaviours among Belizean citizens, and these data can provide a basis to develop an effective road safety campaign strategy that can facilitate behavioural change.

A brief summary of some of the key factors that often contribute to road crashes in countries around the world is provided below. In instances where data specific to Belize are not available, data from other Caribbean countries or North American countries are discussed.

### Education

Generally speaking, driver education and knowledge among all road users about road legislation and regulation, as well as safe driving habits, are essential measures to prevent and reduce road crashes. Of importance, Belize is beginning to address this issue with the important first step to develop a road safety curriculum for youths in schools, which can complement a road safety campaign.

In Belize, driver licences for passenger vehicles are issued by the Ministry of Transport as well as nine municipalities; only the Ministry of Transport has authority to issue licences for commercial vehicles. Restrictions on driving may also vary depending on which agency issued the licence.

Of importance, there is no standardized driving licence in Belize in practice, although there is in principle. Generally speaking, each municipality issues its own distinctive licence and to date, there is no central repository for driver licence information in Belize. Although each municipality has its own data system for licence information, this information is not shared with the Ministry of Transport. This situation presents a substantial barrier to tracking drivers with violations and preventing drivers who have had their licence cancelled or revoked from obtaining another one. In other words, tracking driver compliance with road regulations, driver behaviour, and licence status is very challenging in Belize.

It is estimated that approximately 90% of Belize citizens hold a driver's licence; in contrast, in a survey of 380 youth at the University of Belize in 2005 who identified themselves as drivers, just 50% of them actually held a valid driver's licence (Hoare 2007). There is no requirement that drivers complete some form of driver education in advance of obtaining a driver licence in Belize.

The qualifications to obtain a driver's licence are minimal and not consistently required. For example, in 2005, the process to obtain a driver's licence required completion of a written and practical exam, and the written test is quite dated and oftentimes applicants are very much aware of the types of questions asked as part of it. The handout sheet for applicants contained only five items about road signs (i.e., speed limits, legality of road signs, and no entry, keep right and yield signs) and these items did not have accompanying samples of the road signs (Hoare 2007). In addition, it was noted that the written test did not reflect the road conditions in the town where the test was given, and that the drive test excluded municipal streets and highways (Shaw 2011). Anecdotally, it has been reported that practical driving tests can be very limited and/or non-existent depending on the municipality and the transport officer conducting the test. As a consequence, the lack of formal driver education and a standardized practical driving test means that young and new drivers are forced to learn to drive through experience, and may not gain valuable knowledge about safe driving habits. (Hoare 2007).

Similarly, the process regarding endorsement of licenses (renewals) is irregular whereas sometimes drivers can renew their license without a practical test and other times drivers must do a practical test. It is also possible that drivers may obtain a different class of licence at renewal without any test. Perhaps of most concern, research by Shaw (2011) suggested that the current driver's licence in Belize can be easily forged because of its format as a laminated card. In addition, transport and police officers may encounter challenges in identifying valid licences if they are not readily familiar with the signing authorities in each municipality.

In sum, licensing practices are variable across municipalities and officers. To this end, it has been suggested that local systems are more often revenue-driven as opposed to safety driven, and there is general consensus among road safety stakeholders that a consistent approach to driver licensing, with driver education being a pre-requisite, would considerably improve road safety in Belize.

Vehicle ownership is more limited in Belize and the use of shared or community vehicles is not uncommon. Of note, many of the vehicles on the road in Belize are imported as used vehicles; passenger vehicles are estimated to be approximately 13 to 15 years old; buses and mini-vans often used for public transportation are approximately 25 years old. This means that many vehicles in the country are older and lack standard safety features found in most Western countries.

## **Drinking and driving**

There is a body of evidence that has been established over four decades that clearly demonstrate the risks associated with driving after drinking. Safe driving requires that drivers are alert, possess situational awareness, hazard perception and quick reaction times. In sharp contrast, alcohol consumption degrades skills required to drive safely. Studies have shown that alcohol consumption results in measurable decrements in driver performance such as reduced situational awareness, reduced peripheral vision, poor recovery from glares, slower reaction times, poor performance in complex visual tracking and reduced performance with respect to dividing attention over different tasks (Moskowitz & Fiorentino 2000). The consumption of larger quantities of alcohol also has the ability to impair judgment (Canadian Public Health Association 2010) and can lead individuals to

take risks that they would not take if they were sober such as engaging in reckless behaviour that could lead to injury, or driving under the influence (Zeigler et al. 2005).

In addition, every drink that is consumed potentially reduces driver reaction times, and for every .02 increase in BAC the likelihood of a fatal crash significantly increases. Indeed, many studies have determined that human performance skills, including driving, begin to decline at BACs above zero (Borkenstein et al. 1964; Blomberg et al. 2009; Peck et al. 2008). As BACs increase, the level of impairment becomes more pronounced and the risk of collision involvement escalates; this is referred to as relative risk. Most notably, a study conducted in Long Beach, California and Fort Lauderdale, Florida revealed a demonstrable relationship between risk and BAC begins at .04-.05 and increases exponentially once BACs reach .10 or greater (Blomberg et al. 2009). This means that even at low BACs, drivers still pose a serious crash risk.

**Magnitude of the problem.** Alcohol-impaired driving is estimated to contribute to 25-40% of road crashes worldwide. In particular, drinking and driving has been widely recognized as a major social problem in many countries for more than three decades. To illustrate, in 2010 in Canada, 33.6% of fatally injured drivers had a BAC in excess of the legal limit of .08 (TIRF 2010). In the United States, progress in reducing alcohol-impaired deaths and injuries has been very comparable to Canada, and in 2012, alcohol-impaired driving fatalities accounted for 31 percent of the total motor vehicle traffic fatalities in the United States (NHTSA 2013). Progress in the European Union (EU) has been more difficult to gauge in light of inconsistencies in reporting across member states. It is estimated that there were 31,000 road deaths in 2010 in the EU and the European Commission estimates 25% of all road deaths in the EU are alcohol-related. It is important to note that comparisons of drink driving crashes and fatalities across countries should be made with caution in light of significant differences in breath alcohol concentration limits, data collection and reporting (ETSC 2011).

According to the WHO (2014), in Belize the 2012 age-standardized death rates (ASDRs) due to road crashes per 100,000 population are 41.1 for males and 5.0 for females. The proportion of these crashes where alcohol was involved (i.e., alcohol-attributable fractions or AAF) is 21.4% for males and 3.6% for females. To compare, the ASDRs for liver cirrhosis among Belizean males is 49.1 and 13.8 among Belizean females with AAF scores of 58.8% for males and 27.2% for females. In addition, according to the WHO calculated alcohol-attributable years of life lost on a scale of one to five, with five being the highest), Belize was ranked as a five in relation to the number of lives lost attributed to alcohol. Although this calculation included lives claimed by alcohol-related diseases, it signifies the concern associated with alcohol-related crashes in Belize (WHO 2014b).

Belize has a law prohibiting driving with a blood alcohol concentration of .08 and above (WHO 2014b). According to the Federation Internationale de l'Automobile (2012), the penalties for impaired driving in Belize typically include a fine of \$500 (BZD), a license suspension and up to one year in prison. However, while this legislation has been implemented, enforcement is inconsistent and penalties are not always imposed. Belize received a score of two on a scale to ten (with ten being the highest level of enforcement) for the enforcement of drunk-driving laws, according to

the WHO (2014). These low levels enforcement of drinking and driving laws may lower perceptions of risk among drivers.

**Characteristics.** Some characteristics are strongly associated with drinking and driving in many countries around the world. These are briefly highlighted below.

- > **Males.** Drinking and driving has predominantly been considered a male- based problem (Waller 1997; Simpson and Mayhew 1991; Jones and Lacey 2001). Research has repeatedly shown that the vast majority of driving while intoxicated or driving while impaired offenders are male and that men account for a disproportionate share of the drunk driver population (Moore 1994; Burgess and Lindsey 1997; Schwartz and Rookey 2008). To illustrate, men and young adults are more likely than women or older age groups to self-report drinking and driving behaviour, to be arrested for impaired driving, or to be fatally injured or to fatally injure others while driving drunk (Mayhew et al. 2003; Zador et al. 2000). While the involvement of females in road crashes generally, and impaired driving events specifically, has been much less pronounced relative to males (Schwartz and Rookey 2008), increases in the rate of female drinking drivers have been reported across North America as well as in Finland, Sweden, Germany, and New Zealand (Waller 1997). Males are also more likely to be killed in alcohol-related road crashes (at 41.1 per 100,000 population) as compared to 5.0 females (WHO 2014b).
- > **Youth** involvement in impaired driving is also a particular source of concern in many countries, including Belize, due to their inexperience driving combined with young age (Mayhew et al., 2005). Even when sober, young drivers in general are two to three times more likely to experience a crash. In particular, during the first six months of licensure, young drivers are eight times more likely to be involved in a fatal crash than more experienced drivers (IIHS 2004), and alcohol consumption by young drivers greatly increases this crash risk. For example, research shows that males aged 16 to 20 with a BAC of .08 were 52 time more likely to be killed in a single vehicle crash than young male drivers with a BAC of 0 (Zador et al. 2000).
- > **Binge drinking.** There is also research to indicate that a majority of impaired drivers are, in fact, binge drinkers (Caetano & McGrath 2005; Chou et al. 2006). A study by Flowers et al. (2008) indicated that 84% of alcohol impaired drivers were binge drinkers while 88% of impaired driving episodes involved binge drinkers. Of concern, youths are more likely to participate in binge drinking and, thus, are more at risk for road traffic accidents involving heavy episodic drinking. A study of American youth, for example, conducted that the majority of young drivers involved in road traffic crashes had high levels of BAC indicating heavy episodic drinking (CDC 2012). The high reported rate of heavy episodic drinking among Belizean youth, mentioned previously, increases their risk of involvement in alcohol-related crashes.
- > **Temporal factors.** Alcohol-related crashes are more likely to occur on evenings and weekends, particularly Saturday (Hingson & Winter 2003). Data from Belize indicate that, in 2007, fatalities due to road crashes were more likely to occur on Saturday than any other day of the week (Perez-Nunez et al. 2010).

- > **Concern.** The level of concern and risk-perception associated with alcohol-related crashes also directly influences behaviour and individuals who are more concerned about the problem, and believe it to be risky are less likely to drive after drinking. Similarly, Vanlaar et al. (2008) found that the respondents' level of concern is influenced partially by their perceptions of risk. To this end, research from Bogota and Cali, Columbia found that the majority of drivers believed it is safe to drive after consuming alcohol (62.3% and 50% respectively). Hence understanding the perceptions of risk associated with drinking and driving in Belize is an important to inform the development of a road safety campaign.

### Non-use of seat belts

There is a large body of research that shows that seatbelts, when worn correctly, reduce the chances of death in a collision by 47% and the chances of serious injury by 52% (Stewart et al. 1997). For instance, if the vehicle is struck and an occupant is not wearing a seatbelt, their body becomes a projectile that can hit anything else inside the vehicle, such as the steering wheel, dashboard or other passengers. The seatbelt minimizes an occupant's contact with other objects in the vehicle that are moving toward the point of impact. Belts also prevent occupants from being thrown out of the vehicle, through the windshield or doors, where they could hit a pole, tree or rock, or be struck by another vehicle (Transport Canada 2007). Research shows that three-quarters of occupants ejected from a vehicle will die (WHO 2009). The National Highway Traffic Safety Administration (NHTSA) considers seatbelts to be the single most important protective mechanism available to adult vehicle occupants (ICBC 2006) and found that they reduce risk of serious injury to the head, chest and extremities by 50%- 83% (Strine et al. 2010). Data from many jurisdictions also suggests that a majority of fatalities involving non-use of seatbelts occurred at speeds less than 50 km/h and less than 15 km away from their home (Meunier et al. 1993; Brijs et al. 2009).

The non-use of seatbelts is often a factor in a not insignificant proportion of fatal and serious injury crashes in many countries (WHO 2009). For example, although a majority of Canadians wear their seatbelt (approximately 95%), a large proportion of those involved in crashes were not wearing seatbelts at the time of the crash. Between 2006 and 2010, the percentage of drivers who were fatally injured in a crash and were not wearing seatbelts ranged from 33.6%-36.9%, and the percentage of fatally injured passengers who were not wearing seatbelts at the time of the crash ranged from 36.3%-40.4% (Transport 2010).

Research also shows that young drivers, males in particular, are less likely to wear seatbelts as compared to young female drivers and to other age groups. This observation is consistent across many countries including Jamaica and Trinidad and Tobago (Crandon 2006; Strine et al. 2010; Olukoga et al. 2011b). More specifically, younger individuals are less likely to wear seatbelts when driving late at night, when driving with passengers who are impaired, and when driving with younger passengers. In addition, the use of seatbelts among younger individuals is lower for younger passengers than for younger drivers (Williams and Shabanova 2002). Research reveals that one of the main reasons for not wearing a seatbelt is forgetfulness/ laziness, a perceived low risk of injury, and discomfort (Begg and Langley 2000). To illustrate, simply forgetting to put on the seatbelt was consistently mentioned as the number one reason for not wearing their seatbelt by

the driver, front seat passenger and backseat passenger in a New Zealand study (Begg and Langley 2000, p. 217).

In Belize, a national seatbelt law exists; however it only applies to front seat passengers (WHO 2014a), and the legislation specifies that a penalty of approximately \$25 (USD) is incurred for not wearing a seatbelt. According to the WHO, the enforcement of seatbelt laws in Belize received a score of seven out of ten, with ten being the highest level of enforcement (WHO 2014a).

While research regarding seatbelt use is limited in Belize, survey research is available from Trinidad and Tobago (Olukoga et al. 2011b) that showed a majority of drivers stated that they either sometimes (51.8%) or always (31.6%) wore a seat belt. The motivations reported by drivers for not wearing a seatbelt were infrequent stops and discomfort whereas those who did report wearing a seatbelt were motivated by stiff penalties for non-compliance and increased mass media promotion for seatbelt use. Drivers in the study also reported their perceptions of the behaviour of other drivers. In this regard, the majority of drivers reported that they believed other drivers used seat belts less often than they did, and, more importantly, this perception influenced their likelihood of wearing a seatbelt. Although this research was conducted in Trinidad and Tobago, it sheds light on the 'bandwagon effect', mentioned previously (Vanlaar et al. 2008) in which a person's belief is strengthened when they are convinced that others share that belief.

## Speeding

Speeding is a contributing cause to road crashes worldwide. While definitions of speeding may vary somewhat across jurisdictions, it is generally defined as driving any amount over the posted speed limit or driving too fast for conditions (IIHS 2003; CCMTA 2008; NHTSA 2008), and this includes driving over the speed limits to an excessive amount or street racing.

There is very strong evidence to support the idea that speed affects crash risk. Specifically, as speed increases, so does the risk of being involved in a collision (Evans 2006; Aarts & van Schagen 2006; OECD 2006). Driver fatality risk, for example, is increased by 4-12% for every 1% increase in speed. This increase in driver fatality risk jumps to 10% with an increase of 25 km/hr (Vanlaar et al. 2008). This is because at higher speeds the amount of time and distance that drivers have to react to change or avoid hazards is greatly reduced. For example, the distance needed to stop at 120 km/h is longer than the distance needed to stop at 100 km/hr. As a consequence, at higher speeds drivers have less control and maneuverability (Vanlaar et al. 2008).

Conversely, a 3% reduction in speed can reduce crash risk by 13%. To illustrate, the reduction in risk due to decreased speed is greater than, for example, reductions due to frontal airbags (Evans 2006). On average, a 1% decrease in speed is associated with a 2% decrease in injury collisions, a 3% decline in serious injury collisions, and a 4% decrease in fatal collisions (Aarts & van Schagen 2006; Elvik et al. 2004). Similarly, it has been estimated that a reduction in speed by 1 km/h is equal to a 3% reduction in crash frequency (Finch et al. 1994).

Speeding behaviour among youth is influenced in a variety of ways including popular media and peers. Movies often glamorize speeding or street-racing without depicting the substantial increase in the likelihood of serious injury and death that are often a result of crashes. In addition,

passengers who are peers can equally influence drivers to perform dangerous driving maneuvers, such as speeding. Drivers can also use speeding as a method to impress their passengers.

In Canada, it is estimated that over 20% of collisions involve excessive speed or driving too fast for conditions. Such collisions have resulted in about 800 fatalities and about 3,000 serious injury collisions in Canada in 2006 (CCMTA 2008). In Belize, according to the International Road Assessment Programme, the majority of the monitored roads in Belize (271 miles of roads) had observed average speeds that were approximately the same as the posted speed limit. Roads that had observed averages of approximately 10 or higher accounted for 28% of the monitored roads.

No research was located regarding fatality and injury rates associated with speeding in Belize; however, according to Arrive Alive Trinidad and Tobago (AATT unknown date), between 2007 and 2012, speeding contributed to 55% of fatal road traffic crashes in Trinidad and Tobago (AATT unknown date). In Belize, the speed limits on urban and rural roads are set at 40 km/h and 25 km/h around schools (WHO 2014a). The penalties for speeding in Belize are 50\$; however, 'The 'Report on the Legislative Analysis of Traffic Management in Belize' indicates that people in Belize often opt to pay a speeding ticket as opposed to reducing their speed (Shaw 2011). The report also indicated that the large number of taxis and low levels of demand creates competition and speeding by taxi drivers on the roads surrounding San Ignacio, Belize (Shaw 2011) has been documented.

## **Distracted driving**

Distracted driving occurs when a driver's attention is diverted away from driving because they are focused on something non-driving related. A lot of the early focus on distracted driving was generated by concerns over cell phone use. For much of the driving public, distracted driving is synonymous with cell phone usage, but the reality is that this is just one small part of the problem. Distracted driving encompasses a wide range of activities, many of which have become typical in our daily driving environment. Distractions can be inside the vehicle (e.g., reading a newspaper, tending to children, eating) or outside of the vehicle (e.g., looking at billboards, staring at activities on the roadside, reading road signs) (Hedlund 2006). Sources of distraction include those that are visual (eyes off the road), manual (hands off the wheel) and cognitive (mind off task), and effects of this behaviour include a reduction of the driver's awareness of changes in the road environment, decision-making about how to respond to changes, and their ability to safely control the vehicle (Strayer et al. 2013).

Generally, it has been estimated that distraction is a factor in some 25% of road crashes (Robertson 2011), although solid estimates are difficult to obtain due to the difficulty in identifying this issue at roadside and the inconsistent reporting on crash forms across jurisdictions. To this end, an examination of 2008 national data in Canada that was collected by TIRF revealed that driver distraction was a factor in 13-16% of fatal crashes and between 23-27% of injury crashes. It must be underscored that these data should be interpreted with extreme caution in light of data limitations noted above.

With regard to risks associated with distracted driving, in 2006, the 100-Car Naturalistic Driving study conducted by the Virginia Tech Transportation Institute examined data from 69 crashes and 761 near-crashes in conjunction with baseline data from 20,000 randomly selected, uneventful

driving segments. It revealed that distraction resulting from a secondary task was reported in 33% of crashes and 27% of near-crashes. Using these data to calculate the relative risk of crashing, researchers concluded that performing a complex secondary task (e.g., reaching for a moving object, applying makeup or dialing) exposed drivers to approximately three times the risk of involvement in a crash or near-crash; moderate secondary tasks (talking/listening, eating, inserting a CD) were approximately twice the risk, and for simple secondary tasks (e.g., drinking, smoking) there was no appreciable increase in risk (Klauer et al. 2006). It should be noted that there are limitations to this study; most importantly, only a small number of crashes were studied, and many of the distraction-related crashes involved minor damage and would not have resulted in a police report (Ranney 2008). More recently, risks associated with distractions have been better documented. For example, talking on mobile devices has been shown to increase the crash risk by four times and texting by 23 times (Fitch et al. 2013). In addition, texting while driving has been found to be 2 to 5 times more risky than driving drunk (Harkness 2013).

Young drivers are often involved in distracted driving crashes (AAAFTS 2015; NHTSA 2010). Some common distracted driving behaviours among youth include conversing with passengers and adjusting car radios (NHTSA 2011). To illustrate, research has suggested that one passenger of the same age as the driver in the car increased the likelihood of crashing by 2.5 times as compared to when the young driver was driving alone; this figure increased to 5.5 when there were more than two passengers (Lam et al. 2003). Distractions are associated with passenger movements (Curry et al. 2012) as well as the social environment of having peers in the vehicle (Williams 2001). Also of concern, young passengers may influence young drivers to show off and, thus, take risks while driving, and research shows that male youths are more likely to be influenced by passengers. For example, males are approximately six times more likely to perform an illegal driving move in front of peer passengers than when driving alone (Curry et al. 2012).

