



THE THIRD  
NATIONAL HEALTH AND MORBIDITY SURVEY  
2006  
(NHMS III)

# INJURY AND RISK REDUCTION PRACTICE

INSTITUTE FOR PUBLIC HEALTH  
NATIONAL INSTITUTES OF HEALTH  
MINISTRY OF HEALTH  
MALAYSIA  
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JANUARY 2008**

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## LIST OF RESEARCH TOPICS

Topic 1 Health Expenditure

Topic 2 Oral Health

Topic 3 Load of Illness

Topic 4 Health Utilization

### **Topic 5 Injury and Risk Reduction Practice**

Topic 6 Physical Disability

Topic 7 Asthma

Topic 8 Dengue Prevention Practice

Topic 9 Health Information

Topic 10 Physical Activity

Topic 11a Smoking

Topic 11b Alcohol

Topic 12 Hypertension and Hypercholesterolemia

Topic 13 Diabetes Mellitus

Topic 14 Infant Feeding

Topic 15 Nutritional Status

Topic 16 Women's Health

Topic 17 Sexual Behaviour

Topic 18 Psychiatric Morbidity



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## **MESSAGE FROM THE DIRECTOR GENERAL OF HEALTH MALAYSIA**

Since independence, Malaysia has achieved remarkable progress economically and socially, notably in the health sector, through a well planned and comprehensive health care delivery system. However, Malaysia's health care system still has to grapple with many challenges, particularly the rising costs of health care and the increasing demands and expectations for quality care by our consumers. In this respect, the Ministry of Health formed the 'National Institutes of Health' to spearhead health research that will provide the body of evidence to help formulate health policies and create new tools to measure health impacts arising from the series of interventions made in the provision of health care. This will lead to an environment of better governance.

The first National Health & Morbidity Survey (NHMS) was conducted in 1986 by the Institute for Public Health (IPH) which is currently one of the research organizations under the umbrella of the National Institutes of Health (NIH). IPH was also given the task of conducting the second NHMS II in 1996 and the current NHMS III in 2006. Data and information gathered by these surveys are consistently and extensively been used by the Ministry of Health in formulating the Malaysian Health Plans and evaluating the intervention programmes.

The publication of the current NHMS III report would generate much interest amongst of all health care stakeholders in the country as well as international health organizations. It is my sincere wish that the data and information generated by NHMS III be fully distributed, discussed and utilized to enhance further the provision of health care in this country. The data generated on the national health and health-related prevalence would be useful in assessing the national health burden as well as allowing for international comparison of health systems achievements.

I would like to take this opportunity to congratulate all those directly involved in the conduct of the survey, namely members of the National Steering Committee, the Advisory Committee, Research Groups and the Working Committee for their untiring efforts in the planning and conduct of the survey as well as publication of the reports. I would like to specially place on record the Ministry's appreciation of the excellent work done by the Principal Investigator and his team and for their dedication and tenacious efforts in spearheading this project to fruition. The Ministry of Health is committed to conduct these National Health and Morbidity Surveys on a regular basis and hope that IPH will continue to provide the leadership in conducting future National Health and Morbidity Surveys in this country.

Thank you.



**Tan Sri Datuk Dr Hj. Mohd Ismail Merican**  
Director General of Health, Malaysia.

## **MESSAGE FROM THE DEPUTY DIRECTOR GENERAL OF HEALTH (RESEARCH AND TECHNICAL SUPPORT)**

The Research and Technical Support Programme of the Ministry of Health emphasizes the need for research in supporting decision making and planning the activities in the Ministry. Only then can we ensure that every decision made either in planning resources or providing services to the people is supported by evidence based information and ensuring better results and outcome. We would certainly prefer local expertise rather than depend on foreign experts to carry out local research.

Under the umbrella of the National Institutes of Health, the Institute for Public Health has actively been involved in conducting research in public health and the National Health and Morbidity Survey is one of the major research conducted by IKU. This is the third time IKU has been given the responsibility to conduct such a mammoth task. I am very pleased that a lot of improvement have been made in the way this survey was conducted based on the experience learnt during the first and second surveys. However, due to the nature of the community survey, not all diseases and health issues were able to be covered in this survey. The research teams had to conduct an extensive literature reviews for relevant and up to date information on the health status of the Malaysian population.

I believe that the information in these reports are extremely valuable to all decision makers at the National State and district levels as well as those interested in the health of the Malaysian population. It can be a tool in providing guidance in developing and implementing strategies for the disease prevention and control programme in Malaysia.

I would like to take this opportunity to congratulate the research team members who have successfully undertaken and completed this survey. I would also like to thank all individuals and agencies who directly or indirectly made the completion of this survey possible.

The Institute for Public Health again gained a feather in its cap by successfully completing the Third National Health and Morbidity Survey.



**Datuk Ir. Dr. M. S. Pillay,**  
**Deputy Director General of Health (Research and Technical Support).**

## **MESSAGE FROM THE DIRECTOR OF INSTITUTE FOR PUBLIC HEALTH**

This is the third time the Institute for Public Health (IPH) was given the task to conduct the National Health and Morbidity Survey. The frequency of the study is every 10 years and I am proud that the Institute is able to conduct the surveys successfully since it was first initiated in 1986.

I would like to take this opportunity to thank the Director-General of Health Malaysia, Tan Sri Datuk Dr. Hj. Mohd Ismail Merican, and the Deputy-Director General of Health (Research and Technical Support), Datuk Ir Dr.M.S. Pillay, whose invaluable support and guidance were instrumental in the successful completion of the third National Health and Morbidity Survey (NHMS III). Our appreciations are also extended to all members of the Steering Committee and the Advisory Committee of NHMS III.

I would like also to take this opportunity to congratulate the Principal Investigator and his Project Team Members in completing the NHMS III study and the publication of its report. The NHMS III was made possible through the collaboration of all agencies. The meetings, workshops and conferences that were organised, met their intended objectives and the hard work put up by the field staffs, ensured the three months data collection productive and successful.

My sincere gratitude also goes to Dr.Nirmal Singh, the former Director of the Institute for Public Health, Chairman of the Advisory Committee for his continuous support and guidance which contributed towards the successful completion of the study.

I hope the documentation of this report will be beneficial for future reference.

Finally, I would like to thank all those involved in the survey for a job well done, in making the NHMS III a success and finally producing the national report of this survey.



**Dr. Yahya Baba,**  
Director, Institute for Public Health.

## **MESSAGE FROM THE PRINCIPAL INVESTIGATOR NHMS III**

It is indeed a challenging task when the responsibility was given to me to conduct this survey. I learned the hard way and gained a lot of valuable experience in leading the survey. The survey also taught me lots of new techniques and how it should be addressed which is not available in the textbook. In doing so, I also learned the meaning of friendship and honesty, how to manage people involved and manage properly the given budget.

I would like to take this golden opportunity to thank the Director General of Health Malaysia, Tan Sri Datuk Dr. Hj. Mohd Ismail Merican, Chairman of the Steering Committee for giving me the confidence, valuable support and guidance for the success of this survey.

I would also like to thank the Deputy Director General of Health Malaysia (Research & Technical Support), Datuk Ir. Dr. M.S. Pillay as Co-chairman of the Steering Committee for his patience in seeing through the survey until its completion the production of the national report.

My sincere appreciation to current Director of Institute for Public Health (IPH), Dr.Yahya Baba and former Directors of IPH, Dr.Nirmal Singh, Dr.Sivashamugam and Dr.Sulaiman Che Rus for their trust in me to carried out this survey. Their support for the survey has resulted the smooth conduct and success of the survey.

Special thanks to all State Directors, State Liaison Officers, Field supervisors, Scouts, Data Collection Team members for their full cooperation and efforts to ensure the success of the data collection. My appreciation is also extended to the Assistant Principal Investigator, Dr.Mohd Azahadi Omar, Main Research Group members, members of the Working Committee, Data Management group members, Statistics Consultant, Research group members , Research Officers and Research Assistants for their patience and tolerance of my behaviour to ensure the success of the study. Nevertheless I acknowledge a lot more can be done in strengthening the study.

I believe this report will serve as a useful reference for future surveys and helps in improving the local data sources and also add new valuable information for the Ministry of Health to use in the planning process. I also would like to encourage all research members to participate in further analysis of the data and publish the findings in peer review journals.

Thanks to everyone.



**Dr. Hj. Ahmad Faudzi Hj. Yusoff,  
Principal Investigator, The Third National Health and Morbidity Survey,  
Institute for Public Health.**



## *A***UTHOR'S STATEMENT**

Unintentional injuries were the sixth leading cause of death and third leading cause of admission in government hospitals in 2006 (Information and Documentation System Unit, Ministry of Health). The NHMS III study conducted in 2006 included determining the incidence of injuries, factors associated with the occurrence of injuries and injury risk reduction practices. This report presents the findings of the study, by location of injuries i.e. home, road, workplace, school and recreational areas. The incidence of injuries and the factors associated with each of the type of injuries are discussed. Information on exposure to training on First Aid, Cardio Pulmonary Resuscitation and Occupational Safety and Health and the provision and use of personal protective equipment, seat belt and motor cycle helmets is presented. The report is targeted at various stakeholders including policy makers, program managers and researchers interested in understanding the injury problem in Malaysia.

## *A*CKNOWLEDGEMENT

This report would not have been possible without the ideas and insights gained from the previous NHMS studies.

We, the researchers, wish to express our sincere appreciation and heartfelt gratitude to the following individuals and organizations for their invaluable contribution in preparation of this report: -

- Third National Health and Morbidity Survey Steering Committee and Advisory Committee
- Directors of all State Health Departments
- Director, Disease Control Division, Ministry of Health
- Director, Institute for Medical Research
- Director, Institute for Public Health
- Dean, Medical Faculty, Universiti Kebangsaan Malaysia
- Dean, Medical Faculty, University Malaya
- Principal Investigator, Third National Health and Morbidity Survey
- All individuals who have been involved directly or indirectly in this research project.

Expertise and useful comments from reviewers and editors are gratefully acknowledged. However, any errors and omissions are those of the authors.

## ABSTRACT

According to the Malaysian Burden of Disease Study, unintentional injuries were responsible for 9.6% of the total disability adjusted life years (DALYs) in the year 2000. Injury was the second leading cause of burden by disease category. The objectives of the National Health and Morbidity Survey III (NHMS III) conducted in 2006 included determining the prevalence and factors related to injuries at home, on the road, in workplaces, recreational areas and schools and assessing the magnitude of a few important risk reduction practices among the general population and workers. The NHMS III was a nation wide health survey involving 55,774 respondents, with a response rate of 98.4%. Out of the total respondents, a total of 9,032 (16.2%) suffered at least one type of injury either at home, on the road, at recreational area, at workplace or at school in the last one year. Among the five types of injuries studied, the highest number of injuries was due to those at home (3,742), followed by on the road (2,432), at workplace (998), at recreational area (960) and the least was at school (900). However, by incidence rate, injuries at schools were highest at 7.0%, followed by at home (6.5%), at workplace (4.8%), on the road (4.4%) and at recreational areas (1.7%). Among those injured, incidence rate of those with severe injuries was highest for road injuries. Nearly 40.0% of them had injuries affecting their ability to go to school, work or play and 16.6% of them needed hospital admission for at least one night. Injury incidence rates in homes, on roads and in the workplace were higher in rural areas while those in schools were higher in urban areas. Injury prevalence rates for all types of injuries were higher among males except for those occurring at home where they were higher among females. Except for injuries occurring in the workplace, Malaysians had higher prevalence rates for all types of injuries compared to Non-Malaysians. For risk reduction practices studied, the proportion of front car seat users who used seatbelt all the time in the last one month was 71.3% and was significantly higher among those living in the urban areas 74.7%, Malaysians 72.6%, those with tertiary education 83.1% and married individuals 74.7%. Only 56.5% of motorcycle users wore helmet correctly all the time in the last one month. The proportion wearing helmet correctly were significantly higher among those who were Malaysians, were males and those who had secondary education. Slightly more than one third of workers were trained on occupational safety and health training prior or within one month of starting work. Only 38.9% of those who felt they needed personal protective equipment (PPE) in the workplace were provided with PPE by their employers. However, among those provided with PPE, 85.1% stated they used it all the time. Nearly 20-25% of respondents admitted to being exposed to first aid and cardio pulmonary resuscitation. In conclusion incidence of injuries in the country are high and the adoption of risk reduction practices need to be increased.

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## **ABBREVIATIONS**

CPR	Cardio Pulmonary Resuscitation
DE	Design Effect
EB	Enumeration Blocks
DALY	Disability Adjusted Life Years
LQ	Living Quarters
MOH	Ministry of Health
NHMS II	Second National Health and Morbidity Survey
NHMS III	Third National Health and Morbidity Survey
OR	Odds Ratio
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Act
PPE	Personal Protective Equipment
PPS	Probability Proportionate To Size
RTA	Road Traffic Accident
RR	Response Rate
WHO	World Health Organization



## **1. INTRODUCTION**

Injuries, may they be unintentional or intentional, are a major public health problem. Injuries have previously been neglected as they were viewed as accidents or random events and the term used interchangeably with accidents. Accidents are unfortunate events that were thought to occur by chance and as an act of God. It is now however increasingly known to occur as result of the interaction between the agent (hazard), the host (man) and the environment (physical and psychosocial). From theories that initially expounded that accidents occurred as a result of a single cause, it is increasingly attributed to multiple causes. These causes could be direct, indirect and underlying cause of the accident. Accidents may or may not result in injuries, only causing property damage or environmental damage . If as a result of these accidents, energy transfer (in the form of mechanical, chemical, electrical energy etc) to the host occurs, in this case humans, the host suffers injuries. Studies on injuries have shown that injury events are predictable and controllable and they can be prevented through human effort.

Injuries rank among the leading causes of death and burden of disease worldwide. They affect people of all ages. According to the Malaysian Burden of Disease Study, unintentional injuries were responsible for 9.6% of the total disability adjusted life years (DALYs) in Malaysia in 2000. It was the second leading cause of burden by disease category. The burden due to mortality was 86%. Road traffic injuries were the commonest cause contributing to 60% of total burden of unintentional injuries (MOH 2004). In 2006, injuries were the sixth leading cause of death and third leading cause of admissions in government hospitals (Information and Documentation System Unit, Ministry of Health 2006).

In order to develop effective prevention strategies, more information is needed such a the number and types of injuries that occur and the circumstances in which the injury occurred as it will indicate the seriousness of the problem and where preventive measures are needed most. Therefore, nonfatal injuries at various locations were included in this study to look at the socio demographic predictors of injuries, related factors and their implications, as well as to assess the magnitude of risk reduction practices among the general population and workers.

## **2. LITERATURE REVIEW**

The World Health Organization (WHO) defines injury as unintentional and/or intentional physical damage that results when a human body is suddenly or briefly subjected to intolerable levels of energy that exceeds the physiological tolerance, or from a lack of one or more vital elements e.g. oxygen. The damage can be a bodily lesion or impairment of function. The energy causing an injury may be mechanical as in an impact with a moving or stationary object, radiant as in a shock wave from an explosion, thermal as in exposure to hot water, electrical or chemical as in poisoning (Holder et al. 2001). Injuries are usually categorized by intention into intentional interpersonal, self harm, legal intervention and war, civil insurrection and disturbances, unintentional accidental or undetermined intent.

