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

LOAD OF ILLNESS

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

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LOAD OF ILLNESS

Chapter I:
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Institute for Public Health,
Ministry of Health Malaysia.

MESSAGE FROM THE DIRECTOR GENERAL OF HEALTH MALAYSIA

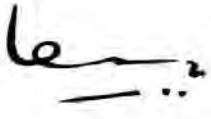
Since independence, Malaysia has achieved remarkable progress economically and socially, notably in the health sector, through a well planned and comprehensive health care delivery system. However, Malaysia's health care system still has to grapple with many challenges, particularly the rising costs 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 date 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 and 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.

DEDICATION

This volume is dedicated specially to all individuals and groups who have contributed their ideas, suggestions, time, energy, effort and commitment throughout the stages of planning, data collection, data processing and analysis of this massive survey. With their support and co-operation, difficult times passed unknowingly and the whole survey had been a joyful experience that would be treasured and remembered for all time.

The authors dedicate this volume to all of them

AUTHOR'S STATEMENT

This volume is the culmination of several months of collaborative effort by the authors who have strived to ensure the integrity of this work.

The findings in this volume have not been adjusted for the differences in population composition of the survey sample and the 2006 Malaysian population. It has been weighted by state and urban rural strata using the 2005 population as a base.

The authors welcome any inquiries, comments and suggestions for further improvement of this volume.

ACKNOWLEDGEMENT

The authors wish to acknowledge the dedication and commitment of all the field enumerators, both from the Ministry of Health and contract officers who have strived against great hardship to ensure the success of the survey.

We also wish to thank the Director General of Health and the Ministry of Health for granting us the funds and support for conducting extensive and comprehensive mammoth survey.

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ABREVIATIONS

ADI	Acute Diarrhoeal Illness
AGLQ	Asthma Quality of Life Questionnaire
AHRTAG	Appropriate Health Resources and Technology Action Group
AIDS	Acquired Immunodeficiency Syndrome
AIMS	Arthritis Impact Measurement Scale
ARI	Acute Respiratory Illness
BAKAS	Rural Health Water Supply and Sanitation
CI	95% Confidence Interval
COOP	Continuity of Operations
CPD	Continuing Professional Development
CVD	Cardiovascular diseases
DE	Design Effect
DHP	Diabetes Health Profile
DHS	Disease Health Survey
DQOL	Diabetes Quality of Life Measure
DUKE	Duke Health Profile
EB	Enumeration Blocks
ERGHO	European Research Group on Health Outcomes
FI	Face to Face Interview
FLP	Functional Limitations Profile
GDP	Gross Domestic Product
GHQ	General Health Questionnaire
GHPQ	General Health Perception Questionnaire
GNP	Gross National Product
GP	General Practitioner
HIV	Human Immunodeficiency Virus
HAS	Hospital Specific Approach
HMO	Health Maintenance Organization
IASP	International Association for the Study of Pain
ICD	International Classification of Disease
ID	Individual Identification
ISO	International Organization for Standardization

JCAHO	Joint Commission on the Acreditation of Healthcare Facilities
LRTI	Lower Respiratory Tract Infection
LQ	Living Quarters
MOH	Ministry of Health
MP	Malaysia Plan
NHFM	National Health Financing Mechanism
NHIS	National Health Interview Survey
NHMS	National Health Morbidity Survey
NHS	National Highway System
NIA	National Indicator Approach
PPS	Probability Proportionate to Size
QCC	Quality Control Circles
RR	Response Rate
UNICEF	The United Nations Children's Fund
SIP	Sickness Impact Profile
SLE	Systemic Lupus Erythematosus
SPSS	Statistical Package for the Social Sciences
STATA	Statistic Data Analysis
STAI	State-Trait Inventory
TQM	Total Quality Management
URTI	Upper Respiratory Tract Infection
WONCA	World Organization of General Practice/Family
WHO	World Health Organisation

GLOSSARY OF TERMS

Chronic illness
Operationally defined as any illness which is of long duration, slow progress and long continuance (WHO). For this study the duration used is 1 year from the date of interview. This includes diseases already diagnosed by the doctor i.e. Diabetes Mellitus.

Functional disability
The perceived inability of the respondents who were ill / injured to carry out normal activity at home, school or workplace

Health-care seeking behaviour
Behaviour related to the seeking of health / medical care, and includes the following:

a) Decision-maker for place to seek health care who, in general, decides for the respondent on where to seek health care
b) Sources of payment for health care who, in general, pays for the respondent's health care
c) Ill / injured and whether care was sought or not, with or without the occurrence of self-medication
d) Not ill / injured but had visited / used a health facility

Health facility /services
May be either modern, traditional or alternative care facilities / services.

Nearest health facility
A modern static health facility, either government or private, a hospital or a clinic, which was located nearest to the respondent's living quarters, with distance measured in kilometres, and not in terms of difficulty of physical access.

Perception on necessity to seek care
The respondent's perception with regards to whether it is necessary to have sought care for their recent illness / injury / chronic illness, even though they had not done so.

Recent illness / Injury
Operationally defined as any illness or symptom presents prior to 2 weeks from the date of interview which required the person to limit her/his daily duties at school, work, home or free time (Health survey of England)

Recommendation of facility
Whether the respondent who had used a particular facility would recommend it to others if they too had the same problem. By definition, the respondent would have to have used a facility before they could recommend it.

Self-medication
Treating one-self without having seen or being advised by a doctor, or other health personnel, or a traditional / alternative practitioner.

Sought /seek care
Refers to the pursuit of health care from a health facility, which may be modern or traditional / alternative. It pertains to all respondents who reported recent illness / injury or chronic illness, and does not include self-medication.

Utilization of services
Use of any type of health services, modern or traditional, which may be either for the respondent's recent illness / injury / chronic illness or for other reasons other than recent illness / injury / chronic illness.

CHAPTER 1

ACUTE DIARRHOEAL ILLNESS

ABSTRACT

About 1.8 million people die from acute diarrhoea yearly, making it a major health problem in many parts of the world. The NHMS III was the first attempt to obtain community based data on the epidemiology of Acute Diarrhoeal Illness (ADI). The objective of the study was to determine the incidence, the impact on productivity and the health seeking behaviour of the community in relation to ADI. A nationwide cross-sectional survey was conducted via face-to-face interview among eligible respondents of all ages. An acute diarrhoeal episode was defined as having 3 or more episodes of loose stools in any 24 hour period within the two weeks prior to the interview. The definition excludes any type of pre-existing chronic diarrhoea already experienced by the respondent. The 2 week incidence of ADI was 5.0% (CI: 4.8 - 5.2) in the Malaysian population. The incidence of ADI among the estimated population was highest among young adults 20-29 years, rural dwellers, Other Bumis, and those with tertiary educational level. The mean duration of ADI was 2.0 days, with a SD of 1.3 days. Majority of the population with ADI also reported having stomach cramps. About 411,433 persons or 40.3% of those reporting diarrhoea also experienced limitation of functioning in their daily activities. A total of 25.6% of the population with ADI or 262,307 people reported taking time off from work or school as a result of the illness. Less than half of those with ADI, 43.3% (CI: 41.3 – 45.4) sought treatment for the illness. Majority or 71.8% (CI: 69.0 - 74.4) of those seeking treatment, did so within 12 hours of the onset of the symptoms. Most people with ADI sought treatment at private clinics. The main reason given for not seeking treatment was that the illness was mild and did not warrant treatment. The study revealed that acute diarrhoeal illness is still a major public health problem in our country. Therefore, efforts must be taken by the relevant authorities to reduce the incidence of ADI, indirectly reducing the socio-economic and functional loss of daily activities in the Malaysian population.

1. INTRODUCTION

The National Health and Morbidity Survey (NHMS) is a community based survey conducted once every ten years by the Institute for Public Health, Ministry of Health. One of the main aims of conducting such a study is to enable the Ministry of Health to review health priorities, program strategies and activities, and to plan for allocation of resources. The first NHMS was conducted in 1986 in which the sample population was limited to the West Malaysia. The second NHMS in 1996 was extended to include East Malaysia. The third NHMS III was conducted in the year 2006 between April to August. Since the first NHMS, the scope of the study has been extended.

One of the main objectives of the NHMS III was to determine the load of illness of some specific diseases namely, acute respiratory illnesses, acute diarrhoeal illnesses and recent and chronic illnesses among Malaysian population. In the previous NHMS, acute diarrhoeal illness has never been studied in detail in terms of magnitude, severity, and health seeking behaviour. This study was the first attempt to obtain baseline epidemiological estimates for acute diarrhoeal illness.

2. LITERATURE REVIEW

In many parts of the world, diarrhoea is still a major health problem. Diarrhoea causes 4% of all deaths and 5% of health loss to disability. Global estimates are that each year, there are about 4 billion cases of diarrhoea causing 1.8 to 2.2 million deaths. More than 90% of these deaths are among children under 5, mostly in developing countries (WHO 2000). This is equivalent to one child dying every 15 seconds. In fact diarrhoeal disease is responsible for between one-fifth to one-fourth of all causes of deaths among children under-5 worldwide (WHO Regional Office for the Western Pacific).

Worldwide, these children experience an average of 3.3 episodes of diarrhoea each year, but in some areas the average exceeds nine episodes each year (The Epidemiology and Etiology of Diarrhoea Medical Education). Where episodes are frequent, young children may spend more than 15% of their days with diarrhoea. About 80% of deaths due to diarrhoea occur in the first two years of life. The main cause of death from acute diarrhoea is dehydration, which results from the loss of fluid and electrolytes in diarrhoeal stools. Other important causes of death are dysentery and under nutrition. Diarrhoea is an important cause of under nutrition. This is because patients eat less during diarrhoea and their ability to absorb nutrients is reduced. Moreover, nutrient requirements are increased as a result of infection. Each episode of diarrhoea contributes to under nutrition and when episodes are prolonged, their impact on growth is increased.

Diarrhoeal disease also represents an economic burden for the developing countries. In many nations more than a third of the hospital beds for children are occupied by patients with diarrhoea. These patients are often treated with expensive intravenous fluids and ineffective drugs. Although diarrhoeal disease is usually less harmful to adults than to children, it can also affect a country's economy by reducing the health of its work force. About 60% to 90% of diarrhoeal illness can be attributed to unsafe water, sanitation and hygiene in the industrialised countries and developing countries respectively. Among children under five, 85-90% of deaths related to diarrhoeal illness is due to the lack of safe

water, sanitation and hygiene (WHO Regional Office for the Western Pacific). UNICEF had estimated that globally, in the year 2000, 1.1 billion people were still without access to improved water supply and many more were without access to safe water (UNICEF 2000).

Fortunately, simple and effective treatment measures are available that can markedly reduce deaths due to diarrhoea, avoid unnecessary hospitalisation in most cases, and prevent the adverse effect of diarrhoea on nutritional status. Practical preventive measures can also be taken that to substantially reduce the incidence and severity of diarrhoeal episodes. Improved water supply reduces diarrhoea morbidity by 6% to 25%, if severe outcomes are included. Improved sanitation would reduce diarrhoea morbidity by 32% (WHO 2004). Hygiene interventions including hygiene education and promotion of hand washing can lead to a reduction of diarrhoeal cases by up to 45% while improvements in drinking-water quality through household water treatment, such as chlorination at point of use, can lead to a reduction of diarrhoea episodes by between 35% and 39%.

Various definitions for diarrhoea have been used in studies. In epidemiological studies, diarrhoea is usually defined as the passage of three or more loose or watery stools in a 24-hour period, a loose stool being one that would take the shape of a container. It is the consistency of the stools rather than the number that is most important. Passing stools frequently alone does not mean that an individual has diarrhoea. Rather, a change in the usual frequency of passing stools and associated with a loose consistency is important to recognize as possible diarrhoea. (Bagui et al. 1991) showed that the definition with the best balance of sensitivity and specificity were three or more loose stools or any number of stools containing blood, in a 24 hour period. It has been also been proposed to include three consecutive diarrhoea-free days for defining the end of an episode. A study in Sub-Saharan Africa had shown that estimates of diarrhoeal incidence vary substantially with different definitions of diarrhoeal episode. The authors suggest that differences in the definitions could be reduced by using adjustment (James et al. 2006).

When the intestinal lining becomes irritated and inflamed, it hinders the absorption of water from food waste. In severe cases, the intestinal lining may even leach water. There is also increased motility of the colon, giving rise to frequent faecal evacuations. This is the underlying mechanism of diarrhoea. Generally, acute diarrhoea is self-limiting and resolves after a day or two.

It is known that diarrhoea is an important symptom of underlying disorders and events such as (The Epidemiology and Etiology of Diarrhoea Medical Education; What are the causes of acute diarrhoea?)

a) Food poisoning
b) Intestinal infections or gastroenteritis
c) Anxiety or emotional stress
d) Over consumption of alcohol
e) Medications, especially antibiotics
f) Ischemic bowel disease
g) Inflammatory bowel disease
h) Lactose intolerance
i) Gastrointestinal tumours

Some of the infectious agents known to cause diarrhoea include:

a) **Viruses** - such as rotavirus, calici virus, astrovirus, Norwalk like virus, and adenovirus.
b) **Bacteria** - such as *E. coli, Campylobacter, V. Cholerae, Shigella, Salmonella* and *Staphylococcus aureus*.
c) **Parasites** - such as *Giardia lamblia, Cryptosporidium parvum* and tapeworm.

Rotavirus is the most important cause of severe diarrhoea among children younger than five years old (Medici 2004). Almost every child would have at least one rotavirus infection by age three (Espinoza et al. 1997; Rotavirus – Epidemiology 2004). Other infective agents like *Campylobacter jejuni, E. coli O157:H7, Listeria monocytogenes and Cyclospora cayetanensis* are of greater concern today compared to more than two decades ago (Anthony 2004).

The infectious agents that cause diarrhoea are usually spread by the faecal-oral route, which includes the ingestion of faecal contaminated water or food, person-to-person transmission, and direct contact with infected faeces. It has been estimated that 36% of all acute gastroenteritis are attributable to food borne transmission. Of this, 67% are caused by viruses, 30% are caused by bacteria and 3% due to parasites (Anthony 2004).

Most enteric infections are asymptomatic, and the proportion that is asymptomatic increases beyond two years of age owing to the development of active immunity. During asymptomatic infections, which may last for several days or weeks, stools contain infectious viruses, bacteria, or protozoa cysts. Persons with asymptomatic infections play an important role in the spread of many enteric pathogens, especially as they are unaware of their infection, take no special hygienic precautions and move normally from place to place.

Diarrhoea, being a symptom complex is clinically recognized by three types of presentations; acute watery diarrhoea, acute bloody diarrhoea and persistent diarrhoea. Each type reflects the underlying pathology and altered physiology involved. The approaches to treatment are also different. It has been suggested that acute watery diarrhoea accounts for 50% of deaths due to diarrhoea, and another 50% is due do persistent diarrhoea and dysentery together (Manun'ebo et al. 1994).

2.1 Acute Watery Diarrhoea

The term refers to diarrhoea that begins acutely, lasts less than 14 days (most episodes last less than seven days), and involves the passage of frequent loose or watery stools without visible blood. Vomiting may occur and fever may be present. Acute watery diarrhoea causes dehydration. Under nutrition is possible especially when food intake is also reduced. If not treated appropriately, acute dehydration can lead to death. It has been found that the most important causes of acute watery diarrhoea in young children in developing countries are rotavirus, *Campylobacter*, enterotoxigenic *Escherichia coli, Vibrio cholerae, Shigella*, and *Salmonella* (Paul et al.1999).

2.2 Acute Bloody Diarrhoea

Diarrhoea with visible blood in the stools is also known as dysentery. The main dangers are intestinal damage, sepsis and malnutrition; other complications, including dehydration, may also occur. Dysentery may be caused by a variety of aetiological agents. Some of the most important pathogens especially in children are *Shigella*, *Campylobacter jejuni* and, infrequently, enteroinvasive *Escherichia coli* or *Salmonella*. *Entamoeba histolytica* can cause serious dysentery in young adults but is rarely a cause of dysentery in young children.

2.3 Persistent Diarrhoea

The episode may begin either as watery diarrhoea or as dysentery, thus can be caused by a variety of aetiological agents. It is defined by the duration of the illness rather than the aetiology. The World Health Organisation has defined persistent diarrhoea as an episode of diarrhoea which starts acutely but which lasts at least 14 days (Tulloch). Persistent diarrhoea is associated with greater morbidity and mortality risks compared to acute diarrhoea (Syed et al.1994; WHO 1994; Victoria et al. 1993,1992). Marked weight loss and nutritional compromise is frequent. Diarrhoeal stool volume may also be great, hence the greater risk of dehydration. Usually no single microbial cause for persistent diarrhoea can be identified. It has been found that enteroaggregative *Escherichia coli* may play a greater role than other agents (Bhan 1989; Victoria et al. 1993). Persistent diarrhoea should not be confused with chronic diarrhoea, which refers to recurrent or long-lasting diarrhoea due to non-infectious causes, such as sensitivity to gluten or inherited metabolic disorders.

Diarrhoea can also be classified according to the International Classification of Disease (ICD) codes (Victoria et al. 1992). The ICD-10 classifies diarrhoea according to the aetiological agent rather than by clinical presentation. It has already been noted that a variety of pathogens can cause different clinical patterns of diarrhoea. Diarrhoeal diseases of infectious origin are classified under Chapter I of the ICD-10 Certain Infectious and Parasitic Diseases. Table 2.1 shows the ICD-10 codes that approximate watery diarrhoea and dysentery (Bhan et al. 1989) Persistent diarrhoea may fall under any of the ICD-10 codes depending on the aetiological agent.

Table 2.1: International Classification of Diseases (ICD -10) Codes Corresponding to Watery Diarrhoea and Dysentery

Symptom Complex	Aetiological Agent	ICD-10
Watery diarrhoea	Cholera	A00
	Salmonella gastroenteritis	A02
	Bacterial food poisoning	A05
	Other bacteria	A04.0-A04.9
	Giardiasis	A07.1
	Viral gastoenteritis	A08
	Gastroenteritis,presumed infectious	A09
Dysentery	Shigella	A03
	Camplylobacter	A04.5
	Yersinia	A04.6
	Amoebiasis	A06
	Dysentery, aetiology unspecified	A09

The likelihood of diarrhoeal illness in an individual depends on the interplay between agent, host (individual) and the environment. The agent includes infectious agents described above, chemicals, toxins, medications, and alcohol among others. The environment in general affects host susceptibility or the agent's existence, multiplication and transmissibility. Socio-cultural, demographic and environmental factors such as water storage in mud-containers, pump water supply, throwing of garbage indiscriminately around the house, the absence of a latrine in the household and failing to wash hands before preparing food has been shown to be associated with diarrhoea (Caryn 2004; International Classification of Diseases and Health Problems 1996; Mohammad et al. 2001).

These factors facilitate the transmission of pathogenic agents that cause diarrhoea. Specific behaviours that increase the risk of diarrhoea can be summarised as follows (The Epidemiology and Etiology of Diarrhoea Medical Education).

a) Failing to breast-feed exclusively for the first 4-6 months of life. Exclusively breast fed infants are greatly protected against developing severe diarrhoea compared to non-breast-fed infants. Mortality from diarrhoea is also substantially greater among the latter compared to the former.

b) Failing to continue breast-feeding until at least one year of age. Prolonged breast-feeding reduces the number of episodes and the severity of some types of diarrhoeal disease, such as shigellosis and cholera.

c) Using infant feeding bottles. These bottles must be adequately sterilised before being utilized as they can easily become contaminated with enteropathogenic agents. Milk, when added to an unclean bottle, becomes contaminated. If it is not consumed immediately, further bacterial growth occurs.

d) Improper storage of cooked food. Cooked food can easily become contaminated if it is kept at room temperature for several hours before being served. Bacteria in it can multiply many times, increasing the risk of causing food poisoning to an individual. Contamination such as this can lead to a point source epidemic especially the large groups or masses of people are being served food at once.

e) Consumption of water that is contaminated with infective agents of diarrhoeal disease. Water may be contaminated at its source, in the distribution chain or during storage at home or other premises.

f) Failing to wash hands before handling food, after defecation, or after handling faeces. Food handlers not practicing high levels of hygiene are especially an important source of transmission of infections to the masses.

g) Unsanitary disposal of faeces. Faeces contain large numbers of infectious viruses or bacteria that could be harmful to humans. If it is not disposed off properly, it may easily contaminate water bodies. Animal faeces can also transmit enteric infections to man.

Several other host factors are associated with increased incidence, severity, or duration of diarrhoea (The Epidemiology and Etiology of Diarrhoea Medical Education). They include:

a) Under nutrition. Undernourished children suffer from greater frequency, severity, duration, and risk of death from diarrhoea.

b) Current or recent measles. Diarrhoea and dysentery are more frequent or severe in children with measles or who have had measles in the previous four weeks. This presumably results from immunological impairment caused by measles.

c) Immunodeficiency or immunosuppression. This may be a temporary effect of certain viral infections (e.g., measles), or it may be prolonged, as in persons with the Acquired Immunodeficiency Syndrome (AIDS). When immunosuppression is severe diarrhoea can be caused by unusual pathogens and may also be prolonged.

In children, most diarrhoeal episodes occur during the first two years of life. Incidence is highest in the age group 6-11 months, when weaning often occurs (The Epidemiology and Etiology of Diarrhoea Medical Education). This pattern reflects the combined effects of declining levels of maternally-acquired antibodies, the lack of active immunity in the infant, the introduction of food that may be contaminated with faecal bacteria and direct contact with human or animal faeces when the infant starts to crawl. Most enteric pathogens stimulate at least partial immunity against repeated infection or illness, which helps to explain the declining incidence of disease in older children and adults.

Distinct seasonal patterns of diarrhoea occur in many geographical areas (The Epidemiology and Etiology of Diarrhoea Medical Education). In temperate climates, bacterial diarrhoeas tend to occur more frequently during the warm season, whereas viral diarrhoeas, particularly disease caused by rotavirus, peak during the winter. In tropical areas, rotavirus diarrhoea tends to occur throughout the year, increasing in frequency during the drier, cool months, whereas bacterial diarrhoeas tend to peak during the warmer, rainy season. The incidence of persistent diarrhoea follows the same seasonal pattern as that of acute watery diarrhoea.

Most of the time, the diagnosis of acute diarrhoeal illness which is usually self limiting can be made clinically. Further tests such as blood tests, laboratory analysis of stool sample and colonoscopy may be required when the identification of the specific causative agent of the illness is necessary for instituting the appropriate treatment and management. Until a few years ago, pathogenic organisms could be identified in the faeces of only about 25% of patients with acute diarrhoea. Today, with the availability of new techniques, experienced laboratories can identify pathogens in about 75% of cases seen at a treatment facility and up to 50% of milder cases detected in the community (The Epidemiology and Etiology of Diarrhoea Medical Education).

Most countries have set up surveillance systems to monitor the incidence of acute diarrhoeal illnesses. However, as many cases of intestinal infection are asymptomatic, the true incidence of acute diarrhoeal illness in the community is difficult to estimate.

Of those clinical cases, majority are mild and self-limiting, therefore they are not presented to the health services and not notified to the surveillance system. Wheeler *et al* has shown in a cohort study of infectious intestinal disease in England that for every one case reported to the national surveillance, 1.4 laboratory identifications were confirmed (Wheeler 1999). Also for one case reported to the national surveillance system, there were 6.2 stool samples sent for laboratory investigations, 23 cases presenting to general practice and 136 community cases. In the medical field, health is commonly defined as an organism's ability to efficiently respond to challenges (stressors) and effectively restore and sustain a "state of balance," known as homeostasis. The WHO 1985 defines health as "the state of complete physical, mental and social well being, and not merely the absence of disease and infirmity". In more recent years, this statement has been modified to include the ability to lead a "socially and economically productive life". The view of health has shifted from the terms of survival to a freedom from disease, emphasising on the individual's ability to perform his daily activities, social and emotional well being and quality of life.

Cheung and Spears 1995, stated that a characteristic of ill health is that it stimulates people to seek relief for their complaints. Relief may be found at home by the person's own initiative or through the advice of relatives, and modern or traditional forms of home remedies may be used. According to Djukanvoic and Mach 1975, the options when an individual seek help from outside his immediate environment is either biomedical or traditional.

Epidemiologists and social scientists have devoted increasing attention to study health seeking behaviour associated with acute diarrhoea illness in recent years. Community-based interview surveys such as National Health and Morbidity Survey III appear to offer the best vehicle for analysing care seeking behaviour on a representative sample of population.

There are critical factors that determined health-care seeking behaviour for acute diarrhoea illness, which are related to perceived illness severity and recognition of certain signs and symptoms (Taffa & Chepngeno 2005). Hill et al. 2003, argue that health beliefs are important barriers to care seeking in addition to the maternal ability to recognise symptoms. Some illnesses are recognised as 'not-for-hospital'. Additionally, past experience with similar illness in children can motivate mothers to play a 'waiting game' to see if the illness recedes on its own, particularly in situations where the cost of care is an inhibitory factors (D'Souza 1999) There are studies that demonstrated the decision to engage with a particular medical channel is influenced by a variety of socio-economic variables, sex, age, the social status of women, the type of illness, access to services and perceived quality of the service (Tipping & Segall 1995) Ahmed et al. 2001 reported only 17% of neonates were taken to trained providers, and only 5% to government health facilities. Seeking care from trained providers was found to be associated with the gender of the neonate, birth order, antenatal care of the mother from trained providers, father's education and monthly expenditure of the family. The results of this study suggest that efforts should be made to raise community awareness regarding neonatal morbidity, the importance of seeking care from trained personnel and the availability of services for these conditions. It is important to note that proper understanding of health seeking behaviour could reduce delay in diagnosis, improve treatment compliance and improve health promotion strategies in a variety of contexts.

Although accessibility is commonly suggested as a factor in health facility use (Wang et al. 2004) the type of health care provider that is sought, or the health seeking behaviour adopted, also differs according to the type of disease.

For example Mbonye 2004 found that mothers were more likely to seek help for diarrhoeal disease than acute respiratory infections, since diarrhoea weakens children rather fast compared to fever, despite the fact that both are leading causes of child mortality in developing countries.

Despite the ongoing evidence that people do choose traditional and folk medicine or providers in a variety of contexts which have potentially profound impacts on health, few studies recommend ways to build bridges to enable individual preferences to be incorporated into a more responsive health care system. For example, Ahmed et al. (2000) conclude: "efforts should be made to raise community awareness regarding the importance of seeking care from trained personnel and the availability of services".

The impact of acute diarrhoeal illness can be substantial. The Ireland study (Study to estimate the frequency and characteristics of acute gastroenteritis in the community in Ireland 2007) reported 17.4% (CI: 14.2 - 21.2) respondents surveyed took time off work which translated into 1.5 million working days lost or £173.5 million (CI: 124.4 - 222.7) loss of earnings due to acute gastroenteritis per year.

3. OBJECTIVES

3.1 General Objective

To provide community based data and information on the epidemiology of acute diarrhoeal illness to enable the Ministry of Health to review the program strategies & activities and to plan for the allocation of resources in relation to these areas (or concerns or diseases)

3.2 Specific Objectives

3.2.1 To determine the incidence of acute diarrhoeal illness in the community

3.2.2 To determine the severity of acute diarrhoeal illness in the community in terms of duration and associated symptoms

3.2.3 To assess the impact of acute diarrhoeal illness on productivity by estimating the days of limitation of activities and days of loss of work or school

3.2.4 To determine the health seeking behaviour of the community in relation to acute diarrhoeal illness

4. METHODOLOGY

A cross-sectional community household survey was conducted throughout Malaysia between April to August 2006. Structured questionnaire on recent illness, injury, limitations in activity, health care access and utilisation and health behaviours were related to a 14-day period preceding the interview to minimize recall bias. A reference period of the past one year was used for collecting information on chronic illness. Respondents aged 13 years and above participated in this survey. Descriptive statistics was used to analyse the data.

Each eligible household member was asked whether he/she had any illness or injury the past two weeks. Reference was made to the exact date by computing backwards from the day of the survey. For respondents who could not immediately recall an illness or injury, the interviewers probed them to trigger the memory. They were asked whether or not they had any recent illness or injury from a given list of health problems (Card I). Then with respect to chronic illness, they were asked on long standing illness for the duration of one year. If the response was negative, then the list of chronic illness as listed in card J were read. Those who responded positively to any of the above questions were further asked whether or the illness/injury had prevented them from carrying out their normal activities at home, in the work place or in school. They were also asked the number of days of illness and for those who are working or schooling the number of days of absence from work/school because of illness or injury.

In order to obtain information on use of services, visits to hospitals, clinics, traditional healers, or alternative medicine practitioners during the reference period of two weeks for recent illness and one year for chronic illness were recorded. There was also the possibility that some respondents who were ill/injured had sought care for other reasons during the same reference periods (either two-week of one year). Similarly, it was possible they did not seek treatment for their illness/injury but had used services for other reasons.

Estimates obtained from the survey were derived using a complex ratio estimation procedure that ensures that the survey estimates conform to an independently estimated distribution of the total population by pre-determined variables. Population estimates expressed in proportions, rates were used in the analysis, and computation of standard errors was incorporated to provide a range of estimates within a confidence interval of 95%. Prevalence rates, which were calculated by dividing the number of existing respondents with the health problem to the population at risk at the time of measurement (i.e. all respondents interviewed), were used as the estimates of the magnitude of a health problem. These estimates include among others, the disability rates, i.e. rates that pertain to any temporary or long-term reduction in activity.

In this survey, to increase the reliability of the respondent's recall, inquiry about disability experienced was limited to the 2-week period prior to the date of interview. The data were then adjusted to reflect the annual experience of the total Malaysian population. Specific rates, in which the numerator and the denominator represented the same demographic category, were also reported, wherever relevant. These include gender, race, household income and age-group specific rates.

Proportions were used to estimate utilisation of government, private, alternative medicine and other health facilities, as well as those who practiced self-medication. Proportions were also used to estimate and report reasons for use and non-use of the facilities and reasons for seeking treatment.

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

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:

Stratum	Population of gazetted areas
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.

4.2.3 Sample size

In the course of sample selection, 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.

4.2.4 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.

4.3 The Questionnaire and Household Interview

4.3.1 The questionnaire

A bi-lingual (Bahasa Malaysia and English) pre-coded questionnaire was designed, pre-tested and piloted prior to the survey.

Certain terminology and items in the questionnaire were also had been made available in the dialects or languages of the main ethnic groups in Malaysia, such as Hokkien and Cantonese for the Chinese and Tamil for the Indians. All versions were back translated to English by independent reviewers to ensure the accuracy of the translations

Self-administered questionnaires were also developed for a sub-sample of household members for questions pertaining to sensitive issues or areas such as sexual behaviour and practices. The self-administered questionnaires were left with the selected household members to be collected by the team members at a later time or day.

4.3.2 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.

For the first part of the interview which covers sections on general household, socio-demographic and economic profile, load of illness, health utilization and consumption cost, a trained non-medical or paramedical interviewer conducted the interviews. Sections pertaining to specific health problems and involving blood or other physical or medical examination was conducted by trained nurses.

4.4 Method of Data Collections

a) The questionnaires

All research topics for the questionnaire are arranged into modules ranging from A to Z. Topics that are similar area are arranged into sub-modules under a particular module. Questions comprised of both close ended and open ended. The questions in each module were tailored to the target group. Two types of questionnaires were developed i.e. face to face and self administered based on the requirements of the research subgroups and the research topics involved.

i) Face to face interview questionnaire

The face to face interview questionnaires consisted of 2 subtypes, i.e., the household questionnaire (orange) to be answered by the head of the household of the LQ selected, and the individual questionnaire, to be answered by each member of the household. Four types of individual FI questionnaires were developed, to cater to the different age groups of less than 2 years old (pink), 2 to less than 13 years old (blue), 13 to less than18 years old (yellow) and 18 years old and above (purple).

For those aged below 13 years old, the child's parents or guardians were responsible for answering on his or her behalf. Those aged 13 years and above are required to answer their respective questionnaires directly through the interview.

All the FI questionnaires have 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.

4.5 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 the month of 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:

a) Testing of the questionnaire
b) Testing of the field logistic preparation
c) Testing of the scouting activities
d) 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 for the data collection were done at two stages, field and central. Please refer to NHMS III protocol for detail 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 Acute diarrhoea

An acute diarrhoeal episode was defined as having 3 or more episodes of loose stools in any 24 hour period. The diarrhoea excludes any type of chronic diarrhoea already experienced by the respondent as a result of underlying diseases such as cancer of the bowel, ulcerative colitis or Chrohn's disease.

4.8.2 Severity of the acute diarrhoea

The severity of the acute diarrhoea was measured by 2 parameters namely

a) The duration of the diarrhoea, as defined by the number of days the respondent experienced the diarrhoea.

b) The association of any other symptom/s along with the diarrhoea such as fever, vomiting, stomach cramps and blood in the stools.

4.8.3 Loss of productivity

Loss of productivity was measured by 3 parameters, namely

a) Daily activities being affected by the illness, i.e., the respondent perceives a drop in the quantity or quality of their normal daily activities, such as schooling, household chores, recreational activities or vocational activities

b) Days taken off from work or school for rest a result of the sickness. Work here includes any kind of activity or work carried out with or without monetary returns, for example in the case of a full time homemaker or in fulfilling any kind of household chores. In the case of a respondent aged less than 13 years, the days taken off applies to the caretaker of the child.

c) The number of days taken off work or school for rest either in the form of sick leave, annual leave or any other form of leave as a result of the sickness. This applies only for adults who are working for monetary returns or those who are schooling. For respondents less than 13 years old, the number of days taken off work applies to the caretaker who needs to take time off in order to care for the child who is suffering from diarrhoea. If a range of days is given, the minimum of the range is taken.

4.8.4 Health seeking behaviour

Health seeking behaviour was measured by 3 parameters, namely

a) Seeking treatment for the illness, defined as the act of actively seeking or obtaining treatment for the diarrhoea from anyone or any facility (acute diarrhoeal illness or allopathic) outside the home. It includes having house calls by a doctor.

b) Place first sought treatment from for the illness, regardless of type of treatment rendered, i.e., acute diarrhoeal illness or allopathic.

c) Timeliness of seeking treatment for the illness, defined as how soon the respondents first sought treatment for the diarrhoea since the appearance of the symptoms, measures in hours.

d) Reasons for not seeking treatment if applicable, defined as the **main reason** given by the respondent for not seeking any kind of treatment for the illness.

5. FINDINGS

5.1 General Findings

The total number of eligible respondents of all ages was 56,710 which represents 21, 095, 810 people on weighted counts. The number of respondents who answered the module on acute diarrhoeal illness was 55,748 (unweighted) representing 20, 732, 575 people (weighted). Hence, the response rate for this module on acute diarrhoeal illness was 98.3%. Appendix: Table 1, shows the distribution of the respondents and non-respondents in the sample population by socio-demography and geography.

Majority of the respondents or 55.5% were children and young adults aged 29 years and below. The proportion was similar among non-respondents. The elderly aged 60 years and above comprised only 8.6% of the respondents compared to 15.1%. A similar proportion was seen among the non-respondents.

There were slightly more females compared to males, comprising of 52.9% and 47.1 % respectively among the respondents. A similar pattern was seen among non-respondents.

Majority of the respondents were Malays (57.4%), followed by Chinese (18.0%), Other Bumiputras (12.5%) and Indians (7.8%). A similar pattern was seen among the non-respondents.

Among respondents aged 7 years and above, majority or 38.2% had attained a highest level of secondary education followed by 31.4% attaining primary education. Only 7.1% had attained tertiary education. Among the non-respondents, a different picture was seen. Majority of non-respondents or 34.6% had only attained a highest level of primary education. A smaller proportion of only 4.6% had attained tertiary education.

Among respondents of marriageable age, majority or 61.7% were currently married, 31.4% had never married, while 6.6% were currently divorced or widowed. A similar picture was seen among the non-respondents. However, the proportion of unclassified cases among the non-respondents was at least 14 times that the respondents.

With regards to religion, 67.5% of the respondents professed Islam, followed by 15.4% Buddhism and 9.1% Christianity. Among the non-respondents, there were a slightly lower proportion of Muslims (62.0%) and Christians (6.8%) and more Buddhists (19.3%).

Malaysians comprised 95.0% of the respondents, with 5.0% foreigners and 0.1% of unclassified nationality. Among the non-respondents, 92.9% were Malaysians while 3.4% were unclassified.

Majority of the respondents (61.9%) were from a household income of RM 1,999 or below. Only 11.7% had a household income of RM 4,000 or more. Similarly, among non-respondents 63.3% comprised of those below a household income of RM 1,999, while 10.7% had a household income of RM 4,000 or more.

About 57.8% of the respondents lived in urban areas and 42.2% in rural areas. Among the non-respondents, majority or 54.3% also lived in urban areas.

By state, the proportions of respondents and non-respondents differed. About 16.8% of the respondents were from Selangor, followed by 12.8% from Sabah and 11.1% from Johor. Only 0.9% & 1.6% were from Perlis and Labuan respectively. Majority of the non-respondents were from Perak (15.6%), followed by from Sarawak (15.2%) and from Selangor (14.0%). Only 0.7% and 0.1% of non-respondents were from Melaka and Perlis respectively.

5.2 Incidence of Acute Diarrhoeal Illness

Overall, the incidence of self-reported acute diarrhoeal illness within a 2 week period in the Malaysian population was 5.0% (CI: 4.8 - 5.2) or 1,036,518 episodes (CI: 985,935 - 1,087,100 episodes) in the weighted population. In a year, this translates to 26, 949,457 acute diarrhoeal illness episodes (CI: 25,634,302 – 28,264,611 episodes) or 1.3 episodes (CI: 1.26 - 1.34 episodes) of acute diarrhoeal illness person per year. The incidence of acute diarrhoeal illness by socio-demography and location is shown in Appendix: Table 2.

a) By age group

Compared to other age groups, teenagers aged 15-19 years old had the highest incidence [7.7% (CI: 7.0 - 9.0)] of acute diarrhoeal illness. The incidence of acute diarrhoeal illness then steadily declines between the ages 20-54 years. Among young children aged 0-4 and 5-9 years, the incidence was 4.5% (CI: 3.9 - 5.1) and 3.4% (CI: 2.9- 4.0) respectively.

b) By gender

The incidence of acute diarrhoeal illness among males and females was 5.03% and 4.97% each (CI: 4.7 - 5.3) and (CI: 4.7 - 5.0) respectively.

c) By ethnicity

Among major ethnic groups in Malaysia, the highest incidence of 5.9% (CI: 5.2 -6.6) was among the Other Bumis while the lowest incidence [3.6% (CI: 3.2 - 4.0)] was among the Chinese.

d) By educational level

Those with tertiary education had the highest incidence of acute diarrhoeal illness [6.4% (CI: 5.5 - 7.3)], while those with no formal education at all had the lowest incidence of ADI [4.1% (CI: 3.7 - 4.6)].

e) By monthly household income group

The highest incidence of ADI [5.5% (CI: 4.8 - 6.3) was among those in the less than RM 400.00 per month household income bracket. Those in the RM 700–RM 999 monthly household income bracket had the lowest incidence of 4.8 (CI: 4.0 - 5.3).

f) By nationality

Malaysians [5.1% (CI: 4.9 - 5.3)] were found to have a higher incidence of ADI compared to foreigners [3.4% (CI: 2.8 - 4.1)].

f) By location

The incidence of ADI among the rural population [5.5% (CI: 5.1 - 5.8)] was only slightly higher than in the urban population [4.7% (CI: 4.5 - 5.0)].

g) By state

By state, Perak had at the lowest incidence of ADI or 2.3% (CI: 1.8 - 2.9). The incidence in Kedah was the highest [6.8% (CI: 6.0 - 7.6)]

5.3 Severity of Acute Diarrhoeal Illness

5.3.1 Duration of acute diarrhoeal illness

The duration of acute diarrhoeal illness in the population ranged from 1 to 7 days. The mean duration was 2.0 days, with a SD of 1.3 days. More than one third [42.0% (CI: 40.2 - 44.2)] of the population experienced ADI for only 1 day. Less than 3.8% experienced ADI between 4 days to one week each.

a) By age group

The longest mean duration of 2.7 days (CI: 2.4 - 2.9 days) was among young children and infants. The mean duration of ADI declined steadily between ages 6-40 years old, with the shortest duration being 1.8 days (CI: 1.6 - 1.9 days) among adults 21-49 years old. From ages 50 onwards, the mean duration of ADI showed an increasing trend. The mean duration of ADI by socio-demography and location in the population is shown in Appendix: Table 3.

b) By gender

Females had only a slightly longer duration of ADI [2.1 days (CI: 2.0 - 2.1 days)] compared to men [2.0 days (CI: 1.9 - 2.0 days)].

c) By ethnicity

Among the major ethics groups in Malaysia, the longest mean duration of diarrhoea was 2.2 days (CI: 2.0 - 2.4 days) among the Other Bumis followed by 2.1 days (CI: 2.0 - 2.4 days) among Indians. The Chinese only experienced ADI for a mean of 1.8 days (CI: 1.7 - 1.9 days).

d) Educational level

The mean duration of diarrhoea steadily decreases from 2.1 days (CI: 1.9 - 2.2 days) among those with no formal education at all to 1.6 days (CI: 1.5 - 1.7 days) among those with tertiary education.

e) By monthly household income group

The longest mean duration of ADI was 2.3 days (CI: 2.1 - 2.5) among those earning a monthly household income of between RM700 - RM999. Those earning a monthly household income of RM 5,000 and above and RM 3,000 - 3,999 experienced the shortest mean duration of ADI of 1.8 days each (CI: 1.6 - 1.9).

f) By location

Urbanites had a mean duration of ADI of 2.1 days (CI: 2.0 - 2.2 days) while the rural population had a mean duration of 2.0 days (CI: 1.9 - 2.0 days).

5.3.2 Associated symptoms

About 56% of the estimated population with ADI had at least one symptom with the diarrhoea. Majority reported having stomach cramps [45.8% (CI: 43.8 - 47.9)]. About 16.0% of the estimated population with ADI complained of having vomiting and fever each (CI: 14.6 - 17.5) and (CI: 14.4 - 17.5) respectively. Only 3.6% (CI: 2.9 - 4.3) reported having blood in the stools.

Among the estimated population ADI without blood in the stools, between 7.1 - 9.9% (CI: 6.2 - 11.1) experienced at least 2 other symptoms. About 4.5% (CI: 3.7 - 5.4) experienced all three symptoms of stomach cramps, vomiting and fever.

For those suffering from dysentery, 2.3% (CI: 1.8 - 3.0) reported of also having stomach cramps alone. The estimated population of dysentery with any other combination of symptoms was less than one percent (CI: 0.3 - 0.8). About 43.6% reported having diarrhoea alone without any other associated symptoms such as fever, vomiting or blood in the stool.

a) Fever

The frequency distribution and proportion of respondents with ADI who also experienced fever by socio-demographic characteristics are shown in Appendix: Table 4.

i) By age group

The highest rate of fever among the estimated population with ADI was 37.1% (CI: 31.0 - 43.5) in children less than 5 years old. The fever rate steadily declines with age to a minimum of 9.9% (CI: 7.4 - 13.1) among adults 20-29 years of age. From age 40 years onwards, the proportion of fever increases steadily again

ii) By gender

A higher proportion of females [16.7% (CI: 14.8 - 18.9)] than males [14.9% (CI: 13. - 17.1)] reported having fever with ADI.

iii) By ethnicity

By ethnicity, about 20.0% (CI: 15.0 - 27.5) of Other Bumis and Indians reported having fever, while only 13.8% (CI: 12.0 - 15.8) of Malays had the same symptom with ADI.

iv) Educational level

In terms of educational level, the highest proportion [19.4% (CI: 15.8 - 23.6)] of fever was reported by those with no formal education at all. This proportion declines steadily as the educational level attained increases.

v) Monthly household income group

Those earning a monthly household income of <RM 400.00 had the highest proportion of fever of 20.3% (CI: 15.6 - 26.0). The proportion of the estimated population with ADI who also had fever declined as the monthly household income increased up to <RM 2,000 per month. As the monthly household income increased from RM 3,000 onwards, the proportion of fever also increased.

vi) By location

A higher proportion of rural dwellers [17.9% (CI: 15.6 - 20.5)] than urban dwellers [14.5% (CI: 12.6 - 16.6)] with acute diarrhoeal illness reported fever.

b) Vomiting

The frequency distribution and proportion of respondents with ADI who also experienced vomiting by socio-demographic characteristics are shown in Appendix: Table 5.

i. By age group

Children < 10 years old had the highest proportion of vomiting [> 30.0% (CI: 24.9 - 40.6)] while the lowest proportion was among adults 40-49 years old [7.4% (CI: 4.9 - 11.0)].

ii) By gender

The proportion of females with acute diarrhoeal illness and vomiting [18.6% (CI: 16.6 - 20.7)] was at least 1.4 times more than among males with ADI.

iii) By ethnicity

About 24.0% (CI: 18.8 - 30.0) of Indians reported vomiting while only 13.1% (CI: 9.9 - 17.2) of Chinese reported similar symptoms with ADI.

iv) By educational level

As with fever, those who never had any formal education at all, had the highest proportion [22.5% (CI: 18.6 - 26.9)] of vomiting. Those with secondary level of education had about half this proportion being the lowest proportion with vomiting.

v) By monthly household income group

Those earning a household income of between RM1000-1999 had the highest proportion [17.7% (CI: 14.9 - 20.9) of vomiting while those with a household income of RM4,000-4,999 had the lowest proportion [10.0% (CI: 5.6 - 17.2)] of vomiting.

vi) By location

Urban dwellers reported a higher proportion [17.1% (CI: 15.3 - 19.2)] of vomiting compared to rural dwellers.

c) Stomach cramps

The frequency distribution and proportion of respondents with acute diarrhoeal illness who also experienced stomach cramps by socio-demographic characteristics are shown in Appendix: Table 6.

i) By age group

Teenagers aged 10-19 years old had the highest proportion [54.2% (CI: 50.2 - 58.1)] of stomach ache with ADI. The proportion shows a declining trend with increase in age until age 40-49 years old. Children less than five had the lowest proportion of stomach ache or 31.4% (CI: 25.8 - 37.6).

ii) By gender

Almost half or 49.5% (CI: 46.8 - 52.3) of the females reported having stomach cramps while 41.7% (CI: 38.9 - 44.5) of males reported experiencing the same symptom with ADI.

iii) By ethnicity

The highest proportion of stomach ache with ADI was 51.8% (CI: 45.2 - 58.3), reported among the Indians. Only 41.7% (CI: 36.5 - 47.1) of the Chinese reported having stomach ache with the illness.

iv) By educational level

As the level of education attained increased from none at all to tertiary, the proportion of the estimated population reporting stomach cramps decreased from 50.3% (CI: 45.4 - 55.2) to 42.3% (CI: 35.6 - 49.2).

v) By monthly household income group

About 52.9% (CI: 46.2 - 59.5).of those who earned a monthly household income of less than RM400 reported stomach ache as an associated symptom with ADI while only 42.5% (CI: 35.9 - 49.5) of those who earned RM5,000 or more as their monthly household income reported the same associated symptom.

vi) By location

A higher proportion of rural [48.2% (CI: 45.1 - 51.2)] than urban dwellers [44.3 (CI: 41.6 - 47.1)] reported having stomach cramps with the ADI.

d) Blood in the stools

The frequency distribution and proportion of respondents with ADI who also experienced blood in the stools by socio-demographic characteristics are shown in Appendix: Table 7.

i) By age group

The highest proportion [5.3% (CI: 3.2 - 8.8)] of blood in the stools was reported among children less than five followed by the elderly [4.8% (CI: 2.6 - 8.7)]. Children aged 5-9 years old had the lowest proportion [2.1% (CI: 1.9 – 5.0)] of blood in the stools.

ii) By gender

Less than 4.0% for percent of males (CI: 3.0 - 5.2) and females (CI: 2.4 - 4.2) reported having blood in the stools.

iii) By ethnicity

By major ethnic groups, Indians reported the highest proportion [6.0% (CI: 3.7 - 9.7) of stomach ache while Malays and Chinese reported a proportion of about 3.1% each (CI: 2.4 - 4.1 and 1.7 - 5.4 respectively)

iv) By educational level

Those with a primary level of education reported the highest proportion [4.3% (CI: 3.0 - 6.0)] of having stomach ache while those with no formal education at all had the lowest proportion [2.3% (CI: 1.2 - 4.2)].

v) By monthly household income group

Of those with a monthly household income bracket of RM 700-RM 999, 5.6% (CI: 3.4 - 9.1) of the estimated population reported blood in the stools while less than one percent of those within the monthly household income bracket of RM 4,000 - 4,999 reported the same symptom.

vi) By location

More urban [3.7% (CI: 2.9 - 4.8)] than rural dwellers [3.3% (CI: 2.4 - 4.4)] experienced ADI with blood in the stools.

5.4 Health Seeking Behaviour

Information on health seeking behaviour was enquired during the survey. Estimated population were asked whether they seek care for the acute diarrhoea illness (ADI), the place where was sought first and timeliness of seeking care within a two week recall periods. A total of 43.3% (CI: 41.3 - 45.4) estimated population self-reported to have ADI in the preceding two week period before the survey, compared to 56.3% (CI: 54.3 - 58.4) who did not seek care. For those who had ADI and did not seek care were also asked the reasons for not doing so. The characteristics of those who had sought care are as shown in Appendix: Table 8.

5.4.1 Seeking care for acute diarrhoea illness

A total of 1190 estimated population or 442,992 estimated population reported to have ADI during the two-week recall period sought care for their illness.

a) By age group

The younger age groups; 0-4 years [67.7% (CI: 61.5 - 73.4)] and 5-9 years [56.5% (CI: 48.6 - 64.1)] were more likely to seek care for ADI than the rest of the age groups. The 10-19 age group has significantly the lowest percentage of seeking care [30.7% (CI: 27.2 - 34.3)].

b) By gender

There was no significant difference in health seeking behaviour between males [49.3% (CI: 44.2 - 49.3)] and females [36.7% (CI: 39.3 - 44.7)]

c) By ethnicity

The Indians were significantly more likely to seek care [54.0% (CI: 47.3 - 60.6)] compared to other ethnic groups. Malays had the lowest percentage of seeking care for ADI [41.4% (CI: 38.9 - 44.0)].

d) By educational level

The percentage of estimated population with ADI who sought care was significantly lower in those with primary education [36.7% (CI: 33.1 - 40.5)].

e) By household monthly income group

Seeking care was highest amongst the <RM400 household monthly income group, while RM4000-RM4999 household monthly income group had the lowest percentage of seeking care.

f) By location

Overall, higher percentage was observed in urban location [44.3% (CI: 41.6 - 47.1)] than rural residency [41.8% (CI: 38.9 - 44.8)].

g) By state

Four states had almost similar percentage of seeking care; Melaka (49.8%), Wilayah Persekutuan Labuan (49.7%) Wilayah Persekutuan Kuala Lumpur (49.5%) and Johor (49.1%).The lowest percentage of seeking care was observed in Perlis (26.4%).

5.4.2 Place first sought care

A total of 43.3% respondents (estimated population 442,992) who self-reported to have ADI had sought care for their illness 96.6% of this estimated population had provided information on the place where they first sought care for their illness. The type of facilities most commonly used by estimated population when seeking care for their diarrhoea is shown in Appendix: Table 9.

i)	Private clinics	41.9%
ii)	Government health clinics	20.9%
iii)	Pharmacy/Chinese medicine shops	16.7%
iv)	Government district Hospitals	9.0%
v)	Government general Hospitals	4.4%
vi)	Private Hospitals	2.1%
vii)	Other facilities	5.1%

a) By age group

Private clinics were the first choice of facilities where estimated population first sought care for their ADI for all age groups except the 50-59 age groups where they first sought care from government health clinics. Three age groups; 20-29, 30-39, 40-49 reported their second choice of facilities for care as pharmacy/Chinese medicine shops, the rest of the age group sought care from government health clinics except the 50-59 age group (private clinics). The facilities most commonly used by estimated population when seeking care for their diarrhoea were almost consistent in all age groups as described in Appendix: Table 10.

b) By gender

There was no difference in places where respondents first sought care for their diarrhoea between male and females. The main preference of places was in the order: private clinic, government health clinic, pharmacy/Chinese medicine shop, government district hospital and government general hospital (Appendix: Table 11).

c) By ethnicity

Private clinics remained the first choice of place where care was first sought by Malays, Chinese, Indians and Others. Other Bumiputras used government health clinics s the first choice of place where care was first sought (Appendix: Table 12).

d) By educational level

Similar pattern was observed for education levels where respondents' first choice of place where they first sought care for their diarrhoea was from private clinics (Appendix: Table 13).

e) By monthly household income group

The lower income groups, i.e. <RM400 and RM400 - RM699 had out clinics as the first choice of place where first sought care from government health clinics, followed by private clinics. All other household monthly income groups preferred private clinics as the first choice of place when they first sought care (Appendix: Table 14).

f) By location

By residence, the main facilities of first place of treatment sought by respondents in urban areas were private clinics, followed by pharmacy/Chinese medicine shops and government health facilities. Majority of rural respondents first sought care from government health clinics, followed by private clinics (Appendix: Table 15).

g) By state

Private clinics were the first place of treatment sought for ADI by respondents from all states in Peninsular Malaysia. The first place of treatment sought by respondents from Sabah and Sarawak were government district hospitals and government health clinics respectively. Generally, the pattern of the places where respondents first sought care was about the same as in Appendix: Table 9. The details of first place of treatment sought for ADI by respondents from all states are as in Appendix: Table 16.

5.4.3 Timeliness for seeking care

Respondents were asked how prompt they sought care for their diarrhoea. A total of 845 respondents (316,495 estimated populations) provided information on this question. A total of 71.8% (CI: 69.0 - 74.4) sought care ≤12 hrs after the onset of diarrhoea. The characteristics of timeliness for seeking care are shown in Appendix: Table 17.

a) By age group

More than 60% of estimated population in all age groups had sought care ≤12 hrs after the onset of diarrhoea. The highest and lowest percentages were reported in the 60 and above age group [84.3% (CI: 75.9 - 90.1)] and 0-4 age group [65.4% (CI: 57.4 -72.6)] respectively. A total of 24.2% (CI: 16.5 - 34.1) estimated population in the 50-59 age group sought care 13-24 hrs after the onset of illness, while 12.6% (CI: 7.9 - 20.5) in the age group 60 and above had sought care 13-24 hrs after the onset of illness. The 0-4 age group had the highest percentage of seeking care >24hrs after the onset of the illness [21.4% (CI: 15.5 - 28.7)].

b) By gender

There was significantly higher percentage of female estimated population seeking care ≤12 hrs and >24 hrs after the onset of diarrhoea. However, significantly higher percentage of males sought care 13 -24 hrs after the onset of diarrhoea.

c) By ethnicity

Higher percentage of estimated population seeking care ≤12 hrs after the onset of diarrhoea were observed among all ethnic groups as compared to the other time intervals.

d) By educational level

Similar pattern of promptness in seeking care was seen for all education levels. Those estimated population with tertiary education had the highest percentage of seeking care ≤12 hrs after the onset of diarrhoea [76.2% (CI: 66.8 - 83.6)] and the lowest percentage being observed in those with no formal education [72.4% (CI: 65.4 - 78.3)].

e) By monthly household income group

The highest percentage of estimated population seeking care ≤12 hrs after the onset of diarrhoea was seen in the RM1000-RM1999 household monthly income group [73.9% [CI: 68.4 - 78.8)]. Those families with household monthly income of RM4000-RM4999 had the lowest percentage of seeking care ≤12 hrs after the onset of diarrhoea.

f) By location

A significantly higher percentage was observed in urban location [74.9% (CI: 71.3 -78.2)] than rural [66.9% (CI: 62.4 - 71.1)].

g) By state

A general pattern of majority who had sought care did so in ≤12 hrs after the onset of diarrhoea; this was seen in all states. Higher percentage were observed in Wilayah Persekutuan Kuala Lumpur [83.3% (CI: 70.7 - 91.2)], Melaka [81.4% (CI: 65.0 - 91.2)], Johor [79.8% (CI: 71.9 - 85.9)], Selangor [77.5% (CI: 71.3 - 82.7)] and Penang [77.2% (CI: 61.5 - 87.8)].

5.4.4 Reasons for not seeking care

A total of 56.3% (CI: 54.3 - 58.4) respondents or 575,976 estimated population who self-reported to have ADI in the preceding two week period before the survey did not seek care. They were asked why they did not do so and 93.3% of the estimated population answered this question.

The common reasons for not seeking care are shown below. Details are shown in Appendix: Table 18.

i)	The illness was mild	53.6%
ii)	Self-medication	22.4%
iii)	The illness was cured already	9.1%
iv)	Treatment was not required	5.5%
v)	Able to get medicine without seeing doctor	2.2%
vi)	The illness was not an emergency	2.0%
vii)	No specialist treatment nearby	1.0%

a) By age group

The reasons for not seeking care were consistent in all age groups. The reasons being that the illness was mild, followed by ability to self-medicate and the illness was cured already, except for the 50-59 age group, the third reason being treatment is not required. No transportation to go for seeking care was among the main reasons for not seeking care given by estimated population in the 60 and above age group (Appendix: Table 19).

b) By gender

Similar reasons as described above for not seeking care were observed by both males and females (Appendix: Table 20).

c) By ethnicity

Among all ethnic groups in Malaysia, the main reason for not seeking care remained that the illness was mild and did not warrant for care. However, a higher percentage of Indians self-medicate for ADI [34.3% (CI: 25.0 – 45.0)] compared to other ethnic groups. Chinese had the lowest percentage of self-medication [16.1% (CI: 11.6 - 22.0)] (Appendix: Table 21).

d) By educational level

The first four main reasons for not seeking care for ADI was similar across all education levels, i.e. (Appendix: Table 22)

i) The illness was mild
ii) Self-medication
iii) The illness was cured already
iv) Treatment was not required except those estimated population who did not have formal education had provided the fourth main reason as the illness was not an emergency.

c) By monthly household income group

The first three main reasons for not seeking care for ADI were similar across all income groups, i.e. (Appendix: Table 23)

i) The illness was mild
ii) Self-medication
iii) The illness was cured already except the RM 5000 and above income group cited treatment was not required as the third main reason.

f) By location

Rural and urban estimated population had the same first three main reasons for not seeking care for ADI as by state (Appendix: Table 24).

g) By state

The first three main reasons for not seeking care for ADI was similar for all state, i.e. (Appendix: Table 25)

i) The illness was mild
ii) Self-medication
iii) The illness was cured already except that the respondents from Johor state cited treatment was not required as the third main reason.

5.5 The Impact of Acute Diarrhoeal Illness

5.5.1 Taking time off as a result of ADI

Information on whether ADI warranted respondents to take time off from work, school or carrying out normal activities was sought. Taking time off was defined as not attending school or work place as a result of ADI by taking sick leave, annual leave or other forms of leaves. A total of 25.6% (CI: 23.8 - 27.4) estimated population took time off as a result of ADI. The characteristics of those who took time off are shown in Appendix: Table 26.

a) By age group

About 25% of estimated population in all age groups took time off as a result of ADI. The age groups 0-4 and 5-9 refers to the mothers or carers of the children in those age groups who took time off to care for their children. The highest and lowest percentages of estimated population taking time off were reported in the 10-19 age group [27.7% (CI: 24.3 - 31.3)] and 40-49 age group [22.4% (CI: 18.1 - 27.3)] respectively.

b) By gender

The percentages of male [25.3% (CI: 22.8 - 28.0)] and female [25.8% (CI: 23.5 - 28.3)] estimated population taking time off as a result of ADI were almost similar.

c) By ethnicity

The highest and lowest percentage of estimated population taking time off as a result of ADI were observed in Other Bumiputras [28.4% (CI: 23.7 - 33.5)] and Chinese [21.8% (CI: 17.8 - 26.5) respectively.

d) By educational level

Estimated population with no formal education [30.9% (CI: 26.4 - 35.8)] had the highest percentage of taking time off while those with primary education [22.2% (CI: 19.2 -25.5)] had the lowest percentage of taking time off for the illness.

e) By monthly household income group

The highest percentage of estimated population taking time off diarrhoea was reported in the RM700-RM999 household monthly income group [30.0% (CI: 23.9 - 36.9)]. Those from household monthly income of RM3000-RM3999 [22.8% (CI: 17.3 - 29.4)] had the lowest percentage of taking time off.

f) By location

There was no significant difference in percentages of estimated population taking time off in urban [25.2% (CI: 22.8 - 27.6)] and rural [26.2% (CI: 23.7 - 29.0)] locations.

g) By state

The percentages of estimated population taking time off by states ranges from 19.5% (CI: 13.9 - 26.7) in Kelantan to 35.1% (CI: 29.2 - 41.6)] in Johor.

