

Health Concerns of Three-Wheel Drivers in Galle, Sri Lanka

by

Jacob Michael Kirkorowicz

Duke Global Health Institute  
Duke University

Date: \_\_\_\_\_

Approved:

\_\_\_\_\_  
Truls Ostbye, Supervisor

\_\_\_\_\_  
Justine Strand De Oliveira

\_\_\_\_\_  
P. Vijitha De Silva

Thesis submitted in partial fulfillment of  
the requirements for the degree of Master of Science in the Duke Global Health Institute  
in the Graduate School of Duke University

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ABSTRACT

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## **Abstract**

Little is known about the general health concerns of three-wheel drivers, who provide an important transport service through many South Asian nations, including Sri Lanka. In order to fill this gap in the literature, a two-stage qualitative study was employed to determine the types of health concerns that three-wheel drivers in Galle, Sri Lanka experience. The first stage employed one-on-one semi-structured interviews relating to personal health with 20 three-wheel drivers. The second stage consisted of two semi-structured focus groups, one with five participants and the other with eight. The most common health concern among three-wheel drivers at this site was musculoskeletal pain in the back, shoulders, and knees. The most common health risk factors were alcohol consumption, tobacco use, lack of physical activity, and poor utilization of routine examinations. An unexpected finding was the relative lack of road traffic accidents and injuries. Based on these findings, government or private health initiatives aimed at three-wheel drivers might seek to intervene on modifiable risk factors such as substance use and failure to seek well care. Health officials might also encourage three-wheel manufacturers to re-think their design to reduce musculoskeletal stress. The information collected was used to design a survey instrument, which will be used in future research to quantify three-wheel driver health concerns on a larger scale in Sri Lanka.

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## Introduction

The Indian Ocean state of Sri Lanka is defined by the World Bank as a “lower-middle-income” country and ranks among the world’s fastest growing economies. Like other economically robust South Asian nations, the Sri Lankan government has struggled to maintain a transportation infrastructure that can facilitate growth. Because Sri Lanka’s economy is expanding much faster than transportation infrastructure, a number of improvised transportation systems have emerged. In Sri Lanka the most ubiquitous form of improvised transportation is the three-wheel, or trishaw. These vehicles typify what Kumarage et al (2003) call “informal public transport,” an unregulated form of transportation designed to meet the demand for rapid urban mobility. Although three-wheels have been a fixture of Sri Lanka’s public transport system for decades, very little is known about the health of three-wheel drivers aside from some epidemiological data on road traffic injury. This gap in research has profound implications given that three-wheel drivers constitute 15% of Sri Lanka’s road users. (Kumarage et al 2010) Without a proper understanding of the health concerns of three-wheel drivers, Sri Lanka’s health care system can scarcely hope to properly serve members of this widespread occupation. If drivers’ ability to work becomes compromised by poor health, Sri Lankan road users may have increasingly limited access to this important form of informal public transport.

Transportation, in both the public and private sectors, is highly regulated in upper income countries. The primary tools by which rich states monitor the transportation industry is through vehicle insurance, vehicle registration, driver licensing, and physical exams for drivers. (Chan et al 2010) In Sri Lanka these mechanisms exist in theory but the state lacks the resources to enforce them. As a result three-wheel drivers operate in a “gray” economy- legally sanctioned but poorly regulated. Most importantly there is no set price scale for three-wheel fares. Instead,



drivers and passengers must negotiate fares based on a locally accepted norm. Some three-wheel driver trade unions exist (Kumarage et al 2010) but membership is inaccessible to most drivers because of mandatory union dues. Most often, drivers establish informal mutual assistance organizations with the other drivers who congregate at their three-wheel “stand.” These stands are congregations of drivers, who usually wait outside major bus depots, train stations, or road junctions. The fact that three-wheel drivers operate in a semi-informal industry and have no channel for collective action, their needs have been invisible to Sri Lanka’s health system as well as academic researchers.

Three-wheel drivers occupy a contradictory niche in Sri Lankan society. It is an entirely male dominated profession (Mohan 03) and typically drivers are individuals who have completed a high school education and managed to only just pass their Ordinary Level Examinations. (Kumarage 10) Many drivers who were old enough to have attended school before the passage of mandatory education laws, only have some grade school education. The demographic profile of three-wheel driver’s as being men with limited education shapes social perceptions of their occupation. Often three-wheel drivers are seen as crass, uneducated, and even criminal. (Mohan 03) This notion of criminality is due to the fact that three-wheel drivers are a mainstay of tourist transportation. On some occasions tourists have been known to ask drivers to facilitate drug purchases or prostitution. Nonetheless, their services are perceived in Sri Lanka as being a convenient, affordable way to travel. (Kumarage 10) With a shared occupation and social position, three-wheel drivers have formed a distinct subculture (Mohan 03), exemplified by the gaudy religious iconography displayed in three-wheels and enacted in the social life of the three-wheel park. This informal subculture is the context in which three-wheel drivers discuss and begin to understand their health concerns.

The small body of literature that does exist about the chronic health concerns of three-wheel drivers has explored occupationally-related cardiovascular

disease (CVD) risk factors, exposure to environmental toxins, and exposure to noise. Chaudhary et al's 2010 cross-sectional study of CVD risk factors among three-wheel drivers in Delhi found that three-wheel drivers were often hypertensive (35.14 %), frequently smoked (35.14%) or chewed (40.2%) tobacco, and regularly reported moderate-to-severe levels of work-related stress (27.36%). While overweight (14.86%) and obesity (3.86%) were less common, they still made a non-negligible contribution to CVD risk. This study relies on cross-sectional data so it does not establish that these risk factors result from working as a three-wheel driver. More research is needed to establish a causal link between three-wheel driving and cardiovascular health as well as other salient non-communicable illnesses.

Three-wheel drivers additionally are exposed to a number of environmental toxins as a result of their profession. Gavali et al (2012) found that three-wheel drivers in Pune, India who spent 8-10 hours a day exposed to traffic exhaust had decreased forced vital capacity, forced expiratory volume, and peak expiratory flow rate. These pulmonary ailments result from injury to the terminal bronchioles from nitrogen oxides and respiratory muscle weakening from carbon monoxide. Aside from toxins found in automotive exhaust, three-wheel drivers are constantly exposed to heat, bodily vibration, and noise. (Sen 11) Exposure to noise presents serious risks to the long term hearing of three-wheel drivers. A case-control study by Merchant et al (00) compared the effect of noise exposure between three-wheel drivers (exposed) and automobile taxi drivers (unexposed) on hearing. They found that three-wheel drivers were three times more likely than taxi drivers to have hearing loss, 2 times more likely to have tinnitus, and 2.5 times more likely to have difficulty conversing on the telephone. The environmental health risks associated with three-wheel driving, particularly in crowded settings like Sri Lanka's congested roads, are diverse and remain poorly understood. Even more poorly understood are the effects of these exposures on three-wheel driver health.

It is well documented that the use of substances, including alcohol and tobacco, is a risk factor for a whole suite of non-communicable illnesses. Demographically, three-wheel drivers belong to a number of Sri Lankan social subsets that are known to have a higher propensity for substance use, i.e. that they are male, middle aged, and have low educational attainment. Dr. Bilesha Perera of the University of Ruhuna Faculty of Medicine in Galle, Sri Lanka has conducted the only existing cross-sectional research on adult substance abuse in Sri Lanka. In his group's 2005 study on adult smoking in Sri Lanka, they found that the highest age-specific prevalence for cigarette smoking (38%) was among men aged 35-44 years. Indeed the smoking in Sri Lanka, as in many other South Asian nations is a male dominated habit; in Sri Lanka 21% of men are daily smokers while just 0.6% of women are daily smokers. (Perera et al 05) Indeed smoking in Sri Lanka is a symbol of masculinity and male bonding. Perera et al (2009) also found that alcohol consumption was a male dominated habit in Sri Lanka (53% of Sri Lankan men drink versus 5% of women) and that men chose to drink due to social pressure, for personal enjoyment, and for stress relief. The final widespread method of tobacco smoking in Sri Lanka is to chew it with betel. This practice is a risk factor for gingival bleeding (Amarasena et al 03) and is widely used among three wheel drivers. (Chaudhary et al 10). The demographic profile of Sri Lankan substance users warrants a serious investigation on the prevalence of substance abuse among Sri Lankan three-wheel drivers.

The one area of three-wheel driver health for which a relatively large amount of research exists is in road traffic injury. This richness of data is likely a coattail effect of the recent interest on road traffic injury and its increasing contribution to the global burden of disease. According to the WHO, road traffic accidents are the 7<sup>th</sup> leading cause of death in Middle-Income income countries like Sri Lanka. Currently, Sri Lanka lacks sufficient road safety infrastructure, both structural and legal. The WHO's 2009 report on road safety showed that as in virtually every other nation, road traffic injury (RTI) in

Sri Lanka occurs mainly in men with 82% of RTI victims being male in 2008. Aside from being male, the two other important risk factors for RTI in Sri Lanka are being the driver of the vehicle (41% of injuries) and being a vulnerable road user, (50% of injuries) meaning pedestrians, cyclists, motorbikes, and three-wheelers. (WHO 09) Three-wheel drivers fall into all three risk groups: they are exclusively male, they drive the vehicle, and they are vulnerable road users. Demographically speaking, three-wheel drivers are at risk for RTI, suggesting the need for investigation as to whether three-wheel drivers experience RTI more than other road users.