Worldwide injury is a major public health problem. It is a leading cause of death and disability for all age groups except among people 60 years and above. In 2000, approximately 5 million people died as a result of an injury and about 50% of these occurred in the South-East Asia and Western Pacific Region. Almost 50% of the world's injury related deaths occurred in young people aged between 15 to 44 years old and worldwide, twice as many men die as a result of injury compared to women. Road traffic accidents (RTA) accounted for one quarter of all injury deaths. Injuries contributed to 12% of the total burden of disease worldwide and road traffic injuries are among the greatest contributors to the global burden (Peden et al. 2002).

According to the Report on Road Traffic Injury Prevention (WHO), in 2002, an estimated 1.2 million people died as the result of road traffic collisions. This gives an average of 3,242 people being killed on the world's roads daily and 90% of road traffic deaths occurred in low and middle income countries. More than half of all road traffic deaths occurred among young adults aged between 15 and 44 years and 73% of all road traffic fatalities are males. Road crashes caused about 20 to 50 million people to be injured or disabled. Road traffic injuries were the 11<sup>th</sup> leading cause of death worldwide and accounted for 2.1% of all deaths globally. Globally, road traffic crashes caused USD518 billion and between 1-2% of gross national product (GNP) of countries. In low and middle income countries including Malaysia, road users who are found to be more vulnerable are pedestrians, cyclists and motorcyclists (Peden et al. 2004).

Falls are one of the most important mechanisms of injuries. Worldwide, an estimated 283,000 people died due to falls in 2000 and nearly 60% of all fatal falls occurred in Europe and the Western Pacific region. Fall related mortality rate is higher among the elderly whereby 40% of the deaths occurred among persons aged 70 years and above. Males had higher fall related mortality rates in all regions worldwide compared to females. Globally, approximately 50% of the total number of disability adjusted life years (DALYs) due to falls occurred in children under 15 years of age (Peden et al. 2002).

The impact of injuries is not only to the injured person but also everyone involved in the injured person's life. In nonfatal injuries, family members and close friends may need to care for the injured persons resulting in stress, time away from work, and possibly lost of income. At the workplace, the employers may have to cope with temporary or permanent loss of valued employees. While in fatal injuries, family, friends, coworkers, and employers will feel the loss and apart from the grief, they may also experience loss of income or the loss of a primary caregiver.

Evidence has shown that injuries are a global problem as well as in Malaysia and there is a need for a coordinated effort to prevent injuries both world wide and in Malaysia. In Malaysia, the magnitude and characteristics of the problem must be assessed. We need to know who are affected and where it occurred. The risk factors and protective factors should be identified so that programs can be developed and implemented to reduce the risk factors and to capitalize the protective factors in order to protect people from being injured. Information on it should be disseminated so that the various stakeholders will benefit from it.

### **3. OBJECTIVES**

#### **3.1 General Objective**

To determine the incidence rate of injuries and to assess the magnitude of risk reduction practices in the population.

#### **3.2 Specific Objectives**

3.2.1 To determine the prevalence of injuries at:-

- a) home
- b) road
- c) workplace
- d) recreational areas
- e) school

3.2.2 To determine factors related to injury and its implications:-

- a) causes
- b) location where injury occurred
- c) type of injury
- d) parts of body injured
- e) absence from school or work or inability to play
- f) hospital admission

3.2.3 To assess the magnitude of risk reduction practices among the general population:-

- a) first aid cardio pulmonary resuscitation training
- b) safety practices which are correct use of helmet and use of seat belt

3.2.4 To assess the magnitude of risk reduction practices among workers:-

- a) safety and health training
- b) safety practices which are provision and use of personal protective equipment

## **4. METHODOLOGY**

### **4.1 Scope of The Study**

Research problems, scopes and main issues to be included in NHMS III were obtained from discussions and feedbacks from Ministry of Health state health managers, as well as experts from the local universities and individuals. The main research team members of the NHMS III reviewed and studied closely the feasibility and practicality of the suggested research topics for this community-based household survey. Extensive literature review was initiated. Technical and research experts in the field related to the identified research areas were consulted for further advise and comments. The main research group used the following criteria in considering the suggested scopes for this survey:

- a) The issue/problem is current or has potential of high prevalence
- b) The issue/problem is focused on disease/disorders associated with affluence, lifestyle, environment and demographic changes.
- c) The issue/problem is causing physical, mental or social disability
- d) The issue/problem has important economic implications
- e) It is feasible to implement interventions to reduce the problem
- f) The information related to the issue/problem is not available through the routine monitoring system or other sources.
- g) The information is more appropriately obtained through a nation-wide community survey, and
- h) It is feasible to obtain through a nation-wide community-based survey.

The short-listed research topics were then presented to the Advisory Group Members for further deliberation and decisions. These topics were later refined by the research team members based on the decisions made at the Advisory Committee meeting. It was tabled to the Steering Committee and 18 research topics were approved to be included in the NHMS III.

### **4.2 Sampling Design and Sample Size**

In calculating the sample size, stratification and sampling design, the Methodology Division, Department of Statistics Malaysia as well as several other biostatistics consultants were roped in for advice.

#### **4.2.1 Sampling frame**

The sampling frame for this survey is an updated 2004 version; an effort undertaken prior to the implementation of Labour Force Survey (LFS) 2004. In general, each selected Enumeration Blocks (EB) comprised of 8 sampled Living Quarters (LQ). The EBs was geographically contiguous areas of land with identifiable boundaries. Each contains about 80-120 LQs with about 600 persons. Generally, all EBs are formed within gazetted boundaries.

The EBs in the sampling frame was also classified into urban and rural areas. The classification into these categories was in terms of population of gazetted and built-up areas as follows:

<b>Stratum</b>	<b>Population of gazetted areas and built-up</b>
Metropolitan	75,000 and above
Urban large	10,000 to 74,999
Urban small	1,000 to 9,999
Rural	The rest of the country

For sampling purposes, the above broad classification was found to be adequate for all states in Peninsular Malaysia and the Federal Territories of Kuala Lumpur and Labuan. However, for Sabah and Sarawak, due to problems of accessibility, the rural stratum had to be further sub-stratified based on the time taken to reach the area from the nearest urban centre.

For the purpose of urban and rural analysis, Metropolitan and Urban Large strata are combined together thus referred to as 'urban' stratum, while for Urban Small and the various sub-divisions of the rural areas they are combined together to form to a 'rural' stratum.

#### **4.2.2 Sampling design**

A two stage stratified sampling design with proportionate allocation was adopted in this survey. The first stage sampling unit was the EB and within each sampled EB, the LQs were selected as second stage unit. One LQ was estimated to comprise of 4.4 individuals. All household and persons within a selected LQ were studied.

#### **4.2.3 Sample size**

The sample size was determined based on 95% confidence interval and the following factors were taken into consideration:

a) Expected prevalence rate

The prevalence rate of the health problems for Malaysia obtained from the National Health and Morbidity Survey 2 (NHMS II) were used to estimate the overall sample size. Using the previous finding of 10% prevalence rate, the initial sample size at the state level was calculated in order to come up with overall sample size. The size was further apportioned for each state using the probability proportionate to size (PPS) method.

b) Response rate of the NHMS II

The response rates, which ranged from 83 to 97% for the NHMS II of each state, were taken into consideration in the course of the determination of sample size.

c) Margin of error and design effect

As the factors of precision and efficient of the survey are paramount, the decision reached for the targeted margin of error is 1.2 and the design effect valued at 2. These values were used at the initial stages of the calculation of the sample size of each state.

The survey findings addressing the specific objectives of this survey are expected to be used for state level programmed planning. Thus, the calculation for the sample size has taken into consideration data to be analyzed at the state level.

In addition to the major factors mentioned earlier, the availability of resources, namely, financial and human resources, and the time taken to conduct this survey also becomes part of the process of the determination of sample size.

### **4.3 Preparation of Field Areas and Logistic Support**

A number of state liaison officers were recruited in preparation for the survey proper. Strong networking with state liaison officers and District Health Officers (MOH and local authorities) from the areas sampled for the survey was established. Field scouts were mobilized from these areas to identify and tag the LQ's selected for the survey, as well as to inform the community and related government agencies of the importance and schedule of the planned survey. State liaison officers were also assisting Field Supervisors in the arrangement of transportation, accommodation and other logistics for the survey teams.

### **4.4 Method of Data Collections**

#### **4.4.1 The questionnaire**

A cross-sectional community household survey was conducted throughout Malaysia during April to August 2006. A bi-lingual (Bahasa Malaysia and English) pre-coded questionnaire was designed, pre-tested and piloted prior to the survey. The injury and risk reduction questionnaire were from module E of the questionnaire. It comprised of both close ended and open ended questions. The questions were tailored according to the target age group.

Respondents were given a face to face interview (FI) questionnaires consisted of two subtypes, i.e., the household questionnaire that was answered by the head of the household of the LQ selected, and the individual questionnaire that was answered by each member of the household according to respondent's age [booklet for age group <2 years (pink), 2-<13 years (blue), 13-<18 years (yellow) and ≥18 years old (purple). For those below 13 years old, the child's mother or guardian was responsible for answering on his or her behalf. Those aged 13 years and above were required to answer their respective questionnaires directly through the interview.

All the FI questionnaires had a consent form to be read and signed by the respondent or parent / guardian of the respondent. The outside cover of all questionnaires had to be filled with a unique



individual identification (ID) number by the enumerator. The enumerator also had to fill his or her ID as well as the code for the outcome of the interview as part of the quality assurance process.

#### **4.4.2 The interview**

As far as possible, all adult members who qualify from the selected LQ's were interviewed by the data collection team members. Parents or guardians were expected to provide information for their children aged 12 years and below (primary school). Interviews commenced early in the morning and lasted till late in the evening. Where an interview had been unsuccessful due to the absence of the respondent at the selected LQ, repeat visits were conducted after leaving messages with neighbours or by other means for an appointment at a later date. A household member can only be classified as a non-responded after 3 unsuccessful visits.

### **4.5 Field Preparations**

Two main survey implementation groups were formed: the Central Coordinating Team (CCT) and the field team. The CCT's main role was to monitor and coordinate the progress of implementation and provide administrative support in terms of financial and logistic arrangement for the field survey. The Field Teams were responsible to oversee and manage the field data collection process as well as undertake quality control.

The field data collection was conducted throughout Malaysia simultaneously, spanning a continuous period of 4 months starting from April 2006. Teams were organized to move into 5 regions in Peninsular Malaysia, 2 regions in Sabah and 4 regions in Sarawak for data collection.

#### **4.5.1 Pilot study**

A pilot study was conducted on a sample of EB's (not included in the NHMS III) about 2 months prior to the nationwide survey. It was conducted in three different areas in and around the Klang Valley, namely Sepang, Klang and Bangsar. The population in these locations comprised of three distinct socio-demographic strata that are rural, semi-urban and urban respectively. The pilot study focused on the following aspects of the survey such as testing of the questionnaire, testing of the field logistic preparation, testing of the scouting activities and testing of the central monitoring and logistic support.

#### **4.5.2 Training of data collection teams**

A two weeks training course was held for field supervisors, team leaders, nurses and interviewers was to familiarize them with the questionnaire, develop their interpersonal communication skills and appreciate the need for good teamwork. Briefing on the questionnaire, mock interview in the classroom and individual practice under supervision was conducted during the training.



## **4.6 Quality Control**

Quality control procedures were done in two stages, field and central. Please refer to NHMS III Study Protocol for details description.

## **4.7 Data Management**

### **4.7.1 Data screening**

The following data screening exercises were conducted at the field and central level prior to data entry:

- a) Field data screened by each interviewers at the end of his/her interview
- b) Field data screened for each question by peer interviewers through exchanging questionnaire booklets
- c) Field data screened by team leaders and field supervisors
- d) Central data screening of the questionnaire by the quality control team

### **4.7.2 Data entry**

The data entry system was developed to record the information collected during the data collection phase. It is a web based system that allows multiple simultaneous accesses to the database. The NHMS III used a double manual data entry method and any discrepancy between both entries was verified by the supervisors. The data entry started simultaneously with data collection (first week of April 2006) and was completed at the end of January 2007. The data entered was stored in the database according to the module. The databases were designed using Structured Query Language (SQL) which is a standard language for relational database management system.

### **4.7.3 Data analysis**

Data analysis was done by exporting the data into other analytical tools such as Microsoft Excel, SPSS and STATA. The data in database (text form) was exported to the Microsoft Excel form then to the SPSS and STATA. The raw data was cleaned and analysed according to the terms, working definition and dummy table prepared by the research groups. All the analytical process were monitored and advised by the NHMS III Statistics Consultant.

## **4.8 Definition of Terms / Variables**

### **4.8.1 Home injury**

Any injuries incurred in the respondent's house and/or 'other houses' in the last one year.

#### **4.8.2 Road injury**

Any injuries due to traffic accident including paved or unpaved road, pavement or pathway for pedestrian or motorcycle / pillion rider in the last one year, referring to the 3 most serious accidents.

#### **4.8.3 Recreational injury**

Any injuries incurred at recreational areas e.g. at playground, water world, swimming pool, picnic area, etc, in the last one year.

#### **4.8.4 Injury at workplace**

Any injuries incurred at the workplace excluding accidents which happened while going and coming back from work, in the last one year.

#### **4.8.5 School injury**

Any injuries incurred at school including classroom and other areas at school such as toilet, canteen, swimming pool and field / playground in the last one year.

#### **4.8.6 Admitted to hospital**

Any injuries which required hospital admission for at least 24 hours (admission to ward / stay one night at hospital).

#### **4.8.7 Absence from work / school / play**

Absence from work/school/play due to injury.

## 5. FINDINGS

### 5.1 General Findings

A total of 55,774 (98.4%) out of 56,710 samples responded to the injury and risk reduction questionnaire. The weighted incidence rate of home injury was 6.5% [n=3742, (CI: 6.2 - 6.8)], road injury was 4.4% [n=2432 (CI: 4.2 - 4.6)], workplace injury was 4.8% [n= 998 (CI: 4.5 - 5.1)], recreational injury was 1.7% [n= 960 (CI: 1.6 - 1.8)] and school 7.0% [n=900 (CI: 6.5 - 7.5)] (Table 5.1).