5.5.2 Limitation of daily activities

Limitation of daily activities is defined as the perceived inability of the estimated population who had ADI to carry out normal activity at home, school or work place. Among those estimated population who provided further information on whether ADI affect their normal activity at home, work or school, 40.3% (CI: 38.4 - 42.3) claimed that the illness had prevented them from carrying out their normal activities compared to those reported to have no limitation on their daily activities [59.7% (CI: 57.7 - 61.6)]. This difference was significant. The characteristics of those who experience limitation of activities are as shown in Appendix: Table 27.

a) By age group

The percentages of estimated population who experienced limitations on their daily activities ranged from 32.9% (CI: 26.9 - 39.4) in 50-59 age group and 45.7% (CI: 38.1 -53.4) in the 5-9 age group.

b) By gender

No significant difference in limitation of daily activities was reported between male [39.1% (CI: 36.2 - 42.0)] and female [41.4% (CI: 38.8 - 44.0)] estimated population.

c) By ethnicity

The highest and lowest percentages of estimated population who experienced limitations on their daily activities were reported in Malays [41.3% (CI: 38.9 - 43.9)] and Chinese [35.5% (CI: 30.7 - 40.7)] respectively. The other ethnic groups had almost similar percentages (CI: 40.4 – 40.6).

d) By educational level

Estimated population with no education [46.6% (CI: 41.5 - 51.8)] experienced the highest percentage of limitations on their daily activities, while those with primary education [37.3% (CI: 33.8 - 40.9)] had the lowest percentage.

e) By monthly household income group

The highest percentage of estimated population experiencing limitations on their daily activities was reported in the RM4000 -RM4999 household monthly income group [44.5% (CI: 34.4 - 55.1)]. Those estimated population with household monthly income of RM3000 - RM3999 [35.1% (CI: 28.5 - 42.4)] had the lowest percentage of limitation on their daily activities.

f) By location

Urban estimated population [40.6% (CI: 38.0 - 43.2)] had higher percentage of experiencing limitations on their daily activities as compared to rural [39.9% (CI: 37.0 - 42.9)] estimated population.

g) By state

Percentages of estimated population experiencing limitations on their daily activities ranges from 29.6% (CI: 23.8 - 36.1) in Kedah to 50.9% (CI: 34.2 - 67.3) in Wilayah Persekutuan Labuan.

6. DISCUSSION

With respect to the socio-demographic characteristics, generally both respondents and non-respondents in the study had similar characteristics. Some differences were present in terms of proportion for certain categories of occupation, educational level, citizenship and state.

It is generally known that the incidence of acute diarrhoeal illness is higher in populations living in poor environmental and sanitary conditions. Malaysia is a country that can boast of rapid development and satisfactory standards of living. In our quest of achieving vision 2020, we have invited a large migrant workforce that serves to accentuate our multicultural and racial population. The diverse socio-demographic and cultural factors of our heterogeneous and mobile population would significantly influence the magnitude and transmission of ADI.

Comparison of the magnitude of ADI between populations has been difficult due to the differences in the definitions used to classify an episode of gastroenteritis or diarrhoeal illness. Definitions range from broad to strict (Study to estimate the frequency and characteristics of acute gastroenteritis in the community in Ireland 2007; Thomas et al. 2006). In our study, we chose an intermediate case definition used in several studies in Australia, Canada, Ireland and the US (Elaine et al. 2005; Ozfoodnet 2002).

A recall period of four weeks has been used in many studies. In this study, we used a two week recall period to minimize the possibility of recall bias. Many studies on ADI are also confined to children under five as the disease cause significantly higher morbidity and mortality among this subgroup of population. The NHMS III on the other hand, was conducted to obtain baseline estimates of the magnitude of ADI in the population of Malaysia.

Various methods and study designs for conducting studies on acute diarrhoea and related areas have been reported throughout the world. Many of these studies are population based cross-sectional telephone surveys, where the respondents are interviewed by telephone (Study to estimate the frequency and characteristics of acute gastroenteritis in the community in Ireland 2007; Thomas et al. 2006). There are many limitations in such studies that can be discussed. Telephone surveys are always biased since the sample population is unrepresentative of the population targeted. Response rates also vary between countries, ranging from 84.1% in Ireland to 34.7% in Canada (Elaine et al. 2005; Thomas et al. 2006). In our survey, the study design was such that it was representative of the general population, and yielded a high response rate of 98.3% for the ADI module.

It has been shown that estimates based on retrospectively reported diarrhoea is higher than that compared to prospective study rates. The 'telescoping' theory has been proposed to explain this phenomenon. Telescoping is a tendency for study participants to report events in the distant past as occurring in the recent past (Wheeler et al.1999). For our study, the investigators believe that respondents would not be likely to forget an event such as an acute diarrhoeal episode. It is also unlikely to experience two separate episodes of acute diarrhoea within that period. Therefore telescoping is not an issue. It should be noted that the estimates from this study have not been adjusted for differences in the population structure. It has only been weighted to the 2005 population. Therefore the actual burden of ADI in the population, in terms of episodes per year could be more although the incidence per person per year may not vary much. We also assumed that the incidence of ADI is constant throughout the year. However, there could be geographical and seasonal variations in the incidence of ADI as a result of variations in the climate, socio-cultural and behavioural factors that serve to facilitate the occurrence of infective and food borne diarrhoeal illness. One would expect to see an increase in the incidence of food poisoning related ADI for example during the fasting month owing to the large number of people eating out during this time and the sudden mushrooming of hawkers and street food vendors.

6.1 Incidence of Acute Diarrhoeal Illness

The overall incidence of acute diarrhoea in the population was 1.30 episodes per person per year. The incidence estimate of per person per year is similar to studies in the United States (Beth et al. 2004) and British Columbia (Thomas et al. 2006), but is at least twice higher than the incidence in Ireland (Beth et al. 2004). Our estimate is also only slightly lower than estimates from a Queensland study (Ozfoodnet). In Queensland, the annual incidence of was estimated to be between 1.49 to 1.79 episodes per person per year. Differences in the recall period and case definition must be noted when comparing the estimates.

The four week incidence rate of 10.00% in our study is higher than estimates from a study by Elaine Scallan in Australia, Canada, United States and Ireland, which ranged from 7.6% in Canada to 3.4% in Ireland (Elaine et al. 2005). In that particular study, although there was the limitation of being a telephone survey, the use of the same definition and method enabled the estimates of the four

countries to be comparable. Another study in Ireland also showed a similar lower four week acute gastroenteritis rate of 4.5% compared to our study (Study to estimate the frequency and characteristics of acute gastroenteritis in the community in Ireland 2007).

This study found the highest incidence of ADI to be among young adults aged 20-29 years old followed by teenagers between 10-19 years old and adults 30-39 years old. Children less than five years old had an incidence of ADI that was slightly lower than in persons 30-39 years old. A similar picture was seen in Queensland, where the highest incidence was among persons age 18-39 years followed by children 7 months to 4 years old. Other studies have found the highest rates among children less than 5 years while the lowest rates among persons aged 65 years and above (Beth et al. 2004; Elaine et al. 2005; Study to estimate the frequency and characteristics of acute gastroenteritis in the community in Ireland 2007).

In studies among children under five, higher rates for acute diarrhoea episodes compared to our study has been shown (Nepal Multiple Indicator Surveillance 1996; Olawuyi et al. 2004). Most of these studies were conducted in third world countries where the lack of resources and a poorer standard of hygiene put this group of children at a disadvantage from the health perspective. The lowest incidence rates found in our study are among children 5-9 years old followed by the adults aged 50-59 years old. The reason why the incidence of ADI was higher among young adults compared to other age groups in our population could possibly be attributed to their lifestyle and eating habits, rather than their inherent susceptibility to develop intestinal infections. In fact as young healthy adults, they are a more active and mobile group, possibly in the workforce or in higher institutions of learning whereby there is more exposure to food poisoning. However, further studies are required to identify the etiological factors for ADI among these groups of individuals.

Although the prevalence of ADI was found to be consistently higher among females in some of the other studies (Elaine et al. 2005; Study to estimate the frequency and characteristics of acute gastroenteritis in the community in Ireland 2007; Thomas et al. 2006), no such findings were found in our study. The Foodnet and Queensland study also did not find any differences in the proportion of males and females with ADI.

The Chinese were found to have the lowest incidence of ADI compared to other major ethnic groups. In the Foodnet study, a racial difference in the proportion of respondents with episodes of acute diarrhoea was also seen (Beth et al. 2004). In British Columbia, Asians and North Americans had significantly different rates of gastrointestinal illness when compared to all other cultural groups (Thomas et al. 2006). A racial difference in the estimates of the incidence of ADI could be attributed to genetic or socio-cultural factors such as dietary habits.

The incidence of ADI was higher among those with a secondary or higher level of education compared to those with no formal education at all. Similar findings have been shown in other studies. In Queensland, persons with a higher level of education were more likely to report acute diarrhoea than persons with a lower level of education (Ozfoodnet 2002). In British Columbia, the monthly gastrointestinal rate also increased steadily from 8.2% among persons with less than high school education to 11.5% among persons with college or tertiary education. Since social disadvantage, which is usually associated with lower levels of education does not seem to be a risk factor in our study; it is likely that age can explain the findings observed. Young adults with the highest incidence of ADI are likely to have attained higher levels of education compared to older adults.

There was also no difference in the incidence of ADI among the different socio-economic groups in our study. While a similar finding was found in the Queensland study (Ozfoodnet 2002). A yearly household income of between $60,000 - <$80,000 was found to be associated with the highest rate of gastrointestinal illness compared to other household income levels combined in British Columbia (Beth et al. 2004).

Urban dwellers had a higher incidence of ADI compared to rural dwellers in this study. However, no such difference was found in other studies (Ozfoodnet 2002; Thomas et al. 2006). In Malaysia, urban dwellers are more likely to be comprised of an educated, mobile and younger working population compared to rural dwellers. The difference between the states in the study is not clear and should be analysed further. Malaysians were found to have a higher incidence of ADI compared to foreigners. This would be due to differences in the level of susceptibility of acquiring ADI between Malaysians and foreigners, the former being more susceptible.

6.2 Severity of Acute Diarrhoeal Illness

Severity of ADI in the study was reflected by the mean duration of the illness and the presence of other associated symptoms experienced. The overall mean duration of ADI in this study, was two days and is comparable to the median duration of two days in the Foodnet study (Beth et al. 2004) It must be cautioned that in the Foodnet study, ADI was defined as self-reported diarrhoea that lasted more than 1 day or was associated with impaired daily activity. In contrast, the mean duration of acute gastroenteritis was found to be longer in other studies ranging from 3.7 to 4.0 days (Study to estimate the frequency and characteristics of acute gastroenteritis in the community in Ireland 2007; Thomas et al. 2006) While the range of duration for ADI in our study was 1 to 7 days, the range was greater in the United States and British Columbia, from between less than 1 day to 42 days (Beth et al. 2004; Thomas et al. 2006).

Children under five had the longest mean duration of ADI or 2.7 days compared to other age groups. This is an indication of the severity of the illness in among younger children due to their relatively immature immune system. In another study, the mean duration of acute gastroenteritis was found to increase from 3.2 days to 5.2 days between the age groups of 5-24 years and 65+ years respectively (Study to estimate the frequency and characteristics of acute gastroenteritis in the community in Ireland 2007)

ADI in our study was mostly associated with abdominal cramps (46.3%), followed by vomiting (16.0%) and fever (15.9%). Only 3.6% of those with ADI reported blood in the stools. The findings concur with that of the Foodnet and British Columbia study whereby 58% and 77% or majority of respondents with ADI also reported having abdominal cramps respectively (Beth et al. 2004; Thomas et al. 2006). A slightly higher proportion of 35% and 25% of respondents reported fever associated with diarrhoea in the same studies respectively (Beth et al. 2004; Thomas et al. 2006), compared to our study. In the Foodnet study, a lesser proportion of respondents reported vomiting (26%), unlike our study where almost a similar proportion of the estimated population with ADI had vomiting and fever each (Beth et al. 2004). In other countries, diarrhoea and vomiting was present only among 2.0-2.6% of the respondents (Elaine et al. 2005). Rates of blood in the stool vary in other studies from < 0.1% to 6% (Beth et al. 2004; Study to estimate the frequency and characteristics of acute gastroenteritis in the community in Ireland 2007). Seasonal variation in the proportion of associated symptoms seen with ADI was shown in the Foodnet study; however the trend was similar throughout the different seasons.

Also, the case definition of ADI in that study would imply that these cases were more severe compared to cases of acute diarrhoeal episodes only. As such, it is not surprising that the proportion of respondents with associated symptoms was higher than in our study.

Overall, most of the associated symptoms with acute diarrhoea were highest among children less than 10 years old. The incidence of fever and blood in stools were highest among children below 5 years old, i.e., more than twice and 1.5 times the incidence for the overall population respectively. Only for stomach cramps, the highest incidence was among teenagers 10-19 years and the lowest incidence among children under five. Among all the associated symptoms, stomach cramps is the most subjective. Fever, vomiting and blood in stools can be verified by measurement or observation. Stomach cramp is a symptom that is subject to an individual's level of tolerance for pain. This in turn can also be culturally conditioned or influenced. Furthermore, in young children it is more difficult to verify the presence of stomach ache as children may not be able to communicate well enough. The incidence of blood in the stools of children in our study is much less than other studies (Anita et al. 2004; Nepal Multiple Indicator Surveillance 1996). The findings support the notion that an under five child with an episode of acute diarrhoea is more clinically ill than older children and adults. Fever and vomiting only serve to dehydrate the child further. Blood in the stools, signifies a more severe pathology for the illness. It may lead to a longer recovery time for the child. This signifies the importance of early intervention and management for ADI among children under five.

Currently it is a requirement by law to notify new cases of ADI such as cholera, typhoid and paratyphoid, all forms of dysentery and food poisoning. Since 1995 to 2005, the number of notifications received for the above acute diarrhoeal illnesses ranged from 4,705 to 10,416 cases (Ministry of Health Malaysia 1986). Based on the estimates by Wheeler *et al* (Wheeler et al. 1999), estimates from our study and the national surveillance data for communicable diseases, we can conclude that in Malaysia, the notification of ADI in Malaysia is grossly underreported.

6.3 Health Seeking Behaviour

A total of 43% of the estimated population sought care for ADI in our study as compared to 21% and 18.4% in studies in United States (Beth et al. 2004) and Australia (Ozfoodnet 2002) respectively. On studying the factors affecting health-seeking behaviour, our study showed that the estimated population in younger age groups; i.e., 0-4 and 5-9 years were more likely to seek care than the other age groups. Taffa and Chepngeno (2005) also found more children below one year old seeking health care. Children of younger age groups are more likely to seek care suggesting that acute diarrhoea is probably a more serious illness in younger children, or is perceived to be more serious by their parents than adults with similar symptoms. Most parents are also aware of the greater risk of dehydration among young children with diarrhoea. In contrast, Sudharsanam and Rott (2007) and Sreeramareddy et al. (2006) reported that age did not influenced health seeking.

In terms of timeliness of seeking care, majority (71.8%) of persons with ADI sought care ≤12 hours after the onset of diarrhoea. However, the greatest proportion seeking care promptly was seen in the 60 and above age groups in our study. This may be due to the perceived greater risk for other complications among older people.

No gender difference in seeking care for ADI was reported by Sudharsanam and Rott (2007) and Pillai et al. (2003), which was in accordance with the result of NHMS III. Gender of a child affects illness

reporting and the decision to choose a health care provider as well as the amount to spend on the sick child (Pokhrel & Sauerborn 2004). Interestingly, we found that females were more likely to seek care ≤12 hours and ≥ 24 hours after the onset of diarrhoea, whereby males more often sought care 13-24 hours after the onset of diarrhoea. Our study indicated that Indians were significantly more likely to seek care compared to other ethnic groups. However, majority of all ethnic groups sought care promptly i.e. ≤12 hr after the onset of diarrhoea. This suggested that all ethnic groups viewed ADI as a serious illness.

The proportion of the estimated population with primary education was significantly lower in seeking care than other education levels which was in agreement with studies elsewhere (Fosu 1994; Kutty 1989). It was also observed that persons with no formal education (72.4%) delayed seeking care (≥ 24 hours after the onset of diarrhoea) as compared to those with tertiary education (76.2%). A study by Taffa and Chepngeno (2005) implied that education influenced a person's perception of severity of illness and thus health-seeking.

In contrast, a converse trend was shown in relation to monthly household income and health seeking behaviour in our study. Respondents with a monthly household income of less than RM 400 had the highest proportion of seeking care compared to respondents of other monthly household income groups. This trend observation was also reported in another study where families with a higher economic status seek care less often (Pillai et al. 2003).

In terms of timeliness of seeking care, respondents with a monthly household income of RM 2000 – RM 2999 had the highest proportion of seeking care ≤12 hours after the onset of diarrhoea, compared to other monthly household income groups. Respondents in the monthly household income group of RM 3000 – RM 3999 and RM 5000 and above had the highest proportion (21.2% and 21.0%) of seeking care between 13 – 24 hours of onset of the illness respectively. A possible explanation may be that families with better economic status may wait for the illness to subside spontaneously or have enough resources needed to obtain care later if the illness got worse.

In our study, geographical location seemed to determine the health-seeking behaviour for ADI. Persons from more developed states such as Melaka, Wilayah Persekutuan Labuan, Wilayah Persekutuan Kuala Lumpur and Johor were more likely to seek care for ADI compared to less developed states such as Perlis, Kelantan, and Pahang. Similarly, greater proportions of urban residents tend to seek care than the rural residents. These observations were also true for the timeliness in seeking care.

It was noted almost slightly less than half (41.9%) of the estimated population in our study first sought care from private clinics, followed by government health clinics (20.9%) and pharmacy/Chinese medicine shops (16.7%). This health-seeking behaviour was true for all age groups except the 50-59 age years group where they first sought care from government health clinics. Three adult age groups; 20-29, 30-39 and 40-49 reported their second choice of facilities for care as pharmacy / Chinese medicine shop. In a previous study in Western Nepal, it was found that medicine shops and traditional healers were common sources of medicines (Shankar et al. 2003)

Although Pillai et al. (2003) revealed no gender difference in usage of facilities of care and male children were taken to the alternative system of medicine, our study did not reveal any gender difference in the type of health care systems used. Similarly, there was no difference in the pattern of facilities first visited for ADI by the respondents in terms of ethnicity and educational level. Majority of

the lower monthly household income groups, i.e. <RM400 and RM400 - RM699 first sought care from government health clinics, followed by private clinics. For respondents in all other monthly household income groups, majority first sought care from private clinics.

Private clinics also played a significant role in the provision of care in the NHMS II (Maimunah et al. 1996) where people visited private clinics more for recent illness / injury. Private clinics are the commonest type of nearest static health facility, both in urban and rural areas. People are more willing to seek preventive and promotive health care from private facilities.

Traditional practitioners were reported to be minimally utilised in 1986 (NHMS I) (Study to estimate the frequency and characteristics of acute gastroenteritis in the community in Ireland 2007) and 1996 (NHMS II) (Maimunah et al. 1996). A similar trend has been observed in the present study.

A total of 56.3% estimated population with self-reported ADI in the preceding two weeks period before the survey did not seek care. This finding was in agreement with the Victorian Population Health Survey (Enhancing foodborne disease surveillance across Australia in 2001 2007) where 70.6% of those with acute gastroenteritis did not seek medical care for their symptoms. The most important reason given for not seeking care was related to the severity of the illness; i.e. the illness was mild (53.4%). Other reasons included self-medication (22.2%) and the illness was cured (9.1%). The same three leading reasons were consistently observed with the selected socio-demographic characteristics of persons with ADI; namely age group, gender, educational level, monthly household income group, state and residence. Studies by OzFoodNet (2002) and Taffa and Chepngeno 2005) also found the most common reasons for estimated population with ADI not seeking care as diarrhoea does not last long enough or the illness was too mild.

About a quarter (22.2%) of the estimated population self medicated for their diarrhoea. Our finding was much lower than the British Columbia study (Thomas et al. 2006) where 63.9% of the respondents self -treated their illness using one or more over the counter medications such as painkillers, anti-diarrhoeal, anti-nauseates and herbal remedies. Self-medication may range from using prescribed or non-prescribed drugs to home remedies such as using physical devices (plaster, canes) to herbal remedies to certain foods (Levin & Idler 1983; Segall 1990). We defined self-medication as treating oneself without having seen, or being advised, by a doctor, or other health personnel, or traditional / alternative practitioners.

In this survey, the behaviour of self-medication only was collected, no information was collected regarding the type of pharmaceutical products, medicines or herbs that were used, nor was there an attempt to differentiate self-prescription or the un-prescribed use of the prescription drugs. In our study, higher proportions of Indians (33.9%) self-medicated than other ethnic groups. This finding was in contrast with findings of NHMS II (Maimunah et al. 1996) where higher rates of self-medication for recent illness / injury were found among the Other Bumiputras. This study did not probe into greater depth as to the reasons for self-medication, for which qualitative research would be more appropriate. The findings from NHMS III reinforced the fact that self-medication is a major health seeking behaviour among Malaysians. Therefore it is necessary to make self-medication safe and informed practice rather than to prevent using it.

6.4 The Impact of Acute Diarrhoeal Illness

Taking time off from work, school or carrying out normal activities as a result of ADI and limitation of daily activities were used to assess the impact of ADI and loss of productivity. In this study, it was found that a quarter (25.6%) of estimated population took time off as a result of ADI, or to take care of their family members with diarrhoea. A much lower rate of taking time off from work was reported in Ireland (17.4%) (Study to estimate the frequency and characteristics of acute gastroenteritis in the community in Ireland 2007) and in Australia (3.6%) (Enhancing foodborne disease surveillance across Australia in 2001 2007). In our present study, teenagers 10-19 years old (27.7%) accounted for the biggest proportion of persons with ADI taking time off either from school, college or work. In our present study, about 25% of male and female estimated population took time off from work, school or normal daily activities. This would contribute to a lot of loss in terms of productivity and social wellbeing.

The greatest proportion of estimated population who experienced limitation of activities was the school going children aged 5 - 9 age (45.7%), followed by 32.1% to 42.5% of the economically productive age group of 20 - 49 years old. Males and females had almost similar rate of experiencing limitation of activities.

Time taken off work and limitation of activities as a result of ADI have a bearing on the economic loss in the society. Since a large proportion of adults have been shown to take time off work and experience limitation of activities, the impact of ADI in terms of productivity loss in the country is significant. The overall community costs of diarrhoea depend much more on production loss by the affliction of young people than direct costs for medical care. Therefore preventive measures would be economically rewarding (Thoren et al. 1988).

7. CONCLUSION

Acute diarrhoeal illness is still a major public health problem in Malaysia with an incidence of 5.0% in the estimated population. The annualized rate was 1.3 episodes per person per year or 26,949,457 ADI episodes per year. The magnitude reflects the burden of disease of the illness in the population. Although young adults and teenagers had the highest incidence, children under five suffered more in terms of severity of the illness. Young adults are the productive working population. Female adults are also usually the caretakers of young children in the family. Therefore priority must be given towards efforts of prevention and management of ADI among this group of sub-population. Although it is impossible to totally prevent the illness from occurring in a heterogeneous and dynamic population, efforts must still undertaken to reduce its incidence further comparable to countries with low rates in the population. A sizeable proportion of ADI can be attributed to food poisoning. In this context, there is vast room for preventing food poisoning since it is largely related to the standards of hygiene food handlers practice. Based on our study, there is still gross underreporting of ADI in the population.

Only about 43% of estimated population sought care for their ADI. Private clinics were the preferred choice of facility where almost 50% of those with ADI first sought care. About a quarter of the persons with ADI self-medicated for their illness. Although majority of the affected population did not seek treatment for the illness, the burden of the illness in the community is reflected by the estimated

population taking time off within the two weeks period. The impact of ADI was found to be substantial, with 25.6% taking time off from work, school or carrying out normal daily activities. A great proportion (32.1 to 42.5%) of the productive age groups (10 - 49 years old) with ADI experienced limitation of activities. Therefore, efforts must be undertaken by the relevant authorities to reduce the incidence of ADI, indirectly reducing the socio-economic and functional loss of daily activities in the Malaysian population.

8. RECOMMENDATIONS

8.1 The following areas for research are recommended

8.1.1 To study the burden of mortality of ADI in the population

8.1.2 To determine the risk factors of ADI in the population

8.1.3 To conduct further studies to identify the etiology of ADI in the population

8.1.4 To determine the magnitude of hospitalisation or in-patient care as a result of ADI in the population

8.1.5 To asses the impact of the availability of different health care systems on health-seeking behaviour

8.1.6 To study the reasons of choosing specific health facilities for ADI

8.1.7 To further study on the implications of not seeking care for ADI

8.1.8 To study the factors associated with health seeking behaviour in children with ADI

8.1.9 To assess knowledge and practices of management of ADI especially among the under fives

8.2 The following actions are recommended

8.2.1 To evaluate current programs or activities implemented by the Ministry of Health in relation to the prevention and management of ADI in the community

8.2.2 To determine new strategies that can be implemented to effectively reduce the incidence of ADI in the population

8.2.3 To develop a policy for the provision of informed decision and action in relation to home management of ADI

8.2.4 To strengthen the current surveillance system including notification of ADI in the population

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APPENDIX

APPENDIX

Table 1: Distribution of the respondents and non-respondents in the sample population by socio-demographic

Category	Respondents	(%)	Non-respondents	(%)
Total	55,748	98.3	962	1.7
Age Group				
0 - 4 yrs	5,912	10.6	83	8.7
5 - 9 yrs	6,629	11.9	88	9.3
10 –19 yrs	10,900	19.6	232	24.4
20 - 29 yrs	7,497	13.5	125	13.1
30 – 39 yrs	7,136	12.8	94	9.9
40 – 49 yrs	7,325	13.2	97	10.2
50 - 59 yrs	4,810	8.6	144	15.1
60 & above	5,510	9.9	88	9.3
Sex				
Male	26,245	47.1	464	48.2
Female	29,503	52.9	498	51.8
Ethnic group				
Malay	31,986	57.4	508	52.8
Chinese	10,059	18.0	192	20.0
Indian	4,333	7.8	82	8.5
Other Bumis	6,954	12.5	138	14.4
Other	2,416	4.3	42	4.4
Religion				
Islam	37,631	67.5	596	62.0
Christian	5,083	9.1	65	6.8
Buddha	8,590	15.4	186	19.3
Hindu	3,584	6.4	62	6.4
Others	802	1.4	22	2.3
Unclassified	58	0.1	31	3.2

Table 1: Distribution of the respondents and non-respondents in the sample population by socio-demographic characteristics (continue)

Category	Respondents	(%)	Non-respondents	(%)
Nationality				
Malaysian	52,953	95.3	894	92.9
Non-Malaysian	2,762	4.7	35	3.7
Unclassified	33	0.1	33	3.4
Educational Level				
None	11,026	23.4	218	29.8
Primary	14,818	31.4	253	34.6
Secondary	18,008	38.2	34	4.6
Tertiary	3,344	7.1	227	31.0
Marital Status				
Not Married	12,303	31.4	254	35.1
Married	24,206	61.7	361	49.9
Divorced	738	1.9	42	5.8
Widow/ Widower	153	0.4	51	7.1
Unclassified	1,844	4.7	15	2.1
Occupation				
Senior Official & Manager	640	1.6	7	1.0
Professionals	2,253	5.7	27	3.7
Technical & Associate	2,638	6.7	32	4.4
Clerical Workers	1,835	4.7	14	1.9
Service Workers & Shop	5,644	14.4	75	10.4
Skilled Agricultural & Fishery	2,673	6.8	27	3.7
Craft & Related Trade Workers	2,013	5.1	33	4.6
Plant & Machine Operator & Assembler	1,871	4.8	26	3.6
Elementary Occupations	1,619	4.1	13	1.8
Housewife	8,035	20.5	115	15.9
Unemployed	3,870	9.9	119	16.5
Unclassified	6148	15.7	235	32.5

Table 1: Distribution of the respondents and non-respondents in the sample population by socio-demographic characteristics (continue)

Category	Respondents	(%)	Non-respondents	(%)
Household Income Group				
< 400	4,617	8.3	74	7.7
400 – 699	8,447	15.2	173	18.0
700 – 999	6,454	11.6	126	13.1
1000 – 1999	14,992	26.9	236	24.5
2000 – 2999	8,419	15.1	123	12.8
3000 – 3999	4,215	7.6	66	6.9
4000 – 4999	2,018	3.6	38	4.0
≥ 5000	4,508	8.1	65	6.8
Unclassified	2,078	3.7	61	6.3
State				
Perlis	516	0.9	1	0.1
Kedah	4,201	7.5	31	3.2
Penang	2,959	5.3	108	11.2
Perak	4,107	7.4	150	15.6
W.P.Kuala Lumpur	2,935	5.3	27	2.8
Selangor	9,352	16.8	135	14.0
Melaka	1,382	2.5	7	0.7
Negeri Sembilan	2,041	3.7	31	3.2
Johor	6,179	11.1	99	10.3
Pahang	2,922	5.2	47	4.9
Terengganu	2,523	4.5	14	1.5
Kelantan	3,754	6.7	50	5.2
Sarawak	4,820	8.7	146	15.2
W.P. Labuan	906	1.6	8	0.8
Sabah	7,151	12.8	108	11.2
Locality				
Urban	32,212	57.8	522	54.3
Rural	23,536	42.2	440	45.7

Table 2: Incidence of acute diarrhoea by socio-demography and locality

Category	Incidence (%)	95 % CI		n	N
		Lower	Upper		
Overall	5.0	4.8	5.2	2,799	1,036,518
Age Group (years)					
0 -4	4.5	3.9	5.1	268	97,375
5 – 9	3.4	2.9	4.0	222	82,662
10 – 19	6.3	5.8	6.8	685	253,840
20 – 29	6.7	6.1	7.3	503	188,260
30 – 39	5.2	4.7	5.8	369	138,440
40 - 49	4.4	4.0	4.9	328	120,921
50 – 59	3.9	3.4	4.5	219	80,945
60 above	4.1	3.6	4.8	203	73,328
Sex					
Male	5.0	4.7	5.3	1,325	490,070
Female	5.0	4.7	5.3	1,474	546,447
Ethnic group					
Malay	5.4	5.1	5.8	1,729	641,911
Chinese	3.6	3.2	4.0	363	144,515
Indian	5.1	4.3	5.9	221	87,564
Other Bumis	5.8	5.2	6.6	406	135,062
Others	3.2	2.5	4.0	80	27,463
Non Malaysians	3.4	2.7	4.2	96	32,846
Educational Level					
None	4.1	3.7	4.5	445	164,109
Primary	4.8	4.5	5.2	726	264,606
Secondary	5.8	5.5	6.2	1,055	394,348
Tertiary	6.4	5.5	7.3	214	83,851
Nationality					
Malaysia	5.1	4.9	5.3	2,701	1,002,886
Non-Malaysia	4.2	3.4	2.8	96	32,846
Unclassified	1.9	6.2	1.6	2	786

Table 2: Incidence of acute diarrhoea by socio-demography and locality (continue)

Category	Incidence (%)	95 % CI		n	N
		Lower	Upper		
Household Income Group					
Less than RM400	5.5	4.8	6.3	249	87,966
RM 400 – RM 699	5.3	4.8	5.9	443	1,554,966
RM 700 – RM 999	4.7	4.1	5.3	302	108,802
RM 1000 – RM 1999	5.0	4.6	5.4	756	278,591
RM 2000 – RM 2999	5.0	4.5	5.6	426	161,353
RM 3000 – RM 3999	4.9	4.2	5.6	206	80,804
RM 4000 – RM 4999	4.9	3.9	6.1	97	38,596
RM 5000 & above	5.1	4.4	5.9	232	92,186
Unclassified	4.2	3.4	5.3	88	33,250
State					
Perils	5.6	4.2	7.7	30	10,639
Kedah	6.8	6.0	7.6	284	101,656
Penang	3.8	3.1	4.7	115	40,162
Perak	2.3	1.8	2.9	97	39,371
W.P Kuala Lumpur	3.5	2.8	4.4	102	40,146
Selangor	6.1	5.5	6.7	570	232,910
Melaka	5.7	4.3	7.6	76	32,397
Negeri Sembilan	6.3	5.1	7.7	128	46,700
Johor	4.8	4.2	5.5	301	114,206
Pahang	6.4	5.3	7.6	185	71,201
Terengganu	4.3	3.5	5.5	107	37,256
Kelantan	4.6	3.9	5.3	170	56,569
Sarawak	5.6	4.8	6.5	277	104,335
W.P Labuan	3.7	2.5	5.5	34	10,491
Sabah	4.5	4.0	5.1	323	98,472
Locality					
Urban	4.7	4.5	5.0	1,518	621,701
Rural	5.5	5.1	5.8	1,281	414,815

Table 3: Mean duration of acute diarrhoea by socio-demography and location

Category	Mean Duration	95 % CI	
		Lower	Upper
Overall	2.0	1.9	2.1
Age Group			
0 - 4 yrs	2.7	2.4	2.9
5 – 9 yrs	2.1	1.9	2.4
10 – 19 yrs	2.0	1.9	2.1
20 – 29 yrs	1.9	1.8	2.0
30 - 39 yrs	1.8	1.7	2.0
40– 49 yrs	1.8	1.6	1.9
50 – 59 yrs	2.1	1.9	2.2
61 & above	2.0	1.8	2.1
Sex			
Male	2.0	1.9	2.0
Female	2.1	2.0	2.1
Ethnicity			
Malay	2.0	1.9	2.1
Chinese	1.8	1.7	1.9
Indian	2.1	2.0	2.3
Other Bumis	2.2	2.0	2.4
Others	2.5	2.1	2.8
Educational Level			
None	2.1	1.9	2.2
Primary	2.0	1.9	2.1
Secondary	1.9	1.8	2.0
Tertiary	1.6	1.5	1.7

Table 3: Mean duration of acute diarrhoea by socio-demography and location (continue)

Category	Mean Duration	95 % CI	
		Lower	Upper
Household Income			
Less than RM 400	2.1	2.0	2.3
RM 400 – RM 699	2.1	2.0	2.3
RM 700 – RM 999	2.3	2.1	2.5
RM 1000 – RM 1999	2.0	1.9	2.0
RM 2000 – RM 2999	2.0	1.9	2.2
RM 3000 – RM 3999	1.8	1.6	1.9
RM 4000 – RM 4999	1.9	1.6	2.2
RM 5000 & above	1.8	1.6	1.9
Unclassified	2.3	2.0	2.6
Locality			
Urban	2.0	1.9	2.0
Rural	2.1	2.0	2.2

Table 4: Fever by socio-demography and locality

Category	Proportion (%)	95 % CI		n	N
		Lower	Upper		
Overall	15.9	14.4	17.5	445	163,256
Age groups					
0 - 4 yrs	37.1	31.0	43.5	993	5,815
5 – 9 yrs	25.5	19.6	32.4	57	20,761
10 – 11 yrs	14.3	11.7	17.3	96	35,897
20 – 29 yrs	9.9	7.4	13.1	50	18,565
30 – 39 yrs	11.5	8.5	15.3	42	15,858
40-49 yrs	10.4	7.5	14.3	35	12,485
50-59 yrs	14.8	10.6	20.3	32	11,832
61 & above	15.6	11.1	21.6	32	11,303
Gender					
Male	14.9	13.0	17.1	199	72,594
Female	16.7	14.8	18.9	246	90,662
Educational Level					
None	19.4	15.8	23.6	86	31,519
Primary	15.5	12.9	18.6	112	40,595
Secondary	10.4	8.6	12.6	109	40,850
Tertiary	8.1	5.1	12.7	17	6,774
Ethnicity					
Malay	13.8	12.0	15.8	239	87,559
Chinese	16.9	13.2	21.4	60	24,056
Indian	20.5	15.0	27.5	45	17,988
Other Bumis	21.5	17.5	26.2	87	29,008
Others	16.9	9.9	27.4	41	4,643

Table 4: Fever by socio-demography and locality (continue)

Category	Proportion (%)	95 % CI		n	N
		Lower	Upper		
Household Income					
Less than RM 400	20.3	15.6	26.0	50	17,866
RM 400 – RM 699	17.2	13.6	21.6	76	26,453
RM 700 – RM 999	16.6	12.0	22.5	51	17,964
RM 1000 – RM 1999	14.4	11.9	17.4	110	40,058
RM 2000 – RM 2999	17.2	13.4	21.7	72	27,275
RM 3000 – RM 3999	12.5	8.5	18.0	26	9,963
RM 4000 – RM 4999	12.7	7.2	21.2	13	4,839
RM 5000 & above	14.2	10.2	19.5	32	13,024
Unclassified	17.6	10.6	27.8	15	5,809
Locality					
Urban	14.5	12.6	16.6	218	89,669
Rural	17.9	15.6	20.5	227	7,358

Table 5: Vomiting by socio-demography and locality

Category	Proportion (%)	95 % CI		n	N
		Lower	Upper		
Overall	16.0	14.6	17.5	440	164,696
Age groups					
0 - 4 yrs	30.4	24.9	36.5	82	29,332
5 – 9 yrs	33.6	27.3	40.6	73	27,490
10 – 19 yrs	15.3	12.7	18.4	101	38,630
20 – 29 yrs	12.6	9.9	15.9	62	23,605
30 – 39 yrs	9.8	7.1	13.3	35	13,539
40 – 49 yrs	7.4	4.9	11.0	24	8,850
50 - 59 yrs	16.4	11.9	22.1	35	13,065
60 & above	13.6	9.4	19.1	47	9,837
Gender					
Male	13.1	11.3	15.2	171	63,828
Female	18.6	16.6	20.7	269	868
Ethnicity					
Malay	15.6	13.8	17.5	264	99,093
Chinese	13.1	9.9	17.2	46	18,703
Indian	25.0	18.8	30.0	53	20,986
Other Bumis	16.1	12.5	20.5	65	21,625
Others	15.6	8.9	25.8	12	4,287
Educational Level					
None	22.5	18.6	26.9	96	36,649
Primary	13.1	10.7	15.8	93	34,197
Secondary	11.1	9.3	13.2	114	43,542
Tertiary	11.7	8.0	16.9	24	9,810

Table 5: Vomiting by socio-demography and locality (continue)

Category	Proportion (%)	95 % CI		n	N
		Lower	Upper		
Household Income					
Less than RM 400	13.5	9.5	18.9	34	11,913
RM 400 – RM 699	15.8	12.5	19.7	68	24,255
RM 700 – RM 999	16.0	11.6	21.7	47	17,384
RM 1000 – RM 1999	17.7	14.9	20.9	132	49,120
RM 2000 – RM 2999	17.4	13.9	21.6	73	27,711
RM 3000 – RM 3999	14.8	10.4	20.8	29	11,758
RM 4000 – RM 4999	10.0	5.6	17.2	10	3,802
RM 5000 & above	15.5	11.0	21.3	35	14,290
Unclassified	13.4	7.5	22.9	12	4,458
Locality					
Urban	17.1	15.3	19.2	258	10,5882
Rural	14.3	12.3	16.6	182	58,814

Table 6: Stomach cramps by socio-demography and locality

Category	Proportion (%)	95 % CI		n	N
		Lower	Upper		
Overall	45.8	43.8	47.9	1283	470,773
Age groups					
0 - 4 yrs	31.4	25.8	37.6	84	29,706
5 – 9 yrs	46.8	39.7	54.1	103	38,284
10 – 19 yrs	54.2	50.2	58.1	371	136,098
20 – 29 yrs	44.9	40.5	49.3	227	84,324
30 – 39 yrs	43.3	38.2	48.5	159	59,779
50 - 59 yrs	43.0	37.5	48.6	141	51,430
40 – 49 yrs	45.1	38.4	52.0	99	35,981
60 & above	47.7	41.1	54.5	98	34,824
Gender					
Male	41.7	38.9	44.5	551	202,325
Female	49.5	46.8	52.3	732	268,449
Ethnicity					
Malay	45.2	42.7	47.8	782	287,917
Chinese	41.7	36.5	47.1	150	58,282
Indian	51.8	45.2	58.3	114	44,918
Other Bumis	48.3	42.6	54.0	197	64,720
Others	50.8	40.3	61.1	40	13,937
Educational Level					
None	50.3	45.4	55.2	224	81,982
Primary	48.7	44.9	52.5	355	127,378
Secondary	46.5	43.3	49.7	490	182,172
Tertiary	42.3	35.6	49.2	89	35,134

Table 6: Stomach cramps by socio-demography and locality (continue)

Category	Proportion (%)	95 % CI		n	N
		Lower	Upper		
Household Income					
Less than RM 400	52.9	46.2	59.5	132	46,513
RM 400 – RM 699	50.8	45.7	55.9	225	77,861
RM 700 – RM 999	43.2	37.3	49.3	130	46,953
RM 1000 – RM 1999	42.7	39.0	46.5	324	17,950
RM 2000 – RM 2999	45.2	40.1	50.4	189	71,670
RM 3000 – RM 3999	47.5	40.3	54.8	97	37,433
RM 4000 – RM 4999	46.1	37.1	55.5	45	17,628
RM 5000 & above	42.5	35.9	49.5	100	39,218
Unclassified	47.2	37.1	57.6	41	15,547
Locality					
Urban	44.3	41.6	47.1	670	272,949
Rural	48.2	45.1	51.2	613	197,824

Table 7: Blood in the stools by socio-demography and locality

Category	Proportion (%)	95 % CI		n	N
		Lower	Upper		
Overall	3.5	2.9	4.3	98	36,059
Age Group					
0 - 4 yrs	5.3	3.2	8.8	14	5,095
5 – 9 yrs	2.1	0.9	5.0	5	1,690
10 – 19 yrs	2.7	1.7	4.3	17	6,767
20 – 29 yrs	4.2	2.7	6.4	22	7,799
30 – 39 yrs	3.3	1.9	5.8	12	4,560
40 – 49 yrs	3.8	2.2	6.6	12	4,540
50 - 59 yrs	2.8	1.2	6.1	6	2,173
60 & above	4.8	2.6	6.9	10	3,435
Gender					
Male	3.9	3.0	5.2	52	19,002
Female	3.2	2.4	4.2	46	17,057
Ethnicity					
Malay	3.1	2.4	4.1	53	19,702
Chinese	3.1	1.7	5.4	11	4,350
Indian	6.0	3.7	9.7	14	5,283
Other Bumis	3.7	2.2	6.3	15	4,982
Others	6.5	2.7	14.7	5	1,742
Educational Level					
None	2.3	1.2	4.2	10	3,630
Primary	4.3	23.0	6.0	31	11,128
Secondary	3.3	2.4	4.5	34	12,749
Tertiary	3.0	1.4	6.4	6	2,486

Table 7: Blood in the stools by socio-demography and locality (continue)

Category	Proportion (%)	95 % CI		n	N
		Lower	Upper		
Household Income					
Less than RM 400	4.3	2.2	8.3	11	3,766
RM 400 – RM 699	3.5	2.2	5.6	16	5,359
RM 700 – RM 999	5.6	3.4	9.1	15	6,064
RM 1000 – RM 1999	3.3	2.3	4.9	25	9,189
RM 2000 – RM 2999	2.8	1.6	4.8	12	4,359
RM 3000 – RM 3999	4.1	1.9	8.7	8	3,193
RM 4000 – RM 4999	0.9	0.1	6.0	1	3,48
RM 5000 & above	2.5	1.2	5.5	6	2,335
Unclassified	4.5	1.6	11.5	4	1,465
Locality					
Urban	3.7	2.9	4.8	56	22,818
Rural	3.3	2.4	4.4	42	13,241

Table 8: Percentage of respondents who had sought care for acute diarrhoea illness by socio-demographic characteristics

Socio-demography characteristics	Total Percentage			Total	
	%	95 % CI		n	N
		Lower	Upper		
Overall	43.3	41.3	45.4	1,190	442,992
Age Group					
0 - 4 yrs	67.7	61.5	73.4	177	64,894
5 – 9 yrs	56.5	48.6	64.1	121	45,828
10 – 19 yrs	30.7	27.2	34.3	206	77,086
20 – 29 yrs	41.0	36.6	45.6	204	77,049
30 – 39 yrs	42.7	37.6	48.0	153	57,925
40 – 49 yrs	42.3	36.8	47.9	136	49,929
50 - 59 yrs	41.7	34.9	48.9	89	32,905
60 & above	50.8	43.5	58.0	104	37,377
Gender					
Male	49.3	44.2	49.3	585	216,190
Female	36.7	33.1	40.5	605	226,802
Ethnicity					
Malay	41.4	38.9	44.0	705	262,693
Chinese	42.0	36.7	47.6	147	59,409
Indian	54.0	47.3	60.6	117	46,893
Other Bumis	46.8	41.2	52.6	188	62,539
Others	42.4	31.8	53.7	33	11,458

Table 8: Percentage of respondents who had sought care for acute diarrhoea illness by sosio-demographic characteristics (continue)

Socio-demography characteristics	Total Percentage			Total	
	%	95% CI		n	N
		Lower	Upper		
Educational Level					
None	49.3	44.2	49.3	212	79,376
Primary	36.7	33.1	40.5	264	95,999
Secondary	37.8	34.7	40.9	392	147,096
Tertiary	44.6	37.8	51.5	93	36,512
Monthly Household Income Group					
Less than RM 400	46.9	40.4	53.5	116	41,133
RM 400 - RM 699	41.3	36.3	46.4	180	63,106
RM 700 - RM 999	44.2	37.6	51.0	131	47,556
RM 1000 - RM 1999	43.1	39.3	47.0	317	118,684
RM 2000 - RM 2999	44.4	39.1	49.9	186	70,253
RM 3000 - RM 3999	42.9	35.6	50.5	87	34,164
RM 4000 - RM 4999	38.7	30.0	48.1	37	14,655
RM 5000 & above	43.6	37.2	50.1	99	14,655
Unclassified	42.7	32.8	53.2	37	14,014

Table 8: Percentage of respondents who had sought care for acute diarrhoea illness by sosio-demographic characteristics (continue)

Socio-demography characteristics	Total Percentage			Total	
	%	95% CI		n	N
		Lower	Upper		
Location					
Urban	44.3	41.6	47.1	662	271,665
Rural	41.8	38.9	44.8	528	171,327
State					
Johor	49.1	42.9	55.3	143	55,432
Kedah	45.5	39.6	51.7	128	45,783
Kelantan	32.9	25.7	40.9	55	18,270
Melaka	49.8	39.0	60.6	35	15,399
N. Sembilan	43.0	35.6	50.7	54	19,730
Pahang	34.2	27.0	42.3	64	24,369
Penang	47.5	37.6	57.7	54	18,918
Perak	45.4	34.8	56.4	43	17,493
Perlis	26.4	14.2	43.7	8	2,804
Selangor	43.9	39.7	48.3	246	100,830
Terengganu	41.9	29.7	55.1	43	15,343
Sabah	41.2	35.1	47.6	132	40,213
Sarawak	42.5	36.0	49.1	118	43,512
W.P. Kuala Lumpur	49.5	39.2	59.9	50	19,679
W.P. Labuan	49.7	33.9	65.6	17	5,215

Table 9: Overall percentage of place first sought care for acute diarrhoeal illness

Place first sought care	%	95% CI		n	N
		Upper	Lower		
Government General Hospital	4.4	3.3	5.8	49	18,631
Government District Hospital	9.0	7.4	11.1	110	38,658
Government Health Clinic	20.9	18.4	23.7	248	89,408
Government Mobile Clinic	0.6	0.2	1.6	7	2,622
University Hospital	0.3	0.1	0.9	3	1,261
Army Hospital	0.6	0.3	1.3	7	2,497
Private Hospital	2.1	1.4	3.3	23	9,128
Private Clinic	41.9	38.6	45.2	465	179,093
Estate Hospital	0.1	<0.1	0.5	1	290
Estate Clinic	0.7	0.3	1.5	10	3,055
Traditional practitioner	0.7	0.4	1.4	9	3,025
Pharmacy/Chinese medicine shop	16.7	14.5	19.1	194	71,362
NGO clinics	0.2	<0.1	0.6	2	662
Religious leaders/spiritual healers	0.1	<0.1	0.6	1	361
Drug sellers	1.0	0.6	1.9	12	4,429
Direct selling	0.2	0.1	0.8	2	860
Village midwife	0.1	<0.1	0.6	1	361
Village headmen/friend/relative	0.4	0.1	1.5	5	1,757
Others	0.1	<0.1	0.7	1	446
Total	100.0	100.0	100.0	1150	427,905

Table 10: Percentage of respondents and place first sought care for acute diarrhoea illness by age groups

Socio-demography characteristics	Age Groups									
	0-4					5-9				
	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper		
Government General Hospital	5.5	2.8	10.5	10	3,499	2.9	1.0	8.3	3	1,280
Government District Hospital	12.9	8.3	19.6	24	8,194	8.8	4.9	15.5	11	3,893
Government Health Clinic	26.4	19.8	34.2	46	16,699	25.5	18.1	34.7	31	11,271
Government Mobile Clinic	.	.	.	.	.	1.6	0.4	6.5	2	718
University Hospital	.	.	.	.	.	.	.	.	.	.
Army Hospital	1.4	0.3	5.9	3	908	.	.	.	.	.
Private Hospital	2.7	1.0	7.0	4	1,708	2.8	0.9	8.2	3	1,216
Private Clinic	47.6	39.7	55.6	80	30,128	51.3	41.2	61.3	58	22,635
Estate Hospital	.	.	.	.	.	.	.	.	.	.
Estate Clinic	1.0	0.2	3.8	2	617	0.7	0.1	4.6	1	292
Traditional Practitioner	.	.	.	.	.	0.8	0.1	5.1	1	335
Pharmacy/Chinese Medicine Shop	1.9	0.6	5.8	3	1,206	4.1	1.7	9.6	5	1,821
NGO Clinics	.	.	.	.	.	.	.	.	.	.
Religious Leaders/ Spiritual Healers	.	.	.	.	.	.	.	.	.	.
Drug Sellers	.	.	.	.	.	.	.	.	.	.
Direct Selling	.	.	.	.	.	.	.	.	.	.
Village Midwife	0.6	0.1	3.9	1	361	.	.	.	.	.
Village Headmen/ Friend/Relative	.	.	.	.	.	1.6	0.2	10.2	2	696
Others	.	.	.	.	.	.	.	.	.	.

Table 10: Percentage of respondents and place first sought care for acute diarrhoea illness by age groups (continue)

Socio-demography characteristics	Age Groups									
	10-19					20-29				
	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper		
Government General Hospital	2.4	0.9	6.4	5	1,820	4.4	2.2	8.6	8	3,303
Government District Hospital	9.8	6.4	14.5	21	7,327	4.8	2.5	8.9	9	3,573
Government Health Clinic	27.3	21.3	34.1	56	20,481	10.6	7.0	15.7	23	7,951
Government Mobile Clinic	1.0	0.3	4.1	2	774	.	.	.	.	.
University Hospital	.	.	.	.	.	1.1	0.3	4.3	2	827
Army Hospital	.	.	.	.	.	0.6	0.1	3.9	1	426
Private Hospital	2.2	0.8	5.7	4	1,641	1.3	0.4	4.1	3	1,010
Private Clinic	35.8	29.3	42.9	69	26,901	50.3	43.1	57.5	97	37,671
Estate Hospital	.	.	.	.	.	0.4	0.1	2.7	1	290
Estate Clinic	0.8	0.2	3.1	2	585	0.8	0.2	3.0	2	582
Traditional Practitioner	.	.	.	.	.	1.0	0.2	3.8	2	724
Pharmacy/Chinese Medicine Shop	16.8	12.2	22.6	34	12,596	23.8	18.2	30.5	48	17,848
NGO Clinics	.	.	.	.	.	0.4	0.1	2.7	1	292
Religious Leaders/ Spiritual Healers	0.5	0.1	3.3	1	361	.	.	.	.	.
Drug Sellers	2.0	0.7	5.3	4	1,497	.	.	.	.	.
Direct Selling	0.6	0.1	4.0	1	434	0.6	0.1	3.9	1	426
Village Midwife	.	.	.	.	.	.	.	.	.	.
Village Headmen/ Friend/Relative	1.0	0.2	3.8	2	727	.	.	.	.	.
Others	.	.	.	.	.	.	.	.	.	.

Table 10: Percentage of respondents and place first sought care for acute diarrhoea illness by age groups (continue)

Socio-demography characteristics	Age Groups									
	30-39					40-49				
	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper		
Government General Hospital	2.2	0.7	6.6	3	1,208	7.8	4.2	13.9	10	3,595
Government District Hospital	7.8	4.5	13.3	12	4,275	5.2	2.5	10.7	77	2,418
Government Health Clinic	14.1	9.3	20.8	21	7,738	16.9	11.4	24.4	22	7,814
Government Mobile Clinic	1.4	0.4	5.6	2	782	.	.	.	.	.
University Hospital	.	.	.	.	.	.	.	.	.	.
Army Hospital	2.1	0.7	6.4	3	1,164	.	.	.	.	.
Private Hospital	2.2	0.7	6.7	3	1,229	1.6	0.4	6.3	2	748
Private Clinic	45.2	37.0	53.6	64	24,784	36.6	28.8	45.3	44	16,940
Estate Hospital	.	.	.	.	.	.	.	.	.	.
Estate Clinic	0.6	0.1	4.4	1	354	0.6	0.1	4.3	4	290
Traditional Practitioner	.	.	.	.	.	.	.	.	.	.
Pharmacy/Chinese Medicine Shop	22.1	16.1	29.6	33	12,140	27.3	20.1	35.8	35	12,604
NGO Clinics	.	.	.	.	.	0.8	0.1	5.4	1	370
Religious Leaders/ Spiritual Healers	.	.	.	.	.	.	.	.	.	.
Drug Sellers	1.5	0.4	5.8	2	813	2.2	0.7	6.5	3	999
Direct Selling	.	.	.	.	.	.	.	.	.	.
Village Midwife	.	.	.	.	.	.	.	.	.	.
Village Headmen/ Friend/Relative	0.6	0.1	4.2	1	335	.	.	.	.	.
Others	.	.	.	.	.	1.0	0.1	6.5	1	446

Table 10: Percentage of respondents and place first sought care for acute diarrhoea illness by age groups (continue)

Socio-demography characteristics	Age Groups									
	50-59					60 & above				
	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper		
Government General Hospital	6.6	3.0	14.1	6	2,209	4.8	1.8	12.1	4	1,719
Government District Hospital	12.0	6.3	21.7	11	4,002	13.8	8.6	21.6	15	4,977
Government Health Clinic	28.3	19.8	38.7	26	9,445	22.3	14.6	32.4	23	8,008
Government Mobile Clinic	1.0	0.1	6.9	1	348	.	.	.	.	.
University Hospital	1.3	0.2	8.7	1	434	.	.	.	.	.
Army Hospital	.	.	.	.	.	.	.	.	.	.
Private Hospital	2.1	0.5	8.3	2	716	2.4	0.6	9.1	2	860
Private Clinic	27.9	18.9	39.1	24	9,307	29.8	21.3	40.0	29	10,727
Estate Hospital	.	.	.	.	.	.	.	.	.	.
Estate Clinic	1.0	0.1	6.7	1	335	.	.	.	.	.
Traditional Practitioner	1.0	0.1	6.6	1	323	4.6	1.9	10.5	5	1,644
Pharmacy/Chinese Medicine Shop	17.8	11.0	27.4	16	5,926	20.1	13.3	29.2	20	7,221
NGO Clinics	.	.	.	.	.	.	.	.	.	.
Religious Leaders/ Spiritual Healers	.	.	.	.	.	.	.	.	.	.
Drug Sellers	1.0	0.1	6.6	1	323	2.2	0.5	8.7	2	797
Direct Selling	.	.	.	.	.	.	.	.	.	.
Village Midwife	.	.	.	.	.	.	.	.	.	.
Village Headmen/ Friend/Relative	.	.	.	.	.	.	.	.	.	.
Others	.	.	.	.	.	.	.	.	.	.