Economic growth has a dichotomous effect on road traffic injury statistics. According to Garg et al 05, a graph of road traffic injury as a function of economic development would be a inverted U-shaped curve. At the initial stages of growth road traffic injury first spikes with increasing motorization combined with poor infrastructure development. Eventually this relationship plateaus as infrastructure races to keep up with motorization. (Kopits and Cropper 05) Finally, road traffic injury rates begin to fall precipitously as the investment in road safety infrastructure pays dividends. These effects can vary both between and within nations. In a rapidly growing, export-driven economy Sri Lanka's infrastructure development has been inequitable in urban versus rural settings. According to Goonewardene et al over 60.6% of Sri Lanka's road traffic injuries occurred in sparsely populated rural districts with poor road infrastructure. The future direction of Sri Lanka's burden of road traffic injury will be determine by Sri Lanka's ability to sustain its current rate of economic growth and the state's ability to properly invest revenue into road safety infrastructure.

In addition to road safety infrastructure, human behaviors have a strong influence on patterns of road traffic injury. In Chaudhary et al's previously cited study on cardiovascular disease risk factors among three-wheels drivers, they found that a large proportion of participants experienced work related stress. This stress can often lead to behaviors that jeopardize a driver's road safety. In their 2011 study on road rage

among three-wheel drivers in Pakistan, Shaikh et al found that 78.6% of drivers had experienced verbal or physical threats from other drivers while on the road. In the Sri Lankan context, Akalanaka et al (2012) found that road rage led to aggressive driving in three-wheel drivers including driving at excessive speeds, weaving through lanes, and running traffic lights. In this study, unmarried drivers with less than a high school education were most likely to drive aggressively or to drive under the influence of alcohol. That alcohol consumption is an important risk factor for road traffic injury is well known. In Sri Lanka, 10.6% of accidents were linked to driver alcohol consumption in 2000. (Guraj et al 2005) In terms of demography three-wheel drivers are at risk for both aggressive and drunk driving due to their gender, age, and educational status.

The latest data show that Sri Lanka's incidence of road traffic injury is 11.6/100,000 population, with a 55% increase between 1980 and 2006. (Dharmaratne & Stevenson 2004) What is of interest is whether three-wheel drivers experience road traffic injury at a greater rate than the general population. De Silva et al (2001) conducted a prospective cohort study on three-wheel drivers in Colombo, Sri Lanka using emergency room data. They found that the most common form of three-wheel accident was overturning, and that passengers were more likely than drivers to become injured in accidents. This finding that passengers are more frequently injured than drivers is inconsistent with WHO reports. The most common forms of injury sustained in three wheel crashes were soft tissue damage (75%) followed by long bone fracture (21%.) Interestingly, 89% of drivers in this particular sample were under the influence of alcohol at the time of the auto collision. In a more recent study in urban India, Schmucker et al (2011) found that the majority of crashes involving three-wheels were single or multiple vehicle crashes that resulted in three-wheels becoming overturned. In many cases, three-wheels were overloaded with passengers at the time of crash and most accidents occurred in the evening hours. Road traffic injury data specific to three-wheels suggests that there are structural features that make these vehicles unsafe in

accidents. The high center of gravity makes them prone to overturn and the fact that they have no windows or doors places passengers at greater risk for injury.

## **1. Objectives**

This project has two primary objectives. The data themselves are a first small step toward filling the gap in literature on the general health of Sri Lankan three-wheel drivers. Importantly the information gleaned from this qualitative study will be used to inform the design of a survey instrument to be used in future quantitative research on three-wheel driver health. Quantitative epidemiological research on health concerns of three-wheel drivers in Sri Lanka will then supplement the qualitative research by providing generalizable data collected by a methodology that can be standardized and replicated. Taken together, a qualitative and quantitative approach could potentially improve the general understanding of the health needs of this globally widespread occupation.

## **2. Methods**

Qualitative data were collected in two stages: first through semi-structured individual interviews and second through focus groups. Three-wheel drivers working in the large town of Galle, Southern Province were recruited from three-wheel stands in the Galle Town Center and surrounding suburbs. Recruitment from multiple parks was designed to capture the urban topography of Galle, including its bustling commercial center and quiet residential suburbs.

### **2.1 Study Site**

Galle is the largest town in the Southern Province of Sri Lanka with a population of 91,000. Its population is majority Sinhalese and the city was relatively untouched by the conflicts of the recent Sri Lankan Civil War. Galle was, however, devastated by the 2004 tsunami. In the wake of the disaster Galle received an influx of foreign and government aid for infrastructural redevelopment. In comparison to other districts in Sri Lanka, Galle performs well on a number of social and health indicators. Galle is famous for its educational institutions, including a number of international secondary schools and the Faculties of Medicine and Engineering of the University of Ruhuna.

### **2.2 Participant Pool**

To qualify for participation, individuals had to be working as a full or part time three-wheel driver in Galle District, Southern Province, Sri Lanka at the time of data collection. Participants had to be over Sri Lanka's age of majority, eighteen years, and have at least three years experience working as a three-wheel driver. While there was no explicitly stated limitation of the participant pool to men, there are virtually no female three-wheel drivers in Sri Lanka for a number of cultural and sociological reasons. Participants were not asked whether or not they were licensed.



## 2.3 Stage 1: Individual Interviews

The two-person study team consisted of the Principal Investigator, Jacob Kirkorowicz, and research assistant, Dr. Pasindu Sapukotana. Dr. Sapukotana is a recent graduate from University of Ruhuna Faculty of Medicine who agreed to help with this project during his pre-internship gap period of six months following his graduation. He functioned as a translator during interviews and during the post-interview transcriptions.

Participants were recruited by approaching three-wheel drivers on breaks at various three-wheel parks throughout Galle. First Dr. Sapukotana approached a three-wheel driver, consent documentation in hand, and explained the objectives of the study as well as the steps involved in participation. If the individual agreed, he would be asked to drive the study team in the three-wheeler to a quiet, private area, typically near a temple complex. There the team conducted the semi-structured interviews with the participant inside the three-wheel while digitally recording the interview. All interviews were conducted in mixed Sinhala (the language spoken in Galle and in the majority of Sri Lanka) and English. During the interviews Jacob Kirkorowicz read questions from an semi-structured interview guide in English, which Pasindu Sapukotana translated and asked the driver in Sinhalese. Next Dr. Sapukotana provided the main points of the drivers' response in English, which might elicit follow-up questions.

When the interview was complete, participants were compensated for their time and asked to transport the investigators either to the three-wheel park where recruitment originally took place or to a different one. For large parks more than one participant was recruited while for smaller parks only one driver was recruited. Twenty three-wheel drivers participated in the semi-structured interviews- twelve from Galle proper and eight from the suburbs of Karapitiya (4), Kumarakanda (2), and Richmond Hill (2). A relatively small number of the drivers who were originally approached declined to participate; out of 25 approached, only five declined

Following the completion of data collection all digital recordings were simultaneously translated into English and transcribed for analysis. While playing digital recordings Jacob Kirkorowicz typed verbatim the English portions of the interview while Pasindu Sapukotana translated the Sinhalese portions verbatim before Jacob Kirorowicz typed them. On all transcripts the translated portions were recorded in italics to indicate that they were in translation. Finally transcripts were analyzed by reading through the transcripts in Microsoft Word® one by one and inserting the individuals' responses to each into a master document so that they could be compared and contrasted piece by piece.

## **2.4 Stage 2: Focus Groups**

The focus groups component was included in order to add richness to the qualitative data collection. When questions were asked in a group setting, participants were able to engage in discussions to support or contradict one another's answers. As a result, the focus groups were able to shed light on aspects of participants' health concerns that individual interviews could not. The trade off, of course is that participants were less inclined to share personal information and restricted their answers largely to general observations.

In total two focus groups were conducted, the first with five participants and the second with eight. Recruitment for the focus groups was conducted in much the same way as recruitment for the individual interviews. For both rounds individual three-wheel drivers were approached and informed about the nature of the focus group, what activities participation would entail, the length of time involved, and the amount of compensation. They were then asked to approach their friends and/org colleagues to ask them if they would like to participate. By this method recruitment of focus group participants was very quick and none of the drivers approached declined to participate. The first focus group participants were recruited from the large three-wheel park in central Galle Town and the second was recruited from Kumarakanda Junction, in

the suburbs of Galle. Recruiting participants from these two different settings was designed to create a somewhat representative mix of urban and suburban three-wheel drivers.

Focus groups took place in quiet, secluded public places to ensure a degree of confidentiality. The first focus group took place in a park and the second on the grounds of a Buddhist temple (with prior permission). As a courtesy, participants were offered refreshments in the form of water and soft drinks. In the first focus group participants sat in a circle on the ground with the principle investigator and research assistant and in the second focus group they sat in two rows of chairs. The same questions from the individual interviews were employed in the focus groups but were rephrased to elicit more generalized, rather than personal, responses. Just like in the individual interviews, the principle investigator read from the list of questions in English to the research assistant who then relayed the question to the focus groups participants in Sinhalese. In turn, the participants responded in Sinhalese and were allowed to engage in discussion during each questions. After responses were given the research assistant gave a synopsis of the main responses in English to the principle investigator in order to inform follow up question. The focus groups were recorded and took about an hour to complete.

## **2.5 Non-Response**

Overall the non-response rate, defined by drivers refusing to participate in interviews following the initial approach, was quite low. For the individual interview component, of twenty-five drivers initially approached, only five declined. The five drivers who declined gave two reasons for not wanting to participate. Three mentioned that they had fares scheduled within a short period of time and did not have time to participate in the interview. Two were suspicious of our motives, believing that the interview was a ploy to get a free three-wheel ride, as a fare price was not initially negotiated upon. Although drivers did not decline for this reason, a number of recruits wanted confirmation that none of the information they provided would not be published in Sri Lanka. They were afraid that personal health information might be published. Nonetheless

all participants were ensured that their answers will be kept confidential and de-identified. For the focus groups the non-response rate was zero. This was mostly due to a combination of good luck and the fact that we asked our initial contact to recruit friends. We were fortunate that in both focus group recruitments our initial contacts were excited about participation and were able to mobilize a group of friends to participate.