Table 5.1: Injuries according to location they occurred

Location	No of respondents (n)	No of respondents injured (n)	Incidence rate (Unweighted) (%)	Incidence rate (weighted) (%)	95% CI	
					Lower	Upper
Home	55,593	3742	6.7	6.5	6.2	6.8
Road	55,624	2432	4.4	4.4	4.2	4.6
Recreational area	55,141	960	1.7	1.7	1.6	1.8
Workplace	20,196	998	4.9	4.8	4.5	5.1
School	13,928	900	7.0	7.0	6.5	7.5

### 5.2 Injuries at Home

The incidence rate of home injuries was 6.5% [n=3742 (CI: 6.2 - 6.8)]. The characteristics of the respondents with home injuries by socio-demographic variables are shown in Table 5.2. The incidence rate was highest in the 0-4 year old group (11.8%), then declined with age and was lowest at 45-54 (3.7%) and then increased with age to 6.0% among those 65 years and above. The incidence rate among females (6.8%) was higher than males (6.1%). The highest incidence rate by ethnicity was among other Bumiputras (10.7%) and Indians (6.9%). The Chinese had significantly lower incidence rate (4.2%) as compared to all other ethnic groups. Married individuals had significantly lower incidence rate of injuries than those who were single. Injury incidence rate declined with education level. The incidence rate of injuries was highest 7.2% in those with the highest household income group ( $\geq$  RM 5000). The injury incidence rate was significantly higher among those living in rural areas (7.4%) as compared to those in urban areas (5.9%). Malaysians had significantly higher injury incidence rate (6.6%) compared to non-Malaysians (4.7%).

Table 5.2: Incidence rate of home injuries by socio-demographic characteristics

Characteristics		n	%	95% CI	
				Lower	Upper
<b>Age</b>	0 to 4	703	11.8	10.8	12.7
	5 to 14	1,092	8.2	7.6	8.9
	15 to 24	661	7.4	6.8	8.1
	25 to 34	350	4.6	4.1	5.2
	35 to 44	308	4.0	3.5	4.4
	45 to 54	248	3.7	3.2	4.2
	55 to 64	185	4.4	3.8	5.0
	≥ 65	195	6.0	5.1	6.8
<b>Sex</b>	Male	1,667	6.1	5.8	6.5
	Female	2,075	6.8	6.4	7.2
<b>Ethnicity</b>	Malay	2,054	6.4	6.0	6.8
	Chinese	434	4.2	3.7	4.7
	Indian	301	6.9	6.0	7.7
	Other Bumiputras	784	10.7	9.3	12.1
	Others	169	6.5	5.3	7.7
<b>Marital Status</b>	Unmarried	955	7.4	6.8	8.0
	Married	1,064	4.2	3.9	4.6
	Divorcee/widow/widower	179	6.6	5.6	7.6
<b>Level of Education</b>	None	248	6.1	5.3	7.0
	Primary	1,317	6.2	5.8	6.6
	Secondary	1,053	5.2	4.8	5.6
	Tertiary	168	4.7	4.0	5.5
<b>Personal Income</b>	< RM 1,000	522	4.3	3.9	4.8
	RM 1,000 - RM 1,999	205	3.4	2.9	3.9
	RM 2,000 - RM 2,999	71	3.1	2.4	3.8
	RM 3,000 - RM 3,999	33	4.0	2.6	5.4
	RM 4,000 - RM 4,999	8	2.6	0.6	4.5
	≥ RM 5,000	21	3.8	2.1	5.4
<b>Household Income</b>	< RM 1,000	1,315	6.6	6.1	7.0
	RM 1,000 - RM 1,999	979	6.3	5.8	6.8
	RM 2,000 - RM 2,999	577	6.6	5.8	7.3
	RM 3,000 - RM 3,999	276	6.4	5.5	7.2
	RM 4,000 - RM 4,999	143	6.8	5.6	8.1
	≥ RM 5,000	334	7.2	6.1	8.2
<b>Residence</b>	Urban	1,963	5.9	5.5	6.3
	Rural	1,779	7.4	6.8	8.0
<b>Citizenship</b>	Malaysians	3,605	6.6	6.2	6.9
	Non-Malaysians	137	4.7	3.7	5.7

## 5.2.1 Factors related to home injuries and its implications

### i. Causes of home injuries

The main causes of home injuries reported were due to fall (63.4%) followed by cut (19.9%), fire (4.3%) and struck by object (3.9%) (Table 5.3).

**Table 5.3: Causes of home injuries**

Causes	*n	Percentage of Injuries (%)
Fall	2,575	63.4
Cut	810	19.9
Fire/flames or heat	173	4.3
Struck by object	159	3.9
Caught in between objects	47	1.2
Animal bites	43	1.1
Stab	28	0.7
Hit by a person	22	0.5
Foreign body entering natural orifices	9	0.2
Electric shock	4	0.1
Near drowning	2	< 0.1
Poisoning	1	0.0
Others	190	4.7
<b>Total</b>	<b>4,063</b>	<b>100.0</b>

### ii. Location where injury occurred

More than 80% of home injuries occurred in these five locations; garden (28.0%), kitchen (24.9%), living room (14.7%), bathroom (7.5%) and stairs (7.2%) (Table 5.4).

**Table 5.4 : Location of home injuries**

Location	n	Percentage of Injuries (%)
Garden	1,229	28.0
Kitchen	1,095	24.9
Living room	646	14.7
Bathroom/toilet	331	7.5
Stairs	318	7.2
Driveway	273	6.2
Bedroom	254	5.8
Drain	66	1.5
Balcony	66	1.5
Under the house	55	1.3
Attic/roof	11	0.3
Store	7	0.2
Swimming pool	5	0.1
Lift	5	0.1
Other place	30	0.7
<b>Total</b>	<b>4,391</b>	<b>100.0</b>

The risk of falls was highest at the stairs followed by bathroom/toilet, where else for cuts and fire, kitchen posed the highest risk (Table 5.5).

**Table 5.5: Causes of home injury by location**

	Falls		Cuts		Fire	
	%	OR	%	OR	%	OR
Garden	80.7	2.5	12.7	0.4	1.6	0.3
Kitchen	34.9	0.1	59.6	23.8	13.0	12.6
Living room	82.8	2.5	9.8	0.3	1.5	0.3
Bathroom/toilet	92.4	6.2	7.9	0.3	0.9	0.2
Stairs	95.9	12.0	6.0	0.2	1.9	0.4

OR: Odds Ratio

### iii. Home injuries by severity

Among those with home injuries, 16.7% affected the respondents' ability to go to school, work or play and (4.9%) required hospital admission for at least one night (Table 5.6).

**Table 5.6: Home injuries by severity**

	n	Percentage of injuries (%)	95% CI	
			Lower	Upper
Inability to go to work, school & play	607	16.7	15.4	18.0
Hospital admission	177	4.9	0.4	4.2

## 5.3 Injuries on the Road

The incidence rate for injuries on the road was 4.4% [n=2,432 (CI 4.2 - 4.6)]. The characteristics of the respondents with road injury by socio-demographic variables are shown in Table 5.7. The incidence rate was significantly higher among those aged between 15 to 24 years old (11.1%) as compared to other age groups. The injury incidence rate was significantly higher among males (6.4%) compared to females (2.5%). Among the ethnic groups, higher incidence rates were among Indians (6.1%) and Malays (5.0%). The incidence rate was also significantly higher among those who were not married (10.1%) compared to those who were ever married. In reference to education level, incidence rate of injuries on the road was significantly higher among those with secondary education (5.9%). Generally, the incidence rate of injuries on the road declined with increasing personal and household income. The injury incidence rate was significantly higher among those living in the rural areas (4.8%) compared to urban dwellers (4.1%). Malaysians had significantly higher incidence rate of injuries on the road (4.5%) compared to non Malaysians (1.2%).

Table 5.7: Incidence rate of road injuries by socio-demographic characteristics

Characteristics		Road			
		n	%	95% CI	
				Lower	Upper
<b>Age</b>	0 to 4	111	1.9	1.5	2.3
	5 to 14	605	4.7	4.3	5.2
	15 to 24	944	11.1	10.3	11.8
	25 to 34	269	3.8	3.3	4.2
	35 to 44	195	2.6	2.2	3.0
	45 to 54	141	2.2	1.8	2.6
	55 to 64	103	2.5	2.0	3.0
	≥ 65	64	2.0	1.6	2.5
<b>Sex</b>	Male	1,681	6.4	6.1	6.8
	Female	751	2.5	2.3	2.7
<b>Ethnicity</b>	Malay	1,601	5.0	4.7	5.3
	Chinese	269	2.7	2.3	3.0
	Indian	265	6.1	5.3	6.9
	Other Bumiputras	249	3.6	3.1	4.1
	Others	48	2.0	1.4	2.5
<b>Marital Status</b>	Unmarried	1,251	10.1	9.5	10.7
	Married	647	2.7	2.5	2.9
	Divorcee/widow/widower	53	2.1	1.6	2.7
<b>Level of Education</b>	None	72	1.8	1.4	2.3
	Primary	889	4.3	4.0	4.7
	Secondary	1,155	5.9	5.5	6.3
	Tertiary	125	3.7	3.1	4.4
<b>Personal Income</b>	< RM 1,000	644	5.6	5.2	6.1
	RM 1,000 - RM 1,999	271	4.6	4.0	5.2
	RM 2,000 - RM 2,999	70	3.3	2.5	4.1
	RM 3,000 - RM 3,999	17	2.1	1.1	3.1
	RM 4,000 - RM 4,999	7	2.4	0.6	4.2
	≥ RM 5,000	8	1.4	0.4	2.5
<b>Household Income</b>	< RM 1,000	890	4.6	4.3	5.0
	RM 1,000 - RM 1,999	712	4.7	4.4	5.1
	RM 2,000 - RM 2,999	379	4.5	4.0	5.0
	RM 3,000 - RM 3,999	164	3.8	3.2	4.5
	RM 4,000 - RM 4,999	70	3.6	2.6	4.5
	≥ RM 5,000	144	3.1	2.6	3.7
<b>Residence</b>	Urban	1,318	4.1	3.9	4.4
	Rural	1,114	4.8	4.4	5.1
<b>Citizenship</b>	Malaysians	2,400	4.5	4.3	4.7
	Non-Malaysians	32	1.2	0.8	1.6

### 5.3.1 Factors related to road injuries and its implication

#### i. Type of injury

The common injuries among those injured on the road are cuts or other open wounds (50.7%) and bruises or superficial injuries (29.2%) (Table 5.8).

**Table 5.8: Type of road injuries**

	*n	Percentage of Injuries (%)
Cut or other open wounds	2,138	50.7
Bruise or superficial injuries	1,231	29.2
Sprain or strain	350	8.3
Fracture	246	5.8
Head injury	93	2.2
Dislocation	65	1.5
Burn	39	0.9
Internal organ injury	25	0.6
Others	28	0.7
<b>Total</b>	<b>4,215</b>	<b>100.0</b>

*\*A respondent may have more than one injuries*

#### ii. Type of road user

Injuries on the road occurred commonest among motorcycle users (61.1%), out of which 81.1% involved the riders. This is followed by the bicycle/trishaw driver/passenger (19.3%) and pedestrian (12.7%) (Table 5.9).

**Table 5.9: Road injuries by type of road user**

	*n	Percentage of Injuries (%)
Motorcycle rider	1,414	49.6
Bicycle/trishaw driver/passenger	549	19.3
Pedestrian	363	12.7
Pillion rider	328	11.5
Car/Van Driver	85	3.0
Car/Van Passenger	72	2.5
Heavy vehicle passenger	24	0.8
Heavy vehicle driver	12	0.4
Others	2	0.1
<b>Total</b>	<b>2,849</b>	<b>100.0</b>

*\*A respondent may have more than one injuries*



iii. Road injuries by severity

Of the road injuries 39.7% affected respondents' ability to go to school, work or play and 16.6% required hospital admission for at least one night (Table 5.10).

**Table 5.10: Road injuries by severity**

	*n	Percentage of Injuries (%)
Inability to go to work, school & play	1,138	39.7
Hospital admission	477	16.6

## 5.4 Injuries at the Workplace

The incidence rate for injuries at the workplace was 4.8% [n=998 (CI: 4.5 - 5.1)]. The characteristics of the respondents with workplace injury by socio-demographic variables are shown in Table 5.11. The incidence rate of injury declined with age, and was significantly higher among those aged between 18 to 24 years of age (8.1%) compared to all other age groups. The incidence rate was significantly higher among males (5.9%) compared to females (3.1%). The highest incidence rates were among the other Bumiputras and other races both at 7.4%, followed by the Indians (5.1%) and lowest among the Chinese (3.8%). The incidence rate was significantly higher among those who were not married (7.4%) compared to those who were ever married. Incidence rate of injuries at the workplace was highest among those without formal education (5.5%) and it was significantly lower among those with tertiary education (3.0%). By occupation, the highest incidence rate of injury was among plant and machine operators and assemblers (8.6%), followed by elementary occupations (6.8%) and craft and related trade workers (6.7%). Those working as senior official and managers (2.1%), clerical workers (2.4%) and professionals (2.6%) had the lowest incidence rate of injury. The incidence rate of injuries at the workplace declined with increasing personal and household income. The incidence rate was significantly higher among respondents living in the rural areas (5.8%) as compared to those in urban areas (4.3%). Non- Malaysians had a significantly higher injury incidence rate (7.2%) than Malaysians (4.6%).

**Table 5.11: Incidence rate of workplace injuries by socio-demographic characteristics**

Characteristics		Workplace			
		n	%	95% CI	
				Lower	Upper
<b>Age</b>	18 to 24	262	8.1	7.1	9.1
	25 to 34	298	5.6	5.0	6.3
	35 to 44	216	4.1	3.5	4.7
	45 to 54	144	3.3	2.8	3.9
	55 to 64	65	3.4	2.6	4.2
	≥ 65	13	1.9	0.8	3.0
<b>Sex</b>	Male	754	5.9	5.5	6.3
	Female	244	3.1	2.7	3.5

**Table 5.11: Incidence rate of workplace injuries by socio-demographic characteristics (continue)**

Characteristics		Workplace			
		n	%	95% CI	
				Lower	Upper
<b>Ethnicity</b>	Malay	506	4.4	4.0	4.8
	Chinese	153	3.8	3.2	4.4
	Indian	85	5.1	4.0	6.2
	Other Bumiputras	162	7.4	6.2	8.7
<b>Marital Status</b>	Unmarried	366	7.4	6.6	8.2
	Married	600	4.0	3.7	4.4
	Divorcee/widow/widower	27	3.0	1.9	4.2
<b>Level of Education</b>	None	66	5.5	4.1	6.8
	Primary	262	4.9	4.3	5.5
	Secondary	573	5.1	4.7	5.5
	Tertiary	84	3.0	2.3	3.7
<b>Personal Income</b>	< RM 1,000	589	5.4	5.0	5.9
	RM 1,000 - RM 1,999	275	4.9	4.3	5.5
	RM 2,000 - RM 2,999	78	3.6	2.9	4.4
	RM 3,000 - RM 3,999	28	3.6	2.3	5.0
	RM 4,000 - RM 4,999	8	2.8	0.9	4.7
	≥ RM 5,000	6	1.0	-0.1	2.0
<b>Household Income</b>	< RM 1,000	348	5.7	5.0	6.3
	RM 1,000 - RM 1,999	285	5.2	4.6	5.9
	RM 2,000 - RM 2,999	145	4.2	3.5	4.9
	RM 3,000 - RM 3,999	75	4.1	3.1	5.0
	RM 4,000 - RM 4,999	27	2.9	1.8	3.9
	≥ RM 5,000	78	3.5	2.6	4.3
<b>Residence</b>	Urban	524	4.3	3.9	4.7
	Rural	474	5.8	5.3	6.4
<b>Citizenship</b>	Malaysians	880	4.6	4.3	4.9
	Non-Malaysians	116	7.2	5.7	8.6

### 5.4.1 Factors related to workplace injuries and its implications

#### i. Parts of body injured

The two most common parts of the body affected in workplace injuries were wrist and hand (39.6%), and ankle and foot (24.4%) (Table 5.12).

