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NHMS 2020

NATIONAL HEALTH & MORBIDITY SURVEY

COMMUNICABLE DISEASES

Volume I

iku INSTITUTE FOR PUBLIC HEALTH @NIH

KEMENTERIAN KESIHATAN MALAYSIA

IPTK Institut Penyelidikan Tingkahlaku Kesihatan @NIH

National Health and Morbidity Survey (NHMS) 2020 : Communicable Diseases Volume I

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The views expressed in this report are those of the authors alone and do not necessarily represent the opinions of other investigators participating in the survey, nor the views or policy of the Ministry of Health Malaysia.

Message From

THE DIRECTOR-GENERAL OF HEALTH MALAYSIA

The National Health and Morbidity Survey (NHMS) is a national level community study that has been conducted by the Institute for Public Health since 1986. The wealth of data that the NHMS provides are essential and instrumental in monitoring and evaluating programmes conducted by the Ministry of Health. The NHMS has consistently gone beyond providing up-to-date epidemiological data on key diseases and risk factors, as they are the benchmark in reflecting our laborious progress towards achieving global commitments of the Sustainable Development Goals (SDG) indicators.

Many issues concerning infectious diseases continue to pose a threat to the country. COVID-19 virus infection is an important example of how an infectious disease can devastate a community, burdening the health care system and economy of the country. On the other hand, incidence rates of Dengue, Hepatitis B & C, and TB continues to increase. Emerging diseases such as dog-mediated human Rabies has caused us to lose our eradication status. Misuse of antibiotics has led to anti-microbial resistance that threatens the effective treatment of an ever-increasing range of infections. Nevertheless, we have successfully achieved zero locally transmitted human Malaria in advance. Hence, improving public knowledge is vital in the control and management of infectious diseases.

Interestingly, it was during the COVID-19 pandemic that the NHMS 2020 became the first NHMS that focused primarily on Infectious Diseases, which were the COVID-19 virus infections, Hepatitis B & C, HIV, Tuberculosis, Antibiotic Use & Anti-Microbial Resistance, Malaria, Dengue, and dog associated zoonotic disease. I am confident the accumulated data will assist policymakers, program managers, and stakeholders in enhancing Infectious Diseases programs and strategies for our country.

The NHMS 2020 report is an outcome of collaborations between various organisations such as the Institute for Health Behavioural Research (IHBR), Institute for Medical Research (IMR), and experts from universities and other agencies. My heartiest congratulations to all collaborators as I hope that the comprehensive implementation of this report will benefit many parties in the future.

Ultimately, this survey will not be successful without the gracious support from the state health departments for their endless contributions, including providing logistics reinforcements and human resources. I wish to express my deepest gratitude to all the State Health Directors and their team members for their immeasurable support. My commendation also goes to the survey team from the Institute for Public Health and Institute for Health Behavioural Research for the successful completion of this valuable survey. Thank you to all the agencies involved for their support and cooperation throughout the process. Last but not least, my heartfelt appreciation to all the respondents for their cooperation in this survey, and I urge everyone to join hands towards creating a healthier Malaysia. The results from this survey are imperative as evidence-based and will be used to support and formulate appropriate initiatives for the control and prevention of communicable diseases activities in Malaysia.

YBHG. TAN SRI DATO' SERI DR NOOR HISHAM BIN ABDULLAH
DIRECTOR GENERAL OF HEALTH MALAYSIA
CHAIRMAN OF NHMS STEERING COMMITTEE
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Table of CONTENTS

VOLUME I

ACKNOWLEDGEMENTS

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The National Health and Morbidity Survey 2020, was accomplished with funding supported by the National Institutes of Health, Ministry of Health Malaysia. Technical advice was from the Advisory Panel and Steering Committee, consisting of executives and experts from both inside and outside the Ministry of Health. The authors would like to express our sincere thanks to them.

Our sincere gratitude also goes to the Department of Statistics Malaysia for their assistance in the sampling and preparation of data collection. The authors thank all the State Health Directors, all State Liaison Officers and District Health Officers who have been instrumental in mobilizing resources during the scouting and data collection phase.

We also extend our gratitude to all personnel in Institute for Public Health and Institute for Health Behavioural Research for their support in carrying out this survey.

The authors also thank all parties who assisted in the implementation of the survey, from the Central Committee Team, Field Supervisors, Team Leaders, Data Collectors and Drivers, without whom the survey would not have been a success. Finally, our sincere appreciation is extended to all respondents who had participated in and contributed their valuable time and precious information to the survey. It is our hope that these findings will help program leaders and policymakers to better run the communicable diseases programs and other services available to the people of Malaysia.

LIST OF TABLES

LIST OF TABLES

LIST OF TABLES

LIST OF FIGURES

Executive Summary

The National Health and Morbidity Survey (NHMS) is conducted to collect community data for the Ministry of Health Malaysia to review the country's health policies and priorities. The NHMS 2020 had focused on communicable disease scopes such as COVID-19 virus infection, hepatitis B and C, HIV knowledge and stigma, tuberculosis, antibiotic use and antimicrobial resistance, malaria, dengue fever, and dog-mediated human rabies. The NHMS 2020 was a cross-sectional survey that employed a complex survey design with a two-stage stratified cluster random sampling. The sampling is nationally representative and covers the entire population of Malaysia residing in non-institutionalized living quarters units. A total of 113 enumeration blocks (EBs) were chosen from all states in Malaysia, including the federal territories.

In order to reduce contact time with respondents, the NHMS 2020 data collection process was implemented into two phases. Scouting was conducted prior to data collection to ascertain information about household members. The survey included all respondents aged one year and older. The first phase of data collection took place by appointment at the data collection centre. Trained research assistants conducted face-to-face interviews, and respondents were assisted in administering sensitive self-administered questionnaires (SAQs) using validated questionnaires. Blood samples were drawn from respondents and tested for the presence of COVID-19 antibodies, as well as hepatitis B and C infections, by nurses or medical assistants. Blood test results were provided to everyone, while respondents with positive results were counselled and referred to nearby government health clinics. During phase I, a postal survey was conducted with respondents who were given the Cognitive, Affective, and Behaviour (CAB) booklet while scouting. Completed booklets were returned to the data collection team by mail or in person at the data collection centre.

Phase II data collection included interview-typed questionnaires via Computer-assisted Telephone Interview (CATI). Respondents aged 13 years and older were contacted and interviewed by trained research assistants in the CATI operation room at the Institute for Public Health (IPH), National Institutes of Health (NIH). The CATI operated seven days a week from 8.00 a.m. to 10.00 p.m. daily to improve the participation rate.

Data were analysed using a complex survey data analysis procedure that included weighting to obtain population estimates. This survey included 5,957 individuals aged one year and older and 1,876 living quarters, yielding an overall response rate of 77.9%. The total response rate for CAB postal survey was 73.6%, while the CATI survey had a total response rate of 51.2%.

Findings from the seroprevalence survey

This survey was conducted post-second wave of COVID-19 in the country. Approximately 0.6% of an estimated 191,279 Malaysians had been infected with COVID-19 based on the presence of the SARS-CoV-2 antibodies. However, only 4 in 5 individuals who developed SARS-CoV-2 antibodies had developed neutralising antibodies.

Malaysia is aiming to eradicate viral hepatitis by 2030. The survey discovered a seroprevalence of HBsAg of 1.7% among those aged 15 years and over, with an estimated 396,960 people currently infected with hepatitis B. Additionally, the survey found that 1.4% of an estimated 331,639 Malaysian residents were undiagnosed for hepatitis B, and about 1.5% had chronic hepatitis B. In Malaysia, the prevalence of hepatitis C was 0.4% among adults aged 15 years and over, with an estimated 90,120 cases. While 0.2%, or an estimated 51,675 individuals, were currently infected with hepatitis C.

Tuberculosis (TB) continues to be a major public health issue in Malaysia. Numerous efforts are being made to ensure that the target of ending the TB epidemic by 2030 is achievable. Estimating the TB burden using TB symptoms screening questionaries from a nationwide survey will allow for the detection of more people with TB-like symptoms. According to the survey, 2.5% of Malaysian residents aged 15 years and over reported having TB-like symptoms in 2020.

Findings from the scope of knowledge & behaviour on communicable disease prevention

Both knowledge and behaviour regarding disease prevention are critical components of ensuring the community's long-term prevention of infectious diseases. According to this survey, 22.6% of Malaysian residents aged 13 years and over had adequate HIV knowledge. Malaysian residents also had a high level of stigma towards people living with HIV (PLHIV). Around 78.7% of Malaysian adults aged 15 to 49 reported having a discriminatory attitude towards PLHIV.

Antibiotic misuse results in antimicrobial resistance (AMR), which jeopardises the effective prevention and treatment of an ever-growing variety of bacterial infections. AMR awareness was still low in Malaysia, with only 21.5% of 15 years old Malaysian residents having heard of it. The findings could have been a reflection of how Malaysian residents use antibiotics. According to the survey, 25% of Malaysian residents have taken antibiotics in the last year, and 34.4% of them did not complete the prescribed dosage.

Human-transmitted Malaria has been declared eradicated in Malaysia. To ensure the long-term eradication of malaria in Malaysia, education and awareness about the disease and its prevention are critical. In NHMS 2020, 76% of adults aged 15 years and over had heard of malaria. Despite having heard of malaria, only 24.1% were aware of its symptoms, 34% were aware that certain activities posed a risk of infection, 53.9% were aware of malaria transmission, and 59.7% were aware of how to prevent malaria infection.

ACRONYMS AND ABBREVIATIONS

AMR - Antimicrobial Resistance

ART - Antiretroviral Therapy

CAB - Cognitive, Affective and Behaviour

CATI - Computer-assisted Telephone Interview

CCT - Central Committee Team

CDC - Communicable Disease Control

DOSM - Department of Statistics, Malaysia

EB - Enumeration Block

ELISA - Enzyme-linked Immunosorbent Assay

GSDIW - Global Stigma and Discrimination Indicator Working Group

GTS - Global Technical Strategy for Malaria

HBV - Hepatitis B Virus Infection

HCV - Hepatitis C Virus Infection

IPH - Institute for Public Health

LO - Liaison Officer

LQ - Living Quarter

MOH - Ministry of Health Malaysia

NIH - National Institutes of Health

NIP - National Immunisation Program

OCR - Optical Character Recognition

PLHIV - People Living with HIV

PPE - Personal Protective Equipment

RA - Research Assistant

RSE - Relative Standard Error

RTK - Rapid Test Kit

RT-PCR - Reverse-Transcriptase Polymerase Chain Reaction

SAQ - Self-administered Questionnaire

SCS - Survey Creation System

SDG - Sustainable Development Goal

SOP - Standard Operating Procedure

sVNT - Surrogate Virus Neutralization Test

UNGASS - United Nations General Assembly Special Session

UNIAIDS - Joint United Nations Programme on HIV/AIDS

WHO - World Health Organization

Introduction

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1.1 Background

The National Health and Morbidity Survey (NHMS) is a population-based survey that has been implemented since 1986. Since 2011, the NHMS has been conducted annually in four-year cycles with the aim of supplementing routinely available data to the Ministry of Health Malaysia (MOH) on the patterns of health problems, health needs, and expenditure among the Malaysian population. The NHMS 2020 was the first national survey in the country that mainly focused on communicable diseases.