## **2.6 Ethical Considerations**

Ethical clearance for this project was granted by the Duke University Office of Research Support and the University of Ruhuna Ethics Committee. Informed consent documentation was written first in English, translated into Sinhalese, and then back translated. Because of the nearly universal literacy in Sri Lanka, written informed consent documents were used. Signed informed consent documents were kept in a locked cabinet at the University of Ruhuna Faculty of Medicine Duke-Ruhuna Collaborative Research Office. All digital recordings and the transcripts thereof were de-identified and all participants were given an identification code. Participants were compensated at the rate of 500 Sri Lankan rupees, to adequately compensate them for the time spent interviewing. The figure was based on an estimation of what a driver typically would make from fares during the time spent interviewing. Interviews were conducted privately so that confidentiality would not be breached.

### 3. Results

**Table 1: Summary of Findings**

Health Topic	Major Findings
Health Care Utilization	<ul style="list-style-type: none"> <li>• General satisfaction with mixed public/private health system</li> <li>• No utilization of well medical exams</li> <li>• Often use both public and private depending on condition</li> </ul>
Health Care Finance	<ul style="list-style-type: none"> <li>• Drivers rarely have health insurance</li> <li>• Pay out of pocket for private care</li> <li>• Public health care free of charge but must pay for some drugs, procedures</li> </ul>
Chronic Illness	<ul style="list-style-type: none"> <li>• Risk factors for CVD, pulmonary disease, diabetes are common</li> <li>• Other NCD's: Dermatitis, myopia, hypertension, asthma, diabetes, hypercholesteremia, and arthritis</li> </ul>
Musculoskeletal Pain	<ul style="list-style-type: none"> <li>• Most frequently reported health problem</li> <li>• Pain in lower back, knees, shoulders, hands</li> <li>• Due to bodily vibration while driving, sitting in same position while waiting for fares</li> </ul>
Accidents/Injuries	<ul style="list-style-type: none"> <li>• Reports of road traffic accidents were less frequent than expected</li> <li>• Reports of road traffic injuries were much less frequent than expected</li> <li>• Satisfaction with road safety</li> <li>• Feel that reckless driving and alcohol use are biggest contributors to road traffic accidents among three-wheel drivers</li> </ul>
Substance Use	<ul style="list-style-type: none"> <li>• Consumption of alcohol and tobacco nearly universal</li> <li>• Usually a form of social activity and bonding</li> </ul>

Work-Related Stress	<ul style="list-style-type: none"> <li>• Overall satisfaction with work</li> <li>• Economic concerns tend to be greatest sources of stress</li> </ul>
Health Maintaining Behaviors	<ul style="list-style-type: none"> <li>• Defined exercise, diet, personal hygiene, abstinence from substances to be healthy behaviors</li> <li>• Felt job obligations made exercise/ proper diet difficult</li> </ul>

### 3.1 Demographics

Five demographic characteristics were obtained from interview participants: age, marital status, number of children residing in the household, monthly income, educational attainment, and length of time spent working as a three-wheel driver. Participants ranged in age from 28 to 65 years, with a median age of 47.5 years. Eighteen of the twenty participants were married, one was widowed, and one (the youngest) was unmarried. Number of children ranged from 0 to 4, with a median of 2. 4 participants reported having one or more children who had moved out of the house, one participant reported losing a child to the 2004 Tsunami, two reported being childless (one of which was unmarried and the other reported his wife having a miscarriage), and one reported expecting a child.

Monthly income ranged from 10,000-40,000 LKR, with a median and modal monthly income of 15,000 LKR. One participant was unable to give an estimate of monthly income. Educational attainment varied, ranging from completing grade 3 to sitting for the Advanced Level (university entrance) Exams. Of the 17 participants who provided an answer to their level of education, 8 had only a grade school education, although one had left grade school to attend a Privien (Buddhist Monastic) school. 6 had sat for their Ordinary Level (high school exit) exams and the remaining three sat for their A-Level Examinations. Those with elementary school education only tended to fall

on the higher end of the age spectrum as they attended school prior to the passage of minimum educational laws in Sri Lanka.

Demographic statistics were calculated differently for focus groups because due to the fact that they were non-confidential group settings, questions were asked differently so that participants were not forced to reveal sensitive personal information. The first focus group discussion included five participants and was held in Galle, near the town's largest three-wheel park. Participants ranged in age from 27-46 (median 32), had worked as a three-wheel driver between 3 and 23 years (median 7), and made between 15,000 and 20,000 rupees per month (median 18,000). In terms of household structure, four participants were married and one was single. Participants in the second focus group were recruited from a smaller suburban three-wheel park to account for possible differences between urban and peri-urban drivers. With eight participants, the second focus group was considerably larger than the first and involved more cross-discussions. Participants ranged in age from 23-57 (median 42.5), had worked as a three-wheel driver for 3-21 years (median 8), and made 10,000-15,000 rupees per month (median 15,000). In comparison to the first focus group, the second had a older average age, although it captured a similar range of time spent working as a three-wheel driver. The average monthly income was lower in the second group, which was to be expected given that the participants in the second group served a much lower traffic area. Like the first group almost all (seven of eight) participants were married.

### **3.2 Health Care Utilization**

Sri Lanka has a mixed private/public health system. All physicians, nurses, and other health workers are employees of the government but are allowed to run private practices after hours. Sri Lankan citizens may receive treatment at any government health center free of charge. All participants had utilized government health providers and almost all reported a high level of satisfaction with the free services. However,

many participants were quick to point out that there were trade-offs to having access to free high quality health care. These included having limited physician choice, poor drug availability, and long wait times. Of the efficiency of government services, one focus group participant stated “We have to stay on the waiting list for a long time even for a simple examination.” Free government services were generally perceived as slower and less efficient than the private sector. In fact some participants felt that the public sector was only free because they outsourced expensive procedures to the private sector. “In the government sector they give you a letter and you have to do ECG’s from the outside.” This participant felt that the government failed to provide a service, which he should have received for free. Many participants echoed a common refrain that while government health care was equitable, it sacrificed efficiency.

Three-wheel drivers enthusiastically utilized private health services as well. All the drivers stated that they felt that private health care was expensive, often beyond what their three-wheel driving salary would allow. Nonetheless, they utilized private health care when they could afford it and felt that it was fast, high quality, and allowed for physician choice. In one interview a participant stated that he enjoyed the private sector because “It’s easy to channel a doctor in a private hospital.” The term “channel” is used in Sri Lanka to mean selecting a specialist physician after first seeing a primary care physician. A number of participants reported that the government health system emphasized primary care for community-level health maintenance. Private health care is more specialized. The major downside to this efficient, high quality care model is the cost to the patient. When they or family members had serious illness, some drivers had to take extreme measures. In order to pay for his wife’s course of cancer treatment one driver reported, “Previously I had my own three-wheeler, land, and a house. I had to sell all these things to rescue her.” In this particularly extreme example, affording high quality private health care sometimes caused this driver to make large material sacrifices. A number of other drivers repeated this concern stating that they had



previously taken out loans from friends to pay for their own or their families' health care needs.

Drivers have a choice of whether to utilize private health care, public health care, and how to choose between the two. Drivers used a number of criteria for deciding which health sector to utilize. Most often it depended on the severity of the illness. For routine exams or tests, drivers were much more likely to utilize private health care. The process is expedited and simple services are cheap in the private sector. Conversely, for serious procedures involving potentially expensive procedures, participants tend to utilize public health care systems. They may have to wait for services but they have no choice given that they would not be able to afford the services in the private sector. At times, whether drivers utilize the private or public sector is less a matter of choice than practicality. Sometimes treatments or procedures are unavailable in the public sector so participants were forced to purchase services externally.

One of the most surprisingly common reports from participants was that they virtually never utilized either sector of health care for routine well-check exams. Participants simply did not feel the need to monitor their health. In fact, they thought that dwelling on health concerns had a negative effect on health. "If we know that we are having an illness we have to think about it every day and automatically we become a sick person." In other words, as long as drivers do not know they are sick they can press on with their work. They would rather not be told by a doctor that they are sick. With the knowledge that they have an illness, drivers automatically shift from the "healthy worker" to the "sick person" role. There were practical reasons that virtually all the drivers avoided well check exams. Drivers did not see potential returns to investing the time in having a well check at a government hospital or the expense in having a well check at a private provider.

### **3.3 Health Care Finance**

Insurance coverage is a method of individual risk reduction in a health care market, meaning insurance only can exist in a private health care system. In negotiating Sri Lanka's mixed private/public health system, participants reported frequent use of private health care despite the expense. This begs the question as to whether drivers are able or willing to purchase insurance. In both the focus groups and individual interviews, only a small subset of drivers reported having some form of health insurance. It was often reported that when drivers could not afford to avail themselves of private health care, they simply utilized public health care rather than investing in insurance.

It is difficult to gauge the quality of health insurance in a nation like Sri Lanka with its thriving insurance gray market. One driver reported feeling wary of private insurance schemes because he had heard of cases where friends had been duped. As one driver stated with regard to quality of private insurance "In the private sector we may face a lot of troubles when we go to take the money back." He suggested that often private insurers failed to make the promised payments for health services to customers. Because the government does not have the capacity to regulate private markets, drivers would have no recourse in this situation. As a result, drivers preferred the safe option of using free public health care as a safety net rather than making a risky investment in private insurance.