**Table 5.12: Body parts affected in workplace injuries**

	*n	Percentage of Injuries (%)
Wrist and hand	445	39.6
Ankle and foot	274	24.4
Elbow and forearm	109	9.7
Knee and lower leg	71	6.3
Head	63	5.6
Shoulder and upper arm	48	4.3
Hip and thigh	39	3.5
Other wounds	33	2.9
Abdomen, lower back, lumbar spine and pelvic	30	2.7
Neck	8	0.7
Thorax	3	0.3
<b>Total</b>	<b>1,123</b>	<b>100.0</b>

#### ii. Common type of workplace injuries

The commonest type of workplace injuries were soft tissue injury (25.9%) followed by sprain (10.9%) (Table 5.13).

**Table 5.13: Common type of workplace injuries**

	n	Percentage of Injuries (%)
Superficial injury	277	25.9
Sprain and strain	117	10.9
Multiple injuries	113	10.6
Dislocation	68	6.4
Fractures	38	3.6
Burns	36	3.4
Amputation	29	2.7
Concussion	21	2.0
Electrocution	9	0.8
Contusion and crushing	7	0.7
Radiation injury	5	0.5
Acute poisoning	2	0.2
Others	348	32.5
<b>Total</b>	<b>1,070</b>	<b>100.0</b>

*\*A respondent may have more than one injuries*

## iii. Common causes of workplace injuries

The commonest cause of workplace injuries was due to lifting object (36.2%), followed by fall or slips on the same level (16.6%) and struck against object (13.3%) (Table 5.14).

**Table 5.14: Common causes of workplace injuries**

	n	Percentage of Injuries (%)
Lifting objects	374	36.2
Fall or slip on same level	171	16.6
Struck against object	137	13.3
Other causes	108	10.5
Struck by moving object	76	7.4
Fall from a height	45	4.4
Extreme temperature	37	3.6
Needle stick injury	27	2.6
Caught in between object	14	1.4
Exposure or contact harmful substance/radiation	14	1.4
Exposure to or contact with electric current	14	1.4
Motor vehicle accident	8	0.8
Crush by moving or sliding object	4	0.4
Physical assault	4	0.4
<b>Total</b>	<b>1,033</b>	<b>100.0</b>

## iv. Workplace injuries by severity

Of the workplace injuries, 28.6% resulted in absence from work for at least three days continuously and 8.0% of the workplace injuries required hospital admission (Table 5.15).

**Table 5.15: Workplace injuries by severity**

	n	Percentage of injuries (%)	95% CI	
			Lower	Upper
Absence from work for at least 3 continuous days	276	28.6	25.6	31.8
Hospital admission	77	8.0	6.12	9.72

## 5.5 Injuries at Recreational Areas

The incidence rate for injuries at the recreational area was 1.7% [n= 960 (CI: 1.6 - 1.8)]. The characteristics of the respondents with recreational injury by socio-demographic variables are shown in Table 5.16. By age group, the incidence rate was significantly higher among those aged 15 to 24 years. Injury incidence rate increased with age until those aged 15 to 24 years, after which the incidence rate decreased with age. It was significantly higher among males (2.9%) as compared to

females (0.7%). Among the ethnic groups, the highest incidence rate was among other Bumiputras (3.3%), followed by Indians (2.1%) and Malays (1.9%). The incidence rate of injuries was also significantly higher among individuals who were never married (4.0%) compared to those who had ever married. Injury incidence rate increased with level of education. There was no difference in the rate of injuries by personal income. However, the incidence rate of injuries involving recreation was significantly higher among those with household income of more than RM 4000 as compared to those earning less than RM 1000. The incidence rate was nearly similar between those living in the urban (1.7%) and rural areas (1.7%). Malaysians (1.8%) was found to have significantly higher injury incidence rate compared to non Malaysians.

**Table 5.16: Incidence rate of recreational injuries by socio-demographic characteristics**

Characteristics		Recreational			
		n	%	95% CI	
				Lower	Upper
<b>Age</b>	0 to 4	63	1.1	0.8	1.4
	5 to 14	340	2.7	2.4	3.1
	15 to 24	347	4.0	3.6	4.4
	25 to 34	117	1.6	1.3	1.9
	35 to 44	53	0.7	0.5	0.9
	45 to 54	23	0.3	0.2	0.5
	55 to 64	10	0.3	0.1	0.4
	≥ 65	7	0.2	0.1	0.4
<b>Sex</b>	Male	754	2.9	2.7	3.1
	Female	206	0.7	0.6	0.8
<b>Ethnicity</b>	Malay	580	1.9	1.7	2.0
	Chinese	101	1.0	0.8	1.2
	Indian	90	2.1	1.6	2.6
	Other Bumiputras	164	2.3	1.9	2.8
	Others	25	1.0	0.6	1.4
<b>Marital Status</b>	Unmarried	498	4.0	3.6	4.4
	Married	161	0.7	0.6	0.8
	Divorcee/widow/widower	6	0.2	0.1	0.4
<b>Level of Education</b>	None	15	0.4	0.2	0.6
	Primary	380	1.9	1.7	2.1
	Secondary	377	1.9	1.7	2.1
	Tertiary	79	2.3	1.8	2.8
<b>Personal Income</b>	< RM 1,000	145	1.2	1.0	1.4
	RM 1,000 - RM 1,999	84	1.4	1.1	1.7
	RM 2,000 - RM 2,999	36	1.6	1.0	2.1
	RM 3,000 - RM 3,999	11	1.3	0.6	2.1
	RM 4,000 - RM 4,999	6	2.0	0.4	3.5
	≥ RM 5,000	9	1.6	0.6	2.6

**Table 5.16: Incidence rate of recreational injuries by socio-demographic characteristics (continue)**

Characteristics		Recreational			
		n	%	95% CI	
				Lower	Upper
<b>Household Income</b>	< RM 1,000	277	1.4	1.2	1.6
	RM 1,000 - RM 1,999	275	1.9	1.6	2.1
	RM 2,000 - RM 2,999	135	1.6	1.3	1.9
	RM 3,000 - RM 3,999	86	2.0	1.5	2.5
	RM 4,000 - RM 4,999	49	2.4	1.6	3.1
	≥ RM 5,000	97	2.1	1.6	2.6
<b>Residence</b>	Urban	557	1.7	1.6	1.9
	Rural	403	1.7	1.5	1.9
<b>Citizenship</b>	Malaysians	943	1.8	1.7	1.9
	Non-Malaysians	17	0.6	0.2	0.9

### 5.5.1 Factors related to recreational injuries and its implications

#### i. Common location of recreational injuries

Majority of the recreational injuries occurred at the playground (61.7%), followed by at sport facilities (16.9%) and recreational parks (10.6%) (Table 5.17).

**Table 5.17: Common location of recreational injuries**

	*n	Percentage of Injuries (%)
Playground	600	61.7
Sports facilities	164	16.9
Recreational parks	103	10.6
River	27	2.8
Waterfalls	21	2.2
Mountains/hills	11	1.1
Sea	10	1.0
Swimming pools	7	0.7
lake/pond	3	0.3
Others	26	2.7
<b>Total</b>	<b>972</b>	<b>100.0</b>

\*A respondent may have more than one injuries

ii. Common causes of recreational injuries

The most common cause of recreational injuries was due to fall (91.3%). Other causes reported were insect/animal bite (1.4%) and near drowning (0.3%)(Table 5.18).

**Table 5.18: Common causes of recreational injuries**

	*n	Percentage of Injuries (%)
Falls	856	91.3
Animal / insect bite	13	1.4
Near drowning	3	0.3
Others	66	7.0
<b>Total</b>	<b>938</b>	<b>100.0</b>

*\*A respondent may have more than one injuries*

iii. Recreational injuries by severity

Of the recreational injuries, 21.0% resulted in inability to go to work, school or play and 5.8% required hospital admission for at least one night (Table 5.19).

**Table 5.19: Recreational injuries by severity**

	n	Percentage of Injuries (%)
Inability to go to work, school or play	202	21.0
Hospital admission	55	5.8

## 5.6 Injuries at School

The incidence rate for injuries at school was 7.0% [n= 900 (CI: 6.5 - 7.5)]. The characteristics of the respondents with school injury by socio-demographic variables are shown in Table 5.20. By age group, those aged 15 to 17 years old (8.5%) had a significantly higher injury incidence rate compared to those aged 7 to 14 years (6.6%). Males (8.0%) also had significantly higher incidence rate of injuries at schools compared to females (6.0%). The incidence rate of injuries at schools was higher among other Bumiputras (9.1%), followed by Indians (8.7%) and Chinese (6.6%). It was also higher among secondary students (8.1%) as compared to primary students (7.0%). The incidence rate of injuries increased with increasing household income. The incidence rate was significantly higher among those residing in urban areas (7.7%) compared to rural areas (5.9%). Malaysians (7.1%) had a significantly higher incidence rate of injuries compared non Malaysians (1.5%).

Table 5.20: Incidence rate of school injuries by socio-demographic characteristics

Characteristics		School			
		n	%	95% CI	
				Lower	Upper
<b>Age</b>	7 to 14	682	6.6	6.1	7.2
	15 to 17	218	8.5	7.4	9.7
<b>Sex</b>	Male	520	8	7.3	8.7
	Female	380	6	5.4	6.6
<b>Ethnicity</b>	Malay	518	6.6	6	7.2
	Chinese	132	6.6	5.4	7.8
	Indian	83	8.7	6.9	10.5
	Other Bumiputeras	152	9.1	7.3	10.9
	Others	15	4.9	2.6	7.1
<b>Education Level</b>	Primary	736	7	6.4	7.6
	Secondary	161	8.1	6.9	9.4
<b>Household Income</b>	< RM 1,000	255	5.5	4.8	6.3
	RM 1,000 - RM 1,999	260	7	6.1	7.9
	RM 2,000 - RM 2,999	146	7.7	6.5	9
	RM 3,000 - RM 3,999	75	7.9	6	9.8
	RM 4,000 - RM 4,999	35	7.9	5.3	10.4
	≥ RM 5,000	106	10.7	8.6	12.9
<b>Residence</b>	Urban	551	7.7	7	8.5
	Rural	349	5.9	5.2	6.6
<b>Citizenship</b>	Malaysians	898	7.1	6.5	7.6
	Non-Malaysians	2	1.5	-0.6	3.5

### 5.6.1 Causes of injuries at school

Majority of the injuries occurred at school were unintentional or accidental injuries (79.8%) and 16.2% were due to other causes. These include being injured without using an object (12.0%), injured using an object (4.2%) and self inflicted (4.0%)(Table 5.21).

Table 5.21: Causes of injury at school

	*n	Percentage of Injuries (%)
An accident / unintentional	694	79.8
Being injured without using an object	104	12.0
Being injured using an object	37	4.2
Self-inflicted	35	4.0
<b>Total</b>	<b>870</b>	<b>100.0</b>

\*A respondent may have more than one injuries



## **5.7 Comparison of Types of Injuries by Socio-Demographic Characteristics**

Among the five types of injuries studied, the highest incidence of injury was at schools (7.0%), followed by at home (6.5%), at the workplace (4.8%), on the road (4.4%) and the lowest incidence was at the recreational areas (1.7%). In terms of number of injuries among respondents in the last one year, the highest occurrence of injury was at home 3,742 and the least was at schools 900. Incidence rate for recreational injuries were lowest when studied for all subgroups. Those in the age group 0-4 and 5-14, incidence rate of injuries were significantly highest for home injuries at 11.8% and 8.3% respectively. In the age group 15-24, a significantly higher incidence rate was observed for road injury (11.1%). In the age group 25-44, highest incidence rate was for workplace injuries. Whereas, for those above the age of 45, the highest incidence rate was for home injuries. The incidence for all types of injury was higher among males except for injury at home. There was a marked difference between males (6.4%) and females (2.5%) in incidence of injury on the road. Among the males, the highest incidence of injury was injury at schools (8.0%), followed by injury on the road (6.4%) and injury at home (6.1%). For the female respondents, the highest incidence of injuries was injury at home (6.8%), injury at schools (6.0%) and injury at the workplaces (3.1%). Among the various ethnic groups, incidence rate of injury was highest among the other Bumiputras for all types of injury, except for injury on the road which was higher among the Indians. Incidence of injury was higher among the unmarried respondents for all types of injury with the highest incidence for injury on the road (10.1%), injury at home (7.4%) and injury at the workplace (7.4%). The incidence for injury on the road, at the workplace and at home was higher among respondents living in the rural area. Whilst, incidence of injury at schools and recreational areas, was higher among the urban respondents. Incidence of all types of injury was higher among Malaysians, except for injury at the workplace.