Globally, the burden of communicable diseases has decreased significantly in the past decades. However, in recent years, the emergence and re-emergence of infectious diseases pose a serious threat to global health. Rapid and uncontrolled urbanisation has contributed to the emergence of novel infectious diseases as a result of human exposure to disease vectors and reservoirs [1]. The resurgence of infectious diseases has been documented globally, and can be attributed to urban congestion, urban poor, illegal immigration and deteriorating water and sanitation infrastructure [1]. Increased travel has accelerated the spread of infections by introducing diseases to previously eradicated areas. In addition, the increased access to antibiotics for treating infections have resulted in the excessive usage of antibiotics that have accelerated antibiotic resistance. Furthermore, stigmatization and the lack of knowledge of certain infectious diseases like HIV and Ebola have also hampered the effectiveness of communicable diseases prevention and control. Vaccine hesitancy and the stigmatization associated with health-seeking further contribute to the emergence and re-emergence of infectious diseases.

Approximately 75% of all viral hepatitis cases in Malaysia are attributed to hepatitis B virus infection (HBV) while chronic HBV accounts for more than 80% of the hepatocellular carcinoma cases in Malaysia [2]. Malaysia has been classified as a country with intermediate endemicity, with an estimated prevalence of HBsAg ranging from 5% to 7% [2,3]. The incidence rate of HBV has increased

over the last five years, from 11.5 per 100,000 population in 2013 to 15.4 per 100,000 population in 2017 [4]. Similarly, it was noted that the prevalence of hepatitis C virus infection (HCV) was 2.5%, with an estimated 453,700 people living with hepatitis C infection in Malaysia [5]. The burden of HCV infection is expected to increase in the coming decades unless effective measures to detect and treat infected individuals in the community are implemented.

In Malaysia, tuberculosis (TB) is the infectious disease that has caused the highest number of deaths in Malaysia and continues to be a national public health concern [6]. Over the last five years, the reported incidence rate increased slightly from 79.45 cases per 100,000 population in 2015 to 80.88 cases per 100,000 population in 2019 [7,8]. Efforts to eliminate TB by targeting a 50% reduction in the incidence rate by 2025 is required to achieve the milestone of end TB strategy by 2030. Hence, screening for TB-like symptoms in the community is critical for early case detection and appropriate treatment in order to prevent TB disease in the Malaysian population.

Human immunodeficiency virus (HIV) infection has not been completely eliminated despite declining trends over the years. In the past, HIV-related behaviour was mostly confined to intravenous drug users (IDUs) [9]. However, recently, men having sex with men (MSM) have emerged as the primary high-risk population in Malaysia for HIV infections [9]. Knowledge and awareness on HIV transmission are critical for preventing infection. Widespread misconceptions about HIV transmission have resulted in the increased risk of infections.

Similarly, reducing HIV-related stigma against People Living with HIV (PLHIV) is critical to ensuring a higher quality of life for them [10]. Stigmatization towards HIV also obstructs access to counselling and testing services for anyone at risk of contracting HIV. Reducing HIV stigmatization would significantly contribute to the country's successful implementation of HIV prevention and control programmes.

Zoonotic diseases have been identified as a new threat to communities where humans and animals coexist. Human rabies has recently resurfaced in Malaysia following its eradication. Disease outbreaks due to pets have become more prevalent, as more sporadic zoonotic cases have been reported in Malaysia. The US Centre for Communicable Disease Control (USCDC) declared alert level 2 (rabies infectious areas) in three divisions of Sarawak in August 2017 in response to the recent human rabies epidemic in the state [11]. Although there have been no reported cases of human rabies transmitted by dogs in Peninsular Malaysia, there have been cases reported of canine rabies, which poses a risk of human infection [12]. Knowledge and awareness of the transmission and reservoirs for pet-related disease, are critical in preventing the disease spread in the community.

Despite numerous efforts to control mosquito-borne diseases, dengue fever remains an important public health problem in Malaysia. Dengue fever has risen to become the number one threat in recent years, with an incidence rate of 397.71 cases per 100,000 population in 2019 [8]. In contrast, the incidence of malaria has decreased over time, with the disease being concentrated in a few endemic

areas [13]. Understanding mosquito-borne diseases is critical in increasing the efficacy of control measures. Community awareness and effective control measures for malaria will help prevent the spread of the disease. This will result in the aim of having zero human malaria cases in Malaysia.

This report included a new scope in response to the current COVID-19 pandemic situation in 2020. The extent of asymptomatic or subclinical COVID-19 infections in the population is unknown due to underdiagnosis during the pandemic. A serosurvey conducted using archived serum samples from a hospital in Klang Valley produced an estimate of the COVID-19 infection rates in the country's most populous region [14]. However, the study used convenient sampling and could not estimate the actual burden of COVID-19 infection in the Malaysian population. Thus, a community-based COVID-19 seroprevalence survey will quantify the true extent of COVID-19 infection in Malaysia.

With the rising trends and high prevalence of communicable diseases and their risk factors, the time has come for the first national communicable disease population survey. This survey would provide an evidence-based estimate of the actual burden of communicable diseases in the Malaysian population. Findings in this survey would allow to track progress toward disease elimination, and evaluate existing health programmes aimed at mitigating communicable diseases in Malaysia.

1.2 Rationale of the Study

This national survey would collect population-based health data on the burden of disease and the population's attitudes toward disease prevention in Malaysia. This includes seroprevalence data for specific diseases such as HBV, HCV, and COVID-19 virus infection, which would significantly improve case management and prevent disease transmission in a population. Information on communicable disease awareness would provide critical information for developing effective disease prevention and control programmes. This study is necessary for the development of evidence-based policies and programmes, as well as for tracking the country's progress toward national goals and global commitments. Findings from this study could inform policy decisions and programme interventions aimed at achieving the Sustainable Development Goals (SDGs) target. Most importantly, the information gathered would provide a more complete picture of the population's health status based on the current MOH strategies.

1.3 Scope of the Survey

NHMS 2020 is the first NHMS to focus exclusively on topics related to communicable diseases. Stakeholders and programme managers from the Disease Control Division, State Health Departments, and Economic Planning Unit provided suggestions and feedback. Since 2018, several discussions and engagements with stakeholders have taken place to discuss the suggested topics, which have been prioritised and shortlisted. These suggestions were then compiled and discussed at the institutional level, and final selections for all scopes were made in accordance with the NHMS survey criteria. The NHMS's scopes were determined using the following criteria:

1. Relatively high prevalence, currently or in future,
2. Focusing on diseases/disorders associated with affluence, lifestyle, environment and demographic changes,
3. Causing significant physical, mental or social disability,
4. Have important economic implications,
5. Information not available through routine monitoring system or other sources,
6. Feasibility of implementing the intervention,
7. Information more appropriately obtained through a nationwide community survey,
8. Feasibility of obtaining information through a nationwide community survey.

The NHMS Steering Committee, chaired by the Director-General of Health, approved the final shortlisted scopes. NHMS 2020 included the following ten scopes:

1. COVID-19 virus infection
2. Hepatitis B (HBV)
3. Hepatitis C (HCV)
4. TB-like symptoms
5. Antibiotic use & Antimicrobial resistance (AMR)
6. HIV knowledge
7. HIV stigma
8. Malaria
9. Dengue prevention practice (CAB)
10. Dog-mediated zoonotic diseases (CAB)

1.4 Survey Objectives

1.4.1 General Objective

This survey aims to provide health-related community-based data and information to the Ministry of Health Malaysia to review health priorities, program strategies, and activities, and to plan allocation of resources for the communicable disease prevention and control program in Malaysia.

1.4.2 Specific Objectives

The specific objectives of the NHMS 2020 are as follows:

To estimate the prevalence related to:

a. SARS-CoV-2 antibody
b. Hepatitis B (HBsAg and Anti-HBs)
c. Hepatitis C (Anti-HCV and HCV Core Antigen)
d. HIV Knowledge and stigma
e. Knowledge on antibiotic resistance
f. Awareness of malaria and its prevention
g. Attitude and practice on dengue prevention*
h. Cognitive, affective and behaviour on dog-mediated human rabies*

*Note: Detail methodology is described in Volume II for the Cognitive, Affective and Behavioural (CAB) scope.

2. Methodology

2.1 Target Population

The NHMS 2020 is a cross-sectional survey with a complex survey design. The sample represents the entire population aged one year and above residing in non-institutionalized living quarters (LQ) units in Malaysia, regardless of citizenship. The survey excluded individuals residing in institutional LQs such as hotels, hostels, hospitals, prisons, boarding houses, and nursing homes.

2.2 Sampling Frame

Prior to the sampling process, the sampling frame for this survey was updated in 2020 and provided by the Malaysian Department of Statistics (DOSM). Malaysia's geographical area is divided into Enumeration Blocks (EBs), with each EB classified as urban or rural by the DOSM. An urban area is defined as one with a combined population of 10,000 or more, whereas a rural area is defined as one with a combined population of less than 10,000. According to DOSM, Malaysia has over 90,000 EBs. Each EB typically contains between 80 and 120 LQs and has between 500 and 600 people.

2.3 Sample size determination

The sample size was calculated using a single proportion formula for the estimation of prevalence.

$$n_{SRS} \geq \frac{z^2_{\alpha/2} P(1-P)}{e^2}$$

The sample size was calculated for each objective and was finalized according to the criteria as follows:

a. The prevalence with the largest sample size required was for Hepatitis C: 2.5% [5],
b. Margin of error (e) between 0.00125 (HCV) to 0.05,
c. Confidence interval of 95%

Few adjustments were made to ensure an optimum sample size:

a. Adjusted for a finite population (Based on 2020 projected population)

$$n \geq \frac{n_{SRS}}{1+\frac{n_{SRS}}{N}}$$

b. Adjusted for the design effect (deff), where n(complex)= n(srs)*deff
c. Adjusted the n(complex) taking into account expected non-response rates of 50%, considering for blood taking via venepuncture procedure, n(adj)=n(complex)* (1+non-response rate).

Further sample size adjustments were made based on the analysis's requirements, including whether the prevalence estimate was at the national, urban, or rural level, or by age group. After adjustment, 2,260 LQs were chosen from 113 EBs with an estimated 5,000 respondents. Samples were allocated proportionately to states, urban and rural, based on population size. Thus, more samples were allocated to states with larger population sizes, such as Selangor, Johor, Sabah, and Sarawak. A lesser number of samples were allocated to states with smaller population sizes, such as Perlis, Melaka, and Wilayah Persekutuan Putrajaya **(Table I)**.

Table I: Distribution of samples by states and strata, NHMS 2020

Zone	State	Enumeration Block			Living Quarters		
		Urban	Rural	Total	Urban	Rural	Total
South	Johor	5	5	10	100	100	200
	Melaka	3	1	4	60	20	80
	Negeri Sembilan	3	3	6	60	60	120
Central	Selangor	12	4	16	240	80	320
	WP Kuala Lumpur	6	0	6	120	0	120
	WP Putrajaya	1	0	1	20	0	20
North	Perak	4	4	8	80	80	160
	Pulau Pinang	2	1	3	40	20	60
	Kedah	3	4	7	60	80	140
	Perlis	1	1	2	20	20	40
East Coast	Kelantan	3	4	7	60	80	140
	Terengganu	3	2	5	60	40	100
	Pahang	5	3	8	100	60	160
Borneo	Sabah & Labuan	6	7	13	120	140	260
	Sarawak	8	9	17	160	180	340
Total		**65**	**48**	**113**	**1,300**	**960**	**2,260**

2.4 Sampling Design

This survey used a two-stage stratified random sampling technique to ensure national representativeness. The primary stratum is composed of all states in Malaysia including the Federal Territories, and the secondary stratum is composed of urban and rural strata within the primary stratum. The sampling procedure consisted of two stages, with the primary sampling unit (PSU) being the enumeration blocks (EBs) and the secondary sampling unit (SSU) being the living quarters (LQs) within each sampled EB (SSU). DOSM randomly selected the PSU and SSU based on the required sample size. A total of 113 EBs were chosen from all Malaysian EBs; 83 EBs were chosen for Peninsular Malaysia, 13 for Sabah, and 17 for Sarawak. Twenty LQs were chosen at random from each of the selected EBs, and the survey included,

- all eligible households within the selected LQs, and
- all household members aged one year and older.