### **3.4 Chronic Non-Communicable Illnesses**

With the exception of one driver who reported a brief bout of Dengue fever years previously, all the participants who reported having a major health concern had chronic non-communicable illnesses. The chronic illnesses cited included dermatitis, myopia, hypertension, asthma, diabetes, hypercholesteremia, and arthritis. Four drivers reported a combination of two or more of the previously listed conditions. Participants were much more forthcoming about their

personal health concerns in the individual interview setting rather than in the focus group setting. In either case it seems that a minority of drivers suffered from serious chronic illnesses and it is difficult to say whether working as a three-wheeler was the contributing factor for drivers having these diseases. It is notable that many of the chronic non-communicable disease reported are the result of lifestyle factors such as age, substance use, poor diet, and a sedentary lifestyle. It is unclear whether being a three-wheel driver is actually a risk factor for these conditions.

While most participants acknowledged the role of systems in shaping health, a number of drivers mentioned that health was more a matter of personal responsibility and decision making. “We have to shape our own health to be able to go on hires.” In essence, this participant felt that maintaining health was essential for doing the job and that staying employable was an individual’s responsibility. Interestingly participants in the focus groups had a much more pessimistic view of three-wheel driver health. Almost all participants in both groups stated that they felt three-wheel drivers were unhealthy in some way or other. “We have to stay under the sun and we are exposed to dust and usually we sit in one position for a long time so with time we get various diseases.” In this sardonic statement, the participant implied that the occupation of being a three-wheel driver necessarily makes people sick. The second focus group had a similarly pessimistic view on three-wheel driver health, suggesting that almost all drivers have some form of illness and most work exhaustingly long hours to maintain a consistent income stream.

### **3.5 Musculoskeletal Pain**

The most common health complaint among participants was musculoskeletal pain. Of all the health concerns mentioned in the interviews and focused groups, musculoskeletal pain is the most clearly linked to occupation. Participants reported feeling pain in the lower back, shoulders, and knees. They attributed this pain to two occupationally related factors: vibrations of the vehicle and staying in the same position for long hours. Many drivers reported that having one wheel in front caused stronger vibrations to be transferred to the driver’s body. This is especially true for older models

of three-wheel. "It feels uncomfortable if the vehicle is an old one. If the shock absorbers are working well we don't feel any discomfort. If the vehicle is good there's no discomfort." Drivers are thereby dependent on the mechanical integrity of their vehicle to be physically capable of doing their job.

Three-wheel driving is a sedentary profession. Drivers sit while driving, but more importantly have to sit for long hours while waiting for fares. Many drivers reported that this contributes to musculoskeletal pain. "The main reason for getting back pain is prolonged sitting on the seat.... We are looking for hires so we have to sit in the three-wheel all day." This participant has defined a clear link between occupation and musculoskeletal pain. If the frequency and consistency of these reports are any indication, musculoskeletal pain might be the most common occupational health risk among three-wheel drivers.

### **3.6 Accidents and Injury**

Spending nearly all their time on the road, three-wheel drivers are at risk for road traffic accidents. Their risk of road traffic injury is modulated by road safety, vehicle safety, and personal decision-making. Inadequate road safety is often cited as a cause of accidents in highly motorized lower and middle-income countries. However, the participants generally felt that the roads in Sri Lanka were safe. Two participants qualified this by stating that the roads were inadequately policed and that the roads lacked sufficient traffic signals or shoulder space. Some drivers specifically pointed to government sponsored road improvement projects in the last five years as the main reason for road safety. When asked when the road system had improved, one participant responded, "Since the appointment of the president... four or five years. The roads are paved and now in very good condition." The road improvement projects to which this participant was referring, were a result of the influx of foreign aid money following the 2004 Tsunami that hit Galle District particularly hard. One participant

stated that Galle District had particularly good roads when compared to other regions in the country. In fact a only a small minority of participants reported that they themselves had ever been in an accident

Participants gave mixed responses when asked whether it was common for three-wheel drivers to have accidents. None stated that it was especially common, but the degree to which they felt it occurred was largely dependent on how many of their peers had had accidents. Three-wheels do not do well in collisions. They lack doors, have no windows other than the main windshield, and neither the driver nor passenger wears a seatbelt. One driver had a minor collision with an electrical pole and “I was thrown out through the front window. Then my leg hit the [broken] windshield frame.” The driver sustained a severe laceration to the leg that required hospitalization. The inwardly compressed design of a three-wheel with high a high center of gravity makes rounding bends precarious. A number of drivers stated that-three wheels overturn easily when rounding bends. “This [vehicle] only has three-wheels so when we go around a bend the vehicle tends to overturn.” Both this inability to handle winding roads and the lack of vehicle protection in a three-wheel place drivers at greater risk of injury than the road, based on the responses of participants. Only a small proportion of drivers reported having had an accident and even fewer reported having sustained any injuries in said accidents. The handful of participants that did report having sustained an injury during an accident, did not report any major injuries other than lacerations or contusions that required outpatient treatments.

While road and vehicle safety can go a long way toward protecting drivers from road traffic injury, individual decision-making is also an important factor. The major behavioral risk factors for road traffic injury are reckless driving and driving while intoxicated. Participants did not seem to believe that drunk driving was common among their colleagues, but it did happen. Participants frequently cited drunk driving as an important cause of accidents. The more common form of risky driving behavior

among three-wheel drivers was reckless driving. According to participants this was true mainly for younger three-wheel drivers. "It's not common but occasionally there are some young people that drive recklessly." This response may have simply been an attempt at socially desirable reporting, as a three-wheel driver's reputation depends on his ability to safely transport passengers. Drivers were quick to point out that operators of other kinds of vehicles drove recklessly at the expense of three-wheel drivers, particularly private buses. They felt that the privileged status of bus companies allowed conductors to drive unsafely with impunity. "Because the owners of those buses are politicians and ministers so they have no problems. Although they go at high speeds or cross double lines they are not charged by the police." This particular statement by one participant reflected a common concern among three-wheel drivers. They generally felt that, as privileged road users, bus drivers and other vehicles took advantage of the diminutive size of three-wheels to dominate the road.

### **3.7 Substance Use**

A casual observer of three-wheel drivers in Sri Lanka off duty at a three-wheel park might ask himself or herself whether all three-wheel drivers are heavy smokers. Indeed, smoking appears to be a regular fixture of three-wheel driver public social interaction. To gain more insight into this publicly ubiquitous three-wheel driver habit, participants were asked about their own and their peers' smoking habits. About half of the drivers admitted to smoking themselves but all stated that smoking was nearly universal among other drivers. In fact the first participant interviewed emphatically stated "About 98% of drivers smoke or drink." This participant's observation was made more dire by a later participant's observation that "Those who smoke do it to the maximum." Taken together the two statements from two participants suggest that smoking is common and heavy among Galle-based three-wheel drivers. However, some drivers observed that smoking appeared to increasingly be a habit of older drivers. As

one participant observed “Younger drivers don’t smoke too much.” It is likely that this younger generation was exposed to more anti-tobacco messaging and cultural stigmatization of smoking than the older generation. When asked to explain why it was common for drivers to smoke participants provided a range of answers. Surprisingly, however, it was more common for drivers to report using cigarette smoking as a male social activity or for simple pleasure than for stress relief.

Much like tobacco use, alcohol consumption was common among three-wheel drivers. In fact, virtually all the drivers stated that alcohol consumption at whatever capacity was quite common among three-wheel drivers. “Most people drink beer at least. Non-drinkers are rare. At least 90% of drivers drink.” This openness about alcohol consumption came with qualifications. According to participants, it was uncommon for drivers to be problem drinkers and even less common for them to drink on the job. In fact alcohol, like cigarettes, was mainly framed as a male social activity. When asked when it was most common for drivers to consume alcohol one participant responded “usually at parties at home or when getting together with friends.” Many other drivers echoed this perception of alcohol as something to be reserved for social settings. A handful of drivers noted that some of their coworkers used alcohol to relieve the physical tensions of work namely fatigue and pain. “That’s why we drink- due to body aches.” Interestingly, more participants affirmed this observation that drinking more commonly happens to relieve physical stress rather than emotional stress. It appears that to these drivers alcohol is more of a social relaxant than a means of numbing emotional pain.

### **3.8 Work Related Stress**

Participants were asked whether they had experienced emotional stress at work and, if they had, the severity of that stress. Emotional stress, and the physical side effects thereof, is a major risk factor for a number of non-communicable diseases. The reason

participants were asked to specifically focus on stress related to their occupation was to make initial observations as to whether the working as a three-wheel driver is excessively stressful. Most drivers stated that as long as fares, and therefore income, were sufficient they were generally satisfied with their job. As one participant put it “It’s a free job. That means there’s no stress from working under some boss or general manager.” The appeal of working as a three-wheel driver is that drivers are able to function as independent entrepreneurs on their own terms.

The major downside to this freelance occupation is the inconsistency of income. Many drivers expressed concern about the inconsistency of fares particularly in the tourist low season. Even more of a threat was competition from increasingly developed public transportation and increasingly common family vehicle ownership, as one focus group participant pointed out. “Now every family has a motorbike or three-wheeler. Because of that our income is in a very difficult position.” In the same focus group, another participant complained that a new bus line in his neighborhood had decreased his fares dramatically. Three-wheel drivers reported that low income was stressful because it placed their families’ well-being and thus their self-perceived manhood in jeopardy. “My family has five members and out of those five the main income source is me... I have to allocate my income for their food, garments, and medicine. So I can’t be satisfied with my income.” As primary family breadwinners in a profession with inconsistent earnings, three-wheel drivers become stressed by the prospect that they will be inadequate family providers. A handful of drivers reported that sometimes when fares were uncommon, they worked sixteen-hour shifts to maximize fare intake. The final source of stress was the fact that drivers had no hope of income upon retirement. Many expect that their children will take care of them, per Sri Lankan tradition, but this is never guaranteed the way a state social safety net is.