Table 5.22: Comparison of types of injuries by socio-demographic characteristics

Characteristics		Home			Road			Recreational					
		n	%	95% CI		n	%	95% CI		n	%	95% CI	
				Lower	Upper			Lower	Upper			Lower	Upper
<b>National</b>		3,742	6.5	6.2	6.8	2,432	4.4	4.2	4.6	960	1.7	1.6	1.9
<b>Age</b>	0 to 4	703	11.8	10.8	12.7	111	1.9	1.5	2.3	63	1.1	0.8	1.4
	5 to 14	1,092	8.3	7.6	8.9	605	4.7	4.3	5.2	340	2.7	2.4	3.1
	15 to 24	661	7.4	6.8	8.1	944	11.1	10.3	11.8	347	4.0	3.6	4.4
	25 to 34	350	4.6	4.1	5.2	269	3.8	3.3	4.2	117	1.6	1.3	1.9
	35 to 44	308	4.0	3.5	4.4	195	2.6	2.3	3.0	53	0.7	0.5	0.9
	45 to 54	248	3.7	3.2	4.2	141	2.2	1.8	2.6	23	0.3	0.2	0.5
	55 to 64	185	4.4	3.8	5.0	103	2.5	2.0	3.0	10	0.3	0.1	0.4
	≥ 65	195	6.0	5.1	6.8	64	2.1	1.6	2.5	7	0.2	0.1	0.4
<b>Sex</b>	Male	1,667	6.1	5.8	6.5	1,681	6.4	6.1	6.8	754	2.9	2.7	3.1
	Female	2,075	6.8	6.4	7.2	751	2.5	2.3	2.7	206	0.7	0.6	0.8
<b>Ethnicity</b>	Malay	2,054	6.4	6.0	6.8	1,601	5.0	4.7	5.3	580	1.9	1.7	2.0
	Chinese	434	4.2	3.7	4.7	269	2.7	2.3	3.0	101	1.0	0.8	1.2
	Indian	301	6.9	6.0	7.7	265	6.1	5.3	6.9	90	2.1	1.6	2.6
	Other Bumiputras	784	10.7	9.3	12.1	249	3.6	3.1	4.1	164	2.3	1.9	2.8
	Others	169	6.5	5.3	7.7	48	2.0	1.4	2.5	25	1.0	0.6	1.4
<b>Marital Status</b>	Unmarried	955	7.4	6.9	8.0	1,251	10.1	9.5	10.7	498	4.0	3.6	4.4
	Married	1,064	4.3	3.9	4.6	647	2.7	2.5	2.9	161	0.7	0.6	0.8
	Divorcee/widow/widower	179	6.6	5.7	7.6	53	2.1	1.6	2.7	6	0.2	0.1	0.4
<b>Level of Education</b>	None	248	6.1	5.3	7.0	72	1.8	1.4	2.3	15	0.4	0.2	0.6
	Primary	1,317	6.2	5.8	6.6	889	4.3	4.0	4.7	380	1.9	1.7	2.1
	Secondary	1,053	5.2	4.8	5.6	1,155	5.9	5.5	6.3	377	1.9	1.7	2.1
	Tertiary	168	4.7	4.0	5.5	125	3.7	3.1	4.4	79	2.3	1.8	2.8
<b>Personal Income</b>	< RM 1,000	522	4.3	3.9	4.8	644	5.6	5.2	6.1	145	1.2	1.0	1.4
	RM 1,000 - RM 1,999	205	3.4	2.9	3.9	271	4.6	4.1	5.2	84	1.4	1.1	1.7
	RM 2,000 - RM 2,999	71	3.1	2.4	3.9	70	3.3	2.5	4.1	36	1.6	1.0	2.1
	RM 3,000 - RM 3,999	33	4.0	2.6	5.4	17	2.1	1.1	3.1	11	1.3	0.6	2.1
	RM 4,000 - RM 4,999	8	2.6	0.7	4.5	7	2.4	0.6	4.2	6	2.0	0.4	3.5
	≥ RM 5,000	21	3.8	2.1	5.4	8	1.5	0.5	2.5	9	1.6	0.6	2.6
<b>Household Income</b>	< RM 1,000	1,315	6.6	6.1	7.0	890	4.6	4.3	5.0	277	1.4	1.2	1.6
	RM 1,000 - RM 1,999	979	6.3	5.8	6.8	712	4.7	4.4	5.1	275	1.9	1.6	2.1
	RM 2,000 - RM 2,999	577	6.6	5.8	7.3	379	4.5	4.0	5.0	135	1.6	1.3	1.9
	RM 3,000 - RM 3,999	276	6.4	5.5	7.2	164	3.9	3.2	4.5	86	2.0	1.5	2.5
	RM 4,000 - RM 4,999	143	6.8	5.6	8.1	70	3.6	2.6	4.5	49	2.4	1.6	3.1
	≥ RM 5,000	334	7.2	6.1	8.2	144	3.1	2.6	3.7	97	2.1	1.6	2.6
<b>Residence</b>	Urban	1,963	5.9	5.5	6.3	1,318	4.1	3.9	4.4	557	1.7	1.6	1.9
	Rural	1,779	7.4	6.8	8.0	1,114	4.8	4.4	5.1	403	1.7	1.5	1.9
<b>Citizenship</b>	Malaysians	3,605	6.6	6.2	6.9	2,400	4.5	4.3	4.7	943	1.8	1.7	1.9
	Non-Malaysians	137	4.7	3.7	5.7	32	1.2	0.8	1.6	17	0.6	0.2	0.9

Table 5.22: Comparison of types of injuries by socio-demographic characteristics (continue)

Characteristics		Workplace				School			
		n	%	95% CI		n	%	95% CI	
				Lower	Upper			Lower	Upper
<b>National</b>		998	4.8	4.5	5.1	900	7.0	6.5	7.5
<b>Age</b>	0 to 4	NA	NA	NA	NA	NA	NA	NA	NA
	5 to 14	NA	NA	NA	NA	682	6.6	6.1	7.2
	15 to 24	262	8.1	7.1	9.1	218	8.5	7.4	9.7
	25 to 34	298	5.6	5.0	6.3	NA	NA	NA	NA
	35 to 44	216	4.1	3.5	4.7	NA	NA	NA	NA
	45 to 54	144	3.3	2.8	3.9	NA	NA	NA	NA
	55 to 64	65	3.4	2.6	4.2	NA	NA	NA	NA
	≥ 65	13	1.9	0.8	3.0	NA	NA	NA	NA
<b>Sex</b>	Male	754	5.9	5.5	6.3	520	8.0	7.3	8.7
	Female	244	3.1	2.7	3.5	380	6.0	5.4	6.6
<b>Ethnicity</b>	Malay	506	4.4	4.0	4.8	518	6.6	6.0	7.2
	Chinese	153	3.8	3.2	4.4	132	6.6	5.4	7.8
	Indian	85	5.1	4.0	6.2	83	8.7	6.9	10.5
	Other Bumiputras	162	7.4	6.2	8.7	152	9.1	7.3	10.9
	Others	92	7.4	5.7	9.1	15	4.9	2.6	7.1
<b>Marital Status</b>	Unmarried	366	7.4	6.6	8.2	NA	NA	NA	NA
	Married	600	4.0	3.7	4.4	NA	NA	NA	NA
	Divorcee/widow/widower	27	3.0	1.9	4.2	NA	NA	NA	NA
<b>Level of Education</b>	None	66	5.5	4.1	6.8	0	0.0	0.0	0.0
	Primary	262	4.9	4.3	5.5	736	7.0	6.4	7.6
	Secondary	573	5.1	4.7	5.5	161	8.1	6.9	9.4
	Tertiary	84	3.0	2.3	3.7	0	0.0	0.0	0.0
<b>Personal Income</b>	< RM 1,000	589	5.4	5.0	5.9	NA	NA	NA	NA
	RM 1,000 - RM 1,999	275	4.9	4.3	5.5	NA	NA	NA	NA
	RM 2,000 - RM 2,999	78	3.6	2.9	4.4	NA	NA	NA	NA
	RM 3,000 - RM 3,999	28	3.6	2.3	5.0	NA	NA	NA	NA
	RM 4,000 - RM 4,999	8	2.8	0.9	4.7	NA	NA	NA	NA
	≥ RM 5,000	6	1.0	-0.1	2.0	NA	NA	NA	NA
<b>Household Income</b>	< RM 1,000	348	5.7	5.0	6.3	255	5.5	4.8	6.3
	RM 1,000 - RM 1,999	285	5.2	4.6	5.9	260	7.0	6.1	7.9
	RM 2,000 - RM 2,999	145	4.2	3.5	4.9	146	7.7	6.5	9.0
	RM 3,000 - RM 3,999	75	4.1	3.1	5.0	75	7.9	6.0	9.8
	RM 4,000 - RM 4,999	27	2.9	1.8	3.9	35	7.9	5.3	10.4
	≥ RM 5,000	78	3.5	2.6	4.3	106	10.7	8.6	12.9
<b>Residence</b>	Urban	524	4.3	3.9	4.7	551	7.7	7.0	8.5
	Rural	474	5.8	5.3	6.4	349	5.9	5.2	6.6
<b>Citizenship</b>	Malaysians	880	4.6	4.3	4.9	898	7.1	6.5	7.6
	Non-Malaysians	116	7.2	5.7	8.6	2	1.5	-0.6	3.5

NA: Not Available

## 5.8 Risk Reduction Practices

### 5.8.1 First aid

Exposure to first aid was found among 25.6% of respondents. The exposure was significantly higher among those living in urban areas (28.6%), males (29.9%), Malaysians (26.6%), Malays (30.5%) and those with tertiary education (57.0%). It was also found that exposure to first aid increased significantly with level of education. Other notable findings were the increase of exposure to first aid among younger age group and higher personal and household income (Table 5.23).

**Table 5.23: Prevalence of exposure to first aid by socio-demographic characteristics**

Characteristics		n	%	95% CI	
				Lower	Upper
<b>National</b>		8,482	25.6	24.9	26.3
<b>Age</b>	18 to 24	2,192	40.5	38.9	42.1
	25 to 34	2,416	34.2	32.9	35.6
	35 to 44	1,864	25.7	24.5	26.9
	45 to 54	1,253	19.9	18.7	21.0
	55 to 64	536	13.6	12.4	14.8
	≥ 65	221	7.4	6.4	8.5
<b>Sex</b>	Male	4,428	29.9	28.9	30.9
	Female	4,054	22.2	21.4	23.0
<b>Ethnicity</b>	Malay	5,503	30.5	29.6	31.5
	Chinese	1,117	16.5	15.3	17.6
	Indian	752	27.5	25.5	29.5
	Other Bumiputras	907	23.7	21.9	25.5
	Others	203	12.5	10.3	14.7
<b>Level of Education</b>	None	26	0.7	0.5	1.0
	Primary	645	6.7	6.1	7.3
	Secondary	5,862	34.8	33.9	35.7
	Tertiary	1,906	57.0	55.0	58.9
<b>Occupation</b>	Senior Official & Manager	235	37.4	33.5	41.3
	Professionals	1,183	52.8	50.6	55.1
	Technical & Associates	1,522	58.0	55.9	60.2
	Clerical Workers	673	37.6	35.2	39.9
	Service Workers & Shop	1,261	22.8	21.5	24.1
	Skilled Agricultural & Fishery	228	8.8	7.7	9.9
	Craft & Related Trade Workers	454	23.4	21.1	25.7
	Plant & Machine Operator & assembler	438	23.8	21.7	25.9
	Elementary Occupations	228	14.8	12.9	16.7
	Housewife	0	0.0	0.0	0.0
	Unemployed	0	0.0	0.0	0.0

**Table 5.23: Prevalence of exposure to first aid by socio-demographic characteristics (continue)**

Characteristics		n	%	95% CI	
				Lower	Upper
<b>Personal Income</b>	< RM 1,000	2,405	21.8	20.9	22.8
	RM 1,000 - RM 1,999	2,187	37.6	36.1	39.1
	RM 2,000 - RM 2,999	992	45.1	42.9	47.3
	RM 3,000 - RM 3,999	347	44.0	40.4	47.6
	RM 4,000 - RM 4,999	129	44.4	38.2	50.6
	≥ RM 5,000	260	47.3	43.1	51.4
<b>Household Income</b>	< RM 1,000	1,813	16.0	15.2	16.9
	RM 1,000 - RM 1,999	2,288	26.0	24.8	27.1
	RM 2,000 - RM 2,999	1,635	31.8	30.3	33.4
	RM 3,000 - RM 3,999	951	36.7	34.4	39.0
	RM 4,000 - RM 4,999	450	35.1	32.1	38.2
	≥ RM 5,000	1,069	36.6	34.3	38.9
<b>Residence</b>	Urban	5,721	28.6	27.7	29.6
	Rural	2,761	20.1	19.1	21.0
<b>Citizenship</b>	Malaysians	8,267	26.6	25.9	27.4
	Non-Malaysians	213	10.6	8.7	12.5

### 5.8.2 Cardio pulmonary resuscitation (CPR)

Exposure to CPR was found among 19.0% of respondents. The exposure was significantly higher among those living in urban areas (21.4%) compared to rural residents (14.7%) and also among males (23.1%) as compared to females (15.7%). The proportion of exposure to CPR was also significantly highest among Malays (23.5%) compared to all other ethnics. Malaysians (19.9%) compared to Non-Malaysians (4.7%) and those with tertiary education (47.6%). It was also noted that exposure to CPR increased significantly with level of education. However, exposure to CPR decreased significantly with age with the highest proportion of exposure among those aged 18 to 24 years old (29.3%) and lowest among those aged 65 years old and more (3.8%). Exposure to CPR was also highest among those with personal income of RM5000 and more (Table 5.24).

**Table 5.24: Prevalence of exposure to cardio pulmonary resuscitation by socio-demographic characteristics**

Characteristics		CPR			
		n	%	95% CI	
				Lower	Upper
<b>National</b>		6,282	19.0	18.4	19.7
<b>Age</b>	18 to 24	1,579	29.3	27.8	30.8
	25 to 34	1,827	25.9	24.7	27.1
	35 to 44	1,423	19.6	18.5	20.7
	45 to 54	927	14.8	13.8	15.8
	55 to 64	399	10.2	9.2	11.2
	≥ 65	127	4.3	3.5	5.0

**Table 5.24: Prevalence of exposure to cardio pulmonary resuscitation by socio-demographic characteristics (continue)**

Characteristics		CPR			
		n	%	95% CI	
				Lower	Upper
<b>Sex</b>	Male	3,409	23.1	22.3	24.0
	Female	2,873	15.7	15.1	16.4
<b>Ethnicity</b>	Malay	4,210	23.5	22.6	24.3
	Chinese	775	11.5	10.4	12.5
	Indian	500	18.4	16.7	20.1
	Other Bumiputras	676	17.8	16.2	19.3
	Others	121	7.3	5.8	8.8
<b>Level of Education</b>	None	16	0.4	0.2	0.7
	Primary	388	4.0	3.6	4.4
	Secondary	4,253	25.3	24.4	26.1
	Tertiary	1,592	47.6	45.6	49.6
<b>Occupation</b>	Senior Official & Manager	185	29.7	25.9	33.5
	Professionals	995	44.4	42.1	46.6
	Technical & Associates	1,249	47.9	45.7	50.1
	Clerical Workers	484	27.1	24.9	29.3
	Service Workers & Shop	901	16.3	15.2	17.4
	Skilled Agricultural & Fishery	156	6.0	5.1	7.0
	Craft & Related Trade Workers	287	14.8	13.0	16.5
	Plant & Machine Operator & assembler	315	17.1	15.2	18.9
	Elementary Occupations	155	10.1	8.5	11.7
	Housewife	NA	NA	NA	NA
	Unemployed	NA	NA	NA	NA
<b>Personal Income</b>	< RM 1,000	1,698	15.4	14.6	16.2
	RM 1,000 - RM 1,999	1,693	29.1	27.7	30.5
	RM 2,000 - RM 2,999	783	35.6	33.4	37.8
	RM 3,000 - RM 3,999	287	36.5	33.0	40.0
	RM 4,000 - RM 4,999	103	35.5	29.5	41.5
	≥ RM 5,000	227	41.2	37.3	45.1
<b>Household Income</b>	< RM 1,000	1,263	11.2	10.4	11.9
	RM 1,000 - RM 1,999	1,691	19.2	18.2	20.2
	RM 2,000 - RM 2,999	1,214	23.7	22.3	25.1
	RM 3,000 - RM 3,999	718	27.8	25.6	29.9
	RM 4,000 - RM 4,999	360	28.2	25.4	30.9
	≥ RM 5,000	824	28.2	26.0	30.4
<b>Residence</b>	Urban	4,267	21.4	20.5	22.2
	Rural	2,015	14.7	13.9	15.5
<b>Citizenship</b>	Malaysians	6,159	19.9	19.3	20.5
	Non-Malaysians	122	6.0	4.7	7.3

NA: Not Available

### 5.8.3 Occupational safety and health (OSH) training

The overall proportion of workers who had received OSH training prior to or within 1 month of starting work was 33.6%. The proportion was significantly higher among those residing in urban areas (37.3%), males (35.5%) and those with tertiary education (42.2%). The proportion of those who received training increased significantly with level of education. It was also found that the proportion of those who had received training increased with age until those aged 25 to 34 years old, after which the proportion decreased with age. Proportion of OSH training was higher among Indians, non Malaysians and technicians and allied professionals (Table 5.25).