In Belize, there is currently no legislation that prohibits mobile phone use while driving, although anecdotal evidence suggests there is growing concern about this problem among road safety stakeholders. While data regarding the magnitude of the distracted driving problem in Belize are unavailable due to data collection limitations, research from Trinidad and Tobago about the prevalence of and attitudes towards mobile phone use revealed high levels of usage of mobile phones while driving. Indeed, 91% of drivers surveyed reported using a mobile phone; among these drivers 86% used a handheld device and 14% used a hands-free device. In sharp contrast to usage, a majority of these drivers also believed that using a mobile phone while driving was dangerous; 50% believed it was extremely dangerous and 31% believed it as moderately dangerous (Olukoga et al. 2011a). Although this research was conducted in Trinidad and Tobago, it illustrates a disconnect that often exists between drivers' behaviours and attitudes regarding mobile phone use. A KAP survey can help to increase understanding of this issue in Belize.

### **Vulnerable road users**

Vulnerable road users include pedestrians, cyclists, and motorcyclists. They are considered vulnerable because they are not protected by an enclosed vehicle and its safety features such as seat belts or air bags. They are also smaller and less visible to other road users, which increases their vulnerability. As a result of these factors, vulnerable road users are more likely than other types of

road users to be killed or severely injured in a collision, especially in collisions with vehicles (Transport Canada 2009). For instance, a pedestrian is 284 times more likely to be injured or killed in a car-pedestrian collision than the motorist. A cyclist is 150 times more likely to be injured or killed in a car-bicycle collision than the motorist and a motorcycle driver is 50 times more likely to be injured or killed in a car-motorcycle collision than the driver of the car (Wegman & Aarts 2006).

Pedestrian fatalities commonly occur on urban roads (70 km/h or less) and near intersections. Urban areas and intersections are dangerous because they are occupied by a high volume of vehicles and foot traffic which increases the chance of collision. Being close to a bus stop, a school zone, a road with multiple lanes or an area without raised medians also leads to a higher probability of experiencing a pedestrian collision. A majority of pedestrian fatalities result from pedestrians crossing a road (60% of fatalities). This is especially dangerous when it is a road without traffic controls (no walk signs or lights) or when a pedestrian ignores traffic controls and crosses without the right-of-way. More recently, it has been reported that pedestrians using new technologies, such as smart phones, computer tablets and MP3 players, are dangerously distracted as they travel to their destination. These devices cause sensory deprivation such as hearing loss from headphones/ear buds or loss of sight if a pedestrian is focused on a screen or image. They also cause '*inattentive blindness*' (i.e., perceptual blindness), which decreases a pedestrian's awareness of his or her surroundings. These distractions prevent pedestrians from paying attention to the environment, such as traffic signals telling a pedestrian to stop walking, or from hearing important safety cues, such as approaching vehicles (Robinson 2012).

Young cyclists are less likely to wear helmets compared to older cyclists, especially if there are no jurisdictional helmet laws. A study conducted across Canada found that young adults were less likely to wear helmets if they were cycling with an adult who also was not wearing a helmet. Helmets have been found to reduce head and brain injury by 63%-88% and are an important safety tool to protect young cyclists. Thus, positive role modeling from adults is needed to encourage helmet use among youth (Dennis et al. 2010).

Over half of motorcycle fatalities occur on rural roads (80 km/h or higher) and the rest at intersections. Most motorcycle collisions involve single vehicles that either run off the road or experience a head on collision (Transport Canada 2009). These commonly occur in darkness or low light, especially between 6 pm and 9 pm, when people are still outside commuting but the sun is setting, or has set. Pedestrian and cyclist collisions are more likely to occur at this time period as well.

In Belize, national data from the Ministry of Health mortality database (BHIS) and the Police Department traffic accident reports (JICC) were compared and analysed in a validation study for the period 2011-2013 (Pérez et al. 2014). It was found that similar to other countries in the region, vulnerable road users (i.e., cyclists and pedestrians) are especially affected by unsafe road conditions in Belize. To illustrate, during the three data years that were included in this study, the Philip Goldson Highway – a main corridor in the country – reported the most fatal crashes involving these VRUs, accounting for a combined 52% of all fatal traffic crashes on that highway. In this study, it was concluded that "Immediate intervention is required for cyclists on the Philip Goldson

Highway which can include using lights and reflectors on bicycles, use of reflective jackets and on the longer term, lighting project and proper demarcation of the roadways.” (p.18)

### Road conditions

Road user behaviour is a factor in more than 80% of crashes, however, poor road conditions, such as lack of signage and narrow roads, can significantly contribute to the consequences associated with driver error. In Belize, poor road conditions are often cited as a problem that must be addressed to improve road safety as many roads are narrow and without adequate shoulders or lighting.

Several road evaluations have been conducted to assess the quality and safety of the road conditions for road users in Belize. For example, assessments by the International Road Assessment Programme (iRaP) (2011) and World Economic Forum (WEF) (2011) both attributed low scores to the road conditions in Belize. More specifically, in 2011, iRaP used a scale of one to five to measure the quality of roads in Belize from the most safety-related features (five stars) to few safety-related features. iRaP scored the majority of roads used by drivers as two-star rating, those used by motorcyclist received one-star, and those used by bicyclists and pedestrians received two-star and three-star ratings respectively. Similarly, the assessment by the WEF rated the quality of the roads in Belize on a seven-point scale from the lowest (one) to highest (seven) quality of road conditions. Belize was rated as 3.53 out of 7 for road quality and was ranked 123<sup>rd</sup> among 142 participating countries (WEF 2011).

More recently, the quality of the road infrastructure has been reported to be decreasing at an alarming rate. The proportion of roads considered to be in poor to bad condition increased almost 60% between 2012 and 2013 (McNish & Granada 2013). The rapid deterioration of road conditions in Belize has been identified as a risk to road users, especially in light of the already existing poor road conditions. Some of the important characteristics of roads in Belize are briefly highlighted below.

**Paved roads.** The low-quality road conditions are, in part, attributed to the quality of the road surface, which are primarily unpaved in Belize (MWT 2013; McNish & Granada 2013). In 2011, 488 km of the 2,382 km, or approximately 17% of the roads in Belize were reported as being paved (CIA 2015). More recently, the Ministry of Works and Transport (2013) reported that 18% of the roads in Belize were paved in 2014 and of the total paved roads, 65% were in good condition and 35% were in poor condition. A majority of the unpaved roads are covered with marl wearing course<sup>7</sup> and/or are earth-covered (MWT 2013). Of the unpaved roads approximately 92% were reported as being in fair condition and 8% were considered in bad condition (MWT 2013).

The quality of some of the roads in Belize is also impacted by commercial vehicles associated with industries that often use those roads. According to the Ministry of Works and Transport (2013), the majority of the roads in each district are feeder roads. Feeder roads, or farm or sugar roads, are

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<sup>7</sup> Marl wearing course refers to the top layer of a road that is constructed from crushed rock or other naturally occurring materials, such as a mixture of clay and limestone (Harrison, 1993).

roads that connect the agricultural areas to the main highways. These feeder roads were built for agriculture and agricultural products, and the conditions of these roads reflect the economic circumstances of the industries. In other words, industries with a stronger economy are more likely to be in better condition compared to those that are not (McNish & Granada 2013).

**Inconsistent use of road markings and signage.** Another factor related to the road conditions in Belize is the inconsistent use of road markings and signage, and limited resources are available in this regard. Public concern has been noted in relation to this issue, and Shaw (2011) reported a lack of signage and road markings in Belize, such as stop signs at junctions. Particular road designations, such as one-ways or no-parking areas, are also not properly identified. This lack of road markings and signage can contribute to road crashes as road users who are unfamiliar with an area may commit driving errors and interfere with traffic flow, resulting in negative outcomes such as crashes.

Road markings and signs can help reduce the number of road crashes as these measures are designed to have various effects depending on their purpose. For example, yield or hazard signs can re-focus the attention of drivers on the potential for road hazard and facilitate cautious passing behaviour (Luoma et al. 2000). Similarly, signs to indicate slippery road conditions can serve to reduce the average speed of drivers by 1-2 km/hr (Rama & Kulmala 2000). As such, the increased use of road markings and signs can help drivers adopt safer behaviours and prevent crashes. However, once implemented, continuous upkeep is essential because the resilience and durability of markings as well as other road conditions can be negatively affected by harsh environmental conditions such as intense and prolonged heat as is common in the Caribbean.

**Environmental factors.** The warm, subtropical climate in Belize also has important implications for road conditions and Belize experiences an annual rainy season (May to November) and a dry season (February to May). In particular, the rainy season brings devastating hurricanes and coastal flooding (CIA 2015), although temperatures do not vary greatly between these seasons and average 23 to 27 Celsius (McSweeney et al. 2010).

The characteristics of the climate in Belize can add additional risks to the road users. To illustrate, rainy conditions can increase the risk of road crashes by approximately two to three times as compared to dry weather (Brodsky & Hakkert 1988). As such, the Ministry of Works and Transport in Belize has underscored that the heavy rainfall could further erode the conditions of the roadways, especially if drainage is inadequate (MWT 2013). At the same time, constant high temperatures in Belize create an ongoing need for constant maintenance of road infrastructure. High temperatures degrade road markings and it has been reported that the thermoplastic material used for road marking could blacken in hot weather (Highway Department 2010). In addition, hot and dry temperatures can cause the road surface to also soften and buckle or push off the ground (Mills & Andrey 2002). Extreme hot weather can equally affect road users as drivers may experience increased fatigue or tiredness with higher temperatures (MacDonald 1984) or loss of concentration (Stern & Zehavi 1990).

Finally, the subtropical climate in Belize influences the year-round flourishing of vegetation along roadways and this has implications for road maintenance as well as road users. In particular,

overgrown vegetation along roadways reduces visibility and sightlines for drivers and other road users, making it more difficult to identify potential hazards such as oncoming traffic, cyclists or pedestrians, or animals that may wander into the road. Moreover, trees and large shrubs along roadways can increase risk of fatalities and injuries in a collision and a high volume of shrubs could make it more difficult to locate crashes (Forman 2005).

### **Summary**

There is a broad variety of road user behaviours that can contribute to road fatalities and injuries in countries around the world, and these problems are more pronounced when combined with poor road conditions. This section has briefly summarized some of the key issues that pose substantial concern, and data from the Caribbean and Belize are included where available to help provide important context for these issues that can inform the development of a road safety campaign.

# METHODOLOGY

## Introduction

This report is based on data acquired through the design and application of three key methods to inform the development of a communications strategy for the delivery of biannual road safety campaigns in Belize. It includes the following methods:

- > Knowledge, Attitudes, Practices (KAP) Survey: a survey among a representative sample of Belizeans collecting data about their knowledge, attitudes and practices with respect to road safety;
- > Focus groups with Belizeans: several focus groups with members from the public to collect in-depth data about their knowledge, attitudes and behaviour with respect to road safety;
- > Focus groups and key informant interviews with road safety stakeholders: several focus groups and semi-structured interviews with representatives of relevant stakeholders in Belize about road safety.

This section describes each of the methods used in this project in detail.

## Knowledge, Attitudes, Practices (KAP) Survey

### Research design

The research design of the KAP survey consists of a cross-sectional design to collect information from a representative sample of the general public in Belize as well as in communities and schools along the Demonstration Corridor (DC). A total of 1,066 subjects were asked to participate and 966 agreed to, meaning the response rate in this survey was 91%. Of the 966 individuals who responded to the KAP Survey, complete information about location, age and gender was obtained from 952 respondents, with 306 individuals (32% unweighed or 50% weighed; see below for more information about weights) being from within the Demonstration Corridor and the remainder from outside the Demonstration Corridor. The Demonstration Corridor includes the Western Highway, between its junction with Central American Boulevard in Belize City to its junction with the Hummingbird Highway in Belmopan; the Hummingbird Highway, from its junction with the Western Highway to its junction with Constitution Drive in Belmopan; Constitution Drive; and the Belmopan Ring Road.

### Study population

The study population consists of the general public in Belize with special attention to people living in communities and attending schools along the Demonstration Corridor. Note that the sampling design was stratified enabling us to distinguish between people living within the Demonstration Corridor versus people not living within the Demonstration Corridor. Due to the overrepresentation of young males in fatal road crashes, this sub-population received special attention. A filter question was asked at the beginning of the survey to ensure all participants have actively

participated in traffic in the past 30 days (i.e., “In the past 30 days, have you driven a car, a motorcycle or a bicycle on the road, or have you walked as a pedestrian on the road? Yes/No; If yes, continue; If not, end interview).

### Data collection methods

Data for the quantitative survey were collected using a questionnaire that took approximately 12 minutes to complete. The majority of the questions were closed-ended. The questionnaire topics were of a general, non-intrusive nature, focusing on knowledge, opinions and behaviours in relation to road safety topics, including:

- > Speeding;
- > Alcohol and drug-impaired driving;
- > Distracted driving;
- > Vulnerable road users;
- > Road markings;
- > Overtaking;
- > Use of seatbelts;
- > Use of helmet and protective/reflective clothing;
- > Overcapacity vehicles;
- > Careless/reckless driving;
- > Child safety (seat restraints);
- > Use of turn signals;
- > Unsafe passenger transport;
- > Enforcement efforts;
- > Public education efforts;
- > Driver’s license testing; and,
- > General demographic and background information such as urban/rural, sex, age, mileage, type of driver’s license, years of experience driving, crash history and offence history.

TIRF prepared an English version of the questionnaire, which was provided to Great Belize Productions Ltd. Great Belize Productions Ltd. pre-tested the questionnaire and based on the results from this pre-test, TIRF made some final changes to the questionnaire. Great Belize Productions Ltd. translated the questionnaire into Spanish as needed to ensure the sample of subjects included in the study is representative of the Belizean population.

A copy of the questionnaire is included in the appendix.

### **Sampling design and size**

The sample size of the quantitative survey was 966 completed interviews according to a random, stratified, disproportional sampling design. Great Belize Productions Ltd. randomly selected these respondents, country-wide, including the six districts, representing urban and rural regions.

Also, Great Belize Productions Ltd. collected information for each respondent regarding other stratification variables not included in this matrix to enable the TIRF team to post-stratify the data during the analyses.

Data to randomly select respondents from inside the corridor were obtained via the Transport Department in Belmopan. Data included demographic information, phone numbers, as well as the specified strata such as specific drivers of motorcycles or cars. Phone numbers from respondents outside the Demonstration Corridor were obtained using the phone directory.

### **Training of interviewers and data collection**

Great Belize Productions Ltd. was responsible for the training of interviewers. TIRF attended the training session and provided a brief overview of the purpose of the study and the importance of the data collection at the beginning of the training (this introduction took no longer than 15 minutes) and TIRF also oversaw the training. The training was conducted on April 9, 2015 to ensure timely data collection. Data collection commenced on April 10, 2015 through to April 30, 2015.

### **Data analysis**

Methods used include descriptive statistics as well as multivariate statistical analysis techniques such as logistic regression analysis. Proper weights were calculated for the quantitative survey data. These weights were used in the analysis of the data for post-stratification purposes and to avoid biased estimates as a result of the disproportionate sampling design.

Data analyses were conducted using Stata, version 13.1. Univariate frequency distributions, bivariate cross-tabulations, and logistic regression analyses were used to analyze the results of the KAP Survey. Statistical significance was evaluated using 95% confidence intervals (CIs), as well as logistic regression modelling with the threshold of significant p-values at 5%.

### **Weights**

Design and post-stratification weights were used to most accurately analyze the survey data. Determination of the weights used during analysis involved several sequential procedures using different frequency tables.

First, population estimates of the distribution of a set of demographic characteristics that have been measured in the sample (age, gender and location) were collected from the Statistical Institute of Belize (see <http://www.sib.org.bz/statistics/population>). Estimated populations for the year 2015 were based on the 2010 census. Specifically, crosstab tables for location/gender and age/gender were available. Using these data, the total population of Belize was distributed according to stratification by location (inside DC and outside DC) and gender. Sample and population proportions were calculated for each stratification cell (columns 3 and 5 in the table below). The

first post-stratification weight (weight1) was calculated as the population-proportion divided by the sample-proportion. The survey data were weighted according this weight.

**Table 2: Sample and population proportions according to location and gender**

loc./gender	Sample Freq.	Sample prop.	Population	Pop. Prop.	weight1= Pop.prop/Sample.prop	weighted sample
inDC-male	190	0.20	61957	0.17	0.86	164.34
inDC-female	116	0.12	63862	0.18	1.46	169.40
outDC-male	428	0.45	117494	0.33	0.73	311.66
outDC-female	218	0.23	115586	0.32	1.41	306.60
Total	952	1	358899	1		952

Next, the total population of Belize was distributed according to stratification by age (young being between 16 and 29 years old and not young being 30 and older) and gender. Note that the data about the Belize population also include people 15 years old as it was not possible to separate them. Similarly to the previous procedure, sample and population proportions were calculated for each stratification cell. The second post-stratification weight (weight2) was calculated as the population-proportion divided by the sample-proportion.

**Table 3: Sample and population proportions according to age and gender**

age/gender	Weight. Sample Freq.	Weight. Sample prop.	Population	Pop. Prop.	weight2= Pop.prop/Sample.prop	weighted sample
young male	115	0.12	50264	0.22	1.80	207.00
young female	92.6	0.10	51801	0.22	2.30	213.33
male	361	0.38	64716	0.28	0.74	266.52
female	383.4	0.40	64381	0.28	0.69	265.14
Total	952	1	231162	1		952

Finally, for the 952 records for which location, age and gender were known, both weights were multiplied and a normalization constant was applied ( $C = (231162 - 14) / 952$ ). The 14 records with unknown gender were included in the analysis with weight=1.

**Table 4: Sample and population proportions according to location, age and gender**

loc./age/gender	Sample Freq.	weight= weight1*weight2*C	weighted sample
inDC-young-male	42	378.13	15881.45
inDC-young-female	22	816.84	17970.45
inDC-male	148	155.04	22945.77
inDC-female	94	245.21	23049.65
outDC-young-male	108	318.33	34379.51
outDC-young-female	43	786.68	33827.42
outDC- male	320	130.52	41766.31

<b>Table 4: Sample and population proportions according to location, age and gender</b>			
<b>loc./age/gender</b>	<b>Sample Freq.</b>	<b>weight= weight1*weight2*C</b>	<b>weighted sample</b>
outDC-female	175	236.16	41327.45
unknown	14	1	14
Total	966		231162

## Focus groups with the public

### Focus group organization

A discussion guide was prepared by TIRF and provided to Great Belize Productions Ltd. to conduct the eight focus groups. Focus group discussions took place between April 10 and April 24, 2015. Discussions were recorded and electronic recordings as well as verbatim transcribed discussions (in Word) were provided to TIRF by Great Belize Productions Ltd. The focus groups were organized as follows:

- > One focus group with ten men, with an age of 30 or older within the Demonstration Corridor;
- > One focus group with ten men, with an age of 30 or older outside of the Demonstration Corridor;
- > One focus group with ten women, with an age of 30 or older within the Demonstration Corridor;
- > One focus group with ten women, with an age of 30 or older outside the Demonstration Corridor;
- > One focus group with ten young males, with an age of at least 16 but not older than 29 within the Demonstration Corridor;
- > One focus group with ten young males, with an age of at least 16 but not older than 29 outside the Demonstration Corridor;
- > One focus group with ten young females, with an age of least 16 but not older than 29 within the Demonstration Corridor; and,
- > One focus group with ten young females, with an age of least 16 but not older than 29 outside the Demonstration Corridor.

The total number of participants in the focus groups was 80.

### Data collection and analysis

Qualitative data in the form of focus group transcriptions were examined and synthesized according to thematic analysis techniques. A hybrid process of coding was established according to deductive and inductive methods. The deductive method was based on pre-established themes supported by the scientific literature. The inductive approach was based on emerging themes of the expressed thoughts of the focus group participants.



## Key informant interviews

### Focus group organization

The study population in this project further included road safety stakeholders who play a crucial role with respect to road safety in Belize, and who were interviewed either in focus groups or as key-informants by TIRF during a second on-site visit that took place on April 8-11, 2015. The purpose of this on-site visit was to collect a variety of data and information regarding agency knowledge, experiences and operational systems that can be used to inform the communications strategy.

### Data collection and analysis

All of the meetings and focus groups were delivered by the lead and second author of this report, whereby either one recorded discussion and perspectives and the other moderated the discussion or vice versa. A semi-structured interviewing approach was adopted using a discussion guide to ensure all relevant topics were explored while at the same time allowing for sufficient flexibility such that all participants had an opportunity to share their most important thoughts and concerns.