### **3.9 Health Maintaining Behaviors**

Because many drivers stated that they viewed health as a matter of individual decision making, drivers were asked what daily health maintaining activities they practiced. The three main categories that drivers defined as health-maintaining behaviors were diet, exercise, personal hygiene, and abstaining from substances. This last health maintaining behavior, of course, was the least commonly practiced. Drivers felt that their occupation made it difficult to properly exercise and diet even though they had a general idea of what proper exercise and nutrition entailed. As one focus group participant stated “When we have to go on long hires we miss our meals” and another quickly responded with “We eat anything we can get at any time.” The obligations of working long hours and constantly traveling is that drivers plan their diets around expediency. They eat what is readily available and convenient rather than what is necessarily the healthiest option. Work obligations had a similar effect on exercise. A number of participants stated that they wished they had some form of daily exercise, but working hours made this goal unrealistic. “We would like to [exercise] but we are not having enough time.” The fact that participants could not find time to exercise or eat during the day was a source of frustration for some drivers. Although participants generally seemed confident that they could maintain their own health, they often reported that to stay competitive as a three-wheel driver they had to sacrifice aspects of their health.

## 4. Discussion

Overall, the most frequently cited health complaint among the participants, and one that is plausibly attributable to working conditions, is musculoskeletal pain. Three-wheel drivers' joints are under constant stress throughout the day. While driving they are exposed to prolonged bodily vibration on Sri Lanka's often rocky roads, and while waiting for fares they must crouch in one position for extended periods of time. As participants reported that their typical work day lasts up to twelve hours, they are occupationally exposed to severe musculoskeletal strain. This observation has not been reported in what little literature exists on three-wheel driver health, and warrants future investigation.

Also inconsistent with the literature was the infrequency with which drivers reported having experienced an accident. There is abundant literature exploring road traffic injury in lower and middle income countries, particularly those with a high rate of motorization. Work that has focused on risk of accidents among urban South Asian three-wheel drivers, particularly that of Schmucker et al (2011) suggests that three-wheel drivers are at high risk for road traffic injury. In the Galle participant group only a small minority of drivers reported having experienced a road traffic accident while working, and even fewer reported serious injury. This may be attributable to the fact that Galle's road system is simply safer than that of urban Delhi where Schmucker et al conducted their study. It could be true that the road projects financed by the Sri Lankan Government and various foreign NGO's following the 2004 Tsunami have actually reduced the risk of road traffic injury for three wheel drivers. An alternative explanation is that drivers under-reported past accidents. During the interviews many drivers expressed pride in being a "safe driver" that their passengers trust. Revealing a past accident might jeopardize their self-perception as a safe driver. Along the same lines, a "healthy worker effect" might be at play here. Drivers who had become injured in

accidents may have been unable to work and therefore were not well represented in the sample.

The participants from Galle had many of the same risk factors for cardiovascular disease that Chaudhary et al (2010) observed among three-wheel drivers in Delhi. These include smoking, hypertension, and a high degree of work related stress. While Chaudary et al did not cite lack of physical activity as a finding in their study, this was something that participants frequently complained of. They understood that exercise was a healthy activity but felt that work obligations prevented them from getting sufficient exercise. Chaudhary et al additionally did not focus on environmental risk factors for cardiovascular disease. Participants from Galle frequently complained of exposure to motor exhaust and dust. Exposure to environmental toxins is a risk factor for both cardiovascular illness and lower respiratory illness as Gavali et al (2012) observed among three-wheel drivers in Urban India. Risk factors for cardiovascular and pulmonary disease are inter-related among three-wheel drivers in Galle. First there are the behavioral risk factors for both categories of disease, including tobacco use and lack of physical activity. Compounding this further are the environmental exposures to toxins and particulate matter.

The most alarmingly widespread risk factor for chronic illness among Galle-based three-wheel drivers is substance use, possibly also abuse. Time and time again participants reported that almost all of their colleagues smoked, drank, or both. Interestingly, few were willing to admit they did so themselves, as is to be expected by socially desirable reporting. These modifiable risk factors could be a potential area on which to intervene and further research is needed. Participants offered insights that are consistent with Perera's et al's work on smoking (2005) and drinking (2009) among Sri Lankan men. Participants talked about smoking and drinking a form of social bonding among drivers and their male colleagues. By forming social gatherings centered on consumption of alcohol and tobacco, drivers are expressing their masculinity and

membership in a group. Participants sometimes used the same language of masculinity when discussing work related stress. As the sole income source for their families, some drivers reported that when their income was low they felt that they were inadequate husbands and/or fathers. The desire to prove that they are following their duties as men contributes to three cardiovascular risk factors among Galle-based three-wheel drivers: stress, smoking, and drinking.

A particularly striking report that drivers in the second focus group vocalized most clearly was the feeling that three-wheel drivers were losers in the recent economic development. They felt that they were losing transportation market share to buses and single-family vehicles. Economic growth means more formalized transportation, including bus lines and family vehicle ownership. As both of these become more widespread in Sri Lanka, three-wheels may become increasingly less important as a form of transportation. At 15% of total road users in Sri Lanka, the three-wheel driver occupation is a significant means of employment for Sri Lankan men. It will be a challenge for the Sri Lankan government to fill the employment vacuum that the gradual decline of three-wheel driving will leave. Overall three-wheel drivers reported that they trusted that the state had their best interests in mind. However, they did not feel empowered to seek political ends. Many drivers stated that there is no formal three-wheel drivers' union, and that drivers never demonstrated to seek concessions from the state. If three-wheel drivers hope to keep their occupation alive, they must devise a way to devise collective political action.

Participants were overall satisfied with the mixed public/private health system to which they had access and felt that each of the two sectors had their own strengths and weaknesses. However, when asked what the health system could be doing better to meet drivers' needs, participants had plenty of suggestions. They wished that government health facilities would improve. They enjoyed the high quality health care at little to no cost but felt that the government could keep better drug stocks and to

streamline bureaucratic processes to reduce patient wait times. Participants also felt that there should be a pension scheme for three-wheel drivers so that they could finance health care in their old age. It is unlikely that the Sri Lankan government will follow through on this in the short term, particularly with the absence of a mechanism for political action. Having a governmental pension scheme for three-wheel drivers would mean that the state would have to regulate and therefore legitimize the three-wheel driving occupation. The government is more interested in supporting the development of bus and train lines, rather than keeping alive a form of transportation seen as “backward”. Moreover, the stigma against three-wheel drivers as being crass and dishonest, which Mohan (03) observed, further reduces the political will to provide services for them.

#### **4.1 Limitations**

Given its qualitative study design, this project does not purport to be widely generalizable. Rather it aims to gain deeper insight into the health needs of a very specific community. The design is consistent with the project’s main objective of informing a design for a future quantitative survey instrument. In addition, there are some limited or even missing responses to questions as a result of variable rates of responsiveness and comprehension of questions among the participants. Although Dr. Sapukotana made every effort to translate participants’ responses as verbatim as possible, it is inherent to even the best translations that certain linguistic subtleties will be lost in translation. The extent to which this affected or changed the information gathered is unclear. While very few highly personal or sensitive questions were asked it is quite likely that participants failed to report or under reported their use of alcohol, tobacco smoking, and number of accidents. For the first two, social desirability may have played a role while with the latter they may have been hesitant to admit to accidents as they may have felt it called into question their occupational abilities. The

final limitation here is the social dynamic of the interviews. While it appeared that participants were comfortable and forthcoming, the possibility of the principal being a North American White Person, may have made participants feel that I was less trustworthy and may have withheld certain information.

## **4.2 Strengths, Implications**

The primary strength of this study is the fact that it is the first of its kind. To date the few studies that have explored three-wheel driver health have had a narrow focus on particular health topics like cardiovascular risk factors. This is the first study that aimed to get at a more generalized picture of three wheel driver health. While it difficult to discern a definitive health policy implication (since participants were largely pleased with the health system) it seems there are areas where the Sri Lankan Health system may intervene on three-wheel driver health. In particular, the state or private sector might launch an alcohol and tobacco program aimed at three-wheel drivers to encourage reduction or cessation in current users, and prevention in potential users. Additionally, private and public health system officials would be advised to encourage preventative care among three-wheel drivers. While physical examinations are accessible, three-wheel drivers appear to scarcely utilize them. Government health providers should encourage uptake of preventative care by keeping them free of charge reducing the amount of wait times for physical exams. One final area in which the Sri Lankan health system could intervene, particularly at the state area, is to pass regulation on three-wheel manufacture design to reduce the vibration and other factors which contribute to sever musculoskeletal pain in drivers.

## **4.3 Future Directions**

This project has served as to prepare for future investigations into three-wheel driver health in Sri Lanka. It would be of value to discern the clinical applications of this information but it is difficult to do so with the qualitative study design employed here. This project would be

supplemented by a larger scale quantitative study on three-wheel driver health to better quantify the issues established. These initial inquiries into the types of health concerns that three-wheel drivers face have shaped the attached survey instrument to be used in more widely sampled quantitative data collection. While a quantitative sample will be unable to get at the nuances of the relationship between three-wheel drivers and their health it may help inform a more generalized health intervention for three-wheel drives in Sri Lanka. Following the completion of this study Misa Noda, a student at Duke- National University School of Medicine developed a survey instrument to be used in future quantitative survey research on the general health of three-wheel drivers. This instrument is a compilation of validated health metrics whose structure was guided by the results of this study.