**Table 5.25: Prevalence of workers who had received training in occupational safety and health by socio-demographic characteristics**

Characteristics		OSH Training			
		n	%	95% CI	
				Lower	Upper
<b>National</b>		6,320	33.6	32.6	34.6
<b>Age</b>	18 to 24	1,107	36.7	34.5	38.8
	25 to 34	2,009	40.2	38.6	41.8
	35 to 44	1,669	34.7	33.1	36.3
	45 to 54	1,188	30.8	29.2	32.3
	55 to 64	305	19.4	17.4	21.4
	≥ 65	42	8.1	5.7	10.4
<b>Sex</b>	Male	4,071	35.5	34.3	36.7
	Female	2,249	30.7	29.4	32.1
<b>Ethnicity</b>	Malay	3,803	36.2	34.9	37.4
	Chinese	905	24.0	22.4	25.6
	Indian	644	41.3	38.4	44.2
	Other Bumiputras	577	31.6	29.0	34.2
	Others	391	36.0	31.0	40.9
<b>Level of Education</b>	None	163	16.2	13.6	18.9
	Primary	1,034	21.6	20.2	23.1
	Secondary	3,950	38.4	37.1	39.6
	Tertiary	1,123	42.2	40.0	44.4
<b>Occupation</b>	Senior Official & Manager	201	34.1	30.2	38.0
	Professionals	904	44.3	41.8	46.7
	Technical & Associates	1,183	53.7	51.4	56.1
	Clerical Workers	560	33.6	31.2	36.1
	Service Workers & Shop	1,129	23.4	22.0	24.8
	Skilled Agricultural & Fishery	209	10.1	8.2	12.1
	Craft & Related Trade Workers	964	52.1	49.2	54.9
	Plant & Machine Operator & assembler	646	37.5	35.0	40.0
	Elementary Occupations	375	26.8	24.0	29.7
	Housewife	NA	NA	NA	NA
	Unemployed	NA	NA	NA	NA

**Table 5.25: Prevalence of workers who had received training in occupational safety and health by socio-demographic characteristics (continue)**

Characteristics		OSH Training			
		n	%	95% CI	
				Lower	Upper
<b>Personal Income</b>	< RM 1,000	2,638	27.8	26.5	29.0
	RM 1,000 - RM 1,999	2,144	40.2	38.6	41.8
	RM 2,000 - RM 2,999	854	41.5	39.1	44.0
	RM 3,000 - RM 3,999	295	39.7	36.1	43.3
	RM 4,000 - RM 4,999	122	43.9	37.5	50.2
	≥ RM 5,000	206	38.6	34.2	43.0
<b>Household Income</b>	< RM 1,000	1,318	24.8	23.2	26.3
	RM 1,000 - RM 1,999	1,779	35.4	33.8	37.0
	RM 2,000 - RM 2,999	1,236	38.4	36.4	40.4
	RM 3,000 - RM 3,999	688	39.1	36.4	41.8
	RM 4,000 - RM 4,999	333	35.5	31.9	39.1
	≥ RM 5,000	796	38.0	35.1	40.8
<b>Residence</b>	Urban	4,403	37.3	36.0	38.5
	Rural	1,917	26.1	24.6	27.6
<b>Citizenship</b>	Malaysians	5,799	33.4	32.5	34.4
	Non-Malaysians	517	36.0	31.7	40.3

NA: Not Available

#### 5.8.4 Provision and use of personal protective equipments (PPE)

The proportion of workers who were provided with PPE amongst those who required it was 38.9% (Table 5.26). The proportion who were provided with PPE was significantly higher among those living in the urban area (41.0%), males (44.6%), non Malaysians (45.7%), those with secondary education (43.6%) and craft and related trade workers (60.7%). Amongst those provided with PPE, 85.1% stated they used it all the time (Table 5.26).

**Table 5.26: Prevalence of workers who were provided with personal protective equipment by socio-demographic characteristics**

Characteristics		PPE			
		n	%	95% CI	
				Lower	Upper
<b>National</b>		5,289	38.9	37.7	40.1
<b>Age</b>	15 to 24	1,017	43.0	40.5	45.5
	25 to 34	1,637	43.8	41.9	45.8
	35 to 44	1,375	39.7	37.9	41.5
	45 to 54	963	35.8	33.8	37.7
	55 to 64	247	23.9	21.3	26.6
	≥ 65	50	15.7	11.5	19.8
<b>Sex</b>	Male	3,821	44.6	43.2	46.0
	Female	1,468	29.2	27.5	30.9



**Table 5.26: Prevalence of workers who were provided with personal protective equipment by socio-demographic characteristics (continue)**

Characteristics		n	PPE		
			%	95% CI	
				Lower	Upper
<b>Ethnicity</b>	Malay	3,155	40.8	39.3	42.3
	Chinese	648	25.7	23.7	27.7
	Indian	527	46.3	43.0	49.6
	Other Bumiputras	547	42.2	38.7	45.7
	Others	412	48.1	43.2	52.9
<b>Level of Education</b>	None	165	23.7	20.3	27.1
	Primary	1,155	34.2	32.3	36.1
	Secondary	3,351	43.6	42.1	45.0
	Tertiary	571	33.0	30.6	35.4
<b>Marital Status</b>	Unmarried	1,469	41.3	39.1	43.4
	Married	3,644	38.6	37.3	39.9
	Divorcee/widow/widower	154	28.4	24.6	32.3
<b>Occupation</b>	Senior Official & Manager	106	28.8	24.1	33.6
	Professionals	559	38.8	36.1	41.6
	Technical & Associates	909	53.7	51.0	56.5
	Clerical Workers	249	22.7	20.1	25.3
	Service Workers & Shop	976	30.5	28.7	32.4
	Skilled Agricultural & Fishery	252	19.2	16.5	21.9
	Craft & Related Trade Workers	1,001	60.7	57.8	63.5
	Plant & Machine Operator & assembler	671	47.9	45.1	50.8
	Elementary Occupations	445	40.4	36.8	44.0
<b>Personal Income</b>	< RM 1,000	2,562	36.8	35.2	38.3
	RM 1,000 - RM 1,999	1,742	44.2	42.4	46.1
	RM 2,000 - RM 2,999	570	40.0	37.2	42.8
	RM 3,000 - RM 3,999	179	35.6	31.1	40.1
	RM 4,000 - RM 4,999	68	38.5	30.9	46.1
	≥ RM 5,000	124	36.0	30.5	41.5
<b>Household Income</b>	< RM 1,000	1,333	34.6	32.7	36.6
	RM 1,000 - RM 1,999	1,579	42.1	40.2	44.1
	RM 2,000 - RM 2,999	1,000	42.6	40.2	44.9
	RM 3,000 - RM 3,999	517	41.2	37.9	44.6
	RM 4,000 - RM 4,999	226	35.4	30.9	39.9
	≥ RM 5,000	486	34.5	30.9	38.0
<b>Residence</b>	Urban	3,484	41.0	39.5	42.5
	Rural	1,805	34.4	32.6	36.3
<b>Citizenship</b>	Malaysians	4,741	38.2	37.1	39.4
	Non-Malaysians	543	45.7	41.4	50.1

### **5.8.5 Seatbelt usage**

The proportion of front car seat users who used seatbelt all the time in the last one month was 71.3%. It was significantly higher among those living in the urban areas (74.7%), Malaysians (72.6%), those with tertiary education (83.1%) and married individuals (74.7%). It was also found to be higher among males (72.9%) and Chinese (79.2%). The proportion of those who used this seat belt all the time increased with age until those aged 45 to 54, it then reduces with increase in age. This proportion was also found to increase with increase in household income. The proportion of those who never used the front seat belt was significantly higher among those living in rural areas (13.3%), female (11.4%), those aged 65 years and above (21.5%), other ethnic groups (28.5%), non Malaysians (33.1%), those without formal education (28.8%), divorced or widowed individuals (22.1%) and personal and household income of less than RM1,000 (Table 5.27).

### **5.8.6 Correct helmet usage**

The proportion of motorcycle users who always wore helmet correctly in the last one month was 56.9%. It was significantly higher among males (62.7%), Malaysians (57.6%) and those with secondary education (61.1%). It was also higher among those living in rural area (57.5%), Indians (62.4%), and those with personal income of RM1,000-RM1,999 (63.7%). The proportion of those who never wore helmet correctly was significantly higher among those living in urban areas (25.4%), females (30.4%), those aged 65 years and above (43.4%), other ethnic groups (47.4%), non Malaysians (47.4%), those without formal education (40.4%) and divorced or widowed individuals (42.8%). The proportion of those who never wore helmets correctly increased with increase in personal income (Table 5.28).

Table 5.27: Prevalence of seat belt usage by socio-demographic characteristics

Characteristics	All the time	%	95% CI		Sometimes	%	95% CI		Never	%	95% CI	
			Lower	Upper			Lower	Upper			Lower	Upper
<b>National</b>	20,629	71.3	70.5	72.1	5,774	19.5	18.8	20.1	2,773	9.2	8.7	9.7
<b>Age</b>												
15 to 24	2,869	61.4	59.7	63.1	1,330	27.9	27.8	26.4	521	10.8	9.7	11.9
25 to 34	4,555	71.5	70.2	72.8	1,356	20.8	20.8	19.6	512	7.7	7.0	8.5
35 to 44	4,937	75.3	74.1	76.5	1,192	17.8	17.8	16.7	481	7.0	6.2	7.7
45 to 54	4,373	77.2	76.0	78.5	898	15.4	15.4	14.3	440	7.4	6.6	8.2
55 to 64	2,558	75.0	73.4	76.6	556	16.0	16.0	14.6	321	9.1	8.0	10.1
≥ 65	1,337	59.4	57.2	61.6	442	19.1	19.1	17.4	498	21.5	19.7	23.3
<b>Sex</b>												
Male	9,814	72.9	71.9	73.9	2,820	20.5	19.6	21.4	929	6.6	6.1	7.2
Female	10,815	70.0	69.0	71.0	2,954	18.6	17.8	19.3	1,844	11.4	10.8	12.1
<b>Ethnicity</b>												
Malay	11,170	69.7	68.7	70.7	3,559	22.0	21.1	22.9	1,395	8.3	7.8	8.8
Chinese	4,936	79.2	77.7	80.6	907	14.4	13.3	15.6	406	6.4	5.6	7.2
Indian	1,891	77.5	75.5	79.6	319	13.0	11.5	14.5	238	9.5	8.1	10.8
Other Bumiputras	2,042	64.0	61.5	66.5	750	22.8	20.8	24.9	413	13.2	11.1	15.3
Others	590	51.3	47.4	55.3	239	20.2	17.7	22.6	321	28.5	24.6	32.4
<b>Level of Education</b>												
None	1181	49.3	47.0	51.7	539	21.9	20.0	23.7	705	28.8	26.7	31.0
Primary	5268	67.7	66.5	69.0	1526	19.3	18.2	20.3	1030	13.0	12.1	13.9
Secondary	11364	73.9	73.0	74.9	3173	20.2	19.3	21.0	931	5.9	5.4	6.3
Tertiary	2693	83.1	81.6	84.6	489	14.9	13.4	16.2	68	2.1	1.5	2.6
<b>Marital Status</b>												
Unmarried	3877	64.1	62.6	65.7	1584	25.6	24.3	26.9	639	10.3	9.3	11.2
Married	15648	74.7	73.8	75.5	3799	17.6	17.0	18.3	1688	7.7	7.2	8.2
Divorcee/widow/widower	1047	57.9	55.5	60.3	367	20.0	18.2	21.8	416	22.1	20.0	24.2

Table 5.27: Prevalence of seat belt usage by socio-demographic characteristics (continue)

Characteristics	All the time	%		95% CI		Sometimes	%		95% CI		Never	%		95% CI	
		Lower	Upper	Lower	Upper		Lower	Upper	Lower	Upper		Lower	Upper		
<b>Occupation</b>															
Senior Official & Manager	513	82.6	79.4	85.7	96	15.4	12.5	18.3	13	2.1	1.0	3.2			
Professionals	1829	83.9	82.2	85.6	309	14.1	12.5	15.7	46	2.0	1.4	2.6			
Technical & Associates	2093	83.0	81.4	84.6	380	14.9	13.4	16.4	54	2.1	1.5	2.7			
Clerical Workers	1352	78.5	76.5	80.6	307	17.4	15.5	19.3	71	4.0	3.1	5.0			
Service Workers & Shop	3370	70.6	69.2	72.1	1015	21	19.7	22.3	394	8.3	7.5	9.2			
Skilled Agricultural & Fishery	1262	61.5	58.7	64.2	452	21.6	19.5	23.7	352	17.0	14.7	19.2			
Craft & Related Trade Workers	1104	68.2	65.2	71.2	342	20.7	18.5	22.9	179	11.1	8.7	13.5			
Plant & Machine Operator & assembler	1256	73.8	71.5	76.1	369	21.4	19.3	23.5	82	4.9	3.7	6.0			
Elementary Occupations	793	63.5	60.3	66.6	319	24.7	22.2	27.2	156	11.8	9.8	13.9			
<b>Personal Income</b>															
< RM 1,000	6107	65.8	64.5	67.0	2108	22.3	21.3	23.3	1124	12.0	11.1	12.9			
RM 1,000 - RM 1,999	4370	78.9	77.6	80.2	1006	18.1	16.9	19.2	167	3.1	2.6	3.6			
RM 2,000 - RM 2,999	1775	82.9	81.1	84.6	333	15.4	13.7	17.1	37	1.7	1.2	2.3			
RM 3,000 - RM 3,999	683	88.0	85.6	90.4	88	11.2	8.9	13.5	6	0.8	0.2	1.4			
RM 4,000 - RM 4,999	253	86.3	82.2	90.4	33	11.3	7.5	15.2	7	2.4	0.6	4.1			
≥ RM 5,000	481	87.6	84.6	90.5	63	11.5	8.6	14.3	5	1.0	0.1	1.8			
<b>Household Income</b>															
< RM 1,000	5543	61.6	60.3	63.0	2061	22.3	21.2	23.4	1492	16.1	15.1	17.1			
RM 1,000 - RM 1,999	5625	71.9	70.7	73.2	1610	20.2	19.2	21.3	620	7.9	7.1	8.6			
RM 2,000 - RM 2,999	3609	76.3	74.8	77.8	880	18.4	17.1	19.7	254	5.3	4.6	6.1			
RM 3,000 - RM 3,999	1885	77.3	75.2	79.4	446	18.3	16.5	20.2	104	4.3	3.4	5.3			
RM 4,000 - RM 4,999	983	80.7	77.9	83.5	182	14.8	12.4	17.2	56	4.5	3.1	5.9			
RM 5000 & above	2204	81.0	79.1	82.8	388	14.3	12.6	15.9	131	4.8	3.9	5.7			

Table 5.27: Prevalence of seat belt usage by socio-demographic characteristics (continue)