The stakeholder groups listed below participated in this activity. As can be seen, a wide range of stakeholders were involved in the interviews and focus groups to ensure the process was inclusive and that different perspectives regarding road safety in all areas of the country were acknowledged and can be incorporated in the strategy.

Key-informant interviews of approximately one hour with representatives of the following organizations were delivered on April 8:

- > Department of Transportation;
- > Police Department;
- > Government of Belize Press Office;
- > University of Belize;
- > Ministry of Works and Transport.

Focus groups of approximately two hours with representatives of the following organizations took place on April 10:

- > Ministry of Health;
- > Police Joint Intelligence Coordinating Center (JICC Police);
- > Police Department;
- > Belizean municipalities, including:
  - » San Pedro Town Council
  - » Orange Walk Town Council
  - » San Ignacio/Santa Elena Town Council



- » Belmopan City Council
- » Dangriga Town Council
- » Benque Viejo
- » Ministry of Local Government
- > Pan American Health Organization;
- > Ministry of Works and Transport;
- > Belize Chamber of Commerce and Industry;
- > Department of Transportation;
- > Bus Association;
- > Ministry of Education, Youth and Sports;
- > Belize Emergency Response Team;
- > Insurance.

Data were collected using a similar approach adopted in the focus groups with the public. Synthesized according to thematic techniques, a hybrid process of deductive and inductive coding was used. The deductive approach was based on pre-established themes from scientific literature and the inductive approach was based on emerging themes from within the interview process.





# KAP SURVEY RESULTS

## Descriptive results

In this section, descriptive analyses are presented to describe the survey sample in terms of demographics and knowledge, attitudes and practices in relation to the road safety topics included in the questionnaire (see appendix for a copy of the questionnaire).

### Survey response

Of the 966 individuals who responded to the KAP Survey, a total of 952 individuals included complete information about location, age and gender. Illustrated below, in the stratification matrix, is a breakdown of the data according to these variables.

	<b>Within DC</b>	<b>Outside DC</b>	<b>Total</b>
Young male	42	108	150
Young female	22	43	65
Male	148	320	468
Female	94	175	269
Total	306	646	952

For the remaining 14 respondents, information about gender was unknown. However, data from these respondents were used whenever possible, i.e., in analyses where these particular variables with missing data were not relied upon. Approximately 84% of the 966 respondents answered at least one question about driving cars, 79% answered at least one question about riding motorcycles, and 54% answered at least one question about riding bicycles.

With a survey of this size, on average, results are accurate within plus or minus 3.2%, 95% of the time.

### Demographics

Descriptive statistics of the weighted sample were evaluated to determine the overall percentages of each group in the population studied with respect to age, sex, urban/rural, mileage, type of driver's license, years of experience driving, crash history, and offence history (see Figures 5 to 14).

With respect to age, 16-29 year olds made up 44.1% of the weighted sample, 30-39-year olds made up 22.9%, 40-49 olds made up 20.8%, and over 50 year olds comprised 12.1%. As well, male respondents comprised 49.7% of total weighted sample compared to female respondents, 50.3%.



**Figure 5: Weighted statistics of sample according to age**

Number of strata	=	9	Number of obs	=	966
Number of PSUs	=	966	Population size	=	231162
			Design df	=	957

age	percentages	lb	ub
16 - 29	44.15	44.15	44.15
30 - 39	22.91	20.91	25.04
40 - 49	20.84	18.88	22.95
older than 50	12.1	10.5	13.91
Total	100		

**Figure 6: Weighted statistics of sample according to gender**

Number of strata	=	8	Number of obs	=	952
Number of PSUs	=	952	Population size	=	231148
			Design df	=	944

gender	percentages	lb	ub
male	49.74	49.74	49.74
female	50.26	50.26	50.26
Total	100		

Key: percentages = cell percentages  
 lb = lower 95% confidence bounds for cell percentages  
 ub = upper 95% confidence bounds for cell percentages





**Figure 9: Weighted statistics of sample according to family status**

Number of strata	=	9	Number of obs	=	915
Number of PSUs	=	915	Population size	=	220779.05
			Design df	=	906

Which of the following best describes your family status	percentages	lb	ub
single, never married	35.68	31.92	39.62
married or living with a part separated or divorced	53.81	49.83	57.75
widow or widower	7.781	5.841	10.3
	2.728	1.611	4.583
Total	100		

With respect to injuries, 27.4% [23.8, 31.3] of the weighted sample had been injured in a motor vehicle accident that required medical attention.

**Figure 10: Weighted statistics of sample according to motor vehicle accident**

Number of strata	=	9	Number of obs	=	810
Number of PSUs	=	810	Population size	=	192179.92
			Design df	=	801

Have you ever been injured in a motor vehicle accident	percentages	lb	ub
yes	27.35	23.77	31.25
no	72.65	68.75	76.23
Total	100		

Also, 37.2% [33.5, 41.01] of the weighted sample had been in a situation where they almost crashed but were able to avoid it.



**Figure 13: Weighted statistics of sample according to miles driven/ridden on motorcycle**

Number of strata	=	9	Number of obs	=	954
Number of PSUs	=	954	Population size	=	227727.67
			Design df	=	945

Approximately how many miles do you drive or ride a motorcycle in a typical mont	percentages	lb	ub
50 miles p/mnth	21.48	18.3	25.05
100 miles p/mnth	29.26	25.86	32.91
150 miles p/mnth	19.03	16.26	22.14
200 miles p/mnth	11.36	9.401	13.67
more than 200 miles p/mnt	8.313	6.553	10.49
zero miles p/mnth	10.55	8.199	13.48
Total	100		

**Figure 14: Weighted statistics of sample according to professional driver type**

Number of strata	=	9	Number of obs	=	916
Number of PSUs	=	916	Population size	=	221423.34
			Design df	=	907

Are you a professional driver, bus driver or transport truck driver	percentages	lb	ub
yes	17.26	14.58	20.33
no	82.74	79.67	85.42
Total	100		

## Knowledge

This subsection analyzes the knowledge of Belizeans in regards to alcohol laws, alcohol-impaired driving, road markings, speeding and use of safety features (seatbelt and helmets) (Q5).



- > Specific to alcohol laws, 85.8% [83.05, 88.21] of respondents knew that there is a law that limits how much alcohol you are allowed to drink before driving. With respect to this knowledge, there were no significant differences within gender and age groups. However, the percentage of respondents that knew about this law was significantly larger outside the Demonstration Corridor than inside (90.2% versus 77.6%).
  - » Of those familiar with the law, only 39.8% [35.8, 43.8] knew that the alcohol ingestion limit is equal to roughly 2 glasses; with 24.3% believing it is 1 glass and 36% believing it is over 3 glasses. There were no significant differences in knowledge with respect to respondents inside and outside the Demonstration Corridor; however, there were differences according to age and gender groups. For instance, 42.68% of the younger respondents believed that the limit is over 2 glasses, whereas just 30.93% respondents over 30 years old shared the same belief. As per differences according to gender, 43.48% of the male population believed that the limit is over 2 glasses versus 29% of the female population.
- > In general, 80.7% [77.3, 83.7] knew that the ingestion of alcohol has a detrimental effect on driving skills (i.e., does not improve but rather negatively affects your driving skills). No significant differences were found in this respect within the different locations and age groups. A significantly larger percentage of female respondents however (22.9% versus 15.8%) believed that drinking has a beneficial effect on driving skill (i.e., that it improves their driving skills).
- > Specific to road markings, 69.8% [66, 73.3] of respondents felt confident in their knowledge in regards to the meaning(s) of the roadway markings and signs. No significant differences were found within the different groups.
- > Specific to speeding, 55.3% [51.4, 59.2] of respondents knew that levels of severity with respect to damage and/or injury increases as speed increases (i.e., higher severity associates with driving faster/higher speeds). Significant differences were found within age groups, wherein only 50.2% of the younger respondents knew this fact versus 59.6% of the over 30 years old respondents.
- > Specific to the use of seatbelt, 81.3% [77.9, 84.3] of respondents knew that the use of seatbelts increase safety across all driving speeds. There were no significant differences within the different groups in this regard.
- > Specific to the use of helmets, 79.4% [75.9, 82.6] of respondents knew that it is unsafe to ride a motorcycle without the use of a helmet, even at slower speeds. Similarly, 79.4% [76.1, 82.4] of respondents answered they thought that helmets are necessary when riding bicycles. There were no significant differences within the different groups in this respect.

### Attitudes

This subsection analyzes the attitudes of Belizeans with respect to social issues (Q1), serious issues in road safety (Q2), beliefs about enforcement and education (Q4), and attitudes in relation to

practice (Q6). Beliefs were measured using a six point scale, where 1 meant respondents were “not at all concerned” and 6 meant respondents were “extremely concerned”.

With respect to social issues/concerns (Q1) the following measures represent respondent attitudes:

- > Violent crime: 95% [93.5, 97] of respondents were concerned (i.e., options 4, 5, 6 on the six point scale) in regards to the issue of violent crime. More specifically, 80.3% [77.2, 83] of respondents were extremely concerned (i.e., option 6 on the six point scale) with respect to violent crime. Although females were significantly more extremely concerned than males (86.5% versus 74.1%), overall, they were similarly concerned (i.e., options 4, 5, 6 on the six point scale).
- > Road safety: 94% [93.1, 96.1] of respondents were concerned (i.e., options 4, 5, 6 on the six point scale) and 63% [59.2, 66.7] were extremely concerned (i.e., option 6 on the six point scale) in regards to the issue of road safety. There were no significant differences within the different groups in this respect.
- > Unemployment: 90.1% [87.52, 92.14] of respondents were concerned (i.e., options 4, 5, 6 on the six point scale) and 61.2% [57.6, 64.8] were extremely concerned (i.e., option 6 on the six point scale) in regards to the issue of unemployment. There were no significant differences within the different groups in this respect.
- > Health and education: 91.9% [89.4, 93.8] of respondents were concerned (i.e., options 4, 5, 6 on the six point scale) and 62.1% [58.4, 65.8] were extremely concerned (i.e., option 6 on the six point scale) in regards to the issue of health and education. There were no significant differences within the different groups in this respect.

Regarding serious issues in road safety (Q2) the following measures represent respondent attitudes:

- > Drivers under the influence of alcohol: 94% of respondents believe it is a serious problem (i.e., options 4, 5, 6 on the six point scale) and 67% believe it is an extremely serious problem (i.e., option 6 on the six point scale). There were no significant differences within location and age groups. However, a larger percentage of males (97.4% versus 92.1%) believe it is a serious problem (i.e., options 4, 5, 6 on the six point scale), but a larger percentage of females (71.6% versus 68.3%) believe it is an extremely serious problem (i.e., option 6 on the six point scale).
- > Speeding drivers: 94.2% of respondents believe it is a serious problem (i.e., options 4, 5, 6 on the six point scale) and 56% believe it is an extremely serious problem (i.e., option 6 on the six point scale). There were no significant differences within location and age groups. Similar to the previous issue, a larger percentage of males believe it is a serious problem (96.9% versus 91.5%), however, a larger percentage of females (57.1% versus 54.9%) believe it is an extremely serious problem.
- > Drivers and motorcyclists being careless when overtaking other drivers: 92% of respondents believe it is a serious problem (i.e., options 4, 5, 6 on the six point scale) with 46.7% believing it is an extremely serious problem (i.e., option 6 on the six point scale). There were



no significant differences within location and age groups. Females were significantly (57.1% versus 54.9%) more extremely concerned when compared with males. However, overall, males and females were similarly concerned (i.e., options 4, 5, 6 on the six point scale).

- > Drivers under the influence of drugs other than alcohol: 87.6% of respondents believe it is serious problem (i.e., options 4, 5, 6 on the six point scale) and 38.9% believe it is an extremely serious problem (i.e., option 6 on the six point scale). There were no significant differences within location and age groups. However, a larger percentage of males (92.1% versus 83.2%) believe it is a serious problem. In addition, a larger percentage of males (51.2% versus 44.2%) believe it is an extremely serious problem (i.e., option 6 on the six point scale).
- > Overconfident pedestrians who believe they have the right of way: 85.7% of respondents believe it is a serious problem (i.e., options 4, 5, 6 on the six point scale) whilst 39% believe it is an extremely serious problem (i.e., option 6 on the six point scale). There were no significant differences within location, age or gender.
- > Bicyclists not paying attention to traffic on the road: 84.8% of the population believe it is a serious problem (i.e., options 4, 5, 6 on the six point scale) whilst 39.6% believe it is an extremely serious problem (i.e., option 6 on the six point scale). There were no significant differences within location and age groups. A larger percentage of females (41.5% versus 37.7%) were more extremely concerned (i.e., option 6 on the six point scale).
- > Drivers texting while driving: 91.4% of surveyed respondents believe it is a serious problem (i.e., option 4, 5, 6 on the six point scale) whilst 57.5% believe it is an extremely serious problem (i.e., option 6 on the six point scale). There were no significant differences within location and age groups. Overall, males were more concerned than females (94.1% versus 88.7%). In addition, a larger percentage of females (8.8% versus 1.9%) considered this issue not to be a problem at all.
- > Motorcycle riders carrying too many passengers: 75.8% of surveyed respondents believe it is a serious problem (i.e., options 4, 5, 6 on the six point scale) whilst 44.3% believe it is an extremely serious problem (i.e., option 6 on the six point scale). There were no significant differences within location and age groups. In addition, males and females were similarly concerned, however a larger percentage of females considered this issue not to be a problem at all (8.2% versus 0.93%).
- > Drivers not wearing seatbelts: 79.2% of surveyed respondents believe it is a serious problem (i.e., options 4, 5, 6 on the six point scale) whilst 42.9% believe it is an extremely serious problem (i.e., option 6 on the six point scale). There were no significant differences within location and age groups. In addition, males and females were similarly concerned, however a larger percentage of females consider this issue not to be a problem at all (8.2% versus 0.93%).

- > Motorcycle riders not wearing helmets: 75.8% of the population believe it is a serious problem (i.e., option 4, 5, 6 on the six point scale) whilst 44.3% believe it is an extremely serious problem (i.e., option 6 on the six point scale). There were no significant differences within location and age groups. Females respondents were seen as being more extremely concerned (i.e., option 6 on the six point scale) than males (46.2% versus 39.5%). Additionally, a larger percentage of female respondents considered this issue not to be a problem at all (13.4% versus 6.1%).

With respect to beliefs about enforcement and education (Q4) the following measures represent respondent attitudes:

- > There should be more enforcement of traffic laws by transport and police officers: 86.1% of respondents are in agreement (i.e., options 4, 5, 6 of the six point scale) with 51.1% in strong agreement (i.e., option 6 on the six point scale). There were significant differences with respect to location, age and gender groups. For instance, the respondents inside the Demonstration Corridor were more agreeable (i.e., option 4, 5, 6 on the six point scale) than the respondents from outside Demonstration Corridor (91.6% versus 83.2%). The older group of respondents (i.e., 30 years and over) were also more agreeable (i.e., options 4, 5, 6 on the six point scale) than the younger respondents (89% versus 82.4%). In addition, males were more agreeable (i.e., options 4, 5, 6 of the six point scale) than females (91.4% versus 80.8%).
- > There should be more education for the public about road safety: 83.2% of survey respondents agree (i.e., option 4, 5, 6 on the six point scale) with 39.2% strongly agreeing (i.e., option 6 on the six point scale). There were significant differences with respect to differences across location, age and gender. For instance, the population inside the Demonstration Corridor was more agreeable (i.e., options 4, 5, 6 on the six point scale) than the population outside the Demonstration Corridor (89.7% versus 80.9%). Additionally, older respondents (i.e., 30 years and older) were more agreeable (86.7% versus 80.4%) in comparison with younger respondents. Similarly, males were more agreeable in comparison with females (87.9% versus 80%).
- > There should be stricter testing of driving skills to obtain a driver's license: 80.1% of surveyed respondents agreed (i.e., options 4, 5, 6 on the six point scale) with 33.4% strongly agreeing (i.e., option 6 on the six point scale). There were no significant differences within location and age groups. However, males were more in agreement (84.1% versus 76.3%) in this respect.
- > There should be stricter rules for the licensing of public transport bus drivers and drivers of transport trucks: 74.9% of surveyed respondents were in agreement (i.e., options 4, 5, 6 on the six point scale) with 40.3% in strong agreement (i.e., option 6 on the six point scale). There were significant differences within location and gender groups. The surveyed respondents inside the Demonstration Corridor were more agreeable than the respondents outside the Demonstration Corridor (80.1% versus 72.2%). Additionally, males were more in agreement (79.8% versus 70.1%).

With respect to attitudes in relation to practice (Q6) the following measures represent respondent answers:

- > The three most cited reasons to the question “I drive or ride fast because?” related to the extent to which the responder believes s/he is a good driver (78.56%), the extent to which the responder feels bored when driving the speed limit (29.89%), and the extent to which the responder feels hurried (39.78%). Additionally, there was a significant ( $p=0.034$ ) difference in the percentage of males (19.8%) and females (12.6%) that report that they drive fast because it is fun. Similarly, there was a significant ( $p=0.015$ ;  $p=0.017$ ) difference in the percentage of males and females that explained their rationale to drive or ride fast as being (1) because they don’t believe it is an unsafe practice (males=22.2%; females=13.9%), and (2) they are bored when they drive the speed limit (males=34.5%; females=25.5%), respectively.
- > The two most cited reasons given to the question “I drive or ride after drinking alcohol because?” related to the extent to which the responder believes s/he is relaxed and feels that they drive better (11.57%), and the extent to which they think they are better than the average driver (10.1%). Additionally, there was a significant ( $p=0.015$ ) difference in the percentage of males (10%) and females (4.46%) that reported that they don’t think drinking alcohol makes “me” less safe as a driver. Similarly, there was a significant ( $p<0.001$ ) difference in the percentage of males (34.49%) and females (25.46%) that reported that they drive or ride fast because friends do it so I can too.
- > With respect to helmet use and motorcycles, 34.82% of respondents say that motorcycle helmets are too expensive and so they don’t use a helmet when riding a motorcycle. Furthermore, a significant ( $p=0.003$ ) difference between males (25.32%) and females (44.39%) exists with respect to this belief. Similarly, 26.18% of respondents say they don’t wear helmets because it makes them look silly. A significant ( $p<0.001$ ) difference between males (36.66%) and females (16.95%) exists with respect to this belief.
- > With respect to helmet use and bicycles, 47.91% of respondents say that they don’t wear helmets because it makes them look silly. A significant ( $p<0.001$ ) difference between males (31.11%) and females (60.19%) exists with respect to this belief.
- > With respect to seatbelt use in the front seat of vehicles, 65.41% of respondents say that they don’t use seatbelts because they forget to put them on. Additionally, 21.86% of respondents think that wearing seatbelts do not protect in the event of crashes. A significant ( $p<0.005$ ) difference between males (16.49%) and females (27.11%) exist with respect to this belief.
- > With respect to seatbelt use in the backseat of vehicles, 70.61% of respondents reported that they don’t use seatbelts because they forget to put them on, with a significant ( $p<0.007$ ) difference between younger respondents (76.8%) and older respondents (65.6%). Additionally, 23.4% reported that “It’s too much trouble to put it”, 27.88% reported that “It would trap me in the vehicle in a crash”, 18.21% reported that “wearing a seatbelt doesn’t protect me in a crash anyway” with a significant ( $p<0.002$ ) difference



between males (13.5%) and females (23.64%). Lastly, 17.18% of respondents reported that “the law doesn’t require me to wear it”, with a significant ( $p < 0.009$ ) difference between (13.25%) and females (21.77%) in this respect.

Table 6 contains a summary of results relating to questions of attitudes as covered by the KAP Survey.