Table 11: Percentage of respondents and place first sought care for acute diarrhoea illness by gender

Socio-demography characteristics	Gender									
	Male					Female				
	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper		
Government General Hospital	4.2	2.8	6.3	23	8,623	4.5	3.1	6.6	26	10,008
Government District Hospital	10.0	7.7	10.0	60	20,784	8.1	6.1	10.6	50	17,875
Government Health Clinic	19.3	16.1	23.0	111	39,983	22.4	18.9	26.3	137	49,425
Government Mobile Clinic	0.5	0.2	1.6	3	1,066	0.7	0.2	2.2	4	1,556
University Hospital	0.6	0.2	1.9	3	1,261	.	.	.	.	.
Army Hospital	0.9	0.3	2.3	5	1,805	0.3	0.1	1.3	2	693
Private Hospital	2.0	1.1	3.7	11	4,218	2.2	1.2	4.1	12	4,910
Private Clinic	40.3	35.9	44.9	217	83,472	43.3	39.0	47.7	248	95,621
Estate Hospital	0.1	0.0	1.0	1	290	.	.	.	.	.
Estate Clinic	1.0	0.4	2.4	7	2,140	0.4	0.1	1.7	3	914
Traditional Practitioner	0.5	0.2	1.6	3	1,069	0.9	0.4	2.0	6	1,956
Pharmacy/Chinese Medicine Shop	17.7	14.6	21.2	100	36,553	15.8	12.9	19.1	94	34,809
NGO Clinics	0.3	0.1	1.3	2	662	.	.	.	.	.
Religious Leaders/Spiritual Healers	0.2	<0.1	1.2	1	361	.	.	.	.	.
Drug Sellers	1.5	0.8	3.1	9	3,205	0.6	0.2	1.7	3	1,224
Direct Selling	0.2	<0.1	1.5	1	434	0.2	<0.1	1.4	1	426
Village Midwife	0.2	<0.1	1.2	1	361	.	.	.	.	.
Village Headmen/Friend/Relative	0.3	0.1	1.3	2	683	0.5	0.1	2.0	3	1,075
Others	.	.	.	.	.	0.2	<0.1	1.4	1	446

Table 12: Percentage of respondents and place first sought care for acute diarrhoea illness by ethnicity

Socio-demography characteristics	Ethnicity													
	Malays					Chinese				Indian				
	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper				Lower	Upper		
Government General Hospital	4.4	3.0	6.3	29	11,055	2.9	1.1	7.5	4	1,687	4.8	2.0	11.2	5	2,144
Govt. District Hospital	7.9	5.9	10.4	54	19,807	2.6	1.0	6.8	4	1,538	10.3	5.8	17.6	11	4,565
Government Health Clinic	21.5	18.2	25.1	147	54,053	4.9	2.3	10.3	8	2,893	21.5	14.3	30.9	24	9,551
Government Mobile Clinic	0.8	0.2	2.4	5	1,896	.	.	.	.	.	1.0	0.1	6.5	1	434
University Hospital	0.3	0.1	1.4	2	868	0.7	0.1	4.6	1	394	.	.	.	.	.
Army Hospital	0.8	0.3	2.0	6	2,051	.	.	.	.	.	.	.	.	.	.
Private Hospital	2.1	1.2	3.7	13	5,255	4.1	1.6	9.9	6	2,405	0.9	0.1	6.0	1	394
Private Clinic	42.3	38.2	46.5	280	106,512	57.2	48.5	65.5	83	33,795	53.2	42.9	63.1	59	23,656
Estate Hospital	0.1	<0.1	0.8	1	290	.	.	.	.	.	.	.	.	.	.
Estate Clinic	0.6	0.2	1.7	5	1,494	.	.	.	.	.	2.1	0.5	8.2	3	914
Traditional Practitioner	1.0	0.5	2.0	7	2,409	.	.	.	.	.	.	.	.	.	.
Pharmacy/Chinese Medicine Shop	16.3	13.5	19.4	113	40,957	25.6	18.9	33.7	37	15,126	6.4	3.1	12.8	7	2,841
NGO Clinics	0.1	<0.1	1.0	1	370	.	.	.	.	.	.	.	.	.	.
Religious Leaders/ Spiritual Healers	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Drug Sellers	1.4	0.7	2.8	10	3,641	0.6	0.1	4.1	1	354	.	.	.	.	.
Direct Selling	.	.	.	.	.	1.5	0.4	5.7	2	860	.	.	.	.	.
Village Midwife	0.1	<0.1	1.0	1	361	.	.	.	.	.	.	.	.	.	.
Village Headmen/ Friend /Relative	0.3	0.1	1.1	2	713	.	.	.	.	.	.	.	.	.	.
Others	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Table 12: Percentage of respondents and place first sought care for acute diarrhoea illness by ethnicity (continue)

Socio-demography characteristics	Ethnicity									
	Other Bumis					Others				
	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper		
Government General Hospital	5.1	2.6	10.0	9	3,130	5.4	1.4	18.6	2	615
Government District Hospital	19.7	13.8	27.3	39	12,072	5.9	1.5	20.9	2	677
Government Health Clinic	35.8	27.7	44.7	66	21,880	9.0	2.8	25.1	3	1,031
Government Mobile Clinic	0.5	0.1	3.3	1	292	.	.	.	.	.
University Hospital	.	.	.	.	.	.	.	.	.	.
Army Hospital	0.7	0.1	5.0	1	446	.	.	.	.	.
Private Hospital	1.8	0.6	5.3	3	1,074	.	.	.	.	.
Private Clinic	16.7	11.5	23.6	29	10,202	43.0	26.5	61.2	14	4,928
Estate Hospital	.	.	.	.	.	.	.	.	.	.
Estate Clinic	0.5	0.1	3.3	1	292	3.1	0.4	19.0	1	354
Traditional Practitioner	0.5	0.1	3.3	1	292	2.8	0.4	16.8	1	323
Pharmacy/Chinese Medicine Shop	15.3	10.4	21.9	28	9,342	27.0	14.4	45.0	9	3,096
NGO Clinics	0.5	0.1	3.3	1	292	.	.	.	.	.
Religious Leaders/ Spiritual Healers	0.6	0.1	4.0	1	361	.	.	.	.	.
Drug Sellers	.	.	.	.	.	3.8	0.5	22.5	1	434
Direct Selling	.	.	.	.	.	.	.	.	.	.
Village Midwife	.	.	.	.	.	.	.	.	.	.
Village Headmen/ Friend /Relative	1.7	0.2	11.0	3	1,044	.	.	.	.	.
Others	0.7	0.1	5.0	1	446	.	.	.	.	.

Table 13: Percentage of respondents and place first sought care for acute diarrhoea illness by educational level

Socio-demography characteristics	Educational Level									
	None					Primary				
	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper		
Government General Hospital	3.0	1.4	6.6	6	2,344	5.0	2.8	8.6	12	4,504
Government District Hospital	13.8	9.5	19.5	30	10,633	8.9	5.9	13.1	23	8,000
Government Health Clinic	26.2	20.4	33.1	55	20,287	26.6	21.3	32.7	67	24,031
Government Mobile Clinic	1.9	0.5	6.6	4	1,492	0.9	0.2	3.4	2	782
University Hospital	.	.	.	.	.	.	.	.	.	.
Army Hospital	.	.	.	.	.	.	.	.	.	.
Private Hospital	2.0	0.8	5.4	4	1,578	2.2	0.9	5.2	5	2,002
Private Clinic	38.6	31.7	46.0	77	29,833	27.5	22.1	33.7	66	24,893
Estate Hospital	.	.	.	.	.	.	.	.	.	.
Estate Clinic	0.4	0.1	2.6	1	292	1.3	0.5	3.5	4	1,209
Traditional Practitioner	1.6	0.6	4.2	4	1,251	0.4	0.1	3.0	1	392
Pharmacy/Chinese Medicine Shop	10.5	7.0	15.5	22	8,109	23.5	18.6	29.4	59	21,264
NGO Clinics	.	.	.	.	.	.	.	.	.	.
Religious Leaders/ Spiritual Healers	.	.	.	.	.	0.4	0.1	2.8	1	361
Drug Sellers	0.4	0.1	2.9	1	323	2.9	1.3	6.4	7	2,591
Direct Selling	.	.	.	.	.	.	.	.	.	.
Village Headmen Friend/Relative	0.9	0.1	6.1	2	696	0.4	0.1	2.6	1	335
Others	0.6	0.1	3.9	1	446	.	.	.	.	.

Table 13: Percentage of respondents and place first sought care for acute diarrhoea illness by educational level (continue)

Socio-demography characteristics	Educational Level									
	Secondary					Tertiary				
	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper		
Government General Hospital	4.1	2.5	6.7	15	5,844	4.4	1.6	11.4	4	1,580
Government District Hospital	5.8	3.8	8.6	23	8,217	6.6	3.0	14.0	6	2,351
Government Health Clinic	12.9	9.9	16.6	52	18,383	13.4	7.9	21.8	13	4,772
Government Mobile Clinic	0.2	<0.1	1.7	1	348	.	.	.	.	.
University Hospital	.	.	.	.	.	3.5	1.1	10.4	3	1,261
Army Hospital	1.1	0.4	3.0	4	1,590	.	.	.	.	.
Private Hospital	1.9	0.9	4.0	7	2,736	0.9	0.1	6.2	1	322
Private Clinic	47.7	42.6	52.8	175	67,945	49.1	38.9	59.5	44	17,536
Estate Hospital	0.2	<0.1	1.4	1	290	.	.	.	.	.
Estate Clinic	0.7	0.2	2.0	3	936	.	.	.	.	.
Traditional Practitioner	0.7	0.2	2.3	3	1,047	.	.	.	.	.
Pharmacy/Chinese Medicine Shop	22.3	18.3	26.8	87	31,726	21.2	13.7	31.4	19	7,567
NGO Clinics	0.3	<0.1	1.8	1	370	0.8	0.1	5.6	1	292
Religious Leaders/ Spiritual Healers	.	.	.	.	.	.	.	.	.	.
Drug Sellers	1.1	0.4	2.8	4	1,515	.	.	.	.	.
Direct Selling	0.6	0.2	2.4	2	860	.	.	.	.	.
Village Headmen Friend/Relative	0.5	0.1	2.0	2	727	.	.	.	.	.
Others	.	.	.	.	.	.	.	.	.	.

Table 14: Percentage of respondents and place first sought care for acute diarrhoea illness by monthly household income group

Socio-demography characteristics	Monthly Household Income Group														
	Less than RM400					RM400 - RM699					RM700 - RM999				
	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper				Lower	Upper		
Government General Hospital	4.5	1.8	10.5	5	1,791	4.3	2.0	8.8	7	2,609	9.9	5.6	17.1	12	4,629
Government District Hospital	16.1	10.4	24.1	19	6,475	13.2	8.6	19.7	24	8,033	7.8	4.3	13.9	10	3,660
Government Health Clinic	31.1	22.4	41.3	35	12,475	35.2	27.9	43.2	62	21,408	24.3	17.0	33.5	31	11,352
Government Mobile Clinic	1.9	0.5	7.4	2	782	1.1	0.3	4.5	2	696	.	.	.	.	.
University Hospital	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Army Hospital	.	.	.	.	.	1.1	0.3	4.2	2	640	.	.	.	.	.
Private Hospital	1.1	0.1	7.2	1	426	.	.	.	.	.	2.5	0.8	7.3	3	1,144
Private Clinic	20.8	13.6	30.6	23	8,364	20.6	14.8	27.9	34	12,513	26.0	17.4	36.9	33	12,120
Estate Hospital	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Estate Clinic	1.6	0.4	6.0	2	627	1.5	0.5	4.7	3	939	1.2	0.3	4.9	2	582
Traditional Practitioner	3.2	1.2	8.3	4	1,287	2.3	0.9	6.0	4	1,404	.	.	.	.	.
Pharmacy/Chinese Medicine Shop	16.3	10.3	24.6	18	6,521	18.2	12.8	25.2	32	11,085	24.8	17.5	33.9	33	11,589
NGO Clinics	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Religious Leaders/ Spiritual Healers	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Drug Sellers	.	.	.	.	.	2.5	0.9	6.5	4	1,499	2.4	0.6	9.4	3	1,137
Direct Selling	.	.	.	.	.	.	.	.	.	.	0.9	0.1	6.3	1	434
Village Midwife	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Village Headmen/ Friend/Relative	3.4	0.7	14.7	4	1,378	.	.	.	.	.	.	.	.	.	.
Others	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Table 14: Percentage of respondents and place first sought care for acute diarrhoea illness by monthly household income group (continue)

Socio-demography characteristics	Monthly Household Income Group													
	RM1000 - RM1999					RM2000 - RM2999				RM3000 - RM3999				
	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper				Lower	Upper		
Government General Hospital	4.2	2.4	7.3	13	4,833	2.4	0.9	6.3	4	1,607	4.1	1.3	12.0	3	1,278
Government District Hospital	9.9	6.6	14.6	32	11,462	6.2	3.3	11.6	12	4,138	7.3	3.2	15.5	6	2,286
Government Health Clinic	16.8	12.7	21.7	53	19,391	17.9	12.0	25.8	33	11,875	15.3	8.6	25.8	12	4,808
Government Mobile Clinic	1.0	0.2	4.5	3	1,144	.	.	.	.	.	.	.	.	.	.
University Hospital	0.7	0.2	2.8	2	827	.	.	.	.	.	.	.	.	.	.
Army Hospital	0.9	0.3	2.8	3	1,041	0.7	0.1	4.6	1	446	1.2	0.2	7.9	.	370
Private Hospital	0.6	0.2	2.6	2	750	3.4	1.5	7.5	6	2,269	.	.	.	.	.
Private Clinic	44.8	38.7	51.1	135	51,855	51.0	42.6	59.4	88	33,857	65.8	54.4	75.7	53	20,667
Estate Hospital	0.3	<0.1	1.8	1	290	.	.	.	.	.	.	.	.	.	.
Estate Clinic	0.5	0.1	2.0	2	582	0.5	0.1	3.4	1	324	.	.	.	.	.
Traditional Practitioner	0.3	<0.1	2.0	1	335	.	.	.	.	.	.	.	.	.	.
Pharmacy Chinese Medicine Shop	18.4	14.4	23.3	57	21,319	15.6	10.6	22.3	27	10,336	6.3	2.6	14.5	5	1,987
NGO Clinics	.	.	.	.	.	0.6	0.1	3.8	1	370	.	.	.	.	.
Religious Leaders/ Spiritual Healers	0.3	<0.1	2.2	1	361	.	.	.	.	.	.	.	.	.	.
Drug Sellers	0.7	0.2	2.6	2	756	1.0	0.3	4.0	2	683	.	.	.	.	.
Direct Selling	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Village Midwife	0.3	<0.1	2.2	1	361	.	.	.	.	.	.	.	.	.	.
Village Headmen/ Friend/Relative	0.3	<0.1	2.3	1	379	.	.	.	.	.	.	.	.	.	.
Others	.	.	.	.	.	0.7	0.1	4.4	1	446	.	.	.	.	.

Table 14: Percentage of respondents and place first sought care for acute diarrhoea illness by monthly household income group (continue)

Socio-demography characteristics	Monthly Household Income Group														
	RM4000 - RM4999					RM5000 & above					Unclassified				
	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper				Lower	Upper		
Government General Hospital	.	.	.	.	.	2.9	0.9	8.4	3	1,103	5.7	1.5	19.9	2	782
Government District Hospital	5.0	1.3	17.6	2	726	3.2	1.0	9.6	3	1,252	4.6	1.2	16.3	2	627
Government Health Clinic	9.8	3.6	24.0	4	1,434	11.7	6.7	19.8	12	4,519	15.7	7.0	31.4	6	2,147
Government Mobile Clinic	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
University Hospital	.	.	.	.	.	.	.	.	.	.	3.2	0.4	19.4	1	434
Army Hospital	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Private Hospital	11.0	3.3	30.6	4	1,609	6.5	2.6	15.3	6	2,504	3.1	0.4	19.1	1	425
Private Clinic	11.0	3.3	11.0	23	9,370	30.6	51.6	72.0	60	24,038	46.2	30.2	63.0	16	6,308
Estate Hospital	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Estate Clinic	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Traditional Practitioner	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pharmacy/Chinese Medicine Shop	10.3	3.8	25.2	4	1,516	11.5	6.4	19.8	11	4,426	18.9	9.3	34.8	7	2,583
NGO Clinics	.	.	.	.	.	0.8	0.1	5.2	1	292	.	.	.	.	.
Religious Leaders/ Spiritual Healers	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Drug Sellers	.	.	.	.	.	.	.	.	.	.	2.6	0.4	16.4	1	354
Direct Selling	.	.	.	.	.	1.1	0.2	7.5	1	426	.	.	.	.	.
Village Midwife	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Village Headmen/ Friend/Relative	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Others	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Table 15: Percentage of respondents and place first sought care for acute diarrhoea illness by location

Socio-demography characteristics	Location									
	Urban					Rural				
	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper		
Government General Hospital	5.9	4.3	8.1	40	15,611	1.8	1.0	3.5	9	3,020
Government District Hospital	7.4	5.5	9.9	50	19,523	11.6	8.7	15.2	60	19,136
Government Health Clinic	14.3	11.5	17.7	90	37,620	31.4	26.9	36.3	158	51,788
Government Mobile Clinic	0.5	0.1	2.1	3	1,286	0.8	0.2	2.7	4	1,336
University Hospital	0.5	0.2	1.5	3	1,261	.	.	.	.	.
Army Hospital	0.6	0.2	1.6	4	1,565	0.6	0.1	2.3	3	933
Private Hospital	2.7	1.6	4.6	17	7,168	1.2	0.5	2.6	6	1,960
Private Clinic	51.7	47.5	55.9	330	135,911	26.2	21.8	31.1	135	43,182
Estate Hospital	.	.	.	.	.	0.2	<0.1	1.2	1	290
Estate Clinic	.	.	.	.	.	1.9	0.9	3.8	10	3,055
Traditional Practitioner	0.4	0.1	1.3	3	1,085	1.2	0.5	2.6	6	1,940
Pharmacy/ Chinese Medicine Shop	14.5	11.8	17.6	92	38,126	20.2	16.7	24.2	102	33,237
NGO Clinics	0.1	<0.1	1.0	1	370	0.2	<0.1	1.2	1	292
Religious Leaders / Spiritual Healers	.	.	.	.	.	0.2	<0.1	1.5	1	361
Drug Sellers	0.1	<0.1	1.0	4	1,796	1.6	0.7	3.4	8	2,633
Direct Selling	0.1	<0.1	1.0	2	860	.	.	.	.	.
Village Midwife	.	.	.	.	.	0.2	<0.1	1.5	1	361
Village Headmen/ Friend/Relative	0.1	<0.1	1.0	1	379	0.8	0.2	3.9	4	1,378
Others	0.2	<0.1	1.2	1	446	.	.	.	.	.

Table 16: Percentage of respondents and place first sought care for acute diarrhoea illness by state

Socio-demography characteristics	State														
	Johor					Kedah					Kelantan				
	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper				Lower	Upper		
Government General Hospital	2.4	0.8	7.0	3	1,278	0.9	0.1	6.3	1	400	5.9	1.9	17.0	3	1,056
Government District Hospital	7.7	4.2	14.0	11	4,178	12.1	12.1	19.5	15	5,282	7.4	2.7	18.4	4	1,320
Government Health Clinic	18.9	12.9	26.7	27	10,181	8.6	4.9	14.7	11	3,746	27.5	16.3	42.5	15	4,927
Government Mobile Clinic	1.6	0.2	10.4	2	852	.	.	.	.	.	.	.	.	.	.
University Hospital	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Army Hospital	0.8	0.1	5.4	1	426	.	.	.	.	.	.	.	.	.	.
Private Hospital	2.8	1.0	7.3	4	1,501	0.9	0.1	6.3	1	400	1.8	0.3	11.5	1	323
Private Clinic	55.7	46.2	64.9	77	30,059	43.3	33.7	53.5	51	18,837	30.3	18.0	46.2	16	5,425
Estate Hospital	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Estate Clinic	0.6	0.1	4.2	1	324	0.8	0.1	5.1	1	335	.	.	.	.	.
Traditional Practitioner	.	.	.	.	.	2.3	0.8	6.8	3	1,004	.	.	.	.	.
Pharmacy/Chinese Medicine Shop	8.7	5.0	14.7	12	4,706	30.3	22.7	39.1	37	13,168	18.2	10.9	28.7	10	3,255
NGO Clinics	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Religious Leaders/ Spiritual Healers	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Drug Sellers	.	.	.	.	.	.	.	.	.	.	9.0	3.3	22.1	5	1,613
Direct Selling	0.8	0.1	5.4	1	426	.	.	.	.	.	.	.	.	.	.
Village Midwife	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Village Headmen/ Friend/Relative	.	.	.	.	.	0.8	0.1	5.3	1.0	335	.	.	.	.	.
Others	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Table 16: Percentage of respondents and place first sought care for acute diarrhoea illness by state (continue)

Socio-demography characteristics	State														
	Melaka					Negeri Sembilan					Pahang				
	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper				Lower	Upper		
Government General Hospital	6.2	1.9	18.6	2	983	3.9	1.0	14.3	2	724	1.5	0.2	10.3	1	354
Government District Hospital	3.1	0.6	14.8	1	491	1.8	0.2	11.7	1	332	8.4	3.0	21.0	5	1,913
Government Health Clinic	22.2	12.1	37.0	9	3,523	28.8	18.2	42.5	15	5,400	25.1	14.2	40.4	16	5,735
Government Mobile Clinic	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
University Hospital	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Army Hospital	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Private Hospital	.	.	.	.	.	.	.	.	.	.	3.7	1.0	13.3	2	851
Private Clinic	39.0	25.2	54.9	14	6,205	56.0	40.7	70.3	28	10,497	31.6	21.1	44.4	18	7,229
Estate Hospital	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Estate Clinic	.	.	.	.	.	.	.	.	.	.	1.5	0.2	10.1	1	354
Traditional Practitioner	.	.	.	.	.	2.1	0.3	13.6	1	392	1.5	0.2	10.1	1	354
Pharmacy/Chinese Medicine Shop	23.3	11.1	42.6	8	3,706	7.4	2.8	18.5	4	1,388	25.1	15.6	37.8	15	5,738
NGO Clinics	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Religious Leaders/ Spiritual Healers	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Drug Sellers	6.2	1.6	21.0	2	3,706	.	.	.	.	.	1.5	0.2	10.1	1	354
Direct Selling	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Village Midwife	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Village Headmen/ Friend/Relative	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Others	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Table 16: Percentage of respondents and place first sought care for acute diarrhoea illness by state (continue)

Socio-demography characteristics	State														
	Pulau Pinang					Perak					Perlis				
	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper				Lower	Upper		
Government General Hospital	.	.	.	.	.	13.3	5.7	28.2	5	2,222	.	.	.	.	.
Government District Hospital	3.9	1.0	14.2	2	354	9.9	3.7	24.0	4	1,652	12.1	1.6	53.7	1	338
Government Health Clinic	15.3	6.9	30.7	8	2,892	13.6	5.5	29.7	6	2,268	24.1	7.3	56.3	2	677
Government Mobile Clinic	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
University Hospital	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Army Hospital	2.0	0.3	12.8	1	370	.	.	.	.	.	.	.	.	.	.
Private Hospital	2.0	0.3	11.9	1	370	2.8	0.4	17.4	1	465	.	.	.	.	.
Private Clinic	57.1	42.8	70.3	31	10,807	31.0	17.8	48.1	12	5,164	39.7	15.6	70.0	3	1,113
Estate Hospital	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Estate Clinic	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Traditional Practitioner	2.0	0.3	12.8	1	370	.	.	.	.	.	.	.	.	.	.
Pharmacy/Chinese Medicine Shop	15.9	7.6	30.1	9	3,001	22.9	12.8	37.5	10	3,815	24.1	5.7	62.7	2	677
NGO Clinics	2.0	0.3	12.3	1	370	.	.	.	.	.	.	.	.	.	.
Religious Leaders/ Spiritual Healers	.	.	.	.	.	2.2	0.3	13.4	1	361	.	.	.	.	.
Drug Sellers	.	.	.	.	.	2.2	0.3	13.4	1	361	.	.	.	.	.
Direct Selling	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Village Midwife	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Village Headmen/ Friend/Relative	.	.	.	.	.	2.2	0.3	13.9	1	361	.	.	.	.	.
Others	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Table 16: Percentage of respondents and place first sought care for acute diarrhoea illness by state (continue)

Socio-demography characteristics	State														
	Selangor					Terengganu					Sabah				
	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper				Lower	Upper		
Government General Hospital	2.1	0.9	5.0	5	2,025	4.8	1.2	17.0	2	758	8.9	4.6	16.6	11	3,522
Government District Hospital	5.0	2.8	8.6	11	4,773	23.3	11.2	42.1	10	3,643	26.8	18.6	36.9	35	10,600
Government Health Clinic	15.4	11.2	20.6	37	14,758	12.7	5.3	27.2	6	1,981	21.7	14.0	32.1	29	8,601
Government Mobile Clinic	0.5	0.1	3.1	1	434	.	.	.	.	.	0.7	0.1	5.0	1	292
University Hospital	0.9	0.2	3.5	2	868	.	.	.	.	.	.	.	.	.	.
Army Hospital	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Private Hospital	2.7	1.0	7.3	6	2,603	.	.	.	.	.	.	.	.	.	.
Private Clinic	55.7	48.8	62.4	129	53,522	38.8	24.7	55.1	17	6,076	23.0	16.0	31.9	29	9,091
Estate Hospital	0.3	<0.1	2.1	1	290	.	.	.	.	.	.	.	.	.	.
Estate Clinic	0.6	0.1	4.1	2	580	.	.	.	.	.	3.7	1.3	10.0	5	1,462
Traditional Practitioner	0.3	<0.1	2.1	1	290	.	.	.	.	.	0.7	0.1	4.9	1	292
Pharmacy/Chinese Medicine Shop	15.7	11.2	21.4	38	15,048	13.6	6.0	27.9	6	2,127	13.8	8.3	21.9	18	5,446
NGO Clinics	.	.	.	.	.	.	.	.	.	.	0.7	0.1	5.0	1	292
Religious Leaders/ Spiritual Healers	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Drug Sellers	0.5	0.1	3.1	1	434	4.4	1.1	16.3	2	685	.	.	.	.	.
Direct Selling	0.5	0.1	3.2	1	434	.	.	.	.	.	.	.	.	.	.
Village Midwife	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Village Headmen/ Friend/Relative	.	.	.	.	.	2.4	0.3	15.7	1	379	.	.	.	.	.
Others	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Table 16: Percentage of respondents and place first sought care for acute diarrhoea illness by state (continue)

Socio-demography characteristics	State														
	Sarawak					W.P Kuala Lumpur					W.P Labuan				
	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper				Lower	Upper		
Government General Hospital	4.3	1.8	9.7	5	1,838	18.2	9.0	33.3	8	3,149	6.2	0.9	31.5	1	323
Government District Hospital	6.5	3.2	12.9	8	2,783	.	.	.	.	.	11.8	3.0	36.8	2	615
Government Health Clinic	53.1	42.8	63.2	62	22,751	11.4	4.7	25.0	5	1,968	.	.	.	.	.
Government Mobile Clinic	2.4	0.6	9.8	3	1,044	.	.	.	.	.	.	.	.	.	.
University Hospital	.	.	.	.	.	2.3	0.3	14.6	1	394	.	.	.	.	.
Army Hospital	1.9	0.5	7.3	2	794	.	.	.	.	.	17.4	4.0	51.4	3	908
Private Hospital	2.7	0.9	7.9	3	1,142	6.8	2.3	18.5	3	1,181	5.6	0.8	29.5	1	292
Private Clinic	11.5	6.1	20.5	13	4,916	50.0	33.6	66.4	22	8,659	28.6	14.6	48.5	5	1,492
Estate Hospital	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Estate Clinic	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Traditional Practitioner	.	.	.	.	.	.	.	.	.	.	6.2	0.9	31.5	1	323
Pharmacy/Chinese Medicine Shop	14.1	8.3	23.1	16	6,058	11.4	33.6	9.7	5	1,968	24.2	8.2	53.3	4	1,261
NGO Clinics	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Religious Leaders/ Spiritual Healers	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Drug Sellers	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Direct Selling	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Village Midwife	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Village Headmen/ Friend/Relative	2.4	0.3	15.1	3	1,044	.	.	.	.	.	.	.	.	.	.
Others	1.0	0.2	6.6	1	446	.	.	.	.	.	.	.	.	.	.

Table 17: Percentage of respondents and timeliness of seeking care for acute diarrhoeal illness by socio-demographic characteristics

Socio-demography characteristics	Total		Total Percentage														
			<=12 hrs aft on set					<13 - 24hrs aft onset					>24hrs aft onset				
	%	N	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		n	N
				Lower	Upper				Lower	Upper				Lower	Upper		
Overall	100	440,915	71.8	69.0	74.4	845	316,495	18.1	16.0	20.5	219	79,976	10.0	8.3	12.0	120	44,088
Age Group																	
0-4	100	64,535	65.4	57.4	72.6	115	42,178	21.4	15.5	28.7	37	13,790	21.4	15.5	28.7	24	8,566
5-9	100	45,023	73.5	63.9	81.2	86	33,074	18.3	11.9	27.1	23	8,248	8.2	4.4	14.9	10	3,700
10-19	100	76,692	69.2	62.3	75.4	141	53,087	18.6	13.8	24.6	39	14,254	12.2	8.3	17.5	25	9,350
20-29	100	76,366	69.6	62.8	82.1	140	53,127	15.2	10.4	21.7	36	13,828	8.2	4.8	13.8	26	9,409
30-39	100	58,935	76.0	68.6	82.1	117	44,782	15.2	10.4	21.7	25	8,939	8.2	4.8	13.8	13	4,859
40-49	100	49,025	72.6	64.2	79.7	97	35,610	16.6	11.2	24.0	23	8,162	10.7	6.2	17.9	14	5,251
50-59	100	33,308	70.3	59.6	79.2	63	23,427	24.2	16.5	34.1	22	8,072	5.4	2.3	12.4	5	1,808
60 & above	100	37,029	84.3	75.9	90.1	86	31,207	12.6	7.5	20.5	14	4,679	3.1	1.0	9.2	3	1,142
Gender																	
Male	100	215,516	72.0	68.2	75.6	416	155,259	18.7	15.8	22.0	112	40,258	9.3	7.1	12.0	55	19,998
Female	100	225,399	71.5	67.6	75.2	429	161,236	17.6	14.7	21.0	107	39,717	10.7	8.4	13.6	65	24,090
Ethnicity																	
Malay	100	260,360	73.3	69.7	76.6	510	190,873	18.3	15.5	21.4	128	47,564	8.3	6.4	10.7	60	21,568
Chinese	100	59,461	77.6	69.4	84.1	114	46,120	11.8	7.0	19.3	17	7,012	10.6	6.5	17.0	16	6,328
Indian	100	46,859	71.2	61.8	79.0	83	83,347	15.4	10.0	23.0	18	7,215	13.4	8.2	21.2	16	6,295
Other Bumis	100	62,776	63.3	55.2	70.8	120	89,749	24.3	18.4	31.4	47	15,257	12.4	8.1	18.5	22	7,768
Others	100	11,458	55.9	39.6	71.0	18	6,404	25.5	14.2	41.6	9	2,926	18.6	8.4	36.1	6	2,127

Table 17: Percentage of respondents and timeliness of seeking care for acute diarrhoeal illness by socio-demographic characteristics (continue)

Socio-demography characteristics	Total		Total Percentage														
			<=12 hrs aft on set					<13 - 24hrs aft onset					>24hrs aft onset				
	%	N	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		n	N
				Lower	Upper				Lower	Upper				Lower	Upper		
Educational Level																	
None	100	78,135	72.4	65.4	78.3	150	56,533	18.8	13.7	25.1	40	14,669	8.9	5.7	13.6	19	6,931
Primary	100	96,826	72.5	66.8	77.6	191	70,235	17.5	13.2	22.8	48	16,957	9.9	6.9	14.2	27	9,632
Secondary	100	146,140	73.3	68.5	77.6	286	107,091	17.0	13.6	21.1	67	24,889	9.4	6.8	13.0	36	13,804
Tertiary	100	36,164	76.2	66.8	83.6	68	27,548	15.0	9.2	23.4	15	5,420	8.8	4.6	16.3	9	3,195
Monthly Household Income Group																	
Less than RM 400	100	41,091	67.7	58.2	76.0	78	27,830	19.6	13.4	27.7	23	8,040	12.7	7.6	20.5	15	5,220
RM 400 - RM 699	100	63,398	66.2	58.0	73.5	119	41,944	14.3	27.3	37.0	20	12,673	13.9	9.3	20.0	25	8,780
RM 700 - RM 999	100	47,988	71.5	62.3	79.2	95	84,317	17.3	11.6	25.1	23	8,325	11.1	6.5	18.4	14	5,344
RM 1000 - RM 1999	100	117,489	73.9	68.4	78.8	229	86,871	18.7	14.5	23.7	61	21,934	7.4	5.0	10.8	24	8,684
RM 2000 - RM 2999	100	69,153	78.7	71.9	84.2	143	54,431	13.9	9.5	20.1	26	9,643	7.3	4.4	11.9	14	5,078
RM 3000 - RM 3999	100	34,163	70.8	59.1	80.2	62	24,180	21.2	13.0	32.6	18	7,233	8.0	3.8	16.2	7	2,750
RM 4000 - RM 4999	100	14,947	70.9	53.1	84.0	27	10,604	12.6	5.2	27.5	5	1,880	16.5	6.8	34.9	6	2,462
RM 5000 & above	100	38,670	68.3	57.8	77.2	66	26,407	21.0	13.7	30.7	20	8,110	10.7	5.6	19.7	11	4,151
Unclassified	100	14,014	70.7	54.1	83.1	26	9,909	15.2	7.0	30.1	6	2,135	11.5	4.3	27.2	4	1,616

Table 17: Percentage of respondents and timeliness of seeking care for acute diarrhoeal illness by socio-demographic characteristics (continue)

Socio-demography characteristics	Total		Total Percentage														
			<=12 hrs aft on set					<13 - 24hrs aft onset					>24hrs aft onset				
	%	N	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		n	N
				Lower	Upper				Lower	Upper				Lower	Upper		
Location																	
Urban	100	269,697	74.9	71.3	78.2	491	201,955	16.0	13.3	19.0	105	43,036	9.2	7.1	11.7	61	24,705
Rural	100	171,217	66.9	62.4	71.1	354	114,540	21.6	18.1	25.5	114	36,939	11.3	8.7	14.6	59	19,383
State																	
Johor	100	55,006	79.8	71.9	85.9	114	43,890	15.3	10.1	22.6	21	8,437	4.9	2.3	9.9	7	2,677
Kedah	100	45,782	68.2	59.8	75.5	86	81,204	24.5	17.9	32.6	32	11,232	7.3	3.8	13.7	10	3,346
Kelantan	100	18,270	74.5	60.5	84.8	41	13,607	16.5	8.9	28.8	9	3,020	9.0	3.8	20.0	5	1,642
Melaka	100	15,891	81.4	65.0	91.2	30	12,942	18.6	8.8	35.0	6	2,948	-	-	-	-	-
N. Sembilan	100	20,122	65.4	51.8	76.8	36	13,153	13.0	6.1	25.8	7	2,624	21.6	12.9	33.8	12	4,344
Pahang	100	24,369	73.8	62.2	82.9	47	17,994	12.5	6.9	21.7	8	3,046	12.2	5.9	23.6	8	2,974
Penang	100	18,613	77.2	61.5	87.8	41	14,373	16.8	8.4	30.9	9	3,131	6.0	2.0	16.5	3	1,108
Perak	100	17,493	61.0	45.1	74.9	27	10,677	23.6	13.0	39.1	10	4,129	15.4	7.1	30.2	6	2,686
Perlis	100	2,804	75.9	37.3	94.3	6	2,127	24.1	5.7	62.7	2	676	-	-	-	-	-
Selangor	100	100,396	77.5	71.3	82.7	189	77,826	13.0	9.1	18.1	32	13,020	9.5	6.2	14.4	24	9,549
Terengganu	100	14,891	68.9	56.3	79.2	29	10,257	13.3	6.5	25.4	6	1,981	17.8	9.1	31.8	7	2,651
Sabah	100	40,798	61.4	52.5	69.6	82	25,044	28.8	21.9	37.0	39	11,769	9.8	5.5	16.7	13	3,984
Sarawak	100	42,370	56.6	45.1	67.4	65	23,990	26.8	18.7	36.9	31	11,375	16.5	10.7	24.8	19	7,003
W.P. Kuala Lumpur	100	18,892	83.3	70.7	91.2	40	15,743	10.4	4.6	21.7	5	1,967	6.3	2.0	18.0	3	1,180
W.P. Labuan	100	5,214	70.2	50.3	84.6	12	3,661	11.8	3.3	34.2	2	615	18.0	6.4	41.3	3	938

Table 18: Percentage of reasons for not seeking care for acute diarrhoeal illness

Reasons for not seeking care	%	95% CI		n	N
		Upper	Lower		
Mild illness	53.6	50.7	56.6	781	286,921
Cured already	9.1	7.7	10.8	134	48,749
No specialist treatment nearby	1.0	0.6	1.7	14	5,239
Not satisfied with the attitude of the staff	0.1	<0.1	0.4	1	292
Not confident with the medication	0.1	<0.1	0.4	1	335
Treatment is not effective	0.1	<0.1	0.6	2	782
Lost confidence with the advice & treatment given	0.1	<0.1	0.5	2	676
Given unfriendly services before	0.1	<0.1	0.8	2	646
Did not obtain suitable treatment	0.1	<0.1	0.6	1	434
Did not receive proper attention	0.1	<0.1	0.4	1	323
Crowded /uncomfortable	0.1	<0.1	0.6	1	434
Have to pay for treatment	0.1	<0.1	0.5	1	348
Cost is expensive	0.1	<0.1	0.5	2	615
Daily wage will be cut / affected	0.2	<0.1	0.7	2	880
Long waiting time	0.2	0.1	0.6	3	970
Operating hours not suitable	0.1	<0.1	0.6	1	426
Place is far	0.3	0.1	0.8	5	1,838
Too long travelling time	0.1	<0.1	0.5	2	677
No transport	0.4	0.2	0.9	7	2,381
Unable to afford transport fees	0.1	<0.1	0.4	2	585
Unable to leave home / child	0.2	0.1	0.7	4	1,165
No one to accompany	0.7	0.4	1.4	11	3,856
Treatment is not required	5.5	4.4	7.0	76	29,541
Self-medicate	22.3	20.0	24.9	321	119,519
Able to get medicine without seeing doctor	2.2	1.5	3.2	33	11,770
Afraid to obtain treatment	0.6	0.3	1.1	9	3,004
Not an emergency	2.0	1.3	3.0	27	10,706
Others	0.3	0.1	0.8	5	1,762
Total	100.0	100.0	100.0	1451	534,872

Table 19: Percentage of respondents and reasons for not seeking care for acute diarrhoea disease by age group

Socio-demography characteristic	Age groups									
	0-4					5-9				
	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper		
Mild illness	51.0	39.8	62.1	39	13,988	49.8	38.8	60.9	44	16,392
Cured already	8.8	4.2	17.4	7	2,418	11.4	5.8	21.0	11	3,737
No specialist treatment nearby	.	.	.	.	.	2.5	0.6	9.6	2	819
Not satisfied with the attitude of the staff	1.1	0.1	7.2	1	292	.	.	.	.	.
Not confident with the medication	.	.	.	.	.	.	.	.	.	.
Treatment is not effective	1.3	0.2	8.5	1	348	.	.	.	.	.
Lost confidence with the advice & treatment given	1.3	0.2	8.7	1	370	.	.	.	.	.
Given unfriendly services before	1.2	0.2	7.9	1	323	1.0	0.1	6.7	1	323
Did not obtain suitable treatment	.	.	.	.	.	.	.	.	.	.
Did not receive proper attention	.	.	.	.	.	.	.	.	.	.
Crowded /uncomfortable	.	.	.	.	.	.	.	.	.	.
Have to pay for treatment	.	.	.	.	.	1.1	0.1	7.2	1	348
Cost is expensive	1.2	0.2	7.9	1	323	.	.	.	.	.
Daily wage will be cut / affected	.	.	.	.	.	.	.	.	.	.
Long waiting time	.	.	.	.	.	.	.	.	.	.
Operating hours not suitable	.	.	.	.	.	.	.	.	.	.
Place is far	.	.	.	.	.	.	.	.	.	.
Too long travelling time	.	.	.	.	.	.	.	.	.	.
No transport	1.2	0.2	7.9	1	323	.	.	.	.	.
Unable to afford transport fees	.	.	.	.	.	.	.	.	.	.
Unable to leave home / child	1.1	0.1	7.2	1	292	.	.	.	.	.
No one to accompany	1.0	0.1	6.6	1	266	2.9	0.7	11.8	3	969
Treatment is not required	3.9	1.3	11.5	3	1,084	3.3	1.0	9.8	3	1,074
Self-medicate	24.6	16.1	35.7	18	6,747	20.3	12.8	30.7	18	6,668
Able to get medicine without seeing doctor	2.4	0.6	9.3	2	669	2.0	0.5	7.7	2	657
Afraid to obtain treatment	.	.	.	.	.	1.0	0.1	6.7	1	323
Not an emergency	.	.	.	.	.	2.6	0.7	9.9	2	859
Others	.	.	.	.	.	2.2	0.6	8.2	2	718

Table 19: Percentage of respondents and reasons for not seeking care for acute diarrhoea disease by age group (continue)

Socio-demography characteristic	Age groups									
	10-19					20-29				
	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper		
Mild illness	59.2	54.2	64.1	256	92,378	51.1	45.0	57.2	143	52,903
Cured already	7.1	5.1	10.0	30	11,151	12.1	8.6	16.7	33	12,474
No specialist treatment nearby	0.8	0.3	2.5	3	1,247	1.3	0.5	3.3	4	1,305
Not satisfied with the attitude of the staff	.	.	.	.	.	.	.	.	.	.
Not confident with the medication	0.2	<0.1	1.5	1	335	.	.	.	.	.
Treatment is not effective	0.3	<0.1	1.9	1	434	.	.	.	.	.
Lost confidence with the advice & treatment given	.	.	.	.	.	.	.	.	.	.
Given unfriendly services before	.	.	.	.	.	.	.	.	.	.
Did not obtain suitable treatment	.	.	.	.	.	0.4	0.1	2.9	1	434
Did not receive proper attention	0.2	<0.1	1.5	1	323	.	.	.	.	.
Crowded /uncomfortable	.	.	.	.	.	.	.	.	.	.
Have to pay for treatment	.	.	.	.	.	.	.	.	.	.
Cost is expensive	0.2	<0.1	1.3	1	292	.	.	.	.	.
Daily wage will be cut / affected	0.3	<0.1	2.0	1	446	0.4	0.1	2.9	1	434
Long waiting time	0.2	<0.1	1.5	1	323	0.3	<0.1	2.2	1	323
Operating hours not suitable	.	.	.	.	.	.	.	.	.	.
Place is far	0.2	<0.1	1.6	1	352	0.3	<0.1	2.0	1	292
Too long travelling time	0.2	<0.1	1.5	1	323	0.3	<0.1	2.4	1	354
No transport	.	.	.	.	.	0.3	<0.1	2.4	1	354
Unable to afford transport fees	0.2	<0.1	1.3	1	292	.	.	.	.	.
Unable to leave home / child	.	.	.	.	.	0.3	<0.1	2.0	1	292
No one to accompany	0.7	0.2	2.3	3	1,149	0.4	0.1	2.8	1	425
Treatment is not required	4.7	3.0	7.2	19	7,293	5.8	3.5	9.5	15	6,012
Self-medicate	19.3	15.7	23.4	81	30,088	21.5	16.9	27.0	60	22,253
Able to get medicine without seeing doctor	2.2	1.1	4.2	9	3,431	2.7	1.3	5.3	8	2,796
Afraid to obtain treatment	0.8	0.3	2.2	4	1,323	0.7	0.2	2.6	2	687
Not an emergency	2.8	1.6	5.0	11	4,443	1.8	0.8	4.3	5	1,866
Others	0.2	<0.1	1.6	1	354	0.3	<0.1	1.9	1	290

Table 19: Percentage of respondents and reasons for not seeking care for acute diarrhoea disease by age group (continue)

Socio-demography characteristic	Age groups									
	30-39					40-49				
	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper		
Mild illness	57.5	50.3	64.4	112	42,236	50.6	42.9	58.3	88	32,228
Cured already	7.5	4.6	12.0	16	5,503	13.1	8.9	18.9	23	8,358
No specialist treatment nearby	0.5	0.1	3.5	1	370	1.1	0.3	4.6	2	724
Not satisfied with the attitude of the staff	.	.	.	.	.	.	.	.	.	.
Not confident with the medication	.	.	.	.	.	.	.	.	.	.
Treatment is not effective	.	.	.	.	.	.	.	.	.	.
Lost confidence with the advice & treatment given	.	.	.	.	.	.	.	.	.	.
Given unfriendly services before	.	.	.	.	.	.	.	.	.	.
Did not obtain suitable treatment	.	.	.	.	.	.	.	.	.	.
Did not receive proper attention	.	.	.	.	.	.	.	.	.	.
Crowded /uncomfortable	.	.	.	.	.	.	.	.	.	.
Have to pay for treatment	.	.	.	.	.	.	.	.	.	.
Cost is expensive	.	.	.	.	.	.	.	.	.	.
Daily wage will be cut / affected	.	.	.	.	.	.	.	.	.	.
Long waiting time	.	.	.	.	.	.	.	.	.	.
Operating hours not suitable	.	.	.	.	.	0.7	0.1	4.6	1	426
Place is far	0.6	0.1	4.1	1	434	.	.	.	.	.
Too long travelling time	.	.	.	.	.	.	.	.	.	.
No transport	.	.	.	.	.	.	.	.	.	.
Unable to afford transport fees	.	.	.	.	.	0.5	0.1	3.2	1	292
Unable to leave home / child	0.4	0.1	2.8	1	290	.	.	.	.	.
No one to accompany	.	.	.	.	.	.	.	.	.	.
Treatment is not required	6.4	3.5	11.6	12	4,735	6.6	3.7	11.6	11	4,217
Self-medicate	23.7	18.1	30.4	47	17,400	23.0	16.8	30.8	38	14,660
Able to get medicine without seeing doctor	1.9	0.7	5.0	4	1,390	2.6	1.1	6.2	5	1,671
Afraid to obtain treatment	0.4	0.1	3.1	1	324	.	.	.	.	.
Not an emergency	1.1	0.3	4.1	2	782	1.7	0.6	5.3	3	1,106
Others	.	.	.	.	.	.	.	.	.	.

Table 19: Percentage of respondents and reasons for not seeking care for acute diarrhoea disease by age group (continue)

Socio-demography characteristic	Age groups									
	50-59					60 & above				
	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper		
Mild illness	50.9	42.5	59.3	60	22,034	42.6	33.1	52.7	42	14,764
Cured already	5.9	2.8	12.0	7	2,541	7.4	3.5	14.9	7	2,566
No specialist treatment nearby	1.0	0.1	6.7	1	426	1.0	0.1	6.8	1	348
Not satisfied with the attitude of the staff	.	.	.	.	.	.	.	.	.	.
Not confident with the medication	.	.	.	.	.	.	.	.	.	.
Treatment is not effective	.	.	.	.	.	.	.	.	.	.
Lost confidence with the advice & treatment given	.	.	.	.	.	0.9	0.1	6.0	1	306
Given unfriendly services before	.	.	.	.	.	.	.	.	.	.
Did not obtain suitable treatment	.	.	.	.	.	.	.	.	.	.
Did not receive proper attention	.	.	.	.	.	.	.	.	.	.
Crowded /uncomfortable	.	.	.	.	.	1.3	0.2	8.2	1	434
Have to pay for treatment	.	.	.	.	.	.	.	.	.	.
Cost is expensive	.	.	.	.	.	.	.	.	.	.
Daily wage will be cut / affected	.	.	.	.	.	.	.	.	.	.
Long waiting time	0.7	0.1	5.1	1	324	.	.	.	.	.
Operating hours not suitable	.	.	.	.	.	.	.	.	.	.
Place is far	1.0	0.1	6.5	1	425	1.0	0.1	6.6	1	335
Too long travelling time	.	.	.	.	.	.	.	.	.	.
No transport	.	.	.	.	.	4.9	2.0	11.4	5	1,705
Unable to afford transport fees	.	.	.	.	.	.	.	.	.	.
Unable to leave home / child	0.7	0.1	4.6	1	290	.	.	.	.	.
No one to accompany	0.9	0.1	6.2	1	400	1.9	0.5	7.1	2	646
Treatment is not required	6.5	3.1	13.0	7	2,808	6.7	3.0	14.2	6	2,317
Self-medicate	30.7	23.1	39.5	36	13,287	24.3	16.4	34.4	23	8,416
Able to get medicine without seeing doctor	.	.	.	.	.	3.3	1.1	9.9	3	1,155
Afraid to obtain treatment	.	.	.	.	.	1.0	0.1	6.8	1	348
Not an emergency	0.8	0.1	5.5	1	348	3.8	1.2	11.0	3	1,302
Others	0.9	0.1	6.3	1	400	.	.	.	.	.

Table 20: Percentage of respondents and reasons for not seeking care for acute diarrhoea disease by gender

Socio-demography characteristic	Gender									
	Male					Female				
	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper		
Mild illness	55.9	51.8	60.0	371	135,571	51.7	48.0	55.4	410	151,350
Cured already	9.4	7.3	12.1	62	22,819	51.7	48.0	55.4	72	25,930
No specialist treatment nearby	1.2	0.6	2.4	8	2,953	0.8	0.3	1.7	6	2,286
Not satisfied with the attitude of the staff	0.1	<0.1	0.9	1	292	.	.	.	.	.
Not confident with the medication	.	<0.1	.	.	.	0.1	<0.1	0.8	1	335
Treatment is not effective	0.1	<0.1	1.0	1	348	0.1	<0.1	1.0	1	434
Lost confidence with the advice & treatment given	.	.	.	.	.	0.2	0.1	0.9	2	676
Given unfriendly services before	0.1	<0.1	0.9	1	323	0.1	<0.1	0.8	1	323
Did not obtain suitable treatment	.	.	.	.	.	0.1	<0.1	1.0	1	434
Did not receive proper attention	.	.	.	.	.	0.1	<0.1	0.8	1	323
Crowded /uncomfortable	0.2	<0.1	1.3	1	434	.	.	.	.	.
Have to pay for treatment	.	<0.1	.	.	.	0.1	<0.1	0.8	1	348
Cost is expensive	0.1	<0.1	0.9	1	323	0.1	<0.1	0.7	1	292
Daily wage will be cut / affected	.	.	.	.	.	0.3	0.1	1.2	2	880
Long waiting time	0.3	0.1	1.1	2	647	0.1	<0.1	0.8	1	323
Operating hours not suitable	0.2	<0.1	1.2	1	426	.	.	.	.	.
Place is far	.	.	.	.	.	0.6	0.3	1.5	5	1,838
Too long travelling time	0.1	<0.1	1.0	1	354	0.1	<0.1	0.8	1	323
No transport	0.4	0.1	1.2	3	947	0.5	0.2	1.3	4	1,434
Unable to afford transport fees	.	.	.	.	.	0.2	0.1	0.8	2	585
Unable to leave home / child	0.1	<0.1	0.8	1	290	0.3	0.1	1.3	3	875
No one to accompany	0.9	0.4	2.1	7	2,242	0.6	0.2	1.5	4	1,614
Treatment is not required	7.6	5.7	10.0	46	18,301	3.8	2.6	5.5	30	11,239
Self-medicate	18.9	15.8	22.3	121	45,707	25.2	22.2	28.6	200	73,812
Able to get medicine without seeing doctor	2.1	1.2	3.6	14	5,014	2.3	1.4	3.7	19	6,756
Afraid to obtain treatment	0.4	0.1	1.3	3	1,009	0.7	0.3	1.5	6	1,995
Not an emergency	1.3	0.7	2.6	8	3,190	2.6	1.6	4.2	19	7,516
Others	0.5	0.1	1.4	3	1,118	0.2	0.1	0.9	2	644

Table 21: Percentage of respondents and reasons for not seeking care for acute diarrhoea disease by ethnicity

Socio-demography characteristics	Ethnicity														
	Malay					Chinese					Indian				
	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		N	N
		Lower	Upper				Lower	Upper				Lower	Upper		
Mild illness	55.0	51.4	58.6	514	189,098	58.3	51.1	65.2	113	44,321	53.0	42.5	63.2	52	19,838
Cured already	9.2	7.4	11.3	85	31,510	6.5	3.7	11.1	13	4,919	4.4	1.7	10.9	4	1,644
No specialist treatment nearby	1.0	0.5	1.8	9	3,299	1.6	0.5	4.9	3	1,216	1.0	0.1	6.7	1	370
Not satisfied with the attitude of the staff	0.1	<0.1	0.6	1	292	.	.	.	.	.	.	.	.	.	.
Not confident with the medication	.	.	.	.	.	0.4	0.1	3.0	1	335	.	.	.	.	.
Treatment is not effective	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lost confidence with the advice & treatment given	0.2	<0.1	0.8	2	676	.	.	.	.	.	.	.	.	.	.
Given unfriendly services before	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Did not obtain suitable treatment	.	.	.	.	.	.	.	.	.	.	1.2	0.2	7.8	1	434
Did not receive proper attention	0.1	<0.1	0.7	1	323	.	.	.	.	.	.	.	.	.	.
Crowded /uncomfortable	0.1	<0.1	0.9	1	434	.	.	.	.	.	.	.	.	.	.
Have to pay for treatment	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cost is expensive	0.1	<0.1	0.7	1	323	.	.	.	.	.	.	.	.	.	.
Daily wage will be cut / affected	0.1	<0.1	0.9	1	434	0.6	0.1	4.0	1	446	.	.	.	.	.
Long waiting time	0.1	<0.1	0.7	1	324	.	.	.	.	.	.	.	.	.	.
Operating hours not suitable	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Place is far	0.3	0.1	1.0	3	1,120	0.6	0.1	3.8	1	425	.	.	.	.	.
Too long travelling time	0.1	<0.1	0.7	1	354	.	.	.	.	.	.	.	.	.	.
No transport	0.7	0.3	1.4	7	2,381	.	.	.	.	.	.	.	.	.	.
Unable to afford transport fees	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Unable to leave home / child	0.1	<0.1	0.6	1	290	.	.	.	.	.	0.8	0.1	5.3	1	290
No one to accompany	0.7	0.3	1.5	6	2,328	1.2	0.3	5.2	3	912	.	.	.	.	.
Treatment is not required	4.9	3.7	6.6	43	16,920	7.1	4.2	11.7	13	5,391	1.2	0.2	7.8	1	434
Self-medicate	22.8	19.8	26.1	209	78,263	16.1	11.6	22.0	30	12,250	34.3	25.0	45.0	32	12,850
Able to get medicine without seeing doctor	1.7	1.1	2.9	17	5,978	3.8	1.8	8.0	8	2,904	2.3	0.6	8.8	2	868
Afraid to obtain treatment	0.6	0.3	1.3	6	2,010	.	.	.	.	.	.	.	.	.	.
Not an emergency	1.9	1.1	3.1	16	6,431	3.8	1.8	7.5	7	2,853	1.2	0.2	7.8	1	434
Others	0.2	0.1	1.0	2	826	.	.	.	.	.	0.8	0.1	4.9	1	290

Table 21: Percentage of respondents and reasons for not seeking care for acute diarrhoea disease by ethnicity (continue)

Socio-demography characteristics	Ethnicity									
	Other Bumis					Others				
	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper		
Mild illness	44.6	37.0	52.4	86	28,273	37.3	24.0	52.9	16	5,392
Cured already	13.5	8.8	20.1	26	8,562	14.6	6.4	29.9	6	2,114
No specialist treatment nearby	0.6	0.1	3.9	1	354	.	.	.	.	.
Not satisfied with the attitude of the staff	.	.	.	.	.	.	.	.	.	.
Not confident with the medication	.	.	.	.	.	.	.	.	.	.
Treatment is not effective	0.5	0.1	3.8	1	348	3.0	0.4	18.5	1	434
Lost confidence with the advice & treatment given	.	.	.	.	.	.	.	.	.	.
Given unfriendly services before	1.0	0.1	6.7	2	646	.	.	.	.	.
Did not obtain suitable treatment	.	.	.	.	.	.	.	.	.	.
Did not receive proper attention	.	.	.	.	.	.	.	.	.	.
Crowded /uncomfortable	.	.	.	.	.	.	.	.	.	.
Have to pay for treatment	0.5	0.1	3.8	1	348	.	.	.	.	.
Cost is expensive	0.5	0.1	3.2	1	292	.	.	.	.	.
Daily wage will be cut / affected	.	.	.	.	.	.	.	.	.	.
Long waiting time	0.5	0.1	3.5	1	323	2.2	0.3	13.8	1	323
Operating hours not suitable	0.7	0.1	4.6	1	426	.	.	.	.	.
Place is far	.	.	.	.	.	2.0	0.3	13.2	1	292
Too long travelling time	0.5	0.1	3.5	1	323	.	.	.	.	.
No transport	.	.	.	.	.	.	.	.	.	.
Unable to afford transport fees	0.9	0.2	3.5	2	585	.	.	.	.	.
Unable to leave home / child	.	.	.	.	.	4.0	0.6	23.6	2	585
No one to accompany	1.0	0.2	3.8	2	615	.	.	.	.	.
Treatment is not required	7.9	4.1	14.7	14	4,987	12.5	5.2	27.2	5	1,809
Self-medicate	20.9	15.5	27.7	41	13,280	19.9	10.0	35.8	9	2,877
Able to get medicine without seeing doctor	3.2	1.3	7.7	6	2,019	.	.	.	.	.
Afraid to obtain treatment	1.1	0.3	4.1	2	671	2.2	0.3	14.4	1	323
Not an emergency	1.6	0.5	4.6	3	988	.	.	.	.	.
Others	0.6	0.1	3.9	1	354	2.0	0.3	11.8	1	292

Table 22: Percentage of respondents and reasons for not seeking care for acute diarrhoea disease by educational level

Socio-demography characteristics	Educational Level									
	None					Primary				
	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper		
Mild illness	44.4	37.7	51.4	93	33,899	54.6	49.4	59.6	229	82,188
Cured already	9.9	6.6	14.5	22	7,530	7.7	5.5	10.7	31	11,572
No specialist treatment nearby	1.5	0.5	4.7	3	1,167	1.3	0.5	3.0	5	1,883
Not confident with the medication	.	.	.	.	.	.	.	.	.	.
Treatment is not effective	0.6	0.1	3.9	1	434	.	.	.	.	.
Lost confidence with the advice & treatment given	0.4	0.1	2.8	1	306	.	.	.	.	.
Did not obtain suitable treatment	.	.	.	.	.	0.3	<0.1	2.0	1	434
Did not receive proper attention	.	.	.	.	.	.	.	.	.	.
Crowded /uncomfortable	.	.	.	.	.	0.3	<0.1	2.0	1	434
Cost is expensive	.	.	.	.	.	0.2	<0.1	1.4	1	292
Daily wage will be cut / affected	.	.	.	.	.	.	.	.	.	.
Long waiting time	0.4	0.1	2.9	1	324	0.2	<0.1	1.5	1	323
Operating hours not suitable	.	.	.	.	.	0.3	<0.1	2.0	1	426
Place is far	0.4	0.1	3.1	1	335	0.6	0.1	2.2	2	859
Too long travelling time	.	.	.	.	.	0.2	<0.1	1.5	1	323
No transport	1.9	0.7	4.9	4	1,415	.	.	.	.	.
Unable to afford transport fees	0.8	0.2	3.0	2	585	.	.	.	.	.
Unable to leave home / child	.	.	.	.	.	0.4	0.1	1.5	2	582
No one to accompany	1.7	0.6	4.5	4	1,292	1.0	0.4	2.7	4	1,549
Treatment is not required	2.0	0.7	5.2	4	1,508	5.8	3.8	8.9	23	8,775
Self-medicate	26.4	20.4	33.4	54	20,148	23.2	19.3	27.7	96	34,960
Able to get medicine without seeing doctor	3.4	1.6	6.9	7	2,582	1.4	0.6	3.2	6	2,163
Afraid to obtain treatment	2.2	0.9	5.1	5	1,671	1.4	0.6	3.2	2	687
Not an emergency	3.5	1.7	7.2	7	2,690	1.9	0.9	3.9	7	2,838
Others	0.6	0.1	3.8	1	425	0.2	<0.1	1.4	1	292

Table 22: Percentage of respondents and reasons for not seeking care for acute diarrhoea disease by educational level (continue)

Socio-demography characteristics	Educational Level									
	Secondary					Tertiary				
	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper		
Mild illness	57.4	53.1	61.5	349	129,590	52.4	42.8	61.8	57	22,457
Cured already	9.4	7.3	12.2	58	21,339	11.5	6.8	18.8	13	4,927
No specialist treatment nearby	0.6	0.2	1.6	4	1,385	1.9	0.5	7.1	2	803
Not confident with the medication	0.1	<0.1	1.0	1	335	.	.	.	.	.
Treatment is not effective	.	.	.	.	.	.	.	.	.	.
Lost confidence with the advice & treatment given	.	.	.	.	.	.	.	.	.	.
Did not obtain suitable treatment	.	.	.	.	.	.	.	.	.	.
Did not receive proper attention	0.1	<0.1	1.0	1	323	.	.	.	.	.
Crowded /uncomfortable	.	.	.	.	.	.	.	.	.	.
Cost is expensive	.	.	.	.	.	.	.	.	.	.
Daily wage will be cut / affected	0.4	0.1	1.5	2	880	.	.	.	.	.
Long waiting time	0.1	<0.1	1.0	1	323	.	.	.	.	.
Operating hours not suitable	.	.	.	.	.	.	.	.	.	.
Place is far	0.3	0.1	1.1	2	644	.	.	.	.	.
Too long travelling time	0.2	<0.1	1.1	1	354	.	.	.	.	.
No transport	0.3	0.1	1.1	2	644	.	.	.	.	.
Unable to afford transport fees	.	.	.	.	.	.	.	.	.	.
Unable to leave home / child	0.1	<0.1	0.9	1	290	.	.	.	.	.
No one to accompany	0.2	<0.1	1.3	1	425	.	.	.	.	.
Treatment is not required	6.6	4.9	8.9	38	14,917	5.9	2.6	12.5	6	2,515
Self-medicate	19.4	16.3	22.9	116	43,870	22.3	15.2	31.6	25	9,584
Able to get medicine without seeing doctor	2.4	1.4	4.0	15	5,331	2.4	0.8	7.2	3	1,024
Afraid to obtain treatment	0.1	<0.1	1.0	1	323	0.8	0.1	5.2	1	324
Not an emergency	1.7	0.9	3.2	10	3,916	2.9	1.0	8.5	3	1,261
Others	0.5	0.1	1.4	3	1,044	.	.	.	.	.