Characteristics	All the time	% 95% CI		Sometimes	% 95% CI		Never	% 95% CI	
		Lower	Upper		Lower	Upper		Lower	Upper
<b>Residence</b>									
Urban	13318	74.7	73.7	3227	18.1	17.3	1266	7.2	6.6
Rural	7311	64.6	63.2	2547	22.2	21.1	1507	13.3	12.3
<b>Citizenship</b>									
Malaysians	19972	72.6	71.8	5459	19.4	18.7	2296	8.0	7.6
Non-Malaysians	648	46.0	42.3	309	20.9	18.5	473	33.1	29.8

Table 5.28: Prevalence of helmet usage by socio-demographic characteristics

Characteristics	Always correct	% 95% CI		Sometimes correct	% 95% CI		Never correct	% 95% CI		Never wore correct	% 95% CI	
		Lower	Upper		Lower	Upper		Lower	Upper		Lower	Upper
<b>National</b>	13,394	56.5	55.5	4,303	17.9	17.2	874	3.6	3.3	5,203	22.1	21.1
<b>Age</b>												
15 to 24	2,404	58.9	57.1	897	21.5	20.2	203	4.8	4.1	607	14.8	13.4
25 to 34	3,076	60.1	58.4	872	16.9	15.8	176	3.4	2.9	1,006	19.6	18.1
35 to 44	3,041	57.9	56.3	955	17.9	16.6	177	3.2	2.7	1,089	21.0	19.5
45 to 54	2,720	58.8	57.1	787	16.7	15.4	148	3.1	2.5	979	21.4	20.0
55 to 64	1,513	53.1	51.0	487	16.8	15.3	94	3.2	2.5	747	27.0	25.0
≥ 65	640	35.6	33.2	305	16.9	15.1	76	4.1	3.1	775	43.4	40.9
<b>Sex</b>												
Male	7,351	62.7	61.5	2,430	20.4	19.5	407	3.4	3.0	1,601	13.5	12.7
Female	6,043	50.5	49.2	1,873	15.4	14.6	467	3.8	3.4	3,602	30.4	29.1

Table 5.28: Prevalence of helmet usage by socio-demographic characteristics (continue)

Characteristics	Always correct	% correct	95% CI		Sometimes correct	% correct	95% CI		Never correct	% correct	95% CI		Never wore correct	% correct	95% CI	
			Lower	Upper			Lower	Upper			Lower	Upper			Lower	Upper
<b>National</b>	13,394	56.5	55.5	57.5	4,303	17.9	17.2	18.5	874	3.6	3.3	3.9	5,203	22.1	21.1	23.0
<b>Ethnicity</b>																
Malay	8,776	60.1	59.0	61.3	2,831	19.0	18.1	19.9	562	3.8	3.4	4.1	2,468	17.1	16.2	18.1
Chinese	2,125	49.6	47.4	51.9	729	17.1	15.6	18.6	157	3.6	2.9	4.4	1,259	29.7	27.4	32.0
Indian	1,233	62.4	59.9	64.8	277	14.0	12.3	15.7	53	2.5	1.7	3.3	415	21.2	19.0	23.4
Other Bumiputras	963	48.6	45.3	51.8	345	17.1	14.9	19.3	68	3.3	2.4	4.2	647	31.0	27.8	34.3
Others	297	34.8	30.6	38.9	121	14.0	11.0	17.0	34	3.9	2.4	5.4	414	47.4	42.6	52.1
<b>Level of Education</b>																
None	764	37.3	34.9	39.8	366	17.9	16.0	19.8	92	4.3	3.4	5.3	837	40.4	37.9	43.0
Primary	3,743	54.5	53.0	56.0	1,350	19.5	18.4	20.6	297	4.3	3.7	4.8	1,491	21.8	20.5	23.1
Secondary	7,701	61.1	59.9	62.3	2,286	17.8	17.0	18.6	435	3.4	3.0	3.8	2,191	17.7	16.7	18.7
Tertiary	1,123	54.0	51.4	56.6	268	12.8	11.3	14.3	45	2.1	1.5	2.8	631	31.1	28.4	33.8
<b>Marital Status</b>																
Unmarried	2,984	57.8	56.2	59.4	1,075	20.5	19.2	21.7	225	4.2	3.6	4.9	899	17.5	16.2	18.9
Married	9,799	57.7	56.6	58.8	2,970	17.2	16.4	18.0	595	3.4	3.1	3.7	3,658	21.7	20.7	22.7
Divorcee/widow/ widower	566	38.1	35.5	40.7	234	15.7	13.8	17.6	51	3.4	2.4	4.3	626	42.8	40.1	45.5
<b>Occupation</b>																
Senior Official & Manager	191	50.5	45.1	56.0	43	11.4	8.1	14.6	11	3.1	1.3	4.8	128	35.1	29.7	40.4
Professionals	810	56.1	53.1	59.1	191	13.3	11.5	15.0	41	2.8	1.9	3.7	390	27.8	24.9	30.7
Technical & Associates	1,352	66.9	64.6	69.1	295	14.4	12.8	16.0	46	2.2	1.6	2.8	330	16.5	14.7	18.4
Clerical Workers	793	62.1	59.3	64.9	170	13.2	11.3	15.0	31	2.5	1.6	3.4	275	22.2	19.6	24.7
Service Workers & Shop	2,187	56.0	54.2	57.8	776	19.7	18.3	21.1	138	3.5	2.9	4.1	812	20.8	19.3	22.4
Skilled Agricultural & Fishery	1,236	57.9	55.2	60.6	492	22.8	20.6	25.0	116	5.4	4.3	6.4	308	14.0	12.1	15.8

Table 5.28: Prevalence of helmet usage by socio-demographic characteristics (continue)

Characteristics	Always correct	%	95% CI		Sometimes correct	%	95% CI		Never correct	%	Never wore helmet	%	95% CI	
			Lower	Upper			Lower	Upper					Lower	Upper
Craft & Related Trade Workers	1,028	63.9	61.1	66.7	314	19.3	17.2	21.4	64	3.9	205	13.0	10.6	15.3
Plant & Machine Operator & assembler	926	64.3	61.8	66.9	326	22.3	20.1	24.5	44	3.0	156	10.4	8.7	12.1
Elementary Occupations	670	58.6	55.4	61.8	273	23.3	20.7	26.0	46	3.9	170	14.1	11.6	16.7
<b>Personal Income</b>														
< RM 1,000	5,061	59.5	58.2	60.8	1,762	20.3	19.3	21.4	347	4.0	1,384	16.2	15.1	17.3
RM 1,000 - RM 1,999	2,875	63.7	62.1	65.4	788	17.4	16.2	18.7	140	3.1	709	15.8	14.5	17.1
RM 2,000 - RM 2,999	941	61.2	58.6	63.9	224	14.5	12.7	16.4	37	2.4	332	21.8	19.5	24.2
RM 3,000 - RM 3,999	258	54.4	49.7	59.1	71	15.5	11.9	19.0	10	2.1	131	28.1	23.7	32.5
RM 4,000 - RM 4,999	74	43.7	36.3	51.1	23	14.1	8.9	19.3	3	1.9	67	40.4	33.1	47.6
≥ RM 5,000	98	36.5	29.7	43.4	25	9.3	5.8	12.9	4	1.5	136	52.7	45.6	59.8
<b>Household Income</b>														
< RM 1,000	4,473	55.3	53.9	56.8	1,649	20.0	18.9	21.1	353	4.3	1,674	20.4	19.1	21.7
RM 1,000 - RM 1,999	4,026	60.4	58.9	61.9	1,247	18.4	17.3	19.5	252	3.7	1,156	17.5	16.2	18.7
RM 2,000 - RM 2,999	2,240	59.6	57.7	61.5	663	17.5	16.0	18.9	115	3.0	743	19.9	18.3	21.6
RM 3,000 - RM 3,999	1,044	57.7	54.9	60.5	307	17.0	15.0	19.1	59	3.3	392	22.0	19.5	24.4
RM 4,000 - RM 4,999	426	50.6	46.6	54.6	131	15.6	12.9	18.4	25	2.9	264	30.9	27.1	34.6
RM 5000 & above	751	45.6	42.2	48.9	182	11.1	9.2	12.9	48	2.8	653	40.6	37.0	44.2
<b>Residence</b>														
Urban	7,432	55.9	54.6	57.2	2,092	15.8	14.9	16.7	379	2.9	3,435	25.4	24.1	26.8
Rural	5,962	57.5	55.9	59.0	2,211	21.2	20.1	22.3	495	4.7	1,768	16.6	15.4	17.9
<b>Citizenship</b>														
Malaysians	13,062	57.6	56.6	58.6	4,122	17.9	17.2	18.6	818	3.5	4,705	20.9	20.0	21.9
Non-Malaysians	326	31.4	28.0	34.8	177	16.2	13.5	19.0	55	5.0	495	47.4	43.2	51.6

## **6. DISCUSSION**

### **6.1 Overall**

Injuries were studied by location of injury i.e. at home, on the road, at recreational area, at workplace and in school. The magnitude of the injury problem shown by number of respondents injured was highest at home, followed by injuries on the road and at the workplace. However, the weighted incidence rate for injuries was highest in school, followed by injuries at home and work place. These findings could be due to the larger number of respondents for home and road. Recreational injuries were fewer and this could be due to respondents spending less time for recreational activities. The most severe injuries occurred on the road with 17% requiring admission as compared to workplace 8.0% and recreational 5.8%.

Findings from an epidemiological study conducted in 1996 regarding injuries in Malaysia reported the most common place of occurrence of injury was on the road, followed by at home, at workplace, recreation and schools (Junainah & Sarojini 1997). The discrepancy is attributed to the different methodology in data collection whereby the study in 1996 gathered data from government health care facilities. Our study was a population-based study which captured all types of non-fatal injuries including minor ones. This would probably explain why home injuries were highest as it did not require seeking treatment at any health facilities.

### **6.2 Injuries by Location**

#### **6.2.1 Injuries at home**

Home is supposed to be a place where we seek shelter and is supposedly to be a safe place. Nevertheless injuries at home do occur especially among children and the elderly. There was an increase from 2.5% to 6.5% in the incidence rate of home injuries in this study compared to NHMS II. Although there was an increase in the incidence rate, similar finding in the pattern of injuries by age group was noted in this study and NHMS II. The home injuries incidence rate showed a 'U' shape pattern by age with the highest incidence rate in lowest and highest age groups. Home injuries are more common among these groups and this can be related to the proportion of time they spend at home. Children especially those less than 5 years old are at highest risk of injuries at home as they are inexperienced, curious and inquisitive which could lead to danger and also because of lack of supervision (RoSPA 2007). The elderly are also at high risk of injury at home and most of the injury can be attributed to falls. The causes of falls in the elderly are generally attributed to environmental hazards such as slippery floor, poor lighting, poor housekeeping, etc, gait disturbance and muscle weakness, dizziness, vertigo, drop attacks, postural hypotension, visual impairment, and syncope (Rao 2005). In this study, married individuals were found to have lower incidence rate possibly due to lower risk taking behaviour known to occur among those who are married. Falls contributed to about two thirds of home injuries and occurred more frequently among the younger and older age group. Fall was also the most common mechanism of injury at home in previous studies done in Malaysia (Junainah & Sarojini 1997) and other parts of the world. In the United Kingdom, for 2002,



it was estimated that falls contributed to nearly 50% of all victims of non fatal home injuries that warranted a visit to the hospital (RoSPA 2007). In the US, in 2003, more than 1.8 million children less than 4 years old had nonfatal injuries and falls were the leading cause (CDC 2004b). Whilst among the elderly in 2003-2004, falls accounted for about 50% out of all unintentional injuries that required visits to the emergency department (NCHS 2006).

In this study, garden and kitchen together contributed to more than 50% of home injuries. The living room, bathroom/toilet and stairs were also common location 30.5% for injuries. The risk of falls was highest at the stairs followed by bathroom/toilet, where else for cuts and fire, kitchen posed the highest risk. Hospital admission was required for 4.9% of the home injuries suffered.

### **6.2.2 Injuries on the road**

Injuries occur on the road as people need to travel - to go to work, for pursuits of education and leisure. While the increase in the number of motor vehicles and road infrastructure has brought societal benefits, it has also lead to increase in injuries on the road. The incidence rate of injuries on the road in this study showed an increase of about 2% compared to NHMS II (from 2.5% to 4.4%). The increase in incidence rate is expected as there has been a remarkable increase in the number of road and vehicles in Malaysia in the last decade. Between 1994 and 2004, the total length of paved roads increased from 60,734 to about 71,814 kilometers and registered vehicles increased from 7,210,089 to 13,878,00 vehicles. There was also a 2 fold rise in the number road traffic accidents (RTA) from 148,801 in 1994 to 326,817 in 2004 (Umar RS 2005). Noting the importance of reducing RTA and the burden to the country, an integrated road safety program has been introduced to both prevent and reduce future traffic accidents as well as to reduce injuries during and after accidents. Since the introduction of road safety initiatives in 1996, there has been a reduction in fatality index per 10,000 registered vehicles and fatality index per 100,000 population from 1996 to 2005 i.e. from 8.2 to 4.2 and 29.8 to 23.5 respectively (Road Safety Department 2006).

In NHMS III, road injuries were significantly higher among those aged between 15 to 24 years old as compared to other age groups, males, single and those with higher personal and household income. Globally, children and young people under 25 years account for over 30% of those killed and injured in road traffic crashes (Toroyanti & Peden 2007). Males sustained more road traffic injury deaths with a mortality rate of 28.8 per 100,000 populations compared to females with 10.8 per 100,000 populations (Mohan et al. 2002). It has been suggested that injuries among youth and males are higher as they are more likely to be on the roads, often because of socio-cultural reasons, as well as greater propensity to take risks, peer influence to do what is 'cool', not necessary what is safe and inexperience whereby they are less able to accurately perceived hazards, controlled the vehicles and make appropriate decision on the road (Toroyanti & Peden 2007).

In this study, road injuries were also found significantly higher among Malaysian and those living in rural areas. This could be due to poor infrastructure on roads in the rural areas which were longer and often not well maintained. Majority of the injuries 79.9% were cuts, bruises or superficial injuries. Most of the injuries (61.1%) involved respondents riding motorcycles (riders/pillion), followed by bicycle and being pedestrians. Junainah & Sarojini (1997) also reported similar findings where by 55.7% of road injuries were among motorcycle riders and 10.4% among cyclists. Road traffic accidents resulting in deaths were also quite high among motorcyclists as reported by our neighbouring countries,

in which deaths among motorized two-wheelers constituted about 70% of all road traffic deaths in Thailand and about 40% in Bandung, Indonesia (Peden et al. 2004). Other notable finding among those with road injuries was it had the highest prevalence by severity. It resulted in nearly two fifths of the respondents not able to go to school, work or play and 17% of them requiring hospitalization for at least one night.