**Table 6: Summary of results relating to questions of attitudes as covered by the KAP Survey.**

	Overall % yes	% gender			% age		
		male	female	p-value	16-30	30+	p-value
I drive or ride fast because							
It’s fun to drive fast	16.04	19.8	12.6	0.0337			
I am often in a hurry	39.78						
I don’t believe it’s unsafe to drive fast	17.85	22.18	13.88	0.015			
I am bored when I drive the speed limit	29.89	34.49	25.46	0.0173			
I am a good driver	78.56						
I drive or ride after drinking alcohol because:							
It relaxes me so I drive better	11.57						
I am better than the average driver so it’s ok for me to drink before driving	10.1						
I don’t think drinking alcohol makes me less safe as a driver	7.244	10	4.457	0.0151			
My friends do it, so I can too	5.041	8.35	1.831	0.0008			
I don’t use a helmet when riding a motorcycle because							
It makes me look silly	26.18	36.66	16.95	0.0007			
It is too warm	31.05						
My friends don’t wear a helmet	22.44						
Wearing a helmet doesn’t protect me in a crash anyway	21.72						
A motorcycle helmet is too expensive	34.82	25.12	44.39	0.0033			
I don’t use a helmet when riding a bicycle because:							
It makes me look silly	47.91	31.11	60.19	0.0002			
It is too warm	25.24						
My friends don’t wear a helmet	25.62						
Wearing a helmet doesn’t protect me in a crash anyway	22.35						
A bicycle helmet is too expensive	21.2						
I don’t wear a seatbelt in the front seat of the vehicle because:							
I forget to put it on	65.41						
It’s too much trouble to put it on	21.07						
It would trap me in the vehicle in a crash	31.15						

**Table 6: Summary of results relating to questions of attitudes as covered by the KAP Survey.**

	Overall % yes	% gender			% age		
		male	female	p-value	16-30	30+	p-value
Wearing a seatbelt doesn't protect me in a crash anyway	21.86	16.49	27.11	0.0047			
I don't wear a seatbelt in the backseat of the vehicle because							
I forget to put it on	70.61				76.8	65.6	0.0065
It's too much trouble to put it on	23.4						
It would trap me in the vehicle in a crash	27.88						
Wearing a seatbelt doesn't protect me in a crash anyway	18.21	13.5	23.64	0.0016			
The law doesn't require me to wear it	17.18	13.25	21.77	0.0086			

\*Note: within Table 6 empty cells under the headings 'gender' and 'age' do not indicate missing values but instead indicate non-significant results.

## Practice

This subsection analyzes the behaviour of Belizeans with respect to road safety issues such as speeding, alcohol-impaired driving, vulnerable road users, use of safety features (seatbelt, child restraint seat and helmets), signs, and distracted driving. Similarly as with the previous subsection (i.e., variables measuring respondent attitudes), the variables within this subsection (i.e., variables measuring the level of practice with respect to road safety behaviours) also use a six point scale to assess respondent input.

With respect to road safety issues/concerns the following measures represent respondent behavioural practices:

- > With respect to alcohol, 10.94% of respondents reported that they very often (i.e., option 6 on the six point scale) drive a car after drinking more than 2 glasses of alcohol, with a significant difference between male (19.8%) and female (36.2%) respondents reported. Similarly, 9.80% of respondents reported that they very often (i.e., option 6 on the six point scale) ride a motorcycle after drinking more than 2 glasses of alcohol, with a borderline significant ( $p=0.06$ ) difference between male (21.6%) and female (30.11%) respondents. Additionally, 13.04% of respondents reported that they very often (i.e., option 6 on the six point scale) have been a passenger with a driver who has had more than 2 glasses of alcohol to drink.
- > With respect to speed, 13.01% of respondents reported to very often (i.e., option 6 on the six point scale) ride a motorcycle at least 15 miles faster than the speed limit. A borderline significant ( $p=0.05$ ) difference between male (36.78%) and female (26.77%) respondents was reported. Additionally, 17.83% of respondents reported to very often (i.e., option 6 on the six point scale) drive a car at least 15 miles over the speed limit.
- > With respect to overtaking, 16.18% of respondents reported to very often (i.e., option 6 on the six point scale) overtake other drivers on a curve or when there is double yellow line on

the road. A significant ( $p<0.001$ ) difference between male (28.41%) and female (45.08%) respondents was reported with respect to overtaking practices.

- > With respect to illegal drugs, 7.89% of respondents reported to very often (i.e., option 6 on the six point scale) drive a car after taking illegal drugs other than alcohol. Similarly, 11.98% of respondents reported to very often (i.e., option 6 on the six point scale) ride a motorcycle after taking illegal drugs other than alcohol, with a significant ( $p<0.006$ ) difference between male (17.25%) and female (29.51%) respondents with respect to drug-driving.
- > With respect to pedestrian crossing and wearing protective clothing, 28.97% of respondents reported to very often (i.e., option 6 on the six point scale) see a pedestrian crossing the road when it's not safe to cross. A significant ( $p<0.001$ ) difference between male (72.41%) and female (58.3%) respondents was reported according to survey results of respondents that they often (i.e. options 4, 5, 6 on the six point survey) see pedestrian crossing the road when it's not safe to cross. In addition, 28.7% of respondents reported to very often (i.e., option 6 on the six point scale) ride a bicycle in the dark without bicycle lights or wearing reflective clothing.
- > With respect to texting and driving (i.e., distracted driving), 10.51% of respondents reported to very often (i.e., option 6 on the six point scale) text while driving a car. A significant ( $p<0.046$ ) difference between male (35.36%) and female (44.35%) respondents was reported. Additionally, 14.78% of respondents reported to very often (i.e., option 6 on the six point scale) text while driving a motorcycle, with a borderline significant ( $p=0.052$ ) difference between respondents within the Demonstration Corridor (35.08%) and respondents outside the Demonstration Corridor (25.84%).
- > With respect to talking on cellphones while driving (i.e., distracted driving), 15.06% of respondents reported to very often (i.e., option 6 on the six point scale) talk on their cell phone while driving a car. Similarly, 11.75% of respondents reported to very often (i.e., option 6 on the six point scale) talk on their cell phone while riding a motorcycle, with a significant difference between male (14.83%) and female (33.32%) respondents.
- > With respect to seatbelt use, 33.95% of respondents reported to very often (i.e., option 6 on the six point scale) not wear their seatbelt when driving a car in the city. Similarly, 31.73% of respondents reported to very often (i.e., option 6 on the six point scale) not wear their seatbelt when driving a car on the highway, with a significant difference between male (35.95%) and female (63.19%) drivers. Additionally, 32.61% of respondents reported to very often (i.e., option 6 on the six point scale) not wear your seatbelt as a passenger in the backseat of a car, with a significant ( $p<0.001$ ) difference between male (52.95%) and female (70.88%) respondents.
- > With respect to helmet use, 24.71% of respondents reported to very often (i.e., option 6 on the six point scale) not wear a helmet on a motorcycle, with a significant ( $p<0.001$ ) difference between male (24.86%) and female (45.1%) respondents. Similarly, 26.07% of respondents reported to very often (i.e., option 6 on the six point scale) not wear a helmet

on a bicycle, with a significant ( $p < 0.007$ ) difference between male (30.06%) and female (44.6%) respondents.

- > With respect to child safety, 12.93% of respondents reported to very often (i.e., option 6 on the six point scale) not use a special seat to restrain a child in the car. Similarly, 14.55% of respondents reported to very often (i.e., option 6 on the six point scale) take a child on a motorcycle as a passenger, with a significant ( $p = 0.016$ ) difference between male (34.21%) and female (20.92%) respondents.
- > With respect to the use of turn signals, 13.43% of respondents reported to very often (i.e., option 6 on the six point scale) not use signals when turning, with a significant ( $p < 0.001$ ) difference between male (25.62%) and female (41.34%) respondents.
- > With respect to riding in the pan of a pick-up truck, 13.27% of respondents reported to very often (i.e., option 6 on the six point scale) practicing this behaviour. A significant ( $p = 0.046$ ) difference between male (25.89%) and female (33.61%) respondents was reported.

Table 7 contains a summary of results relating to questions of practices as covered by the KAP Survey.

Table 7: Summary of results relating to questions of practices as covered by the KAP Survey.								
	Overall		% gender			% location		
	% often	% very often	male	female	p-value	inDC	outDC	p-value
Drive a car after drinking more than 2 glasses of alcohol	28.61	10.94	19.8	36.2	0			
Ride a motorcycle after drinking more than 2 glasses of alcohol	26.16	9.80	21.6	30.11	0.06			
Drive a car at least 15 miles faster than the speed limit	48.27	17.83						
Ride a motorcycle at least 15 miles faster than the speed limit	31.32	13.01	36.78	26.77	0.0525			
Overtake other drivers on a curve or when there is a double yellow line on the road	37.02	16.18	28.41	45.08	0.0001			
Ride as a passenger with a driver who has had more than 2 glasses of alcohol to drink	36.69	13.04						
Drive a car after taking illegal drugs other than alcohol	10.16	7.887						
Ride a motorcycle after taking illegal drugs other than alcohol	24.03	11.98	17.25	29.51	0.0059			
See a pedestrian crossing the road when it's not safe to cross	65.28	28.97	72.41	58.3	0.0003			
Ride a bicycle in the dark without bicycle lights and without wearing reflective clothing	45.22	28.7						
Text while driving a car	40.13	10.51	35.36	44.35	0.0445			

**Table 7: Summary of results relating to questions of practices as covered by the KAP Survey.**

	Overall		% gender			% location		
	% often	% very often	male	female	p-value	inDC	outDC	p-value
Text while riding a motorcycle	29.02	14.78				35.08	25.84	0.0517
Walk down the street when it's dark without wearing reflective clothing	49.34	15.58	55.52	55.52	0.0045			
Not wear your seatbelt when driving a car in the city	52.8	33.95						
Not wear your seatbelt when driving a car on the highway	50.31	31.73	35.95	63.19	0			
Not wear your seatbelt as a passenger in the backseat of a car	61.56	32.61	52.95	70.88	0.0001			
Not wear a helmet in a motorcycle	34.79	24.71	24.86	45.1	0.0001			
Not wear a helmet in a bicycle	38.17	26.07	30.06	44.6	0.0066			
Not signal when turning	33.8	13.43	25.62	41.34	0.0006			
Not use a special seat to restrain a child in the car	31.07	12.93						
Take a child on a motorcycle as a passenger	27.27	14.55	34.21	20.92	0.0161			
Talk on your cell phone while driving a car	40.89	15.06						
Talk on your cell phone while riding a motorcycle	24.08	11.75	14.83	33.32	0			
Ride in the pan of a pick-up truck	29.67	13.27	25.89	33.61	0.0457			

\*Note: within Table 7 empty columns/cells under the headings 'gender' and 'age' do not indicate missing values but instead indicate non-significant results.

### Regression analysis results

Preliminary bivariate analysis indicated that there may be some differences in terms of knowledge, attitudes and behaviours among subgroups defined by gender, age and location. In this section we used regression analyses to formally test the variance within the data while controlling for confounding variables such as mileage or crash history. This approach enables us to more robustly test whether a variable truly has a significant impact or not.

#### Practice

This subsection presents results from the logistic regression models used to analyze the self-reported behaviour of Belizeans with respect to road safety issues such as speeding, alcohol-impaired driving, vulnerable road users, use of safety features (seatbelts, child restrain seats, helmets), signs, and distracting driving. Refer to the appendix section for a more detailed table with results. The main results are described below. Significant effects are reported using odds ratios (OR): if the OR for a category is greater than 1, this means there is a greater probability that this category self-reports the behavior. For example, if the OR for males is greater than 1, it means that

males are more likely to report this behaviour than females. If the OR is smaller than 1, the probability is smaller.

The following measures represent respondents' behavioural practices as covered by the KAP Survey:

- > Drive a car after drinking more than 2 glasses of alcohol: female respondents (OR=2.56,  $p<0.001$ ), persons with experience of having been injured in a traffic accident(s) (OR=3.52,  $p<0.001$ ), respondents from rural areas (OR=1.85,  $p=0.046$ ), and professional drivers (OR=2.57,  $p=0.002$ ) were all more likely to report having driven after drinking 2 or more glasses of alcohol.
- > Ride a motorcycle after drinking more than 2 glasses of alcohol: persons with experience of having been injured in a traffic accident(s) (OR=2.25,  $p=0.026$ ) were more likely to report having ridden after drinking more than 2 glasses of alcohol.
- > Drive a car at least 15 miles faster than the speed limit: persons with experience of having been injured in a traffic accident(s) (OR=3.97,  $p<0.001$ ), and professional drivers (OR=3.89,  $p<0.001$ ) were both more likely to report driving a car at least 15 miles faster than the speed limit.
- > Ride a motorcycle at least 15 miles faster than the speed limit: male respondents (OR=2.23,  $p=0.014$ ), and persons with experience of having been injured in a traffic accident(s) (OR=4.06,  $p<0.0001$ ) were both more likely to report driving a car at least 15 miles faster than the speed limit.
- > Overtake other drivers on a curve or when there is a double yellow line on the road: female respondents (OR=2,  $p=0.004$ ), persons with experience of having been able to avoid a crash situation (OR=2.99,  $p<0.001$ ), and professional drivers (OR=2.145,  $p=0.009$ ) were all more likely to report overtaking other drivers on a curve or when there is a double yellow line on the road.
- > Ride as a passenger with a driver who has had more than 2 glasses of alcohol to drink: female respondents (OR=1.63,  $p=0.021$ ) and professional drivers (OR=1.76,  $p=0.03$ ) were both more likely to report having ridden as a passenger with a driver who has drunk more than 2 glasses of alcohol.
- > Drive a car after taking illegal drugs other than alcohol: only persons with experience of having been injured in a traffic accident(s) (OR=3.09,  $p=0.013$ ) were more likely to drive a car after taking illegal drugs other than alcohol.
- > Ride a motorcycle after taking illegal drugs other than alcohol: only female respondents (OR=2.66,  $p=0.018$ ) were more likely to ride a motorcycle after taking illegal drugs other than alcohol.
- > See a pedestrian crossing the road when it's not safe to cross: male respondents (OR=1.91,  $p=0.003$ ), persons with experience of having been injured in a traffic accident(s) (OR=4.4,  $p<0.001$ ), respondents from urban areas (OR=2.1,  $p=0.001$ ), and professional drivers

(OR=1.72,  $p=0.046$ ) were all more likely to say they see pedestrians crossing the road when it's not safe to cross.

- > Ride a bicycle in the dark without bicycle lights and without wearing reflective clothing: only respondents from urban areas (OR=2.12,  $p=0.026$ ) were more likely to ride a bicycle in the dark without bicycle lights and without wearing reflective clothing.
- > Text while driving a car: male respondents (OR=2.195,  $p=0.003$ ), and respondents from urban areas (OR=1.81,  $p=0.034$ ) were both more likely to text while driving.
- > Text while riding a motorcycle: respondents from within the Demonstration Corridor (OR=1.88,  $p=0.026$ ), respondents younger than 30 years (OR=2.04,  $p=0.009$ ), and professional drivers (OR=1.92,  $p=0.029$ ) were more likely to text while riding a motorcycle.
- > Walk down the street when it's dark without wearing reflective clothing: persons with experience of having been injured in a traffic accident(s) (OR=5.08,  $p<0.001$ ), persons with experience of having been able to avoid a crash situation (OR=2.03,  $p=0.004$ ), and respondents from urban areas (OR=3.28,  $p<0.001$ ) were all more likely to walk down a street without reflective clothing.
- > Not wear your seatbelt when driving a car on the highway: respondents 30 years and over (OR=2.07,  $p=0.005$ ) were more likely to not wear seatbelt when driving a car on the highway.
- > Not wear your seatbelt as a passenger in the backseat of a car: female respondents (OR=2.85,  $p<0.001$ ), and respondents from rural areas (OR=3.751,  $p<0.001$ ) were both more likely to not wear seatbelts as a passenger in the backseat of a car.
- > Not wear a helmet on a motorcycle: female respondents (OR=3,  $p=0.001$ ), persons with experience of having been able to avoid a crash situation (OR=3.63,  $p<0.001$ ), respondents from rural areas (OR=2.69,  $p=0.001$ ), and non-professional drivers (OR=3.35,  $p=0.004$ ) were all more likely to not wear a helmet when riding a motorcycle.
- > Not wear a helmet on a bicycle: female respondents (OR=4.09,  $p<0.001$ ) were more likely to not wear a helmet on a bicycle.
- > Not signal when turning: female respondents (OR=2.13,  $p=0.005$ ) were more likely to not signal when turning.
- > Not use a special seat to restrain a child in the car: female respondents (OR=2.71,  $p=0.005$ ), persons with experience of having been injured in a traffic accident(s) (OR=4.37,  $p<0.001$ ), respondents from urban areas (OR=2.31,  $p=0.029$ ), and professional drivers (OR=2.115,  $p=0.05$ ) were all more likely to not use a special child restraint seat in a car.
- > Take a child on a motorcycle as a passenger: respondents from outside Demonstration Corridor (OR=2.68,  $p=0.028$ ), persons with experience of having been injured in a traffic accident(s) (OR=3.37,  $p=0.005$ ), respondents from urban areas (OR=3.18,  $p=0.001$ ), and



non-professional drivers (OR=4.72,  $p=0.013$ ) were all more likely to take a child on a motorcycle as a passenger.

- > Talk on your cell phone while driving a car: persons with experience of having been injured in a traffic accident(s) (OR=4.17,  $p<0.001$ ), persons with experience of having been able to avoid a crash situation (OR=2.72,  $p=0.002$ ), and professional drivers (OR=3.64,  $p<0.001$ ) were all more likely to talk on your cell phone while driving a car.
- > Talk on your cell phone while riding a motorcycle: female respondents (OR=6.4,  $p<0.001$ ), and persons with experience of having been injured in a traffic accident(s) (OR=4.93,  $p=0.001$ ), were both more likely to talk on a cell phone while driving a car.
- > Ride in the pan of a pick-up truck: female respondents (OR=2.71,  $p=0.005$ ), persons with experience of having been injured in a traffic accident(s) (OR=1.93,  $p=0.017$ ), persons with experience of having been able to avoid a crash situation (OR=1.69,  $p=0.044$ ), and professional drivers (OR=2.113,  $p=0.013$ ) were all more likely to ride in the pan/bed of a pick-up truck.

### Knowledge

This subsection analyzes the knowledge of Belizeans about alcohol laws, alcohol-impaired driving, road marking, speeding and use of safety features (seatbelt and helmets) (Q5).

Eight knowledge variables were defined based on the survey questions:

- > alcohol law;
- > alcohol limit;
- > alcohol/no skills: Knowing that alcohol does not improve your driving skills;
- > road signs: Knowing the meaning of road markings and signs along the road;
- > speeding: Knowing that in a crash the damage and injuries are more severe when the crashing drivers drove faster;
- > seat belt: Knowing that seatbelts are safer not only at higher speeds;
- > motorcycle helmet: Knowing that it is not fine not to wear a helmet on a motorcycle even when you do not go too fast; and,
- > bicycle helmet: Knowing that it is not fine not to wear a helmet on a bicycle even when you do not go too fast.

A logistic regression model was estimated for each of these knowledge variables while controlling for differences in the demographics data. The results of these models (see Table 1 in appendix section) support the results from the descriptive analyses and also build on information previously provided.

Specific to alcohol laws, as previously found, the population inside the Demonstration Corridor was less likely to know that there is a law that limits how much alcohol you are allowed to drink before driving (OR=0.49,  $p=0.007$ ). Females were more likely to know about this law (OR=1.8,  $p=0.035$ ) and were also more likely to know the correct limit (OR=1.93,  $p=0.002$ ). However, they were less likely to know that alcohol does not improve your driving skills (OR=0.366,  $p<0.001$ ). Although experienced drivers (i.e., over 11 years with a license) seem to be more likely to know about the law (OR=3.19, 5.64,  $p=0.01$ , 0.04), they were more likely to think that alcohol improves your driving skills (6-10 years: OR=0.17,  $p=0.025$ ; over 16 years: OR=0.09,  $p=0.011$ ). The rural population (i.e., respondents outside the demonstration corridor) were more likely to know about the alcohol limit (OR=3.97,  $p<0.001$ ). Professional drivers, in comparison with non-professional drivers, were less likely to know about the law limiting alcohol consumption for drivers. Professional drivers were also less likely to know that alcohol does not improve driving skills (OR=0.45, 0.39,  $p=0.01$ , 0.007).

Specific to road markings, people who have not been injured in road incidents were more likely to feel confident about the meaning of the road markings and signs along the roadways (OR=2.36  $p=0.004$ ). People who have been able to avoid a crash situation were also more likely to feel confident about the meaning of the road markings and signs along the roadways (OR=1.8  $p=0.01$ ). Similarly, rural people (i.e., respondents outside the demonstration corridor) were more confident about this knowledge (OR=2.03  $p=0.001$ ).

Specific to speeding, respondents over 30 years old were more likely to know that damage and injuries are more severe when the crashing drivers drive faster (OR=2.1,  $p=0.001$ ). In this respect, females were less likely to know this information (OR=0.47,  $p<0.001$ ). Interestingly, experienced drivers were also less likely to know this information (11-16 years: OR=0.27,  $p=0.004$ ; over 16 years: OR=0.2,  $p=0.013$ ), as were rural respondents (i.e., respondents outside the demonstration corridor) (OR=0.66,  $p=0.032$ ).