3. Ethics Approval

The Medical Research and Ethics Committee of the Ministry of Health Malaysia approved the NHMS 2020 methodology, protocol, and procedures. The survey was registered with the National Medical Research Registry as NMRR-19-867-47973.

3.1 Consent & Assent

Prior to each interview, respondents were informed of the study's purpose, procedure, and methods. Additionally, all respondents received a 'Study Information Sheet' **(Annex B)** outlining the benefits and potential risks of participating in this survey. All respondents were asked to complete and sign a consent form for adults and an assent form for children and adolescents upon agreeing to participate in the survey.

4. Survey Materials

4.1 Questionnaire

Structured questionnaires were used to collect data based on the survey scopes. Two types of questionnaires were used: face-to-face interviews and self-administered questionnaires (SAQ). A validated questionnaire in two languages (Bahasa Melayu and English) was used for the face-to-face interview, along with a questionnaire manual and codebook for the data collectors. **Table II** summarises the questionnaires and procedures used by age group. Each chapter of the module briefly discusses the survey questionnaire used, the types of questionnaires, and the development and interpretation of the scoring method.

5. Pre-test

Pre-testing, including cognitive debriefing, was conducted to ensure that all questionnaires and instruments for NHMS 2020 were reliable and valid for use in the local context during data collection. Any instruments derived from an original English instrument were cross-culturally adapted and translated into Bahasa Melayu. All head modules received pre-test training, and the pre-test was conducted in January 2020 with 30 respondents from each module. This pre-test drew a total of 300 respondents. The research team members recorded and discussed the feedback. Based on the feedback, the questionnaire's wording and translations were revised.

6. Pilot Study

A pilot study was conducted in July 2020 to investigate whether the blood collection process, instruments, and standard operating procedures (SOPs) were suitable and feasible before going ahead with the actual survey. Amidst the COVID-19 pandemic, the pilot study enabled the core team to determine the appropriateness of the disease prevention measures during the actual data collection process. All field standard operating procedures and instruments were revised and modified according to the findings of the pilot study. All findings were documented, and their feasibility was determined.

NATIONAL HEALTH & MORBIDITY SURVEY (NHMS) 2020
COMMUNICABLE DISEASES (VOLUME I)

Table II: Questionnaires used in NHMS 2020 (Communicable Disease)

#	Topic	Tool/ Reference	Method	Procedure	Age
1	Household questionnaire	Standard NHMS questionnaire	Face-to-face interview	-	≥ 1 year old
2	Home & Environment	Adopted from the Demographic Health Survey (DHS)	Face-to-face interview	-	≥ 1 year old
3	COVID-19 virus Infection	COVID-19 Seroprevalence UNITY study (WHO)	Face-to-face interview	Blood collection	≥ 1 year old
4	Hepatitis B	Hepatitis (NHANES, CDC)	Face-to-face interview	Blood collection	≥ 15 years old
5	Hepatitis C	Hepatitis (NHANES, CDC)	Face-to-face interview	Blood collection	≥ 15 years old
6	Tuberculosis	TB-like-symptoms screening questionnaire (NHMS 2015)	[a]CATI	-	≥ 15 years old
7	Antibiotic use and awareness on AMR	Antibiotics Resistance Public Awareness Survey (WHO)	[a]CATI	-	≥ 15 years old
8	Malaria	Malaria Indicator Survey, MIS (DHS)	[a]CATI	-	≥ 15 years old
9	HIV Knowledge	UNGASS Indicator	[a]CATI	-	≥ 13 years old
10	HIV Stigma	Validated GSDIW Malay Version	[b]SAQ	-	≥ 13 years old
11	Dengue prevention	CAB-IPTK-DQ	[c]SAQ	-	≥ 13 years old
12	Zoonotic Infections from Pets at home	CAB-IPTK-ZDQ	[c]SAQ	-	≥ 13 years old

Notes:

[a]CATI: Computer-assisted telephone interview was done during phase II

[b]SAQ: Self-administered questionnaire was done on-site at the data collection centre

[c]SAQ: Self-administered questionnaire via postal survey

7. Publicity and Media Coverage

Publicity campaigns are critical for increasing the participation rate of all household members in the selected LQs across the country. Its purpose was to increase public awareness of the survey's purpose and activities. A dedicated NHMS webpage was created to include detailed information about the survey's purpose, activities, locations, and frequently asked questions (FAQs).

The NHMS 2020 publicity team provided ‘Media Kits’ for the state liaison officers (LOs), central field supervisors (CFSs), and field supervisors (FSs) to serve as a reference for publicity and the NHMS campaign. The media kit contained public relations ethics and guidelines for conducting the campaign and utilising media for publicity. The NHMS 2020 used various platforms, including pamphlets, posters, buntings, banners, and a 'Study Information Sheet,' to inform the public about the survey.

For media distribution, press releases in Bahasa Melayu and English were prepared. The publicity team collaborated closely with the MOH's Corporate Communication Unit, particularly in scheduling interviews with mass media channels such as television and radio. Additionally, the media releases were shared with the state LO for distribution in the local newspapers and mass media. The state LOs and FSs used the media kit to distribute public service announcements in the survey's residential areas and to brief the village chieftain or district police chief on the study. The NHMS 2020 campaign actively utilised social media platforms such as Facebook and Instagram to ensure the NHMS 2020 campaign reached a wider audience.

Printed publicity materials were created in four major languages (Bahasa Melayu, English, Mandarin and Tamil) to ensure that the message reached out to the community’s diverse ethnic groups. Additionally, Bahasa Iban was added to all publicity materials for the people in Sarawak. A research team from IPH, IBHR, or state LO conducted numerous interviews and media reporting about the NHMS 2020 on radio and television.

The publicity team for NHMS 2020 helped educate the community about the survey with substantial information about the NHMS teams. All data collectors' profiles were publicly available on the NHMS website. Anyone who accessed the webpage would be aware that the survey was conducted by legitimate data collectors. NHMS 2020 promotional materials and media coverage are listed in **Annex C**.

8. Field Data Collection

8.1 Field Preparation and Logistic Support

To assist with data collection activities, the State Communicable Disease Control (CDC) Officers were appointed as liaison officers (LOs). The LOs promoted and disseminated information about the survey to all relevant officers at the State Health Department, District Health offices, and relevant agencies. Throughout the survey period, all State Health Departments assisted the survey team by providing nurses and medical assistants to assist with the blood collection procedure. Additionally, the LOs aided the survey team by providing temporary storage and acquiring necessary field survey supplies.

All survey materials were procured in advance of the survey. Each team received a list of survey materials and a box of survey kits. Apart from that, each team received publicity materials, scouting materials, hard copies of the questionnaires as backups, and SAQ questionnaires for use in the survey.

8.2 Training

8.2.1 Field Data Collection Training

Separate data collection training sessions were conducted for Peninsular Malaysia and Borneo teams. Training for the Borneo team was conducted from 2nd August to 6th August 2020, with a total of four teams comprised six field supervisors and twenty data collectors. While training for the Peninsular Malaysia teams took place from 8th August to 12th August 2020; eight teams comprised sixteen field supervisors and thirty-two research assistants. Each team consisted of one field supervisor, one phlebotomist (either nurse or medical assistant), three data collectors and one driver. All field supervisors and research assistants received extensive training on the survey's background, scouting process, fieldwork flow and procedures, and questionnaires used in this survey. Furthermore, data collectors received training in administering questionnaires via tablet, managing quality control, and handling biospecimens on-site. Additionally, they were trained on a technique that aided respondents in responding to the sensitive questionnaires.

8.2.2 Nurses and Medical Assistants Training

Earlier, on 27th July 2020, training was conducted for nurses and medical assistants on the biospecimen collection and interpretation of the Wondfo SARS-CoV-2 antibody rapid test kit (RTK) for COVID-19 antibody testing.

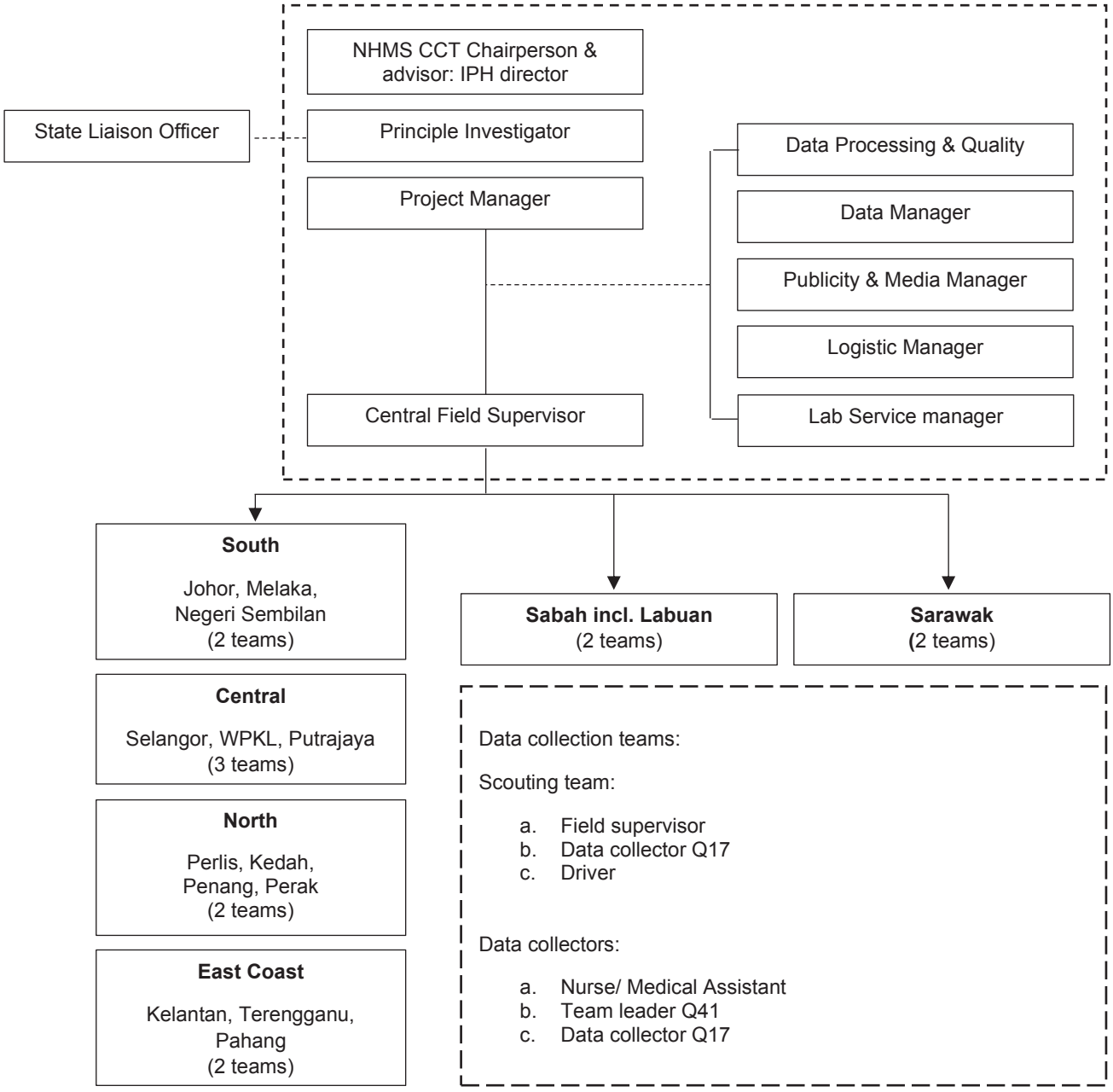

Figure 1: Field implementation for NHMS 2020 survey

8.3 Scouting & Appointment

Prior to data collection, the field supervisors and research assistants scouted survey areas and briefed the community leaders about the survey. The scout team collected information about household members at selected LQs, updated in-lists as needed, and tagged each selected LQ with a card. Additionally, the field supervisor explained the survey purpose and procedures involved to the head of the household. After consenting to participate, the survey team scheduled an appointment at the data collection centre for an interview and blood draw.