Table 23: Percentage of respondents and reasons for not seeking care for acute diarrhoea disease by monthly household income group

Socio-demography characteristics	Monthly Household Income Group														
	Less than RM 400					RM 400 - RM 699					RM 700 - RM 999				
	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		N	N
		Lower	Upper				Lower	Upper				Lower	Upper		
Mild illness	52.7	44.1	61.2	63	22,025	47.2	40.4	54.1	110	38,518	57.9	49.4	65.9	90	32,001
Cured already	7.8	4.1	14.2	10	3,248	10.7	7.3	15.5	26	8,771	7.9	4.7	13.2	13	4,389
No specialist treatment nearby	1.8	4.0	7.0	2	755	1.3	4.0	3.9	3	1,037	1.5	4.0	5.7	2	805
Not satisfied with the attitude of the staff	.	.	.	.	.	.	.	.	.	.	0.5	0.1	3.7	1.0	292
Not confident with the medication	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Treatment is not effective	8.0	1.0	5.7	1	348	.	.	.	.	.	.	.	.	.	.
Lost confidence with the advice & treatment given	.	.	.	.	.	0.4	0.1	2.6	1	306	0.7	0.1	4.6	1	370
Given unfriendly services before	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Did not obtain suitable treatment	.	.	.	.	.	.	.	.	.	.	0.8	0.1	5.4	1	434
Did not receive proper attention	0.8	0.1	5.3	1	323	.	.	.	.	.	.	.	.	.	.
Crowded /uncomfortable	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Have to pay for treatment	0.8	0.1	5.7	1	348	.	.	.	.	.	.	.	.	.	.
Cost is expensive	.	.	.	.	.	.	.	.	.	.	0.6	0.1	4.0	1	323
Daily wage will be cut / affected	.	.	.	.	.	0.5	0.1	3.7	1	434	.	.	.	.	.
Long waiting time	.	.	.	.	.	0.4	0.1	2.8	1	323	.	.	.	.	.
Operating hours not suitable	.	.	.	.	.	.	.	.	.	.	0.8	0.1	5.3	1	426
Place is far	1.8	0.5	7.2	2	768	0.4	0.1	2.5	1	292	.	.	.	.	.
Too long traveling time	.	.	.	.	.	.	.	.	.	.	0.6	0.1	4.4	1	354
No transport	0.7	0.1	4.7	1	290	1.2	0.4	3.8	3	1,009	0.6	0.1	4.3	1	348
Unable to afford transport fees	0.7	0.1	4.8	1	292	0.4	0.1	2.5	1	292	.	.	.	.	.
Unable to leave home / child	.	.	.	.	.	.	.	.	.	.	0.5	0.1	3.6	1	290
No one to accompany	2.6	0.8	7.8	3	1,080	0.9	0.2	3.5	2	723	0.8	0.1	5.3	1	425
Treatment is not required	3.4	1.3	8.9	4	1,422	3.5	1.8	6.9	8	2,875	5.9	2.9	11.6	9	3,259
Self-medicate	18.1	12.0	26.4	21	7,576	25.1	19.5	31.7	59	20,463	16.9	11.3	24.7	26	9,373
Able to get medicine without seeing doctor	2.5	0.8	7.7	3	1,049	3.9	1.9	7.7	9	3,171	3.2	1.2	8.7	5	1,787
Afraid to obtain treatment	.	.	.	.	.	1.7	0.6	4.3	4	1,357	.	.	.	.	.
Not an emergency	4.5	1.9	10.4	5	1,888	1.5	0.5	4.5	3	1,214	0.8	0.1	5.4	1	434
Others	0.8	0.1	5.8	1	354	1.0	0.3	3.9	2	826	.	.	.	.	.

Table 23: Percentage of respondents and reasons for not seeking care for acute diarrhoea disease by monthly household income group (continue)

Socio-demography characteristics	Monthly Household Income Group														
	RM 1000 - RM 1999					RM 2000 - RM 2999					RM 3000 - RM 3999				
	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		N	N
		Lower	Upper				Lower	Upper				Lower	Upper		
Mild illness	56.8	51.4	62.0	225	81,841	54.1	46.5	61.5	119	44,893	50.6	40.7	60.4	54	21,264
Cured already	9.9	7.3	13.3	39	14,233	9.1	5.8	14.2	20	7,594	10.8	6.2	18.4	11	4,556
No specialist treatment nearby	0.7	0.2	2.3	3	1,080						1.0	0.1	7.0	1	434
Not satisfied with the attitude of the staff															
Not conficent with the medication						0.4	0.1	2.8	1	335					
Treatment is not effective						0.5	0.1	3.6	1	434					
Lost confidence with the advice & treatment given															
Given unfriendly services before	0.4	0.1	3.1	2	646										
Did not obtain suitable treatment															
Did not receive proper attention															
Crowded uncomfortable	0.3	<0.1	2.1	1	434										
Have to pay for treatment															
Cost is expensive	0.2	<0.1	1.4	1	292										
Daily wage will be cut affected						0.5	0.1		1	446					
Long waiting time	0.4	0.1	1.8	2	647										
Operating hours not suitable															
Place is far	0.3	<0.1	2.1	1	425	0.4	0.1	3.0	1	352					
Too long travelling time	0.2	<0.1	1.6	1	323										
No transport	0.3	<0.1	1.9	1	400										
Unable to afford transport fees															
Unable to leave home / child	0.6	0.1	2.6	3	875	2.6									
No one to accompany	0.2	<0.1	1.6	1	323	1.3	0.3	5.0	3	1,038					
Treatment is not required	4.7	2.9	7.5	17	6,795	4.7	2.5	8.5	10	3,873	9.0	4.3	17.7	10	3,765
Self-medicate	19.9	16.0	24.6	79	28,755	26.2	20.2	33.4	57	21,784	22.6	15.7	31.4	25	9,492
Able to get medicine without seeing doctor	2.2	1.2	4.3	9	3,225	0.4	0.1	2.8	1	332	1.1	0.2	7.0	1	446
Afraid to obtain treatment	1.1	0.5	2.7	5	1,647										
Not an emergency	1.3	0.5	3.2	5	1,918	2.3	1.0	5.5	5	1,945	5.0	1.8	12.8	5	2,091
Others	0.2	<0.1	1.4	1	292										

Table 23: Percentage of respondents and reasons for not seeking care for acute diarrhoea disease by monthly household income group (continue)

Socio-demography characteristics	Monthly Household Income Group														
	RM 4000 - RM 4999					RM 5000 & above					Unclassified				
	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper				Lower	Upper		
Mild illness	56.1	42.1	69.2	29	11,797	55.8	47.0	64.2	68	26,476	43.9	29.3	59.5	23	8,106
Cured already	11.8	5.4	23.8	6	2,474	4.8	2.0	10.9	6	2,264	6.6	2.2	18.0	3	1,220
No specialist treatment nearby	1.5	0.2	10.2	1	324	1.7	0.4	6.5	2	803	.	.	.	.	.
Not satisfied with the attitude of the staff	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Not confident with the medication	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Treatment is not effective	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lost confidence with the advice & treatment given	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Given unfriendly services before	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Did not obtain suitable treatment	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Did not receive proper attention	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crowded /uncomfortable	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Have to pay for treatment	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cost is expensive	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Daily wage will be cut / affected	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long waiting time	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Operating hours not suitable	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Place is far	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Too long travelling time	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
No transport	.	.	.	.	.	.	.	.	.	.	1.8	0.3	11.9	1	335
Unable to afford transport fees	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Unable to leave home / child	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
No one to accompany	.	.	.	.	.	0.6	0.1	3.9	1	266	.	.	.	.	.
Treatment is not required	7.8	3.0	18.7	4	1,650	8.1	4.2	14.8	9	3,831	11.2	4.8	24.0	5	2,071
Self-medicate	19.5	10.2	34.2	10	4,104	25.1	18.1	33.7	29	11,900	32.9	20.0	48.9	15	6,073
Able to get medicine without seeing doctor	3.2	0.8	11.8	2	671	1.6	0.4	6.3	2	766	1.7	0.2	11.5	1	323
Afraid to obtain treatment	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Not an emergency	.	.	.	.	.	1.8	0.5	7.0	2	868	1.9	0.3	11.9	1	348
Others	.	.	.	.	.	0.6	0.1	4.2	1	290	.	.	.	.	.

Table 24: Percentage of respondents and reasons for not seeking care for acute diarrhoea disease by location

Socio-demography characteristics	Location									
	Urban					Rural				
	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper		
Mild illness	53.2	49.2	57.2	415	169,101	54.3	50.1	58.5	386	117,820
Cured already	8.0	6.2	10.2	62	25,276	10.8	8.6	13.5	72	23,473
No specialist treatment nearby	0.9	0.4	1.9	7	2,941	1.1	0.5	2.2	7	2,297
Not satisfied with the attitude of the staff	.	<0.1	.	.	.	0.1	<0.1	1.0	1	292
Not confident with the medication	.	<0.1	.	.	.	0.2	<0.1	1.1	1	335
Treatment is not effective	0.1	<0.1	1.0	1	434	0.2	<0.1	1.1	1	348
Lost confidence with the advice & treatment given	0.1	<0.1	0.8	1	370	0.1	<0.1	1.0	1	306
Given unfriendly services before	0.2	<0.1	1.4	2	646	.	.	.	.	.
Did not obtain suitable treatment	0.1	<0.1	1.0	1	434	.	.	.	.	.
Did not receive proper attention	.	.	.	.	.	0.1	<0.1	1.0	1	323
Crowded /uncomfortable	0.1	<0.1	1.0	1	434	.	.	.	.	.
Have to pay for treatment	.	<0.1	.	.	.	0.2	<0.1	1.1	1	348
Cost is expensive	0.1	<0.1	0.7	1	323	0.1	<0.1	1.0	1	292
Daily wage will be cut / affected	0.3	0.1	1.1	2	880	.	.	.	.	.
Long waiting time	0.2	0.1	0.8	2	646	0.1	<0.1	1.1	1	324
Operating hours not suitable	0.1	<0.1	0.9	1	426	.	.	.	.	.
Place is far	0.4	0.1	1.2	3	1,211	0.3	0.1	1.1	2	627
Too long travelling time	0.1	<0.1	0.7	1	323	0.2	<0.1	1.1	1	354
No transport	0.1	<0.1	0.9	1	400	0.9	0.4	2.0	6	1,981
Unable to afford transport fees	.	.	.	.	.	0.3	0.1	1.1	2	585
Unable to leave home / child	.	.	.	.	.	0.5	0.2	1.8	4	1,165
No one to accompany	0.8	0.4	1.9	7	2,621	0.6	0.2	1.5	4	1,235
Treatment is not required	6.0	4.5	8.0	45	19,111	4.8	3.2	7.1	31	10,429
Self-medicate	24.1	20.9	27.6	187	76,597	19.8	16.6	23.4	134	42,921
Able to get medicine without seeing doctor	1.9	1.1	3.1	15	5,922	2.7	1.5	4.7	18	5,847
Afraid to obtain treatment	0.4	0.2	1.1	4	1,321	0.8	0.3	1.8	5	1,684
Not an emergency	2.4	1.5	3.9	18	7,658	1.4	0.7	2.7	9	3,047
Others	0.3	0.1	1.0	2	826	0.4	0.1	1.3	3	936

Table 25: Percentage of respondents and reasons for not seeking care for acute diarrhoea disease by state

Socio-demography characteristics	State														
	Johor					Kedah					Kelantan				
	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper				Lower	Upper		
Mild illness	63.6	54.2	72.0	89	33,749	62.0	52.4	70.8	84	30,470	70.8	59.3	80.1	78	25,953
Cured already	7.3	4.1	12.8	11	3,873	9.3	5.6	14.9	13	4,547	3.6	1.4	8.9	4	1,320
No specialist treatment nearby	1.4	0.3	5.5	2	750	7	1	4.6	1	335	.	.	.	.	.
Not satisfied with the attitude of the staff	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Not confident with the medication	.	.	.	.	.	0.7	0.1	4.5	1	335	.	.	.	.	.
Treatment is not effective	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lost confidence with the advice & treatment given	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Given unfriendly services before	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Did not obtain suitable treatment	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Did not receive proper attention	.	.	.	.	.	.	.	.	.	.	0.9	0.1	5.9	1	323
Crowded /uncomfortable	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Have to pay for treatment	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cost is expensive	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Daily wage will be cut / affected	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long waiting time	0.6	0.1	4.1	1	324	.	.	.	.	.	.	.	.	.	.
Operating hours not suitable	0.8	0.1	5.5	1	426	.	.	.	.	.	.	.	.	.	.
Place is far	.	.	.	.	.	0.7	0.1	4.7	1	335	1.0	0.1	6.6	1	352
Too long travelling time	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
No transport	.	.	.	.	.	1.5	0.4	5.7	2	735	0.9	0.1	5.9	1	323
Unable to afford transport fees	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Unable to leave home / child	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
No one to accompany	.	.	.	.	.	0.8	0.1	5.4	1	400	0.9	0.1	5.9	1	323
Treatment is not required	3.4	1.4	8.1	5	1,825	2.2	0.7	6.5	3	1,069	1.8	0.5	6.6	2	645
Self-medicate	20.2	13.3	29.5	30	10,748	18.0	11.9	26.2	25	8,825	14.8	8.3	24.9	16	5,425
Able to get medicine without seeing doctor	.	.	.	.	.	2.7	0.8	8.6	4	1,338	3.6	1.4	8.9	4	1,320
Afraid to obtain treatment	0.6	0.1	4.1	1	324	0.7	0.1	4.7	1	335	1.8	0.5	7.1	2	674
Not an emergency	2.0	0.7	6.0	3	1,075	.	.	.	.	.	.	.	.	.	.
Others	.	.	.	.	.	0.8	0.1	5.6	1	400	.	.	.	.	.

Table 25: Percentage of respondents and reasons for not seeking care for acute diarrhoea disease by state (continue)

Socio-demography characteristics	State														
	Melaka					N.Sembilan					Pahang				
	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper				Lower	Upper		
Mild illness	62.0	45.5	76.1	22	9,011	57.2	43.4	69.9	35	12,942	55.5	45.5	65.0	63	24,801
Cured already	.	.	.	.	.	6.7	2.6	16.0	4	1,508	8.6	4.7	15.1	10	3,826
No specialist treatment nearby	.	.	.	.	.	.	.	.	.	.	1.6	0.4	6.2	2	708
Not satisfied with the attitude of the staff	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Not confident with the medication	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Treatment is not effective	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lost confidence with the advice & treatment given	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Given unfriendly services before	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Did not obtain suitable treatment	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Did not receive proper attention	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crowded /uncomfortable	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Have to pay for treatment	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cost is expensive	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Daily wage will be cut / affected	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long waiting time	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Operating hours not suitable	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Place is far	.	.	.	.	.	.	.	.	.	.	1.0	0.1	6.4	1	425
Too long travelling time	.	.	.	.	.	.	.	.	.	.	0.8	0.1	5.3	1	354
No transport	.	.	.	.	.	1.5	0.2	9.3	1	332	0.8	0.1	5.0	1	354
Unable to afford transport fees	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Unable to leave home / child	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
No one to accompany	1.8	0.3	11.9	1	266	1.7	0.2	11.4	1	392	1.7	0.4	6.7	2	779
Treatment is not required	8.6	2.9	22.8	3	1,249	.	.	.	.	.	4.4	1.8	10.3	5	1,984
Self-medicate	27.6	14.5	46.1	10	4,014	27.1	17.3	39.7	17	6,125	20.4	13.3	30.1	24	9,139
Able to get medicine without seeing doctor	.	.	.	.	.	5.9	1.5	20.6	4	1,328	.	.	.	.	.
Afraid to obtain treatment	.	.	.	.	.	.	.	.	.	.	0.8	0.1	5.4	1	354
Not an emergency	.	.	.	.	.	.	.	.	.	.	2.7	0.6	11.0	3	1,205
Others	.	.	.	.	.	.	.	.	.	.	1.7	0.5	6.5	2	779

Table 25: Percentage of respondents and reasons for not seeking care for acute diarrhoea disease by state (continue)

Socio-demography characteristics	State														
	Pulau Pinang					Perak					Perlis				
	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper				Lower	Upper		
Mild illness	67.2	54.3	77.9	28	13,569	72.0	59.9	81.5	34	14,039	53.6	29.8	75.8	11	4,015
Cured already	3.3	0.8	12.4	2	674	11.1	5.0	22.7	6	2,163	14.8	5.4	34.8	3	1,113
No specialist treatment nearby	1.8	0.3	11.6	1	370	2.4	0.4	14.1	1	465	.	.	.	.	.
Not satisfied with the attitude of the staff	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Not confident with the medication	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Treatment is not effective	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lost confidence with the advice & treatment given	1.8	0.3	11.3	1	370	.	.	.	.	.	.	.	.	.	.
Given unfriendly services before	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Did not obtain suitable treatment	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Did not receive proper attention	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crowded /uncomfortable	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Have to pay for treatment	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cost is expensive	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Daily wage will be cut / affected	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Long waiting time	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Operating hours not suitable	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Place is far	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Too long travelling time	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
No transport	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Unable to afford transport fees	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Unable to leave home / child	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
No one to accompany	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Treatment is not required	1.5	0.2	9.8	1	305	3.7	0.9	13.3	2	721	4.5	0.7	24.9	1	338
Self-medicate	20.7	12.4	32.5	12	4,175	9.0	3.5	21.1	4	1,756	27.1	11.5	51.5	6	2,030
Able to get medicine without seeing doctor	3.7	0.9	13.4	2	739	.	.	.	.	.	.	.	.	.	.
Afraid to obtain treatment	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Not an emergency	.	.	.	.	.	1.8	0.3	11.4	1	361	.	.	.	.	.
Others	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Table 25: Percentage of respondents and reasons for not seeking care for acute diarrhoea disease by state (continue)

Socio-demography characteristics	State														
	Selangor					Terengganu					Sabah				
	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper				Lower	Upper		
Mild illness	39.0	33.0	45.3	117	46,588	80.4	65.8	89.7	41	14,002	44.5	36.6	52.7	80	24,307
Cured already	8.5	5.5	12.8	24	10,125	3.9	1.2	12.3	2	685	13.8	9.1	20.4	25	7,554
No specialist treatment nearby	1.3	0.5	3.5	4	1,592	2.2	0.3	14.2	1	379	0.5	0.1	3.6	1	292
Not satisfied with the attitude of the staff	.	.	.	.	.	.	.	.	.	.	0.5	0.1	3.7	1	292
Not confident with the medication	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Treatment is not effective	0.4	0.1	2.5	1	434	.	.	.	.	.	.	.	.	.	.
Lost confidence with the advice & treatment given	.	.	.	.	.	1.8	0.2	11.8	1	306	.	.	.	.	.
Given unfriendly services before	.	.	.	.	.	.	.	.	.	.	1.2	0.2	7.6	2	646
Did not obtain suitable treatment	0.4	0.1	2.5	1	434	.	.	.	.	.	.	.	.	.	.
Did not receive proper attention	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crowded /uncomfortable	0.4	0.1	2.5	1	434	.	.	.	.	.	.	.	.	.	.
Have to pay for treatment	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cost is expensive	.	.	.	.	.	.	.	.	.	.	1.1	0.3	4.5	2	615
Daily wage will be cut / affected	0.4	0.1	2.5	1	434	.	.	.	.	.	.	.	.	.	.
Long waiting time	.	.	.	.	.	.	.	.	.	.	1.2	0.3	4.6	2	646
Operating hours not suitable	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Place is far	0.4	0.1	2.5	1	434	.	.	.	.	.	0.5	0.1	3.7	1	292
Too long travelling time	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
No transport	0.2	<0.1	1.7	1	290	.	.	.	.	.	.	.	.	.	.
Unable to afford transport fees	.	.	.	.	.	.	.	.	.	.	1.1	0.3	4.1	2	585
Unable to leave home / child	0.5	0.1	1.9	2	580	.	.	.	.	.	1.1	0.1	7.2	2	585
No one to accompany	0.4	0.1	2.5	1	434	.	.	.	.	.	2.3	0.7	7.3	4	1,261
Treatment is not required	7.6	5.0	11.5	21	9,111	.	.	.	.	.	2.9	1.2	6.9	5	1,584
Self-medicate	33.9	28.2	40.1	98	40,504	9.6	3.5	23.7	5	1,676	23.0	17.6	29.5	41	12,568
Able to get medicine without seeing doctor	2.5	1.2	5.2	7	3,037	2.2	0.3	12.7	1	379	3.9	1.8	8.1	7	2,138
Afraid to obtain treatment	.	.	.	.	.	.	.	.	.	.	0.6	0.1	3.9	1	323
Not an emergency	4.0	2.1	7.3	11	4,773	.	.	.	.	.	1.1	0.3	4.2	2	615
Others	0.2	<0.1	1.7	1	290	.	.	.	.	.	0.5	0.1	3.4	1	292

Table 25: Percentage of respondents and reasons for not seeking care for acute diarrhoea disease by state

Socio-demography characteristics	State														
	Sarawak					W.P Kuala Lumpur					W.P Labuan				
	%	95% CI		n	N	%	95% CI		n	N	%	95% CI		n	N
		Lower	Upper				Lower	Upper				Lower	Upper		
Mild illness	41.6	32.9	51.0	55	21,003	54.0	41.0	66.5	27	10,627	35.0	13.0	66.1	6	1,846
Cured already	16.0	10.6	23.6	21	8,093	12.0	5.5	24.4	6	2,362	17.2	5.4	43.2	3	908
No specialist treatment nearby	0.7	0.1	4.8	1	348	.	.	.	.	.	.	.	.	.	.
Not satisfied with the attitude of the staff	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Not confident with the medication	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Treatment is not effective	0.7	0.1	4.8	1	348	.	.	.	.	.	.	.	.	.	.
Lost confidence with the advice & treatment given	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Given unfriendly services before	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Did not obtain suitable treatment	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Did not receive proper attention	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Crowded /uncomfortable	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Have to pay for treatment	0.7	0.1	4.8	1	348	.	.	.	.	.	.	.	.	.	.
Cost is expensive	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Daily wage will be cut / affected	0.9	0.1	6.0	1	446	.	.	.	.	.	.	.	.	.	.
Long waiting time	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Operating hours not suitable	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Place is far	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Too long travelling time	.	.	.	.	.	.	.	.	.	.	6.1	1.2	25.4	1	323
No transport	0.7	0.1	4.8	1	348	.	.	.	.	.	.	.	.	.	.
Unable to afford transport fees	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Unable to leave home / child	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
No one to accompany	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Treatment is not required	18.3	12.1	26.7	24	9,235	6.0	2.0	16.7	3	1,181	5.5	0.8	29.5	1	292
Self-medicate	12.2	7.1	20.1	16	6,156	26.0	15.2	40.8	13	5,117	23.9	9.3	49.1	4	1,261
Able to get medicine without seeing doctor	3.0	1.0	8.7	4	1,490	.	.	.	.	.	.	.	.	.	.
Afraid to obtain treatment	0.7	0.1	4.7	1	348	.	.	.	.	.	12.2	3.9	32.6	2	646
Not an emergency	4.5	2.1	9.5	6	2,284	2.0	0.3	12.6	1	394	.	.	.	.	.
Others	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Table 26: Percentage of respondents who took time off for acute diarrhoeal illness by socio-demographic characteristics

Socio-demography characteristics	Total Percentage				
	%	95% CI		n	N
		Lower	Upper		
Overall	25.6	23.8	27.4	707	262,307
Age Group					
0-4	25.0	19.9	30.9	65	24,043
5-9	27.0	20.5	34.6	57	22,068
10-19	27.7	24.3	31.3	188	69,665
20-29	27.0	23.3	31.1	134	50,480
30-39	24.3	20.1	29.1	90	33,453
40-49	22.4	18.1	27.3	74	26,866
50-59	22.8	17.5	29.1	49	17,997
60 & above	24.4	18.9	30.9	50	17,735
Gender					
Male	25.3	22.8	28.0	331	122,583
Female	25.8	23.5	28.3	25.8	139,723
Ethnicity					
Malay	26.0	23.8	28.4	441	165,396
Chinese	21.8	17.8	26.5	77	30,878
Indian	24.6	19	31.2	53	21,354
Other Bumis	28.4	23.7	33.5	117	38,234
Others	23.8	15.5	34.9	19	6,444
Educational Level					
None	30.9	26.4	35.8	134	49,914
Primary	22.2	19.2	25.5	160	58,106
Secondary	25.6	23.0	28.5	269	100,078
Tertiary	27.1	21.5	33.5	58	22,508

Table 26: Percentage of respondents who took time off for acute diarrhoeal illness by socio-demographic characteristics (continue)

Socio-demography characteristics	Total Percentage				
	%	95% CI		n	N
		Lower	Upper		
Monthly Household Income Group					
Less than RM 400	27.0	21.4	33.4	67	23,569
RM 400 - RM 699	22.9	19.0	27.3	99	34,794
RM 700 - RM 999	30.0	22.2	29.0	90	32,401
RM 1000 - RM 1999	25.5	23.9	29.0	90	70,315
RM 2000 - RM 2999	26.9	22.7	31.6	111	18,246
RM 3000 - RM 3999	22.8	17.3	29.4	48	18,248
RM 4000 - RM 4999	24.5	16.9	34.6	24	9,431
RM 5000 & above	24.5	19.8	30.1	56	22,424
Unclassified	25.1	17.4	34.9	22	8,241
Location					
Urban	25.2	22.8	27.6	376	154,760
Rural	26.2	23.7	29.0	331	107,546
State					
Johor	35.1	29.2	41.6	104	39,834
Kedah	20.5	16.0	25.7	59	20,792
Kelantan	19.5	13.9	26.7	33	10,909
Melaka	22.9	12.5	28.2	16	7,188
N. Sembilan	20.9	14.5	29.3	26	9,473
Pahang	29.4	23.8	35.7	54	20,829
Penang	20.1	13.7	28.4	23	7,980
Perak	25.8	17.7	36	25	9,747
Perlis	20.0	10.2	35.4	6	2,128
Selangor	26.4	22.6	30.7	148	60,757
Terengganu	23.7	15.1	35.1	25	8,742
Sabah	26.6	21.5	32.3	86	26,153
Sarawak	25.7	20.5	31.6	71	26,471
W.P. Kuala Lumpur	19.8	13.3	28.5	20	7,872
W.P. Labuan	32.7	20.1	48.3	11	3,430

Table 27: Percentage of respondents who experienced limitation of activities from acute diarrhoeal illness by socio-demographic characteristics

Socio-demography characteristics	Total Percentage				
	%	95% CI		n	N
		Lower	Upper		
Overall	40.3	38.4	42.3	1116	412,969
Age Group					
0-4	42.9	36.8	49.3	111	40,644
5-9	45.7	38.1	53.4	99	37,061
10-19	39.5	35.9	43.3	269	99,249
20-29	42.5	38.1	47.0	213	79,827
30-39	36.8	32.1	41.8	136	50,479
40-49	40.2	34.9	45.9	130	48,272
50-59	32.9	26.9	39.4	72	26,198
60 & above	42.7	36.0	49.7	86	31,238
Gender					
Male	39.1	36.2	42.0	515	189,058
Female	41.4	38.8	44.0	601	223,911
Ethnicity					
Malay	41.3	38.9	43.9	706	262,732
Chinese	35.5	30.7	40.7	128	50,520
Indian	40.4	33.7	47.5	88	35,212
Other Bumis	40.4	35.3	45.6	162	53,536
Others	40.6	30.1	52.0	32	10,969
Educational Level					
None	46.6	41.5	51.8	203	75,424
Primary	37.3	33.8	40.9	269	97,675
Secondary	38.5	35.6	41.5	405	150,210
Tertiary	44.0	37.5	50.7	93	36,766

Table 27: Percentage of respondents who experienced limitation of activities from acute diarrhoeal illness by socio-demographic characteristics (continue)

Socio-demography characteristics	Total Percentage				
	%	95% CI		n	N
		Lower	Upper		
Monthly Household Income Group					
Less than RM 400	43.6	37.2	50.2	106	38,044
RM 400 - RM 699	40.7	35.7	45.7	177	61,660
RM 700 - RM 999	40.3	34.0	46.9	121	43,631
RM 1000 - RM 1999	38.9	35.3	42.6	291	107,123
RM 2000 - RM 2999	41.1	36.1	46.3	174	65,396
RM 3000 - RM 3999	35.1	28.5	42.4	72	28,107
RM 4000 - RM 4999	44.5	34.4	55.1	43	17,003
RM 5000 & above	43.0	37.0	49.3	99	39,327
Unclassified	38.1	28.7	48.5	33	12,678
Location					
Urban	40.6	38.0	43.2	611	249,708
Rural	39.9	37.0	42.9	505	163,261
State					
Johor	47.9	42.2	53.8	145	54,557
Kedah	29.6	23.8	47.7	84	29,945
Kelantan	39.8	32.4	47.7	67	222,258
Melaka	45.9	34.3	58.0	33	14,192
N. Sembilan	34.8	26.3	44.4	44	15,990
Pahang	41.2	34.0	48.8	76	29,046
Penang	40.9	31.8	50.7	46	16,156
Perak	38.4	29.0	49.0	37	14,806
Perlis	20.0	9.0	38.7	6	2,128
Selangor	42.1	38.1	46.3	237	96,925
Terengganu	41.2	30.9	52.2	44	15,211
Sabah	42.7	36.6	49.0	137	41,890
Sarawak	38.0	32.1	44.2	103	38,784
W.P. Kuala Lumpur	39.6	30.6	49.4	40	15,744
W.P. Labuan	50.9	34.2	67.3	17	5,337

CHAPTER II

ACUTE RESPRIRATORY ILLNESS

ABSTRACT

Acute upper and lower respiratory infections (ARIs) make up significant proportion of outpatient visits and hospitalisations among adults and children worldwide. This study is to provide community based information on the epidemiology of ARI for intervention programmed. A cross sectional population-based study, with a pre-coded questionnaire in ARI module via face-to-face interview was used. The incidence of ARI was 18.0% (CI: 17.5 - 18.5) in all age groups. The commonest illness reported was common cold [16.9% (CI: 16.4 - 17.4)]. The highest incidence of ARI was among children less than 5 years old [28.8% (CI: 27.4 - 30.2)]. Single house and household of five or less had the lowest incidence of ARI [12.3% (CI: 10.4 - 14.3) and 17.3% (CI: 16.7 - 17.8) respectively]. The median duration of sickness was 3 days with pneumonia having the longest sickness duration of 7 days. ARI affected daily activities of 30.8% of the population (CI: 29.7 - 31.8) and 60.6% of the population having ARI sought treatment (CI: 59.4 - 61.7). Patients took a minimum of 2 days after onset of illness to seek treatment (94.7%). Most of them went to private hospitals and clinics for treatment (45.8%). 58.9% of population who did not seek treatment for ARI perceived that their illness was mild or not serious. Meanwhile 19.2% (CI: 17.7 - 20.7) of the population took self-medication. The incidence of ARI was 18.0%. 60.6% population sought treatment and fifty percent of them went to private health facilities. One third of the population reported that their daily activities were affected by ARI.

1. INTRODUCTION

Acute Respiratory Infections (ARI) are a worldwide problem. It one of the major cause of morbidity and mortality especially in young age group. World Health Organisation (WHO) reported that ARI cases make up a large proportion of patients attended by health care workers in health facilities. WHO estimated that death due to ARI (including pneumonia and influenza) in 1999 was 4 million, whereby 514,000 cases occur in Western Pacific region.

This study is a preliminary assessment of ARI among all groups of Malaysian population. It will provide information on ARI that may be useful to support and guide MOH on policy making related to respiratory infections. An assessment on the impact of respiratory infections to Malaysians may help MOH to focus and enhanced on intervention programmes for ARI.

2. LITERATURE REVIEW

ARI is defined as an acute infection affecting ears, nose, throat, larynx, trachea, bronchi, bronchioles or lungs (Enarson et al. 1998). Haramati defined ARI as any patient with one or more of the following: cough, sputum, chest pain, dyspnea, (with or without fever) (Haramati et al. 2005). ARI is further divided into upper respiratory tract infection (URTI) and lower respiratory tract infection (LRTI). An URTI is considered when a person has sign and symptoms of nose, pharynx, tonsil, epiglottis, larynx, trachea and ears infection, meanwhile LRTI indicates infection of bronchioles and lung tissues.

Many countries reported ARI as a major cause of morbidity and mortality. The National Health Interview Survey (NHIS) in the United States, 1993 reported that over 250 million cases of ARI occur yearly in the nation (Kerr et al. 2002). A report from Appropriate Health Resources and Technology Action Group (AHRTAG), London (1985) quoted that 500 to 900 million ARI episodes per year occur in developing countries (Sikolia et al. 2002). In 1998, Thailand's passive disease reporting system recorded an annual rate of 226.5 per 100,000 population admitted to government hospitals with pneumonia (Garibaldi 1985). Many studies on ARI among children less than 5 years old have been conducted. The prevalence varies among countries and regions.

Table 2.1: Prevalence of ARI among children less than 5 years old in several countries

Country	% of children <5 years old with ARI 2 weeks prior to survey	Year study conducted
Nepal	34.1	1996
India	19.3	1999
Bangladesh	18.3	2000
Philippine	16.2	1999
Vietnam	9.3	2000
Indonesia	9.0	1999

Source: UNICEF 2003

The Malaysian National Health Morbidity Survey (NHMS I) conducted in 1986 / 87 noted that the prevalence of ARI among children below 5 years within 2-week period prior to interview was 28%. Of these, 3% had severe ARI, 7% had moderate and 18% had mild ARI (Maimunah & Patmanathan 1987). In Lye et al. (1994) study in 3 districts in Kelantan, they noted that 30% of children below 7 years experienced ARI in 2-week period prior to interview. Ninety four percent (94%) of them had mild ARI, 1% had moderate and 5 per cent had severe ARI. Twenty-four and 39% of severe and moderate ARI, respectively, were reported by mothers to be mild (Lye et al. 1994).

The prevalence of ARI among children less than 5 years old in NHMS II 1996 was 39.3%. Upper respiratory infection made up 91.1% of these infections and 8.9% were lower respiratory infection (Nora'I et al. 1997). Respiratory infection was responsible for 4.6% of total burden of disease in Malaysia in 2000. Acute lower respiratory infections contributed to two third of the respiratory infection burden (Division Burden of Disease 2004). In 2005, disease of respiratory system was the 5th leading cause of hospital admission in Malaysian government hospitals with pneumonia as the 6th leading cause of mortality (Ministry of Health Malaysia 2005).

Data from Indonesia Disease Health Survey (DHS) in 1997 indicated that prevalence of a cough in 2 weeks preceding the survey among children under 5 years was 27% and the incidence was 24%. Children born to mother with no education have slightly lower prevalence and incidence rate of cough than children of mother who have attended school (Ministry of Health Indonesia 1997).

Meanwhile Ajit Pradhan in his study in Nepal (2001) noted that the prevalence of ARI among children in less than 5 years of age within 2 weeks preceding the survey was 23%. He also noted that children in urban area were more likely to suffer from ARI as compared to children in rural area and there was no difference in mean number of ARI episodes by gender. Children of illiterate mothers suffered less from ARI as compared to those of literate mother (Department of Health Services 2002).

ARI cause a significant proportion of outpatient visits and hospitalisations among adults and children worldwide. In developing countries, ARI account for up to 50% of visits by children to health facilities and an estimated four million deaths annually (Garenne et al. 1992; West et al. 1999). In adults, pneumonia is also a leading cause of hospitalisation and death, although the focus on adults in developing countries has not been as intense as that for children (Han et al. 1999; Scott et al. 1996; Scott et al. 2000; Steen et al. 2001).

UNICEF reported that less than 50% of children with ARI were taken to an appropriate health care provider. This information derived from nearly half of the 81 countries with available ARI data. South Asia's highest country rate for taking children with ARI to a health provider was found in India (64%), while in East Asia and as for the Pacific, the highest rate was in Mongolia (78%) (UNICEF 2003). In the United States, approximately 77% of patients with pneumonia receive treatment on an outpatient basis (Kerr et al. 2002).

Mothers in Nepal and Guatemala were more likely to seek care when they perceived the illness as serious (Chandrashekar et al. 2006; Goldman & Heuveline 2000). Study in Guatemala also noted that families were more likely to seek treatment from health care provider when the children experienced fever and gastrointestinal than when suffering from respiratory signs and symptoms (Goldman & Heuveline 2000).

Study in Singapore by Tan et al. (2006) reported that more than one-third of patients with URTI believed that the illness will resolve by its own. Subjects believed in this belief were not significantly different in term of gender, ethnic group, educational status and age. They are 2.1 times (CI: 1.3 - 3.2) more likely to self medicated (Tan et al. 2006). Knowledge on URTI will resolve on its own is associated with appropriate health-seeking behaviour.

In Guatemala, mother believed about the causes of ARI was an important determinant of whether a child is to be brought to a provider and the type of provider visited. However poverty was a serious constraint on a family's choice about how to treat children illness; where as education and ethnicity have little effect on treatment behaviour when income is held constant (Goldman et al. 2002).

ARI especially LRI may affect one's daily activities. It may cause direct lost due to sick leave or admission to hospital, or indirect lost when the caretaker has to take leave to look after the sick due to ARI. The National Health Information System (NHIS) - United States, 1993 reported that women aged 18 – 44 years had 394.2 restricted activity-days per 100 persons per year due to ARI (Kerr et al. 2002).

A study among a group of subjects who had recent cough and consulted a GP was compared to those who had not consulted any GP, noted that consulting patients perceived their cough as a non-trivial illness. They also perceived that their symptom to be abnormally severe and would interfere with their social roles. Meanwhile, non-consulting subjects regarded their cough as 'normal', mild and did not interfere with their social life (Conford 1999).

3. OBJECTIVES

3.1 General Objective

To provide community based data and information on the epidemiology of acute respiratory infections to enable the Ministry of Health Malaysia to review the program planning, strategies and activities for the allocation of resources in relation to these illnesses.

3.2 Specific Objectives

3.2.1 To determine the incidence rates of acute respiratory infections in the community.

3.2.2 To determine the health seeking behaviour of the community in relation to acute respiratory infections.

3.2.3 To assess the impact of acute respiratory infections on productivity by estimating the days of limitation of activities and days of loss of work or school.

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

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:

Stratum	Population of gazetted areas
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.

4.2.3 Sample size

In the course of sample selection, 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.

4.2.4 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.

4.3 The Questionnaire and Household Interview

4.3.1 The questionnaire

A bi-lingual (Bahasa Malaysia and English) pre-coded questionnaire was designed, pre-tested and piloted prior to the survey.

Certain terminology and items in the questionnaire were also had been made available in the dialects or languages of the main ethnic groups in Malaysia, such as Hokkien and Cantonese for the Chinese and Tamil for the Indians. All versions were back translated to English by independent reviewers to ensure the accuracy of the translations

Self-administered questionnaires were also developed for a sub-sample of household members for questions pertaining to sensitive issues or areas such as sexual behaviour and practices. The self-administered questionnaires were left with the selected household members to be collected by the team members at a later time or day.

4.3.2 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. For the first part of the interview which covers sections on general household, socio-demographic and economic profile, load of illness, health utilization and consumption cost, a trained non-medical or paramedical interviewer conducted the interviews. Sections pertaining to specific health problems and involving blood or other physical or medical examination was conducted by trained nurses.

4.4 Method of Data Collections

a) The questionnaires

All research topics for the questionnaire are arranged into modules ranging from A to Z. Topics that are similar area are arranged into sub-modules under a particular module. Questions comprised of both close ended and open ended. The questions in each module were tailored to the target group. Two types of questionnaires were developed i.e. face to face and self administered based on the requirements of the research subgroups and the research topics involved.

i) Face to face interview questionnaire

The face to face interview questionnaires consisted of 2 subtypes, i.e., the household questionnaire (orange) to be answered by the head of the household of the LQ selected, and the individual questionnaire, to be answered by each member of the household. Four types of individual FI questionnaires were developed, to cater to the different age groups of less than 2 years old (pink), 2 to less than 13 years old (blue), 13 to less than18 years old (yellow) and 18 years old and above (purple).

For those aged below 13 years old, the child's parents or guardians were responsible for answering on his or her behalf. Those aged 13 years and above are required to answer their respective questionnaires directly through the interview.

All the FI questionnaires have 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.

4.5 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 the month of 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:

a) Testing of the questionnaire
b) Testing of the field logistic preparation
c) Testing of the scouting activities
d) 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 class-room and individual practice under supervision was conducted during the training.

4.6 Quality Control

Quality control procedures for the data collection were done at two stages, field and central. Please refer to NHMS III protocol for detail 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 Definition of variables

i. Acute Respiratory Infection (ARI)

ARI is defined as having one or more symptoms of upper respiratory infection (URI) or lower respiratory infection (LRI) within the last two weeks before the interview date.

Table 2.2: Classification and presumed diseases of ARI

Classification	Presumed Disease *	Symptoms
URI	Influenza Like Illness (ILI)	Fever, sore throat, dry cough and/or nasal blocked / discharge
	Common cold / coryza	Nasal blocked / discharge and /or fever
	Pharyngitis / Tonsilitis	Fever and sore throat; and /or cough (dry or productive) and/or difficulty in swallowing
	Epiglotitis / Laryngitis	Fever, sore throat, hoarseness of voice and/or difficulty in swallowing
	Otitis	Earache/purulent ear discharge and/or fever
LRI	Pneumonia	Fever, productive cough, chest pain, difficulty in breathing and/or cyanosis
	Bronchitis and bronchiolitis	Fever, noise breathing, difficulty in breathing and/or cough (dry or productive) and/or cyanosis

Source: (Haramati et al. 2005; Purushothama & Chien 2005)
** Note: These presumed diseases were not physician diagnosed or countercheck by any health professionals.*

Presumed diseases of URI and LRI were further identified by group of symptoms. Symptoms of URI included fever, cough, nasal discharge, nasal block, sore throat, hoarseness of voice/lost of voice, difficulty in swallowing and earache or ear discharge. Symptoms of LRI included fever, productive cough, difficulty in breathing, noisy breathing and cyanosis.

5. FINDINGS

5.1 General Findings

The total number of eligible respondents of all ages for ARI module was 56,710. The number of respondents who answered the module was 55,872 with response rate of 98.52%. About 57.8% of the respondents lived in urban areas and 42.2% in rural areas. Among the non-respondents, 54.2% lived in urban areas.

By state, the proportions of respondents and non-respondents differed. About 16.8% of the respondents were from Selangor, followed by 12.8% from Sabah and 11.1% from Johor. Only 0.9% & 1.6% were from Perlis and Labuan respectively. Majority of the non-respondents were from Perak (17.1%), followed by from Sarawak (15.6%) and from Selangor (12.4%). Only 0.5% and 0.1% of non-respondents were from Melaka and Perlis respectively.

Forty-two percent (42%) of the respondents were children and young adults aged 20 years and below. There were slightly more females compared to males, comprising of 52.9% and 47.1% respectively among the respondents. Malays formed the highest percentage (57.4%) of the respondent population, followed by Chinese (18.1%) and Other Bumiputras (12.5%). Indians and other ethnicities comprised of 7.8% and 4.3% respectively.

Majority of our respondents or 37.8% attained a highest level of secondary education followed by 31.1% attaining primary education and 23.2% had no education. Only 7.0% had attained tertiary education. Among the non-respondents, majority or 29.6% had attained a highest level of primary education. A smaller proportion of only 3.3% had attained tertiary education.

As for marital status, majority of respondents or 43.4% were married, followed by 22.1% never married and 4.6% divorced or widowed. A similar picture was seen among the non-respondents. However, 29.6% of the respondents' marital statuses were not applicable (below 16 years old).

With regards to religion, 67.5% of the respondents professed Islam. Buddhism, Christianity, and Hindus were 15.4%, 9.1% and 6.4% respectively. Malaysians comprised 95.0% of the respondents.

Majority of the respondents (61.9%) were from a household income of RM1,999 or below. Only 11.7% had a household income of RM4,000 or more.

5.2 Incidence of ARI

The incidence of ARI occurring in all age groups was 18.0% (CI: 17.5 -18.5). Upper respiratory tract infection (URI) incidence was higher than lower respiratory tract infection (LRI), 18.0% (CI: 17.5 - 18.5) and 0.47% (CI: 0.4 - 0.5) respectively. The commonest infection reported was common cold with the incidence 16.9% (CI: 16.4 - 17.4) followed by pharyngitis /tonsillitis 2.9% (CI: 2.7 - 3.0), epiglotitis/ tonsillitis 1.0% (CI: 0.9 - 1.1), ILI 1.0% (CI: 0.9 - 1.0), otitis 0.8% (CI: 0.7 - 0.9). For LRI diseases, incidence of bronchitis /bronchiolitis was 0.4% (CI: 0.3 - 0.5) and incidence of pneumonia was only 0.2% (CI: 0.2 - 0.2)

Episode of ARI in the population was 4.7 episodes per person per year with assumption of within 2 weeks; a person suffers only an episode of ARI. The highest episode was common cold with 4.4 episodes per person per year.

5.2.1 Incidence of ARI by sex

There was no significant difference in overall ARI incidence between male and female, however, for pharyngitis / tonsillitis and epiglotitis / laryngitis, the incidence was higher in female [3.1% (CI: 2.9 - 3.4) and 1.2% (CI: 1.1 - 1.4) respectively] as compared to male [2.5% (CI: 2.3 - 2.8) and 0.8% (CI: 0.7 - 0.9) respectively] and the differences were significant.

5.2.2 Incidence of ARI by age groups.

The highest incidence of ARI was in age group 1 to 4 years old (toddler) with 29.7% (CI: 28.1 - 31.2) followed by infant (less than 1 year old) with 24.9% (CI: 22.1 - 27.6) and age group of 12 to 16 years old, 24.8% (CI: 23.5 - 26.1). The incidence of ARI for children less than 5 years old was 28.8% (CI: 27.4 - 30.2). The lowest incidence of ARI was in the age group of 55 to 64 years old and above 65 years [10.7% (CI: 9.7 - 11.7) and 11.7% (CI: 10.5 - 12.8) respectively]. Episode of ARI among toddler was 7.7 episodes per toddler per year.

The similar findings as for ARI were also noted for URI. The highest incidence of common cold was in toddler and infant age groups with 29.0% (CI: 27.5 - 30.5) and 24.4% (CI: 21.6 - 27.1) while other URI diseases such as ILI, pharyngitis/ tonsillitis, epiglotitis and otitis the highest incidence was in the age group of 17 to 24 years old.

The highest incidence of LRI was noted in the infant age group with 1.1% (CI: 0.4 - 1.7) followed by those aged more than 65 years old with 0.6% (CI: 0.3 - 0.9). Pneumonia was highest in the elderly group of more than 65 years old [0.4% (CI: 0.2 - 0.7)], while bronchitis /bronchiolitis was highest in infant followed by toddler group [0.94% (CI: 0.4 -1.5), 0.5% (CI: 0.3 - 0.8) respectively].

5.2.3 Incidence of ARI by ethnicity, religion and citizenship

Indian showed highest incidence of ARI as compared to other ethnicities. There was significant difference of ARI incidence among the Indian 22.9% (CI: 21.2 - 24.5), Malay 20.5% (CI: 19.9 - 21.2) and Other Bumiputera 17.4% (CI: 16.1 - 18.1) ethnicities. Chinese had the lowest incidence of ARI 10.5% (CI: 9.7 - 11.3).

Hindu showed highest incidence [23.1% (CI: 21.2 - 25.0)] followed by Muslim [19.7% (CI: 19.1 - 20.3)] and Christianity [17.6% (CI: 16.2 - 19.0)]. The incidence of ARI was significantly higher among Malaysian [18.4% (CI: 17.9 - 18.9)] as compared to non-Malaysian [10.3% (CI: 8.9 - 11.6)].

5.2.4 Incidence of ARI by education level and marital status

There was no difference in incidence of ARI between educational levels of population. However, the highest incidence was noted among those attained secondary education [17.6% (CI: 17.0 - 18.3)]. Those aged 16 years old and not married had the highest incidence of ARI [22.8% (CI: 21.9 - 23.7)] while widow/widower had the lowest incidence of 12.1% (CI: 10.7 - 13.6).

5.2.5 Incidence of ARI by occupational group and household income

There was no significant difference in ARI incidence between all the occupational groups and household incomes. The highest ARI incidence was among clerical workers with 17.3% (CI: 15.5 - 19.2), followed by craft and related trade workers 16.9% (CI: 15.2 - 18.7). The lowest incidence was among housewives, 12.8% (CI: 12.0 - 13.6).

5.2.6 Incidence of ARI by type of housing area, type of house, type of family and household numbers

Those living in village had higher incidence of ARI as compared to housing estate / area [19.3% (CI: 18.5 - 20.1) and 17.0% (CI: 16.2 - 17.7) respectively]. There was no significant difference for house types among the population. Single household had the lowest incidence of ARI [12.3% (CI: 10.4 - 14.3)] as compared to nuclear [18.0% (CI: 17.5 - 18.6)] and extended family [18.8% (CI: 17.9 - 19.7)] types. The ARI incidence was lowest in the household of five or less [17.3% (CI: 16.7 - 17.8)] as compared to household of 6 to 10 members [19.5% (CI: 18.7 – 20.4)].

5.2.7 Incidence of ARI by state

Negeri Sembilan, Kedah, Wilayah Persekutuan Labuan and Terengganu had high incidence of ARI with 26.7% (CI: 24.3 - 29.1), 25.6% (CI: 23.7 - 27.4), 24.5% (CI: 21.0 -28.0) and 22.6% (CI: 20.3 - 24.9) respectively. The similar findings noted for URI, however, for LRI the highest incidence was in Kedah [0.8% (CI: 0.6 - 1.2)], followed by Melaka [0.8% (CI: 0.4 - 1.4)] and Selangor [0.7% (CI: 0.5 - 0.9)].

For infant group (age below 1 year old), ARI was highest in Pahang with incidence of 43.6% (CI: 27.8 - 59.3) followed by Labuan, Terengganu, Negeri Sembilan and Kedah. In toddler age group (1 – 4 years old), incidence of ARI was high in Negeri Sembilan, Kedah, Terengganu and Pahang.

5.2.8 Incidence of ARI by residence

The overall incidence of ARI was significantly higher in rural area than in urban area, where in rural area it was 20.0% (CI: 19.2 - 20.8) while in urban areas it was 16.9% (CI: 16.3 -17.5). URI in rural was higher or 19.9% (CI: 19.1 - 20.7) as compared to urban with 16.9% (CI: 16.2 - 17.5) with the same picture for LRI [0.6% (CI: 0.5 - 0.7)] in rural and 0.4% (CI: 0.3 - 0.5) in urban. The commonest URI disease was common cold both for rural and urban areas followed by pharyngitis/ tonsillitis. Common cold and pharyngitis /tonsillitis incidence in rural was 18.6% (CI: 17.8 - 19.4) and urban 15.9% (CI: 15.3 - 16.5); and 2.9% in rural (CI: 2.7 - 3.2), 2.8% in urban (CI: 2.6 - 3.1) respectively. As for LRI, commonest illness noted was bronchitis /bronchiolitis followed by pneumonia. Pneumonia was also higher in rural [0.2% (CI: 0.2 - 0.3)] than urban [0.2% (CI: 0.1 - 0.2)].

For Negeri Sembilan, the incidence of ARI in rural was 28.8% (CI: 25.0 - 32.6) while in urban area was 25.1% (CI: 22.8 - 28.1). As for Kedah, 25.9% (CI: 23.6 - 28.2) in rural and 25.1% (CI: 22.0 - 28.2) in urban. There were significant difference between incidence of ARI for rural and urban areas in Selangor and Sarawak, whereby ARI was higher in rural (Selangor 19.7% (CI: 18.5 - 20.9); Sarawak 13.2% (CI: 10.8 - 15.6) as compared to urban areas (Selangor 24.0% (CI: 21.2 - 26.9); Sarawak 19.6% (CI: 17.3 - 22.0).

5.3 Severity of ARI

The mean duration of sickness from ARI was 4.4 days (CI: 4.3 - 4.4) and the median was 3 days. However those with pneumonia had longer sickness duration, mean of 7.1 days (CI: 5.8 - 8.3) with median of 7 days. While bronchitis / bronchiolitis and otitis both had mean days of illness of 5.8 days (CI: 5.1 - 6.5, median 4 days) and 5.6 (CI: 5.1 - 6.1, median 4 days). The percentage of population who suffer ARI more than the mean duration of sickness was 34.6%.

A total of 1.1% of ARI were hospitalised (CI: 0.8 - 1.4). Respondents with symptoms of bronchitis/ bronchiolitis had the highest admission rate of 8.1% (CI: 3.8 - 12.4) followed by pneumonia with 7.9% (CI: 1.7 - 14.1). For illnesses such as otitis, epiglotitis / laryngitis, pharyngitis and ILI, the range of hospitalisation rate was between 2.0% - 3.2%. The lowest rate of admission was for common cold.

The mean duration of hospitalisation was 4.7 days (CI: 3.6 - 5.8) with median of 3 days. The percentage of population who were hospitalised more than the mean duration of hospitalisation was 34.0%.

5.4 Health Seeking Behaviour

Most Malaysians who were having ARI sought treatment when they had the illness [60.6% (CI: 59.4 - 61.7)]. They took minimum of 2 days after onset of illness to seek treatment (94.7%). Majority of the respondent (45.8%) who sought treatment went to private hospitals or clinics as the first place for treatment, while 38.4% went to government hospitals or clinics. However, 11.5% got their medicine from medicine hall, Chinese medicine shop or pharmacy.

For those who did not seek treatment for ARI, 58.9% (CI: 57.0 - 60.8) perceived sickness as mild or not serious while 19.2% (CI: 17.7 - 20.7) self-medicate. These reasons were common for all ARI diseases.

5.5 Lost of Productivity

A total of 30.8% (CI: 29.7 - 31.8) of the population reported that their daily activities were affected by ARI. Higher percentage of LRI sufferers reported that their daily activities were affected by their illness as compared to other ARI diseases.

The mean duration of sickness leave because of the illness was 0.7 days (CI: 0.7 - 0.8) with median of 0 day. The percentage of population who took sickness leave more than the mean of 0.7 was 33.4%.

Meanwhile the mean duration of sickness leave taken by caretaker to take care of their children having ARI was 0.9 days (CI: 0.8 - 1.0), with median 0 day. The percentage of them took leave more than the mean duration of 0.9 was 39.9%.

5.6 Cost of Treatment

The average cost spent from own pocket for paying for the ARI treatment was RM 16.85 (CI: 13.63 - 20.07) with median of RM 3.00. The highest cost paid was for pharyngitis / tonsillitis with mean of RM 24.31 (CI: 10.67 - 37.94) and median of RM 10.00, followed by otitis mean RM 23.19 (CI: 5.60 - 40.78) median RM 2.00, pneumonia RM 20.91 (CI: 11.87 -29.95) median RM 2.00 and bronchitis/ bronchiolitis RM 20.68 (CI: 13.91 - 27.44) median RM 1.00. The least average cost spent out of own pocket was for common cold, RM 15.73 (CI: 13.10 - 18.37, median RM 3.00).

6. DISCUSSION

The definition of ARI used in this study was comparable with other studies (Department of Health Services 2001; Koch et al. 2002; Neil 1990). Acute respiratory infection (ARI) was defined as a disease with one or more symptoms of upper respiratory infection (URI) or lower respiratory infection (LRI) according to site of primary pathology (Enarson et al. 1998; Haramati et al. 2005; Koch et al. 2002; Purushothama & Chien 2005). This is based on ARI syndromes and is compatible with International Classification of Disease (ICD) (Neil 1990).

In our study, the presumed illness was based on symptoms of ARI. It was difficult to differentiate the primary pathology of illnesses and the anatomical symptomatology because of no medical examination by qualified personnel. There might be an overlapping or difficulty to ascertain the illness. However, for each illness, there was a distinct feature. For example, epiglotitis and pharyngitis was differentiated by the existence of hoarseness of voice (Haramati et al. 2005). We used incidence in our study because any illness experienced by the respondents within the 14 days before the interview was considered as an episode of ARI. This was similar to study done by Koch et al. (2002) in Greenland. Majority of ARI episodes lasted within 14 days and is an acute self limiting condition (Koch et al. 2002; Ministry of Health Indonesia 1997).

The incidence of ARI in this study was 18.0%. This can be considered representative of the Malaysia population. In this study 10% prevalence rates for health problems was used to calculate the expected yield of the responses and it also enabled us to compare the ARI incidence between the stratum in states. The incidence of URI was 18.0% while the LRI was only 0.5%. Hence, only the URI incidence especially common cold with incidence of more than 10% comparable between states and their stratum. Other illnesses were not comparable at state levels.

We reported that the episode of ARI in the Malaysian population was 4.7 episodes per person per year and in toddlers were 7.7 episodes per toddler per year. Various studies noted that children aged less than 5 years suffer between 4 to 9 episodes of ARI per year (Cant et al. 2002; Department of Health Services 2001; Neil 1990; Vathanophas et al. 1990). A longitudinal study in Thailand in 1986 – 1987 noted that the overall incidence of ARI among children less than 5 years was 11.2 episodes per child-year (Vathanophas et al. 1990).

Report on Malaysian Burden of Disease 2000 stated that the per capita burden of disease for respiratory infection predominantly occurred in males (Malaysian Burden of Disease and Injury Study

2004). As compared to our study, there was no significant difference in overall ARI incidence between male and female. However we noted in our study, the incidence of URI was significantly higher among the females.

The National Health Morbidity Survey (NHMS) I and II, focused only on children aged five years and below. It was reported in most studies that ARI was the most common cause of morbidity and mortality for this age group (Azizi et al. 1995; Karevold et al. 2006; Neil 1990; Savitha et al. 2007). In this study, we noted that those age 0 to 4 years had the highest incidence of ARI (29.0%). It was comparable with NHMS I and II which were 28% and 39.3% respectively.

Common cold and bronchiolitis were reported more in infants and toddlers as compared to other age group. This may be due to the history of symptoms were given by parents / guardians, not by the child as they could not express the symptoms of sorethroat, chest pain and could not cough out sputum. Unlike diseases like ILI, pharyngitis, tonsillitis, epiglotitis and otitis; it was reported high in those age 17 to 24 years. They could express themselves better and many external factors (Vathanophas et al. 1990) made them exposed to these illnesses.

We also noticed that the incidence of LRI was higher among infants and those aged more than 65 years old. This finding was similar with finding in Malaysian Burden of Disease Report 2000 which noted that LRI predominantly occurred in elderly males (Malaysian Burden of Disease and Injury Study 2004).

This study also noted that the incidence of ARI was significantly highest among the Indian. A case-control study by Azizi et al. (1995) among hospitalised children aged one month to 5 years noted that Malay had 2 times risk of getting ARI [OR = 2.1% (CI: 1.3 - 3.4)]. However, these two findings were incomparable because they were done in two different setting and study population.

In regards to education level, occupation, household income and marital status, it was not associated significantly with ARI. This finding was similar with findings of Graham 1990 in United State. He found that maternal education did not affect the prevalence of ARI, instead it had consistent relation with ethnicity (Neil 1990). A study in India conducted by Savita et al in 2002 among hospitalised children aged less than 5 years noted that there was a significant socio-demographic risk factors associated with ARI. The factors were parental illiteracy, low socioeconomic status, overcrowding and partial immunization (Karevold et al. 2006; Savitha et al. 2007).