Specific to the use of seatbelts, people who have not been injured were more likely to know that the use of seatbelts both at higher and at lower speeds result in safer outcomes (OR=2.18,  $p=0.004$ ). Additionally, professional drivers were less likely to know about this than non-professional drivers (OR=0.368,  $p=0.001$ ).

Specific to the use of helmets, respondents outside the demonstration corridor are less likely to know that it is not fine not to wear a helmet on a motorcycle even when you do not go too fast (OR=0.37,  $p<0.001$ ). Professional drivers are less likely to know this (OR=0.47,  $p=0.012$ ). With respect to the bicycle helmets, people inside the Demonstration Corridor (OR=1.58,  $p=0.047$ ), females (OR=2.24,  $p=0.001$ ) and experienced drivers are more likely to know this.

### Attitudes

This subsection analyzes the attitudes of Belizeans with regards to social issues (Q1), serious issues in road safety (Q2), beliefs about enforcement and education (Q4) and attitudes in relation to practice (Q6). Similarly as with the previous subsections, some variables within this subsection also employ a six-point scale to assess respondent input (e.g., from 1-“not at all concern” to 6-“extremely concern”).

With respect to road safety in general, the following results were found:

- > Road safety: Respondents 30 years and over were less likely to be concerned about road safety (or=0.22, p=0.007). Likewise, professional drivers were also less likely to be concerned (or=0.43, p=0.019) with regards to road safety.

With respect to serious issues in road safety, the following results were found:

There were no significant differences between respondents according to age and location. The main differences were between gender and urban/rural areas.

- > Drivers under the influence of alcohol: Females were less likely to be concerned (OR=0.24, p=0.002). Rural population were more likely to be concerned (OR=8.2, p<0.001).
- > Speeding drivers: Females were less likely to be concerned (OR=0.16, p<0.001) and people outside the corridor were more likely to be concerned (OR=4.4, p=0.001).
- > Drivers and motorcyclists being careless when overtaking other drivers: Females were less likely to be concerned (OR=0.47, p=0.039). Rural population was more likely to be concerned (OR=2.4, p=0.003). People who had been able to avoid a crash situation were less likely to be concerned (OR=0.49, p=0.03).
- > Drivers under the influence of drugs other than alcohol: Females were less likely to be concerned (OR=0.295, p<0.001). Rural population was more likely to be concerned (OR=1.95, p=0.028).
- > Overconfident pedestrians who believe they have the right of way: Females were less likely to be concerned (OR=0.574, p=0.034). Rural population were more likely to be concerned (OR=4.37, p<0.001).
- > Bicyclists not paying attention to traffic on the road: Rural population were more likely to be concerned (OR=3.22, p<0.001).
- > Drivers texting while driving: Females were less likely to be concerned (OR=0.397, p=0.007). Rural population were more likely to be concerned (OR=4.399, p=0.001). Professional drivers were more likely concerned (OR=7.85, p=0.004).
- > Motorcycle riders carrying too many passengers: Females were less likely to be concerned (OR=0.521, p=0.008). Rural population were more likely to be concerned (OR=2.576, p<0.001).
- > Drivers not wearing seatbelts: Females were less likely to be concerned (OR=0.5, p=0.005). Rural population were more likely to be concerned (OR=3.822, p<0.001).
- > Motorcycle riders not wearing helmets: Professional drivers were likely more concerned (OR=1.6, p=0.04).

Regarding beliefs about enforcement and education, the following results were found:

- > There should be more enforcement of traffic laws by transport and police officers: people 30 years old and over (OR=2.36, p=0.009) and people who had been able to avoid a crash (OR=2.48, p=0.003) were more agreeable. Females (OR=0.385, p=0.003), people who have

never been injured (OR=0.054,  $p<0.001$ ) and living in rural areas (OR=0.056,  $p<0.001$ ) were less agreeable.

- > There should be more education for the public about road safety: people who had been able to avoid a crash (OR=2.2,  $p=0.003$ ) were more likely to agree. Females (OR=0.495,  $p=0.007$ ) and people living in rural areas (OR=0.197,  $p<0.001$ ) were less likely to agree.
- > There should be stricter testing of driving skills to obtain a driver's license: professional drivers were more likely to agree (OR=3.5,  $p=0.013$ ).
- > There should be stricter rules for the licensing of public transport bus drivers and drivers of transport trucks: females (OR=0.43,  $p=0.001$ ) and people living in rural areas (OR=0.293,  $p<0.001$ ) were less likely to agree.

## Summary of main findings

The results relying on univariate, bivariate and logistic regression analyses of data from the KAP survey, shed light on the knowledge, attitude and behaviors of Belizeans.

According to the univariate distributions of self-reported behaviors, "Pedestrians crossing the roads when it's not safe to cross" was the most reported risky behaviour (65.3% of the respondents reporting having seen it often). "Not wearing seatbelts" follows with 61.6% reporting not wearing it in the backseat, 52.8% not wearing it when driving a car in the city and 50.3% when driving a car on the highway. Not wearing reflective gear when walking or bicycling in the dark was also one of the most reported risky behaviors with 49.3% reporting it while walking and 45.2% while biking. Approximately 48% of the respondents reported speeding at least 15 miles faster than the speed limit when driving a car and 31% reported doing so when riding a motorcycle. With respect to distracted driving, 40.9% reported often talking on a cell phone while driving a car, 24.1% while riding a motorcycle; and 40.1% reported often texting while driving a car and 29% while riding a motorcycle. Specific to drinking and driving, 36.7% reported often riding as a passenger with a driver who has had more than 2 glasses of alcohol to drink, 28.6% reported often driving a car after drinking more than 2 glasses of alcohol and 26.2% reported doing so when riding a motorcycle.

Building on these findings, logistic regression analysis was used to compare different groups of interest to find out who is more likely to engage in these behaviors while also controlling for different possible confounding variables. Although some of the findings from the bivariate analyses initially suggested that there were more differences that appeared to be significant, when controlling for confounding variables this turned out to be no longer the case. When this happened, such apparent significant differences were no longer considered, while significant findings according to the logistic regression analysis were. As such, the following results were confirmed:

- > Females are more likely to not wear their seatbelt as a passenger in the backseat than males (OR=2.85,  $p<0.001$ );



- > Respondents of at least 30 years old are more likely to not wear their seatbelt while driving a car on the highway (OR=2.07,  $p=0.005$ );
- > With respect to distracting driving, males are more likely to text while driving a car (OR=2.2,  $p=0.003$ ) and females are more likely to talk on the phone while riding a motorcycle (OR=6.4,  $p<0.001$ );
- > People inside the Demonstration Corridor (OR=1.88,  $p=0.026$ ) and younger than 30 years old (OR=2.04,  $p=0.009$ ) are more likely to text while riding a motorcycle;
- > Specific to drinking and driving, females are more likely to drive a car after drinking more than 2 glasses of alcohol (OR=2.56,  $p<0.001$ ). This finding appears to contradict the knowledge that suggests males are more likely to drink and drive. However, some of the evidence in the literature review suggests that drinking among females has increased in the past three decades (Gudrais 2011) and lends credence to the possibility that females are also at risk of this dangerous behaviour;
- > With respect to speeding, males are more likely to ride a motorcycle at least 15 miles faster than the speed limit (OR=2.23,  $p=0.014$ ).

All of these risky behaviours can be explained by lack of knowledge and attitudes among the population, at least partially. The data clearly support that few people know how much they can drink before reaching the limit (only 39.8%), with young people and males being more likely to not know about the law. The main reason cited for drinking and driving was that it relaxes and makes them feel like better drivers (11.57%). With respect to speeding, only 55.3% reported knowing that higher severity of injuries is associated with driving faster/higher speeds and the main reason for speeding was that the respondents believed they are good drivers (78.6%). Specific to wearing seatbelts, the top reason why people are not wearing their seatbelt is because they simply forget to put it on (65.4% in the front seat and 70.6% in the back seat).

Based on the result from the univariate, bivariate, and multivariate analyses, a picture begins to emerge in terms of what dangerous behaviours to focus on and how to address it. In the next section, data from the focus groups with the public are described.



# RESULTS FROM FOCUS GROUPS WITH THE PUBLIC

## Introduction

In this section the results from the focus groups with the public are described. A total of 80 Belizeans participated in the focus groups (refer to the methods section for a detailed description of the methodology used and the distribution of respondents according to a variety of relevant dimensions such as age and gender).

First, a high-level summary is provided, which is followed by a more detailed description of results according to the different questions that were asked.

## Overall focus group summary

Of most concern with respect to road safety, according to focus group participants, are the issues and behaviours related to speeding, improper overtaking/passing maneuvers, distracted driving, and overcrowded vehicles. These safety concerns are largely seen as the result of a lack in consistent enforcement practices, a lack of public awareness and education of best road safety practices, and the need for stricter penalties and licensing practices.

With respect to examples of good behaviours, only *family*, as a categorized identifiable group, was uniformly seen as setting a good public example for road safety practices. All other road user categories (i.e., peers/friends, government employees, professional drivers, and enforcement officers) were more closely identified as exhibiting risky behaviours and thus setting bad examples for public consumption.

Suggested remedial efforts include a large focus on the use of media, specifically local and national news outlets in addition to local and international digital and social media platforms (i.e., Belize Telemedia Limited, Facebook, and Smart).

The implementation of law enforcement campaigns, in addition to education and awareness campaigns, towards remedial efforts are seen as necessary and vitally important.

## Summary according to focus group questions

*Q1: Do you believe many people in Belize are concerned about road safety? What do you think people in Belize are more concerned with today?*

According to the majority of focus group participants, Belizeans are very concerned about the challenges faced with respect to road safety. To illustrate, one participant expressed the following observations:

“...there is [sic] a lot of topics that need to be touched and addressed in Belize, but road safety is definitely one of them. Our highways are really dangerous ... they all need to be more careful and



... address all these safety issues and stuff ... and all the laws. A lot of people ...lots of people, they're not doing anything about it."

Generally, issues involving inconsistent law enforcement efforts, highway safety practices involving high rates of speeding and overtaking, improper child-safety practices, pedestrian safety violations, impaired driving, distracted driving, and a general lack of traffic signs are of high concern. Aside from road safety, other major and often superseding concerns relate to a perceived high prevalence of violence and crime, unemployment, and reservations relating to the quality of public education and healthcare. As an example, one participant explains:

"I never hear it (i.e., road safety issues) on the radio or on TV. Individuals are concerned about road safety, but on [sic] the media the focus is on other issues that they consider – like crime and violence and that kind of thing, and health, health issues and so on, but ... if some accident happen [sic] they will put that on TV or announce it on the radio, but that's the end of it."

*Q2: When thinking about road safety in Belize, what topic do you think Belizeans believe is the most important problem?*

According to focus group participants, when thinking about the most important road safety issues in Belize, speeding was most frequently identified as being of great concern. Improper overtaking/passing maneuvers, seatbelt use, and impaired driving, were also among the most important problems identified. Other reported issues included concerns relating to public infrastructure: lack of speed bumps, lack of traffic signs, lack of street lights, and narrow roads.

*Q3: What are two of the most dangerous things you see other drivers do on the road?*

Participants most often identified distracted driving behaviours (i.e., cell phone use: texting, talking; loud music; etc.) as some of the most dangerous actions performed by other drivers on the road. Participants identified as a secondary concern (as was made clear by the previous participant's account) issues relating to overcrowding, overloading and overtaking (i.e., passing maneuvers), with particular focus on public transportation services (i.e., buses). A list of other important issues identified included: impaired driving, speeding, child-safety, improper lighting (i.e., vehicle and street lighting), seatbelt use, and improper roadside pick-up and drop-off practices (i.e., public transportation).

As an interesting illustration of pushing the limits in terms of capacity of vehicles, one participant described the dangerous convergence of some the different issues in the following way, referring to both motorcyclists and non-motorcyclist drivers, as he explains:

"I see some drivers put their babes in their lap with them when they drive, and they [sic] young! ... I saw one time, four people – I'm really not over exaggerating – I saw four people 'pon fat [sic] motorcycle."

Q4: *Why do you think people behave dangerously on the road like this?*

On the subject of motivating factors, participants most often identified the following:

- > For drivers: lack of enforcement was the most cited reason followed by feelings of being rushed/hurried.
- > Additionally, other reasons given included distraction (i.e., cell phone: texting and talking, children, loud music), egocentricity (i.e., competition, racing, imitation, showing-off, attention seeking, love of speed, feeling entitled), sense of empowerment (i.e., feeling of safety as the driver versus pedestrian, recklessness/carefree), impairment (i.e., alcohol), improper license acquisition (i.e., bought license), unawareness (i.e., lack of road safety education), and road rage.
- > For motorcyclists: egocentricity (i.e., attention seeking, imitation, competition, feeling entitled) and lack of enforcement were most often identified as behavioural motivations.
- > For pedestrians: sense of empowerment (i.e., protected by law) and unawareness (i.e., lack of road safety education) were most often cited.
- > For bicyclists: sense of empowerment (i.e., protected by law) and unawareness (i.e., lack of road safety education) were most often cited.
- > Of interest, there seems to be a perceived association between bicyclists, young people, gangs, and criminality (i.e., a lot of people on bicycles – they are perceived as being robbers). For example, as illustrated by one respondent: “sometimes these bicyclists, they ride even on the walkways, and the look to knock you down. Right? Now why is that? I look at the people who do that, and mostly they’re young people. Right? And, I would even go as far as to say that some are gang related. Right? And some of them are people who normally give trouble. Right? And, they don’t care and they feel like they could do what they want. So they fly through here and fly through there. You have to move out of the way when you see them coming. Right? ... A lot of people on bicycles are robbers. You with your gold chain – I remember in Belize City ... this guy come [sic]... this lady was standing beside me ... and this guy came, fly pass, and just lean over and ... tear the earring out of the lady ... it’s easier to use the bicycle and get away.”
- > For professional bus drivers: the most cited motivation relates to feelings of being rushed/hurried due specifically to incentives of increased monetary commission. Egocentricity (i.e., competition, feeling entitled) was also suggested as another important factor. In addition, over-confidence, general disregard for road safety, and improper licensing (i.e., bought license) were also mentioned.
- > For transport truck drivers: the most cited motivation identified was to feelings of empowerment (i.e., sense of control, authority, and safety due to size of vehicle) and feelings of being hurried (i.e., incentivized to speed in order to meet with scheduled deadlines). In addition, impairment (i.e., alcohol), improper license acquisition (i.e., bought license) were also mentioned.

Q5: *Whose behaviour on the road sets an example for the public?*

On the subject of road safety role models, participants uniformly identified family, as an identifiable group, as exhibiting good on-road behaviour, in particular because safety is seen as being of high priority with respect to families. However, participants commonly did not identify peers/friends, government employees, professional bus and transport drivers, nor transport and police officers as exhibiting good behaviours appropriate in setting an example for the public. Government employees, in particular, were identified most often as the worst offenders:

“once they have blue license plate [*sic*] they don’t worry about nobody. ... not even check point...”

Similarly, enforcement officers were identified as often being both inconsistent and dishonest:

“whenever you see check point, if they stop the bus – but when you see they stop private vehicle [*sic*] – it’s a hustle.”

Q6: *What actions or information do you believe is needed to convince people to be more careful on the road?*

On the subject of appropriate remedial actions, increased enforcement of current regulations and the introduction of education and awareness campaigns were most often cited across most road user types. Specific to the different categories of road users, the following were also suggested:

- > For drivers: increased/harsher penalties for violations, encouraging the increased use of public transport, encouraging public reporting of dangerous behaviours, changes to driving age requirements (i.e., from 18 to 20), addressing physical infrastructure of highways (i.e., lane widening).
- > For motorcyclists: enforcement of maximum carrying/occupancy capacity regulations, mandatory training and use of helmets and protective clothing, harsher penalties and stricter laws, license suspensions, and changes to vehicle registration were also mentioned.
- > For pedestrians: increase stopping distance requirements at pedestrian stops to 100 yards, increasing the number of pedestrian ramps, increasing the number of traffic lights, installing pedestrian road-side railings, installing more traffic signs, and building more walkways were also cited.
- > For bicyclists: introduction of scalable enforcement practices, warnings (on 1st and 2nd infractions) and penalties (on 3rd and ensuing infractions), reintroduction of bicycle registration programs, and the introduction of licensing requirement were also mentioned.
- > For professional bus drivers: increased training requirements, reducing scheduling pressure(s), increased/harsher fines and penalties (i.e., license suspensions, demerit system, penalize passengers), setting and monitoring compliance of carrying/occupancy capacities, encourage public reporting of unsafe behaviours, corporate responsibility practices, employer liability, and encouraging the formation of professional transport association(s) authority were all suggested.



- > As per transport truck drivers: restricting and/or avoiding transport during high traffic periods and the introduction of separate trucking roads and/or lanes were also mentioned.

*Q7: If an educational campaign was organized to help improve road safety in Belize, what do you think is the most important feature of this campaign to change behaviour and make people be safer on the road?*

On the subject of identifying important education and awareness campaign features, participants across the focus groups cited the following:

- > For content: vibrant and attractive education and awareness campaigns coupled with provocative (i.e., shock and awe) messaging. Include information about current laws, regulations, penalties, and police enforcement efforts. Youth specific targeted campaigns should focus on in-school presentations. Targeting illiterate individuals using physical, visual, auditory, and community means (i.e., signs at bus stops). Delivered during peak viewing hours and community events (i.e., meetings and celebrations).
- > For materials: social media (i.e., Facebook), traditional media (i.e., local and national T.V. and radio news outlets), cellphone/mobile texting messaging campaigns (i.e., Smart and BTL services).
- > For influencers: family, parents in particular, mothers to be specific, are most often cited as influential.
  - » When targeting younger audiences, respected authority, peers, and celebrity figures were also suggested as being influential groups. Educational institutions were also seen as important messaging portals.
  - » When targeting older audiences, education messages should focus on outlining existing laws, penalties and consequences.

*Q8. Do you think improved enforcement of traffic laws by police and transport officers is necessary to change people's behaviour?*

In relation to improved enforcement, a unanimous majority of focus group participants reported that consistent and honest enforcement of traffic laws (i.e., punishment of bad behaviour and incentivizing good behaviour) by police and transport officers is necessary to change behaviours and to reinforce the idea that driving is a privilege and not a right. One participant summarized the issue in the following way:

“they need to get down and serious about it ... People need to look at it from a safe – from a real point of view. They should look at it from a safety point of view.”



# RESULTS FROM FOCUS GROUPS AND KEY-INFORMANT INTERVIEWS WITH STAKEHOLDERS

## Introduction

In this section the results from the focus groups and key-informant interviews with stakeholders are summarized. For a detailed description of participants in these focus groups and interviews, refer to the methods section.

## Summary results

Using the methodology described in the methods section, the following results emerged from the focus groups and key-informant interviews with stakeholders.

- > Overall, there was a high level of participation during the meetings; all participants were engaged in discussion and shared insightful information that serves as original, empirical data that will be synthesized in an organized fashion to inform the communications strategy;
- > While not all representatives agreed on every perspective or experience that was discussed, there was general agreement regarding main themes that emerged in almost all of the discussions. These findings can provide strong direction in relation to the focus and priorities that should be considered as components or features of the communications strategy:
  - » There was consensus that education and general knowledge of safe driving practices and road safety strategies were limited among the population. This was linked to a lack of driver education and minimal licensing requirements which result in misperceptions about risks to different groups of road users and is associated with various unsafe behaviours. It particularly contributes to unsafe practices being adopted by younger generations.
  - » There was agreement among participants that education will be more effective if it is coupled with enforcement and that higher levels of enforcement would be beneficial. Although resource limitations exist, some alternatives were identified among different stakeholders that can be considered and explored to help augment enforcement.
  - » There was agreement that overtaking vehicles in an unsafe way, non-use of seatbelts and speeding are major concerns that should be addressed, especially in light of the fact that the road is shared with vulnerable road users like pedestrians and bicyclists.

- » The lack of knowledge regarding road markings and signage as well as distraction was also a concern in relation to all road users.
  - » It was noted that government representatives at various levels and across agencies were often viewed as role models by other road users in terms of behaviour. In this regard, it was considered important that staff within government agencies consistently adhere to safe practices on the road to encourage and reinforce safe practices within the population. It was also suggested that youth can play a substantial role in changing social norms and encouraging their peers as well as their parents to adopt safe practices.
  - » It was acknowledged that the close relationships within communities and the influence of senior leaders can make it more challenging for road safety stakeholders to consistently reinforce road safety strategies.
  - » There was agreement that limitations associated with other systems within road safety related to data collection, vehicle safety, and registration are barriers to managing and tracking road user behaviour to increase safety.
- > In terms of differences between stakeholder groups, one theme that stood out is the fact that different stakeholder groups have access to different media to distribute and disseminate information, and that it would be worthwhile to capitalize on these capabilities.