To ensure coverage and a high response rate, survey teams attempted to contact the head of the household of the locked LQ at least three times. The invitation letter, study brochure, and contact information of the field supervisor were all left in the mailbox. The household was considered non-responsive if the survey team was unable to contact the LQ household members. Numerous other factors have contributed to the survey's failure at the household level, such as vacant LQs or building units that were not LQs, i.e., converted into a store, shop, or LQ that was temporarily renovated, all of which were considered ineligible for the survey.

8.4 Eligible Respondents

The survey included all household members aged one year and older who resided in the selected LQ during the data collection period. The study excluded individuals who stayed in the LQ for a brief period, such as a homestay or transit, or who did not permanently reside in the LQ, as well as those who reported a contraindication to venepuncture.

8.5 Field Data Collection

Due to the COVID-19 pandemic, the household survey was strictly prohibited. Therefore, the data collection process was divided into two stages. **Figure 2** details the NHMS 2020 data collection activities.

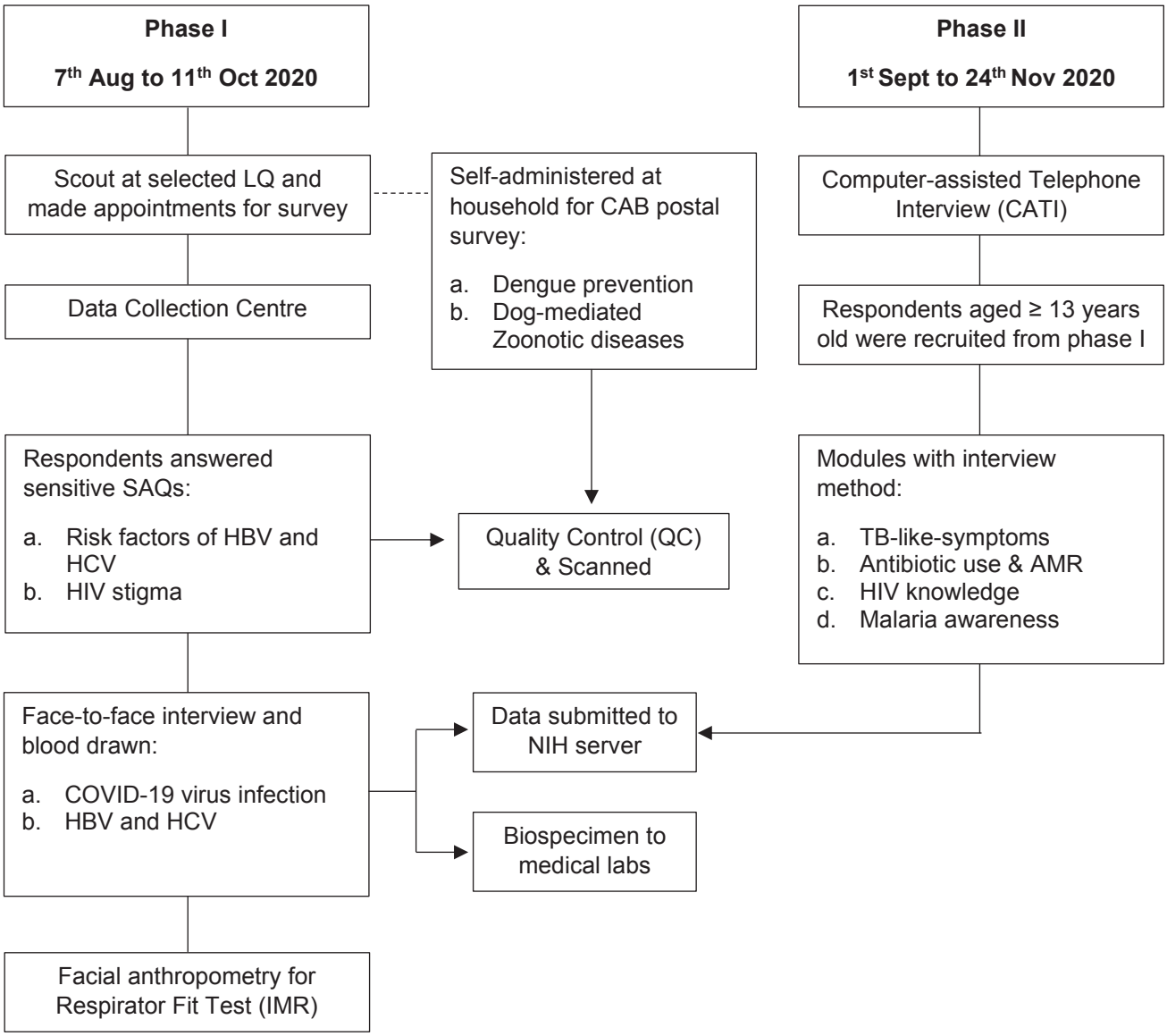

Figure 2: NHMS 2020 Survey overview

8.5.1 Data Collection at Data Collection Centre

The first phase of data collection took place from 7th August to 11th October at the data collection centre for each of the selected EB sites **(Annex D)**. Data collection was scheduled to avoid overcrowding at the data collection centre. Only three to four households with children aged one year and older were interviewed daily. All respondents were briefed about the study's purpose, risks, and benefits during registration, and consented adults were required to sign the consent form. Minors were required to sign an assent form and obtain parental or guardian approval to participate in the survey.

During the interview, respondents were asked about their health status, exposures and sign and symptoms related to COVID-19, HBV and HCV infections. Minors, particularly younger children, were interviewed via proxy by their parent or guardian. Respondents aged 13 years and older were asked to complete a sensitive SAQ about HIV stigma, while those aged 15 years and older were also asked to complete a sensitive SAQ about risk factors for HBV and HCV infections. Blood was also drawn via venepuncture from all respondents, and two drops of blood were tested for RTK COVID-19 antibody testing. Respondents who completed the survey at the data collection centre received RM 30.00 as a token of appreciation for their time and travel to the data collection centre.

Ineligible individuals were part of the reason for an unsuccessful survey. Non-response individuals were also considered unsuccessful, i.e., uncontactable individuals, did not attend the data collection centre, refused to participate, or faced a language barrier.

8.5.2 NHMS Central Committee Meeting

The NHMS Central Committee Team (CCT) was formed to monitor fieldwork activities and survey progress. The CCT held weekly meetings which was chaired by the Director of IPH. The CCT collected fieldwork data from the data monitoring dashboard. All field supervisors logged and updated their fieldwork activities daily on the monitoring dashboard. The central field supervisors monitored fieldwork progress and reported to the CCT weekly. Additionally, the CCT discussed and resolved issues relating to data and response rates, field activity problems, and logistical issues. **Figure 1** details the CCT and field organisation.

8.6 Biospecimen Collection & Testing

Trained nurses or medical assistants at the data collection centre drew venous blood from all eligible respondents aged one year and older. **Table III** provides a detailed description of the blood sample volumes.

Table III: Total volume of blood samples taken from respondents according to age groups

#	Age category	Volume (ml)	Approximate
1.	Children aged 1 to 7 years old	3.5	3/4 teaspoon
2.	Children aged 8 to 14 years old	5	One teaspoon
3.	≥ 15 years old	10	Two teaspoons

Two drops of blood were pipetted and tested for total antibody tests using the Wondfo SARS-CoV-2 antibody test to ensure immediate control measures against COVID-19 infection at the blood collection centre. The results were analysed by a trained nurse or medical assistant and were available within 15 minutes. A physician immediately consulted respondents who received positive results at the nearest health clinic.

All blood samples were stored in tubes and labelled with a unique barcode at the data collection centre. Subsequently, all blood samples were centrifuged on-site to ensure their stability. Blood samples were temporarily stored in a chiller box at 4° C to 8° C. A Thermologger was installed in the chiller box to monitor the temperature and ensure it was correctly maintained. All samples had to be delivered to the IPH within 48 hours. All tubes were inspected for quality upon arrival and then registered in the lab system for subsequent laboratory testing. All blood specimens were tested for COVID-19 virus infection. However, respondents age 15 years and older were further tested for HBV and HCV testing.

8.7 Laboratory Testing

COVID-19 antibodies were tested in all samples using the Wantai SARS-CoV-2 total antibody enzyme-linked immunosorbent assay (ELISA). Positive total antibody results were confirmed using the GenScript SARS-CoV-2 Surrogate Virus Neutralization Test (sVNT). All samples for COVID-19 testing were analysed at the Virology Unit, Institute for Medical Research. Additional five millilitres of venous blood were collected in plain tubes and sent to an accredited private medical laboratory for HBV and HCV testing. All samples were tested for HBV using the Chemiluminescent Microparticle Immunoassay (The Architect HBsAg Qualitative II Assay). Anti-HBs were tested using the Alinity I anti-HBs assay, while the anti-HBc IgM and anti-HBc total were tested using the Architect for anti-HBc IgM and anti-HBc Total.

Also, for Hepatitis C testing, all samples were tested for Anti-HCV (Architect Anti-HCV). To ascertain current infection, samples with positive anti-HCV tests were further tested for the HCV core antigen (Architect HCV Ag). As part of the accreditation requirements, quality control was performed to ensure the precision and accuracy of the test results. **Table IV** contains information about laboratory testing and respondent eligibility.

Table IV: Serological markers for laboratory testing

#	Disease	Age	Serological Marker
1.	COVID-19 virus infection	≥ 1	SARS-CoV-2 Total antibody SARS-CoV-2 surrogate virus neutralizing antibody (sVNT)
2.	Hepatitis B	≥ 15	Hepatitis B surface antigen (HBsAg) Hepatitis B surface antibody (Anti-HBs) Total hepatitis B core antibody (Anti-HBc) IgM antibody to hepatitis B core antigen (IgM anti-HBc)
3.	Hepatitis C	≥ 15	Antibody to HCV (Anti-HCV) HCV Core Antigen

8.8 Case Notification and Management

A medical officer evaluated all test results and were confirmed by a pathologist. The NHMS secretariat established a list of all confirmed cases and notified each LO, primarily the State CDC officer, of all positive cases for further case investigation and management.

Respondents who received positive lab results were contacted and informed of their status. All results were kept strictly confidential, and no family members or other third parties had access to the data. On the other hand, positive test results for minors aged 1 to 17 years were communicated to their parents or guardians. Each of them was given a referral letter advising them to seek additional medical evaluation and assessment at the nearest government health clinic.

Negative results were also communicated to respondents, and their laboratory results were mailed to them. The NHMS secretariat established a hotline for all respondents seeking clarification on the status of their lab results, and counselled those who received positive results.

8.9 Prevention of COVID-19 virus infection during data collection

All personnel involved in the data collection process received infection prevention and control training, with a special emphasis on standard contact and droplet precautions. Additionally, they received training on proper hand hygiene, proper use of personal protective equipment (PPE), including the proper use of surgical masks and visors to minimise the risk of infection during data collection. Strict precautions were taken to avoid infection with COVID-19, including the following:

- COVID-19 virus screening was conducted on all field personnel, including trainers, field supervisors, and data collectors, to ensure they were not infected with the virus. At baseline and post-survey, each participant was required to declare their health status and a nasopharyngeal swab was collected and tested for reverse-transcriptase polymerase chain reaction (RT-PCR) or antigen RTK.
- A nasopharyngeal swab was tested for antigen RTK every two weeks.
- Appointments were required for data collection to avoid overcrowding at the data collection centre.
- All data collectors were required to wear complete PPE, including face masks, visors, aprons, and gloves.
- Social distancing and a one-way movement flow from entering to exiting was enforced at the data collection centre.
- The environment at the data collection centre was configured to prevent any transmission of infection. For additional information, please refer to the NHMS 2020: Field Data Collection Manual.