The incidence of ARI was noted to be low in Kuala Lumpur, Penang and Perak. These states were categorised as a more developed state, unlike the less developed states like Kedah, Labuan and Terengganu. The states were categorised by Malaysian Economic Planning Unit based on composite development index, which comprised of 10 indicators including infant mortality rate and number of doctors per 10,000 of population (Eight Malaysia Plan 2001 - 2005; 2001). Study done by Koch et al. 2002 noted that developed and industrialised countries had low incidence of ARI. Our study also noted that the incidence of ARI was higher in rural area and among those staying in village and land development area. Further study needs to be done to explore the specific factors associated with the low incidence of ARI in urban area.

This study also noted that a single household had the lowest incidence of ARI; while both nuclear and extended family types had almost the same incidence. However, when looking at numbers of household members, those household with 6 to 10 members had the highest incidence of ARI. These

finding was similar with Azizi et al. (1995), who noted that a risk for ARI was significantly high in a household with more than five members [OR = 1.5% (CI: 1.0 - 2.2)] (Azizi et al. 1995). ARI are contagious diseases and the incidence is always associated with large family size, crowded living conditions and stressful living environments; which will favour propagation of the infectious agents (Karevold et al. 2006).

In this study it was interesting to note that 60.6% of the population having ARI sought treatment when they had the illness and 45.8% of them sought treatment at private health facilities; compared to 39.4% who were treated at government health facilities. These findings may indicate that our population prefers to seek treatment at private health facilities because of shorter waiting time and affordable service.

Our study noted that the mean cost of treatment for ARI is only RM 16.85. This cost was to correspond to the commonest ARI illnesses in this study, which was common cold. The usual cost for treatment of common cold at private clinics was around RM 15.00 to RM 25.00 per visit.

A total of 58.9% of Malaysian did not sought treatment for their ARI because they perceived the sickness as mild or not serious. In Nepal, less than one in 4 children under 5 years of aged had been taken to health facilities for treatment of the ARI symptoms (Department of Health Services 2001). Macfarlane et al. (2000) noted that common reasons for consultation for previously well adults with acute lower respiratory tract illness were the troublesome nature of the symptoms, being prompted to consult by concerned family members and friends, and for reassurance that the disease are not serious (Macfarlane et al. 2000). Study in Norway reported that low level of education among mothers' of school children had been associated with lower utilisation of health services (Karevold et al. 2006).

Majority of ARI sufferers in this study took a minimum of 2 days after onset to seek treatment. Those with presumed LRI such as pneumonia and bronchitis have longer duration of sickness as compared to other ARI diseases. However, there was no significant difference on promptness of their seeking treatment behaviour. This finding contradicted with the study finding of Karevold et al. (2006) on respiratory infections in schoolchildren in Norway. They noted that perception on severity of illness was a predictor for prompt care or appropriate care (Karevold et al. 2006).

Lost of productivity can be measured by presenteeism (being present at work but working at a reduced capacity) and absenteeism (being absent from work); whether due to their illness or as a caregiver absenteeism (Soeren et al. 2007). In our study we only measured absenteeism by sick leave given to the sufferers and / or when they took own leave. In this study we noted the mean duration of sickness leave taken by sufferers and caretakers was less than 1 day. It was also noted that the lost of productivity was highly affected by LRI.

Study at other country showed that one-third of days taken off work were attributed to acute respiratory illness (Neil 1990). Bramley et al (2002) noted that each common cold experienced by a working adult caused an average of 8.7 lost work hours (2.8 absenteeism hours; 5.9 hours of on-the-job loss), and 1.2 work hours were lost because of attending to children under the age of 13 who were suffering from colds (Soeren et al. 2007). This shows that the day loss of productivity due to ARI is very minimal and similar in our study. However the exact lost of productivity was several times greater among the ARI presenteeism as reported by Soeren et al. (2007); which was not measured in our study.

6.1 Bias and Limitation

It is important to understand the limitations of this study. The disease occurrence was based on parental report for their children, as well as self-reporting; which may have generated disease misclassification and recalled /reporting bias. However, symptoms of those diseases are distinct by the anatomical symptomatology. Hence, systematic exaggerated reporting was not likely.

Reporting bias occurred among children who could not complain sore throat and productive cough. Perceived ARI diseases by respondents were not counterchecked by any health care examination or health cards.

The cross sectional designed study confined us to study temporal and not causal association. Having considered the above reservation, we concluded that our data was reliable and would enable us to fulfil our research objectives. However further research is needed to overcome these limitations.

7. CONCLUSION

The incidence of ARI was 18.0%. Only 60.6% of the population sought treatment and fifty percent of them went to private health facilities. One third of the population reported that their daily activities were affected by ARI.

8. RECOMMENDATIONS

It is recommended that:

8.1 Further studies are conducted to identify the aetiology of ARI and determine the risk factors for acquiring ARI, such as smoking, nutritional deficiency, breast-feeding, exposure to environmental pollutants (tobacco smoke, wood smoke, urban air pollution) and incomplete immunisation status.

8.2 Further review of the Malaysian burden on ARI is needed.

8.3 An assessment of knowledge and practices in managing ARI especially among the children less than five years should be done. It will determine new strategies that can be implemented effectively in reducing the incidence of ARI and the impact to the population.

8.4 The current programs or activities related to management (prevention and control) of ARI in Ministry of Health is evaluated, reviewed and updated.

8.5 A study be conducted to determine new strategies that can be effectively implemented to reduce the incidence of ARI and enhance health seeking behaviour.

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APPENDIX

APPENDIX

Table 1: Incidence of ARI in Malaysia, 2006

ARI Diseases	N	%	95% CI	
			LL	UL
ARI	3,746,295	18.2	17.5	18.5
URI	3,732,343	18.0	17.5	18.5
ILI	196,707	1.0	0.9	1.0
Common cold/coryza	3,513,047	16.9	16.4	17.4
Pharyngitis/Tonsilitis	593,423	2.9	2.7	3.0
Laryngitis & Epiglotitis	212,036	1.0	0.9	1.1
Otitis	161,693	0.8	0.7	0.9
LRI	97,883	0.5	0.4	0.5
Pneumonia	37,477	0.2	0.2	0.2
Bronchitis and bronchiolitis	81,630	0.4	0.3	0.5

Table 2: Sociodemography of ARI in Malaysia, 2006

Socio-demography characteristics	ARI				URI			
	N	%	LL	UL	N	%	LL	UL
Sex								
Male	1,767,220	18.1	17.5	18.7	1,762,382	18.0	17.4	18.7
Female	1,979,075	18.0	17.4	18.5	1,969,961	17.9	17.3	18.5
Age Groups								
0 - <1	99,934	24.9	22.1	27.6	99,934	24.9	22.1	27.6
1 - 4	529,867	29.7	28.1	31.2	528,450	29.6	28.0	31.1
5 - 11	615,872	18.0	17.0	19.0	614,179	17.9	17.0	18.9
12 - 16	512,594	24.8	23.5	26.0	511,555	24.7	23.4	26.0
17 - 24	528,904	22.0	20.8	23.1	527,691	21.9	20.8	23.1
25 - 54	1,155,951	14.5	13.9	15.1	1,150,539	14.5	13.9	15.0
55 - 64	165,685	10.7	9.7	11.7	163,166	10.5	9.6	11.5
65 & above	136,842	11.7	10.5	12.8	136,183	11.6	10.5	12.8
Ethnicity								
Malays	2,425,055	20.5	19.9	21.2	2,413,852	20.4	19.8	21.1
Chinese	423,298	10.5	9.7	11.3	423,298	10.5	9.7	11.3
Indian	396,001	22.8	21.2	24.5	394,911	22.8	21.1	24.5
Other Bumis	404,471	17.4	16.1	18.8	402,812	17.4	16.0	18.7
Others	97,471	11.4	9.8	12.9	97,471	11.4	9.8	12.9

Table 2: Sociodemography of ARI in Malaysia, 2006 (continue)

Socio-demography characteristics	ARI				URI			
	N	%	LL	UL	N	%	LL	UL
Religion								
Islam	2,698,507	19.7	19.1	20.3	2,686,981	19.6	19.0	20.2
Christian	327,932	17.6	16.2	19.0	326,479	17.5	16.1	18.9
Buddha	343,512	10.0	9.1	10.8	343,512	10.0	9.1	10.8
Hindu	331,041	23.1	21.2	25.0	330,417	23.0	21.2	24.9
Others	41,550	13.6	10.3	16.9	41,202	13.5	10.1	16.8
Unclassified	3,754	16.9	7.7	26.0	3,754	16.9	7.7	26.0
Citizenship								
Malaysian	3,644,605	18.4	17.9	18.9	3,630,654	18.3	17.8	18.9
Non-Malaysian	99,554	10.3	8.9	11.6	99,554	10.3	8.9	11.6
Unclassified	2,135	16.5	4.3	28.8	2,135	16.5	4.3	28.8
Education level								
None	612,288	15.3	14.5	16.1	610,310	15.2	14.4	16.0
Primary	885,308	16.2	15.5	16.9	878,850	16.0	15.3	16.7
Secondary	1,198,777	17.6	17.0	18.3	1,196,347	17.6	16.9	18.3
Tertiary	214,380	16.2	14.8	17.6	213,680	16.1	14.8	17.5
Unclassified	21,009	15.0	11.4	18.5	21,009	15.0	11.4	18.5
Marital Status								
Not married	1,048,337	22.8	21.9	23.7	1,045,403	22.7	21.8	23.6
Married	1,247,011	13.8	13.2	14.3	1,240,096	13.7	13.1	14.2
Divorcee	37,264	13.4	11.0	15.8	36,940	13.3	10.9	15.7
Widow/Widower	83,010	12.1	10.7	13.6	82,632	12.1	10.6	13.5
Not applicable	1,322,886	21.7	20.9	22.6	1,319,487	21.7	20.8	22.5
Unclassified	7,786	13.3	7.9	18.7	7,786	13.3	7.9	18.7

Table 2: Sociodemography of ARI in Malaysia, 2006 (continue)

Socio-demography characteristics	ARI				URI			
	N	%	LL	UL	N	%	LL	UL
Occupation								
Senior Official & Manager	34,207	13.5	10.6	16.3	34,207	13.5	10.6	16.3
Professionals	132,919	15.1	13.5	16.6	132,919	15.1	13.5	16.6
Technical & Associate	159,901	15.8	14.3	17.2	159,901	15.8	14.3	17.2
Clerical Workers	122,695	17.3	15.5	19.2	122,695	17.3	15.5	19.2
Service Workers & Shop	323,059	15.0	14.0	16.0	320,724	14.9	13.9	15.9
Skilled Agricultural & Fishery	138,525	15.3	13.7	16.8	137,843	15.2	13.6	16.8
Craft & Related Trade Workers	130,104	16.9	15.2	18.7	130,104	16.9	15.2	18.7
Plant & Machine Operator &Assembler	103,194	14.7	13.0	16.3	103,194	14.7	13.0	16.3
Elementary Occupations	89,079	15.6	13.8	17.3	88,727	15.5	13.7	17.3
Housewife	383,648	12.8	12.0	13.6	379,469	12.7	11.9	13.5
Unemployed	226,876	16.0	14.8	17.3	224,645	15.9	14.6	17.1
Unclassified	578,265	25.0	23.7	26.2	577,491	24.9	23.7	26.2
Household income								
Less than RM400	294,915	18.3	16.8	19.8	293,592	18.2	16.8	19.7
RM400 - RM699	546,135	18.6	17.5	19.7	540,271	18.4	17.3	19.5
RM700 - RM999	427,131	18.3	17.0	19.5	424,930	18.2	16.9	19.4
RM1000 - RM1999	1,018,549	18.2	17.4	19.0	1,016,766	18.2	17.3	19.0
RM2000 - RM2999	601,070	18.5	17.4	19.6	599,621	18.5	17.4	19.6
RM3000 - RM3999	302,053	18.2	16.7	19.6	301,787	18.2	16.7	19.6
RM4000 - RM4999	139,509	17.6	15.5	19.6	139,161	17.6	15.5	19.6
RM5000 & above	312,791	17.3	15.8	18.9	312,399	17.3	15.8	18.8
Unclassified	104,141	13.2	11.2	15.1	103,817	13.1	11.2	15.1

Table 2: Sociodemography of ARI in Malaysia, 2006 (continue)

Socio-demography characteristics	ARI				URI			
	N	%	LL	UL	N	%	LL	UL
Family Type								
Nuclear	2,535,522	18.0	17.5	18.6	2,525,012	18.0	17.4	18.5
Extended	1,034,202	18.8	17.9	19.7	1,031,054	18.7	17.8	19.6
Single household	82,075	12.3	10.3	14.3	81,783	12.3	10.3	14.3
Non-related household members	64,177	16.0	12.8	19.2	64,177	16.0	12.8	19.2
No of household members								
5 or less	2,265,480	17.3	16.7	17.8	2,257,067	17.2	16.7	17.8
6-10	1,367,311	19.5	18.7	20.4	1,361,772	19.4	18.6	20.3
11 and above	107,602	18.4	15.6	21.3	107,602	18.4	15.6	21.3
House Type								
Single house	1,786,127	18.7	17.9	19.4	1,778,203	18.6	17.8	19.3
SemiD house	178,929	18.3	16.1	20.5	178,929	18.3	16.1	20.5
SS terrace house	735,215	18.8	17.7	19.9	732,692	18.8	17.6	19.9
DS terrace house, town house	413,464	17.0	15.6	18.4	411,906	17.0	15.6	18.3
Condo @ apartment	106,148	14.1	12.0	16.2	106,148	14.1	12.0	16.2
Flats	285,691	16.6	15.0	18.2	284,358	16.6	15.0	18.2
Long house	35,854	17.9	13.4	22.5	35,506	17.8	13.2	22.3
Boat house	1,302	25.0	25.0	25.0	1,302	25.0	25.0	25.0
Traditional house	55,709	22.1	17.5	26.8	55,442	22.0	17.3	26.7
Shop house	61,907	13.7	11.3	16.1	61,907	13.7	11.3	16.1
Workers colony	41,593	13.6	10.3	16.9	41,593	13.6	10.3	16.9
Others	36,688	27.4	20.4	34.4	36,688	27.4	20.4	34.4

Table 2: Sociodemography of ARI in Malaysia, 2006 (continue)

Socio-demography characteristics	ARI				URI			
	N	%	LL	UL	N	%	LL	UL
Type of Housing Area								
Housing estate	1,579,165	17.0	16.2	17.7	1,574,618	16.9	16.2	17.6
Village	1,662,596	19.3	18.5	20.1	1,655,095	19.2	18.4	20.0
New Village	71,639	16.8	13.4	20.3	71,639	16.8	13.4	20.3
Squatter house	45,934	17.1	12.5	21.6	45,934	17.1	12.5	21.6
Estate	76,231	15.0	12.3	17.8	76,231	15.0	12.3	17.8
Land Development	114,210	20.0	16.9	23.2	113,495	19.9	16.7	23.1
Others	191,280	18.7	16.8	20.7	190,091	18.6	16.7	20.5

Table 3: Sociodemography of ARI by classification of the illness in Malaysia, 2006

Socio-demography characteristics	ILI				Common cold/Coryza			
	N	%	LL	UL	N	%	LL	UL
Sex								
Male	81,115	0.8	0.7	1.0	1,661,915	17.0	16.4	17.6
Female	115,592	1.1	0.9	1.2	1,851,132	16.8	16.3	17.4
Age Groups								
0 - <1	1,946	0.5	0.1	0.9	97,860	24.4	21.6	27.1
1 - 4	9,308	0.5	0.3	0.7	518,293	29.0	27.5	30.5
5 - 11	35,072	1.0	0.8	1.3	583,370	17.0	16.1	18.0
12 - 16	24,297	1.2	0.9	1.5	488,801	23.6	22.3	24.9
17 - 24	41,523	1.7	1.4	2.0	493,835	20.5	19.4	21.6
25 - 54	67,511	0.8	0.7	1.0	1,055,802	13.3	12.7	13.8
55 - 64	11,129	0.7	0.5	1.0	148,771	9.6	8.7	10.5
65 & above	5,923	0.5	0.3	0.8	125,670	10.7	9.6	11.8
Ethnicity								
Malays	137,294	1.2	1.0	1.3	2,277,638	19.3	18.6	19.9
Chinese	13,536	0.3	0.2	0.5	401,033	9.9	9.2	10.7
Indian	19,850	1.1	0.8	1.5	367,666	21.2	19.6	22.8
Other Bumis	23,217	1.0	0.7	1.3	375,043	16.2	14.9	17.5
Others	2,811	0.3	0.1	0.6	91,667	10.7	9.2	12.2

Table 3: Sociodemography of ARI by classification of the illness in Malaysia, 2006 (continue)

Socio-demography characteristics	ILI				Common cold/Coryza			
	N	%	LL	UL	N	%	LL	UL
Religion								
Islam	148,163	1.1	1.0	1.2	2,530,957	18.5	17.9	19.1
Christian	21,623	1.2	0.8	1.5	307,125	16.5	15.2	17.8
Buddha	8,860	0.3	0.1	0.4	327,468	9.5	8.7	10.3
Hindu	16,555	1.2	0.7	1.6	306,215	21.4	19.6	23.1
Others	1,080	0.4	<0.1	0.8	38,302	12.5	9.3	15.7
Unclassified	425	1.9	-1.7	5.6	2,980	13.4	5.1	21.7
Citizenship								
Malaysian	193,136	1.0	0.9	1.1	3,418,354	17.3	16.8	17.8
Non-Malaysian	3,572	0.4	0.1	0.6	92,906	9.6	8.3	10.9
Unclassified	0	0.0	0.0	0.0	1,787	13.8	2.4	25.2
Education level								
None	35,101	0.9	0.7	1.1	574,802	14.3	13.6	15.1
Primary	50,078	0.9	0.8	1.1	820,668	15.0	14.3	15.6
Secondary	74,338	1.1	0.9	1.2	1,109,038	16.3	15.7	17.0
Tertiary	16,367	1.2	0.8	1.6	196,827	14.9	13.6	16.2
Unclassified	1,625	1.2	0.1	2.2	19,067	13.6	10.2	17.0

Table 3: Sociodemography of ARI by classification of the illness in Malaysia, 2006 (continue)

Socio-demography characteristics	ILI				Common cold/Coryza			
	N	%	LL	UL	N	%	LL	UL
Marital Status								
Not married	67,451	1.5	1.2	1.7	979,878	21.3	20.4	22.2
Married	69,483	0.8	0.7	0.9	1,147,393	12.7	12.1	13.2
Divorcee	2,214	0.8	0.2	1.4	33,445	12.0	9.7	14.4
Widow/Widower	5,289	0.8	0.4	1.2	72,669	10.6	9.2	12.0
Not applicable	51,569	0.8	0.7	1.0	1,272,579	20.9	20.0	21.8
Unclassified	702	1.2	-0.5	2.9	7,084	12.1	6.9	17.3
Occupation								
Senior Official & Manager	2,545	1.0	0.2	1.8	30,947	12.2	9.4	14.9
Professionals	8,070	0.9	0.5	1.3	124,199	14.1	12.6	15.6
Technical & Associate	10,753	1.1	0.7	1.5	145,620	14.4	13.0	15.8
Clerical Workers	11,225	1.6	1.0	2.2	111,358	15.7	14.0	17.5
Service Workers & Shop	17,979	0.8	0.6	1.1	298,664	13.9	12.9	14.9
Skilled Agricultural & Fishery	6,448	0.7	0.4	1.0	128,588	14.2	12.6	15.7
Craft & Related Trade Workers	9,520	1.2	0.7	1.7	116,901	15.2	13.5	16.9
Plant & Machine Operator & Assembler	3,910	0.6	0.2	0.9	95,644	13.6	12.0	15.2
Elementary Occupations	2,758	0.5	0.1	0.8	83,081	14.5	12.8	16.3
Housewife	23,434	0.8	0.6	1.0	350,661	11.7	10.9	12.5
Unemployed	19,389	1.4	1.0	1.7	205,546	14.5	13.4	15.7
Unclassified	29,106	1.3	1.0	1.5	548,322	23.7	22.5	24.9

Table 3: Sociodemography of ARI by classification of the illness in Malaysia, 2006 (continue)

Socio-demography characteristics	ILI				Common cold/Coryza			
	N	%	LL	UL	N	%	LL	UL
Household income								
Less than RM400	11,773	0.7	0.5	1.0	274,596	17.0	15.6	18.4
RM400 - RM699	31,148	1.1	0.8	1.3	507,370	17.3	16.2	18.4
RM700 - RM999	19,651	0.8	0.6	1.1	398,935	17.1	15.8	18.3
RM1000 - RM1999	52,301	0.9	0.8	1.1	961,828	17.2	16.4	18.0
RM2000 - RM2999	35,729	1.1	0.9	1.3	562,149	17.3	16.3	18.4
RM3000 - RM3999	14,185	0.9	0.6	1.1	285,316	17.2	15.7	18.6
RM4000 - RM4999	6,502	0.8	0.4	1.2	129,809	16.4	14.4	18.4
RM5000 & above	17,714	1.0	0.6	1.4	294,702	16.3	14.9	17.8
Unclassified	7,705	1.0	0.5	1.5	98,342	12.4	10.6	14.3
Family Type								
Nuclear	127,779	0.9	0.8	1.0	2,382,902	17.0	16.4	17.5
Extended	58,734	1.1	0.9	1.3	964,475	17.5	16.7	18.4
Single household	5,850	0.9	0.4	1.3	76,997	11.6	9.6	13.5
Non-related household members	3,346	0.8	0.2	1.5	59,357	14.8	11.9	17.7
No of household members								
5 or less	116,163	0.9	0.8	1.0	2,127,285	16.2	15.7	16.8
6-10	72,087	1.0	0.9	1.2	1,281,997	18.3	17.5	19.1
11 and above	7,787	1.3	0.6	2.0	98,169	16.8	14.2	19.5

Table 3: Sociodemography of ARI by classification of the illness in Malaysia, 2006 (continue)

Socio-demography characteristics	ILI				Common cold/Coryza			
	N	%	LL	UL	N	%	LL	UL
House Type								
Single house	98,000	1.0	0.9	1.2	1,664,755	17.4	16.7	18.1
SemiD house	10,668	1.1	0.6	1.6	169,849	17.4	15.3	19.6
SS terrace house	35,092	0.9	0.7	1.1	686,203	17.6	16.5	18.6
DS terrace house, town house	22,706	0.9	0.6	1.2	392,843	16.2	14.9	17.5
Condo @ apartment	6,088	0.8	0.4	1.2	101,439	13.5	11.4	15.6
Flats	13,484	0.8	0.5	1.1	269,424	15.7	14.2	17.2
Long house	2,612	1.3	0.3	2.3	34,462	17.2	12.9	21.6
Boat house	0	0.0	0.0	0.0	1,302	25.0	25.0	25.0
Traditional house	3,260	1.3	0.5	2.1	53,193	21.1	16.7	25.5
Shop house	1,760	0.4	0.1	0.7	58,049	12.9	10.5	15.2
Workers colony	1,049	0.3	<0.1	0.7	38,572	12.6	9.4	15.8
Others	1,988	1.5	0.1	2.9	35,288	26.3	19.7	33.0
Type of Housing Area								
Housing estate	82,688	0.9	0.7	1.0	1,485,552	15.9	15.3	16.6
Village	90,501	1.1	0.9	1.2	1,556,402	18.1	17.3	18.8
New Village	4,018	0.9	0.2	1.6	65,879	15.5	12.3	18.6
Squatter house	1,894	0.7	0.2	1.3	43,208	16.1	11.6	20.5
Estate	3,394	0.7	<0.1	1.3	72,457	14.3	11.7	16.9
Land Development	4,372	0.8	0.4	1.2	105,979	18.6	15.4	21.8
Others	9,840	1.0	0.6	1.4	179,039	17.5	15.6	19.4

Table 4: Sociodemography of ARI by classification of the illness in Malaysia, 2006

Socio-demography characteristics	Pharyngitis/Tonsilitis				Laryngitis & Epiglotitis			
	N	%	LL	UL	N	%	LL	UL
Sex								
Male	248,312	2.5	2.3	2.8	77,166	0.8	0.7	0.9
Female	345,111	3.1	2.9	3.4	134,870	1.2	1.1	1.4
Age Groups								
0 - <1	5,174	1.3	0.6	2.0	1,990	0.5	0.1	0.9
1 - 4	37,619	2.1	1.6	2.6	12,029	0.7	0.4	0.9
5 - 11	97,395	2.8	2.5	3.2	27,272	0.8	0.6	1.0
12 - 16	87,574	4.2	3.7	4.8	32,517	1.6	1.2	1.9
17 - 24	106,798	4.4	3.9	5.0	43,759	1.8	1.5	2.1
25 - 54	217,706	2.7	2.5	3.0	81,040	1.0	0.9	1.2
55 - 64	22,969	1.5	1.1	1.9	10,691	0.7	0.4	0.9
65 & above	17,866	1.5	1.1	1.9	2,739	0.2	0.1	0.4
Ethnicity								
Malays	396,313	3.4	3.1	3.6	145,907	1.2	1.1	1.4
Chinese	52,528	1.3	1.0	1.6	14,535	0.4	0.2	0.5
Indian	65,973	3.8	3.1	4.5	23,327	1.3	0.9	1.8
Other Bumis	65,401	2.8	2.4	3.3	22,871	1.0	0.7	1.2
Others	13,208	1.5	1.0	2.0	5,395	0.6	0.3	0.9

Table 4: Sociodemography of ARI by classification of the illness in Malaysia, 2006 (continue)

Socio-demography characteristics	Pharyngitis/Tonsilitis				Laryngitis & Epiglotitis			
	N	%	LL	UL	N	%	LL	UL
Religion								
Islam	438,682	3.2	3.0	3.4	163,554	1.2	1.1	1.3
Christian	55,681	3.0	2.4	3.6	16,048	0.9	0.6	1.1
Buddha	36,887	1.1	0.8	1.3	12,069	0.3	0.2	0.5
Hindu	56,705	4.0	3.2	4.7	19,112	1.3	0.9	1.8
Others	4,616	1.5	0.7	2.3	827	0.3	-0.1	0.6
Unclassified	851	3.8	-1.3	8.9	425	1.9	-1.7	5.6
Citizenship								
Malaysian	581,611	2.9	2.8	3.1	208,489	1.1	1.0	1.2
Non-Malaysian	11,812	1.2	0.8	1.6	3,547	0.4	0.1	0.6
Unclassified	0	0.0	0.0	0.0	0	0.0	0.0	0.0
Education level								
None	95,722	2.4	2.1	2.7	27,180	0.7	0.5	0.8
Primary	143,340	2.6	2.3	2.9	58,466	1.1	0.9	1.2
Secondary	232,578	3.4	3.1	3.7	85,863	1.3	1.1	1.4
Tertiary	50,001	3.8	3.1	4.5	16,380	1.2	0.8	1.6
Unclassified	4,350	3.1	1.4	4.8	1,393	1.0	<0.1	2.0

Table 4: Sociodemography of ARI by classification of the illness in Malaysia, 2006 (continue)

Socio-demography characteristics	Pharyngitis/Tonsilitis				Laryngitis & Epiglotitis			
	N	%	LL	UL	N	%	LL	UL
Marital Status								
Not married	204,562	4.4	4.1	4.8	79,553	1.7	1.5	2.0
Married	212,061	2.3	2.1	2.5	78,254	0.9	0.7	1.0
Divorcee	7,201	2.6	1.4	3.7	1,867	0.7	0.1	1.3
Widow/Widower	14,081	2.1	1.4	2.7	3,826	0.6	0.2	0.9
Not applicable	153,367	2.5	2.2	2.8	47,439	0.8	0.6	0.9
Unclassified	2,152	3.7	0.8	6.6	1,098	1.9	-0.3	4.0
Occupation								
Senior Official & Manager	10,270	4.0	2.5	5.6	3,897	1.5	0.6	2.5
Professionals	26,987	3.1	2.3	3.8	6,755	0.8	0.4	1.1
Technical & Associate	30,072	3.0	2.3	3.6	11,846	1.2	0.7	1.6
Clerical Workers	32,709	4.6	3.6	5.6	10,932	1.5	1.0	2.1
Service Workers & Shop	56,814	2.6	2.2	3.1	23,016	1.1	0.8	1.3
Skilled Agricultural & Fishery	15,251	1.7	1.2	2.2	6,164	0.7	0.4	1.0
Craft & Related Trade Workers	27,909	3.6	2.8	4.5	13,516	1.8	1.2	2.4
Plant & Machine Operator &Assembler	18,854	2.7	1.9	3.4	8,887	1.3	0.8	1.8
Elementary Occupations	12,230	2.1	1.4	2.8	4,194	0.7	0.3	1.1
Housewife	61,889	2.1	1.7	2.4	20,939	0.7	0.5	0.9
Unemployed	44,204	3.1	2.6	3.7	17,006	1.2	0.9	1.5
Unclassified	102,868	4.4	3.9	5.0	37,446	1.6	1.3	1.9

Table 4: Sociodemography of ARI by classification of the illness in Malaysia, 2006 (continue)

Socio-demography characteristics	Pharyngitis/Tonsilitis				Laryngitis & Epiglotitis			
	N	%	LL	UL	N	%	LL	UL
Household income								
Less than RM400	39,207	2.4	2.0	2.9	12,277	0.8	0.5	1.0
RM400 - RM699	78,245	2.7	2.2	3.1	30,372	1.0	0.8	1.3
RM700 - RM999	56,632	2.4	2.0	2.8	20,119	0.9	0.6	1.1
RM1000 - RM1999	155,719	2.8	2.5	3.1	57,002	1.0	0.8	1.2
RM2000 - RM2999	113,926	3.5	3.0	4.0	41,885	1.3	1.0	1.6
RM3000 - RM3999	51,601	3.1	2.5	3.7	18,942	1.1	0.8	1.5
RM4000 - RM4999	26,223	3.3	2.4	4.2	10,275	1.3	0.8	1.8
RM5000 & above	53,800	3.0	2.3	3.6	15,672	0.9	0.6	1.2
Unclassified	18,070	2.3	1.5	3.0	5,494	0.7	0.2	1.2
Family Type								
Nuclear	397,185	2.8	2.6	3.0	139,565	1.0	0.9	1.1
Extended	164,068	3.0	2.6	3.3	62,625	1.1	0.9	1.4
Single household	15,502	2.3	1.6	3.1	4,747	0.7	0.3	1.1
Non-related household members	12,683	3.2	1.9	4.4	4,438	1.1	0.4	1.8
No of household members								
5 or less	355,270	2.7	2.5	2.9	126,512	1.0	0.9	1.1
6-10	217,347	3.1	2.8	3.4	75,997	1.1	0.9	1.3
11 and above	19,756	3.4	2.1	4.7	8,826	1.5	0.6	2.4

Table 4: Sociodemography of ARI by classification of the illness in Malaysia, 2006 (continue)

Socio-demography characteristics	Pharyngitis/Tonsilitis				Laryngitis & Epiglotitis			
	N	%	LL	UL	N	%	LL	UL
House Type								
Single house	268,889	2.8	2.6	3.1	101,172	1.1	0.9	1.2
SemiD house	34,176	3.5	2.6	4.4	10,358	1.1	0.7	1.4
SS terrace house	122,806	3.1	2.7	3.6	45,975	1.2	0.9	1.4
DS terrace house, town house	76,390	3.1	2.6	3.7	25,105	1.0	0.7	1.4
Condo @ apartment	13,979	1.9	1.3	2.4	3,228	0.4	0.1	0.7
Flats	46,915	2.7	2.1	3.3	16,111	0.9	0.6	1.3
Long house	5,185	2.6	1.2	4.0	1,871	0.9	0.2	1.7
Boat house	0	0.0	0.0	0.0	0	0.0	0.0	0.0
Traditional house	6,932	2.8	1.6	3.9	2,541	1.0	0.3	1.7
Shop house	7,244	1.6	0.9	2.3	2,090	0.5	0.1	0.8
Workers colony	5,339	1.7	0.7	2.8	1,492	0.5	0.1	0.9
Others	5,568	4.2	1.7	6.6	2,092	1.6	0.2	2.9
Type of Housing Area								
Housing estate	274,541	2.9	2.7	3.2	92,955	1.0	0.8	1.2
Village	243,774	2.8	2.6	3.1	94,369	1.1	1.0	1.2
New Village	13,843	3.3	1.9	4.7	4,678	1.1	0.3	1.9
Squatter house	4,974	1.8	0.9	2.8	2,602	1.0	0.2	1.8
Estate	9,054	1.8	0.9	2.6	2,839	0.6	0.2	0.9
Land Development	17,200	3.0	2.0	4.0	5,635	1.0	0.6	1.4
Others	28,950	2.8	2.1	3.6	8,958	0.9	0.5	1.2

Table 5: Sociodemography of ARI by classification of the illness in Malaysia, 2006

Socio-demography characteristics	Otitis				LRI			
	N	%	LL	UL	N	%	LL	UL
Sex								
Male	72,565	0.7	0.6	0.9	37,355	0.4	0.3	0.5
Female	89,128	0.8	0.7	0.9	60,529	0.5	0.5	0.6
Age Groups								
0 - <1	748	0.2	-0.1	0.4	4,279	1.1	0.4	1.7
1 - 4	10,815	0.6	0.4	0.8	9,711	0.5	0.3	0.8
5 - 11	26,096	0.8	0.6	0.9	13,832	0.4	0.3	0.5
12 - 16	18,809	0.9	0.7	1.2	9,907	0.5	0.3	0.7
17 - 24	25,056	1.0	0.8	1.3	12,429	0.5	0.3	0.7
25 - 54	60,903	0.8	0.6	0.9	31,736	0.4	0.3	0.5
55 - 64	10,579	0.7	0.4	0.9	8,866	0.6	0.3	0.8
65 & above	8,365	0.7	0.4	1.0	7,124	0.6	0.3	0.9
Ethnicity								
Malays	97,446	0.8	0.7	0.9	69,656	0.6	0.5	0.7
Chinese	11,238	0.3	0.2	0.4	2,505	0.1	<0.1	0.1
Indian	30,028	1.7	1.3	2.2	13,095	0.8	0.5	1.0
Other Bumis	18,729	0.8	0.6	1.0	10,275	0.4	0.3	0.6
Others	4,253	0.5	0.2	0.8	2,353	0.3	0.1	0.5

Table 5: Sociodemography of ARI by classification of the illness in Malaysia, 2006 (continue)

Socio-demography characteristics	Otitis				LRI			
	N	%	LL	UL	N	%	LL	UL
Religion								
Islam	110,147	0.8	0.7	0.9	75,441	0.6	0.5	0.6
Christian	13,257	0.7	0.5	1.0	9,838	0.5	0.3	0.7
Buddha	9,591	0.3	0.2	0.4	1,251	<0.1	<0.1	0.1
Hindu	25,278	1.8	1.3	2.2	10,137	0.7	0.4	1.0
Others	3,072	1.0	0.2	1.8	1,216	0.4	<0.1	0.8
Unclassified	348	1.6	-1.5	4.6	0	0.0	0.0	0.0
Citizenship								
Malaysian	155,107	0.8	0.7	0.9	95,967	0.5	0.4	0.5
Non-Malaysian	6,238	0.6	0.3	0.9	1,917	0.2	<0.1	0.4
Unclassified	348	2.7	-2.5	7.9	0	0.0	0.0	0.0
Education level								
None	26,690	0.7	0.5	0.8	18,550	0.5	0.3	0.6
Primary	47,258	0.9	0.7	1.0	31,444	0.6	0.5	0.7
Secondary	60,419	0.9	0.7	1.0	23,782	0.3	0.3	0.4
Tertiary	6,413	0.5	0.2	0.7	3,914	0.3	0.1	0.5
Unclassified	1,655	1.2	0.1	2.2	950	0.7	-0.1	1.4

Table 5: Sociodemography of ARI by classification of the illness in Malaysia, 2006 (continue)

Socio-demography characteristics	Otitis				LRI			
	N	%	LL	UL	N	%	LL	UL
Marital Status								
Not married	46,483	1.0	0.8	1.2	24,815	0.5	0.4	0.7
Married	62,893	0.7	0.6	0.8	35,976	0.4	0.3	0.5
Divorcee	2,100	0.8	0.1	1.4	1,932	0.7	0.1	1.3
Widow/Widower	10,784	1.6	1.0	2.2	5,947	0.9	0.5	1.3
Not applicable	39,433	0.6	0.5	0.8	29,212	0.5	0.4	0.6
Unclassified	0	0.0	0.0	0.0	0	0.0	0.0	0.0
Occupation								
Senior Official & Manager	1,094	0.4	-0.1	0.9	740	0.3	-0.1	0.7
Professionals	4,583	0.5	0.2	0.8	1,924	0.2	<0.1	0.4
Technical & Associate	7,300	0.7	0.4	1.0	756	0.1	<0.1	0.2
Clerical Workers	5,250	0.7	0.3	1.2	1,472	0.2	<0.1	0.4
Service Workers & Shop	17,664	0.8	0.6	1.1	10,785	0.5	0.3	0.7
Skilled Agricultural & Fishery	6,521	0.7	0.4	1.0	5,645	0.6	0.3	0.9
Craft & Related Trade Workers	9,250	1.2	0.7	1.7	3,087	0.4	0.1	0.7
Plant & Machine Operator &Assembler	6,115	0.9	0.5	1.3	3,228	0.5	0.2	0.8
Elementary Occupations	5,326	0.9	0.5	1.4	2,080	0.4	0.1	0.7
Housewife	18,189	0.6	0.4	0.8	16,338	0.5	0.4	0.7
Unemployed	14,946	1.1	0.7	1.4	12,014	0.8	0.6	1.1
Unclassified	26,022	1.1	0.9	1.4	10,604	0.5	0.3	0.6

Table 5: Sociodemography of ARI by classification of the illness in Malaysia, 2006 (continue)

Socio-demography characteristics	Otitis				LRI			
	N	%	LL	UL	N	%	LL	UL
Household income								
Less than RM400	15,129	0.9	0.7	1.2	12,192	0.8	0.5	1.0
RM400 - RM699	31,801	1.1	0.8	1.3	22,607	0.8	0.6	1.0
RM700 - RM999	20,703	0.9	0.6	1.1	12,344	0.5	0.4	0.7
RM1000 - RM1999	48,011	0.9	0.7	1.0	24,803	0.4	0.3	0.6
RM2000 - RM2999	16,394	0.5	0.3	0.7	9,986	0.3	0.2	0.4
RM3000 - RM3999	10,086	0.6	0.4	0.9	4,987	0.3	0.1	0.5
RM4000 - RM4999	5,572	0.7	0.3	1.1	3,071	0.4	0.1	0.7
RM5000 & above	10,375	0.6	0.4	0.8	4,344	0.2	0.1	0.4
Unclassified	3,621	0.5	0.1	0.8	3,549	0.4	0.2	0.7
Family Type								
Nuclear	100,818	0.7	0.6	0.8	62,876	0.4	0.4	0.5
Extended	52,988	1.0	0.8	1.1	29,153	0.5	0.4	0.6
Single household	4,368	0.7	0.3	1.0	3,038	0.5	0.1	0.8
Non-related household members	2,201	0.5	0.1	1.0	2,477	0.6	<0.1	1.2
No of household members								
5 or less	88,813	0.7	0.6	0.8	63,231	0.5	0.4	0.6
6-10	66,693	1.0	0.8	1.1	33,107	0.5	0.4	0.6
11 and above	5,558	1.0	0.4	1.5	1,545	0.3	<0.1	0.5

Table 5: Sociodemography of ARI by classification of the illness in Malaysia, 2006

Socio-demography characteristics	Otitis				LRI			
	N	%	LL	UL	N	%	LL	UL
House Type								
Single house	89,025	0.9	0.8	1.1	48,278	0.5	0.4	0.6
Semi-D house	7,457	0.8	0.4	1.1	4,692	0.5	0.2	0.8
SS terrace house	33,794	0.9	0.7	1.1	17,155	0.4	0.3	0.6
DS terrace house, town house	11,053	0.5	0.3	0.6	11,970	0.5	0.3	0.7
Condo @ apartment	2,494	0.3	<0.1	0.6	2,076	0.3	<0.1	0.5
Flats	8,153	0.5	0.2	0.7	8,026	0.5	0.2	0.7
Long house	1,916	1.0	<0.1	1.9	1,818	0.9	<0.1	1.8
Boat house	0	0.0	0.0	0.0	0	0.0	0.0	0.0
Traditional house	2,020	0.8	-0.1	1.7	1,548	0.6	0.1	1.1
Shop house	2,480	0.5	0.1	1.0	675	0.1	-0.1	0.4
Workers colony	2,141	0.7	0.2	1.2	585	0.2	-0.1	0.4
Others	726	0.5	-0.2	1.2	1,061	0.8	<0.1	1.6
Type of Housing Area								
Housing estate	57,059	0.6	0.5	0.7	37,536	0.4	0.3	0.5
Village	80,358	0.9	0.8	1.1	46,323	0.5	0.4	0.6
New Village	4,531	1.1	0.4	1.7	434	0.1	-0.1	0.3
Squatter house	3,059	1.1	0.4	1.8	757	0.3	-0.1	0.7
Estate	4,820	0.9	0.5	1.4	2,519	0.5	<0.1	1.0
Land Development	3,951	0.7	0.3	1.1	3,465	0.6	0.2	1.0
Others	7,481	0.7	0.4	1.1	6,850	0.7	0.3	1.1

Table 6: Sociodemography of ARI by classification of the illness in Malaysia, 2006 (continue)

Socio-demography characteristics	Pneumonia				Bronchitis and Bronchiolitis			
	N	%	LL	UL	N	%	LL	UL
Sex								
Male	13,971	0.1	0.1	0.2	31,572	0.3	0.3	0.4
Female	23,506	0.2	0.2	0.3	50,058	0.5	0.4	0.5
Age Groups								
0 - <1	491	0.1	-0.1	0.4	3,788	0.9	0.4	1.5
1 - 4	0	0.0	0.0	0.0	9,711	0.5	0.3	0.8
5 - 11	5,703	0.2	0.1	0.3	11,900	0.3	0.2	0.5
12 - 16	4,091	0.2	0.1	0.3	8,220	0.4	0.2	0.6
17 - 24	5,619	0.2	0.1	0.4	8,715	0.4	0.2	0.5
25 - 54	13,448	0.2	0.1	0.2	25,787	0.3	0.2	0.4
55 - 64	2,968	0.2	0.1	0.3	8,097	0.5	0.3	0.8
65 & above	5,157	0.4	0.2	0.7	5,412	0.5	0.2	0.7
Ethnicity								
Malays	26,249	0.2	0.2	0.3	57,805	0.5	0.4	0.6
Chinese	826	<0.1	<0.0	0.1	2,039	0.1	<0.1	0.1
Indian	5,912	0.3	0.2	0.5	10,848	0.6	0.4	0.9
Other Bumis	3,734	0.2	0.1	0.3	9,019	0.4	0.2	0.5
Others	757	0.1	<0.1	0.2	1,919	0.2	<0.1	0.4

Table 6: Sociodemography of ARI by classification of the illness in Malaysia, 2006 (continue)

Socio-demography characteristics	Pneumonia				Bronchitis and Bronchiolitis			
	N	%	LL	UL	N	%	LL	UL
Religion								
Islam	28,262	0.2	0.2	0.3	62,334	0.5	0.4	0.5
Christian	3,346	0.2	0.1	0.3	9,404	0.5	0.3	0.7
Buddha	826	<0.1	<0.1	0.1	786	<0.1	<0.1	0.1
Hindu	4,610	0.3	0.1	0.5	8,324	0.6	0.3	0.9
Others	434	0.1	-0.1	0.4	782	0.3	-0.1	0.6
Unclassified	0	0.0	0.0	0.0	0	0.0	0.0	0.0
Citizenship								
Malaysian	36,176	0.2	0.1	0.2	80,006	0.4	0.3	0.5
Non-Malaysian	1,301	0.1	<0.1	0.3	1,624	0.2	<0.1	0.3
Unclassified	0	0.0	0.0	0.0	0	0.0	0.0	0.0
Education level								
None	9,010	0.2	0.1	0.3	14,559	0.4	0.2	0.5
Primary	12,257	0.2	0.1	0.3	27,410	0.5	0.4	0.6
Secondary	12,547	0.2	0.1	0.3	16,770	0.2	0.2	0.3
Tertiary	990	0.1	<0.1	0.2	3,190	0.2	0.1	0.4
Unclassified	644	0.5	-0.2	1.1	950	0.7	-0.1	1.4

Table 6: Sociodemography of ARI by classification of the illness in Malaysia, 2006 (continue)

Socio-demography characteristics	Pneumonia				Bronchitis and Bronchiolitis			
	N	%	LL	UL	N	%	LL	UL
Marital Status								
Not married	12,277	0.3	0.2	0.4	17,524	0.4	0.3	0.5
Married	14,746	0.2	0.1	0.2	30,573	0.3	0.3	0.4
Divorcee	782	0.3	-0.1	0.7	1,151	0.4	-0.1	0.9
Widow/Widower	3,146	0.5	0.2	0.8	5,593	0.8	0.4	1.2
Not applicable	6,526	0.1	0.1	0.2	26,789	0.4	0.3	0.5
Unclassified	0	0.0	0.0	0.0	0	0.0	0.0	0.0
Occupation								
Senior Official & Manager	434	0.2	-0.2	0.5	740	0.3	-0.1	0.7
Professionals	724	0.1	<0.1	0.2	1,200	0.1	<0.1	0.3
Technical & Associate	434	<0.1	<0.1	0.1	323	<0.1	<0.1	0.1
Clerical Workers	0	0.0	0.0	0.0	1,472	0.2	<0.1	0.4
Service Workers & Shop	4,416	0.2	0.1	0.3	10,099	0.5	0.3	0.7
Skilled Agricultural & Fishery	2,888	0.3	0.1	0.5	3,348	0.4	0.1	0.6
Craft & Related Trade Workers	1,633	0.2	<0.1	0.5	1,453	0.2	<0.1	0.4
Plant & Machine Operator &Assembler	2,236	0.3	0.1	0.6	1,820	0.3	<0.1	0.5
Elementary Occupations	782	0.1	-0.1	0.3	1,646	0.3	<0.1	0.5
Housewife	6,736	0.2	0.1	0.3	13,716	0.5	0.3	0.6
Unemployed	5,692	0.4	0.2	0.6	10,810	0.8	0.5	1.0
Unclassified	4,977	0.2	0.1	0.3	8,215	0.4	0.2	0.5

Table 6: Sociodemography of ARI by classification of the illness in Malaysia, 2006 (continue)

Socio-demography characteristics	Pneumonia				Bronchitis and Bronchiolitis			
	N	%	LL	UL	N	%	LL	UL
Household income								
Less than RM400	4,617	0.3	0.1	0.4	11,118	0.7	0.4	0.9
RM400 - RM699	7,718	0.3	0.1	0.4	18,977	0.6	0.5	0.8
RM700 - RM999	5,082	0.2	0.1	0.3	10,216	0.4	0.3	0.6
RM1000 - RM1999	9,275	0.2	0.1	0.2	21,196	0.4	0.3	0.5
RM2000 - RM2999	4,248	0.1	<0.1	0.2	7,308	0.2	0.1	0.3
RM3000 - RM3999	2,971	0.2	<0.1	0.3	3,781	0.2	0.1	0.4
RM4000 - RM4999	758	0.1	<0.1	0.2	2,746	0.3	0.1	0.6
RM5000 & above	768	<0.1	<0.1	0.1	3,910	0.2	0.1	0.4
Unclassified	2,041	0.3	<0.1	0.5	2,376	0.3	0.1	0.5
Family Type								
Nuclear	23,471	0.2	0.1	0.2	52,451	0.4	0.3	0.4
Extended	11,252	0.2	0.1	0.3	24,958	0.5	0.3	0.6
Single household	1,130	0.2	<0.1	0.4	2,690	0.4	0.1	0.7
Non-related household members	1,286	0.3	-0.1	0.8	1,191	0.3	<0.1	0.6
No of household members								
5 or less	23,558	0.2	0.1	0.2	53,725	0.4	0.3	0.5
6-10	12,989	0.2	0.1	0.2	26,942	0.4	0.3	0.5
11 and above	930	0.2	<0.1	0.3	963	0.2	<0.1	0.3

Table 6: Sociodemography of ARI by classification of the illness in Malaysia, 2006 (continue)

Socio-demography characteristics	Pneumonia				Bronchitis and Bronchiolitis			
	N	%	LL	UL	N	%	LL	UL
House Type								
Single house	17,382	0.2	0.1	0.2	41,124	0.4	0.3	0.5
SemiD house	3,076	0.3	0.1	0.5	3,576	0.4	0.1	0.6
SS terrace house	7,752	0.2	0.1	0.3	14,215	0.4	0.3	0.5
DS terrace house, town house	2,603	0.1	<0.1	0.2	10,235	0.4	0.2	0.6
Condo @ apartment	925	0.1	<0.1	0.3	1,584	0.2	<0.1	0.4
Flats	3,869	0.2	<0.1	0.4	5,503	0.3	0.1	0.5
Long house	348	0.2	-0.2	0.5	1,818	0.9	<0.1	1.8
Boat house	0	0.0	0.0	0.0	0	0.0	<0.1	0.0
Traditional house	571	0.2	-0.1	0.5	1,548	0.6	0.1	1.1
Shop house	323	0.1	-0.1	0.2	675	0.1	-0.1	0.4
Workers colony	292	0.1	-0.1	0.3	292	0.1	-0.1	0.3
Others	335	0.2	-0.2	0.7	1,061	0.8	<0.1	1.6
Type of Housing Area								
Housing estate	12,681	0.1	0.1	0.2	31,670	0.3	0.3	0.4
Village	16,550	0.2	0.1	0.2	39,233	0.5	0.4	0.5
New Village	434	0.1	-0.1	0.3	434	0.1	-0.1	0.3
Squatter house	0	0.0	0.0	0.0	757	0.3	-0.1	0.7
Estate	1,209	0.2	<0.1	0.5	1,936	0.4	-0.1	0.8
Land Development	2,062	0.4	<0.1	0.7	2,465	0.4	0.1	0.7
Others	4,542	0.4	0.2	0.7	5,135	0.5	0.2	0.8

Table 7: Incidence of ARI by state in Malaysia, 2006

State	ARI				URI			
	N	%	LL	UL	N	%	LL	UL
Johor	379,130	15.8	14.4	17.3	377,731	15.8	14.3	17.2
Kedah	385,639	25.6	23.7	27.4	383,900	25.5	23.6	27.3
Kelantan	248,975	20.0	18.1	21.8	248,301	19.9	18.1	21.8
Melaka	108,283	19.0	16.3	21.7	107,751	18.9	16.2	21.6
N.Sembilan	198,215	26.7	24.3	29.1	197,159	26.5	24.1	29.0
Pahang	230,100	20.5	18.3	22.7	229,392	20.4	18.2	22.7
Pulau Pinang	140,208	13.3	11.5	15.1	140,208	13.3	11.5	15.1
Perak	224,352	13.1	11.5	14.6	222,596	13.0	11.4	14.5
Perlis	31,251	16.4	12.0	20.7	31,251	16.4	12.0	20.7
Selangor	778,317	20.2	19.0	21.3	776,002	20.1	19.0	21.3
Terengganu	193,954	22.6	20.3	24.9	193,575	22.6	20.2	24.9
Sabah	326,417	14.9	13.5	16.2	325,156	14.8	13.5	16.1
Sarawak	311,190	16.5	14.8	18.3	309,352	16.4	14.7	18.2
W.P.Kuala Lumpur	121,226	10.5	9.1	11.8	121,226	10.5	9.1	11.8
Labuan	69,037	24.4	21.0	27.9	68,744	24.3	20.9	27.8
Malaysia	3,746,295	18.0	17.5	18.5	3,732,343	18.0	17.5	18.5

Table 7: Incidence of ARI by state in Malaysia, 2006 (continue)

State	ILI				Common cold/Coryza			
	N	%	LL	UL	N	%	LL	UL
Johor	13,507	0.6	0.4	0.8	353,291	14.8	13.4	16.1
Kedah	16,376	1.1	0.7	1.4	353,883	23.5	21.7	25.2
Kelantan	12,815	1.0	0.6	1.5	238,799	19.2	17.4	21.0
Melaka	9,686	1.7	1.0	2.4	100,213	17.6	15.0	20.2
N.Sembilan	11,161	1.5	0.9	2.1	186,722	25.1	22.8	27.5
Pahang	12,328	1.1	0.7	1.5	219,120	19.5	17.3	21.8
Pulau Pinang	6,088	0.6	0.3	0.9	134,555	12.8	11.1	14.5
Perak	10,061	0.6	0.4	0.8	211,814	12.3	10.8	13.9
Perlis	1,790	0.9	0.2	1.7	29,462	15.4	11.3	19.6
Selangor	39,926	1.0	0.8	1.3	733,896	19.0	17.9	20.2
Terengganu	15,983	1.9	1.3	2.5	182,313	21.3	19.0	23.5
Sabah	11,430	0.5	0.3	0.7	301,297	13.7	12.4	15.0
Sarawak	22,992	1.2	0.9	1.6	289,294	15.4	13.7	17.0
W.P.Kuala Lumpur	7,872	0.7	0.4	1.0	114,535	9.9	8.5	11.2
W.P.Labuan	4,692	1.7	0.6	2.7	63,852	22.6	19.4	25.8
Malaysia	196,707	0.9	0.9	1.0	3,513,047	16.9	16.4	17.4

Table 7: Incidence of ARI by state in Malaysia, 2006 (continue)

State	Pharyngitis/Tonsilitis				Laryngitis & Epiglotitis			
	N	%	LL	UL	N	%	LL	UL
Johor	61,435	2.6	2.1	3.1	19,734	0.8	0.6	1.1
Kedah	54,404	3.6	2.9	4.3	19,184	1.3	0.9	1.6
Kelantan	29,678	2.4	1.8	3.0	10,293	0.8	0.5	1.2
Melaka	26,501	4.7	3.3	6.0	13,742	2.4	1.5	3.3
N.Sembilan	38,372	5.2	4.0	6.3	12,309	1.7	1.1	2.3
Pahang	35,352	3.2	2.3	4.0	14,383	1.3	0.8	1.8
Pulau Pinang	14,069	1.3	0.9	1.8	3,805	0.4	0.1	0.6
Perak	23,169	1.4	1.0	1.7	8,619	0.5	0.3	0.7
Perlis	5,271	2.8	1.4	4.1	1,015	0.5	<0.1	1.1
Selangor	141,334	3.7	3.2	4.1	51,501	1.3	1.1	1.6
Terengganu	35,084	4.1	3.1	5.1	13,842	1.6	1.0	2.2
Sabah	42,781	2.0	1.6	2.3	15,475	0.7	0.5	0.9
Sarawak	54,176	2.9	2.3	3.5	14,703	0.8	0.5	1.0
W.P.Kuala Lumpur	20,860	1.8	1.3	2.3	7,478	0.7	0.3	1.0
W.P.Labuan	10,937	3.9	2.3	5.5	5,953	2.1	0.8	3.4
Malaysia	593,423	2.9	2.7	3.0	212,036	1.0	0.9	1.1

Table 7: Incidence of ARI by state in Malaysia, 2006 (continue)

State	Otitis				LRI			
	N	%	LL	UL	N	%	LL	UL
Johor	15,251	0.6	0.4	0.9	9,634	0.4	0.2	0.6
Kedah	30,351	2.0	1.6	2.5	12,702	0.8	0.5	1.1
Kelantan	11,760	0.9	0.6	1.3	3,607	0.3	0.1	0.5
Melaka	4,097	0.7	0.3	1.1	4,281	0.8	0.3	1.2
N.Sembilan	7,693	1.0	0.6	1.5	4,436	0.6	0.3	0.9
Pahang	8,645	0.8	0.4	1.1	4,391	0.4	0.2	0.6
Pulau Pinang	3,871	0.4	0.1	0.6	305	<0.1	<0.1	0.1
Perak	7,839	0.5	0.2	0.7	7,072	0.4	0.2	0.6
Perlis	2,226	1.2	0.2	2.2	338	0.2	-0.2	0.5
Selangor	31,403	0.8	0.6	1.0	26,474	0.7	0.5	0.9
Terengganu	6,775	0.8	0.5	1.1	4,794	0.6	0.3	0.9
Sabah	15,567	0.7	0.5	0.9	5,861	0.3	0.2	0.4
Sarawak	10,778	0.6	0.3	0.8	10,831	0.6	0.4	0.8
W.P.Kuala Lumpur	2,362	0.2	0.1	0.4	1,574	0.1	<0.1	0.3
W.P.Labuan	3,077	1.1	0.5	1.7	1,584	0.6	<0.1	1.1
Malaysia	161,693	0.8	0.7	0.9	97,883	0.5	0.4	0.5

Table 7: Incidence of ARI by state in Malaysia, 2006 (continue)

State	Pneumonia				Bronchitis and Bronchiolitis			
	N	%	LL	UL	N	%	LL	UL
Johor	2,353	0.1	<0.1	0.2	8,458	0.4	0.2	0.5
Kedah	4,881	0.3	0.2	0.5	11,698	0.8	0.5	1.1
Kelantan	645	0.1	<0.1	0.1	3,284	0.3	0.1	0.5
Melaka	2,765	0.5	0.2	0.8	2,315	0.4	0.1	0.7
N.Sembilan	1,388	0.2	<0.1	0.4	4,104	0.6	0.2	0.9
Pahang	2,478	0.2	<0.1	0.4	2,975	0.3	0.1	0.5
Pulau Pinang	305	<0.1	<0.0	0.1	305	<0.1	<0.1	0.1
Perak	2,943	0.2	<0.1	0.3	5,676	0.3	0.1	0.5
Perlis	338	0.2	-0.2	0.5	338	0.2	-0.2	0.5
Selangor	10,995	0.3	0.2	0.4	21,700	0.6	0.4	0.7
Terengganu	1,370	0.2	<0.1	0.3	4,109	0.5	0.2	0.8
Sabah	2,108	0.1	<0.1	0.2	4,661	0.2	0.1	0.3
Sarawak	4,122	0.2	0.1	0.3	9,243	0.5	0.3	0.7
W.P.Kuala Lumpur	787	0.1	<0.1	0.2	1,181	0.1	<0.1	0.2
W.P.Labuan	0	0.0	0.0	0.0	1,584	0.6	<0.1	1.1
Malaysia	37,477	0.2	0.1	0.2	81,630	0.4	0.3	0.4

Table 8: Severity of ARI in Malaysia, 2006

	ARI	URI	ILI	Common cold/Coryza	Pharyngitis/Tonsilitis
Duration of sickness (days)					
N	10,040	10,001	524	9,403	1,576
Mean (days)	4.4	4.5	4.5	4.3	4.9
LL	4.3	4.3	4.3	4.2	4.7
UL	4.4	4.6	4.6	4.4	5.1
N >mean	3,072	3,464	189	3,227	644
Median	3	3	3	3	3
Hospitalisation					
Yes	1.1	1.1	2.7	1.0	2.4
LL	0.8	0.8	1.1	0.7	1.4
UL	1.4	1.4	4.7	1.3	3.5
Duration of Hospitalisation (days)					
N	53	51	9	42	25
Mean (days)	4.7	4.8	7.2	4.7	5.4
LL	3.6	3.6	1.8	3.5	3.4
UL	5.8	6.0	12.6	6.0	7.4
N >mean	18	18	3	14	7
Median	3	4	5	4	4

Table 8: Severity of ARI in Malaysia, 2006 (continue)