## CONCLUSIONS AND RECOMMENDATIONS

In preparation of designing and delivering biannual road safety campaigns in Belize, data were collected among Belizeans to inform a communications strategy. This data collection effort relied on the following three methodologies:

- > Knowledge, Attitudes, Practices (KAP) Survey: a survey among a representative sample of Belizeans collecting data about their knowledge, attitudes and practices with respect to road safety;
- > Focus groups with Belizeans: several focus groups with members from the public to collect in-depth data about their knowledge, attitudes and behaviour with respect to road safety;
- > Focus groups and key informant interviews with road safety stakeholders: several focus groups and semi-structured interviews with representatives of relevant stakeholders in Belize about road safety.

Before collecting these data, relevant literature about road safety in general and road safety in Belize was reviewed and summarized. Conclusions from this literature review were used when developing the methods of data collection and in preparation of the actual data collection and analysis.

Based on this three-pronged approach, several important findings from the literature are confirmed and some – perhaps somewhat surprising – findings emerged. With respect to the former, the data that were collected clearly support the notion that there are some priority issues with respect to road safety that need addressing. This includes the problem of speeding, drinking and driving, low use of seatbelts, distracted driving and not using reflective clothing when walking down the street or riding a bicycle in the dark. This conclusion is supported by evidence obtained in each of the three, independent sources of information and is bolstered by crash data from Belize described in the literature review. While other dangerous behaviours occur in Belize, it appears that in terms of priorities, these are the behaviours that need immediate attention. The following results from the KAP survey are used to illustrate this:

- > Of all respondents, 52.8% report not wearing their seatbelt when driving a car in the city and 50.3% when driving a car on the highway; 61.6% report not wearing a seatbelt in the backseat.
- > Approximately 48% of the respondents reported speeding at least 15 miles faster than the speed limit when driving a car and 31% reported doing so when riding a motorcycle.
- > Specific to drinking and driving, 36.7% reported often riding as a passenger with a driver who has had more than 2 glasses of alcohol to drink, 28.6% reported often driving a car

after drinking more than 2 glasses of alcohol and 26.2% reported doing so when riding a motorcycle.

- > Not wearing reflective gear when walking or bicycling in the dark was reported by 49.3% while walking and 45.2% while biking.
- > With respect to talking on a phone and texting while driving, 40.9% reported often talking on a cell phone while driving a car, and 40.1% reported often texting while driving a car
- > With respect to talking on a phone and texting while riding a motorcycle, 24.1% report often talking on a cell phone while riding a motorcycle; and 29% reported often texting while riding a motorcycle.

Data from the focus groups with the public as well as the stakeholders corroborate these findings. For example, speeding, drinking and driving and distracted driving have been consistently identified by participants as priority issues of great concern.

In terms of who is engaging in these dangerous behaviours, while some findings were as expected, there were also some findings that are more surprising, especially in relation to gender. For example, females were found to be more likely not to wear their seatbelt as a passenger in the backseat than males. Equally concerning, but perhaps more unexpected, females were found to be more likely to drive a car after drinking more than 2 glasses of alcohol compared to males. This finding challenges well-established research that shows that males are more likely to engage in this behaviour. However, we also noted in the literature review that there is some evidence that suggests that drinking among females has increased in the past three decades in several countries and this may lend credence to the possibility that females may also be at high risk of engaging in this dangerous behaviour.

The data collected in this study also provides insight into possible avenues to address the issues. For example, one of the main reasons why people do not wear their seatbelt is because they simply forget about wearing it. Another important finding suggests that the reason why they speed is because they are over-confident in their own abilities. Detailed data from this study about knowledge and attitudes in relation to these priority road safety issues are available and can be used to tailor the biannual campaigns accordingly and target the specific reasons people engage in risky behaviours.

Finally, with respect to how to communicate with Belizeans, and whether there is support for corrective measures, our data clearly and demonstratively show that Belizeans care deeply about road safety and are supportive of increased levels of enforcement, increased levels of education, enhanced licensing procedures as well as the use of mass and social media. Overall, levels of concern about a variety of dangerous behaviours among Belizeans and levels of support for several measures were consistently high. Such high levels of concern and support are indicative of the opportunities that exist in Belize to improve road safety. It is therefore recommended that the data from this report are used to inform the development of the communications strategy. In particular, the following recommendations are formulated:

- > To focus on the priority issues identified in this report when designing and delivering the road safety campaign strategy;
- > To use the detailed results about demographic information to inform the choice of target audiences;
- > To use the detailed results about knowledge and attitudes to inform the choice of pathways to correct bad behaviour;
- > To use the detailed results about levels of concern and support and preferences for particular media to inform the design of the communications strategy.



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# APPENDIX

## Survey Questionnaire

### Introduction

**Introduction.** Good morning/afternoon/evening, my name is \_\_\_\_\_ and I am calling from Great Belize Research Centre, an independent research firm based in Belize City working in conjunction with the Traffic Injury Research Foundation, an international research firm based in Canada. We are conducting a study for the Government of Belize to ask people about traffic and road safety. This interview will just take 10 minutes. The information you provide will only be used by the research team to help make roads safer in Belize. Will you please help us by answering some questions?

- > No – No time now (**call back later?**)
- > No – Refused (**try to convert respondent**)
  - » The information that you and others provide will help make roads safer in Belize.
  - » Answering all the questions should only take about 10 minutes. Your answers will be kept confidential and only used for research purposes. May I continue?
  - » No – Refused (**thank and terminate**)
- > Yes – **Continue to survey with filter question:**
  - » In the past 30 days, have you driven a car, a motorcycle or a bicycle on the road, or have you walked as a pedestrian on the road?
    - Yes – **Continue to survey**
    - No – Has not driven a car or motorcycle or bicycle or walked on the road in the past 30 days (**thank and terminate**)

**INCLUDE IN SAMPLE ONLY THOSE RESPONDENTS WHO HAVE DRIVEN A CAR, A MOTORCYCLE OR A BICYCLE ON THE ROAD, OR HAVE WALKED AS A PEDESTRIAN ON THE ROAD IN PAST 30 DAYS (SEE ALSO SURVEY PROTOCOL).**

#### DEFINITIONS:

- > **CAR: AUTOMOBILE OR TRUCK**
- > **MOTORCYCLE: MOTORIZED TWO-WHEELER**
- > **BICYCLE: NON-MOTORIZED TWO-WHEELER**

**DO NOT INCLUDE SOMEONE WHO IS TALKING ON BEHALF OF THE RESPONDENT INCLUDED IN THE SAMPLE. IF THE PERSON INCLUDED IN THE SAMPLE IS NOT AVAILABLE, DO NOT CONTINUE THE INTERVIEW WITH THE PERSON TALKING ON BEHALF OF THE RESPONDENT.**

**Q1. I'd like to ask you some questions about social issues in Belize. I will read you a list of items and for each one I'd like you to tell me how concerned you are about it, using a scale of 1 to 6, where 1 means you are not at all concerned, and 6 means you are extremely concerned. You can choose any number from 1 to 6 that best represents your opinion. The first is...(ROTATE ORDER OF QUESTIONS AND REPEAT ANSWERING SCALE AT THIRD ITEM; ASK ALL RESPONDENTS)**

- Q1a Violent crime
- Q1b Road safety (If respondent asks what road safety means, say "Road safety relates to how people behave on the road and how their behaviour can sometimes result in road crashes")
- Q1c Unemployment
- Q1d Health and education

**Q2. Now I'm going to read you a list of issues involving road safety only. For each one, I'd like to know how serious a problem you think it is today in Belize. Please give me a number between 1 and 6, where 1 means you feel it is not a problem at all, and 6 means you feel it is an extremely serious problem. The first one is...(ROTATE ORDER OF QUESTIONS and REPEAT ANSWERING SCALE EVERY 3 TO 4 ITEMS AND REMIND PEOPLE THEY CAN CHOOSE ANY NUMBER FROM 1 TO 6; ASK ALL RESPONDENTS)**

- Q2a Drivers under the influence of alcohol
- Q2b Speeding drivers
- Q2c Drivers and motorcyclists being careless when overtaking other drivers
- Q2d Drivers under the influence of drugs other than alcohol
- Q2e Overconfident pedestrians who believe they have the right of way
- Q2f Bicyclists not paying attention to traffic on the road
- Q2g Drivers texting while driving
- Q2h Motorcycle riders carrying too many passengers
- Q2i Drivers not wearing seatbelts
- Q2j Motorcycle riders not wearing helmets

**Q3. For each of the following statements, please tell me how often you do it by giving me a number between 1 and 6, where 1 means "never", and 6 means "very often". How often do you...(ROTATE ORDER OF QUESTIONS AND REPEAT ANSWERING SCALE EVERY 3 TO 4 ITEMS AND REMIND PEOPLE THEY CAN CHOOSE ANY NUMBER FROM 1 TO 6; Use filter to see if respondent drives a car or rides a motorcycle or bicycle; if not, record as "not applicable"; if yes, use answering scale.)**

- Q3a **If respondent drives car (yes/no), how often do you:** Drive a car after drinking more than 2 glasses of alcohol
- Q3b **If respondent rides motorcycle (yes/no), how often do you:** Ride a motorcycle after drinking more than 2 glasses of alcohol
- Q3c **If respondent drives car (yes/no), how often do you:** Drive a car at least 15 miles faster than the speed limit (or 25 kilometers if respondent prefers using kilometers)
- Q3d **If respondent rides motorcycle (yes/no), how often do you:** Ride a motorcycle at least 15 miles faster than the speed limit (or 25 kilometers if respondent prefers using kilometers)
- Q3e **If respondent drives car or rides motorcycle (yes/no), how often do you:** Overtake other drivers on a curve or when there is a double yellow line on the road



- Q3f **All respondents, how often do you:** Ride as a passenger with a driver who has had more than 2 glasses of alcohol to drink
- Q3g **If respondent drives car (yes/no), how often do you:** Drive a car after taking illegal drugs other than alcohol
- Q3h **If respondent rides motorcycle (yes/no), how often do you:** Ride a motorcycle after taking illegal drugs other than alcohol
- Q3i **All respondents, how often do you:** See a pedestrian crossing the road when it's not safe to cross
- Q3j **If respondent rides bicycle (yes/no), how often do you:** Ride a bicycle in the dark without bicycle lights and without wearing reflective clothing
- Q3k **If respondent drives car (yes/no), how often do you:** Text while driving a car
- Q3l **If respondent rides motorcycle (yes/no), how often do you:** Text while riding a motorcycle
- Q3m **All respondents, how often do you:** Walk down the street when it's dark without wearing reflective clothing
- Q3n **If respondent drives car (yes/no), how often do you:** *Not* wear your seatbelt when driving a car in the city
- Q3o **If respondent drives car (yes/no), how often do you:** *Not* wear your seatbelt when driving a car on the highway
- Q3p **All respondents, how often do you:** *Not* wear your seatbelt as a passenger in the backseat of a car
- Q3q **If respondent rides motorcycle (yes/no), how often do you:** *Not* wear a helmet
- Q3r **If respondent rides bicycle (yes/no), how often do you:** *Not* wear a helmet
- Q3s **If respondent drives car OR rides motorcycle (yes/no), how often do you:** *Not* signal when turning
- Q3t **If respondent drives a car AND has a young/small child (yes/no), how often do you:** *Not* use a special seat to restrain a child in the car (if respondent asks what is a young/small child, say "a child that would fit in a special car seat for small children")
- Q3u **If respondent rides a motorcycle AND has young/small child (yes/no), how often do you:** Take a child on a motorcycle as a passenger (if respondent asks what is a young/small child, say "a child that would fit in a special car seat for small children")
- Q3v **If respondent drives a car (yes/no), how often do you:** Talk on your cell phone while driving a car
- Q3w **If respondent rides motorcycle (yes/no), how often do you:** Talk on your cell phone while riding a motorcycle
- Q3x **All respondents, how often do you:** ride in the pan of a pick-up truck

**Q4. For each of the following statements, I'd like you to tell me the extent to which you agree or disagree. You can do this using a scale of 1-6, where 1 represents strongly disagree and 6 represents strongly agree...(ROTATE ORDER OF QUESTIONS AND REPEAT ANSWERING SCALE AT ITEM 3 AND REMIND PEOPLE THEY CAN CHOOSE ANY NUMBER FROM 1 TO 6; ASK ALL RESPONDENTS)**

- Q4a There should be more enforcement of traffic laws by transport and police officers
- Q4b There should be more education for the public about road safety
- Q4c There should be stricter testing of driving skills to obtain a driver's license
- Q4d There should be stricter rules for the licensing of public transport bus drivers and drivers of transport trucks

**Q5. Can you please answer the following questions with True or False?... (ROTATE ORDER OF QUESTIONS; ASK ALL RESPONDENTS)**

- Q5a In Belize there is a law that limits how much alcohol you are allowed to drink before driving... True/False  
  - Q5aa (Only if respondent answers True to Q5a): Do you know what that limit is? \_\_\_\_\_
- Q5b Drinking alcohol improves your driving skills... True/False
- Q5c The meaning of road markings and signs along the road is clear to me... True/False



- Q5d In a crash the damage and injuries are more severe when the crashing drivers drove faster...True/False
- Q5e Wearing a seatbelt is only safer at higher speeds...True/False
- Q5f Not wearing a helmet on a motorcycle is fine as long as you don't go too fast...True/False
- Q5g Helmets are not necessary for bicycles...True/False

**Q6. Can you please answer the following questions with one or more of the provided answering options?... (ROTATE ORDER OF QUESTIONS AND ORDER OF ANSWERING CATEGORIES; ONLY ASK QUESTION IF RESPONDENT ANSWERED 2 OR HIGER ON QUESTION 3)**

- Q6a **If respondent drives car or rides motorcycle AND answered 2 or higher on Q3c or Q3d:** I drive or ride fast because:
  - Q6aa It's fun to drive fast (Yes/No)
  - Q6ab I am often in a hurry (Yes/No)
  - Q6ac I don't believe it's unsafe to drive fast (Yes/No)
  - Q6ad I am bored when I drive the speed limit (Yes/No)
  - Q6ae I am a good driver (Yes/No)
  
- Q6b **If respondent drives car or rides motorcycle AND answered 2 or higher on Q3a or Q3b:** I drive or ride after drinking alcohol because:
  - Q6ba It relaxes me so I drive better (Yes/No)
  - Q6bb I am better than the average driver so it's ok for me to drink before driving (Yes/No)
  - Q6bc I don't think drinking alcohol makes me less safe as a driver (Yes/No)
  - Q6bd My friends do it, so I can too (Yes/No)
  
- Q6c **If respondent rides a motorcycle AND answered 2 or higher on Q3q:** I don't use a helmet when riding a motorcycle because:
  - Q6ca It makes me look silly (Yes/No)
  - Q6cb It is too warm (Yes/No)
  - Q6cc My friends don't wear a helmet (Yes/No)
  - Q6cd Wearing a helmet doesn't protect me in a crash anyway (Yes/No)
  - Q6ce A motorcycle helmet is too expensive (Yes/No)
  
- Q6d **If respondent rides a bicycle AND answered 2 or higher on Q3r:** I don't use a helmet when riding a bicycle because:
  - Q6da It makes me look silly (Yes/No)
  - Q6db It is too warm (Yes/No)
  - Q6dc My friends don't wear a helmet (Yes/No)
  - Q6dd Wearing a helmet doesn't protect me in a crash anyway (Yes/No)
  - Q6de A bicycle helmet is too expensive (Yes/No)
  
- Q6e **To all respondents if they answered 2 or higher on Q3n or Q3o:** I don't wear a seatbelt in the front seat of the vehicle because:
  - Q6ea I forget to put it on (Yes/No)
  - Q6eb It's too much trouble to put it on (Yes/No)
  - Q6ec It would trap me in the vehicle in a crash (Yes/No)
  - Q6ed Wearing a seatbelt doesn't protect me in a crash anyway (Yes/No)
  
- Q6f **To all respondents if they answered 2 or higher on Q3p:** I don't wear a seatbelt in the backseat of the vehicle because:
  - Q6fa I forget to put it on (Yes/No)
  - Q6fb It's too much trouble to put it on (Yes/No)
  - Q6fc It would trap me in the vehicle in a crash (Yes/No)
  - Q6fd Wearing a seatbelt doesn't protect me in a crash anyway (Yes/No)
  - Q6fe The law doesn't require me to wear it (Yes/No)



## Demographic information

- Q7 Have you ever been injured in a motor vehicle accident? Yes/No; Only include injuries that required medical attention. **(Includes injuries sustained as driver, passenger, pedestrian, etc.)**
- Q8 Have you ever been involved in a situation where you almost crashed but were able to avoid the crash? Yes/No
- Q9 How long have you had your driver's license? \_\_\_\_\_ **(Note the number of years the respondent has had his/her driver's license; If respondent does not have a driver's license, use the number '0'; if respondent has had a driver's license for less than one year, write down the number of months followed by the word "months")**
- Q10 Approximately how many miles (or kilometers if the respondent prefers km) do you drive or ride a motorcycle in a typical month? \_\_\_\_\_ miles (\_\_\_\_\_ km) **TO GREAT BELIZE PRODUCTIONS: MAKE SURE THE PROPER SCALE IS USED FOR CONVERSION PURPOSES AND CONSISTENCY ACROSS RESPONDENTS**
- Q11 What is your age please? \_\_\_\_\_ **(in years)**
- Q12 Which of the following best describes your family status **(ONLY ONE ANSWER POSSIBLE)**
- > Single, never married
  - > Married (or living with a partner)
  - > Separated or Divorced
  - > Widow/Widower
- Q13 Gender (male/female)
- Q14 Region
- Q15 Urban/Rural
- Q16 Are you a professional driver (public transport bus driver or transport truck driver)? Yes/No

**Conclude the interview and thank the respondent for their participation.**

## Survey Data Analysis figures

### Knowledge

Table 1: Logistic Regression Models for All Knowledge Variables

	alcohol laws		alcohol limit		alcohol/skills		road signs		speeding		seat belt		helmet m.		helmet b.	
	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p
<b>insidedc</b>																
no	1		1		1		1		1		1		1		1	
yes	0.494	0.007	1.143	0.570	1.086	0.789	0.849	0.513	0.774	0.213	1.000	1.000	1.397	0.188	1.582	0.047
<b>young</b>																
16-30	1		1		1		1		1		1		1		1	
30+	1.354	0.244	1.580	0.067	1.055	0.858	0.838	0.445	2.136	0.001	1.417	0.167	1.045	0.867	0.876	0.602
<b>gender</b>																
male	1		1		1		1		1		1		1		1	
female	1.756	0.035	1.932	0.002	0.338	0.000	1.485	0.068	0.472	0.000	1.055	0.832	1.105	0.685	2.236	0.001
<b>injured</b>																
yes	1		1		1		1		1		1		1		1	
no	0.834	0.542	1.218	0.449	2.247	0.016	2.511	0.003	1.528	0.071	2.180	0.004	0.734	0.306	1.349	0.260
<b>avoidcrash</b>																
yes	1		1		1		1		1		1		1		1	
no	1.337	0.293	0.990	0.965	1.034	0.908	0.563	0.016	1.109	0.611	1.332	0.269	1.024	0.929	0.718	0.169
<b>licexperience</b>																
no drivers liscense	1		1		1		1		1		1		1		1	
less than 5 years	2.366	0.056	0.725	0.476	0.300	0.123	0.523	0.170	0.682	0.398	1.040	0.949	0.821	0.744	2.934	0.025
6 to 10 years	2.157	0.086	1.841	0.174	0.202	0.044	1.485	0.358	0.587	0.213	0.914	0.879	0.566	0.331	1.081	0.859
11 to 16 years	3.189	0.010	1.379	0.455	0.247	0.076	0.359	0.028	0.269	0.004	1.215	0.753	0.875	0.825	2.907	0.020
more than 16 years	5.637	0.041	2.472	0.159	0.094	0.011	0.618	0.474	0.226	0.013	0.844	0.863	2.441	0.299	7.899	0.023
<b>monthmiles</b>																
50 miles p/mnth	1		1		1		1		1		1		1		1	
100 miles p/mnth	1.386	0.404	0.869	0.666	1.029	0.944	0.740	0.362	0.788	0.451	1.210	0.614	0.925	0.830	0.749	0.393
150 miles p/mnth	1.220	0.608	1.087	0.810	1.479	0.338	1.403	0.323	0.885	0.721	0.910	0.792	1.678	0.204	0.782	0.538
200 miles p/mnth	1.294	0.573	0.740	0.396	2.735	0.041	0.893	0.754	0.872	0.696	1.627	0.230	2.520	0.031	1.473	0.306
more than 200 miles p/mnth	0.281	0.002	0.742	0.506	1.512	0.474	1.418	0.419	1.077	0.847	1.300	0.594	0.706	0.443	0.735	0.471
zero miles p/mnth	0.666	0.444	0.685	0.350	1.610	0.464	1.126	0.802	1.900	0.152	1.176	0.742	1.710	0.288	0.880	0.778
<b>familyst</b>																
single, never married	1		1		1		1		1		1		1		1	
living with a partner	1.080	0.798	0.907	0.703	2.014	0.020	0.739	0.193	0.890	0.592	1.723	0.046	1.280	0.370	1.050	0.847
separated or divorced	0.359	0.033	2.803	0.013	1.681	0.362	0.347	0.037	1.633	0.239	1.122	0.820	1.003	0.995	0.433	0.101
widow or widower	2.735	0.381	0.848	0.813	1.000		1.254	0.722	0.647	0.577	0.464	0.404	2.182	0.512	1.000	
<b>urbrural</b>																
urban	1		1		1		1		1		1		1		1	
rural	1.379	0.247	3.966	0.000	0.256	0.000	2.040	0.001	0.664	0.032	0.609	0.061	0.409	0.000	1.146	0.552
<b>profdriver</b>	0.450	0.011	1.083	0.800	0.388	0.007	1.174	0.578	0.852	0.511	0.368	0.001	0.468	0.012	1.241	0.405
<b>transdrive</b>	0.914	0.774	1.141	0.652	2.589	0.023	1.317	0.327	1.252	0.397	0.541	0.153	0.880	0.752	0.676	0.239
<b>transpride</b>	0.426	0.021	1.787	0.036	0.931	0.824	1.339	0.276	1.415	0.151	0.203	0.000	0.217	0.000	0.353	0.001
<b>transpvru</b>	1.134	0.669	0.844	0.493	0.489	0.021	0.714	0.186	0.688	0.101	2.125	0.027	1.153	0.664	0.555	0.040