9. Data Collection via Computer-assisted Telephone Interview (CATI)

To prevent direct interaction with respondents throughout the survey period, the second phase was done via CATI from 7th September to 23rd October at the Institute for Public Health, National Institutes of Health Setia Alam, Selangor.

9.1 Training

From 1st to 4th September 2020, data collection training was conducted for seven CATI supervisors and eleven research assistants. The training covered CATI operational activities and CATI interviews for each of the four modules, which included Tuberculosis, Antibiotic use, HIV Knowledge, and Malaria.

9.2 Data Collection

Data collection took place at the CATI operation room from 1st September to 23rd October 2020, at the Survey Research Centre, IPH. The CATI survey consisted of four modules, with all questionnaires pretested and validated before data collection. All eligible respondents aged 13 years and older who consented to participate in the first phase survey were contacted for the phone interview. Interviews were conducted by ten trained research assistants who were fluent in Bahasa Melayu, English, and other Malaysian dialects. Data collection activities were scheduled from 8:00 a.m. to 5:00 p.m. and from 1.00 p.m. to 10:00 p.m. Throughout the data collection period, seven CATI supervisors rotated weekly to supervise and assist the research assistants. The CATI data collection process is illustrated in **Figure 3**. Unsuccessful CATI surveys were attributed to respondents who hung up the phone, did not answer phone calls, incorrect phone numbers, a phone number that was no longer in service, or individuals who refused to participate or faced a language barrier.

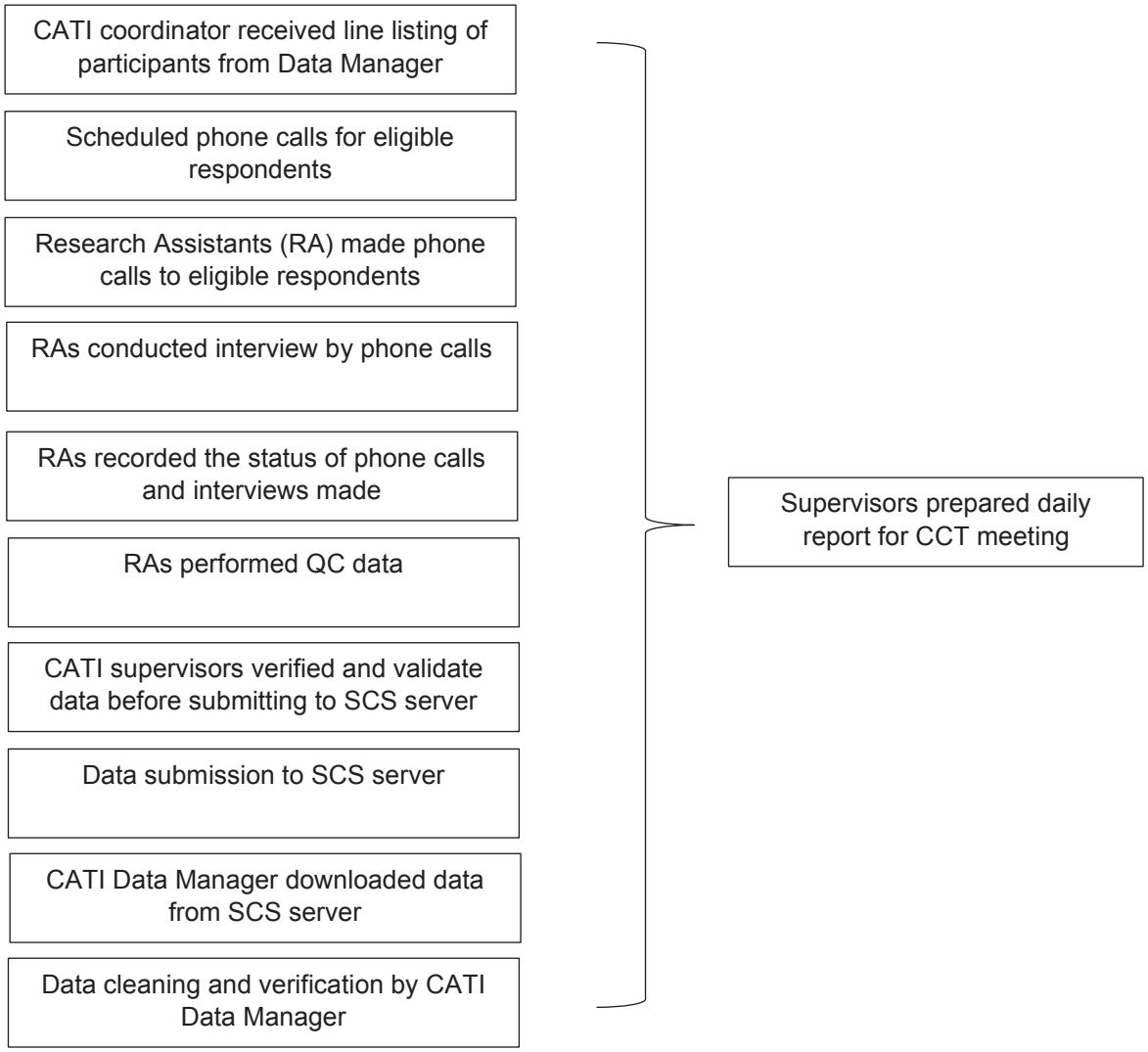

Figure 3: Overview activities for data collection and processing for CATI

10. Data Management and Quality Control

10.1 Data Processing and Quality Control

Several data collection methods necessitated multiple data processing procedures during this survey **(Figure 4)**.

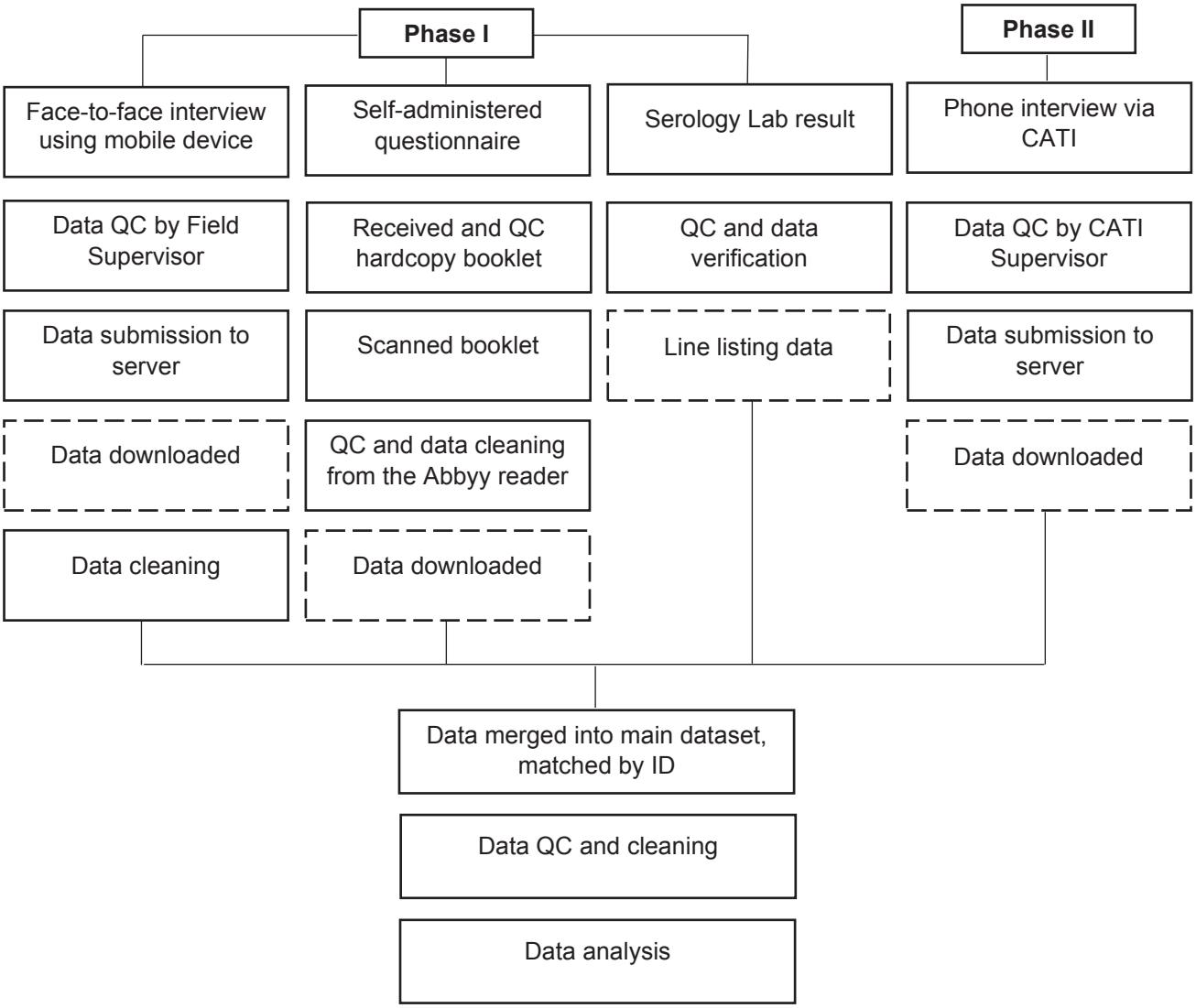

Figure 4: Data capturing methods and data processing of NHMS 2020

10.1.1 Data Processing and Quality for Phase I

a. Face-to-face interviews were conducted by data collection teams using mobile tablet devices and a questionnaire system application with built-in quality controls. The field supervisor verified the data on-site and uploaded the completed interview to the NIH's Survey Creation System (SCS) server. Field supervisors cross-checked critical variables such as the respondent's ID and age against the scouting and registration forms. The central data manager downloaded data from the server each day and conducted preliminary data analysis.

b. Respondents completed SAQs and each SAQ was sealed in an envelope. The field supervisors verified the completeness, respondents' ID, and valid age of all SAQs for each module. Then all SAQs were compiled onto an EB bundle. All EB bundles were delivered to the Data Processing and Quality Control unit (Scanning unit) for secondary data quality control. After quality control, all SAQs were scanned using the Optical Character Recognition (OCR) method on the Abbyy scanning reader. The data was then verified again in the Abbyy data capture software to ensure that all data was captured completely and logically. All data was compiled and saved in an Excel spreadsheet **(Figure 5)**.