## Conclusion

As this study has demonstrated, the three-wheel drivers that were interviewed are reasonably well served by the Sri Lankan Health System but the health providers, both state and private, could take a more active role in addressing the issues which most significantly affect their health: alcohol/tobacco use, poor utilization of primary care, and musculoskeletal pain. By intervening on these three major health problems the Sri Lankan health system could potentially implement a focused approach to addressing the health concerns that affect a large number of drivers. Alcohol and tobacco use might be addressed through cost-effective behavioral intervention programs, tailored to the needs and culture of three-wheel drivers. These have the potential to be effective as three-wheel drivers have a solid understanding on how to maintain their own health and the mechanisms by which their health is negatively impacted. Poor utilization of primary care might be addressed through an incentive program by which three-wheel drivers who utilize primary care can bypass the significant wait times at government health clinics. With proper logistical planning this could be a low cost and effective intervention. The final problem, musculoskeletal pain as a result of vehicle mechanics, is more complex but might be addressed through a better regulatory structure for three-wheeler manufacturers. Potentially, the state could intervene by passing manufacturing standards for three-wheels that will limit heavy vibration. In all, the health problems facing the three-wheel drivers in the study have the potential for resolution through active engagement with members of this occupation on the part of Sri Lankan Health Workers.



# Appendix A: Interview/Focus Group Guidelines

## Demographics.

Age:

Marital Status:

Monthly Income:

How Many People Does this Support:

Level of Education:

## Health Questionnaire

1. What are some health problems that you have seen among auto-rickshaw drivers, including yourself?  
If yes...
  - a. Did you have to miss work due to that illness?
  - b. Did you get treatment?
    - i. Where?
    - ii. Did you have to pay for it?
    - iii. Were you satisfied with the services you received?
2. Do you experience pain while driving?
  - a. Where?
  - b. Do other drivers complain of pain in the same areas?
3. Do you ever feel stressed at work?
  - a. If yes... how do you cope with that stress
4. What are some things you do to maintain your health?
5. Do you smoke?  
  
If yes...
  - a. How long have you been smoking?
  - b. What do you enjoy about smoking?  
If yes or no...
  - c. Is it common for three wheel drivers to smoke?
    - i. Why?
6. Do you consume alcohol?

If yes...

- a. What do you enjoy about drinking alcohol?

If yes or no...

- b. Is it common for drivers to consume alcohol?
  - i. Why?

7. In the last ten years have you seen a physician for a well visit?

- a. If yes...

- i. Was it private or government?
- ii. Were you satisfied with your experience?

- b. If no...

- i. Why not?

8. Have you ever had an accident? If so, please describe the circumstances

If yes...

- a. Where you injured?

- i. What types of injuries did you sustain?
- ii. Did you seek treatment?
  1. Where?
  2. Were you satisfied with the treatments?

- b. Was anyone else injured in the accident?

- i. What types of injuries did they sustain?
- ii. Did they seek treatment?
  1. Where?

9. Is it common for drivers to have accidents?

10. Why do you think drivers get into accidents?

11. Is it common for drivers to drive recklessly?

12. Is it common for other vehicles to drive recklessly?

13. Do you think the roads are safe?

14. Do you have any form of health insurance?

- a. Is it common for drivers to have health insurance?

15. Has anyone in your family had any major health problems in the last ten years?

If Yes...

- a. Did they receive treatment?
- b. Where?
- c. Did you have to pay for it?

i. Was that stressful for you?

16. Overall do you feel that drivers are healthy or unhealthy?

17. Is there anything else you feel I should know about auto-rickshaw driver health?

## Appendix B: Informed Consent Document for Interviews

You are invited to participate in a study exploring the general health concerns of auto-rickshaw (“tuk tuk”) drivers in Galle. We hope that this study will help bring attention to tuk tuk drivers’ health and health needs, and possibly to inform future health programs for tuk tuk drivers. The total number of participants in this study will be 50 and it will be conducted between June 1<sup>st</sup> and August 10<sup>th</sup>, 2012.

Your participation in the study will involve a one-hour long one-on-one interview at the University of Ruhuna Faculty of Medicine, where you will be asked questions about your health experiences and the health experiences of your tuk tuk driver colleagues. The interview will be lead by the principal investigator, Jacob Kirkorowicz, a graduate student at Duke University in the United States and translated by a Sinhalese-speaking graduate of the University of Ruhuna Faculty of Medicine. It will be semi-structured, meaning that there will be guiding questions but your answers will set the course of the conversation. You may decline to answer any question that you do not wish to answer, and it will not affect your participation in the study. In order to ensure that we do not miss any information, the interview will be audio recorded.

Participation in this study will not present any additional risk to you, beyond that found in every day life. However, there will be no direct benefit to you other than the chance to participate in a study that might inform future health programs for tuk tuk drivers in Galle. Participation is voluntary and you may choose to withdraw at any time. Should you withdraw you may specify whether you wish to have the information you provided erased. Any further information will not be collected except that to document your withdrawal. You will be compensated for your participation at the rate of 500 Rupees for an hour of your time, following the interview.

Your privacy is of utmost concern to the investigators, and your full name will only appear on this document. It will be kept in a locked cabinet at the University of Ruhuna. Audio recordings will be kept on a password-protected file on the computer of the principal investigator. The audio files will only be accessible to authorized study personnel. The information you provide will be incorporated into a written report, and a brief journal article but names will not be used in the report. Any health information you provide will be incorporated into a written report and presented as a graduate research project to a faculty panel as well as some students. Your exact words might be featured in the report, but your name will not be used. Written transcripts of information you provide will be kept for five years and then destroyed, and the audio recording will be kept for one year and then destroyed.

If you have any question before we begin please feel free to ask them now. You will be given a separate copy of this document for your records. If you have any additional questions about this study after your participation please contact Jacob Kirkorowicz by phone at +01 949 413 9617 or by email at [jmk53@duke.edu](mailto:jmk53@duke.edu). You may also contact Dr. Vijitha De Silva by phone at 077760970 by email at [pviijithadesilva123@yahoo.com](mailto:pviijithadesilva123@yahoo.com). For information about your rights as a participant you may contact the Duke University Office of Research Support at +01 919 684 3030.

If you agree to participate in this study please sign below the statement of consent:

**STATEMENT OF CONSENT**

"The purpose of this study, procedures to be followed, risks and benefits have been explained to me. I have been allowed to ask questions, and my questions have been answered to my satisfaction. I have been told whom to contact if I have any other questions or concerns. I know that I can stop participation and withdraw from the study at any time."

Printed Name of Participant \_\_\_\_\_

Signature of Participant \_\_\_\_\_ Date \_\_\_\_\_

Signature of Investigator \_\_\_\_\_ Date \_\_\_\_\_

## Appendix C: Informed Consent for Focus Groups

You are invited to participate in a study exploring the general health concerns of auto-rickshaw (“tuk tuk”) drivers in Galle. We hope that this study will help bring attention to tuk tuk drivers’ health and health needs, and possibly to inform future health programs for tuk tuk drivers. The total number of participants in this study will be 50 and it will be conducted between June 1<sup>st</sup> and August 10<sup>th</sup>, 2012.

Your participation in the study will involve a one-hour long group discussion with 3-7 of your colleagues at the University of Ruhuna Faculty of Medicine, where you will be asked questions about your health experiences and the health experiences of your tuk tuk driver colleagues. The discussion will be lead by the principal investigator, Jacob Kirkorowicz, a graduate student at Duke University in the United States and translated by a Sinhalese-speaking graduate of the University of Ruhuna Faculty of Medicine. The discussion will be semi-structured, meaning that there will be guiding questions but your answers will set the course of the conversation. You may decline to answer any question that you do not wish to answer, and it will not affect your participation in the study. In order to ensure that we do not miss any information, the discussion will be audio recorded.

Participation in this study will not present any additional risk to you, beyond that found in every day life. However, there will be no direct benefit to you other than the chance to participate in a study that might inform future health programs for tuk tuk drivers in Galle. Participation is voluntary and you may choose to withdraw at any time. Should you withdraw you may specify whether you wish to have the information you provided erased. Any further information will not be collected except that to document your withdrawal. You will be compensated for your participation at the rate of 500 Rupees for an hour of your time, following the group discussion.

Your privacy is of utmost concern to the investigators, and your full name will only appear on this document. It will be kept in a locked cabinet at the University of Ruhuna. Audio recordings will be kept on a password-protected file on the computer of the principal investigator. The audio files will only be accessible to authorized study personnel. The information you provide will be incorporated into a written report, and a brief journal article but names will not be used in the report. Any health information you provide will be incorporated into a written report and presented as a graduate research project to a faculty panel as well as some students. Your exact words might be featured in the report, but your name will not be used. Written transcripts of information you provide will be kept for five years and then destroyed, and the audio recording will be kept for one year and then destroyed.

If you have any question before we begin please feel free to ask them now. You will be given a separate copy of this document for your records. If you have any additional questions about this study after your participation please contact Jacob Kirkorowicz by phone at +01 949 413 9617 or by email at [jmk53@duke.edu](mailto:jmk53@duke.edu). You may also contact Dr. Vijitha De Silva by phone at 077760970 by email at [pvijithadesilva123@yahoo.com](mailto:pvijithadesilva123@yahoo.com). For information about your rights as a participant you may contact the Duke University Office of Research Support at +01 919 684 3030.

If you agree to participate in this study please sign below the statement of consent:

**STATEMENT OF CONSENT**

"The purpose of this study, procedures to be followed, risks and benefits have been explained to me. I have been allowed to ask questions, and my questions have been answered to my satisfaction. I have been told whom to contact if I have any other questions or concerns. I know that I can stop participation and withdraw from the study at any time."

Printed Name of Participant \_\_\_\_\_

Signature of Participant \_\_\_\_\_ Date \_\_\_\_\_

Signature of Investigator \_\_\_\_\_ Date \_\_\_\_\_

## Appendix D: Three Wheeler Driver Work and Health Questionnaire

Date:

Interviewer:

Consent signed:  Yes  No

Subject ID:

### Introduction

Thank you very much for your participation in this questionnaire. My name is

This study is conducted by a team of collaborators from University of Ruhuna, Duke-NUS Graduate Medical School and Duke University. The aim of this questionnaire is to gather information on the health problems pertinent to your occupation as a three-wheeler driver, which we hope in the near future will help in finding ways to improve/maintain your health.