## Attitude

		Q6AA		Q6AB		Q6AC		Q6AD		Q6AE	
		OR	p	OR	p	OR	p	OR	p	OR	p
0.insidedc	no	1	.	1	.	1	.	1	.	1	.
1.insidedc	yes	1.284	0.360	0.962	0.858	1.280	0.359	1.012	0.960	1.367	0.243
1.young	16-30	1	.	1	.	1	.	1	.	1	.
2.young	30+	0.873	0.624	0.735	0.173	0.871	0.650	1.355	0.209	0.858	0.596
0.gender	male	1	.	1	.	1	.	1	.	1	.
1.gender	female	0.451**	0.007	0.847	0.436	0.734	0.289	0.714	0.130	0.764	0.324
1.injured	yes	1	.	1	.	1	.	1	.	1	.
2.injured	no	0.331***	0.001	0.455**	0.002	0.316***	0.001	0.497**	0.005	1.058	0.854
1.avoidcrash	yes	1	.	1	.	1	.	1	.	1	.
2.avoidcrash	no	0.785	0.354	0.847	0.453	1.198	0.561	1.208	0.437	0.510*	0.014
0.licexperience	no drivers liscense	1	.	1	.	1	.	1	.	1	.
1.licexperience	less than 5 years	1.788	0.463	0.486	0.087	2.160	0.391	0.757	0.579	0.854	0.818
2.licexperience	6 to 10 years	1.781	0.474	0.336**	0.010	1.706	0.569	0.592	0.267	1.157	0.830
3.licexperience	11 to 16 years	1.269	0.767	0.326*	0.010	1.200	0.840	0.548	0.221	1.262	0.729
4.licexperience	more than 16 years	1.891	0.489	2.473	0.126	1.988	0.520	3.628	0.083	1.795	0.439
1.monthmiles	50 miles p/mnth	1	.	1	.	1	.	1	.	1	.
2.monthmiles	100 miles p/mnth	1.147	0.751	0.568	0.072	0.720	0.401	0.507	0.050	0.859	0.657
3.monthmiles	150 miles p/mnth	0.708	0.427	0.625	0.179	0.955	0.920	0.527	0.064	1.164	0.706
4.monthmiles	200 miles p/mnth	0.893	0.807	1.134	0.717	0.612	0.295	1.157	0.680	1.179	0.751
5.monthmiles	more than 200 miles p/mnth	1.449	0.448	1.497	0.320	1.287	0.607	1.000	0.999	1.350	0.596
6.monthmiles	zero miles p/mnth	0.743	0.560	0.552	0.138	0.582	0.281	0.425	0.064	1.324	0.567
1.familyst	single	1	.	1	.	1	.	1	.	1	.
2.familyst	married or living with a partner	0.778	0.394	0.735	0.180	1.185	0.559	0.971	0.905	1.079	0.785
3.familyst	separated or divorced	1.237	0.699	1.057	0.904	0.361	0.125	0.233**	0.004	1.463	0.422
4.familyst	widow or widower	3.941*	0.038	0.271*	0.020	3.080	0.124	0.114*	0.019	4.784	0.161
1.urbrural	urban	1	.	1	.	1	.	1	.	1	.
2.urbrural	rural	2.003**	0.004	0.684	0.070	1.324	0.294	1.489	0.092	0.611	0.060
profdriver	yes	1.253	0.524	0.881	0.571	0.960	0.898	0.504**	0.009	0.618	0.130
transpdrive		0.696	0.348	1.375	0.341	0.319**	0.004	0.648	0.201	0.894	0.785
transpride		2.767*	0.021	0.614	0.082	0.646	0.209	4.673***	0.000	0.358*	0.011
transpvru		0.601	0.121	0.452**	0.002	0.692	0.233	0.613	0.108	0.768	0.338
N		633		675		629		676		720	



		Q6BA		Q6BB		Q6BC		Q6BD	
		OR	p	OR	p	OR	p	OR	p
0.insidedc	no	1	.	1	.	1	.	1	.
1.insidedc	yes	2.296**	0.008	0.638	0.166	1.372	0.300	0.761	0.576
1.young	16-30	1	.	1	.	1	.	1	.
2.young	30+	0.687	0.247	0.654	0.258	0.691	0.236	1.114	0.798
0.gender	male	1	.	1	.	1	.	1	.
1.gender	female	0.752	0.327	1.157	0.660	0.264**	0.002	0.171**	0.003
1.injured	yes	1	.	1	.	1	.	1	.
2.injured	no	0.965	0.914	1.237	0.547	2.287*	0.027	0.405	0.060
1.avoidcrash	yes	1	.	1	.	1	.	1	.
2.avoidcrash	no	0.598	0.094	0.681	0.278	0.476*	0.011	1.804	0.179
0.licexperience	no drivers liscense	1	.	1	.	1	.	1	.
1.licexperience	less than 5 years	6.896	0.105	0.188**	0.007	0.209**	0.004	1.009	0.994
2.licexperience	6 to 10 years	7.921	0.096	0.424	0.138	0.221**	0.006	0.762	0.797
3.licexperience	11 to 16 years	5.041	0.185	0.675	0.520	0.244*	0.011	0.203	0.166
4.licexperience	more than 16 years	36.76**	0.006	0.795	0.791	0.434	0.265	0.844	0.893
1.monthmiles	50 miles p/mnth	1	.	1	.	1	.	1	.
2.monthmiles	100 miles p/mnth	0.826	0.702	0.252**	0.002	1.630	0.339	1.730	0.439
3.monthmiles	150 miles p/mnth	0.834	0.715	0.284*	0.019	1.438	0.478	0.275	0.167
4.monthmiles	200 miles p/mnth	0.952	0.922	0.258**	0.006	1.080	0.897	0.805	0.803
5.monthmiles	more than 200 miles p/mnth	0.671	0.548	1.126	0.816	2.856	0.083	5.646	0.056
6.monthmiles	zero miles p/mnth	0.922	0.889	0.145**	0.001	1.037	0.950	2.081	0.393
1.familyst	single	1	.	1	.	1	.	1	.
2.familyst	married or living with a partner	0.459*	0.012	0.824	0.576	0.827	0.635	3.015	0.070
3.familyst	separated or divorced	0.754	0.661	1.759	0.380	4.744**	0.009	12.96**	0.002
4.familyst	widow or widower	0.328	0.191	3.277	0.170	0.988	0.990	1	.
1.urbrural	urban	1	.	1	.	1	.	1	.
2.urbrural	rural	3.852***	0.000	2.780*	0.019	1.569	0.187	4.321*	0.013
profdriver	yes	0.605	0.231	0.505	0.098	1.242	0.637	1.017	0.984
transpdrive		1.236	0.620	0.899	0.811	1.026	0.947	0.248	0.102
transpride		0.892	0.740	1.111	0.822	1.985	0.089	1	.
transpvru		0.637	0.185	0.717	0.383	0.568	0.155	2.673	0.180
N		680		721		710		516	



		Q6CA		Q6CB		Q6CC		Q6CD		Q6CE	
		OR	p								
0.insidedc	no	1	.	1	.	1	.	1	.	1	.
1.insidedc	yes	1.099	0.812	0.834	0.621	0.521	0.108	0.658	0.309	0.498	0.181
1.young	16-30	1	.	1	.	1	.	1	.	1	.
2.young	30+	0.836	0.631	1.880	0.052	1.686	0.196	1.833	0.128	1.250	0.693
0.gender	male	1	.	1	.	1	.	1	.	1	.
1.gender	female	0.167***	0.000	0.838	0.590	0.686	0.390	1.375	0.428	5.354*	0.012
1.injured	yes	1	.	1	.	1	.	1	.	1	.
2.injured	no	1.062	0.876	0.406*	0.036	0.685	0.412	0.423*	0.049	0.109**	0.003
1.avoidcrash	yes	1	.	1	.	1	.	1	.	1	.
2.avoidcrash	no	0.621	0.243	1.023	0.942	0.495	0.103	0.572	0.150	0.113***	0.000
0.licexperience	no drivers liscense	1	.	1	.	1	.	1	.	1	.
1.licexperience	less than 5 years	43.60***	0.000	0.896	0.895	1.286	0.854	3.514	0.385	0.667	0.683
2.licexperience	6 to 10 years	5.311***	0.001	0.743	0.723	0.648	0.748	2.567	0.522	0.0790*	0.025
3.licexperience	11 to 16 years	1	.	0.312	0.167	0.479	0.579	1.087	0.953	0.0336**	0.002
4.licexperience	more than 16 years	1	.	0.457	0.488	1	.	3.700	0.493	1	.
1.monthmiles	50 miles p/mnth	1	.	1	.	1	.	1	.	1	.
2.monthmiles	100 miles p/mnth	0.663	0.474	0.325*	0.019	1.013	0.985	0.479	0.257	1.274	0.748
3.monthmiles	150 miles p/mnth	1.451	0.495	0.327*	0.017	0.993	0.991	0.419	0.145	0.795	0.722
4.monthmiles	200 miles p/mnth	2.179	0.174	0.658	0.428	0.427	0.185	0.435	0.217	1.092	0.906
5.monthmiles	more than 200 miles p/mnth	2.006	0.316	0.476	0.251	3.054	0.261	1.378	0.688	0.380	0.513
6.monthmiles	zero miles p/mnth	1.070	0.918	0.246*	0.020	0.575	0.479	0.321	0.145	0.791	0.784
1.familyst	single	1	.	1	.	1	.	1	.	1	.
2.familyst	married or living with a partner	3.767**	0.004	0.847	0.640	24.93***	0.000	6.740***	0.000	2.870	0.099
3.familyst	separated or divorced	3.515	0.138	1.509	0.543	106.1***	0.000	3.502	0.072	301.1***	0.000
4.familyst	widow or widower	1	.	1	.	1	.	1	.	1	.
1.urbrural	urban	1	.	1	.	1	.	1	.	1	.
2.urbrural	rural	3.961***	0.001	0.942	0.861	4.652**	0.004	1.774	0.184	0.624	0.558
profdriver	yes	0.249**	0.001	2.690*	0.017	4.169**	0.005	2.147	0.080	5.135**	0.003
transpdrive		0.371	0.106	1.760	0.287	0.715	0.675	0.142**	0.004	21.87**	0.005
transpride		0.0383**	0.010	1	.	1	.	1	.	1	.
transpvru		1.431	0.507	0.200***	0.001	3.060	0.118	13.90***	0.000	9.300*	0.016
N		295		296		278		280		251	



		Q6DA		Q6DB		Q6DC		Q6DD		Q6DE	
		OR	p	OR	p	OR	p	OR	p	OR	p
0.insidedc	no	1	.	1	.	1	.	1	.	1	.
1.insidedc	yes	0.566	0.287	0.654	0.474	0.726	0.600	0.862	0.810	1.232	0.678
1.young	16-30	1	.	1	.	1	.	1	.	1	.
2.young	30+	0.549	0.284	0.636	0.440	0.933	0.881	0.750	0.598	3.059*	0.037
0.gender	male	1	.	1	.	1	.	1	.	1	.
1.gender	female	1.974	0.221	2.049	0.251	0.302*	0.024	0.495	0.190	0.623	0.456
1.injured	yes	1	.	1	.	1	.	1	.	1	.
2.injured	no	0.796	0.646	0.0924**	0.002	0.308	0.079	0.118***	0.001	0.0613***	0.000
1.avoidcrash	yes	1	.	1	.	1	.	1	.	1	.
2.avoidcrash	no	8.157***	0.000	4.075	0.093	2.999*	0.042	4.122**	0.009	2.530	0.062
0.licexperience	no drivers liscense	1	.	1	.	1	.	1	.	1	.
1.licexperience	less than 5 years	0.897	0.928	0.404	0.387	0.214	0.196	3.098	0.052	1.892	0.241
2.licexperience	6 to 10 years	1.442	0.741	0.625	0.654	0.213	0.163	7.079**	0.004	0.437	0.138
3.licexperience	11 to 16 years	0.591	0.640	0.0238**	0.002	0.0413**	0.008	1	.	1	.
4.licexperience	more than 16 years	1	.	1	.	1	.	1	.	1	.
1.monthmiles	50 miles p/mnth	1	.	1	.	1	.	1	.	1	.
2.monthmiles	100 miles p/mnth	0.481	0.343	0.271	0.114	0.318	0.104	0.233*	0.038	0.192*	0.029
3.monthmiles	150 miles p/mnth	1.091	0.898	0.457	0.273	0.591	0.503	0.704	0.616	0.234	0.058
4.monthmiles	200 miles p/mnth	0.841	0.806	1.056	0.943	0.568	0.404	0.652	0.524	1.030	0.973
5.monthmiles	more than 200 miles p/mnth	1.456	0.734	1.121	0.914	0.775	0.810	0.403	0.426	0.232	0.233
6.monthmiles	zero miles p/mnth	1.340	0.733	0.189	0.093	0.309	0.340	0.520	0.540	0.113	0.072
1.familyst	single	1	.	1	.	1	.	1	.	1	.
2.familyst	married or living with a partner	0.342	0.059	1.143	0.877	0.256*	0.023	1.322	0.669	0.246*	0.028
3.familyst	separated or divorced	0.549	0.500	6.905	0.063	0.687	0.550	0.752	0.716	0.0517**	0.002
4.familyst	widow or widower	1	.	1	.	1	.	1	.	1	.
1.urbrural	urban	1	.	1	.	1	.	1	.	1	.
2.urbrural	rural	4.787*	0.013	3.224	0.213	6.250*	0.012	3.612	0.114	1.827	0.442
profdriver	yes	3.653*	0.013	1.956	0.240	6.676**	0.002	9.467***	0.000	0.249**	0.003
transpdrive		0.286	0.193	0.129	0.052	5.858	0.302	1	.	1	.
transpride		1	.	1	.	0.311	0.360	1	.	1	.
transpvru		1	.	1	.	0.0684	0.065	1	.	1	.
N		166		167		196		164		166	



		Q6EA		Q6EB		Q6EC		Q6ED	
		OR	p	OR	p	OR	p	OR	p
0.insidedc	no	1	.	1	.	1	.	1	.
1.insidedc	yes	1.031	0.908	1.223	0.459	1.271	0.360	0.766	0.389
1.young	16-30	1	.	1	.	1	.	1	.
2.young	30+	0.939	0.806	1.321	0.350	0.741	0.268	0.864	0.614
0.gender	male	1	.	1	.	1	.	1	.
1.gender	female	1.390	0.161	1.411	0.212	2.172**	0.005	3.273***	0.000
1.injured	yes	1	.	1	.	1	.	1	.
2.injured	no	0.275***	0.000	0.668	0.219	0.498*	0.026	0.731	0.380
1.avoidcrash	yes	1	.	1	.	1	.	1	.
2.avoidcrash	no	2.657***	0.000	0.598	0.058	0.433**	0.002	1.098	0.755
0.licexperience	no drivers liscense	1	.	1	.	1	.	1	.
1.licexperience	less than 5 years	0.571	0.239	0.530	0.143	0.573	0.217	0.872	0.814
2.licexperience	6 to 10 years	0.481	0.117	0.649	0.288	0.523	0.162	0.570	0.330
3.licexperience	11 to 16 years	0.336*	0.026	0.319*	0.012	0.476	0.148	1.070	0.908
4.licexperience	more than 16 years	0.781	0.733	0.101*	0.031	0.368	0.350	1.806	0.461
1.monthmiles	50 miles p/mnth	1	.	1	.	1	.	1	.
2.monthmiles	100 miles p/mnth	0.709	0.347	1.465	0.333	0.939	0.876	0.936	0.876
3.monthmiles	150 miles p/mnth	0.423*	0.032	1.284	0.561	0.914	0.830	0.679	0.394
4.monthmiles	200 miles p/mnth	0.878	0.757	1.130	0.793	0.859	0.739	0.438	0.097
5.monthmiles	more than 200 miles p/mnth	0.866	0.763	0.952	0.917	0.554	0.223	0.882	0.812
6.monthmiles	zero miles p/mnth	0.751	0.563	0.589	0.360	0.567	0.294	0.503	0.254
1.familyst	single	1	.	1	.	1	.	1	.
2.familyst	married or living with a partner	0.702	0.196	0.920	0.748	1.110	0.698	1.966*	0.030
3.familyst	separated or divorced	3.478*	0.030	0.630	0.357	3.042*	0.023	1.109	0.861
4.familyst	widow or widower	1	.	0.537	0.561	5.389	0.063	1	.
1.urbrural	urban	1	.	1	.	1	.	1	.
2.urbrural	rural	0.535**	0.006	0.637	0.067	0.812	0.438	2.398**	0.002
profdriver	yes	1.327	0.348	2.980***	0.000	2.153**	0.010	5.105***	0.000
transpdrive		0.328*	0.011	0.310**	0.003	0.519	0.174	0.0741***	0.000
transpride		2.261*	0.019	1.357	0.367	1.564	0.304	0.781	0.524
transpvru		0.461*	0.022	1.205	0.519	1.211	0.524	3.159**	0.002
N		515		520		512		498	