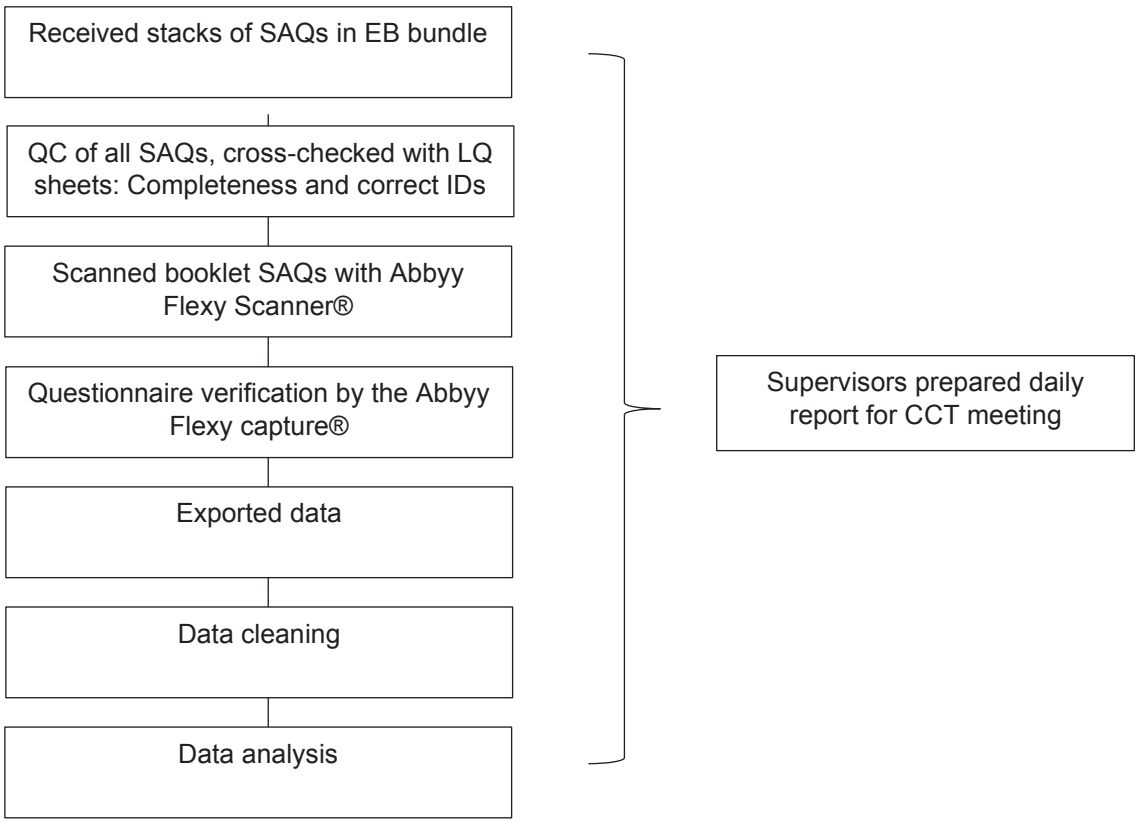

Figure 5: Overview data processing in scanning operation

c. Testing of biospecimens was carried out at two laboratories. The raw data were entered into an Excel spreadsheet along with the respondent's barcode ID. Quality of the data was ensured by checking for missing values, valid field ranges, inliers, and outliers. Additionally, the IMR virologists verified all results to ensure the accuracy of serological results reported.

10.1.2 Data Processing and Quality for Phase II (CATI)

Phase two interviews were done entirely via CATI, which resulted in the entry of all data into the SCS. Prior to submitting data to the NIH server online, CATI supervisors verified all data. Each week, the CATI data manager downloaded and analysed data from the server.

10.1.3 Data QC at Central

The data manager at the central level downloaded data from the NIH server on a daily basis and performed data quality control on the NHMS 2020 data. The data manager used descriptive statistics to examine the distribution and frequencies of the data in order to identify outliers, inliers, and incorrect data. Critical variables such as the respondent's ID were compared to the survey frame's in-list. Additionally, the respondent's age was checked and verified to ensure the respondents had answered the correct modules. In addition, the data manager also verified the completeness, accuracy, and validity of the information captured. All data discrepancies were verified and clarified by field supervisors, and where possible, corrected.

10.2 Data Confidentiality

Individual data was kept strictly confidential at all stages of the survey. The research team members were not given any information about individuals' names or identification numbers. When data was merged or analysed, the study ID was used to identify the study subjects. Datasets were saved and kept safe in a password-protected environment. The identities of the respondents were not revealed in any reports and were kept private in publications.

10.3 Sample Weights

The weight results were used to make important inferences about the prevalence of communicable diseases in the Malaysian population. NHMS 2020 incorporated a variety of survey methods. As a result, sample weights were calculated independently for each survey method, such as phase one for data collection at the data collection centre, phase one for the CAB postal survey, and phase two for the CATI survey. Weighing samples was performed in collaboration with the Biostatistics and Data Repository Sector, NIH. A weighing factor was calculated and applied to each individual to account for the varying probabilities of selection (design weight), non-response rate, and post-stratification weight, all of which were adjusted for the Malaysian population projections according to DOSM 2020. The following formula was used to estimate the weight:

$$\mathbf{W_{final} = W_1 \times W_2 \times F \times PS}$$

W_1 = the inverse of probability of selecting the EBs

W_2 = the inverse probability of selecting the LQ within selected EB

F = the non-response adjustment factor for individual and LQ

PS = a post-stratification adjustment factor calculated by gender, strata, age and ethnicity

10.4 Data Management & Analysis

The data manager pre-cleaned and merged all datasets. Data was stored securely, and backups were performed regularly to ensure data remained current. The data was distributed to all module heads and data analysts within each module. The team members then cleaned the data according to the terms and working definitions developed by each module's research group. SPSS Version 23.0 was used to analyse the data. The data were analysed using a complex sample analysis with weights to obtain population estimates. The survey results were expressed as prevalence with 95% confidence intervals, taking the design effect, unweighted counts, and estimated population into account. The data analysts double-checked and verified each output. In this survey, a relative standard error (RSE) of less than 35% is considered acceptable, and data with large RSEs have been suppressed in all statistical tables due to small counts.

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General Findings

1.1 Field Data Collection

1.1.1 Response Rate: Living Quarters

The scouting activity resulted in the visitation of 2,260 LQs from a list of frames provided by the DOSM. This survey included a total of 2,104 LQs. Following scouting, the remaining 156 LQs were deemed ineligible for this survey for a variety of reasons, including: no longer being a LQ where the building unit has been converted into a store, homestay, or shop, a LQ that no longer exists, has collapsed and been repaired, and no one resides in the particular LQ. In this survey, 1,876 LQ (89.2%) were successfully recruited **(Table V)**.

1.1.2 Response Rate: Individuals

All respondents aged 1-year-old and above living in the selected LQ were eligible for this survey. From the scouting activity, 6,818 individuals were eligible for this survey. However, only 5,957 respondents (87.4%) participated in this survey **(Table V)**. Therefore, the total response rate for the NHMS 2020 survey was 77.9%.

Definition for Eligibility

a. Any LQ:
   - LQ that was successfully recruited during the actual survey, AND
   - LQ that refused, AND
   - LQ that was locked during scouting prior to the actual survey.

b. Any individuals:
   - Individuals who participated in the survey and completed at least one module, AND
   - Individuals that refused to participate, AND
   - Individuals who lived in the LQ during scouting, however, the individual could not be reached or not at home during scouting prior to the actual survey.

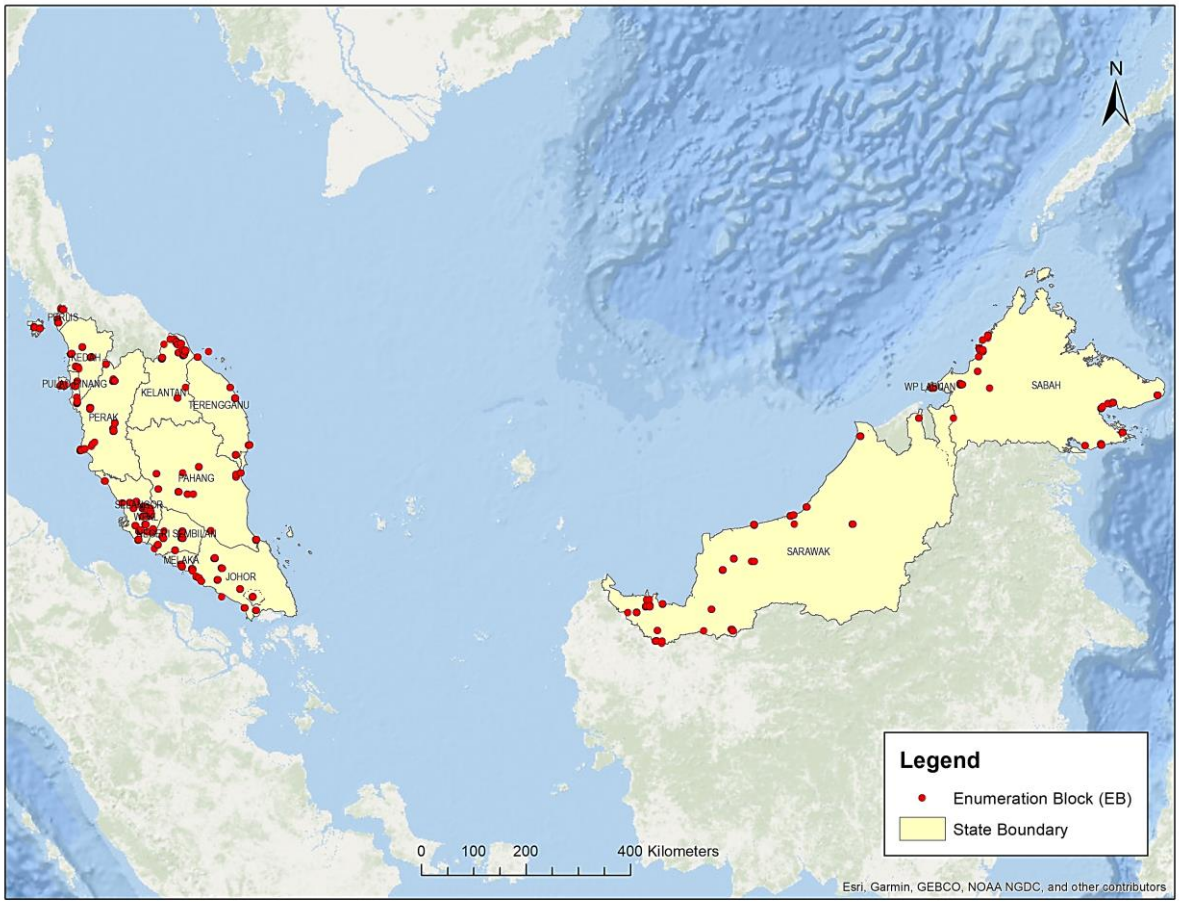
Table V: NHMS 2020 Response rate

State	Living Quarters (LQ)			Individual			Total Response Rate (%)
	Eligible	Interviewed	Response Rate (%)	Eligible	Interviewed	Response Rate (%)	
Johor	192	179	93.2	587	546	93.0	86.7
Kedah	137	130	94.9	472	432	91.5	86.9
Kelantan	131	121	92.4	451	392	86.9	80.3
Melaka	80	77	96.3	242	222	91.7	88.3
Negeri Sembilan	120	119	99.2	378	363	96.0	95.2
Pahang	140	104	74.3	346	280	80.9	60.1
Pulau Pinang	59	53	89.8	189	173	91.5	82.2
Perak	150	140	93.3	432	376	87.0	81.2
Perlis	38	38	100.0	130	127	97.7	97.7
Selangor	291	240	82.5	902	723	80.2	66.1
Terengganu	87	73	83.9	292	251	85.9	72.1
Sabah	222	193	86.9	924	766	82.9	72.1
Sarawak	317	285	89.9	1,009	889	88.1	79.2
WP Kuala Lumpur	104	93	89.4	337	300	89.0	79.6
WP Labuan	20	17	85.0	82	78	95.1	80.9
WP Putrajaya	16	14	87.5	45	39	86.7	75.8
MALAYSIA	**2,104**	**1,876**	**89.2**	**6,818**	**5,957**	**87.4**	**77.9**

1.2 Basic characteristics of survey respondents

Figure 6 details the sampling distribution of 1,876 living quarters that were successfully interviewed during the survey. The sociodemographic characteristics of the sample of 5,364 respondents who were successfully interviewed at the data collection centre are summarised in **Table VI**. A total of 5,364 respondents, 54.1% lived in urban areas, 70.8% lived in Peninsular Malaysia, and 52.3% were female. The highest percentage was observed by age group in those aged 20 to 29 (15.2%), while those aged 70 and older were the lowest (4.5%). Malaysian citizens made up 93% of survey respondents. Malay (62.3%) were the most numerous ethnic groups, followed by other Bumiputera (17.5%), Chinese (8.2%), other ethnicities (7.1%), and Indian (4.9%). Married respondents accounted for 56.0%, while 36.3% were single, and 7.6% were widowers or divorcees. For education level, 37.5% of respondents had secondary education, 31.2% had primary education, 19.6% had tertiary education, and 11.7% had no formal education.