I will be asking questions about your work and health. The information you will provide in this questionnaire will be kept confidential. Please answer all the questions as instructed, and feel free to ask for clarification if you do not understand the question. There are no right or wrong answers, so please provide your best answer for each question.

Many of the questions will ask you to respond using a scale, for example:

E.g. Which would you say best describes how sunny it is today?

- Very sunny
- Sunny
- Somewhat sunny
- Not sunny at all

Participants understands how to answer question that use scales.

- No → Explain to participant before proceeding
- Yes → Proceed with questionnaire

Before we start, please answer the following questions.

- 0.1. Are you driving your three-wheeler as a part time employee?  
 Yes  No



- 0.2 Are you working as a three-wheeler driver temporarily? [  ]Yes [  ]No
- 0.3. Is three-wheeler driver a side job for you? [  ]Yes [  ]No
- 0.4. Are you working as a replacement for another driver today? [  ]Yes [  ]No
- 0.5. Are you over 18 years old? [  ]Yes [  ]No
- 0.6. Have you worked for less than 6 months? [  ]Yes [  ]No

→ If participant answered yes to any of the above, say: “Thank you very much for your time and your understanding, but you do not fulfill the participant criteria.”

### General Questions

- 1.1 How old are you? \_\_\_\_\_ **Years Old**
- 1.2 Do you have a concurrent job or a side job? [  ]Yes [  ]No

→ If you answered yes, please specify:

What job is it? \_\_\_\_\_ .

How many hours a week do you work in your side job?

Hours/week

- 1.3 What is the highest level of education that you have completed?

[  ] No formal education

[  ] Grade 5 or below

[  ] Grade 10 or below

[  ] O-level

[  ] A-level

[  ] Post secondary degree

[  ] Other (please specify) : \_\_\_\_\_ .

- 1.4 What is the model name of your vehicle? Please specify:

.

- 1.5 What year was your three-wheeler manufactured? \_\_\_\_\_ .

- 1.6 What is your average daily income working as a three wheeler driver?

**Rs/day**

- 1.7 What is your average monthly take home income working as a three-wheeler driver (after paying for rental fee, parking, association if any)? \_\_\_\_\_ **Rs.**

3.13. Are you satisfied with your monthly income?  Yes  No

Family

2.1. What is your marital status?

- Single
- Married
- Divorced
- Widowed

2.4. How many people live in your household? \_\_\_\_\_.

2.5. How many children live outside of your household? \_\_\_\_\_.

2.6. Does anyone else in your household have a regular income? If so, please specify who and how much:

Family member	Monthly income (Rs)

Working Condition

3.1. How many years have you been working as a three-wheeler driver?

\_\_\_ Years \_\_\_ Months

3.2. In an average week, how many days do you work as a three-wheeler driver?

\_\_\_ Days

3.3. In an average week, how many days of the week do you work night shifts as a three-wheeler driver?

\_\_\_ Day

3.4 On an average working day, from what time to what time do you work as a three-wheeler driver?

\_\_\_ a.m. /p.m. ~ \_\_\_ a.m. /p.m.

**Total:** \_\_\_\_\_ Hours

3.5 During these hours at work, how many hours do you actually spend driving your three-wheeler?

\_\_\_\_\_ Hours

3.6 During these hours at work, how many hours do you spend sitting and waiting for customers?

\_\_\_\_\_ **Hours**

3.7. Are you satisfied with your working hours?

3.8. Do you own your own three-wheeler?

→ If yes, proceed to question 3.11.

3.9. Who do you rent from?

**Owner**

**Other** (please specify):\_\_\_\_\_.

3.10. How much rent do you pay for your vehicle every month?

**Rs./month**

3.11. How much do you pay for the union every month?

**Rs/month**

3.10. Have you been given a daily target for your earnings? **Yes / No**

If you answered yes, what is your daily target? **Rs**

Stress

The questions in this scale ask you about your feelings and thoughts **during the last month**. In each case, you will be asked to indicate how often you felt or thought a certain way.

4.1. In the last month,                    0            1            2            3            4  
how often have you been upset because  
of something that happened unexpectedly?

4.2. In the last month,                    0            1            2            3            4  
how often have you felt that  
you were  
unable to control the important things in your life?

4.3. In the last month,                    0            1            2            3            4  
how often have you felt nervous and  
“stressed”?

4.4 In the last month,                    0            1            2            3            4  
how often have you felt  
confident about your ability to handle your personal problems?

4.5. In the last month,                    0            1            2            3            4  
how often have you felt that  
things were going your way?

0            1            2            3            4  
44

4.6. In the last month, how often have you found that you could not cope with all the things that you had to do?

4.7. In the last month, how often have you been able to control irritations in your life?

0	1	2	3	4
---	---	---	---	---

4.8. In the last month, how often have you felt that you were on top of things?

0	1	2	3	4
---	---	---	---	---

4.9. In the last month, how often have you been angered because of things that were outside of your control?

0	1	2	3	4
---	---	---	---	---

General Health

5.1. How would you rate your general health?

- Excellent**
- Very good**
- Good**
- Fair**
- Poor**

5.2. Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good? \_\_\_\_\_Days

5.3. Now thinking about your mental health, which includes stress, depression and problems with emotions, for how many days during the past 30 days was your mental health not good? \_\_\_\_\_Days

5.4. During the past 30 days, for about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation? \_\_\_\_\_Days

5.5. Do you have any long-term illness, health problem or disability which limits what you can do?

- Yes**    **No**

IF "NO" GO TO QUESTION 10

IF "YES" please tell us what this problem is: .....

Hearing screening/Self reporting

6.1. Do you have an underlying hearing loss problem since childhood?

6.2. Screening questions

- a. Do you now have total deafness in one or both ears?
- b. Do you have any other trouble hearing in one or both ears?
- c. Have you had tinnitus or ringing in the ears at any time?
- d. Do you use a hearing aid?

→ Proceed to question if you answered yes to any of the above.

### 6.3. Self-rating scale

- a. Which best describes your hearing in your left ear?

- Good**
- A little trouble**
- A lot of trouble**
- Deaf**

- b. Which best describes your hearing in your right ear?

- Good**
- A little trouble**
- A lot of trouble**
- Deaf**

### Musculoskeletal Pain

#### 7.1 Any MSK pain

I would like to ask you some questions about symptoms you may have experienced such as pain, stiffness, aching, numbness, tingling or burning.

- a. Have you ever had symptoms such as pain, aching, stiffness, burning, numbness, or tingling more than 3 times OR lasting a week or more in any of the body areas shown on this card, which include the neck, shoulders, elbow or forearm, wrist or hand, back or knees?

PROVIDE CUE CARD TO PARTICIPANT

- No → SKIP TO SECTION 8
- Yes → Tell me all of the areas you have experienced these symptoms.

AS PARTICIPANT TELLS YOU, CIRCLE BODY PART AND CHECK APPROPRIATE TAB SO YOU KNOW WHICH ADDITIONAL QUESTIONS TO ASK.

THEN GO TO FIRST TAB CHECKED.

#### 7.2 Back pain Qs and RMDQ for back pain

\_\_\_\_\_ Repeat for each  
section \_\_\_\_\_

A. In the last 12 months have you had \_\_\_\_ symptoms (pain, aching, stiffness, burning, numbness or tingling) more than 3 times OR lasting a week or longer?

Yes  No

IF NO, SKIP TO NEXT BODY PART TAB THAT IS CHECKED

B. Have you ever had an accident or sudden injury to your \_\_\_\_ like a fracture, dislocation, tendon tear, or a sports injury?  Yes  No

C. Did this accident or injury occur at work?  Yes  No

D. Have you ever had surgery on your \_\_\_\_ ?  Yes  No

E. In the past 12 months, how often have you had these \_\_\_\_ symptoms?

- Constant
- Daily
- Once a week
- Once a month
- Every 2-3 months
- Every 6 months
- Other \_\_\_\_\_

F. In the past 12 months, how long did your \_\_\_\_ symptoms usually last?

- Less than one week
- 3 to 6 months
- 1-3 weeks
- More than 6 months
- 1-2 months

G. On average, describe how bad your BACK symptoms have been in the past 12 months. Which of these would you say best describes how bad the symptoms have been? PROVIDE CUE CARD TO PARTICIPANT

H. Did your \_\_\_\_ symptoms start:

- Away from work, before starting work as a three-wheeler driver
- Away from work, while working as a three-wheeler driver
- While working as a three-wheeler driver

I. Please describe the job you were doing in when your \_\_\_\_ symptoms STARTED:

**Job:** \_\_\_\_\_

J. Have you changed from another job to your current job because of pain or discomfort in your \_\_\_\_ ?

Yes  No

K. Which side bothers you most?

**Right**    **Left**    **Both the same**

L. In the past 12 months, how many times have you SEEN a doctor, nurse, physiotherapist, Ayurvedic practitioner or any other health care provider for your \_\_\_\_ symptoms?

**Not at all in the past 12 months**  
 **1 time**  
 **2 to 5 times**

M. How many days have you had to MISS WORK in the past 12 months for your \_\_\_\_ symptoms? Include days you may have missed before you worked at this factory if you had symptoms before that.

**0 days**  
 **1 day to 1 week**  
 **More than 1 week to 2 weeks**  
 **More than 2 weeks**

N. How many days have you had to CHANGE YOUR WORK DUTIES OR WORK AT AN EASIER JOB in the past 12 months due to your symptoms?

**0 days**  
 **1 day to 1 week**  
 **More than 1 week to 2 weeks**  
 **More than 2 weeks**

O. Generally, how difficult is it for you to MAINTAIN the SPEED required each work day because of your \_\_\_\_ \_\_\_\_ symptoms?