		Q6FA		Q6FB		Q6FC		Q6FD		Q6FE	
		OR	p	OR	p	OR	p	OR	p	OR	p
0.insidedc	no	1	.	1	.	1	.	1	.	1	.
1.insidedc	yes	0.968	0.885	0.922	0.759	0.973	0.911	0.755	0.285	1.115	0.706
1.young	16-30	1	.	1	.	1	.	1	.	1	.
2.young	30+	0.595*	0.024	0.840	0.513	0.873	0.572	1.005	0.986	0.961	0.889
0.gender	male	1	.	1	.	1	.	1	.	1	.
1.gender	female	1.221	0.365	1.932*	0.014	1.264	0.331	3.183***	0.000	1.825*	0.036
1.injured	yes	1	.	1	.	1	.	1	.	1	.
2.injured	no	0.245***	0.000	1.409	0.227	0.975	0.917	1.097	0.761	1.358	0.386
1.avoidcrash	yes	1	.	1	.	1	.	1	.	1	.
2.avoidcrash	no	1.557	0.073	0.603*	0.045	0.676	0.107	0.992	0.977	0.805	0.468
0.licexperience	no drivers liscense	1	.	1	.	1	.	1	.	1	.
1.licexperience	less than 5 years	0.269*	0.011	1.516	0.431	1.594	0.361	0.420	0.098	0.592	0.300
2.licexperience	6 to 10 years	0.390	0.059	1.587	0.369	1.626	0.331	0.891	0.816	0.813	0.682
3.licexperience	11 to 16 years	0.293*	0.020	0.593	0.385	0.770	0.607	0.518	0.240	0.393	0.086
4.licexperience	more than 16 years	0.251*	0.036	1.445	0.578	0.587	0.514	1.750	0.395	0.665	0.537
1.monthmiles	50 miles p/mnth	1	.	1	.	1	.	1	.	1	.
2.monthmiles	100 miles p/mnth	1.436	0.270	1.172	0.693	1.135	0.717	1.125	0.770	1.959	0.099
3.monthmiles	150 miles p/mnth	1.043	0.904	0.943	0.886	0.940	0.867	1.104	0.813	1.211	0.688
4.monthmiles	200 miles p/mnth	1.929	0.071	1.111	0.806	1.093	0.814	0.838	0.712	0.936	0.894
5.monthmiles	more than 200 miles p/mnth	1.480	0.376	1.109	0.828	0.996	0.993	1.174	0.734	1.875	0.227
6.monthmiles	zero miles p/mnth	1.314	0.509	0.769	0.618	0.728	0.511	0.841	0.732	1.392	0.544
1.familyst	single	1	.	1	.	1	.	1	.	1	.
2.familyst	married or living with a partner	0.715	0.179	2.071**	0.007	1.610	0.071	1.188	0.527	1.809	0.069
3.familyst	separated or divorced	1.143	0.784	3.188*	0.013	2.729*	0.026	1.712	0.241	2.515	0.092
4.familyst	widow or widower	1.362	0.697	4.231	0.089	7.468**	0.002	1	.	4.793*	0.026
1.urbrural	urban	1	.	1	.	1	.	1	.	1	.
2.urbrural	rural	0.481***	0.000	1.146	0.570	1.786*	0.013	0.962	0.880	3.187***	0.000
profdriver	yes	3.040***	0.000	7.483***	0.000	2.229**	0.002	1.944*	0.031	1.043	0.909
transpdrive		2.231**	0.009	0.402**	0.006	1.018	0.961	0.377**	0.002	0.458*	0.034
transpride		5.451***	0.000	1.481	0.241	1.277	0.412	0.925	0.815	1.935	0.063
transpvru		0.260***	0.000	1.553	0.108	0.876	0.627	1.442	0.204	1.243	0.487
N		661		663		655		642		652	



## Practice

value.variable	label	Q3Ar		Q3Br		Q3Cr		Q3Dr		Q3Er	
		OR	p								
0.insidedc	no	1	.	1	.	1	.	1	.	1	.
1.insidedc	yes	0.908	0.701	1.136	0.697	0.885	0.639	0.718	0.284	0.619	0.065
1.young	16-30	1	.	1	.	1	.	1	.	1	.
2.young	30+	1.036	0.899	0.929	0.815	0.973	0.917	0.951	0.865	1.154	0.584
0.gender	male	1	.	1	.	1	.	1	.	1	.
1.gender	female	2.558***	0.000	1.552	0.236	1.212	0.438	0.449*	0.014	2.003**	0.004
1.injured	yes	1	.	1	.	1	.	1	.	1	.
2.injured	no	0.284***	0.000	0.444*	0.026	0.252***	0.000	0.246***	0.000	1.036	0.908
1.avoidcrash	yes	1	.	1	.	1	.	1	.	1	.
2.avoidcrash	no	1.070	0.797	0.686	0.270	0.959	0.867	1.256	0.436	0.334***	0.000
0.licexperience	no drivers liscense	1	.	1	.	1	.	1	.	1	.
1.licexperience	less than 5 years	0.796	0.754	1.396	0.616	1.702	0.317	0.415	0.145	1.103	0.862
2.licexperience	6 to 10 years	1.054	0.941	3.215	0.064	0.655	0.421	0.421	0.125	1.636	0.376
3.licexperience	11 to 16 years	1.011	0.988	1.121	0.876	1.131	0.823	0.425	0.161	1.015	0.979
4.licexperience	more than 16 years	4.212	0.087	1	.	2.759	0.160	1.135	0.865	0.0576*	0.025
1.monthmiles	50 miles p/mnth	1	.	1	.	1	.	1	.	1	.
2.monthmiles	100 miles p/mnth	0.819	0.589	1.770	0.199	0.572	0.128	1.237	0.591	0.556	0.104
3.monthmiles	150 miles p/mnth	0.530	0.099	0.899	0.834	0.838	0.655	0.748	0.509	0.345**	0.006
4.monthmiles	200 miles p/mnth	0.256**	0.004	0.971	0.957	0.514	0.103	0.785	0.625	0.451*	0.040
5.monthmiles	more than 200 miles p/mnth	1.257	0.648	2.130	0.181	1.121	0.806	1.475	0.491	1.815	0.210
6.monthmiles	zero miles p/mnth	0.489	0.189	1.581	0.453	0.735	0.551	1.169	0.749	0.595	0.298
1.familyst	single	1	.	1	.	1	.	1	.	1	.
2.familyst	married or living with a partn	0.400**	0.001	0.318***	0.000	0.947	0.851	0.560	0.076	0.477**	0.007
3.familyst	separated or divorced	0.310*	0.022	1	.	0.250**	0.002	0.430	0.096	0.475	0.169
4.familyst	widow or widower	1	.	1	.	1	.	0.186	0.121	0.299	0.122
1.urbrural	urban	1	.	1	.	1	.	1	.	1	.
2.urbrural	rural	1.846*	0.046	2.063	0.081	0.907	0.707	1.776	0.098	1.344	0.237
1.profdriver	yes	2.571**	0.002	1.556	0.292	3.887***	0.000	0.644	0.229	2.145**	0.009
2.profdriver	no	1	.	1	.	1	.	1	.	1	.
transpdrive		1	.	2.699	0.057	1	.	0.889	0.806	8.516*	0.013
transpride		3.149**	0.007	1	.	4.356***	0.001	1	.	2.171*	0.048
transpvru		0.261***	0.000	0.417*	0.046	0.449*	0.038	1.012	0.981	1.667	0.100
N		550		372		527		405		595	



value.variable	label	Q3Fr		Q3Gr		Q3Hr		Q3lr		Q3jr	
		OR	p	OR	p	OR	p	OR	p	OR	p
0.insidedc	no	1	.	1	.	1	.	1	.	1	.
1.insidedc	yes	0.988	0.957	0.493	0.084	0.978	0.949	0.834	0.454	0.911	0.783
1.young	16-30	1	.	1	.	1	.	1	.	1	.
2.young	30+	0.738	0.158	1.503	0.335	0.946	0.876	1.564	0.058	0.901	0.794
0.gender	male	1	.	1	.	1	.	1	.	1	.
1.gender	female	1.628*	0.021	1.423	0.332	2.663*	0.018	0.523**	0.003	1.632	0.163
1.injured	yes	1	.	1	.	1	.	1	.	1	.
2.injured	no	0.915	0.726	0.324*	0.013	0.644	0.306	0.225***	0.000	0.446	0.090
1.avoidcrash	yes	1	.	1	.	1	.	1	.	1	.
2.avoidcrash	no	0.994	0.979	1.090	0.818	1.964	0.077	1.643*	0.030	0.758	0.421
0.licexperience	no drivers liscense	1	.	1	.	1	.	1	.	1	.
1.licexperience	less than 5 years	0.391*	0.025	0.951	0.941	0.159**	0.008	0.323*	0.039	0.345	0.231
2.licexperience	6 to 10 years	0.424*	0.035	0.636	0.490	0.632	0.466	0.184**	0.001	0.170*	0.042
3.licexperience	11 to 16 years	0.194***	0.000	0.0678**	0.003	0.540	0.346	0.126***	0.000	0.176*	0.049
4.licexperience	more than 16 years	0.815	0.725	1	.	1	.	0.965	0.962	1	.
1.monthmiles	50 miles p/mnth	1	.	1	.	1	.	1	.	1	.
2.monthmiles	100 miles p/mnth	0.851	0.621	2.825	0.116	1.134	0.791	0.859	0.619	1.286	0.647
3.monthmiles	150 miles p/mnth	0.984	0.962	1.413	0.623	1.034	0.948	0.757	0.407	1.774	0.345
4.monthmiles	200 miles p/mnth	0.880	0.735	0.660	0.594	1.310	0.637	0.628	0.201	2.513	0.106
5.monthmiles	more than 200 miles p/mnth	2.956**	0.007	3.231	0.120	2.026	0.222	2.435	0.081	1.723	0.440
6.monthmiles	zero miles p/mnth	0.962	0.925	2.098	0.349	0.855	0.812	0.641	0.246	3.250	0.071
1.familyst	single	1	.	1	.	1	.	1	.	1	.
2.familyst	married or living with a partn	1.057	0.812	1.478	0.362	0.634	0.236	1.043	0.874	1.057	0.892
3.familyst	separated or divorced	0.187**	0.007	1.854	0.416	0.494	0.302	0.714	0.329	0.0523**	0.003
4.familyst	widow or widower	0.585	0.596	1	.	10.95*	0.024	0.878	0.876	1	.
1.urbrural	urban	1	.	1	.	1	.	1	.	1	.
2.urbrural	rural	0.874	0.545	1.389	0.395	0.474	0.069	0.476**	0.001	0.471*	0.026
1.profdriver	yes	1.760*	0.030	2.240	0.062	1.657	0.211	1.723*	0.046	1.510	0.328
2.profdriver	no	1	.	1	.	1	.	1	.	1	.
transpdrive		0.668	0.186	1	.	0.480	0.156	0.676	0.267	1	.
transpride		1.808*	0.040	1.317	0.579	1	.	2.879***	0.001	0.180	0.087
transpvru		1.006	0.983	5.137**	0.002	0.969	0.946	0.384***	0.000	1	.
N		675		497		391		647		266	



value.variable	label	Q3Kr		Q3Lr		Q3Mr		Q3Nr		Q3Or	
		OR	p	OR	p	OR	p	OR	p	OR	p
0.insidedc	no	1	.	1	.	1	.	1	.	1	.
1.insidedc	yes	0.608	0.091	1.878*	0.026	1.093	0.743	0.972	0.906	0.760	0.265
1.young	16-30	1	.	1	.	1	.	1	.	1	.
2.young	30+	0.761	0.284	0.490**	0.009	1.191	0.482	1.422	0.141	2.069**	0.005
0.gender	male	1	.	1	.	1	.	1	.	1	.
1.gender	female	2.195**	0.003	1.319	0.335	0.851	0.466	1.102	0.673	2.649***	0.000
1.injured	yes	1	.	1	.	1	.	1	.	1	.
2.injured	no	0.657	0.177	1.046	0.894	0.197***	0.000	0.838	0.546	0.834	0.523
1.avoidcrash	yes	1	.	1	.	1	.	1	.	1	.
2.avoidcrash	no	1.421	0.201	1.059	0.833	0.493**	0.004	0.879	0.608	0.978	0.927
0.licexperience	no drivers liscense	1	.	1	.	1	.	1	.	1	.
1.licexperience	less than 5 years	0.754	0.677	0.548	0.296	0.248**	0.008	1.539	0.486	0.630	0.345
2.licexperience	6 to 10 years	0.818	0.753	0.887	0.827	0.111***	0.000	0.660	0.480	0.467	0.102
3.licexperience	11 to 16 years	0.394	0.151	0.987	0.983	0.402	0.083	0.318	0.053	0.249**	0.004
4.licexperience	more than 16 years	2.086	0.353	2.538	0.273	0.465	0.227	0.380	0.156	0.103**	0.001
1.monthmiles	50 miles p/mnth	1	.	1	.	1	.	1	.	1	.
2.monthmiles	100 miles p/mnth	0.476*	0.027	1.475	0.364	0.537	0.077	0.906	0.775	0.719	0.311
3.monthmiles	150 miles p/mnth	0.488	0.074	1.179	0.715	0.405*	0.011	0.976	0.949	0.558	0.113
4.monthmiles	200 miles p/mnth	0.820	0.659	1.293	0.594	0.961	0.917	0.774	0.533	0.445*	0.036
5.monthmiles	more than 200 miles p/mnth	2.913*	0.036	1.783	0.310	0.822	0.699	2.540	0.062	0.988	0.979
6.monthmiles	zero miles p/mnth	0.725	0.597	3.468*	0.013	0.638	0.314	0.615	0.348	1.048	0.922
1.familyst	single	1	.	1	.	1	.	1	.	1	.
2.familyst	married or living with a partn	1.296	0.373	0.397**	0.002	1.221	0.439	1.618	0.090	1.864*	0.019
3.familyst	separated or divorced	0.224*	0.034	0.0434***	0.000	0.346*	0.044	0.832	0.681	2.846*	0.020
4.familyst	widow or widower	0.0937*	0.050	0.111*	0.011	0.274*	0.038	4.807*	0.040	0.450	0.399
1.urbrural	urban	1	.	1	.	1	.	1	.	1	.
2.urbrural	rural	0.554*	0.034	0.791	0.468	0.305***	0.000	0.735	0.215	1.129	0.621
1.profdriver	yes	1.654	0.101	1.922*	0.029	1.029	0.917	1.268	0.371	1.021	0.939
2.profdriver	no	1	.	1	.	1	.	1	.	1	.
transpdrive		1	.	1.646	0.304	1.171	0.607	1	.	1	.
transpride		1.307	0.450	1	.	0.386***	0.001	0.455*	0.030	0.838	0.628
transpvru		0.260***	0.000	0.910	0.822	0.647	0.111	1.232	0.563	1.409	0.297
N		513		477		663		541		533	



value.variable	label	Q3Pr		Q3Qr		Q3Rr		Q3Sr		Q3Tr	
		OR	p	OR	p	OR	p	OR	p	OR	p
0.insidedc	no	1	.	1	.	1	.	1	.	1	.
1.insidedc	yes	0.956	0.861	0.777	0.450	0.545	0.098	0.895	0.696	0.682	0.323
1.young	16-30	1	.	1	.	1	.	1	.	1	.
2.young	30+	0.807	0.413	0.766	0.367	0.864	0.667	1.736	0.056	1.195	0.627
0.gender	male	1	.	1	.	1	.	1	.	1	.
1.gender	female	2.852***	0.000	3.003***	0.001	4.089***	0.000	2.129**	0.005	2.714**	0.005
1.injured	yes	1	.	1	.	1	.	1	.	1	.
2.injured	no	1.358	0.363	1.353	0.361	0.662	0.358	0.625	0.108	0.229***	0.000
1.avoidcrash	yes	1	.	1	.	1	.	1	.	1	.
2.avoidcrash	no	0.898	0.672	0.275***	0.000	0.622	0.149	1.538	0.120	1.816	0.127
0.licexperience	no drivers liscense	1	.	1	.	1	.	1	.	1	.
1.licexperience	less than 5 years	1.177	0.774	0.305	0.170	1.444	0.614	1.557	0.546	0.843	0.843
2.licexperience	6 to 10 years	1.120	0.832	1.378	0.701	2.078	0.284	1.117	0.878	0.348	0.196
3.licexperience	11 to 16 years	0.687	0.508	0.288	0.160	0.818	0.785	0.546	0.410	0.103*	0.014
4.licexperience	more than 16 years	0.872	0.835	0.0525	0.071	1	.	0.464	0.374	1.356	0.784
1.monthmiles	50 miles p/mnth	1	.	1	.	1	.	1	.	1	.
2.monthmiles	100 miles p/mnth	0.603	0.138	0.679	0.363	0.921	0.877	1.138	0.733	0.545	0.197
3.monthmiles	150 miles p/mnth	0.602	0.213	1.106	0.823	1.866	0.227	0.955	0.915	0.809	0.692
4.monthmiles	200 miles p/mnth	0.681	0.373	0.980	0.968	1.323	0.604	0.275**	0.005	0.433	0.095
5.monthmiles	more than 200 miles p/mnth	1.435	0.444	2.101	0.212	1.652	0.517	2.326	0.124	0.630	0.497
6.monthmiles	zero miles p/mnth	1.169	0.799	2.845*	0.044	0.998	0.998	1.236	0.688	0.429	0.222
1.familyst	single	1	.	1	.	1	.	1	.	1	.
2.familyst	married or living with a partn	1.456	0.161	0.949	0.856	2.099	0.070	0.400**	0.002	0.780	0.512
3.familyst	separated or divorced	0.753	0.477	0.512	0.316	2.396	0.174	0.268**	0.008	0.211*	0.036
4.familyst	widow or widower	0.430	0.351	0.0584	0.108	1.022	0.985	1.284	0.749	0.277	0.275
1.urbrural	urban	1	.	1	.	1	.	1	.	1	.
2.urbrural	rural	3.751***	0.000	2.689**	0.001	1.201	0.589	1.238	0.473	0.432*	0.029
1.profdriver	yes	2.941*	0.017	0.298**	0.004	0.477	0.081	1.207	0.575	2.115*	0.050
2.profdriver	no	1	.	1	.	1	.	1	.	1	.
transpdrive		0.672	0.236	0.897	0.775	0.418	0.202	0.524	0.475	1	.
transpride		0.729	0.258	1	.	1.154	0.838	0.372*	0.027	2.261	0.178
transpvru		0.299***	0.000	1.297	0.479	1	.	2.263	0.069	0.520	0.250
N		567		409		319		461		362	



value.variable	label	Q3Ur		Q3Vr		Q3Wr		Q3Xr	
		OR	p	OR	p	OR	p	OR	p
0.insidedc	no	1	.	1	.	1	.	1	.
1.insidedc	yes	0.373*	0.028	1.153	0.666	1.123	0.781	0.584	0.064
1.young	16-30	1	.	1	.	1	.	1	.
2.young	30+	0.908	0.818	1.084	0.763	0.550	0.107	1.043	0.863
0.gender	male	1	.	1	.	1	.	1	.
1.gender	female	0.985	0.967	0.660	0.144	6.397***	0.000	1.947**	0.006
1.injured	yes	1	.	1	.	1	.	1	.
2.injured	no	0.297**	0.005	0.240***	0.000	0.203***	0.001	0.518*	0.017
1.avoidcrash	yes	1	.	1	.	1	.	1	.
2.avoidcrash	no	1.066	0.879	2.723**	0.002	1.372	0.468	1.691*	0.044
0.licexperience	no drivers liscense	1	.	1	.	1	.	1	.
1.licexperience	less than 5 years	0.0456**	0.001	1.021	0.970	2.524	0.268	0.249**	0.007
2.licexperience	6 to 10 years	0.0890**	0.001	0.823	0.737	3.433	0.156	0.488	0.116
3.licexperience	11 to 16 years	0.0264***	0.000	0.446	0.148	4.535	0.104	0.235**	0.003
4.licexperience	more than 16 years	0.215	0.074	7.015**	0.006	1.054	0.971	0.272	0.132
1.monthmiles	50 miles p/mnth	1	.	1	.	1	.	1	.
2.monthmiles	100 miles p/mnth	0.786	0.663	0.584	0.159	1.236	0.677	1.153	0.694
3.monthmiles	150 miles p/mnth	1.236	0.763	0.601	0.269	1.126	0.844	1.020	0.960
4.monthmiles	200 miles p/mnth	1.634	0.434	0.769	0.529	0.621	0.482	1.025	0.952
5.monthmiles	more than 200 miles p/mnth	4.953*	0.013	1.480	0.460	1.955	0.276	2.315	0.054
6.monthmiles	zero miles p/mnth	1.737	0.387	1.151	0.812	1.729	0.423	1.373	0.522
1.familyst	single	1	.	1	.	1	.	1	.
2.familyst	married or living with a partn	1.220	0.675	0.704	0.227	0.384*	0.018	0.792	0.396
3.familyst	separated or divorced	0.105*	0.017	0.0624***	0.000	0.428	0.175	0.179**	0.005
4.familyst	widow or widower	1	.	0.0391***	0.000	1	.	1	.
1.urbrural	urban	1	.	1	.	1	.	1	.
2.urbrural	rural	0.314**	0.001	0.688	0.217	0.732	0.454	0.889	0.668
1.profdriver	yes	0.212*	0.013	3.640***	0.000	0.428	0.225	2.113*	0.013
2.profdriver	no	1	.	1	.	1	.	1	.
transpdrive		0.197*	0.022	1	.	0.891	0.841	0.679	0.255
transpride		1	.	6.554***	0.000	1	.	7.603***	0.000
transpvru		0.431	0.084	0.307**	0.008	0.746	0.509	0.945	0.845
N		318		468		414		639	