The analysis included respondents aged 15 and older who were 26.7% employed in the private sector, 19.4% unpaid worker, including homemakers or caregivers, 17.8% unemployed, including those with health problems, adolescents, and retirees, 16.2% self-employed, 11% students, and 8.9% government employees.



Courtesy of En. Mohd Hazrin Bin Hasim@Hahim, Survey Research Center, IKU

Figure 6: Location of the selected enumeration blocks (EBs), NHMS 2020

Table VI: Sociodemographic characteristics of sample, NHMS 2020

Sociodemographic Characteristics	Unweighted Count	Percentage (%)
MALAYSIA	5,364	100.0
Location		
Urban	2,901	54.1
Rural	2,463	45.9
Zone Categories		
Peninsular Malaysia	3,798	70.8
Sabah & Labuan	776	14.5
Sarawak	790	14.7
Sex		
Male	2,556	47.7
Female	2,808	52.3
Age Group		
1 – 9	656	12.2
10 – 19	992	18.5
20 – 29	814	15.2
30 – 39	808	15.1
40 – 49	705	13.1
50 – 59	649	12.1
60 – 69	497	9.3
70 and above	243	4.5
Ethnicity		
Malay	3,342	62.3
Chinese	441	8.2
Indian	264	4.9
Other Bumiputera [a]	937	17.5
Others	380	7.1
Citizenship		
Malaysian	4,987	93.0
Non-Malaysian	377	7.0

Table VI: Sociodemographic characteristics of sample, NHMS 2020 (Cont.)

Sociodemographic Characteristics	Unweighted Count	Percentage (%)
Education Level		
No formal Education	625	11.7
Primary Education	1,665	31.2
Secondary Education	1,998	37.5
Tertiary Education	1,044	19.6
Marital Status [b]		
Single	1,710	36.3
Married	2,637	56.0
Widow(er)/Divorcee	360	7.6
Occupation [c]		
Government Employee	373	8.9
Private Employee	1,117	26.7
Self Employed	681	16.2
Unpaid worker/ Homemaker/caregiver	812	19.4
Student	460	11.0
Not working (Unemployed, health problem, old age, child & retiree)	748	17.8

Note:
[a] Other Bumiputera includes Bumiputera Sabah, Bumiputera Sarawak and Orang Asli
[b] Marital Status from 10 years old and above
[c] Occupation from 15 years old and above

1.3 Sample Representativeness

The estimated population obtained from the NHMS 2020 yields a population structure that is similar to the resident population in Malaysia projected by the Department of Statistics Malaysia for 2020. **Figure 7** illustrates the comparison.

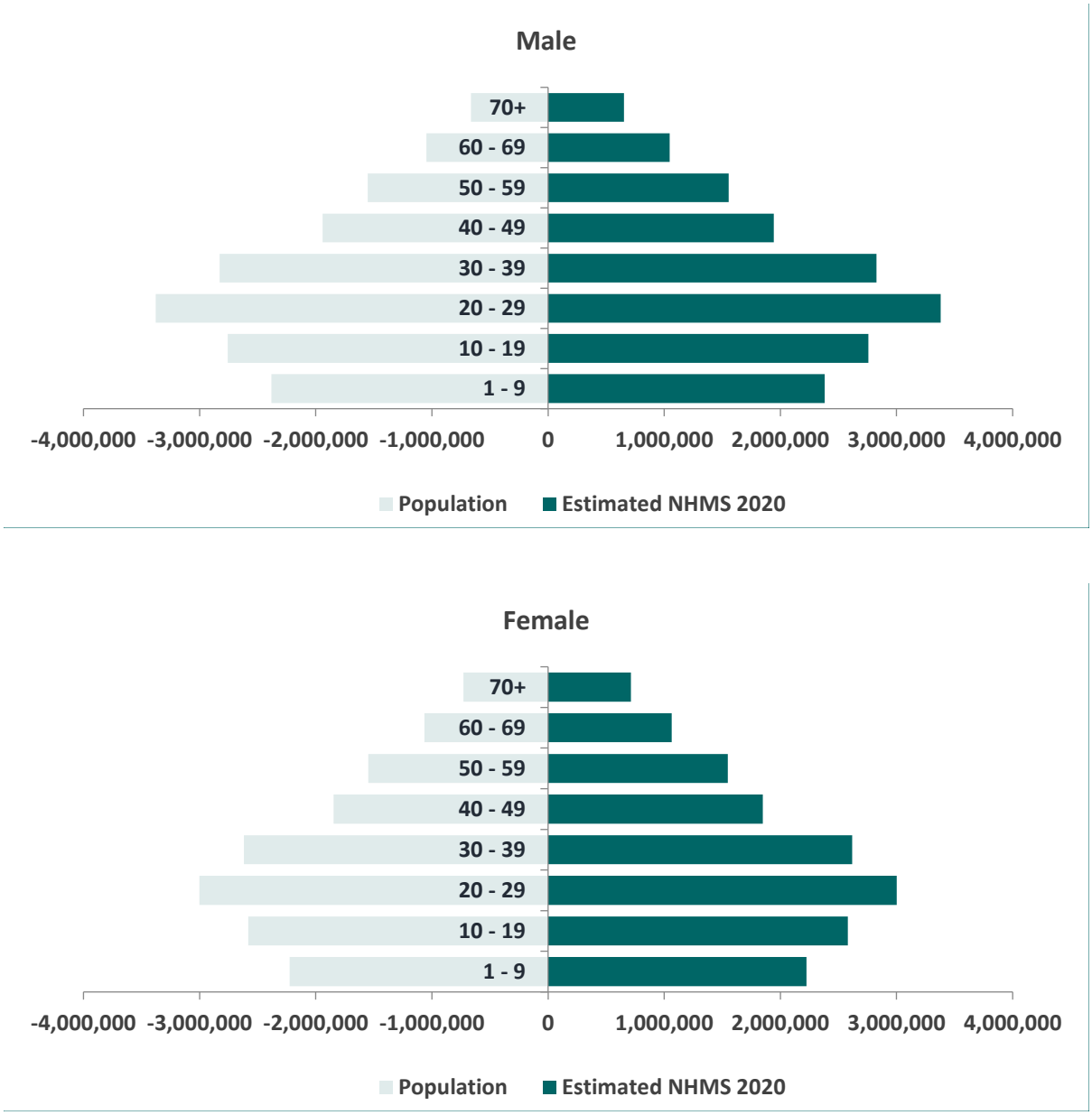


Figure 7: Population pyramid comparing estimated population of NHMS 2020 and projected population of Malaysia for 2020 by age and sex

Housing Characteristics & Environment

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The NHMS 2020 incorporates data on housing characteristics and the built environment to provide context for the population's living conditions in Malaysia. This chapter discusses the housing characteristics, water supply sources, toilet facilities, and handwashing practises of Malaysian residents. In this survey, 5,364 (90%) of all respondents who were successfully interviewed responded to the home and environment questions **(Table VII)**.

2.1 Housing Characteristics

The majority of the respondents lived in landed properties; detached houses, bungalows, and traditional houses (40.8%), followed by the townhouse, terrace, link and cluster house types (37.2%) and semi-detached houses (4.4%). A proportion of respondents lived in a high-rise building (12.6%). Water houses (2.1%), longhouses (1.4%), shop houses (1.0%), and squatters (0.5%) were all home to a small percentage of respondents **(Figure 8)**.

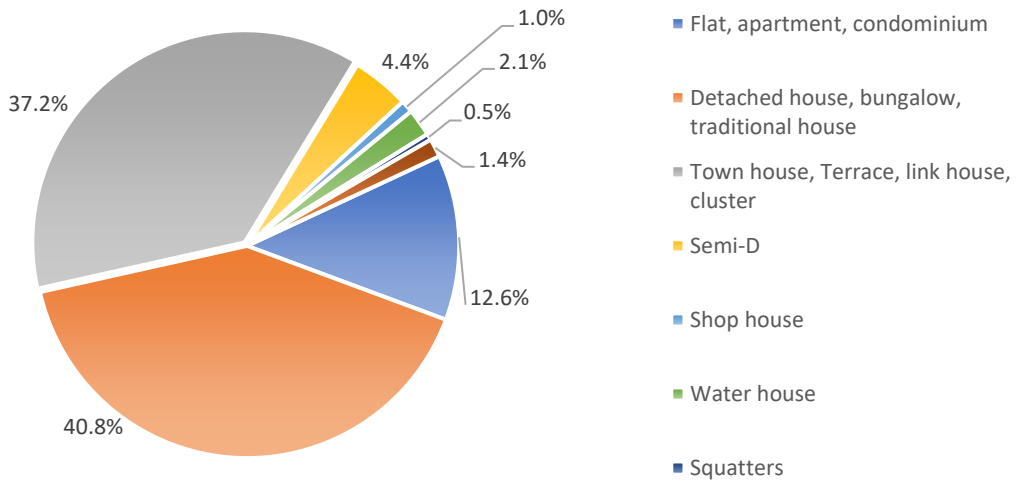

Figure 8: Housing characteristics among the NHMS 2020 respondents

Most of the respondents who live in high-rise buildings lived from the ground floor to the thirty-sixth floor, with an average of 4 floors. For the longhouses, the number of doors ranges from 12 to 63 doors with an average of 41 doors.

2.2 Size of Household and House Ownership Status

In this survey, households living in a house ranged from 1 person to 22 household members per household. Possibly singles or families living in a sharing LQ unit. In average, 5 household members living in a house in this survey.

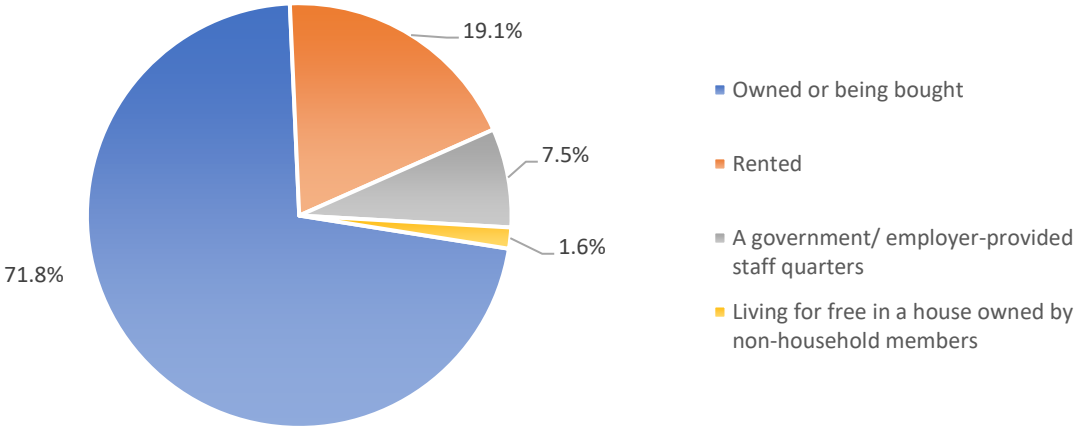

Figure 9: House ownership status

Three-quarters (71.8%) of the respondents lived on their property in terms of house ownership status. Almost one-fifth (19.1%) rented a house, 7.5% lived in government or employer-provided staff quarters, while 1.6% lived for free in a house owned by non-household members **(Figure 9)**.