### **6.2.3 Injuries at the workplace**

Incidence of workplace injuries were significantly higher among younger workers 18-24, males, single, those living in rural areas and non-Malaysians. Whilst it was significantly lower among those with tertiary education. The highest incidence rate of injury was among plant and machine operators and assemblers, followed by elementary occupations and craft and related trade workers. More than half of the injuries involved the upper extremities, while one third affected the lower extremities. Minor injuries were responsible for nearly half of the injuries at the workplace. The commonest cause of workplace injuries was due to lifting objects, followed by fall or slips on same level and struck against object. Absence from work for at least three days was seen in 28.6% of workplace injuries and 8% required hospital admission.

There was an increase in the incidence rate of injury at the workplace in this study compared to NHMS II which was 4.8% and 3.0% respectively NHMS II 1996. In the USA and other developed countries, a downward trend has been reported. According to CDC US, there has been a 39% reduction in incidence rates of injuries which includes fatalities from 1976 to 2001 (CDC 2004a). The incidence rate for total recordable occupational injuries decreased from 9.2 cases per 100 full-time workers in 1979 to 5.4 per 100 full-time workers in 2001. The reduction in the rates of injuries could be attributed to the preventive measures taken to reduce the incidence of injuries, the higher insurance premium that companies with high incidence of work place injuries and illnesses had to pay. Not much can be said about efforts taken in Malaysia to reduce occupational injuries.

In this study, the incidence rate of injury was higher among males compared to females. This finding was similar with injuries in other studies (Laflamme & Petersson 2001; CDC 2004a; Thepakson & Padungtod 2007). Injuries were higher among males as they are usually hired to work in the more hazardous area and they also tend to take more risk compared to women as they perceive that they are at less risk (Courtenay 2000).

The incidence of injury at the workplace was higher among adolescents and young adults. Similar findings were also seen in other studies. According to NIOSH USA (CDC 2004a), young workers are at increased risk of injury due to their limited job knowledge, training and skills. Psychosocially, they are at the stage of development where they are seeking to achieve independence and believe themselves to be invulnerable to negative events and they have not the life experience to foresee the future implications of their actions or the full and permanent impact of an injury (Kuntz 2006). In a population based study done in Canada, they also found that adolescents and young adult workers had a higher rate of work injuries even after adjusting for job characteristics. The higher rates were attributed to the types of jobs that young workers hold (Breslin & Smith 2005).

Upper and lower extremities were the most common body parts affected in this study. In the USA (BLS 2006), the most common body parts affected was the trunk (including shoulder and back) of

which 63% involved the back. The difference seen between the NHMS III study and data from the USA is probably in the definition of parts affected and method of data collection. In NHMS III, the information was self-reported by respondents, as compared to the USA, which gathered clinically diagnosed data (which includes musculoskeletal disorders, MSDs) from their Injury Surveillance System of persons treated at emergency department. The most common type of injuries reported in our study was superficial injuries which include cuts and lacerations. These findings were similar to the previous study done in 1996 for three months among all patients who sought treatment at government hospitals and clinics throughout Malaysia MOH 1997. Lifting and falls were the most frequently reported causes of injuries followed by struck against object. In the study on epidemiology of injury in Malaysia conducted in 1996, the most frequent causes were hit object with part of the body followed by struck by object and caught in between object. Thai National injury Surveillance System from 2001- 2004 showed the most common mechanism of injury was - mechanical force 61.6% followed by falls (Thepakson & Padungtod 2007). In our study, only 8.0 % of the workplace injuries required hospital admission.

#### **6.2.4 Injuries at recreational areas**

In this study, injury incidence rate increased with age until those aged 15 to 24 years, after which the incidence rate decreased with age. It was significantly higher among males, single, those with household income of less than RM1000 and Malaysians. Majority of the recreational injuries occurred at the playground, followed by at sport facilities and recreational parks and the most common cause of injuries was due to fall. A fifth of recreational injuries resulted in inability to go to work, school or play and 5.8% required hospital admission. Other studies also reported similar findings of higher recreational injury incidence among male teens and young adults and it was suggested that this could be due to behavioral factors, differences. In exposure to risk for example, higher sports and recreational activity participation rates among teens and males, or some combination of these and other factors (Dempsey et al. 2005).

#### **6.2.5 Injuries at school**

Injury incidence rate were significantly higher in those aged 15 to 17 years old compared to those aged 7 to 14 years, males, those residing in urban areas and Malaysians. Majority of the injuries occurred at school were unintentional or accidental injuries. However, 16.2% were injured by someone else. In a study involving 28 countries among students aged 11, 13 and 15 years old, there was a wide variation in the prevalence with Sweden reporting the lowest at 5.7% and Lithuania the highest at 39.8%. The prevalence for the entire study was 16.8% and generally prevalence was higher among males than females (Due 2005). Although the incidence of being injured by others in this study was less than 20%, it needs to be further studied whether these injuries were a result of bullying. Bullying is a public health issue as it affects the children who are bullied, children who bully, their families and friends and it is preventable. Children who are bullied has been associated with a broad spectrum of emotional and social problems, including suicidal ideations, low self esteem, depression (Riittakerttu et al. 1999) and unemployment in adulthood (Varhama & Bjorkqvist 2005). Children who bully are sometimes a sign of other serious antisocial or violent behaviour. They are more likely to get into fights and getting injured, vandalize and steal, involve in substance abuse and drop out from school (Nansel et al. 2003). Interventions to prevent school violence are targeted at the individual, the family, or the community and current interventions mostly target individual students with problem behavior (Ehiri et al. 2007).

## **6.3 Risk Reduction Practice**

### **6.3.1 First aid training**

First aid training is an important program in schools and workplaces. Training is provided through teachers in schools as part of health science taught in schools and extra-curricular activities Red Crescent Society, St Johns Ambulance. In the workplace there are Guidelines on First Aid in the Workplace issued by the Department of Occupational Safety and Health. These guidelines require the employers to have first aiders, first aid equipment and first aid facilities. In this study, only a quarter of the respondents had exposure to first aid training. It was significantly higher among males, Malays, those living in urban areas and Malaysians. It was also found that exposure to first aid increased significantly with level of education. Respondents from the younger age group 18 - 44 years old had higher prevalence of exposure to first aid training.

### **6.3.2 Cardiopulmonary resuscitation training (CPR)**

Increasing emphasis is being given to providing the general public on information on CPR as a public health measure in managing emergencies. CPR training is provided to health care workers, working populations and also members of the general public by accredited CPR trainers. In this study, the exposure to CPR was found to be significantly higher among those living in urban areas, males, Malays, Malaysians and those with tertiary education. It was also noted that exposure to CPR increased significantly with level of education. However, exposure to CPR decreased significantly with age related to its more recent introduction to the public and highest among those with higher personal income.

### **6.3.3 Occupational safety and health (OSH) training**

There is a requirement to provide OSH training by employers to their employees under the Occupational Safety and Health Act 1994. The private sector, in particular the multinationals and larger companies, give a strong emphasis on OSH training. However In this study it was noted that only a third of the respondents had received OSH training within a month of starting work. This could be due to some of the respondents working in the public sector where due emphasis is not given, being self employed, housewives and unemployed. Training was found to be significantly higher among those residing in urban areas, males and among respondents with tertiary education. Respondents who received training increased significantly with level of education. It was also found that the proportion of those who had received training increased with age until those aged 25 to 34 years old, after which the proportion decreased with age. Proportion of OSH training was higher among Indians, non Malaysians and technicians and allied professionals.

### **6.3.4 Provision and use of personal protective equipment (PPE)**

Personal protective equipment is a method of controlling exposure to hazards in the workplace. Employers are required to provide PPE if risks to hazards have not been adequately controlled though other measures higher up in the hierarchy of controls. They are also required to provide training and information on the need for and proper use of PPE. In this study the proportion of workers who were provided with PPE amongst those who required it was 38.9%.



The proportion that was provided with PPE was significantly higher among those living in the urban area, males, non Malaysians, those with secondary education and craft and related trade workers. Amongst those provided with PPE, 85.1% stated they used it all the time.

Studies conducted overseas have shown this problem of the lack of provision and proper use of PPE to also exist in their workplaces. In a study done in Tanzania among 310 respondents working as welders, painters, woodworkers and metalworkers from 60 small scale industries, the compliance of using various types of PPE was poor (0 - 9.9%) except among welders who used protective face shields (49.5%) and boots (20.8%) and painters who used overalls (15.1%) (Rongo et al. 2004). Another study in Finland also showed similar findings where protection against risk was proper in only a quarter of the firm, satisfactory in half and poor or lacking in the rest (Vaaranen et al. 1979). In Norway, a study on small enterprises showed that 28% of the enterprises lack using personal safety devices and it was shown that in small enterprises, injuries were better prevented by following up the workers' use of protective devices than by producing comprehensive administrative internal control systems (Bull et al. 2002).

### **6.3.5 Seatbelt usage**

The first law on mandatory seat belt use was passed in Victoria, Australia in 1971. It was shown that this intervention was able to reduce car occupant deaths in Victoria by 18% and 26% by the end of 1971 and 1975 respectively (Peden et al. 2004). In Malaysia, the law on use of front car seatbelt was introduced in 1978. Front seat passengers are required to buckle up all the time when they are driving or sitting next to the driver. All motor vehicle manufacturers are required to install front seat belts in their cars. The requirement for passengers in the rear seat of cars to wear seat belts is being proposed. While these measures do not reduce accidents they are crucial in injury prevention. Wearing seat belts have been proven to reduce the risk of fatal injury to front seat passengers by 45% and the risk of moderate to critical injury by 50% (Kulanthayan et al. 2004).

In this study slightly more than two thirds of the front car seat users used the seatbelt all the time in this study. It was significantly higher among those living in the urban areas, Malaysians, those with tertiary education and married individuals. It was also found to be higher among males, Chinese, higher household income and the proportion of those who used it increased with age until those aged 45 to 54, it then reduces with increase in age. In a study done in Selangor in 2003, it was found that 71.1% of front car seat users wore seat belts, it was significantly higher among those with tertiary education and seat belt use was higher among those driving in city-center compared to outside city-center (Kulanthayan et al. 2004). In 2006, seat belt use among all motorists was 81% and the use rate was higher in areas where enforcement of law was stronger (Glassbrenner & Ye 2006). In 2006, Canada reported 90.5% seat belt usage among front seat occupants and 84.9% among back seat occupants. The rate was higher among urban communities (91.9%) compared to rural (86.9%) (Transport Canada 2006). The proportion of those who never used the front seat belt was significantly higher among those living in rural areas, female, those aged 65 years and above, other ethnic groups, non Malaysians, without formal education, divorced or widowed individuals and personal and household income of less than RM1, 000. A study in Hawaii among front seat passengers who had fatal or incapacitating injuries reported that rural area drivers and passengers were 1.71 and 1.45 times more likely to be unbelted (Kim & Kim 2003). Similar findings were also shown in the study by (Kulanthayan et al. 2006) and this was attributed to the perception that enforcement activities

tend to be lower in rural areas. Therefore, in order to improve the rate of seat belt user and reduce severity of road crashes, stronger enforcement may be necessary. Hopefully, this may be achieved with the implementation of the new regulation of seat belt use by back seat occupants in 2008.

### **6.3.6 Correct helmet usage**

Use of helmets has been shown to protect motorcycle users from head injuries. A local study found motorcyclists who do not wear helmets are three times more likely to sustain head injuries in a crash compared to those who do (Kulanthayan et al. 2000). A review of studies concluded that helmets are effective in reducing head injuries in motorcyclists who crash by 69% and death by around 42% (Liu et al. 2004). In Malaysia, legislation on the use of helmet was introduced in 1973 and its introduction had led to a 30% reduction in motorcycle deaths (Supramaniam et al. 1984). The correct way of using helmets buckling up must also be emphasized in order to reduce injuries as it has been found that while motorcyclists may wear helmets, they may not be using it correctly. In this study, just over one half of motorcycle users wore helmet correctly. It was significantly higher among male, Malaysians and those with secondary education. It was also higher among those living in rural area, Indians, and those with personal income of RM1, 000 - RM1, 999. The characteristics of those who never wore helmet correctly included being female, living in urban areas, age more than 65 years old, belonging to other ethnic groups, non Malaysians, having no formal education and being divorced or widowed.

Findings of this study is quite disturbing as statistics have shown that more than 50% of those injured or killed on the roads in many low and middle-income countries involve users of two-wheelers, particularly motorcyclists (Peden et al. 2004). Head injuries are the main cause of death and disability among motorcycle users, and the costs of head injuries are high because they frequently require specialized medical care or long-term rehabilitation.

## **7. CONCLUSION**

In the NHMS III study, among the five types of injuries studied, the highest number of injuries was due to those at home 3,742, followed by road 2,432 and workplace and the least were at schools 900. However, the incidence rate of injuries at schools was highest 7.0%, followed by at home 6.5%, and the lowest incidence rate was at the recreational areas 1.7%. For risk reduction practices, nearly 20-25% of respondents admitted to being exposed to information on first aid and cardio pulmonary resuscitation, with both significantly associated with increasing level of education. Only slightly more than half of motorists wore helmet correctly all the time. Further studies are urgently needed to be conducted to identify reasons and management for this risk taking behaviour. Slightly more than one third of workers were trained on occupational safety and health training prior or within one month of starting work and just about two fifth of workers who needed personal protective equipments were provided with them by their employers. This issue needs to be addressed to ensure the safety and health of our working population in Malaysia.

## **8. RECOMMENDATIONS**

### **8.1 Home and Recreational Injuries**

- 8.1.1 To advocate the implementation and enforcement of playground and recreational areas safety standards by the Ministry of Housing and local councils.
- 8.1.2 To strengthen the Ministry of Health's Injury Prevention Programme.
- 8.1.3 To increase collaboration between local council, Ministry of Health and other relevant agencies in preventive programmes to reduce home and recreational injuries
- 8.1.4 To improve monitoring and surveillance of home and recreational injuries

### **8.2 Road Injuries**

- 8.2.1 To ensure effective implementation of the Road Safety Plan Of Malaysia 2006-2010 and the 9 strategies outlined in the plan.
- 8.2.2 To support the activities of the Malaysian Road Safety Council, and various agencies and stakeholders involved.
- 8.2.3 To enhance the capabilities of research on road safety including that of the Malaysian Road Safety Research Institute.
- 8.2.4 To strengthen the Ministry of Health's Injury Prevention Programme at all three levels of prevention primary, secondary and tertiary.

### **8.3 Workplace Injuries**

- 8.3.1 To strengthen the National Council for Occupational Safety and Health and the Department of Occupational Safety and Health.
- 8.3.2 To ensure effective implementation of occupational safety and health policies and programmes through enforcement, training and information dissemination.
- 8.3.3 To enhance the capabilities of research on occupational safety and health including that of National Institute Occupational Safety and Health.
- 8.3.4 To strengthen the Ministry of Health's Occupational Health Programme in particular occupational safety and health in public sector.

- 8.3.5 To review the compensation system for injuries suffered by both Malaysian and foreign workers.

#### **8.4 School Injuries**

- 8.4.1 To encourage Ministry of Education to comply with OSHA 1994 legislation by establishing safety and health policies.
- 8.4.2 To strengthen the injury prevention programme which is part of the integrated school health programme of the MOH.
- 8.4.3 To improve monitoring and surveillance of injuries at schools.



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