**Not at all difficult**  
 **A little difficult**  
 **Somewhat difficult**  
 **Very difficult**

P. Generally, how difficult is it for you to MAINTAIN your WORK QUALITY, or do the work the way it needs to be done, each work day because of your \_\_\_\_ symptoms?

**Not at all difficult**  
 **A little difficult**  
 **Somewhat difficult**  
 **Very difficult**

Q. Were your \_\_\_\_ symptoms severe enough to interfere with your activities outside of work?

**No**  
 **Yes, interfered a little**

- Yes, interfered some
- Yes, interfered a lot

here \_\_\_\_\_ Repeat Qs end

R. I am going to ask some more questions regarding back pain. The list contains sentences that people have used to describe themselves when they have back pain. As I read the list, please think of yourself today and answer yes or no.

- I stay at home most of the time because of my back
- I change position frequently to try and get my back comfortable
- I walk more slowly than usual because of my back
- Because of my back I am not doing any of the jobs that I usually do around the house
- Because of my back, I lie down to rest more often
- Because of my back, I try to get other people to do things for me
- I get dressed more slowly than usual because of my back
- I only stand for short periods of time because of my back
- Because of my back, I try not to bend or kneel down
- I find it difficult to get out of a chair because of my back
- My back is painful almost all the time
- I find it difficult to turn over in bed because of my back
- My appetite is not very good because of my back pain
- I only walk short distances because of my back
- I sleep less well on my back
- I sit down for most of the day because of my back
- I avoid heavy jobs around the house because of my back
- Because of my back pain, I am more irritable and bad tempered with people than usual

### 7.3 Neck pain

Same as above if participant has neck pain

### 7.4 Shoulder pain

Same as above if participant has shoulder pain

### 7.5 Hands/ write pain and Upper extremity function scale/Pransky

Same as above if participant has hands/wrist pain

Also ask the following

### R. Upper Extremity Function Scale /Pransky

Now I would like to ask you about some common tasks. Here is a card that lists these tasks.

PROVIDE PARTICIPANT WITH CUE CARD BEFORE YOU READ THE OTHER DIRECTIONS.

Please tell me which of the following things you have difficulty doing because of symptoms in your arms or hands. Which number best describes or indicates how much difficulty you have with each activity? ONE means you



have NO PROBLEM with this activity because of your symptoms and TEN means you have MAJOR PROBLEMS and cannot do this task at all. I will read each activity to you, please tell me which number is most correct for you now.

	No problem ← → Major problem									
<b>Sleeping</b>										0
<b>Writing</b>										0
<b>Opening jars</b>										0
<b>Picking up small objects with fingers</b>										0
<b>Opening a door</b>										0
<b>Washing dishes</b>										0

7.6 Elbow/ forearms pain

Same as above if participant has elbow/ forearms pain

7.7 Other MSK pain areas? Carpal Tunnel Syndrome questionnaire?

Respiratory Health

8.1. Do you have any of the following (tick all that apply)

- a) Heart problems
- b) Stroke
- c) Arthritis or other joint problems
- d) Osteoporosis
- e) Other - please specify: .....

8.2. Do you have a cough on most days?

8.3. Do you bring up phlegm / sputum?

8.4. Are you troubled by breathlessness?

8.5. Have you at any time been wheezy? (This means you have heard a whistling sound, however high or low pitched and faint coming from your chest)

[ ] Yes [ ]

➔ IF "NO" GO TO QUESTION 8.7

8.6. Were you wheezy or breathless as a child?

8.7. Do you suffer with hay fever or any other allergies that make your nose runny or stuffy, apart from colds?

8.8. Has a doctor ever diagnosed you with any of the following?:

Asthma

Emphysema

Chronic Bronchitis

Chronic Obstructive Airways Disease (COPD)

8.9. Have you used any medicines (inhalers, tablets) to help your chest in the last 12 months?

If “NO” please go to the next section.

If “YES”:

8.10. Which of the following have you used? (tick all that apply)

- a) Inhalers
- b) Antibiotics
- c) Steroid (Prednisolone) tablets
- d) Oxygen
- e) Nebulisers
- f) Other (please specify) .....

Health care access / utilization

9.1. Do you have a private health insurance?

9.2. Have you ever gone to see a private doctor?

→ if you answered no, move on to question 3

→ if you answered yes, what percentage of your visit to the doctor are with a private doctor?

- 20%
- 40%
- 60%
- 80%
- 100%

9.3. Was there a time in the past 12 months when you needed to see a doctor but could not because of cost?

- Yes
- No
- Don't know
- Refused

9.4. Was there a time in the past 12 months when you needed to see a doctor but could not because you were too busy?

- Yes
- No
- Don't know
- Refused

9.6. Do you receive care from specialists/ practitioners / therapists, other than medical doctors?

→ if you answered yes, please specify what service you seek, and for what health problem:

\_\_\_\_\_, for \_\_\_\_\_.

\_\_\_\_\_, for \_\_\_\_\_.

\_\_\_\_\_, for \_\_\_\_\_.

9.7. Do you visit the doctor for a routine check up? A routine check up is a general physical exam, not an exam for a specific injury, illness or condition.

- Within past 12 months
- Within past 2 years
- Within past 5 years
- 5 or more years ago
- Never

9.8. Did you do a routine check up at the time of obtaining your driving license?

Health Behaviors and Risk (individual)

10.1. Have you ever smoked?

If "NO" go to question 2  
If "YES":

a. Do you smoke cigarettes everyday, some days, or not at all?

- Everyday**
- Some days**
- Not at all**

b. How old were you when you started? ..... years old

c. If you stopped, how old were you then? ..... years old

d. If not, how many cigarettes do you usually smoke? ..... cigarettes a day

e. During the past 12 months, have you stopped smoking for one day or longer because you were trying to quit?

- Yes**
- No**
- Don't know/Not sure**

f. How long has it been since you last smoked a cigarette, even one or two puffs?

- Within the past month**
- Within the past 3 months**
- Within the past 6 months**
- Within the past year**
- Within the past 5 years**
- Within the past 10 years**
- Over 10 years**

10.2. During the past 30 days, how many days per week or per month did you have at least one drink of any alcoholic beverage such as beer, wine, or arrack?

- \_\_Days per week**
- \_\_Days in past 30 days**
- No drinks in the past 30 days**

10.3. One drink is equivalent to a ? beer, a glass of wine, or a drink with one shot of liquor. During the past 30 days, on the days when you drank, about how many drinks did you drink on average?

\_\_\_\_\_ **Drinks**

10.4. Considering all types of alcoholic beverages, how many times during the past 30 days did you have 5 or more drinks on an occasion?

\_\_\_ **Times**

**None**

**Don't know**

10.5. During the past 30 days, what is the largest number of drinks you had on any occasion?

\_\_\_\_\_ **Drinks**

**Don't know**

10.6. Do you betel chew?

**Yes**

**No**

**Refused**

If yes...

10.6a. How often?

**Everyday**

**Some days**

**Not at all**

10.7. During the past month, other than our regular job, did you participate in any physical activities or exercises such as running or walking for exercise?

**Yes**

**No**

**Don't know**

10.8. How many times per week or per month did you take part in this activity during the past month?

\_\_\_ **times a week**

\_\_\_ **times a month**

**Don't know**

10.9. Approximately how many minutes or hours did you usually take part each time?

\_\_\_\_\_ **Hours** \_\_\_\_\_ **Minutes**

Health Behaviors and Risks (occupational)

11.1. Do you drive aggressively?

**Never**

**Sometimes**

**Often**

11.2. Do you drive during a red light?

**Never**

**Sometimes**

**Often**

11.3. Do you drink while at work?

**Never**

**Sometimes**

**Often**

11.4. Do you bribe the police?

**Never**

**Sometimes**

**Often**

(Qs from APDJ)

11.5. Do you drive under the influence of alcohol?

**Always**

**Sometimes**

**Rarely**

**Never**

11.6. Did you drive without valid license when you started out as a driver?

**Yes**

**No**

→ If yes, for how long? \_\_\_\_\_ **Years** \_\_\_\_\_ **Months** \_\_\_\_\_ **Weeks**

11.7 Have you had any accident in the past one year? If so, how serious was it?

**Yes**

**Fatal**

**Serious**

**slight**

**Damage only**

**No**

11.8. Aggressive driving behavior scale

1. Intentionally tap my brakes when another vehicle follows too closely

**Yes**  **No**

2. Make rude gestures at other drivers when they do something I don't like

**Yes**  **No**

3. Honk when another driver does something inappropriate

**Yes**  **No**

4. Merge into traffic even when another driver tries to close the gap between vehicles

**Yes**  **No**

5. Speed up when another vehicle tries to overtake me

**Yes**  **No**

6. Follow another vehicle in front of me closely to prevent another vehicle from merging in front of me

**Yes**  **No**

7. Flash my lights at slower traffic so that it will get out of my way

**Yes**  **No**

8. Follow a slower vehicle at less than a three-wheeler length

Yes  No

9. Drive much faster than the posted speed limit

Yes  No

10. Pass in front of a vehicle at less than a three-wheeler length

Yes  No

8.3. Have you gotten involved in a traffic accident at work while driving your t three-wheeler?

Yes  No

If you answered yes, was a report made to the police?

8.4. Have you ever acquired any injury while working as a three-wheeler driver?

If you answered yes, please specify:

Examination

1. Visual acuity ?

> 20/20

20/40

20/100

<20/200

2. Color vision

3. Parameters

Height : \_\_\_\_\_m

Weight: \_\_\_\_\_kg

BMI: \_\_\_\_\_kg/m<sup>2</sup>

Waist circumference: \_\_\_\_\_ cm



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