	Laryngitis & Epiglotitis	Otitis	LRI	Pneumonia	Bronchitis and Bronchiolitis
Duration of sickness (days)					
N	565	448	262	99	221
Mean (days)	5.5	5.6	5.9	7.0	5.8
LL	5.1	5.1	5.3	5.8	5.1
UL	5.9	6.1	6.5	8.2	6.5
N >mean	239	179	117	18	96
Median	4	4	4	7	4
Hospitalisation					
Yes	2.0	3.2	7.4	7.9	8.1
LL	0.6	1.1	3.6	1.6	3.8
UL	3.4	5.3	11.2	14.1	12.4
Duration of Hospitalisation (days)					
N	7	8	14	6	13
Mean (days)	4.9	4.4	4.5	3.5	4.3
LL	2.2	1.2	1.4	0.8	0.9
UL	7.6	7.7	7.6	6.3	7.7
N >mean	4	2	4	2	2
Median	4	3	3	3	3

Table 9: Lost of productivity due to ARI in Malaysia, 2006

	ARI	URI	ILI	Common cold/ Coryza	Pharyngitis/ Tonsilitis
Affected daily activity					
Yes (N)	3,090	3,069	527	2,820	787
%	30.8	30.7	46.1	30.0	49.8
LL	29.7	29.7	41.7	28.9	47.3
UL	31.8	31.7	50.5	31.0	52.4
Sickness leave (days)					
N	2,340	2,330	168	2,123	513
Mean	0.7	0.8	1.3	0.7	1.2
LL	0.6	0.7	1.0	0.6	1.1
UL	0.8	0.8	1.5	0.7	1.3
N > Mean	780	777	132	678	387
Median	0	0	1	0	1
Sick leave taken by caretaker					
N	2,065	2,062	99	1,970	342
Mean	0.9	0.9	1.8	0.9	1.6
LL	0.8	0.8	1.2	0.7	1.2
UL	1.0	1.0	2.4	1.0	2.1
N > Mean	770	768	79	720	264
Median	0	0	2	0	1

Table 9: Lost of productivity due to ARI in Malaysia, 2006 (continue)

	Laryngitis & Epiglotitis	Otitis	LRI	Pneumonia	Bronchitis and Bronchiolitis
Affected daily activity					
Yes (N)	319	162	160	66	136
%	56.5	36.0	61.9	67.1	62.3
LL	52.4	31.5	55.8	57.3	55.8
UL	60.7	40.5	68.0	76.9	68.9
Sickness leave (days)					
N	204	138	71	30	57
Mean	1.2	1.1	1.6	1.8	1.7
LL	1.0	0.4	1.1	0.9	1.1
UL	1.4	1.9	2.2	2.5	2.2
N > Mean	153	114	58	25	48
Median	1	0	1	1	1
Sick leave taken by caretaker					
N	127	75	45	15	38
Mean	1.8	0.8	1.4	1.3	1.2
LL	1.4	0.3	0.9	0.4	0.7
UL	2.2	1.3	1.8	2.1	1.7
N > Mean	98	29	27	11	32
Median	2	0	1	1	1

Table 10: Health seeking behaviour for ARI in Malaysia, 2006

	ARI	URI	ILI	Common cold/ Coryza	Pharyngitis/ Tonsilitis
Sought treatment					
Yes	6,055	6,024	364	5,618	1,147
No	3,979	3,971	157	3,786	423
%	60.5	60.5	70.3	59.9	73.5
LL	59.4	59.4	66.1	58.8	71.1
UL	61.7	61.6	74.5	61.1	75.8
How soon sought treatment					
Below 2 days (N)	6,079	6,048	368	5,636	1,153
%	94.7	94.7	94.9	94.9	94.4
LL	94.1	94.1	92.7	94.3	92.9
UL	95.3	95.3	97.2	95.6	95.8

Table 9: Lost of productivity due to ARI in Malaysia, 2006 (continue)

	Laryngitis & Epiglotitis	Otitis	LRI	Pneumonia	Bronchitis and Bronchiolitis
Affected daily activity					
Yes (N)	319	162	160	66	136
%	56.5	36.0	61.9	67.1	62.3
LL	52.4	31.5	55.8	57.3	55.8
UL	60.7	40.5	68.0	76.9	68.9
Sickness leave (days)					
N	204	138	71	30	57
Mean	1.2	1.1	1.6	1.8	1.7
LL	1.0	0.4	1.1	0.9	1.1
UL	1.4	1.9	2.2	2.5	2.2
N > Mean	153	114	58	25	48
Median	1	0	1	1	1
Sick leave taken by caretaker					
N	127	75	45	15	38
Mean	1.8	0.8	1.4	1.3	1.2
LL	1.4	0.3	0.9	0.4	0.7
UL	2.2	1.3	1.8	2.1	1.7
N > Mean	98	29	27	11	32
Median	2	0	1	1	1

Table 10: Health seeking behaviour for ARI in Malaysia, 2006

	ARI	URI	ILI	Common cold/ Coryza	Pharyngitis/ Tonsilitis
Sought treatment					
Yes	6,055	6,024	364	5,618	1,147
No	3,979	3,971	157	3,786	423
%	60.5	60.5	70.3	59.9	73.5
LL	59.4	59.4	66.1	58.8	71.1
UL	61.7	61.6	74.5	61.1	75.8
How soon sought treatment					
Below 2 days (N)	6,079	6,048	368	5,636	1,153
%	94.7	94.7	94.9	94.9	94.4
LL	94.1	94.1	92.7	94.3	92.9
UL	95.3	95.3	97.2	95.6	95.8

Table 10: Health seeking behaviour for ARI in Malaysia, 2006 (continue)

	Laryngitis & Epiglotitis	Otitis	LRI	Pneumonia	Bronchitis and bronchiolitis
Sought Treatment					
Yes	413	284	198	77	168
No	152	163	63	22	52
%	74.0	63.7	77.2	79.9	77.5
LL	70.1	59.3	72.1	72.2	71.8
UL	77.8	68.1	82.4	87.5	83.1
How soon sought treatment					
Below 2 days (N)	415	287	199	77	169
%	96.1	88.0	92.7	87.8	94.0
LL	94.1	84.0	89.0	80.2	90.3
UL	98.0	92.0	96.5	95.5	97.7

Table 10: Health seeking behaviour for ARI in Malaysia, 2006 (continue)

	ARI	URI	ILI	Common cold/ Coryza	Pharyngitis/ Tonsilitis
First place sought treatment					
Government					
N	2472	2454	162	2279	444
%	40.9	40.8	44.9	40.7	38.8
LL	39.2	39.1	39.1	39.0	35.6
UL	42.6	42.5	50.6	42.5	42.0
Private					
N	2680	2671	158	2482	566
%	47.0	47.1	46.3	47.0	52.5
LL	45.3	45.4	40.4	45.2	49.2
UL	48.8	48.8	52.2	48.8	55.8
Others					
N	717	715	31	677	98
%	12.1	12.1	8.8	12.3	8.7
LL	11.1	11.1	5.7	11.2	7.0
UL	13.1	13.1	11.9	13.4	10.5

Table 10: Health seeking behaviour for ARI in Malaysia, 2006 (continue)

	Laryngitis & Epiglotitis	Otitis	LRI	Pneumonia	Bronchitis and Bronchiolitis
First place sought treatment					
Government					
N	164	137	113	49	96
%	40.3	48.1	58.6	65.7	58.9
LL	2.8	42.2	51.2	53.9	50.9
UL	34.9	53.9	66.0	77.5	66.8
Private					
N	196	119	69	23	57
%	50.2	43.4	37.4	31.7	36.4
LL	2.7	37.6	30.3	20.1	28.8
UL	44.8	49.3	44.6	43.3	44.0
Others					
N	40	24	8	2	8
%	9.5	8.5	4.0	2.6	4.7
LL	1.5	5.2	1.2	-1.1	1.5
UL	6.6	11.8	6.7	6.2	8.0

Table 11: Cost of treatment for ARI in Malaysia, 2006

	ARI	URI	ILI	Common cold/ Coryza	Pharyngitis/ Tonsilitis
Cost of treatment					
N	5,081	5,054	298	4,722	939
Mean (RM)	16.8	14.6	16.1	15.7	24.3
LL	13.6	11.8	13.6	13.1	10.7
UL	20.1	17.5	18.7	18.4	37.9
N > Mean	1,714	5,037	121	1617	297
Median (RM)	3	3	5	3	10

Table 11: Cost of treatment for ARI in Malaysia, 2006 (continue)

	Laryngitis and Epiglotitis	Otitis	LRI	Pneumonia	Bronchitis and Bronchiolitis
Cost of treatment					
N	324	241	171	61	149
Mean (RM)	17.9	23.2	18.6	20.9	20.7
LL	15.0	5.6	12.4	11.9	13.9
UL	20.8	40.8	24.8	30.0	27.4
N > Mean	141	59	166	22	41
Median (RM)	10	2	1	2	1

CHAPTER III

RECENT AND CHRONIC ILLNESS

ABSTRACT

A cross-sectional population-based survey was conducted to obtain community-based data and information on the prevalence of recent illness/injury and chronic illness, pattern of health needs and use of health care in the community to enable the Ministry of Health to review health care delivery system and rectify discrepancies in the community. A total of 13,293 respondents of all ages participated in this survey. Prevalence of recent illness/injury was 23.6 percent with more males (24.3%) and higher rural population (25.5%) had reported recent illness/injury within a 2-week recall period. Prevalence of chronic illness within a recall period of one year was 15.5% which is 8% less than the prevalence of recent illness/injury. The percentage of injury among those reported recent illness/injury was 3.1%. The highest reported recent illness/injury was among the 0 – 4 years age group (31.8%), the Indians (26.9%), secondary educational level (22.9%), unemployed (25.0%), those earning less than RM400 (26.6%) and Federal Territory Labuan (37.9%). Prevalence of chronic illness was reported to be significantly higher among the females (16.8%) and those from the urban area (15.6%). Among all those reported recent illness/injury, the most common reported recent illness was related to respiratory system (42.0%). Among those reported recent illness/injury 58.2% sought treatment either from government, private or traditional health facilities of which 43.4% seek treatment from private health facilities, 42.1% from government and 12.7% from traditional facilities. Majority of the respondents (59.5%) who reported recent illness/injury did not seek treatment anywhere due to mildness of illness and 13.3% decided to treat themselves (self-medication). Among those who reported recent illness/injury majority (39.2%) sought treatment less than 12 hours after the onset of the illness. About 70% of the respondents with recent illness/injury reported no limitation on their activities. The mean time taken off due to recent illness/injury was 2.32 days with median of 2 days. The most common chronic illness reported within the last one year was hypertension (7.9%) followed by diabetes mellitus (4.0%). Among those who had chronic illness Indians reported the highest [19.7% (18.4 – 21.0)], followed by Malays [15.9% (15.4 – 16.4)] and Chinese [15.5% (14.7 – 16.4)]. About 40% of those with chronic illness and household income less than RM 400 sought treatment from government health centre and majority those with income more than RM 2000 sought treatment from private clinics. Among the Malays and Indians who sought treatment for their chronic illness, the majority visited government health centre however the majority of the Chinese went to private clinics. Respondents with household income RM2000-2999 reported that mild illness was the main reason for not seeking treatment for their chronic illness [29.3% (20.1 – 38.5)], and also the highest practiced self medication [11.1% (5.1 – 17.0)].

1. INTRODUCTION

Malaysia has progressed since independence over the last 50 years from a commodities producer to a leading manufacturer of high-tech products. With a strong continuous economic growth Malaysia has become a role model for developing countries and even the envy of more developed countries. In the midst of even greater change and continued strong economic growth the health of the nation forms an integral part of our nation's socio-economic development. The health sector both private and public has to ensure that the changes and progress will be in consonance with the rest of the economy (7MP). While the population of Malaysia has doubled in the 18 year period between 1975 -2005 from 12.3 – 26.7 million an increase of 8.3% to 28.96 million is expected between 2005 -2010. Urban areas are expected to grow at a higher rate (9.5%) as compared to non-urban (6.1%) (Malaysian Population and Census Analysis 2000). Consistent with these changes there will be health transition both demographically and epidemiologically. This will be associated with the increased incidence of non-communicable diseases relative to infectious diseases. The transition will further cause changing demands in the health system as the treatment of non-communicable diseases is more expensive either due to the intensity of health utilisation or the chronic nature of individual illness. These predictions will provide a basis for health policy makers and health planners for ensuring that future investments in health keep pace with the ever faster growing needs of the urban population while ensuring the non-urban populations are not neglected.

In our Health for All strategy of the concept of equity in health is very important. All over the world and in every type of political and social system differences in health have been noted between different social groups in the population and between different geographical areas in the country. There is consistent evidence that disadvantaged groups have poor chance of survival, and there are gaps in mortality between urban and rural populations, and between different regions in the country. There are also differences in the experience of illness and disadvantaged groups not only suffer a heavier burden of illness than others, but also experience chronic illness and disability at an earlier age. Equity in health implies that everyone should have a fair opportunity to attain their full potential and more pragmatically that no one should be disadvantaged from achieving this potential. The aim of the policy for equity and health is to reduce or eliminate differences which arise from factors which are avoidable and unfair.

Malaysia's GDP has grown by an average of nearly 9% annually with a budget of development RM438.5 billion for health services. In tandem with Malaysia's rapid economic growth and coupled with health problems of industrialisation, urbanization, an aging population, immigration and expectations of an increasingly affluent population and escalating healthcare costs , the MOH has to emphasize on more comprehensive, sophisticated and quality-orientated services. In line with this, the Vision 2020 of Ministry of Health (MOH) was developed to lead Malaysia to be a nation of healthy individuals, families and communities, through a health system that is affordable and consumer-friendly, with emphasis on quality, innovation, health promotion and respect for human dignity, and which promotes individual responsibility and community participation (Abu Bakar et al. 1992). In the context of MOH vision 2020 objectives and policies were laid down with emphasis on equity in access to services, efficiency, (the ability of the system to deliver outputs at the least cost) effectiveness, (the ability of the outputs of the system to optimize the health status of the population) and finally affordability (the ability of the nation to afford the system and sustain it to the future). The balance between these objectives and how they are measured or defined varies between countries. These objectives form the basic test to evaluate how a health system is working or whether it is failing.

The definition of equity varies from country to country and in Malaysia definition of equity is based on social democracy and universal access, with funding based on the ability to pay. In conclusion equity implies that access to reasonable health services is a basic right.

The foundation of the Malaysian healthcare system since Independence has been based on the effective delivery of health care in rural and urban areas by the government, supported by a comprehensive public health programme. In 1982, the health system received praise from an International Monetary Fund health economist for its egalitarian access to healthcare. In 1992 Malaysia was commended by the World Health Organisation for having one of the most well distributed health system in the Pacific Region (MMA, Reforming Health Care in Malaysia 1999). As in other countries the Malaysian Health System is under pressure to grow at a faster rate. This pressure of rapid growth is largely due to the changes in the environment in which health systems operate. The two main features are the greater community expectations of its health services as disposable incomes grow and the other is the improvement in medical technology which has resulted in a greater range of high cost treatments being available.

The better financed private health sector is said to be accessed by those in a better financial position while the poorer segment of the community has no choice but rely on the government system as a source of curative care. In order to achieve a sustainable and equitable financing system and provide a universal health cover to the population of Malaysia the government is in the process of developing a National Health Financing Mechanism (NHFM).

During the Eighth Malaysia Plan higher priority was given to safeguarding and improving health status of individuals, families and communities and efforts were undertaken to enhance the delivery system and to improve the scope and quality of healthcare. There was continued increased integration and smart partnership among healthcare providers (8MP). With the well established integrated and comprehensive health system, focus of the Ninth Malaysia Plan would be a shift from the traditional focus on providers, facilities and illnesses to consumer empowerment, health promotion, lifelong wellness as well as disease prevention and control (9MP 2006 -2010). During the 8MP health facilities and scope of health services were expanded to increase accessibility, affordability and equity. With better integration of private sector and NGOs and the development of the Health Promotion Foundation, the Ministry of Health was able to implement various activities effectively. With the continuous effort of the Ministry of Health the health status of Malaysians has improved as shown by the decrease in mortality and morbidity indicators, life expectancy, infant mortality rate and maternal mortality rates. Malaysia has been successful in the control of communicable diseases. The coverage of childhood diseases namely tuberculosis, polio, tetanus, diphtheria and pertussis have exceeded 85% and the country was certified polio-free in 2000. (Ministry of Health Technical Report 2000) The life expectancy for males has improved from 70.0 in 2000 to 70.6 in 2006 and for females from 75.1 to 76.4 respectively, infant mortality from 6.6per 1.000 live births (2000) to 5.8 (2005) and maternal mortality rate remains at 0.3 per 100.000 live births since 2000 – 2005 (Department of Statistics 2005). However, there has been some resurgence of communicable diseases like HIV/AIDS as a result of urban /rural and transmigration as noted by WHO.

According to the second National Health and Morbidity Survey (National Health Morbidity Survey 1996), 54.2% of recent illness or injury was seen in private clinics, 38.7% in governmentfacilities, 2.3% in private hospitals and 4.8% was attended by traditional care medical practitioners. In the case of hospital care, 78.4% of those hospitals used MOH hospitals compared to 17.9% who used private hospitals. There was also improvement in the distribution of public clinics and hospitals throughout the

country. 92% of people in urban and 69% in rural areas live within 3 kilometre radius of a health facility. Disparities in health status and health utilization, which were identified in the second NHMS, were to some extent improved through changes made in the strategies, recommendations and policies in the development of the 7MP and 8MP.

The fundamentals of health care is to provide the right care at the right time and in the right setting. This means that patients should be treated in settings that are appropriate to their conditions, avoiding situations where specialists treat patients who can be treated by general practitioners or where patients requiring aged nursing home care occupying acute beds. The appropriate delivery of healthcare has important cost implications on the health system as care of unnecessary intensity or at cost can be avoided. It has been ten years since the last nation wide morbidity survey was conducted. It is now imperative to conduct another nationwide survey to identify changing trends and changes in health seeking behaviour and utilization of recent illness and chronic illness.

Health authorities are required to review the health of the population regularly in order to make rational decisions about the distribution of resources. The results of these decisions must be monitored to ensure services provided meet the needs of the population and to measure the outcome or 'health gain'. The success of this approach will depend on the quantity and quality of information made available for decision making. This study will also be able to identify differences, deficiencies, improvements made over the last ten years. Information obtained from this survey will provide basis for policy makers in planning, prioritizing, setting goals and implementation of new programmes. It will also provide current information for the development of the National Health Financing Scheme and formulation of the Malaysian National Health Policy. This will further help in MOH's aim to prevent and reduce disease burden to further improve health status of the Malaysian population, by enhancing the healthcare delivery system to increase accessibility to quality care, optimizing resources through consolidation and integration, supporting evidence-based decision making for policy makers, enhancing human resource development and strengthening health information and management system.

2. LITERATURE REVIEWS

2.1 Health and Wellness

Traditionally health is defined as the absence of illness. Health is a level of functional and/or metabolic efficiency at both micro (cellular) and macro (social). In the medical context, health is defined as an organism's ability to respond efficiently to challenges (stressors) and effectively restore a 'state of balance' known as homeostasis. However, the widely accepted definition is health is a complete state of physical, mental and social wellbeing and not merely the absence of disease (World Health Organisation 1940). Health is also influenced by a wide spectrum of factors including spiritual, lifestyle, heredity, biological and social such as physical environment for example pollution, housing, sanitation and water supply. Thus, the scope of health is broad. The balance of intellectual, environmental and spiritual components constitutes self-responsibility.

The socio-ecological view of health is known as New Public Health. It is not only a positive view of health but a broader and multi-dimensional view. The New Public Health focuses on preventing diseases as well as curing diseases and pays attention to the economic inequalities, social problems and environmental issues that cause diseases. Hence, it addresses the root cause of disease through its numerous public health programmes, services, policies and health promotion programmes which not only promotes social sustainability but also contributes to ecological and environmental sustainability.(http://www.unesco.org./education/tlsf/theme_b/mod08/uncom08t01bod. htm).

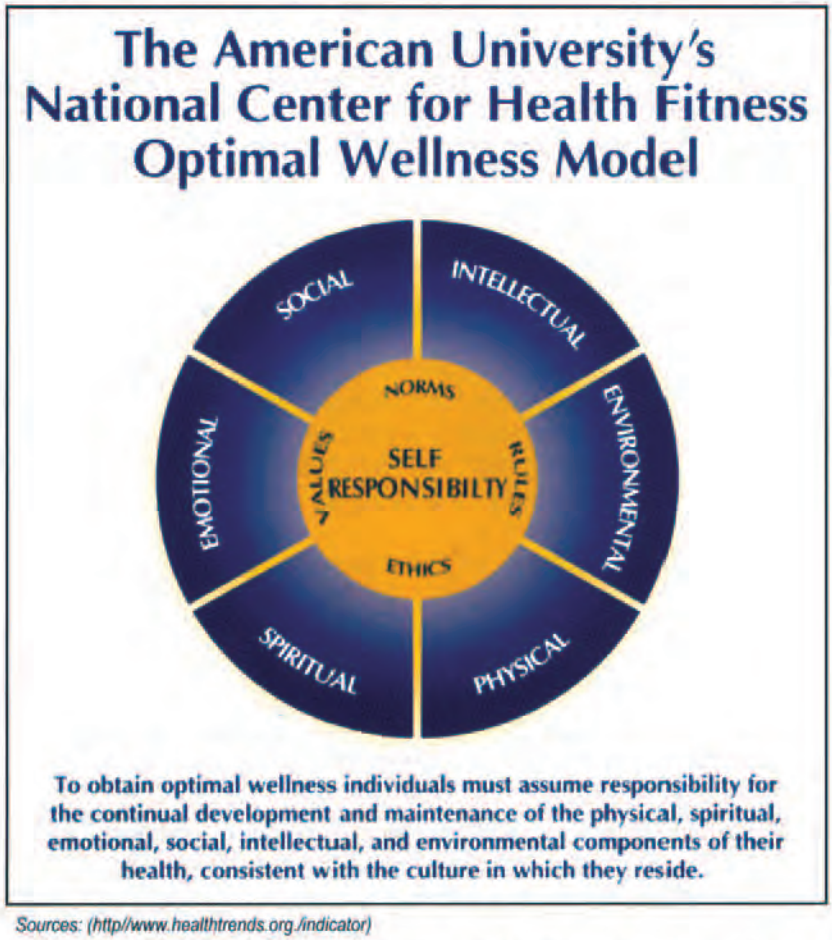
In line with this the goals of future healthcare services is to provide services that:

a) Promote individual wellness throughout life (wellness focus)
b) Focus services on the person and ensure services are available when and where required (person wellness)
c) Provide accurate and timely information and promote knowledge to enable a person to make informed health decisions (Informed person)
d) Empower and enable individuals and families to mange health through knowledge and skills transfer (self-help)
e) Provide services into rural and metropolitan homes, health settings and community centres (Care provided at home or close to home)
f) Manage and integrate healthcare delivery across care settings, episodes of care and throughout life (Seamless, continuous care)
g) Customize services to meet individual and group needs and special circumstances
h) Provide enhanced access, integration and timely delivery of high-quality services at reasonable cost (effective, efficient and affordable services) (Director General of Health Special Technical Meeting 1997).

2.2 Wellness and Empowerment

Wellness is defined as the psychological state of feeling healthy and the best approach is one that focuses on personal and community responsibility for health. The individual and the community must be supported to make the right lifestyle choice, which is possible, only if the individual and the community are well informed of risks associated with lifestyle and habits at the right time.

The efforts to prevent lifestyle-related morbidity must start early in life before choices are made. The emphasis should be on maintaining individuals in a state of health as long as possible by providing access to a wide range of preventive/ promotive services directed at reducing disease morbidity. A individual may choose to receive care from a primary care centre, a general practitioner, a specialist, a government or private hospital. At different times he or she is likely to use different institutions for care. Care should not be episodic, but should take into consideration a patient's entire history (Long-term care).



Sources: (http//www.healthtrends.org./indicator)

Figure 2.1: The American model of diagrammatic for the need and demand concept

2.3 Health Status and Measurement of Health Status

Health status is defined by the World Health Organisation as the state of health of an individual, group or population measured against accepted standards. Health status is a profile of health for a specific population in a specific geographic area and time period. There is no single best measure or standard of health but a variety of indicators and factors that put individuals and populations at increased risk of disease or premature death must be taken into account. (http//www.healthtrends.org./indicator)

Health is a multi-dimensional concept that is usually measured in terms of 1) absence of physical pain, physical disability, or a condition likely to cause death, 2) emotional well-being and 3) satisfactory social functioning. There are two types of health status measurements, namely individual and population health status measurements. Individual health status is measured by an observer (a physician), who performs an examination and rates the individual based on the various dimensions, like presence or absence of life-threatening illness, risk factors for premature death, severity of disease and overall heath. Individual health status can also be assessed by asking the person to report his/her perceptions of physical functioning, emotional well-being, pain or discomfort and overall perception of health. (http//www.rice.edu/projects/Hispanic/ Health Status/Health Stat.html.)

The health of an entire population is determined by aggregating data collected on individuals. In the absence of comprehensive or absolute measures of health of a population, the average lifespan, the prevalence of preventable disease or deaths and availability of health services serve as indicators of health status. Some commonly used measures of population health status are morbidity and mortality measures. It has been argued that the role of health status measures in the assessment of medical care are of limited value in assessing the performance of health care professionals and institutions because of confounding factors, error in data collection and play of chance. However, health status measures should be incorporated as outcome measures in clinical trials since they can provide information on how individuals and institutions can improve performance and give health policy makers information on the effectiveness of intervention.

There is a need to standardise health status measurement to enable one to compare health status between regions and between countries. In attempting to formulate a health outcome measurement instrument a meeting of experts was held in London in 1994 which was sponsored by the European Union BIOMED programme and under the sole responsibility of the European Research Group on Health Outcomes (ERGHO) a number of guidelines were developed. According to the ERGHO statement the basic guidelines to be followed are as follows (Stephen 1996):

a) Match an instrument to your needs

   i) Choose the level of observation- either individual patient or group of patients from a particular age-group with a specific disease or general quality and cost-effectiveness in different care systems

   ii) Formulate and describe your aims- short, feasible and reliable instruments used intervention studies and broadly validated instruments which have been used in other studies are in describing the health status of a defined population.

   iii) Define the context of your interest- bio-medical view of health, to measure change over time of clinical signs and symptoms, severity of illness, pain level and side-effects of medications, sociological view of health, functional status of population or the humanistic perspective of health which includes energy, behaviour and patient concerns of autonomy.

   iv) Consider the sources of your information- whether information is from patients, care-givers, doctors or other care-providers

   v) Who are the users of your information- whether the information is used by politicians, doctors, patient organizations and patients themselves.

vi) What is the aim, whether to describe, to compare or to evaluate health outcomes. Only after the aim of the measurement has been clearly defined and the way to use the results has been decided then the instrument and scales which suits the purpose can be finalised. Health status measure can be used as an indicator, health outcome measure as comparison and health outcome as assessment.

b) The instrument should be condition specific when assessing symptoms and functions of one disease condition, dimension specific when studying daily functioning or mental well-being in different health problems or population. Generic instruments should be used when studying general health or interaction between different conditions and healthy people in the population. A combination of disease specific and generic instruments can also can be used when studying the influence of other diseases or conditions on the results of the problem or disease.

c) Health measurement can be evaluative or subjective rather than objective.

d) The patient should also be given due consideration especially the reaction of the patient to the outcome assessment when the project involves studying people with chronic diseases.

Some of the Health Outcome Instruments for international use in ambulatory care are:

a) **Generic Instrument**
- i) COOP/WONCA charts
- ii) RAND SF36
- iii) Duke Health Profile (DUKE)
- iv) EurQol
- v) MOS 20
- vi) Nottingham Health Profile
- vii) RAND General Health Perception Questionnaire (GHPQ)
- viii) Sickness Impact Profile (SIP) Functional Limitations Profile (FLP)

b) **Disease/Condition Specific Instruments**
- i) State-Trait Inventory (STAI)
- ii) Arthritis Impact Measurement Scale (AIMS)
- iii) Diabetes Health Profile IDDM (DHP I) and NIDDM (DHP2)
- iv) Asthma Quality of life Questionnaire (AGLQ)
- v) Diabetes Quality of Life measure (DQOL)
- vi) EORTC Quality of Life Questionnaire

The 36-item short form (SF-36) was constructed to survey health status in the Medical Outcomes study. It is a multi-item scale that can assess limitations in physical activity because of health problems, limitations in social activities because of physical or emotional problems, limitations in usual activity because of physical health problems, bodily pain, general mental health and limitations in usual role activities because of physical or emotional problems, vitality and general health perceptions (Ware & Sherbourne 1992). The SF-36 was tested for acceptability, validity and reliability by comparing with the Nottingham health profile and was found to be easy to use, well accepted by patients, very reliable and high validity (Brazier et al. 1992).

Most of the health status surveys have been designed for mail, telephone or in person administration. There are not many studies done to show the effect mode of survey administration has on the way respondents assess their health, response rate, non-response bias and data quality. A study done with SF-36 by comparing mail and telephone survey showed that health ratings were less favourable, while reports of chronic conditions were more favourable with mail than telephone surveys. (McHorney et al. 1994).

In a study done by Lyons RA et al. (1994) shows that the SF-36 Questionnaire is suitable for use with an elderly population when used in an interview setting (Lyons et al. 1994). The World Wide Web survey using the internet as a mode of collecting data using the RAND 36- Item Health survey 1.0 (RAND -36) to measure individual health status plays an important role in advancing health services research and outcomes based patient care. In this study it was found that two thirds completed the survey in 5 minutes, 97% in 10 minutes and completion rate was 99.28%. (Bell & Kahn 1996). The development of health status measures to assess outcomes of medical care has been an important advance in clinical and health service research and monitoring of individual patient, but there is problem when using it to monitor and compare the quality of health care institutions.

2.4 Quality of Healthcare

In the last few years, healthcare reform is emerging in various shapes in both developed and developing countries towards entrepreneurship with the introduction of managed care. Managed care has fostered competition among providers and networks of providers to deliver the highest quality of care in the most economical manner while serving the customer's interpersonal and psychological needs, which will be the focus. This involves tremendous skills at capturing and understanding the right segment of the market and to be sensitive to the customer's wants and needs which in turn will lead to customer satisfaction. Donabedian has divided the scope of healthcare into science of care, art of care and amenities. Patients are the best judges of the art of care and often the sole judge of the amenities. Ambroise Pare, the father of surgery defined tasks of medicine in 1575 as to cure sometimes, to comfort often, to console always. Traditionally quality assurance only looks at cure, the area where health professionals rarely succeed. For patients with chronic or terminal illness, comfort and consolation may be more important, and measurement of patient satisfaction is the best tool to learn more about these aspects of care.

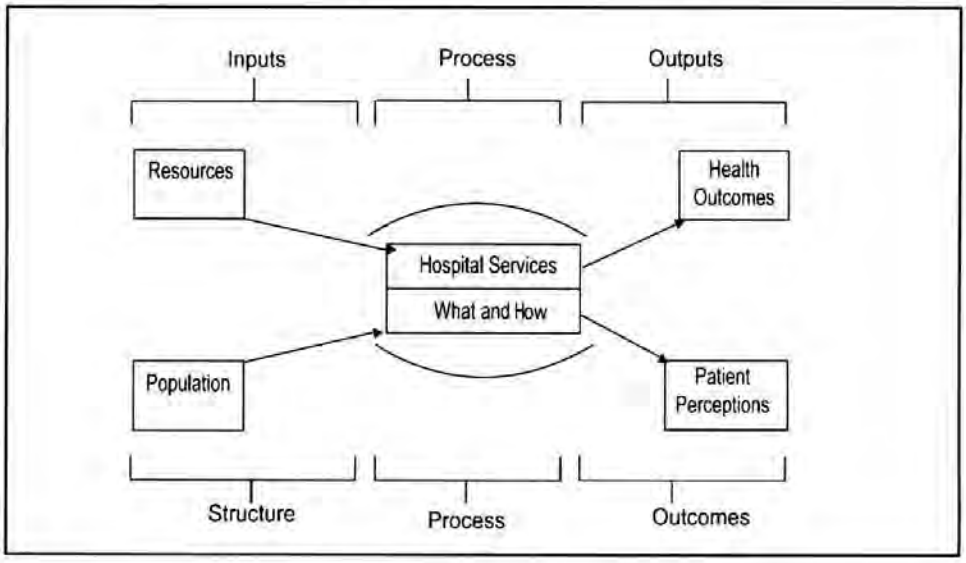
Due to the existence of market forces healthcare is transformed from a seller's market into a buyer's market with emphasis towards cost containment, consumerism, over-supply of physicians and increasing competition between healthcare providers themselves and between healthcare providers and providers of alternative care. This transformation has resulted in the prominence of the role of patient satisfaction in quality assurance. Various quality improvement programmes which include quality assurance, total quality management and continuous quality improvement have been introduced. Quality is one of most talked about issues in the American healthcare system which spends one of the highest proportion of the GNP (about 12%) on personal health services while its health status is at a substantively lower level than other nations that spend significantly lower.

In order to improve access or promote high quality care it is necessary to define quality and understand the factors that help or hinder its delivery. Tremendous economic, political, social and cultural pressures have forced most of the countries to be actively engaged in quality improvement programmes in order to improve the quality of healthcare. The concept of quality is slippery and it's

meaning is elusive due to three reasons. Firstly the meaning of quality changes according to the interests that are advocating it and hence, quality is experienced differently by different people, especially if one is a provider and the other at the receiving end of a service, and may depend on individual needs and expectations. Lastly, even though quality is often associated with process (improvements) the outcome is what matters most.

A clear definition of healthcare quality has not been obtained as it is multi dimensional and its definition varies according to who is doing the definition. Traditionally quality has been used to convey prestige with the upper classes and suggest positional advantage in that a 'quality' product or service is superior and special to others with a suggestion of "perfection". According to Donabedion quality is simply an attribute that the technical and interpersonal aspects of medical care manifest in varying degrees. It is also a judgment about care and like all judgments, it is determined in relation to values, norms and experience.

The question is by quality, do we mean the competent execution of critical processes or the improvement of a person's health and well-being and whether quality as defined by the provider is consistent with patients perceptions of quality (satisfaction). Will greater consumer information about quality actually change purchasing decisions or how people select doctors or hospital? The requisites of high quality medicine are the skilful use of up-to-date medical technology, compassionate attention to the needs of patients and their families and explicit communication about the potential risks and likely benefits of care.



Point of View			
Provider/ Absolutist	Technological imperative	Technical quality (what)"The type of care I provide"	Individual health outcomes
Consumers			
Patient/ Individual	Physical facilities and personnel	Functional quality (how) (tangibles, reliability, assurance, responsiveness, empathy)	Individual health outcomes and perceptions of the art of care
Third Party Payors	Appropriateness: preadmission certification Efficiency: Cost/unit service	Concurrent and retrospective review	Beginning to notice aggregate statistical outcome Beginning to assess patient satisfaction indicators
Society	Total cost, not cost shifting	Seeking specific criteria for "good care".	Aggregate mortality measure

Source: Lanning and O'Connor 1990

Figure 2.2: Definition of quality health care

Quality of care may be evaluated implicitly or explicitly. Implicit evaluation is less complex and involves identifying the components of quality, developing clinical indicators and measuring specific characteristics, which is not very reliable.

An explicit criterion is more reliable, forms the basis for indicator development, and provides information, which allows healthcare organisations to compare based on quality and not just on, costs and benefits. Quality can be assessed using measures of structure, process and outcome based on 'criteria, norms and 'standards'. Figure 2.1 show how health-care quality can be conceptualised as a system with linkages between input and outputs. It also presents some examples of how various groups view it. The linkages are efficiency, appropriateness and effectiveness. Efficiently occurs when a desired output is produced at a minimum cost; it bridges human, capital and technological resources with the service processes delivered by a health-care organization. Appropriateness connects a patient's situation to the available services by evaluating suitability of those services and procedures in accordance to the patient's, specific health needs. Effectiveness connects health service process with patient outcomes or the patient's own perspective about how care was given. Currently there ir more, emphasis on patient perceived outcome under the rubric of patient satisfaction, which forms a reliable indicator of quality.

One of the issues discussed in the 6th Annual National Forum on quality improvement in healthcare held in San Diego, California, was about empowering the hidden health-care system. The hidden healthcare system consists of patients as primary providers of care and the human brain itself as an internal Health Maintenance Organization (HMO). At present, the disparity between the real health needs of the people and the common biomedical response leads to frustration, ineffectiveness and a gross waste of vital resource. Educational, psychological and behavioural interventions can help patients address their needs and help them become active partners in health. A vital function of the healthcare system is empowering the hidden healthcare system, which will result in improved satisfaction, better health outcomes and decreased healthcare costs.

With the introduction of information technology into healthcare, on-line healthcare has produced fundamental changes in the way we think and act about healthcare. A six-level system of information age healthcare which contributes to the new notion of quality has been proposed in which patient consumers will seek help when they have problem in the following order: individual self-care, family and friends, informal self-help networks, the professional as coach, the professional as partner and finally the professional as authority. With provider as partner, a treatment plan will be negotiated where the provider will be responsible for certain things and the patient will be responsible for certain things and both of them will work together as partners. Only when the previous five levels of care have failed will be the patient go on to the final level where the provider is authority and proposes the treatment of his choice. This approach will be used when the patient is very ill, mentally incompetent or unconscious. The current problem is the provider acts as an authority providing all decisions without an opportunity for patients to participle.

The promotion of consumer involvement in decisions about individual healthcare is now high on many health policy agendas in UK as it is in many countries. One of the stated objectives of the NHS for 1996/97 is that purchaser and provider should have a systematic programme to achieve active partnership with individual patients in their own care in particular seeking to improve the quantity and quality of information given to enable patient choice about treatment options. The consumer movement in Australia emphasized that any quality measure should reflect a consumer perspective which means that quality measure should include those aspects of care which consumers had

identified asimportant to them. The experiences and judgments of patients have become an important input to service development and quality review. The shift towards purchasing rather than funding health service has drawn attention towards ways of measuring hospital performance and within this measure quality of hospital care. Patient satisfaction is one of the ways of measuring performance which can provide input for quality improvement. Even in Taiwan where patients health preferences are strongly influenced by culture, consideration of patient's views is an essential component of consumer rights.

The scenario in Malaysia is that progress has been made from the perception that "quality is difficult to define" to a situation where quality can and should be measured and reported for the benefit of the healthcare providers, patients and the public. There is also a need to promote the concept of accountability which is a willingness of providers to share information about their performance with those who need to know or who have an interest in this information. Variations in medical practice and concerns about the cost of healthcare are frequently being discussed in our country. Consumers have expressed their concern about obtaining value for their investment in healthcare. Hence, it is hoped that in the future, assessment of quality and information on quality of care will be on the agenda in the new health financing system. In our vision health aspects of quality which have been emphasized are access, appropriateness, outcomes, client satisfaction and efficiency.

With the increased participation of the private sector in the provision and delivery of health services, there is a need to emphasise the quality of healthcare service in the private sector. There is extensive collaboration between the private and public sector working on quality improvement measure. In order to create an atmosphere that promotes co-operation and trust decisions made must reflect community consensus rather than only the views of certain sectors. There is a need to promote discussion between public and private and consumers and providers of care. There are 17 quality improvement activities in the Ministry of Health, which employ various methods to measure and improve quality of service. The 17 quality improvement activities are as follows:

i) Quality assurance, which comprise of National Indicator Approach (NIA)
ii) Hospital Specific Approach (HAS)
iii) Quality Control Circles (QCC)
iv) Total Quality Management (TQM)
v) Clinical Audit
vi) ISO 9000
vii) Quality control
viii) Confidential enquiry into maternal deaths
ix) Preoperative mortality review
x) Nosocomial infection
xi) Clinical Practice guideline
xii) Incident reporting
xiii) Public circulars
xiv) Innovations
xv) Client Charter
xvi) Corporate culture
xvii) Disease reporting

Serious consideration and importance is given to patient and customer satisfaction while improving technical quality. In line with the quality improvement activities, patient satisfaction surveys have been carried out by most hospitals in the Ministry of Health. There has been a paradigm shift in that quality is now based on the patient's perspective instead of the provider's perspective and the future of medicine in Malaysia is to build partnerships between the provider and the patient by empowering the patient through self-care.

Rapid development, urbanization, increased health status, economic status and educational status has led to demographic changes which has resulted in an increased proportion of aging population especially in the developed countries and also in some developing countries. Along with this demographic transition, epidemiological transition has also occurred with a shift from communicable to non-communicable diseases. An aging population suffers from more chronic diseases, which require long term care. In order to achieve long term care there should be continuity of care and this will only be achieved if the patient is satisfied with the provider.

The WHO defines "health" as a state of complete physical, mental and social well being and not merely the absence of disease of infirmity. If this definition is accepted then one has to accept that patient satisfaction has a role in the quality of care. A dissatisfied patient is not in a state of complete mental and social well being. This indicates that patient satisfaction is much more than an indicator of or a proxy measure for the quality of care. For a desired outcome of care, patient satisfaction is an essential part of its quality. It does not matter whether the degree of patient's satisfaction reflects the competence of the physician or the quality of care. The important thing is that if patients are dissatisfied, the goal of healthcare will not be achieved.

Community participation is a tenet of democracy; those influenced by a decision have the right to participate in making that decision. The Alma-Ata Declaration states that the people have the right and duty to participate individually and collectively in the planning and implementation of their healthcare. It is assumed that with community participation in healthcare the following will be accomplished:

a) More will be accomplished
b) Services can be provided at a lower cost
c) Participation leads to a sense of responsibility
d) Participation ensure that things are done the right way
e) Participation has an intrinsic value for the population and
f) It provides freedom from dependence on professionals

Since the assumed benefits of patient satisfaction seem very similar, it can be explained that considering patient's views is simply a special case of community participation. By letting patients express their opinions in a patient satisfaction survey or interview corresponds with casting a vote in the elections. It enables the patients to vent their feelings and gives them the feeling that they participate in their care.

Consumer involvement in healthcare decision-making has a beneficial effect on health and well being. Informed consumers, when afford a choice, might select more effective forms of healthcare, which are appropriate to their needs and thus secure greater health gain.

Attention to individual patient preferences is likely to lead significant net utility gains. People might also derive satisfaction and benefits from being informed about treatment options and from involvement in

decision making which will have a positive impact on their response to the healthcare they receive. They might be more convinced about the appropriateness of their treatment if they themselves have been involved in the decision-making process, which will in turn determine their compliance to treatment, continuity of care and whether they change their provider. Thus, patient satisfaction can be used as a useful outcome measure. Furthermore, patient satisfaction is useful in assessing consultations and patterns of communication and is good as a screening device that leads to more details.

By determining in the customers language the key areas that drive satisfaction, and by probing what is expected, experienced and unacceptable the real drivers of customer satisfaction can be established. In today's competitive world, the only meaningful strategies are those, which place the highest priority on building partnership with exiting customers. New customers are difficult to win and often take years to become profitable. Hence, satisfied existing customers have more revenue producing potential than new customers.

Quality has gone beyond just meeting the customers' needs to delighting the hopefully satisfied customer by building partnership. Like beauty, quality is partly in the eyes of the beholder (in health-care – the patient). Quality has two aspects-qualities of action and quality of perception. Perceptions are found to be more powerful since they determine patient's satisfaction and guide their behaviour and the degree of satisfaction will determine whether a patient chooses modern healthcare system over alternative care. This makes it important to find out how patients perceive the services they get.

2.5 Equity

Human beings vary in health as in other attributes and that portion of health differential attributable to natural biological variation is inevitable rather than inequitable. However, the difference between different groups cannot be accounted for on biological grounds alone. The important factor is whether the resulting health differences are considered unfair seems to depend on whether people choose the situation that caused ill health or whether it was out of their direct control. Equity in health implies that everyone should have fair opportunity to attain their full potential, and more pragmatically that no one should be disadvantaged from achieving this potential. In the Health for All Strategy Equity is defined as equal access to available care for equal need, equal utilisation for equal need and equal quality of care for all (WHO 1981).

For purposes of measurement and operationalisation, equity in health is the absence of systematic disparities in health or in the major social determinants of health between groups with different levels of underlying social advantage/disadvantage (i.e. wealth, power or prestige). Inequalities in health systematically put groups of people who are already socially disadvantaged (i.e. by virtue of being poor or being a female) at further disadvantage. Equity is an ethical principle and closely related to human rights principle. Assessing health equity requires comparing health and its social determinants between more and less advantaged social groups (Braveman 2004). There is a growing interest for a clear definition of equity at national and international levels (Acheson et al. 1998).

The measurement of health disparities without considering how the disparities are distributed socially is not a measure of equity and does not reflect fairness or justice with respect to health (Allyne et al. 2000). Thus, the choice of definition of equity in health is important because of the implications on the utility of measurement. The definition can guide measurement and hence the accountability on the

effects of actions. Hence, the above definition of equity as the absence of disparities in health that are systematically associated with social advantage/disadvantage can be accepted for measurement.

3. OBJECTIVES

3.1 General Objective

To provide community-based data and information on the pattern of recent illness/injury and chronic illness and to describe the health seeking behaviour in the general population with regards to practices related to the health problems to enable the Ministry of Health to review the program planning, strategies and activities for the allocation of resources in relation to these illnesses.

3.2 Specific Objectives

3.2.1 To determine the prevalence rates of recent illness/injury and chronic illness among different geographic and socio-economic sub-groups in the general population.

3.2.2 To determine the prevalence rates for limitation of activities and taking time off due to recent illness/injury in the general population.

3.2.3 To determine the health seeking behaviour in relation to recent illness/injury in the general population.

3.2.4. To determine the pattern of use of government, private and traditional health facilities as well as self-medication in relation to recent illness/injury and chronic illness

3.2.5 To determine the pattern and reasons for not seeking treatment in relation to recent illness/ injury and chronic illness

4. METHODOLOGY

A cross-sectional community household survey was conducted throughout Malaysia between April to August 2006. Structured questionnaire on recent illness, injury, limitations in activity, health care access and utilisation and health behaviours were related to a 14-day period preceding the interview to minimize recall bias. A reference period of the past one year was used for collecting information on chronic illness. Respondents aged 13 years and above participated in this survey. Descriptive statistics was used to analyse the data.

Each eligible household member was asked whether he/she had any illness or injury the past two weeks. Reference was made to the exact date by computing backwards from the day of the survey. For respondents who could not immediately recall an illness or injury, the interviewers probed them to trigger the memory. They were asked whether or not they had any recent illness or injury from a given list of health problems (Card I). Then with respect to chronic illness, they were asked on long standing illness for the duration of one year. If the response was negative, then the list of chronic illness as listed in card J were read. Those who responded positively to any of the above questions were further asked whether or the illness/injury had prevented them from carrying out their normal activities at home, in the work place or in school. They were also asked the number of days of illness and for those who are working or schooling the number of days of absence from work/school because of illness or injury.

In order to obtain information on use of services, visits to hospitals, clinics, traditional healers, or alternative medicine practitioners during the reference period of two weeks for recent illness and one year for chronic illness were recorded. There was also the possibility that some respondents who were ill/injured had sought care for other reasons during the same reference periods (either two-week of one year). Similarly, it was possible they did not seek treatment for their illness/injury but had used services for other reasons.

Estimates obtained from the survey were derived using a complex ratio estimation procedure that ensures that the survey estimates conform to an independently estimated distribution of the total population by pre-determined variables. Population estimates expressed in proportions, rates were used in the analysis, and computation of standard errors was incorporated to provide a range of estimates within a confidence interval of 95%. Prevalence rates, which were calculated by dividing the number of existing respondents with the health problem to the population at risk at the time of measurement (i.e. all respondents interviewed), were used as the estimates of the magnitude of a health problem. These estimates include among others, the disability rates, i.e. rates that pertain to any temporary or long-term reduction in activity.

In this survey, to increase the reliability of the respondent's recall, inquiry about disability experienced was limited to the 2-week period prior to the date of interview. The data were then adjusted to reflect the annual experience of the total Malaysian population. Specific rates, in which the numerator and the denominator represented the same demographic category, were also reported, wherever relevant. These include gender, race, household income and age-group specific rates.

Proportions were used to estimate utilisation of government, private, alternative medicine and other health facilities, as well as those who practiced self-medication. Proportions were also used to estimate and report reasons for use and non-use of the facilities and reasons for seeking treatment.

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
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

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:

Stratum	Population of gazetted areas
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.

4.2.3 Sample size

In the course of sample selection, 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.

4.2.4 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.

4.3 The Questionnaire and Household Interview

4.3.1 The questionnaire

A bi-lingual (Bahasa Malaysia and English) pre-coded questionnaire was designed, pre-tested and piloted prior to the survey.

Certain terminology and items in the questionnaire were also had been made available in the dialects or languages of the main ethnic groups in Malaysia, such as Hokkien and Cantonese for the Chinese and Tamil for the Indians. All versions were back translated to English by independent reviewers to ensure the accuracy of the translations

Self-administered questionnaires were also developed for a sub-sample of household members for questions pertaining to sensitive issues or areas such as sexual behaviour and practices. The self-administered questionnaires were left with the selected household members to be collected by the team members at a later time or day.

4.3.2 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.

For the first part of the interview which covers sections on general household, socio-demographic and economic profile, load of illness, health utilization and consumption cost, a trained non-medical or paramedical interviewer conducted the interviews. Sections pertaining to specific health problems and involving blood or other physical or medical examination was conducted by trained nurses.

4.4 Method of Data Collections

a) The questionnaires

All research topics for the questionnaire are arranged into modules ranging from A to Z. Topics that are similar area are arranged into sub-modules under a particular module. Questions comprised of both close ended and open ended. The questions in each module were tailored to the target group. Two types of questionnaires were developed i.e. face to face and self administered based on the requirements of the research subgroups and the research topics involved.

i) Face to face interview questionnaire

The face to face interview questionnaires consisted of 2 subtypes, i.e., the household questionnaire (orange) to be answered by the head of the household of the LQ selected, and the individual questionnaire, to be answered by each member of the household. Four types of individual FI questionnaires were developed, to cater to the different age groups of less than 2 years old (pink), 2 to less than 13 years old (blue), 13 to less than18 years old (yellow) and 18 years old and above (purple).

For those aged below 13 years old, the child's parents or guardians were responsible for answering on his or her behalf. Those aged 13 years and above are required to answer their respective questionnaires directly through the interview.

All the FI questionnaires have 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.

4.5 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 the month of 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:

a) Testing of the questionnaire
b) Testing of the field logistic preparation
c) Testing of the scouting activities
d) 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 for the data collection were done at two stages, field and central. Please refer to NHMS III protocol for detail 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

a) Recent illness

For this study recent illness is defined as any illness or symptom as listed in Card I (page 15-17) present 2 weeks prior to from the date of interview which required the person to limit her/his daily duties at school, work, home or free time. (Health survey of England)

b) Chronic illness

Chronic illness is defined as any illness which is of long duration, slow progress and long continuance (WHO) as listed in card J (page 18). For this study the duration used is 1 year from the date of interview. This includes diseases already diagnosed by the doctor i.e. Diabetes mellitus.

c) Indigestion

Any symptom related to food intake e.g. Nausea, heartburn, acidity, pain/ discomfort, wind, fullness, belching.

d) Nausea

A feeling of wanting to vomit

e) Vomiting

The expulsion of gastric contents through the mouth

f) Flatulence

Term used to describe excessive wind, includes belching, abdominal distension, passage of flatus per rectum

g) Diarrhoea

Sudden onset of bowel frequency associated with abdominal cramp pains with or without fever.

h) Educational status

Derived by categorizing the total number of completed years of formal education on the day of the survey, where "none" is no schooling, "primary" is 6 years or less, "secondary" is between 7-12 years and "tertiary" is 13 years and more.

i) Loss of productivity

Loss of productivity is measured by 3 parameters, namely:

i) Daily activities being affected by the illness, i.e. the respondent perceives a drop in the quantity or quality of their normal daily activities, such as schooling, household chores, recreational activities or vocational activities.

ii) Days taken off from work or school for rest as result of the sickness. Work here includes any kind of activity or work carried out for monetary returns, or where monetary return is not an issue as in the case of a full time homemaker. In the case of a respondent aged less than 13 years, the days taken off applies to the caretaker of the child.

iii) The number of days taken off work or school for rest either in the form of sick leave, annual leave or any other form of leave as a result of the sickness. This applies only for adults who are working for monetary returns or those who are schooling. For respondents less than 13 years old, the number of days taken off work applies to the caretaker who needs to take time off in order to care for the child who is suffering from diarrhoea. If a range of days is given, the minimum of the range is taken.

j) Health seeking behaviour

Health seeking behaviour is measured by 3 parameters, namely:

i) Seeking treatment for the illness, defined as the act of actively seeking or obtaining treatment for the diarrhoea from anyone or any facility (traditional or allopathic) outside the home. It includes having house calls by a doctor.

ii) Place first sought treatment from for the illness, regardless of type of treatment rendered, i.e., traditional or allopathic.

iii) Timeliness of seeking treatment for the illness, defined as how soon the respondents first sought treatment for the diarrhoea since the appearance of the symptoms, measured in hours.

iv) Reasons for not seeking treatment if applicable, defined as the **main reason** given by the respondent for not seeking any kind of treatment for the illness.

5. FINDINGS

5.1 Recent Illness and Injury

5.1.1 General findings

A total of 56,710 respondents were interviewed in this survey, with all of them being eligible for this section. Of this, 98.2% (55,660/56710) responded to this module on recent illness and injury.

5.1.2 Estimated prevalence of recent illness/injury in the general population

The combined estimated prevalence of recent illness/injury reported in this study in the general population was 23.6% (CI: 22.9 – 24.3)*[1] of which 96.9% (CI: 96.5 - 97.2) due to recent illness and 3.1% (CI: 2.8 – 3.5) due to injury (Appendix 1: Tables 1 and 2).

5.1.3 By system

Appendix 1: Table 3 shows the percentage of recent illness/injury by system. It was observed that the percentage of illness related to respiratory system was the highest at 42.0% (CI: 41.0 – 43.0) followed by non-specific symptoms at 25.7% (CI: 24.6 – 26.7). The lowest was related to gynaecological system at 0.1% (CI: 0.1 – 0.2).

5.1.4 By socio-demographic factors

Appendix 1: Tables 4 to 10 show the estimated prevalence by and socio-demographic variables among the total population. Males reported a higher prevalence of recent illness/injury [24.3% (CI: 23.5 – 25.2)] than females [22.9% (CI: 22.1 – 23.7)].

The Indians reported the highest prevalence of recent illness/injury [26.9% (CI: 24.8 – 29.1)] compared to Other Bumis [26.4% (CI: 24.7 – 28.2)], Malays [25.3% (CI: 24.4 – 26.3)] and Chinese [16.4% (CI: 15.3 – 17.6)]. The estimated prevalence was highest in the 0 - 4 years age group [31.8% (CI: 30.3 – 33.4)] followed by 15 – 19 years [30.2% (CI: 28.6 – 31.8)] and 80 years and above [27.8% (CI: 23.7 – 32.4)]. The lowest prevalence was reported in the 55 - 59 years age group [17.9% (CI: 16.4 – 19.5)].

Those who were unemployed reported the highest prevalence of recent illness/injury [25.0% (CI: 23.4 – 26.6)] and followed by the skilled agricultural and fishery workers [23.8% (CI: 21.9 – 25.9)]. The lowest prevalence was reported by senior official and manager group [19.0% (CI: 16.0 – 22.4)]. Respondents with the household income of less than RM400 reported the highest prevalence [26.6% (CI: 24.8 – 28.6)].

Ic
F

(italic figures in parenthesis denote lower and upper limits of 95% confidence level. As the findings of this survey were obtained from a igle sample survey, differences observed could be contributed by chance alone. Lower and upper limits of 95% confidence interval (95% l) are used in this report to explain the probability of chance and in describing the precision of the responses within the groups of interest.

The highest income group (RM5000 and above) reported the lowest prevalence [22.4% (CI: 20.7 – 24.3)].

It was observed that respondents with secondary level of education had the highest prevalence of recent illness/injury [22.9% (CI: 22.0 – 23.8)] and the lowest was among the tertiary educated persons [20.8% (CI: 19.3 – 22.5)]. Respondents staying at the traditional house reported the highest prevalence [27.1% (CI: 22.8 – 31.8)] and the lowest was at condo/apartment [17.6% (CI: 15.0 – 20.5)].

5.1.5 By urban/rural, state and state by urban/rural location

Appendix 1: Tables 11 to 13 show the estimated prevalence by urban/rural, state and state by urban/rural location in the population. Rural residents reported significantly higher prevalence of recent illness/injury [25.5% (CI: 24.3 – 26.7)] than the urban counterparts [22.4% (CI: 21.6 – 23.3)]. Respondents in the Federal Territory of Labuan reported the highest prevalence of recent illness/injury [37.9% (CI: 33.4 – 42.7)] and followed by the state of Negeri Sembilan [36.0% (CI: 32.5 – 39.6)]. The lowest was reported by respondents from the state of Perlis [7.9% (CI: 4.6 – 13.2)]. It was also observed that respondents from the urban area of Federal Territory Labuan reported the highest prevalence [40.4% (CI: 35.9 – 45.0)] and followed by rural location of Negeri Sembilan [36.6% (CI: 30.9 – 42.7)].

5.1.6 Health seeking behaviour

Health seeking behaviour is measured by 3 parameters, namely seeking treatment for the illness; place first sought treatment from for the illness (regardless of type of treatment rendered, i.e., traditional or allopathic); reasons for not seeking treatment and timeliness of seeking treatment for the illness (how soon the respondents first sought treatment).

Appendix 1: Tables 14 to 24 show the percentages of respondents with recent illness/injury by the status of seeking treatment, reasons for not seeking treatment, place of seeking treatment and timeliness in seeking treatment. Among those reported recent illness/injury 58.2% sought treatment either from government, private or traditional health facilities of which 43.4% sought treatment from private health facilities, 42.1% government and 12.7% traditional facilities. Majority of the respondents (59.5%) who reported recent illness/injury did not seek treatment anywhere due to mild illness and 13.3% decided to treat themselves (self-medication). Among those who reported recent illness/injury majority (39.2%) sought treatment less than 12 hours after the onset of the illness.

5.1.7 Loss of productivity

Loss of productivity is measured by 2 parameters namely mean time off taken for recent illness/injury and limitation of activities. The overall mean time off taken by respondents who had recent illness/injury was 2.32 days (CI: 2.20 – 2.43) with median of 2 days.

Appendix 1: Tables 25 to 28 show percentages of respondents with loss of productivity. About 70% of the respondents with recent illness/injury reported no limitation on their activities. The mean time off taken due to recent illness/injury was 2.32 days with median of 2 days.

5.2 Estimates of Chronic Illness

5.2.1 General findings

A total of 56,710 respondents were interviewed in this survey, with all of them being eligible for this section. Of this, 92.4% (52,247/56710) responded to this module on chronic illness.

5.2.2 Estimated prevalence of chronic illness in the general population

The estimated prevalence of reported chronic illness in this study in the general population was 15.5% (CI: 15.2 – 15.9) (Appendix 1: Table 1).

5.2.3 By disease

The most common chronic illness reported within the last one year was hypertension [7.9% (CI: 7.6 – 8.2)], diabetes mellitus [4.0% (CI: 3.8 – 4.2)], asthma [3.4% (CI: 3.2 – 3.6)] and heart disease [1.2% (CI: 1.1 – 1.3)] (Appendix 1: Table 29).

5.2.4 By socio-demographic factors

Appendix 1: Tables 30 to 36 show respondents with chronic illness by socio-demographic factors. Female respondents reported significantly higher prevalence of chronic illness [16.8% (CI: 16.3 – 17.3)] than males [14.2% (CI: 13.7 – 14.6)]. Females aged 61 and above reported highest prevalence of chronic illness [51.3% (CI: 49.3 – 53.4)]. Among those who had chronic illness Indians reported the highest [19.7% (CI: 18.4 – 21.0)], followed by Malays [15.9% (CI: 15.4 – 16.4)] and Chinese [15.5% (CI: 14.7 – 16.4)]. It was also observed that Indian females reported the highest prevalence of chronic illness [20.9% (CI: 19.3 – 22.6)]. Prevalence was also reported highest among the respondents with secondary education [31.8% (CI: 30.9 – 32.7], unemployed [31.6% (CI: 30.0 – 33.3)] and household income less than RM400 [19.4% (CI: 17.9 – 20.9)].

5.2.5 By urban/rural location and state

Respondents from urban area reported higher prevalence of chronic illness [15.5% (CI: 15.1 -16.2)]. It was observed that respondents from the state of Malacca reported the highest prevalence of chronic illness [22.1% (CI: 19.5 – 25.0)] followed by Kedah [20.1% (CI: 18.7 – 21.6)]. Respondents from rural area of Malacca were also reported to have the highest prevalence [24.6% (CI: 20.3 – 29.5)] (Appendix 1: Tables 37 to 39).

5.2.6 Health seeking behaviour

Appendix 1: Tables 40 to 43 show the percentages of respondents with health seeking behaviour at different health facilities by gender, household income, level of education and race. It was observed that respondents with household income less than RM400 was the highest users of government health centre [40.6% (CI: 36.0 – 45.1)] while majority of those with income more than RM2000 seek treatment from private clinic [29.1% (CI: 25.8 – 32.3)].

Majority of the respondents with no formal education [29.6% (CI: 26.7 – 32.5)] and primary educated [32.8% (CI: 30.6 - 35.0)] sought treatment at Government Health Centre. However, majority of the respondents with secondary [28.2% (CI: 26.1 – 30.3)] and tertiary education [41.0% (CI: 35.6 – 46.5)] sought treatment at Private Clinic. Majority of the Malays [31.2% (CI: 29.3 – 33.0)] visited government health centre for their chronic illness, however majority of the Chinese went to private clinic [33.1% (CI: 30.0 – 36.1)].

Respondents with household income RM2000-2999 reported that mildness of illness was the main reason for not seeking treatment for their chronic illness [29.3% (CI: 20.1 – 38.5)], and also the highest practiced self medication [11.5% (CI: 5.1 – 17.0)] (Appendix 1: Table 44).

6. DISCUSSION

6.1 Recent Illness/injury

6.1.1 Gathering information on community health status.

Health interview survey such as that being carried out in this exercise is a common technique in national health survey. It is the best source of data on the demographic, social, health seeking behaviour and use of health facilities with economic correlation. Nevertheless, the health interview survey has it s own weaknesses. If an illness has not been medically attended to, proper and comprehensive diagnostic information is substantially lacking. In the case of the medically attended conditions, diagnostic precisions is limited by the respondent's memory of the medically/diagnostic terms mentioned by the physicians and therefore influenced by his or her perceptions. Also asymptomatic illnesses are entirely missed. The household survey requires the use of numerators to gather information. There will be the problem of respondents not being at home at the time of interview, therefore requiring the enumerator to do follow-up visits. Other problems include the possible refusal of respondents to be interviewed and the inability to trace them as identified by the sample.

6.1.2 Comparison between NHMS II and NHMS III

It is noted that in the NHMS III, data on recent illness and injury were combined together as opposed to NHMS II. Therefore, for most of the variables, results were not comparable. In the NHMS III, information on chronic illness was also gathered, which was not done in the NHMS II.

However, overall prevalence for combined recent illness and injury and injury alone for both surveys were obtained and they are comparable. Prevalence of recent illness & injury combined for NHMS III and NHMS II were 23.6% and 29.5% and injury were 3.1% and 2.6% respectively.

It was observed that the prevalence of recent illness was about 8 times higher than that of injury. The prevalence was significantly contributed by illness related to respiratory system (highest at about 42%) and followed by non-specific symptoms (25.7%). There were differences in estimated prevalence of recent illness across the states, with Federal Territory Labuan had the highest at 37.9% followed by

Negeri Sembilan, Kedah, Kelantan and Sabah, with the lowest in Perlis. It is interesting to note that Negeri Sembilan had the highest prevalence of recent illness/injury 10 years ago (NHMS III).

Further analytic studies focusing in Negeri Sembilan need to be carried out in order to confirm the statistics and also to know the real problems and reasons for the reported consistent high prevalence of recent illness/injury. Rural areas had a significantly higher prevalence compared to urban locations (25.5% and 22.4% respectively).

The very young and elderly groups reported higher prevalence of recent illness/injury. The unemployed group reported the highest prevalence of recent illness/injury and followed by skilled agricultural and fishery workers and plant and machine operator and assemblers. The higher propensity to report morbidity by those in the manual social classes than in the non-manual group and among older age groups has also been reported by other studies (Bucquet & Curtis 1986).

Indians reported significantly higher prevalence of recent illness/injury compared to Chinese and Other Bumis were second highest. It was also noted that the prevalence of recent illness/injury were consistently high among those with low socio economic status. In general, it appears that the reported heath status for recent illness/injury in 2006 compared to 10 years ago (NHMS II) remained the same. Therefore, the findings could be used for purposes of planning and resource allocation.

6.1.3 Demand for care

The demand for health services must be distinguished from the need for health services. Demand refers to the extent to which perceived need is met and is measured by utilisation studies. Needs on the other hand refer to two categories – those that are felt and those that are unfelt. Of those who have felt needs, a major proportion would pose demand, while some would not (Bennett 1988). In this study, about 58% of those reported recent illness/injury had sought treatment for their health problems and is significantly higher than those who did not (41.8%). Therefore, these respondents translated their felt needs to demand.

6.1.4 Self medication

Self medication can range from using prescribed or non-prescribed drugs to home remedies such as using physical devices, herbal remedies and certain foods (Segall 1990). In this survey, self medication means that the respondents treating themselves without having seen or being advised by a doctor, or other health personnel, or a traditional/alternative practitioner. The overall prevalence of self -medication in this survey was 20.68%. It was three times less compared to respondents who sought treatment at either government or private health facilities.

6.1.5 Utilization of health services

Previous research have shown that health care utilisation is determined by three types of factors namely (a) predisposing traits, which include demographic, social and attitude/belief; (b) enabling characteristics such as income, insurance and accessibility to a regular source of care; and (c) perceived and objectively measured illness levels (Institute for Medical Research 1990; Haung et al. 1991; Hunts & Sultana 1992). This survey has shown that 43% of the respondents who had recent illness/injury went to private and 42% to government health facilities had sought care for their health problems. This pattern of more people went for private compared to government health facilities was also seen in NHMS II.

6.1.6 Timeliness in seeking treatment

This survey revealed that majority (about 39%) of the respondents with recent illness/injury had sought treatment timely (i.e. less than 12 hours after the onset of the illness) for their health problems. The percentage of those who sought treatment between 13 to 24 hours and after 24 hours but less than 5 days were significantly lower compared to less than 12 hours. There were only about one percent of the respondents with recent illness/injury who sought treatment only after 5 days after the onset of illness. This shows that majority of the respondents were well aware of the importance of getting treatment or attention by qualified medical personnel in time for their illness. However, this can be further improved with the provision of enhanced outpatient care services at the existing health facilities. Health education and promotion on the importance of getting treatment early timely and should be emphasised especially for people from the lower socio-economic status.

6.1.7 Loss of productivity

There was obvious impact of the illness in terms of loss of productivity such as taking time off from work or school. There were several reasons for taking time off from work or school. Limitation of activity and unable to fully function as a result of the illness were also observed such as mothers taking time off to care for children with the illness. This survey revealed that about thirty percent of the respondents with recent illness/injury had limitation of activities due to their health problems. Both groups of professionals and clerical workers aged 21- 40 years were reported to have the highest percentage of limitation of their activities due to their recent illness/injury (about 65% and 63% respectively). This survey also shows that service workers and shop aged 41 - 60 and 21 - 40 years had the highest percentage of taking time-off from their work due to their recent illness/injury (about 22% and 20% respectively).

6.2 Chronic Illness

6.2.1 Prevalence of chronic illness

Chronic illness which is long lasting illnesses such as asthma, cancer, diabetes mellitus, cardiovascular diseases and mental illness impose a great burden to the community. A previous study (Hughes et al. 2006; Cromwick et al. 2006) reported that about 35% of population in a community has been diagnosed with at least one chronic disease. Cardiovascular diseases (CVD) were reported to be among the most prevalent chronic diseases in the community (27%), asthma 15%, cancer 8% and diabetes 7%. Another study (Ozminkowski et al. 2000) reported that roughly about 14 percent of adults between the ages of 18 and 65 experiences a disability that limits their functional activity level. In addition as many as 31 percent of children have special health care needs due to chronic illness or functional limitations.

This survey revealed that the prevalence of chronic illness for Malaysia was 15.5%. Hypertension was reported to be the highest prevalence (about 8%) and followed by diabetes mellitus (4%), asthma (3%) and heart disease (1%). The prevalence of chronic illness was significantly higher among the females. Respondents aged 61 and above both females and males reported the highest prevalence of chronic illness (about 51% and 46 % respectively).

The prevalence of chronic illness was significantly higher among the Indians compared to Malays, Chinese and other Bumis. The highest prevalence was also noted among the Indian females. Among the different groups of occupations, housewife reported the highest prevalent of chronic illness. Further studies and analysis need to be carried out to verify the finding and to identify potential risk factors contributing to the problem.

Chronic illness was reported to be slightly higher among respondents from urban area. However it was not significantly different from rural area. Prevalence was highest in the Malacca state and followed by Kedah and Perlis with the lowest in the state of Sabah.

6.2.2 Health Seeking Behaviour

Government Health Centre was the most frequently visited by respondents with chronic illness followed by Private Clinic for both males and females. Similar patterns were also seen among the different levels of education. Chinese reported visiting Private Clinic more frequently compared to other races. As for reasons given by respondents with chronic illness at different levels of house income on why they did not seek treatment, most of them consistently reported that mildness of illness was the main reason and followed by the illness is already cured.

6.3 Further Analysis

This report deals only with preliminary analysis of NHMS III data. All analyses were in the form of unvaried analysis and specific to certain parameters only. Since perception of health and health seeking behaviour are affected by multiple factors and are complex in nature, advanced and multivariate analyses are required to control for potential confounders.

7. CONCLUSION

A good response rate of 98.2% (55,660/56,710) for the module of recent illness and injury was obtained. Prevalence of recent illness/injury was 23.6 percent with more males (24.3%). Rural population reported higher recent illness/injury prevalence (25.5%) within a 2-week recall period.

The percentage of injury among those who reported recent illness/injury was 3.1%. The highest reported recent illness/injury was among the 0 – 4 years age group (31. 8%), the Indians (26.9%), secondary educational level (22.9%), unemployed (25.0%), those earning less than RM400 (26.6%) and Federal Territory Labuan (37.9%).

Among all those who reported recent illness/injury, the most common reported recent illness was related to respiratory system (42.0%). Among those who reported recent illness/injury 58.2% sought treatment either from government, private or traditional health facilities of which 43.4% sought treatment from private health facilities, 42.1% government and 12.7% traditional facilities.

Majority of the respondents (59.5%) who reported recent illness/injury did not seek treatment anywhere due to mildness of illness and 13.3% decided to treat themselves (self-medication). Among those who reported recent illness/injury majority (39.2%) seek treatment less than 12 hours after the onset of the illness.

About 70% of the respondents with recent illness/injury reported no limitation on their activities. The mean time off taken due to recent illness/injury was 2.32 days with median of 2 days.

A response rate of 92.4% (52,247/56,710) was obtained for the module on chronic illness. Prevalence of chronic illness within a recall period of one year was 15.5% which is 8% less than the prevalence of recent illness/injury. Prevalence of chronic illness was reported to be significantly higher among the females (16.8%) and those from the urban area (15.6%).

The most common chronic illness reported within the last one year was hypertension (7.9%) and followed by diabetes mellitus (4.0%). Among those who had chronic illness Indians reported the highest [19.7% (CI: 18.4 – 21.0)], followed by Malays [15.9% (CI: 15.4 – 16.4)] and Chinese [15.5% (CI: 14.7 – 16.4)].

About 40% of those with chronic illness and household income less than RM400 sought treatment from government health centre and majority those with income more than RM2000 sought treatment from private clinic. Among the Malays and Indians who sought treatment for their chronic illness, majority visited government health centres however majority of the Chinese went to private clinics. Respondents with household income RM2000-2999 reported that mildness of illness was the main reason for not seeking treatment for their chronic illness [29.3% (CI: 20.1 – 38.5)], and also the highest practiced self medication [11.1% (CI: 5.1 – 17.0)]

8. RECOMMENDATIONS

Several recommendations have been proposed as a result of this survey as well as areas of concern and implications.

8.1 Recent Illness/injury

Based on the prevalence of recent illness/injury, this survey has also identified sub-groups of population as presented above, requiring attention to enhance their health status.

The recommendations are:

8.1.1 To continue and strengthen the various existing rural health services provided by the Ministry of Health such as Maternal and Child Health Services, School Health Programme, Rural Health Water Supply and Sanitation ("BAKAS"), etc. The existing emphasis on the very young, adolescence and the elderly is to be continued. Specific programmes for these groups are to be strengthened towards achieving a comprehensive rural health services.

8.1.2 There is also a need to strengthen specific health programmes such as the accident-prevention programme and to further enhance the existing outpatient care and emergency services to cater for the needs of services for acute illness/injury.

8.1.3 A number of states were found to have higher prevalence of illness/injury. It is recommended that the allocation of resources be made on the basis of needs of the community either at urban or rural location. The authors would like to propose further analytical studies to be conducted in order to identify reasons and risk factors for the high prevalence of recent illness/injury in those states up to rural/urban or district levels.

8.2 Health Seeking Behaviour

About 40% of the respondents with recent illness/injury did not seek treatment for various reasons. In addition a significant percentage of respondents resorted to self medication.

The recommendations are:

8.2.1 To evaluate the mode of delivery of services including health education, and promotion in order to reach the poor, less educated the very young and elderly groups.

8.2.2 To further develop health services at the home or community levels, within or outside the Ministry's existing infrastructure, so that as to reach them at or their doorsteps.

8.2.3 To acknowledge the existence of self-medication in the community. To develop self-medication in terms of the support needed provision of information for informed decision and action required by these individuals. To further improve consumer protection in terms of adequate legislation and control of advertisement advertisements and sale of "over the counter drugs".

8.2.4 To further study the barriers to seeking care as shown by this survey and implications for not seeking care.

8.3 General Recommendations

8.3.1 The authors feel that findings in this module need to be correlated with other relevant modules of NHMS III.

8.3.2 Specific analysis is required such as results from the perception of respondents need to be compared with actual findings. Further studies on impact were also needed

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APPENDIX

APPENDIX 1

Table 1: Prevalence of recent illness/injury and chronic illness for Malaysia

Type of Illness	n	N	(%)	95% CI	
				Lower	Upper
Recent illness/injury	13,293	20,701,124	23.6	22.9	24.3
Chronic illness	8,764	21,095,810	15.5	15.2	15.9

Table 2: Percentage of recent illness and injury for Malaysia

Type of Illness	n	N	(%)	95% CI	
				Lower	Upper
Recent illness	12,562	4,604,690	96.9	96.5	97.2
Injury	399	149,510	3.1	2.8	3.5

Table 3: Percentage of recent illness/injury by system

System	n	N	(%)	95% CI	
				Lower	Upper
Respiratory	5,608	2,055,631	42.0	41.0	43.1
Abdomen	390	141,226	2.9	2.6	3.3
Urinary/renal	19	6,506	0.1	0.1	0.2
Cardiovascular	42	14,898	0.3	0.2	0.4
Psychiatric/ nervous system	40	15,041	0.3	0.2	0.4
ENT	556	202,359	4.1	3.8	4.5
Eye	60	20,898	0.4	0.3	0.6
Skin	134	47,947	1.0	0.8	1.2
Musculoskeletal	369	136,329	2.8	2.5	3.1
Gynecological	12	4,276	0.1	0.1	0.2
Non-specific symptoms	3,466	1,256,015	25.7	24.7	26.7
Injuries	410	153,375	3.1	2.8	3.5
Others	2,229	838,254	17.1	16.2	18.1
Total	13,335	4,892,756	100.0	-	-

Table 4: Prevalence of recent illness/injury by gender

Gender	n	N	(%)	95% CI	
				Lower	Upper
Male	6,466	2,367,675	24.3	23.5	25.2
Female	6,827	2,506,657	22.9	22.1	23.7

Table 5: Prevalence of recent illness/injury by race

Race	N	(%)	95% CI	
			Lower	Upper
Malay	2,984,995	25.3	24.4	26.3
Chinese	659,318	16.4	15.3	17.6
Indian	464,773	26.9	24.8	29.1
Other Bumis	608,763	26.4	24.7	28.2
Others	159,053	18.6	16.7	20.8
Total	4,876,901	23.6	22.9	24.3

Table 6: Prevalence of recent illness/injury by age group

Age group	N	(%)	95% CI	
			Lower	Upper
0-4	692,341	31.8	30.3	33.4
5-9	590,211	24.2	22.9	25.5
10-14	541,608	23.7	22.4	25.0
15-19	521,236	30.2	28.6	31.8
20-24	356,444	25.0	23.5	26.6
25-29	310,465	22.4	20.8	24.0
30-34	267,791	20.3	18.8	21.8
35-39	257,699	19.2	17.9	20.7
40-44	280,142	19.6	18.2	21.0
45-49	244,744	18.7	17.3	20.2
50-54	232,046	20.3	18.8	21.9
55-59	166,806	17.9	16.4	19.5
60-64	123,451	20.3	18.3	22.5
65-69	118,097	22.7	20.5	25.0
70-74	87,684	26.8	23.9	29.8
75-79	44,685	25.0	21.1	29.3
80+	38,883	27.8	23.7	32.4
Unclassified	2,568	25.2	7.9	56.9
Total	4,876,901	23.6	22.9	24.3

Table 7: Prevalence of recent illness/injury by occupation

Occupation	n	N	(%)	95% CI	
				Lower	Upper
Senior official & Manager	122	48,176	19.0	16.0	22.4
Professionals	449	171,343	19.5	17.7	21.3
Technical & Associate	574	216,853	21.5	19.8	23.2
Clerical Workers	415	157,107	22.3	20.3	24.4
Service Workers & Shop	1,214	451,729	21.1	19.9	22.4
Skilled Agricultural & Fishery	637	215,685	23.8	21.9	25.9
Craft & Related Trade Workers	426	159,969	20.9	18.9	23.2
Plant & Machine Operator & Assembler	428	158,356	22.6	20.6	24.7
Elementary Occupations	348	121,761	21.4	19.2	23.6
Housewife	1,588	585,000	19.6	18.6	20.6
Unemployed	989	351,836	25.0	23.4	26.6
Unclassified	1,841	680,143	29.5	28.1	30.9

Table 8: Prevalence of recent illness/injury by household income

Household Income (RM)	n	N	(%)	95% CI	
				Lower	Upper
Less than 400	1,222	426,612	26.6	24.8	28.6
400-699	2,079	716,281	24.5	23.1	25.9
700-999	1,593	571,687	24.5	23.0	26.0
1000-1999	3,504	1,285,531	23.0	22.0	24.1
2000-2999	2,003	756,577	23.4	22.1	24.8
3000-3999	968	373,663	22.5	20.8	24.4
4000-4999	473	183,472	23.3	20.9	25.8
5000 and above	1,022	403,693	22.4	20.7	24.3
Unclassified	429	159,384	20.3	18.0	22.9

Table 9: Prevalence of recent illness/injury by level of education

Level of Education	n	N	(%)	95% CI	
				Lower	Upper
None	2,700	861,060	21.5	20.6	22.6
Primary	2,418	1,240,111	22.7	21.8	23.6
Secondary	1,348	1,549,880	22.9	22.0	23.8
Tertiary	3,096	275,086	20.8	19.3	22.5

Table 10: Prevalence of recent illness/injury by type of house

Type of House	n	N	(%)	95% CI	
				Lower	Upper
Single house	6,808	2,350,451	24.7	23.7	25.7
Semi D	578	214,612	22.1	19.5	24.8
Single storey terrace	2,352	924,481	23.7	22.2	25.4
Double storey terrace	1,309	540,850	22.3	20.7	24.1
Condo / apartment	333	132,113	17.6	15.0	20.5
Flats	991	391,373	22.9	20.6	25.3
Long house	123	44,850	22.6	16.7	29.7
Boat house	3.0	1,302	25.0	25.0	25.0
Traditional house	204	67,943	27.1	22.8	31.8
Shop house	273	99,321	22.1	19.1	25.3
Worker's colony	197	66,245	21.7	17.6	26.4
Others	91.0	31,534	23.7	17.3	31.6

Table 11: Prevalence of recent illness/injury by geographical location for Malaysia

Geographical Location	n	N	(%)	95% CI	
				Lower	Upper
Rural	5,989	1,934,174	25.5	24.3	26.7
Urban	7,304	2,942,726	22.4	21.6	23.3

Table 12: Prevalence of recent illness/injury by state for Malaysia

State	N	(%)	95% CI	
			Lower	Upper
Johor	2,379,298	18.9	16.9	21.1
Kedah	1,504,691	34.8	31.9	37.9
Kelantan	1,243,760	26.6	24.0	29.4
Melaka	566,128	22.2	17.6	27.7
N. Sembilan	742,035	36.0	32.5	39.6
Pahang	1,120,345	22.1	19.2	25.3
P. Pinang	1,053,062	17.6	15.7	19.8
Perak	1,711,158	18.3	16.1	20.6
Perlis	190,502	7.9	4.6	13.2
Selangor	3,841,485	23.4	21.8	24.9
Terengganu	857,396	25.3	21.9	29.0
Sabah	2,186,192	26.3	24.5	28.1
Sarawak	1,868,373	22.3	20.1	24.8
W.P Kuala Lumpur	1,155,580	17.8	15.8	19.9
W.P Labuan	281,117	37.9	33.4	42.7
MALAYSIA	20,701,124	23.6	22.9	24.3

Table 13: Prevalence of recent illness/injury for urban and rural location by state

State	Strata	(%)	95% CI	
			Lower	Upper
Johor	Urban	17.2	15.0	19.7
	Rural	22.5	18.7	26.8
Kedah	Urban	36.1	31.7	40.8
	Rural	34.0	30.1	38.0
Kelantan	Urban	24.3	19.5	29.8
	Rural	27.7	24.7	30.9
Melaka	Urban	21.3	15.8	28.1
	Rural	25.5	18.6	33.8
N. Sembilan	Urban	35.5	31.3	40.0
	Rural	36.6	30.9	42.7
Pahang	Urban	23.4	19.0	28.6
	Rural	21.0	17.4	25.1
P. Pinang	Urban	16.3	14.2	18.6
	Rural	23.8	19.4	28.9
Perak	Urban	16.0	13.4	19.1
	Rural	21.7	18.4	25.5
Perlis	Urban	7.2	3.0	16.6
	Rural	8.3	4.2	15.6
Selangor	Urban	23.7	22.1	25.4
	Rural	20.9	16.9	25.5
Terengganu	Urban	26.4	21.5	32.0
	Rural	24.1	19.7	29.2
Sabah	Urban	27.7	25.0	30.5
	Rural	24.9	22.7	27.2
Sarawak	Urban	19.7	16.5	23.3
	Rural	24.8	21.7	28.2
W.P Kuala Lumpur	Urban	17.8	15.8	19.9
W.P Labuan	Urban	40.4	35.9	45.0
	Rural	34.0	25.2	44.0

Table 14: Percentage of respondents with recent illness/injury by status of seeking treatment

Seeking treatment	n	N	(%)	95% CI	
				Lower	Upper
Yes	7,631	2,810,520	58.2	57.2	59.2
No	5,528	2,018,172	41.8	40.8	42.8

Table 15: Percentage of respondents with reasons for not seeking treatment for their recent illness/ injury

Reasons for not seeking treatment	n	N	(%)	95% CI	
				Lower	Upper
Mild illness	3,088	1,122,741	59.5	57.7	61.3
Cured already	220	80,719	4.3	3.7	4.9
No specialist treatment nearby	1	446	<0.1	0.0	0.2
Not confident with the one treating	1	400	<0.1	0.0	0.2
Not satisfied with the attitude of the staff	1	400	<0.1	0.0	0.2
Not confident with the medication	9	3,430	0.2	0.1	0.4
Treatment is not effective	12	4,207	0.2	0.1	0.4
Lost confidence with advice & treatment given	1	434	<0.1	0.0	0.2
Given unfriendly services before	4	1,286	0.1	<0.1	0.2
Treatment painful/because of side effects	1	306	<0.1	0.0	0.1
Did not obtain suitable treatment	6	2,112	0.1	0.1	0.3
Service required not provided	3	975	0.1	<0.1	0.2
Personnel at the facility not competent	2	671	<0.1	<0.1	0.1
Not satisfied with the service rendered	2	700	<0.1	0.01	0.2
Did not receive proper attention	6	2,352	0.1	0.1	0.3
Did not know that facility is available	5	1,968	0.1	<0.1	0.3
Crowded/uncomfortable	3	1,114	0.1	<0.1	0.2
Have to pay for treatment	15	5,098	0.3	0.2	0.5
Cost is expensive	10	3,370	0.2	0.1	0.4
Daily wage will be cut/affected	4	1,500	0.1	<0.1	0.2
Long waiting time	12	4,174	0.2	0.2	0.4
Operating hours not suitable	5	1,814	0.1	<0.1	0.2
Place is far	17	5,579	0.3	0.2	0.5
Too long travelling time	2	646	<0.1	0.0	0.2
No transport	28	9,542	0.5	0.4	0.7
Unable to afford transport fees	6	1,933	0.1	0.1	0.2
Unable to leave home/child	11	3,839	0.2	0.1	0.4
No one to accompany	34	11,975	0.6	0.4	0.9
Treatment is not required	208	76,647	4.1	3.5	4.8
Self-medicate	1,059	389,889	20.7	19.3	22.2
Able to get medicine without seeing doctor	167	61,226	3.3	2.7	3.9
Afraid to obtain treatment	35	12,816	0.7	0.5	0.9
Not an emergency	92	36,919	2.0	1.5	2.6

Table 16: Percentage of respondents with recent illness/injury by seeking treatment either at government / private or take self medication

Seeking treatment	n	N	(%)	95% CI	
				Lower	Upper
Government	3,224	1,154,314	42.1	40.5	43.6
Private	3,132	1,191,151	43.4	41.8	45.0
Self Medication	965	353,126	13.3	12.3	14.5

Table 17: Percentage of respondents who had sought care for their recent illness/injury by place of seeking treatment

Place of seeking treatment	n	N	(%)	95% CI	
				Lower	Upper
Government	3,224	1,154,314	42.1	40.5	43.6
Private	3,132	1,191,151	43.4	41.8	45.0
Estate	68	21,068	1.0	0.5	1.2
NGO/ Societies	23	8,751	0.3	1.0	0.5
Traditional Medicine	951	347,843	12.7	11.7	13.7
Others	14	5,282	1.0	0.1	0.3
None	45	16,917	0.6	0.5	0.8
Total	7,457	2,745,326	100.0	-	-

Table 18: Percentage of respondents who had sought care for their recent illness/injury by place of seeking treatment and household income

Place of seeking treatment	Household income (RM)	n	(%)	95% CI	
				Lower	Upper
Gov. General Hospital	Less than 400	33	5.2	3.7	7.3
	400-699	32	2.8	1.9	4.0
	700-999	47	5.7	4.1	7.7
	1000-1999	100	4.9	3.9	6.2
	2000-2999	42	3.6	2.5	5.1
	3000-3999	25	4.3	2.6	6.9
	4000-4999	11	3.8	2.1	6.8
	5000 & above	16	2.8	1.7	4.5
Gov. District Hospital	Less than 400	111	16.3	13.1	19.9
	400-699	168	14.7	12.4	17.5
	700-999	105	12.3	9.9	15.1
	1000-1999	215	10.3	8.7	12.2
	2000-2999	112	9.2	7.4	11.3
	3000-3999	38	6.1	4.2	8.7
	4000-4999	22	8.1	4.3	14.8
	5000 & above	33	5.3	3.5	7.9

Table 18: Percentage of respondents who had sought care for their recent illness/injury by place of seeking treatment and household income (continue)

Place of seeking treatment	Household income (RM)	n	(%)	95% CI	
				Lower	Upper
Gov. polyclinic/health centre/Com. clinic	Less than 400	260	39.9	35.2	44.9
	400-699	443	39.6	35.9	43.4
	700-999	282	32.5	28.8	36.5
	1000-1999	527	25.5	23.1	28.1
	2000-2999	201	16.9	14.5	19.5
	3000-3999	95	15.8	12.6	19.6
	4000-4999	32	11.9	7.8	17.7
	5000 & above	68	11.3	8.8	14.5
Gov. mobile clinic	Less than 400	4	0.7	0.3	1.8
	400-699	7	0.6	0.3	1.3
	700-999	6	0.6	0.3	1.4
	1000-1999	10	0.5	0.2	1.0
	2000-2999	5	0.5	0.2	1.1
	3000-3999	1	0.2	<0.1	1.3
	4000-4999 5000 & above	1	0.5	0.1	3.0
University Hospital	Less than 400	3	0.6	0.2	1.8
	400-699	3	0.3	0.1	0.9
	700-999	1	0.1	<0.1	0.9
	1000-1999	5	0.2	0.1	0.6
	2000-2999	6	0.5	0.3	1.2
	3000-3999	8	1.3	0.6	2.8
	4000-4999	-	-	-	-
	5000 & above	6	1.1	0.5	2.4
Army Hospital	Less than 400	1	0.2	<0.1	1.1
	400-699	14	1.5	0.6	3.7
	700-999	9	1.1	0.6	2.1
	1000-1999	18	1.0	0.5	1.7
	2000-2999	3	0.3	0.1	0.8
	3000-3999	4	0.7	0.3	1.9
	4000-4999	-	-	-	-
	5000 & above	2	0.4	0.1	1.5
Private Hospital	Less than 400	2	0.3	0.1	1.4
	400-699	7	0.6	0.3	1.3
	700-999	9	1.1	1.0	2.1
	1000-1999	33	1.7	1.2	2.4
	2000-2999	23	2.0	1.3	3.3
	3000-3999	20	3.6	2.2	5.9
	4000-4999	8	2.9	1.4	6.0
	5000 & above	33	5.8	4.0	8.5

Table 18: Percentage of respondents who had sought care for their recent illness/injury by place of seeking treatment and household income (continue)

Place of seeking treatment	Household income (RM)	n	(%)	95% CI	
				Lower	Upper
Estate Hospital	Less than 400	3	0.4	0.1	1.7
	400-699	1	0.1	<0.1	0.5
	700-999	-	-	-	-
	1000-1999	2	0.1	<0.1	0.4
	2000-2999	-	-	-	-
	3000-3999	1	0.2	<0.1	1.4
	4000-4999	-	-	-	-
	5000 & above	-	-	-	-
Estate Clinic	Less than 400	7	1.0	0.4	2.4
	400-699	21	1.7	0.9	3.1
	700-999	15	1.5	0.7	3.1
	1000-1999	12	0.5	0.2	1.2
	2000-2999	2	1.0	<0.1	0.6
	3000-3999	2	0.3	<0.1	1.8
	4000-4999	-	-	-	-
	5000 & above	-	-	-	-
Traditional Complimentary Medicine	Less than 400	7	1.2	0.5	2.9
	400-699	9	0.7	0.4	1.4
	700-999	9	1.1	0.6	2.1
	1000-1999	12	0.6	0.3	1.1
	2000-2999	6	0.5	0.2	1.1
	3000-3999	6	1.0	0.5	2.3
	4000-4999	1	0.3	<0.1	2.0
	5000 & above	8	1.4	1.0	3.0
Medicine hall/Chinese medicine shop /pharmacy	Less than 400	59	9.0	6.8	11.8
	400-699	139	12.5	10.4	15.0
	700-999	102	11.6	9.3	14.2
	1000-1999	227	11.1	9.4	13.0
	2000-2999	147	12.5	10.4	14.9
	3000-3999	54	9.2	6.9	12.1
	4000-4999	28	10.7	7.4	15.1
	5000 & above	53	9.2	6.9	12.1
NGO Clinic	Less than 400	-	-	-	-
	400-699	1	0.1	<0.1	0.6
	700-999	2	0.2	0.1	0.9
	1000-1999	6	0.3	0.1	0.7
	2000-2999	4	0.4	0.1	2.0
	3000-3999	2	0.3	0.1	1.4
	4000-4999	2	0.8	0.9	3.0
	5000 & above	2	0.4	1.0	1.5

Table 18: Percentage of respondents who had sought care for their recent illness/injury by place of seeking treatment and household income (continue)

Place of seeking treatment	Household income (RM)	n	(%)	95% CI	
				Lower	Upper
Clubs/society	Less than 400	1	0.1	<0.1	0.9
	400-699	1	0.1	<0.1	0.6
	700-999	-	-	-	-
	1000-1999	-	-	-	-
	2000-2999	2	0.2	<0.1	0.7
	3000-3999	-	-	-	-
	4000-4999	-	-	-	-
	5000 & above	-	-	-	-
Drug peddlers at night market	Less than 400	4	0.7	0.2	1.7
	400-699	3	0.3	0.1	0.9
	700-999	4	0.5	0.2	1.3
	1000-1999	5	0.2	0.1	0.6
	2000-2999	5	0.4	0.2	1.0
	3000-3999	1	0.2	<0.1	1.0
	4000-4999	-	-	-	-
	5000 & above	1	0.2	<0.1	1.5
Direct Selling	Less than 400	-	-	-	-
	400-699	2	0.2	0.1	0.7
	700-999	2	0.2	0.1	1.0
	1000-1999	1	0.1	<0.1	0.4
	2000-2999	2	0.2	<0.1	0.7
	3000-3999	1	0.2	<0.1	1.4
	4000-4999	2	0.8	0.2	3.3
	5000 & above	3	0.5	0.2	1.5
Village Midwife	Less than 400	1	0.2	<0.1	1.4
	400-699	2	0.2	0.1	0.8
	700-999	4	0.5	0.2	1.4
	1000-1999	1	<0.1	<0.1	0.3
	2000-2999	3	0.2	0.1	0.7
	3000-3999	1	0.2	<0.1	1.1
	4000-4999	2	-	-	-
	5000 & above	3	-	-	-
Friends/ ketua kampung /relatives	Less than 400	1	0.1	<0.1	1.0
	400-699	2	0.2	0.1	0.8
	700-999	-	-	-	-
	1000-1999	1	0.1	<0.1	0.5
	2000-2999	3	0.3	0.1	0.8
	3000-3999	-	-	-	-
	4000-4999	-	-	-	-
	5000 & above	-	-	-	-

Table 18: Percentage of respondents who had sought care for their recent illness/injury by place of seeking treatment and household income (continue)

Place of seeking treatment	Household income (RM)	n	(%)	95% CI	
				Lower	Upper
Did not seek treatment anywhere	Less than 400	4	0.7	0.2	1.7
	400-699	8	0.7	0.3	1.5
	700-999	2	0.2	0.1	0.9
	1000-1999	13	0.7	0.4	1.2
	2000-2999	11	1.0	0.6	1.8
	3000-3999	1	0.2	<0.1	1.2
	4000-4999	3	0.9	0.3	2.8
	5000 & above	2	0.3	0.1	1.3
Don't know	Less than 400	1	0.2	<0.1	1.1
	400-699	1	0.1	<0.1	0.8
	700-999	-	-	-	-
	1000-1999	1	0.1	<0.1	0.4
	2000-2999	-	-	-	-
	3000-3999	-	-	-	-
	4000-4999	-	-	-	-
	5000 & above	-	-	-	-
Others	Less than 400	4	0.6	0.2	1.6
	400-699	1	0.1	<0.1	0.6
	700-999	1	0.1	<0.1	0.8
	1000-1999	3	0.2	0.1	0.5
	2000-2999	2	0.2	<0.1	0.7
	3000-3999	3	0.6	0.1	2.4
	4000-4999	-	-	-	-
	5000 & above	-	-	-	-

Table 19: Percentage of respondents who had sought care for their recent illness/injury by place of seeking treatment and level of education

Place of seeking treatment	Level of Education	n	(%)	95% CI	
				Lower	Upper
Gov. General Hospital	None	57	4.2	3.1	5.6
	Primary	90	5.2	4.2	6.4
	Secondary	102	4.9	4.0	6.0
	Tertiary	13	3.4	2.0	5.8
Gov. District Hospital	None	198	13.5	11.6	15.7
	Primary	213	12.1	10.4	14.0
	Secondary	219	10.2	8.8	11.8
	Tertiary	19	4.6	3.0	7.1
Gov. polyclinic /health centre /Com. clinic	None	408	28.1	25.5	31.0
	Primary	522	29.8	27.3	32.4
	Secondary	445	21.1	19.2	23.1
	Tertiary	44	11.2	8.4	14.8
Gov. mobile clinic	None	8	0.6	0.3	1.1
	Primary	9	0.5	0.2	1.1
	Secondary	6	0.3	0.1	0.6
	Tertiary	1	0.2	<0.1	1.7
University Hospital	None	2	0.2	<0.1	0.7
	Primary	12	0.7	0.4	1.3
	Secondary	10	0.5	0.3	1.0
	Tertiary	4	1.0	0.4	2.7
Army Hospital	None	3	0.2	0.1	0.9
	Primary	5	0.3	0.1	1.0
	Secondary	22	1.2	0.7	2.0
	Tertiary	3	0.8	0.3	2.5
Private Hospital	None	32	2.5	1.7	3.6
	Primary	24	1.5	1.0	2.2
	Secondary	43	2.2	1.6	2.9
	Tertiary	10	2.6	1.4	4.8
Private Clinic	None	517	38.4	35.5	41.4
	Primary	524	32.0	29.6	34.5
	Secondary	822	40.5	38.1	43.0
	Tertiary	226	58.5	53.4	63.5
Estate Hospital	None	3	0.2	0.4	0.7
	Primary	-	-	0.6	-
	Secondary	2	0.1	0.2	0.4
	Tertiary	-	-	0.1	-

Table 19: Percentage of respondents who had sought care for their recent illness/injury by place of seeking treatment and level of education (continue)

Place of seeking treatment	Level of Education	n	(%)	95% CI	
				Lower	Upper
Estate Clinic	None	14	0.8	0.4	1.7
	Primary	19	1.0	0.6	1.6
	Secondary	11	0.4	0.2	0.8
	Tertiary	2	0.4	0.1	1.7
TCM	None	13	0.9	0.5	1.5
	Primary	16	0.9	0.6	1.5
	Secondary	24	1.1	0.8	1.7
	Tertiary	5	1.4	0.6	3.3
Medicine hall/Chinese medicine shop/pharmacy	None	128	9.0	7.5	10.7
	Primary	224	13.2	11.6	15.1
	Secondary	315	14.9	13.3	16.6
	Tertiary	53	13.4	10.4	17.2
NGO Clinic	None	5	0.4	0.2	0.9
	Primary	2	0.1	<0.1	0.5
	Secondary	8	0.4	0.2	0.8
	Tertiary	2	0.5	0.1	2.1
Clubs/society	None	-	-	-	-
	Primary	2	0.1	<0.1	0.5
	Secondary	2	0.1	<0.1	0.4
	Tertiary	-	-	-	-
Drug peddlers at night market	None	3	0.2	0.1	0.6
	Primary	11	0.7	0.4	1.2
	Secondary	8	0.4	0.2	0.8
	Tertiary	-	-	-	-
Direct Selling	None	-	-	-	-
	Primary	2	0.1	<0.1	0.5
	Secondary	6	0.3	0.1	0.7
	Tertiary	5	1.3	0.6	3.1
Village Midwife	None	-	-	-	-
	Primary	6	0.4	0.2	0.8
	Secondary	6	0.3	0.1	0.7
	Tertiary	-	-	-	-
Friends /ketua kampung / relatives	None	1	0.1	<0.1	0.5
	Primary	-	-	-	-
	Secondary	5	0.2	0.1	0.6
	Tertiary	-	-	-	-

Table 19: Percentage of respondents who had sought care for their recent illness/injury by place of seeking treatment and level of education (continue)

Place of seeking treatment	Level of Education	n	(%)	95% CI	
				Lower	Upper
Did not seek treatment anywhere	None	6	0.4	0.2	0.9
	Primary	18	1.1	0.7	1.7
	Secondary	16	0.8	0.5	1.3
	Tertiary	2	0.5	0.1	1.9
Don't know	None	1	0.1	<0.1	0.5
	Primary	2	0.1	<0.1	0.6
	Secondary	-	-	-	-
	Tertiary	-	-	-	-
Others	None	5	0.4	0.2	0.9
	Primary	3	0.2	0.1	0.6
	Secondary	2	0.1	<0.1	0.4
	Tertiary	-	-	-	-

Table 20: Percentage of respondents who had sought care for their recent illness/injury by place of seeking treatment and ethnicity

Place of seeking treatment	Ethnicity	n	(%)	95% CI	
				Lower	Upper
Gov. General Hospital	Malay	179	4.0	3.3	4.8
	Chinese	27	3.0	2.0	4.5
	Indian	48	6.4	4.6	8.9
	Other Bumis	55	5.2	3.8	7.3
	Others	9	4.1	2.1	8.1
Gov. District Hospital	Malay	430	9.3	8.2	10.5
	Chinese	59	6.4	4.9	8.3
	Indian	70	9.1	7.0	11.9
	Other Bumis	246	23.0	19.4	27.0
	Others	22	9.6	6.1	14.9
Gov. polyclinic/health centre/Com. clinic	Malay	1256	26.7	24.9	28.6
	Chinese	126	13.9	11.5	16.8
	Indian	200	25.3	21.2	29.8
	Other Bumis	333	33.1	28.2	38.3
	Others	38	16.9	12.2	23.0
Gov. mobile clinic	Malay	23	0.5	0.3	0.8
	Chinese	1	0.1	<0.1	0.9
	Indian	-	-	-	-
	Other Bumis	5	0.5	0.2	1.3
	Others	5	2.0	0.9	4.8
University Hospital	Malay	22	0.5	0.3	0.8
	Chinese	11	1.3	0.7	2.3
	Indian	4	0.5	0.2	1.7
	Other Bumis	1	0.1	<0.1	0.7
	Others	-	-	-	-
Army Hospital	Malay	38	0.9	0.5	1.5
	Chinese	2	0.2	0.1	0.9
	Indian	2	0.3	0.1	1.2
	Other Bumis	11	1.3	0.6	2.9
	Others	1	0.4	0.1	2.7
Private Hospital	Malay	76	1.8	1.4	2.3
	Chinese	38	4.2	2.9	6.0
	Indian	24	3.2	2.1	5.0
	Other Bumis	5	0.5	0.2	1.2
	Others	2	1.0	0.3	4.0

Table 20: Percentage of respondents who had sought care for their recent illness/injury by place of seeking treatment and ethnicity (continue)

Place of seeking treatment	Ethnicity	n	(%)	95% CI	
				Lower	Upper
Private Clinic	Malay	1,786	40.4	38.4	42.4
	Chinese	508	56.7	52.8	60.5
	Indian	355	47.0	42.0	52.0
	Other Bumis	246	24.2	20.8	27.9
	Others	92	43.6	36.0	51.5
Estate Hospital	Malay	6	0.1	0.1	0.3
	Chinese	1	0.1	<0.1	0.9
	Indian	-	-	-	-
	Other Bumis	-	-	-	-
	Others	-	-	-	-
Estate Clinic	Malay	31	0.6	0.3	1.0
	Chinese	-	-	-	-
	Indian	14	1.4	0.7	2.8
	Other Bumis	8	0.7	0.2	2.5
	Others	8	3.6	1.5	8.1
TCM	Malay	41	0.9	0.7	1.2
	Chinese	11	1.2	0.6	2.4
	Indian	2	0.3	0.1	1.0
	Other Bumis	5	0.5	0.2	1.1
	Others	-	-	-	-
Medicine hall/Chinese medicine shop/pharmacy	Malay	556	12.1	10.9	13.4
	Chinese	100	11.2	9.1	13.6
	Indian	42	5.6	4.2	7.6
	Other Bumis	99	9.6	7.6	12.0
	Others	40	17.7	12.7	24.1
NGO Clinic	Malay	12	0.3	0.1	0.6
	Chinese	5	0.5	0.2	1.3
	Indian	1	0.1	<0.1	0.9
	Other Bumis	1	0.1	<0.1	0.7
	Others	-	-	-	-
Clubs/society	Malay	3	0.1	<0.1	0.2
	Chinese	-	-	-	-
	Indian	-	-	-	-
	Other Bumis	1	0.1	<0.1	0.6
	Others	-	-	-	-

Table 20: Percentage of respondents who had sought care for their recent illness/injury by place of seeking treatment and ethnicity (continue)

Place of seeking treatment	Ethnicity	n	(%)	95% CI	
				Lower	Upper
Drug peddlers at night market	Malay	20	0.4	0.3	0.7
	Chinese	-	-	-	-
	Indian	1	0.1	<0.1	0.9
	Other Bumis	1	0.1	<0.1	0.7
	Others	1	0.4	0.1	3.0
Direct Selling	Malay	10	0.2	0.1	0.4
	Chinese	2	0.2	0.1	0.9
	Indian	1	0.1	<0.1	1.0
	Other Bumis	-	-	-	-
	Others	-	-	-	-
Village Midwife	Malay	8	0.2	0.1	0.4
	Chinese	-	-	-	-
	Indian	1	0.2	<0.1	1.1
	Other Bumis	3	0.3	0.1	1.0
	Others	-	-	-	-
Friends /ketua kampung / relatives	Malay	5	0.1	0.1	0.3
	Chinese	-	-	-	-
	Indian	-	-	-	-
	Other Bumis	2	0.2	0.1	0.9
	Others	-	-	-	-
Did not seek treatment anywhere	Malay	35	0.8	0.6	1.1
	Chinese	7	0.8	0.4	1.6
	Indian	2	0.3	0.1	1.1
	Other Bumis	-	-	-	-
	Others	1	0.6	0.1	4.2
Don't know	Malay	3	0.1	<0.1	0.2
	Chinese	-	-	-	-
	Indian	-	-	-	-
	Other Bumis	-	-	-	-
	Others	-	-	-	-
Others	Malay	9	0.2	0.1	0.4
	Chinese	-	-	-	-
	Indian	-	-	-	-
	Other Bumis	5	0.5	0.2	1.3
	Others	-	-	-	-

Table 21: Percentage of respondents who had sought care for their recent illness /injury by timeliness in seeking treatment

Timeliness in seeking treatment	n	N	%	95% CI	
				Lower	Upper
12 hours or less after onset	2,982	1,096,527	39.2	37.7	40.8
13-24 hours after onset	2,552	943,340	33.8	32.4	35.1
More than 24 hours after onset	1,962	721,535	25.8	24.6	27.1
More than 5 days after onset	91	32,880	1.2	1.0	1.5
Total	7,587	2,794,282	100.0	-	-

Table 22: Percentage of respondents who had sought care for their recent illness/injury by timeliness in seeking treatment and age group

Age Group (years)	Timeliness in seeking treatment	n	%	95% CI	
				Lower	Upper
0-5	12 hrs or less after onset	666	22.1	20.5	23.8
	13 - 24 hrs after onset	609	23.7	22.0	25.5
	More than 24 hrs after onset	405	20.6	18.8	22.6
	More than 5 days after onset	4	4.3	1.7	10.8
	Don't know	1	2.9	0.4	17.7
6-10	12 hrs or less after onset	392	13.2	12.0	14.6
	13 - 24 hrs after onset	355	13.8	12.5	15.3
	More than 24 hrs after onset	224	11.5	10.1	13.1
	More than 5 days after onset	2	2.0	0.3	12.4
	Don't know	3	8.6	2.8	23.5
11-20	12 hrs or less after onset	432	14.5	13.2	15.9
	13 - 24 hrs after onset	389	15.2	13.8	16.8
	More than 24 hrs after onset	345	17.6	16.0	19.4
	More than 5 days after onset	10	11.3	6.2	19.9
	Don't know	4	9.6	3.6	23.2
21-40	12 hrs or less after onset	702	23.9	22.3	25.5
	13 - 24 hrs after onset	540	21.5	19.9	23.2
	More than 24 hrs after onset	423	21.5	19.7	23.4
	More than 5 days after onset	24	26.8	18.7	36.9
	Don't know	10	22.5	12.3	37.5
41-60	12 hrs or less after onset	538	18.2	16.8	19.7
	13 - 24 hrs after onset	447	17.7	16.2	19.4
	More than 24 hrs after onset	390	20.0	18.2	21.9
	More than 5 days after onset	33	36.3	26.8	47.0
	Don't know	11	26.6	15.0	42.5
61 and above	12 hrs or less after onset	246	8.2	7.2	9.2
	13 - 24 hrs after onset	212	8.0	7.0	9.2
	More than 24 hrs after onset	175	8.7	7.5	10.1
	More than 5 days after onset	18	19.3	12.2	29.1
	Don't know	13	30.0	17.9	45.7

Table 23: Percentage of respondents who had sought care for their recent illness /injury by timeliness in seeking treatment and level of education

Level of Education	Timeliness in seeking treatment	n	%	95% CI	
				Lower	Upper
None	12 hrs or less after onset	556	18.5	17.1	20.0
	13 - 24 hrs after onset	518	19.8	18.3	21.3
	More than 24 hrs after onset	341	17.1	15.4	18.9
	More than 5 days after onset	17	17.4	10.7	27.0
	Don't know	16	37.7	23.8	54.0
Primary	12 hrs or less after onset	637	21.2	19.7	22.8
	13 - 24 hrs after onset	572	22.3	20.6	24.1
	More than 24 hrs after onset	501	25.5	23.5	27.6
	More than 5 days after onset	26	28.1	19.7	38.3
	Don't know	12	28.0	16.3	43.7
Secondary	12 hrs or less after onset	862	29.3	27.6	31.0
	13 - 24 hrs after onset	647	25.8	24.0	27.7
	More than 24 hrs after onset	567	29.1	26.9	31.3
	More than 5 days after onset	32	36.1	26.5	46.9
	Don't know	11	26.7	15.2	42.5
Tertiary	12 hrs or less after onset	158	5.6	4.8	6.6
	13 - 24 hrs after onset	132	5.6	4.7	6.6
	More than 24 hrs after onset	96	5.1	4.1	6.3
	More than 5 days after onset	12	14.1	8.2	23.3
	Don't know	-	-	-	-
Not Applicable	12 hrs or less after onset	746	24.6	23.0	26.4
	13 - 24 hrs after onset	665	25.9	24.1	27.8
	More than 24 hrs after onset	452	23.1	21.1	25.1
	More than 5 days after onset	4	4.3	1.7	10.8
	Don't know	2	5.3	1.3	19.0

Table 24: Percentage of respondents who had sought care for their recent illness/injury by timeliness in seeking treatment and ethnicity

Ethnicity	Timeliness in seeking treatment	n	%	95% CI	
				Lower	Upper
Malay	12 hrs or less after onset	1,822	61.1	58.3	63.8
	13 - 24 hrs after onset	1,598	62.7	59.8	65.6
	More than 24 hrs after onset	1,157	59.1	55.8	62.4
	More than 5 days after onset	53	59.3	48.3	69.4
	Don't know	21	49.8	34.2	65.4
Chinese	12 hrs or less after onset	383	13.7	11.9	15.7
	13 - 24 hrs after onset	277	11.6	9.9	13.5
	More than 24 hrs after onset	232	12.7	10.8	14.8
	More than 5 days after onset	18	20.0	12.8	29.7
	Don't know	8	20.9	10.7	36.7
Indian	12 hrs or less after onset	318	11.4	9.8	13.2
	13 - 24 hrs after onset	267	11.4	9.6	13.5
	More than 24 hrs after onset	190	10.6	8.6	12.9
	More than 5 days after onset	8	9.0	4.5	17.1
	Don't know	2	5.7	1.4	20.2
Other Bumis	12 hrs or less after onset	376	11.3	9.6	13.2
	13 - 24 hrs after onset	328	11.4	9.6	13.4
	More than 24 hrs after onset	326	14.9	12.6	17.6
	More than 5 days after onset	12	11.8	6.0	21.7
	Don't know	7	15.1	6.7	30.4
Others	12 hrs or less after onset	83	2.6	2.0	3.2
	13 - 24 hrs after onset	82	2.9	2.2	3.7
	More than 24 hrs after onset	57	2.7	2.0	3.7
	More than 5 days after onset	-	-	-	-
	Don't know	4	8.5	3.2	20.9

Table 25: Percentage of respondents with recent illness/injury by limitation of activities

Limitation of activities	n	N	%	95% CI	
				Lower	Upper
Yes	4,018	1,476,972	30.5	29.5	31.4
No	9,202	3,373,746	69.6	68.6	70.5
Total	13,220	4,850,719	100.0	-	-

Table 26: Prevalence of respondents with recent illness/injury who had limitation of activities by occupation and age group

Occupation	Age group (years)	n	(%)	95% CI	
				Lower	Upper
Senior official & Manager	11-20	1	2.2	0.3	13.8
	21-40	24	56.2	40.7	70.5
	41-60	15	37.0	23.5	52.9
	61 and above	2	4.7	1.2	17.1
Professionals	11-20	5	3.4	1.4	8.1
	21-40	96	64.6	56.1	72.2
	41-60	44	30.0	22.9	38.2
	61 and above	3	2.0	0.7	6.0
Technical & Associate	11-20	9	5.3	2.8	9.8
	21-40	102	58.8	51.1	66.2
	41-60	50	29.0	22.6	36.4
	61 and above	11	6.9	3.9	12.1
Clerical Workers	11-20	14	9.7	6.0	15.5
	21-40	87	63.2	55.0	70.8
	41-60	37	25.7	18.9	33.8
	61 and above	2	1.4	0.3	5.4
Service Workers & Shop	11-20	44	11.8	8.6	16.0
	21-40	192	51.7	46.6	56.7
	41-60	118	32.0	27.4	37.1
	61 and above	17	4.5	2.8	7.2
Skilled Agricultural & Fishery	11-20	12	6.5	3.7	11.0
	21-40	53	27.3	27.3	21.4
	41-60	83	42.0	35.3	49.0
	61 and above	48	24.3	18.9	30.5
Craft & Related Trade Workers	11-20	30	19.3	14.1	25.9
	21-40	83	53.3	45.3	61.1
	41-60	42	26.7	20.0	34.7
	61 and above	1	0.7	0.1	5.0
Plant & Machine Operator & Assembler	11-20	14	10.2	6.0	17.0
	21-40	71	53.6	45.0	62.0
	41-60	43	34.9	27.1	43.5
	61 and above	2	1.3	0.3	5.2
Elementary Occupations	11-20	14	12.5	7.5	19.9
	21-40	50	45.4	36.1	55.0
	41-60	35	32.8	24.4	42.4
	61 and above	10	9.4	5.1	16.7

Table 26: Prevalence of respondents with recent illness/injury who had limitation of activities by occupation and age group (continue)

Occupation	Age group (years)	n	(%)	95% CI	
				Lower	Upper
Housewife	11-20	12	2.9	1.7	5.1
	21-40	144	34.5	30.0	39.3
	41-60	166	41.0	36.2	46.0
	61 and above	93	21.6	17.8	25.9
Unemployed	11-20	66	20.5	16.5	25.2
	21-40	57	17.6	13.7	22.2
	41-60	51	15.9	12.2	20.4
	61 and above	148	46.1	40.5	51.7

Table 27: Prevalence of respondents with recent illness/injury taking time-off by occupation and age group

Occupation	Age group (years)	n	(%)	95% CI	
				Lower	Upper
Senior official & Manager	11-20	1	0.2	<0.1	1.4
	21-40	11	1.8	1.0	3.2
	41-60	8	2.1	1.0	4.1
	61 and above	-	-	-	-
Professionals	11-20	3	0.7	0.2	2.1
	21-40	60	9.7	7.5	12.5
	41-60	33	8.0	5.6	11.4
	61 and above	1	0.7	0.1	4.6
Technical & Associate	11-20	6	1.5	0.7	3.2
	21-40	78	12.5	10.0	15.5
	41-60	34	8.7	6.3	11.9
	61 and above	2	1.5	0.4	5.9
Clerical Workers	11-20	7	1.5	0.7	3.0
	21-40	71	11.2	9.0	13.8
	41-60	30	7.1	4.9	10.0
	61 and above	-	-	-	
Service Workers & Shop	11-20	32	6.8	4.7	9.6
	21-40	129	20.2	17.2	23.6
	41-60	90	21.6	17.8	25.9
	61 and above	9	6.6	3.4	12.3
Skilled Agricultural & Fishery	11-20	7	1.5	0.7	3.1
	21-40	34	4.9	3.5	6.8
	41-60	59	12.5	9.7	16.1
	61 and above	25	16.4	11.3	23.3

Table 27: Prevalence of respondents with recent illness/injury taking time-off by occupation and age group (continue)

Occupation	Age group (years)	n	(%)	95% CI	
				Lower	Upper
Craft & Related Trade Workers	11-20	26	6.0	4.1	8.7
	21-40	73	11.5	9.2	14.4
	41-60	30	7.3	5.1	10.4
	61 and above	-	-	-	-
Plant & Machine Operator & Assembler	11-20	11	2.4	1.3	4.3
	21-40	50	7.3	5.5	9.6
	41-60	26	6.3	4.3	9.1
	61 and above	1	0.7	0.1	4.8
Elementary Occupations	11-20	12	2.4	1.4	4.2
	21-40	46	6.7	5.0	9.0
	41-60	23	5.3	3.5	7.9
	61 and above	4	2.7	1.0	6.9
Housewife	11-20	4	1.0	0.4	2.6
	21-40	51	7.6	5.8	10.0
	41-60	60	14.0	11.0	17.7
	61 and above	28	18.9	13.4	25.9
Unemployed	11-20	26	5.5	3.8	8.0
	21-40	15	2.3	1.4	3.8
	41-60	22	5.0	3.2	7.8
	61 and above	72	51.0	42.9	59.1

Table 28: Mean taking time off for respondents with recent illness/injury by personal income and gender

Personal income group (RM)	Gender	n	(%)	95% CI	
				Lower	Upper
Less than 400	Male	435	1.8	1.7	1.8
	Female	525	1.8	1.8	1.8
400-699	Male	524	1.8	1.8	1.8
	Female	378	1.7	1.7	1.8
700-999	Male	531	1.8	1.7	1.8
	Female	241	1.7	1.6	1.8
1000-1999	Male	803	1.8	1.8	1.8
	Female	384	1.7	1.7	1.8
2000-2999	Male	299	1.8	1.7	1.8
	Female	143	1.7	1.6	1.8
3000-3999	Male	99	1.8	1.8	1.9
	Female	48	1.6	1.5	1.8
4000-4999	Male	32	1.9	1.7	2.0
	Female	14	1.9	1.8	2.1
5000 and above	Male	68	1.9	1.8	2.0
	Female	28	1.8	1.6	1.9

Table 29: Prevalence of chronic illness by type of disease

Chronic disease	n	N	(%)	95% CI	
				Lower	Upper
Hypertension	4,463	1,664,755	7.9	7.6	8.2
Diabetes mellitus	2,206	841,528	4.0	3.8	4.2
Stroke	137	53,016	0.3	0.2	0.3
Arthritis	433	159,808	0.8	0.7	0.9
Tuberculosis	136	47,499	0.2	0.2	0.3
Asthma	1,907	716,672	3.4	3.2	3.6
Kidney failure	193	69,841	0.3	0.3	0.4
Thyroid disease	192	71,020	0.3	0.3	0.4
Heart disease	665	251,622	1.2	1.1	1.3
Anemia	146	52,329	0.3	0.2	0.3
Blood disorders	54	20,713	0.1	0.1	0.1
Migraine	389	144,290	0.7	0.6	0.8
Cancer	159	60,963	0.3	0.2	0.3
Backache	146	52,916	0.3	0.2	0.3
SLE	23	8,737	<0.1	<0.1	0.1
Parkinson's disease	14	5,723	<0.1	<0.1	0.1
Skin disease	189	68,636	0.3	0.3	0.4
Total	8,764	3,277,808	15.5	15.1	15.9

Table 30: Prevalence of chronic illness by gender

Gender	N	(%)	95% CI	
			Lower	Upper
Male	1,405,639	14.2	13.7	14.6
Female	1,872,170	16.8	16.3	17.3

Table 30: Prevalence of chronic illness by gender

Age group (years)	Gender	n	N	(%)	95% CI	
					Lower	Upper
0-5	Male	173	64,425	4.7	4.1	5.5
	Female	145	53,798	4.0	3.4	4.8
6-10	Male	215	80,338	6.2	5.4	7.1
	Female	132	49,531	4.2	3.5	5.0
11-20	Male	283	106,638	5.5	4.9	6.2
	Female	305	113,815	5.8	5.1	6.4
21-40	Male	519	193,562	8.0	7.4	8.8
	Female	941	346,279	11.0	10.3	11.8
41-60	Male	1,590	600,984	28.3	27.1	29.5
	Female	2,225	836,431	32.1	30.9	33.2
61 and above	Male	968	359,692	45.8	43.6	47.9
	Female	1,262	470,078	51.3	49.3	53.4

Table 32: Prevalence of chronic illness by race

Race	N	(%)	95% CI	
			Lower	Upper
Malay	698,446	15.9	15.4	16.4
Chinese	442,174	15.5	14.7	16.4
Indian	347,191	19.7	18.4	21.0
Other Bumis	313,728	13.3	12.2	14.5
Others	68,994	7.9	6.8	9.1

Table 33: Prevalence of chronic illness by race and gender

Race	Gender	n	N	(%)	95% CI	
					Lower	Upper
Malay	Male	2,155	802,739	14.2	13.6	14.8
	Female	2,994	1,107,892	17.5	16.8	18.2
Chinese	Male	754	299,950	15.2	14.2	16.4
	Female	845	337,313	15.8	14.7	16.9
Indian	Male	363	144,681	18.2	16.5	20.1
	Female	508	202,511	20.9	19.3	22.6
Other Bumis	Male	402	132,170	12.0	10.7	13.4
	Female	547	181,558	14.4	13.1	15.9
Others	Male	74	26,099	6.5	5.1	8.3
	Female	122	42,895	9.1	7.6	10.8

Table 34: Prevalence of chronic illness by level of education

Level of Education	n	N	(%)	95% CI	
				Lower	Upper
None	2,396	861,060	17.7	17.0	18.4
Primary	3,400	1,240,111	25.4	24.6	26.3
Secondary	4,186	1,549,880	31.8	30.9	32.7
Tertiary	705	275,086	5.6	5.2	6.2
Not Applicable	2,529	922,232	18.9	18.2	19.7
Unclassified	77	28,533	0.6	0.5	0.8

Table 35: Prevalence of chronic illness by occupation

Occupation	n	(%)	95% CI	
			Lower	Upper
Senior official & Manager	59,515	23.2	20.0	26.8
Professionals	160,851	18.0	16.5	19.7
Technical & Associate	230,210	22.5	20.9	24.2
Clerical Workers	124,759	17.5	15.7	19.5
Service Workers & Shop	397,566	18.3	17.3	19.4
Skilled Agricultural & Fishery	183,268	20.0	18.4	21.7
Craft & Related Trade Workers	101,936	13.1	11.5	14.8
Plant & Machine Operator & Assembler	127,181	17.8	16.1	19.7
Elementary Occupations	100,179	17.3	15.4	19.5
Housewife	844,096	27.8	26.7	28.9
Unemployed	459,389	31.6	30.0	33.3

Table 36: Prevalence of chronic illness by household income

Household Income (RM)	n	N	(%)	95% CI	
				Lower	Upper
Less than 400	877	315,427	19.4	17.9	20.9
400-699	1,387	493,281	16.5	15.6	17.5
700-999	1,029	375,710	15.8	14.7	16.9
1000-1999	2,246	839,725	14.8	14.1	15.5
2000-2999	1,290	494,299	15.0	14.2	16.0
3000-3999	630	245,201	14.6	13.5	15.7
4000-4999	320	126,202	15.7	14.0	17.5
5000 and above	640	255,682	14.0	12.9	15.2
Unclassified	345	132,281	16.3	14.6	18.2

Table 37: Prevalence of chronic illness by geographical location

Geographical Location	n	N	(%)	95% CI	
				Lower	Upper
Rural	3,668	1,189,826	15.4	14.7	16.0
Urban	5,096	2,087,983	15.6	15.1	16.2

Table 38: Prevalence of chronic illness by state

Occupation	N	(%)	95% CI	
			Lower	Upper
Johor	354,713	14.6	13.6	15.7
Kedah	304,682	20.1	18.7	21.6
Kelantan	162,581	12.9	11.8	14.1
Melaka	126,365	22.1	19.5	25.0
N. Sembilan	124,812	16.6	14.7	18.6
Pahang	188,658	16.6	15.0	18.3
P. Pinang	180,257	16.6	15.0	18.2
Perak	284,244	16.0	14.6	17.6
Perlis	37,679	19.7	15.3	25.0
Selangor	650,545	16.7	15.8	17.6
Terengganu	117,128	13.6	12.1	15.2
Sabah	267,050	12.0	10.9	13.2
Sarawak	262,943	13.6	12.4	14.9
W.P Kuala Lumpur	166,095	14.2	12.8	15.8
W.P Labuan	50,056	17.6	14.2	21.7
MALAYSIA	3,277,808	15.5	15.1	15.9

Table 39: Prevalence of chronic illness for urban and rural location by state

State	Strata	N	(%)	95% CI	
				Lower	Upper
Johor	Urban	230,461	14.1	12.9	15.5
	Rural	124,253	15.7	13.9	17.6
Kedah	Urban	127,673	20.7	18.3	23.3
	Rural	177,009	19.7	18.0	21.5
Kelantan	Urban	58,062	14.5	12.7	16.6
	Rural	104,519	12.1	10.8	13.6
Melaka	Urban	93,859	21.4	18.3	24.9
	Rural	32,506	24.6	20.3	29.5
N. Sembilan	Urban	67,044	15.8	13.5	18.4
	Rural	57,768	17.6	14.8	20.8
Pahang	Urban	84,231	16.1	13.7	18.7
	Rural	104,427	17.0	14.9	19.3
P. Pinang	Urban	148,587	16.9	15.2	18.8
	Rural	31,670	15.0	11.9	18.9
Perak	Urban	176,803	16.5	14.5	18.7
	Rural	107,441	15.2	13.3	17.4
Perlis	Urban	9,600	13.2	6.8	23.9
	Rural	28,079	23.7	20.0	27.9
Selangor	Urban	575,745	16.6	15.7	17.7
	Rural	74,799	17.1	15.2	19.2
Terengganu	Urban	61,753	13.8	11.9	16.0
	Rural	55,375	13.4	11.2	15.8
Sabah	Urban	146,310	13.4	11.9	15.2
	Rural	120,741	10.6	9.2	12.3
Sarawak	Urban	113,337	11.9	10.3	13.7
	Rural	149,606	15.2	13.5	17.0
W.P Kuala Lumpur	Urban	166,095	14.3	12.8	15.8
W.P Labuan	Urban	28,422	16.1	12.5	20.5
	Rural	21,634	20.2	13.9	28.3
Malaysia	Urban	2,087,983	15.6	15.1	16.2
	Rural	1,189,826	15.4	14.7	16.0

Table 40: Percentage of respondents who had sought treatment for their chronic illness at different places by gender

Gender	Place seek treatment	(%)	95% CI	
			Lower	Upper
Male	Government General Hospital	13.8	12.3	15.4
	Government District Hospital	21.3	19.5	23.2
	Government Health Centre	26.0	24.1	27.9
	University Hospital	1.6	1.1	2.1
	Private Hospital	5.5	4.5	6.4
	Private Clinic	25.5	23.7	27.3
	Pharmacy/Medicine hall	2.8	2.1	3.4
Female	Government General Hospital	13.7	12.3	15.0
	Government District Hospital	21.1	19.5	22.8
	Government Health Centre	29.3	27.6	31.0
	University Hospital	1.7	1.2	2.1
	Private Hospital	4.4	3.6	5.2
	Private Clinic	24.2	22.6	25.7
	Pharmacy/Medicine hall	2.2	1.7	2.7

Table 41: Percentage of respondents who had sought treatment for their chronic illness at different places by household income

Household income (RM)	Place seek treatment	(%)	95% CI	
			Lower	Upper
Less than 400	Government General Hospital	8.7	6.2	11.2
	Government District Hospital	27.3	23.0	31.6
	Government Health Centre	40.6	36.0	45.1
	University Hospital	1.4	0.2	2.6
	Private Hospital	2.1	0.9	3.4
	Private Clinic	13.6	10.6	16.6
	Pharmacy/Medicine hall	1.3	0.3	2.2
400-699	Government General Hospital	11.6	9.5	13.8
	Government District Hospital	28.0	24.7	31.3
	Government Health Centre	35.6	32.1	39.1
	University Hospital	0.8	0.2	1.4
	Private Hospital	2.7	1.5	3.9
	Private Clinic	15.6	13.0	18.1
	Pharmacy/Medicine hall	2.5	1.4	3.6
700-999	Government General Hospital	14.7	11.7	17.7
	Government District Hospital	24.6	21.2	28.1
	Government Health Centre	31.6	27.8	35.5
	University Hospital	1.1	0.2	2.1
	Private Hospital	2.8	1.4	4.1
	Private Clinic	18.6	15.5	21.8
	Pharmacy/Medicine hall	1.8	0.8	2.8

Table 41: Percentage of respondents who had sought treatment for their chronic illness at different places by household income (continue)

Household income (RM)	Place seek treatment	(%)	95% CI	
			Lower	Upper
1000-1999	Government General Hospital	14.0	12.0	16.0
	Government District Hospital	23.0	20.5	25.5
	Government Health Centre	28.9	26.2	31.5
	University Hospital	1.2	0.6	1.7
	Private Hospital	4.7	3.5	6.0
	Private Clinic	22.9	20.6	25.2
	Pharmacy/Medicine hall	2.6	1.7	3.4
2000-2999	Government General Hospital	15.8	13.1	18.6
	Government District Hospital	19.3	16.4	22.2
	Government Health Centre	23.0	19.9	26.1
	University Hospital	1.9	0.9	2.9
	Private Hospital	5.3	3.4	7.2
	Private Clinic	29.1	25.8	32.3
	Pharmacy/Medicine hall	2.3	1.3	3.3
3000-3999	Government General Hospital	17.1	13.3	20.8
	Government District Hospital	13.9	10.3	17.6
	Government Health Centre	19.3	15.3	23.2
	University Hospital	2.0	0.7	3.4
	Private Hospital	4.1	2.2	6.0
	Private Clinic	37.1	32.1	42.1
	Pharmacy/Medicine hall	3.2	1.5	4.8
4000-4999	Government General Hospital	14.9	10.0	19.9
	Government District Hospital	11.9	7.6	16.1
	Government Health Centre	18.2	12.5	23.9
	University Hospital	2.2	0.3	4.2
	Private Hospital	10.4	6.1	14.7
	Private Clinic	38.3	32.1	44.6
	Pharmacy/Medicine hall	1.8	<0.1	3.5
5000 and above	Government General Hospital	13.3	9.6	17.0
	Government District Hospital	8.4	5.4	11.3
	Government Health Centre	13.4	9.8	17.1
	University Hospital	3.1	1.4	4.7
	Private Hospital	13.3	9.9	16.8
	Private Clinic	41.0	35.8	46.3
	Pharmacy/Medicine hall	3.2	1.3	5.0

Table 42: Percentage of respondents who had sought treatment for their chronic illness at different places by level of education

Level of education	Place seek treatment	(%)	95% CI	
			Lower	Upper
None	Government General Hospital	13.0	10.9	15.2
	Government District Hospital	25.9	23.0	28.8
	Government Health Centre	29.6	26.7	32.5
	University Hospital	1.0	0.3	1.6
	Private Hospital	3.6	2.4	4.8
	Private Clinic	20.6	18.0	23.2
	Pharmacy/Medicine hall	2.3	1.4	3.2
Primary	Government General Hospital	13.5	12.0	15.0
	Government District Hospital	22.5	20.5	24.5
	Government Health Centre	32.8	30.6	35.0
	University Hospital	1.5	0.9	2.0
	Private Hospital	3.7	2.8	4.7
	Private Clinic	20.1	18.3	21.8
	Pharmacy/Medicine hall	2.6	1.9	3.3
Secondary	Government General Hospital	14.1	12.4	15.7
	Government District Hospital	19.4	17.4	21.3
	Government Health Centre	25.2	23.1	27.3
	University Hospital	1.9	1.3	2.5
	Private Hospital	5.6	4.5	6.7
	Private Clinic	28.2	26.1	30.3
	Pharmacy/Medicine hall	2.6	1.8	3.3
Tertiary	Government General Hospital	14.1	10.0	18.1
	Government District Hospital	11.0	7.6	14.3
	Government Health Centre	14.9	11.1	18.8
	University Hospital	3.0	1.2	4.7
	Private Hospital	9.8	6.4	13.2
	Private Clinic	41.0	35.6	46.5
	Pharmacy/Medicine hall	3.0	0.9	5.0

Table 43: Percentage of respondents who had sought treatment for their chronic illness at different places by race

Race	Place seek treatment	(%)	95% CI	
			Lower	Upper
Malay	Government General Hospital	13.9	12.4	15.3
	Government District Hospital	20.8	19.1	22.5
	Government Health Centre	31.1	29.3	33.0
	University Hospital	1.4	1.0	1.8
	Private Hospital	3.1	2.4	3.8
	Private Clinic	23.5	21.8	25.1
	Pharmacy/Medicine hall	2.2	1.7	2.7
Chinese	Government General Hospital	10.7	8.8	12.6
	Government District Hospital	13.9	11.6	16.2
	Government Health Centre	21.2	18.4	24.0
	University Hospital	2.7	1.7	3.7
	Private Hospital	11.3	9.3	13.3
	Private Clinic	33.1	30.0	36.1
	Pharmacy/Medicine hall	4.8	3.5	6.0
Indian	Government General Hospital	17.0	13.2	20.9
	Government District Hospital	18.7	14.9	22.4
	Government Health Centre	25.5	21.4	29.7
	University Hospital	2.0	0.7	3.3
	Private Hospital	5.8	3.3	8.3
	Private Clinic	26.4	22.5	30.3
	Pharmacy/Medicine hall	1.1	0.2	1.9
Other Bumis	Government General Hospital	13.8	10.7	16.8
	Government District Hospital	40.6	35.5	45.8
	Government Health Centre	26.7	22.1	31.2
	University Hospital	0.4	0.1	0.9
	Private Hospital	2.0	0.8	3.3
	Private Clinic	13.3	10.1	16.6
	Pharmacy/Medicine hall	0.7	0.1	1.4
Other	Government General Hospital	23.5	16.2	30.7
	Government District Hospital	16.9	11.0	22.9
	Government Health Centre	19.2	12.3	26.2
	University Hospital	2.5	0.3	5.3
	Private Hospital	2.5	0.3	5.3
	Private Clinic	29.7	21.7	37.8
	Pharmacy/Medicine hall	3.1	0.1	6.1

Table 44: Percentage of respondents who had chronic illness with reasons for not seeking treatment by household income

Household income (RM)	Reasons not seeking treatment	(%)	95% CI	
			Lower	Upper
Less than 400	Mild illness	14.0	5.0	23.1
	Cure already	25.8	15.1	36.6
	Treatment not required	9.9	2.4	17.5
	Self medication	8.0	1.3	14.6
400-699	Mild illness	16.6	9.3	23.9
	Cure already	25.7	16.8	34.7
	Treatment not required	3.9	0.1	7.7
	Self medication	8.8	3.2	14.5
700-999	Mild illness	27.5	16.7	38.2
	Cure already	19.7	10.3	29.1
	Treatment not required	4.1	0.4	8.7
	Self medication	9.6	2.7	16.5
1000-1999	Mild illness	28.4	21.3	35.4
	Cure already	16.4	10.9	21.9
	Treatment not required	4.4	1.5	7.2
	Self medication	6.5	3.2	9.9
2000-2999	Mild illness	29.3	20.1	38.5
	Cure already	15.4	8.2	22.5
	Treatment not required	5.2	1.0	9.3
	Self medication	11.1	5.1	17.0
3000-3999	Mild illness	19.1	7.1	31.2
	Cure already	10.1	1.5	18.6
	Treatment not required	9.1	0.4	17.7
	Self medication	12.5	2.2	22.9
4000-4999	Mild illness	28.0	5.9	50.1
	Cure already	20.5	4.1	36.9
	Treatment not required	16.9	5.7	39.6
	Self medication	5.5	5.1	16.1
5000 and above	Mild illness	23.3	9.9	36.8
	Cure already	22.7	10.3	35.1
	Treatment not required	16.3	5.1	27.6
	Self medication	7.1	0.7	15.0

APPENDIX 2

LIST OF RECENT ILLNESS / INJURY OR CHRONIC ILLNESS SYMPTOMS

Allergy
Asthma
Backache
Bloatness
Chest pain
Continuous allergy
Continuous cough
Cough and/ or with sputum
Diarrhoea
Earache / with or without pus
Eye disease
Feels like fainting
Feel tired easily without reason
Fever
Flu
Frequent constipation
Frequent headaches
Haemorrhoids/piles
Heart disease
Nausea and / or vomiting
Painful/swollen joints/muscles
Problem/pain with menstrual period/menopause
Problem with eyes/eyesight
Problem with ears/hearing
Problem with urinating
Recurrent backache
Recurrent stomach-ache
Skin disease
Sore throat
Shortness of breath
Stomach-ache
Swelling of neck
Swollen joints / feet
Toothache
Unable to sleep
Varicose veins
Yellowish tinged skin
Other problems

CHAPTER IV

CHRONIC PAIN

ABSTRACT

Pain is a common reason for seeking health care, both in hospitals as well as in primary care settings. Chronic persistent pain places a heavy burden on healthcare services. Population-based studies in Europe and Australia have shown that approximately 20% of adults suffer from chronic pain. In Malaysia, a nationwide cross sectional population based survey using a pre-coded questionnaire administered via face-to-face interviews was conducted in 2006 among adults aged 18 years and above. The objective of the study was to determine the prevalence of chronic pain, defined as "pain every day for 3 months or more" and, in those with chronic pain, to determine the level of interference with daily activities. The prevalence of chronic persistent pain in adult Malaysians was 7.1%. Significant predictors for chronic pain were sex, age, educational level and race. The prevalence was higher in females, older population, rural population, and those with lower educational level and lower monthly household income. Among ethnic groups, the highest prevalence was among Indians (10.5%) and the lowest among Chinese (5.4%). According to occupation, the unemployed had the highest prevalence of chronic pain followed by housewives. Of those with persistent pain, 81% reported that the pain interfered with their work, study and daily activities, with 7% having "extreme" levels of interference. Elderly respondents also reported higher levels of interference, with 96% of those above 75 years reporting some level of interference with their daily activities. Those having other co-morbid conditions, including cancer, hypertension, diabetes, stroke, heart disease and SLE, had a higher prevalence of chronic pain compared to the general population. Respondents who reported having been diagnosed to have arthritis, migraine and backache also had a higher prevalence of chronic pain. However, only about a third of respondents with these conditions had persistent pain lasting for 3 months or more. A possible reasons for the lower prevalence of chronic pain in Malaysia may be due to the population structure, having a larger proportion of younger people compared to western countries. Another possibility is that Malaysians suffer from intermittent rather than persistent pain. This study shows that there are almost a million adult Malaysians suffering from chronic persistent pain, with most of these reporting interference with daily activities. Currently there are only 5 Pain Management Clinics in Ministry of Health hospitals and another 3 in University hospitals throughout the country which clearly does not commensurate with the need. The provision of more specialised services for chronic pain patient can decrease the morbidity and disability in this population and needs to be addressed urgently.

1. INTRODUCTION

The National Health and Morbidity Survey (NHMS) is a nation-wide, community-based survey conducted by the Institute for Public Health, Ministry of Health Malaysia. One of the main aims of this study is to enable the Ministry of Health to review health priorities, program strategies and activities, and to plan for allocation of resources. Three NHMS have been carried out so far, once in ten years. The first NHMS (NHMS I) was conducted in 1986 and was limited to West Malaysia. The second NHMS (NHMS II) was conducted in 1996 and was extended to include Sabah and Sarawak. This survey, NHMS III conducted between April and August 2006, and is the largest study done so far.

One of the objectives of the NHMS III was to determine the load of illness among Malaysian population of specific diseases, both acute and chronic. Pain is one of the most common complaints in patients seeking health care and for those with chronic pain, contact with health care providers tends to be repeated and persistent, thus placing a heavy burden on health care services. However, chronic pain has never been studied in previous NHMS and to date, there have been no published studies from Malaysia or Southeast Asia on the prevalence of chronic persistent pain in the population. This study is aimed at obtaining baseline epidemiological data on the prevalence of chronic pain from various causes, as well as the level of interference this kind of pain has on the activities of sufferers.

2. LITERATURE REVIEW

A survey of patients visiting government health centers *(W.P.Kuala Lumpur Klinik Kesihatan)* and general practitioner clinics in Malaysia showed that 31% of them had pain as a complaint (Zalinawati et al. 2006). For patients with chronic persistent pain, visits to healthcare providers would be repeated, thus placing a heavy burden on healthcare services.

Chronic pain is defined by the International Association for the Study of Pain (IASP) as pain that lasts for 3 months or more (Merskey et al. 1994), or as pain that persists beyond the healing period. However, different definitions of pain have been used in the determination of prevalence of chronic pain, in particular with regard to the duration of the pain and this may be one of the reasons why there is such a large variation in published prevalence rates from different parts of the world. A review of the literature (Verhaak et al. 1998) showed that the general prevalence of chronic benign pain worldwide ranged from 2-40% with a median prevalence of 15%. The extremes of prevalence in this review were obtained in older studies. A more recent European survey indicated that the prevalence of pain longer than 6 months in the general population was 19% (Breivik 2006); however, the prevalence ranged from 12 - 30% with the lowest rates in Spain (12%), Ireland (13%) and United Kingdom (13%), and highest prevalence in Norway (30%), Poland (27%) and Italy (26%). In Australia, the prevalence of chronic pain was reported to be 17.1% of men and 20% of women (Blyth et al. 2001), while in Canada it was 29% (Moulin et al. 2002).

To date, there have been few published studies about the prevalence of pain among Asians. The prevalence of pain longer than 6 months duration in Hong Kong was reported to be 10.8% (Ng et al. 2002), and the prevalence in Japan, obtained from an internet survey of over 18000 respondents, was 13.4% (Hattori & Takashima 2004). However, a more recent study also from Hong Kong, found that the prevalence of pain in the preceding 4 weeks before the interview may be as high as 45.9% (Chung & Wong 2007).

Epidemiological studies have shown higher prevalence of chronic pain among females and the elderly (Blyth et al. 2001; Moulin et al. 2002; Ng et al. 2002). Higher prevalence have also been found in the older population, those in rural areas, lower socioeconomic class, those with lower levels of education and those without health insurance (Blyth et al. 2001).

Significant predictors of chronic pain, found in many studies, included age and gender (Blyth et al. 2001; Moulin et al. 2002; Ng et al. 2002). Chronic pain was present in up to 50% of older persons in the community (Helme et al. 2001) and more than 80% of nursing home residents (Ferrell 1995). In another study, 45.8% of older persons admitted to the hospital reported pain with 19% having severe pain (Desbiens et al. 1997).

Chronic pain in older adults is often caused by more than one clinical diagnosis (Jones & Macfarlane 2005). Common conditions causing pain in the older persons include osteoarthritis, postherpetic neuralgia, spinal canal stenosis, cancer, fibromyalgia, post-stroke pain and diabetic peripheral neuropathy. Older adults with chronic pain also had more intense pain (median VAS pain score 7.5 compared to 5.0 in younger sufferers) and were more severely affected by their pain. Older patients with pain had poorer sleep quality, lower self-rated health status and higher proportion of depression when compared to those in the same age group without pain (Miu et al. 2004).

About two thirds of those with chronic pain say that the pain interferes with daily activities (Blyth et al. 2001; Lazarus & Neumann 2001). A whole range of activities are affected, including the ability to exercise, play sport, sleep, perform daily tasks as well as the ability work and to socialise with others (Lazarus & Neumann 2001). Studies have also shown significant correlation between chronic pain and unemployment (Smith et al. 2001); in Australia, among those unemployed due to health reasons, the odds ratio of having chronic pain was 6.4 compared to those without chronic pain (Blyth et al. 2001).

A WHO Collaborative Study of Psychological Problems in General Health showed that pain sufferers had more anxiety or depressive disorders, experienced significant activity limitations and impairment at work, and had poorer health in general compared to those without persistent pain (Gureje et al. 1998). Self-assessment of health status was also poorer in those with chronic pain compared to those without (Blyth et al. 2001). In addition, those with co-morbidity including medical diseases like hypertension, diabetes and stroke were found to have higher prevalences of chronic pain (Blyth et al. 2004).

Overall therefore, people with chronic pain are expected to place a heavier burden on the healthcare system not only because they seek help for the pain but also because of psychiatric co-morbidity and perceive themselves as generally having poor health (Smith et al. 2001). Consequently, expenditure on health of those with chronic pain is also higher than for those without (Thomsen et al. 2002).

3. OBJECTIVES

The objectives of this the survey were as follows:

3.1 General Objective

To provide community based data and information on the epidemiology of chronic pain in the adult Malaysian population in order to enable the Ministry of Health to review the program strategies and to plan for the allocation of resources in relation to the management of chronic pain.

3.2 Specific Objectives

3.2.1 To determine the prevalence of chronic pain among adult Malaysians

3.2.2 To determine the extent to which the pain interfered with the daily activities of chronic pain sufferers.

4. METHODOLOGY

A cross sectional community household survey was conducted throughout Malaysia from April to July 2006. A total of 15,773 living quarters were selected using a two stage stratified random sampling technique.

The survey instrument for the chronic pain module (a sub-module of D2) was a structured questionnaire administered via a face-to-face interview by trained interviewers. All eligible consenting respondents aged 18 years or more were interviewed for this module.

A respondent who did not answer all questions in the module but answered any other module in the questionnaire was treated as missing. A respondent who answered the first question in the chronic pain module was included in the analyses but treated as missing for the subsequent question in the module if he / she did not respond to it.

Chronic pain was defined as "Pain every day or most days for three months", with a recall period of six months prior to the interview. A respondent who answered in the positive would then be asked to rate the level of interference with their daily activities on a five-point scale ("Not at all" to "Extremely"). A responded answering in the negative (No, Don't Know or Refused to Answer) was directed to the next sub-module of D2. There were only two questions in the chronic pain sub-module.

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 communitybased 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
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

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:

Stratum	Population of gazetted areas
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.

4.2.3 Sample size

In the course of sample selection, 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.

4.2.4 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.

4.3 The Questionnaire and Household Interview

4.3.1 The questionnaire

A bi-lingual (Bahasa Malaysia and English) pre-coded questionnaire was designed, pre-tested and piloted prior to the survey.

Certain terminology and items in the questionnaire were also had been made available in the dialects or languages of the main ethnic groups in Malaysia, such as Hokkien and Cantonese for the Chinese and Tamil for the Indians. All versions were back translated to English by independent reviewers to ensure the accuracy of the translations

Self-administered questionnaires were also developed for a sub-sample of household members for questions pertaining to sensitive issues or areas such as sexual behaviour and practices. The self-administered questionnaires were left with the selected household members to be collected by the team members at a later time or day.

4.3.2 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.

For the first part of the interview which covers sections on general household, socio-demographic and economic profile, load of illness, health utilization and consumption cost, a trained non-medical or paramedical interviewer conducted the interviews. Sections pertaining to specific health problems and involving blood or other physical or medical examination was conducted by trained nurses.

4.4 Method of Data Collections

a) The questionnaires

All research topics for the questionnaire are arranged into modules ranging from A to Z. Topics that are similar area are arranged into sub-modules under a particular module. Questions comprised of both close ended and open ended. The questions in each module were tailored to the target group. Two types of questionnaires were developed i.e. face to face and self administered based on the requirements of the research subgroups and the research topics involved.

i) Face to face interview questionnaire

The face to face interview questionnaires consisted of 2 subtypes, i.e., the household questionnaire (orange) to be answered by the head of the household of the LQ selected, and the individual questionnaire, to be answered by each member of the household. Four types of individual FI questionnaires were developed, to cater to the different age groups of less than 2 years old (pink), 2 to less than 13 years old (blue), 13 to less than18 years old (yellow) and 18 years old and above (purple).

For those aged below 13 years old, the child's parents or guardians were responsible for answering on his or her behalf. Those aged 13 years and above are required to answer their respective questionnaires directly through the interview.

All the FI questionnaires have 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.

4.5 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 the month of 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:

a) Testing of the questionnaire
b) Testing of the field logistic preparation
c) Testing of the scouting activities
d) 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 for the data collection were done at two stages, field and central. Please refer to NHMS III protocol for detail 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

a) Chronic pain was defined as "Pain every day, or most days, lasting for 3 months or more." The recall period was 6 months.

b) Pain interference was defined as "pain interfering with your ability to work, study or manage day to day activities" and the levels of interference was "Not at all", "A little bit", "Moderately", "Quite a lot" or "Extremely".

5. FINDINGS

A total of 33,733 adults from 15,733 households answered the questions on chronic pain. The response rate was 97.7%. The demographic characteristics of those surveyed are shown in Appendix: Table 1.

5.1 Prevalence of Chronic Pain

7.7% of females and 6.3% of males reported having chronic pain, with an overall prevalence of 7.1% (CI: 6.7 - 7.4) (Appendix: Table 2). The prevalence increased with increasing age to a maximum of 21.5% in those over 75 years (Appendix: Table 3). Comparing respondents from different ethnic groups (Appendix: Table 4), the highest prevalence was found among Indians [10.5% (CI: 9.3 – 12.0)] and the lowest among Chinese [5.4% (CI: 4.8 – 6.1)] with the prevalence among Malays being close to the national prevalence [7.4% (CI: 7.0 – 7.9)].

The prevalence of chronic pain was also higher in those from the rural [8.3% (CI: 7.7 – 8.9)] areas compared to urban dwellers [6.4% (CI 6.0 – 6.9)], (Appendix: Table 5). The states with the highest prevalence of chronic pain were Kedah and Negeri Sembilan (10.9% and 10.1% respectively) while Penang, WP Kuala Lumpur and Perlis had the lowest prevalence at just over 4.0% (Appendix: Table 6). Prevalence rates were inversely proportional to monthly household income and education levels (Appendix: Tables 7 & 8). With regard to occupation, the highest prevalence was found among the unemployed [12.3% (CI: 11.2 - 13.5)], with those in the "senior official and manager" category as well as clerical workers having the lowest prevalence [4.1% (CI: 2.8 - 6.0)] and 4.0% (CI: 3.1 - 5.1) respectively]. Housewives also had a higher than average prevalence, at 8.9% (CI: 8.2 - 9.6) as did those in Agricultural and Fishery [8.6% (CI: 7.5 - 9.9)]. (Appendix: Table 9)

5.2 Predictors of Chronic Pain

Significant predictors for the presence of chronic pain were age, sex, race, and education level (Appendix: Table 10). The odds ratio for having chronic pain in females compared to males was 1.2. Similarly, those over the age of 75 years were 11 times more likely to have chronic pain than young adults aged 18-24 years. The odds ratio for chronic pain in Malays vs. Chinese and Indians vs. Chinese were 1.7 and 2.5 respectively (Appendix: Table 11).

5.3 Chronic Pain Interfering with Activities

Those with chronic pain were asked how much the pain interfered with their work, study or daily activities. 77.8% of male and 83.8% of female respondents reported interference with their activities (Appendix: Table 12). "Extreme" levels of interference were reported in 7.8% of males and 6.8% of females.

Factors that influenced the level of interference of pain with their activities included age, ethnicity, educational level and monthly household income. In all these categories, those with higher prevalences of chronic pain tended to also have higher levels of interference. For example, 96.2% of those aged 75 years and above reported that chronic pain interfered with their activities, with 13.7% having "extreme" interference, compared with only 75.44% of those in the youngest age group (18 - 24 years) having any interference and 5.6% "extreme" interference.

There was an inverse relationship between level of income and education and level of interference – the lower the monthly household income, and the lower the level of education, the greater the proportion of respondents who reported interference with daily activities. (Appendix: Tables 1 – 2)

5.4 Impact of Co-morbidity

The prevalence of chronic pain in respondents with other chronic diseases - hypertension, diabetes, stroke and heart disease was higher than the overall population prevalence. In those with no co-morbidity, the prevalence of chronic pain was 5.1%, which was lower than the overall prevalence. Those with stroke had the highest prevalence (26.6%), while 17.8%, 15.0% and 13.2% respectively of those with heart disease, diabetes and hypertension had chronic pain (Appendix: Table 17).

Respondents also reported to have been diagnosed as having "backache" and "arthritis". Although there were, as expected, higher prevalences of chronic pain among respondents diagnosed with these painful conditions, only about one third of them reported having *persistent* pain for 3 months or more. Similarly, in those diagnosed as having "migraine" and "cancer" only 12.7% and 14.7% respectively reported having persistent pain for 3 months or more.

5.5 Psychiatric Morbidity

Correlation of chronic pain prevalence with psychiatric morbidity showed that psychiatric morbidity [measured by a General Health Questionnaire 28 (GHQ 28)] score of more than 6) was present in

18.5% (CI: 16.1 - 21.1) of those with chronic pain compared to 10.9% of those without chronic pain (CI: 10.3 - 11.6). Similarly, those with chronic pain had higher mean scores for anxiety and depression and higher prevalences of suicidal ideation (acute and chronic) and insomnia compared to those without chronic pain (Appendix: Table 18).

5.6 Hospitalisation and Out of Pocket Expenditure on Health

In respondents with chronic pain, the proportion of those who had been hospitalised in the last one month was 2.2% compared to 1.1% in those without chronic pain (CI: 1.7-2.8 and 1.1- 1.3 respectively). When respondents were asked about hospitalisation in the last one year, the difference was greater, with 10.1% of those with chronic pain reporting hospitalisation in the last one year while only 4.8% of those without chronic pain were hospitalised. (CI: 8.9 - 11.4 and 4.5 - 5.0 respectively). See Appendix: Table 19. In terms of health expenditure, only data for out of pocket expenditure was available. The mean OOP health expenditure was RM396.17 (CI: 343.49 - 448.84) for those with chronic pain while those without chronic pain had a mean out of pocket expenditure of RM286.21 (CI: 271.94. – 300.49) (Appendix: Table 20).

6. DISCUSSION

The data obtained from the NHMS III shows that 7.1% of adults in Malaysia experience persistent pain lasting 3 months or more. This prevalence is lower than that found in Europe (19.0%, Breivik 2006) and Australia (18.0%, Blyth et al. 2001). The Malaysian prevalence is also lower than that reported from Hong Kong (10.8%, Ng et al. 2002) and Japan (13.0%, Hattori & Takeshima 2004).

The pattern of prevalence in different demographic groups was similar to that reported in other studies, with a higher prevalence among females, older age groups, rural population, lower socioeconomic class, those with lower educational level, and the unemployed. In the 12.0% of unemployed who have chronic pain, it is unclear if the pain is the actual cause of the unemployment, but clinical experience shows that there are many people with chronic pain who are unable to continue working due to the pain.

The different ethnic groups also had different prevalences, with the lowest among the Chinese and the highest among the Malays. This observation is consistent with clinical as well as social observations, where Chinese have a higher pain tolerance compared to the other two ethnic groups. A local study (Zalinawati et al. 2006) of patients visiting local general practitioners and government health clinics (*Klinik Kesihatan W.P.Kuala Lumpur*) also found that the Indians had the highest percentage of patients having pain as a complaint.

A possible reason for the lower prevalence in Malaysia is the age structure of the population where the Malaysian population is a relatively younger population. As the prevalence of chronic pain increases with age, a younger population would result in a lower overall prevalence. If we examine the prevalence in the older adults sampled in the NHMS III, the prevalence rates are more similar to those in the western countries.

Another possible reason for the difference is under-reporting. The prevalence among the Chinese is significantly lower than among the Indians and Malays. Culturally, the Chinese are a more stoical people and it is important for them not to show weakness in public – it is possible that having pain is seen as a sign of weakness, and therefore it is not reported. One of the weaknesses of this survey is that we did not ask for the level of severity of the pain; it is possible that people report pain only if it is moderate to severe and mild pain is ignored, but we cannot ascertain this from the information obtained from the NHMS III.

A third possible reason for a lower prevalence of chronic pain is the definition used – the respondents were asked if they had pain "every day, or most days", that is, pain that was almost continuous. It is possible that our population has intermittent rather than continuous pain, as evidenced by the fact that even in those who had been diagnosed to have back pain and arthritis, only a third reported having chronic persistent pain.

The NHMS III also showed, similar to other studies (Blyth et al. 2001), that those with any kind of chronic disease co-morbidity had higher prevalences of chronic pain compared to the population with no chronic disease. This has important implications for health services – it means that in treating any population with chronic disease, health care providers also have to remember to address the problem of chronic pain. In addition, psychiatric co-morbidity, including general psychiatric morbidity, anxiety and depression is higher in the population with chronic pain and again, this is consistent with findings in other parts of the world (Gujere et al. 1998).

With regard to the level of interference that chronic pain has on daily activities, the percentage of chronic pain sufferers who reported that pain interfered with their activities was much higher than in Australia and in Hong Kong. In New South Wales (Blyth et al. 2001), 68.5% of females and 64.1% of males reported interference with their daily activities, compared with 82.4% of Malaysians. However, the percentage of Australian chronic pain sufferers reporting "extreme" levels of interference with daily activities (10.0%) was slightly higher than in Malaysia (7.2%).

In Hong Kong (Ng et al. 2002) 70.0% of those with chronic pain reported that the pain interfered with their daily life while 38% reported that their work was affected. These findings reinforce the possibility that one of the reasons for a lower overall prevalence of pain in adults in Malaysia is that people only report pain when the levels are more severe and tend to interfere with their lives.

Hospitalisation and expenditure on health for the respondents with chronic pain was also higher than for those without chronic pain – this is consistent with the findings of higher prevalence of chronic pain in the respondents with chronic diseases such as hypertension and diabetes, and again emphasizes the point that our health services need to address all the different aspects in patients with chronic pain rather than a single disease alone.

Chronic pain is now seen as a disease in its own right, which has to be treated aggressively, separately from the underlying condition, if any. Thus, patients with chronic pain need expert services that can best be provided by a Pain specialist in the setting of a multidisciplinary Pain Clinic. Outcomes, especially in terms of improvements in mood and function, have also been shown to be better when multidisciplinary models of management are used, in particular with cognitive behaviour therapy for patients with chronic persistent pain (Nicholas et al. 2006). With regard to prevention of chronic pain, it has now been clearly shown that poor management of acute pain can increase the risk of an individual developing chronic pain; therefore, improving the management of acute pain is another critical step in addressing the problem of chronic persistent pain.

This study has many limitations because of its limited scope. Further study needs to be done to determine the severity of pain suffered, the underlying causes of chronic pain, the types of treatment given for patients with chronic pain and the cost effectiveness of such treatments. In addition, studies looking at the reasons for the differences in prevalence between Malaysia and other countries, as well as to explain the pattern of distribution among the ethnic groups, and between the different states may be needed to give more insight into the problem of chronic pain in Malaysia. More detailed studies are also needed to determine the social and economic impact of chronic pain.

7. CONCLUSION

Overall, this study shows that 7.1% of Malaysians suffer from pain persisting for 3 months or more. Although the prevalence is lower than in the Western countries, this still poses a significant number – almost 900,000. In addition, in the large majority of sufferers, the pain interferes with their daily activities (work and study). Of particular concern are the much higher prevalence rates in the elderly population, and in those with lower household incomes, lower educational levels and the unemployed. These are the most vulnerable groups with the least resources of their own and those who depend most on the government for their health care needs. Therefore, in planning our health services, we need to ensure that the facilities for the expert management of chronic pain is not only in the urban areas and private sector, but also in the rural areas and maintained in the public sector.

The higher prevalence of chronic pain in the presence of co-morbidity is also an area that needs to be addressed in the provision of health services in the Ministry of Health. Furthermore, the higher levels of psychiatric conditions, in particular anxiety and depression, indicates that the problem of chronic pain needs to be addressed specifically in order to improve the mental health of the population. The higher rates of hospitalisation and the higher out-of-pocket expenditure on health in respondents with chronic pain also emphasizes the fact that this population places a heavier burden on the health services and therefore preventive measures should also be looked into.

Patients with chronic pain need expert services that can best be provided by a Pain specialist in the setting of a multidisciplinary Pain Clinic. However, there are currently only 4 trained pain specialists and 5 pain clinics in MOH hospitals. Even if we only consider those in whom the pain interferes "extremely" with their activities, there approximately 64,000 people who need the expert services of a pain specialist and a pain clinic. Thus, the government needs to seriously look into the training of more pain specialists and setting up of more pain clinics in the country. Improving the management of acute pain in the Ministry of Health institutions is another critical step in addressing the problem of chronic persistent pain.

More detailed studies are needed on the nature, severity and cause of the chronic pain, and to determine the reasons for the differences in prevalence between Malaysia and other countries, as well as to explain the pattern of distribution among the ethnic groups, and between the different states. In addition, we need more detailed studies to determine the social and economic impact of chronic pain. Finally, studies on outcomes, not only in terms of pain relief but more importantly, improvements in function and work status should also be carried out including cost-benefit analyses.

8. RECOMMENDATIONS

Increase expert services for patients with chronic persistent pain

a) Set up more Multidisciplinary Pain Clinics in KKM (at least one per state hospital).
   i) Currently 12 pain clinics in Malaysia, 5 in KKM, 4 in Universities, 3 in private hospitals.

Improve management of acute and chronic pain in all KKM hospitals and health centres, including in the rural areas:

a) "Pain as the 5th Vital Sign" – every patient admitted to hospital and health care institutions should have a pain score recorded together with their vital signs. This will make pain more visible and therefore treated earlier and more effectively.

b) Training of primary care specialists in the new concepts of chronic pain and the multimodal, multidisciplinary approach to the management of chronic pain.

c) Make pain more "visible" à Implement "Pain as the 5th Vital Sign", a standard implemented in health care institutions throughout the world initiated by the Joint Commission on the Accreditation of Healthcare Facilities (JCAHO), USA since 2002.

d) Setting up of "Pain management teams" in government clinics (*Klinik Kesihatan*)

e) Training and updates in pain management for doctors at all levels – consultants, specialists, medical officers and housemen.

f) Regular training and awareness raising for nurses and other paramedical staff so that patients with complaints of pain will be attended to appropriately.

Education on chronic pain for doctors in private clinics and hospitals as a Continuing Professional Development (CPD) activity.

Management Protocols and Guidelines on the management of acute, chronic and cancer pain.

Further research;

a) Pattern of chronic pain in Malaysian population

b) Utilisation of health services by chronic pain population

c) Socioeconomic impact of chronic pain (work hours lost, compensation paid, etc)

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APPENDIX

APPENDIX

Table 1: Demographic characteristics of survey population

Sex	
Male	15,106 (44.8%)
Female	18,627 (55.2%)
Age (Mean / Median, Years)	
Male	41.8 / 41
Female	41.5 / 40
Ethnic group	
Malay	18,556 (55.0%)
Chinese	6,854 (20.3%)
Indian	2,775 (8.2%)
Other Bumiputra	3,851 (11.4%)
Others	1,697 (5.0%)

Table 2: Prevalence of chronic pain by sex

Gender	n	N	%	95% CI	
				Lower	Upper
Male	956	352,368	6.3	5.8	6.7
Female	1,450	538,018	7.7	7.3	8.2
Total	2,406	891,179	7.1	6.7	7.4

Table 3: Prevalence of chronic pain by age group

Age group (yrs)	n	%	95% CI	
			Lower	Upper
18 - 24	138	2.5	2.1	3.0
25 - 34	288	4.1	3.6	4.6
35 - 44	402	5.4	4.9	6.0
45 - 54	547	8.3	7.6	9.0
55 - 64	463	11.3	10.3	12.4
65 - 74	378	16.4	14.8	18.2
>=75	188	21.5	18.8	24.4

Table 4: Prevalence of chronic pain by ethnic group

Ethnic group	n	%	95% CI	
			Lower	Upper
Malays	1,392	7.4	7.0	7.9
Chinese	371	5.4	4.8	6.1
Indian	295	10.5	9.3	12.0
Other bumis	284	7.3	6.4	8.4
Others	64	3.8	2.9	4.8

Table 5: Prevalence of chronic pain by locality (urban / rural)

Locality	N	%	95% CI	
			Lower	Upper
Urban	1,273	6.4	6.0	6.9
Rural	1,131	8.3	7.7	8.9

Table 6: Prevalence of chronic pain by state

State	n	%	95% CI	
			Lower	Upper
Johor	278	7.2	6.0	8.5
Kedah	280	10.9	9.5	12.5
Kelantan	127	6.5	5.3	7.9
Melaka	56	6.4	4.6	8.9
N.Sembilan	127	10.2	8.5	12.1
Pahang	101	5.5	4.4	6.8
Pulau Pinang	89	4.2	3.4	5.3
Perak	186	7.1	6.0	8.5
Perlis	14	4.2	2.7	6.7
Selangor	514	8.6	7.7	9.6
Terengganu	82	5.9	4.6	7.4
Sabah	243	6.2	5.4	7.1
Sarawak	192	6.5	5.4	7.7
W.P Kuala Lumpur	81	4.2	3.3	5.4
W.P Labuan	36	6.6	4.4	9.7

Table 7: Prevalence of chronic pain by education level

Education	n	%	95% CI	
			Lower	Upper
None	505	14.1	12.9	15.5
Primary	953	8.7	8.2	9.3
Secondary	796	5.1	4.7	5.5
Tertiary	130	3.9	3.3	4.7
Unclassified	22	7.7	5.0	11.6

Table 8: Prevalence of chronic pain by monthly household income

Monthly Household Income	n	%	95% CI	
			Lower	Upper
Less than RM 400	299	10.4	9.1	11.8
RM 400 - RM 699	436	8.9	8.1	9.9
RM 700 - RM 999	275	7.2	6.4	8.2
RM 1000 - RM 1999	579	6.5	5.9	7.1
RM 2000 - RM 2999	330	6.4	5.7	7.2
RM 3000 - RM 3999	145	5.6	4.7	6.6
RM 4000 - RM 4999	86	6.5	5.1	8.3
RM 5000 & above	150	5.3	4.5	6.3
Unclassified	106	7.5	6.2	9.2

Table 9: Prevalence of chronic pain by occupation

Occupation	n	%	95% CI	
			Lower	Upper
Senior Official & Manager	26	4.1	2.8	6.0
Professionals	117	5.2	4.3	6.3
Technical & Associate	142	5.4	4.6	6.3
Clerical Workers	72	4.0	3.1	5.1
Service Workers & Shop	333	6.0	5.4	6.7
Skilled Agricultural & Fishery	229	8.6	7.5	9.9
Craft & Related Trade Workers	107	5.5	4.5	6.7
Plant & Machine Operator &Assembler	99	5.6	4.5	6.8
Elementary Occupations	82	5.3	4.2	6.5
Housewife	710	8.9	8.2	9.6
Unemployed	420	12.3	11.2	13.5
Unclassified	67	4.2	3.2	5.4

Table 10: Significant predictors for persistent pain lasting for 3 months or more

Source	Tests of Model Effects			
	df1	df2	Wald F	Sig.
(Corrected Model)	15	2,133	58.45	0.00
(Intercept)	1	2,147	3070.74	0.00
Gender	1	2,147	19.44	0.00
Age group	6	2,142	68.09	0.00
Education	3	2,145	6.14	0.00
Race	4	2,144	25.07	0.00
Residence	1	2,147	2.270	0.13

Dependent Variable: s32 (reference category = Yes)
Model: (Intercept), gender, age group, education, race group, residence

Table 11: Odds Ratios for chronic pain

		Odds Ratio	95% CI	
			Lower	Upper
Gender	Female vs. Male	1.2	1.1	1.3
Age	65-74 vs. 18-24	8.1	6.5	10.2
	>=75 vs. 18-24	11.2	8.7	14.4
Education	None vs. Tertiary	4.0	3.2	5.0
Race	Malays vs. Chinese	1.7	1.5	1.9
	Indian vs. Chinese	2.5	2.1	3.0
Residence	Urban vs. Rural	0.9	0.8	1.0
Monthly household income	Less than RM 400 vs. RM 5000 & above	2.067	1.7	2.6

Table 12: Pain interfering with work / study / daily activities

Level of interference	Male			Female			All		
	%	Lower	Upper	%	Lower	Upper	%	Lower	Upper
Not at all	22.2	19.5	25.3	16.2	14.3	18.3	18.6	16.9	20.4
A little bit	37.0	33.9	40.2	40.9	38.3	43.5	39.4	37.4	41.4
Moderately	24.0	21.2	27.1	26.2	23.9	28.6	25.3	23.5	27.2
Quite a lot	8.9	7.2	11.0	10.0	8.5	11.5	9.6	8.4	10.9
Extremely	7.8	6.3	9.7	6.8	5.4	8.3	7.2	6.2	8.3

Table 13: Pain interfering with work / study / daily activities by age group

Age group (years)	Responses	%	95% CI		n	N
			Lower	Upper		
18-24	Not at all	24.6	17.6	33.1	32	12,063
	A little bit	44.0	35.8	52.4	57	21,605
	Moderately	17.1	11.5	24.7	23	8,397
	Quite a lot	8.7	4.9	15.0	12	4,296
	Extremely	5.6	2.8	11.0	8	2,764
25-34	Not at all	26.9	21.9	32.6	76	29,034
	A little bit	42.2	36.5	48.2	121	45,491
	Moderately	20.2	15.8	25.4	56	21,721
	Quite a lot	5.9	3.6	9.5	16	6,372
	Extremely	4.8	2.9	7.8	15	5,146
35-44	Not at all	19.9	16.1	24.3	77	28,809
	A little bit	40.1	35.3	45.1	155	57,917
	Moderately	26.8	22.5	31.6	107	38,781
	Quite a lot	7.3	5.1	10.4	29	10,604
	Extremely	5.8	3.8	8.8	23	8,443
45-54	Not at all	19.9	16.7	23.5	104	39,869
	A little bit	40.5	36.4	44.8	222	81,171
	Moderately	23.7	20.2	27.5	129	47,470
	Quite a lot	9.4	7.3	12.1	52	18,859
	Extremely	6.5	4.7	8.9	36	12,994
55-64	Not at all	18.7	15.1	22.8	83	31,746
	A little bit	38.2	33.8	42.9	174	65,044
	Moderately	25.9	21.8	30.3	118	44,004
	Quite a lot	9.2	6.9	12.3	43	15,703
	Extremely	8.0	5.9	10.9	37	13,618
65-74	Not at all	13.7	10.5	17.7	50	18,572
	A little bit	38.0	33.2	43.0	137	51,576
	Moderately	28.1	23.6	32.9	107	38,099
	Quite a lot	12.5	9.4	16.3	47	16,911
	Extremely	7.8	5.5	11.1	30	10,650
>=75	Not at all	3.8	1.8	7.8	7	2,521
	A little bit	32.6	26.3	39.6	60	21,680
	Moderately	33.5	27.0	40.6	61	22,246
	Quite a lot	16.4	11.7	22.6	30	10,919
	Extremely	13.7	9.5	19.4	26	9,133

Table 14: Pain interfering with work / study / daily activities by ethnicity

Ethnicity	Responses	%	95% CI		n	N
			Lower	Upper		
Malays	Not at all	21.1	18.9	23.5	279	104,825
	A little bit	35.8	33.3	38.5	483	178,028
	Moderately	24.8	22.4	27.3	340	123,142
	Quite a lot	10.4	8.9	12.2	145	51,633
	Extremely	7.9	6.5	9.4	111	39,002
Chinese	Not at all	18.0	14.1	22.8	65	26,357
	A little bit	44.9	39.5	50.4	165	65,583
	Moderately	23.6	19.5	28.4	86	34,527
	Quite a lot	8.3	5.8	11.8	30	12,097
	Extremely	5.2	3.3	8.2	19	7,608
Indian	Not at all	12.7	9.1	17.6	37	14,869
	A little bit	36.2	30.8	42.0	105	42,243
	Moderately	31.4	26.1	37.3	95	36,641
	Quite a lot	10.3	7.3	14.5	30	12,071
	Extremely	9.3	6.2	13.6	28	10,824
Other Bumis	Not at all	12.6	8.9	17.4	34	11,662
	A little bit	50.2	44.4	56.1	141	46,633
	Moderately	24.4	19.7	29.8	69	22,615
	Quite a lot	7.4	4.9	11.0	21	6,870
	Extremely	5.4	3.4	8.5	16	5,022
Others	Not at all	21.5	13.0	33.4	14	4,901
	A little bit	52.7	40.1	65.0	32	11,999
	Moderately	20.1	11.9	31.9	13	4,587
	Quite a lot	4.4	1.4	12.7	3	992
	Extremely	1.3	0.2	8.6	1	292

Table 15: Pain interfering with work / study / daily activities by education level

Education	Responses	%	95% CI		n	N
			Lower	Upper		
None	Not at all	8.0	5.8	11.0	38	14,189
	A little bit	39.1	34.7	43.8	192	69,124
	Moderately	29.9	25.9	34.1	150	52,746
	Quite a lot	15.2	12.1	18.8	75	26,756
	Extremely	7.8	5.7	10.5	40	13,773
Primary	Not at all	18.8	16.3	21.5	174	64,916
	A little bit	39.7	36.4	43.0	372	137,213
	Moderately	25.1	22.3	28.1	239	86,929
	Quite a lot	8.9	7.2	11.0	85	30,883
	Extremely	7.5	6.0	9.4	72	25,944
Secondary	Not at all	23.5	20.6	26.8	182	69,277
	A little bit	39.2	35.8	42.7	303	115,475
	Moderately	22.3	19.5	25.4	173	65,740
	Quite a lot	8.2	6.4	10.3	64	24,064
	Extremely	6.8	5.2	8.8	55	19,930
Tertiary	Not at all	25.9	19.3	33.9	32	13,184
	A little bit	40.7	32.5	49.5	53	20,718
	Moderately	24.8	18.2	32.9	32	12,630
	Quite a lot	3.9	1.6	9.0	5	1,961
	Extremely	4.7	2.1	10.1	6	2,373

Table 16: Pain interfering with work / study / daily activities by household income

Household Income	Responses	%	95% CI		n	N
			Lower	Upper		
Less than RM 400	Not at all	11.2	7.9	15.5	33	11,610
	A little bit	36.5	31.1	42.2	106	37,939
	Moderately	34.5	28.9	40.4	101	35,856
	Quite a lot	11.2	8.1	15.3	34	11,669
	Extremely	6.7	4.4	10.2	20	6,997
RM 400 - RM 699	Not at all	16.0	12.7	19.9	66	24,214
	A little bit	39.6	34.9	44.4	169	59,931
	Moderately	23.0	19.4	27.0	101	34,773
	Quite a lot	11.8	9.0	15.3	51	17,869
	Extremely	9.7	7.3	12.8	42	14,666
RM 700 - RM 999	Not at all	15.5	11.8	20.1	43	15,243
	A little bit	41.5	35.6	47.5	112	40,808
	Moderately	24.3	19.5	29.9	66	23,924
	Quite a lot	9.7	6.7	14.0	25	9,578
	Extremely	9.0	5.9	13.6	25	8,891
RM 1000 - RM 1999	Not at all	21.5	17.9	25.6	120	45,206
	A little bit	38.7	34.5	43.0	219	81,296
	Moderately	24.6	21.1	28.5	141	51,750
	Quite a lot	9.5	7.3	12.3	54	19,925
	Extremely	5.7	4.1	7.9	34	11,978
RM 2000 - RM 2999	Not at all	21.6	17.4	26.6	69	27,126
	A little bit	39.5	34.6	44.6	130	49,468
	Moderately	24.2	19.8	29.3	79	30,341
	Quite a lot	7.8	5.3	11.3	27	9,788
	Extremely	6.9	4.6	10.1	23	8,603
RM 3000 - RM 3999	Not at all	21.9	15.2	30.5	29	11,646
	A little bit	40.4	31.7	49.7	54	21,463
	Moderately	27.0	20.0	35.4	37	14,368
	Quite a lot	6.6	3.5	12.3	9	3,519
	Extremely	4.1	1.8	8.9	6	2,177
RM 4000 - RM 4999	Not at all	27.0	18.9	37.0	23	8,753
	A little bit	43.7	34.1	53.8	37	14,165
	Moderately	26.2	17.8	36.6	21	8,488
	Quite a lot	3.2	1.0	9.4	3	1,035
RM 5000 & above	Not at all	23.1	16.7	31.1	33	13,943
	A little bit	39.3	32.1	47.0	58	23,694
	Moderately	21.0	15.1	28.4	31	12,656
	Quite a lot	8.9	5.3	14.6	13	5,370
	Extremely	7.7	4.2	13.7	12	4,647
Unclassified	Not at all	12.3	7.4	19.7	13	4,875
	A little bit	39.6	30.1	50.0	41	15,721
	Moderately	23.6	16.3	32.9	26	9,356
	Quite a lot	12.4	7.2	20.4	13	4,912
	Extremely	12.1	7.1	19.8	13	4,789

Table 17: Prevalence of persistent pain in those with co-morbidity (chronic disease)

Co-morbidity	%	95% CI		n
		Lower	Upper	
Diagnosed as having hypertension	13.2	12.2	14.3	589
Diagnosed as having diabetes	15.0	13.6	16.6	328
Diagnosed as having Stroke	26.6	19.7	34.8	36
Diagnosed as having kidney failure	13.6	9.0	20.1	20
Diagnosed as having heart disease	17.8	14.9	21.1	110
Diagnosed as having Arthritis	35.6	31.1	40.3	149
Diagnosed as having backache	32.3	24.8	40.7	44
Diagnosed as having migraine	12.7	9.6	16.5	45
Diagnosed as having cancer	14.7	9.8	21.5	24
No chronic disease	5.1	4.8	5.5	1,349

Table 18: Psychiatric morbidity in respondents with and without chronic pain

			95% CI	
		Prevalence	Lower	Upper
Psychiatric Morbidity (GHQ 28 >6)	No chronic pain	10.9	10.3	11.6
	Chronic pain	18.5	16.1	21.1
Insomnia	No chronic pain	13.8	13.2	14.5
	Chronic pain	20.0	17.6	22.6
Suicidal Ideation (Acute)	No chronic pain	25.2	24.5	25.9
	Chronic pain	29.1	26.4	31.9
Suicidal Ideation (Chronic)	No chronic pain	6.2	5.8	6.6
	Chronic pain	8.3	6.7	10.2
		Mean score		
Anxiety	No chronic pain	3.1	3.0	3.2
	Chronic pain	4.1	3.8	4.4
Depression	No chronic pain	1.1	1.1	1.2
	Chronic pain	1.5	1.3	1.6

Table 18: Psychiatric morbidity in respondents with and without chronic pain

		Prevalence %	95% CI	
			Lower	Upper
Hospitalised in last one month	Chronic pain	2.2%	1.7%	2.8%
	No chronic pain	1.1%	1.0%	1.2%
Hospitalised in last one year	Chronic pain	10.1%	8.9%	11.4%
	No chronic pain	4.8%	4.5%	5.0%

Table 20: Out of pocket expenditure on Health in respondents with and without chronic pain

	Mean Out of pocket expenditure (RM)	95% CI	
		Lower	Upper
Chronic pain	396.17	343.49	448.84
No chronic pain	286.21	271.94	300.49