2.3 Source of Household Drinking Water

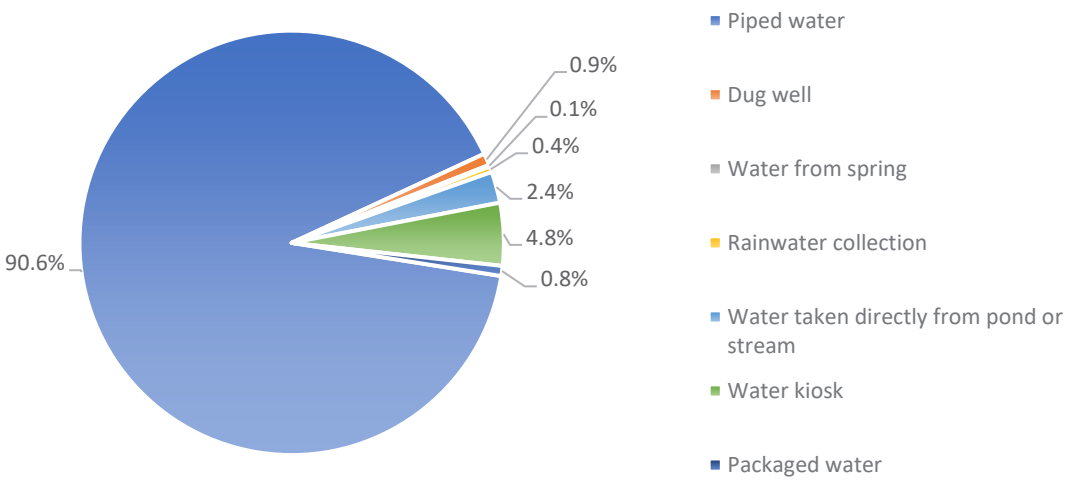

Figure 10: Source of household drinking water

Piped water as a source of drinking water accounted for 90.6% while 4.8% collected drinking water from water kiosks. A small percentage of Malaysian residents do not use piped water as their primary source of drinking. The source of water was taken directly from a pond or stream (2.4%), water from a well that has been dug (0.9%), rainwater collection (0.4%), packaged water (0.8%), and spring water (0.1%) **(Figure 10)**.

Box 1: Classification of household drinking water

Improved drinking water source is a source that, by nature of its construction, adequately protects the water from outside contamination, in particular from faecal matter. It includes piped household water connection, public standpipe, borehole, protected dug well, protected spring and rainwater collection.

Unimproved drinking water sources include unprotected dug well, unprotected spring, surface water (river, dam, lake, pond, stream, canal, irrigation channel), vendor-provided water (cart with small tank/drum, tanker truck), bottled water (bottled water is considered improved only when the household use another improved source for cooking and personal hygiene) and tanker truck water.

Source: World Health Organization [15].

2.4 Sanitation

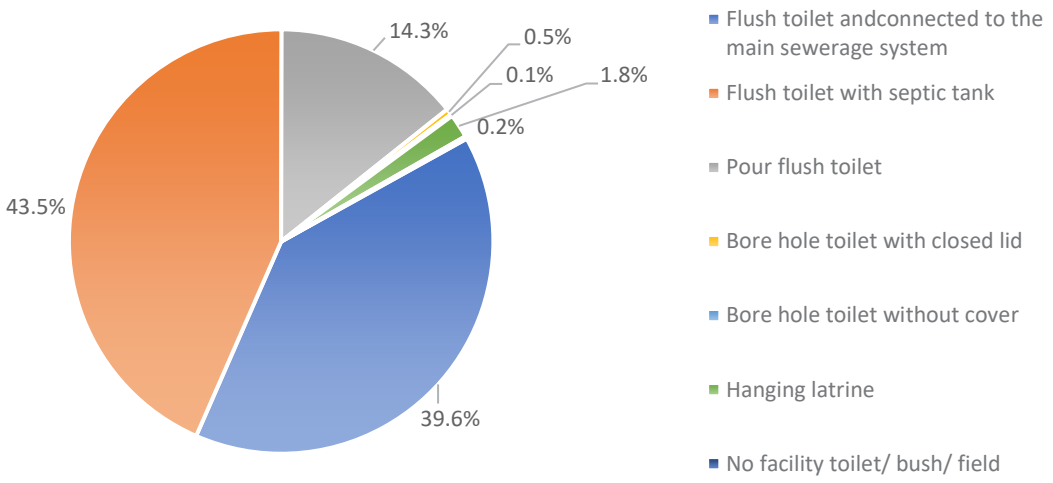

Figure 11: Toilet facility

The majority of respondents reported having sanitary toilet facilities in their home **(Figure 11)**, with 43.5% using a flush toilet connected to a septic tank and 39.6% using a flush toilet connected to the main sewerage system. As for toilet facilities, 14.3% used a pour-flush toilet, 1.8% used a hanging latrine, 0.5% used a borehole toilet with a closed lid, and 0.1% used a borehole toilet without a cover, while 0.2% stated that they lacked toilet facilities and therefore relied on the bush or fields. Most of the respondents, 97.7% stated that they did not share their toilet facilities with other households, and 95.1% stated that they used soap or detergent for handwashing in their household.

Box 2: Types of sanitary toilet facility

Sanitary toilet facility or improved sanitation includes sanitation facilities that hygienically separate human excreta from human contact. It includes a flush toilet with a septic tank and a flush toilet that connected to the main sewerage system.

Unsanitary toilet facility or unimproved sanitation do not ensure hygienic separation of human excreta from human contact and include pit latrines without slabs or platforms or open pit, hanging latrines, bucket latrines, open defecation in fields, forests, bushes, bodies of water or other open spaces, or disposal of human faeces with other forms of solid waste.

Source: World Health Organization [15].

Table VII: Housing characteristics and environment of the respondent, NHMS 2020

Characteristics	Unweighted Count	Percentage (%)
Type of house		
Flat, apartment, condominium	676	12.6
Detached house, bungalow, traditional house	2,191	40.8
Town house, Terrace, link house, cluster	1,996	37.2
Semi-D	236	4.4
Shop house	51	1.0
Water house	113	2.1
Squatters	26	0.5
Longhouse	75	1.4
Ownership status		
Owned or being bought	3,851	71.8
Rented	1,023	19.1
A government / employer-provided staff quarters	404	7.5
Living for free in a house owned by non-household members	86	1.6
Source of drinking water		
Piped water	4,860	90.6
Dug well	49	0.9
Water from spring	7	0.1
Rainwater collection	23	0.4
Water taken directly from pond or stream	128	2.4
Water kiosk	256	4.8
Packaged water	41	0.8
Toilet facility		
Flush toilet and connected to the main sewerage system	2,125	39.6
Flush toilet with septic tank	2,332	43.5
Pour flush toilet	765	14.3
Bore hole toilet with closed lid	25	0.5
Bore hole toilet without cover	8	0.1
Hanging latrine	98	1.8
No facility toilet/ bush/ field	11	0.2
Do you share this facility with others who are not members of your household		
Yes	121	2.3
No	5,243	97.7
Do you have soap or detergent in your household for washing hands?		
Yes	5,103	95.1
No	261	4.9

Computer-assisted Telephone Interview (CATI)

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3.1 Introduction

All respondents aged 13 years old and older were eligible for the CATI interview. The list of topics is described in **Table VIII**. This survey elicited 5,561 responses resulting in a response rate of 57.4% for 3,191 individuals who participated in the CATI interview. The total response rate for the CATI survey was 51.2% **(Table IX)**.

Table VIII: List of topics for CATI survey, NHMS 2020

#	Module	Eligible age
1.	HIV Knowledge	≥ 13 years old
2.	TB-like Symptoms	≥ 15 years old
3.	Antibiotics Use and Awareness of Antimicrobial Resistance	≥ 15 years old
4.	Malaria Prevention	≥ 15 years old

Table IX: CATI Response rate, NHMS 2020

State	Living Quarters (LQ)			Individual			Total Response Rate (%)
	Eligible	Interviewed	Response Rate (%)	Eligible	Interviewed	Response Rate (%)	
Johor	192	179	93.2	471	334	70.9	66.1
Kedah	137	130	94.9	363	240	66.1	62.7
Kelantan	131	121	92.4	387	241	62.3	57.5
Melaka	80	77	96.3	193	150	77.7	74.8
Negeri Sembilan	120	119	99.2	299	225	75.3	74.6
Pahang	140	104	74.3	287	98	34.2	25.4
Pulau Pinang	59	53	89.8	162	89	54.9	49.4
Perak	150	140	93.3	358	152	42.5	39.6
Perlis	38	38	100	104	69	66.4	66.4
Selangor	291	240	82.5	750	415	55.3	45.6
Terengganu	87	73	83.9	233	84	36.1	30.3
Sabah	222	193	86.9	712	400	56.2	48.8
Sarawak	317	285	89.9	864	482	55.8	50.2
WP Kuala Lumpur	104	93	89.4	283	149	52.7	47.1
WP Labuan	20	17	85.0	56	41	73.2	62.2
WP Putrajaya	16	14	87.5	39	22	56.4	49.4
MALAYSIA	**2,104**	**1,876**	**89.2**	**5,561**	**3,191**	**57.4**	**51.2**

3.2 Basic Characteristics of Survey Respondents

Table X summarises the sociodemographic characteristics of the sample of 3,191 respondents who were successfully interviewed via CATI. 55.5% lived in urban areas, 71.1% from the Peninsular Malaysia, and 54.2% were female. By age group, the highest percentages were observed in those aged 20 to 29 (20.3%) and aged 30 to 39 (20.5%) years old, while those aged 70 and older were the lowest (3.4%). Malaysian citizens made up 93.6% of survey respondents. Malay (63.9%) were the most numerous ethnic groups, followed by other Bumiputera (16.8%), Chinese (8.4%), other ethnicities (6.4%), and Indian were the least (4.5%). For marital status, 64.2% of respondents were married, 31.1% were single, and 6.5% were widowers or divorcees. By education level, 48.2% of respondents had secondary education, 27.3% had tertiary education, 20.9% had primary education, and 3.6% had no formal education. The analysis included respondents aged 15 and older who were 27.6% employed in the private sector, 18.9% unpaid worker, including homemakers or caregivers, 16.0% self-employed, 14.3% unemployed, including those with health problems, adolescents, and retirees, 13.7% students, and 9.4% government employees **(Table X)**.

Table X: Characteristics of CATI respondents, NHMS 2020

Sociodemographic Characteristics	Unweighted Count	Percentage (%)
MALAYSIA	3,191	100.0
State		
Johor	334	10.5
Kedah	240	7.5
Kelantan	241	7.6
Melaka	150	4.7
Negeri Sembilan	225	7.1
Pahang	98	3.1
Pulau Pinang	89	2.8
Perak	152	4.8
Perlis	69	2.2
Selangor	415	13.0
Terengganu	84	2.6
Sabah	400	12.5
Sarawak	482	15.1
WP Kuala Lumpur	149	4.7
WP Labuan	41	1.3
WP Putrajaya	22	0.7
Location		
Urban	1,771	55.5
Rural	1,420	44.5
Zone Categories		
Peninsular Malaysia	2,268	71.1
Sabah & Labuan	441	13.8
Sarawak	482	15.1
Sex		
Male	1,462	45.8
Female	1,729	54.2
Age Group		
13 – 19	447	14.0
20 – 29	647	20.3
30 – 39	654	20.5
40 – 49	545	17.1

Table X: Characteristics of CATI respondents, NHMS 2020 (Cont.)

Sociodemographic Characteristics	Unweighted Count	Percentage (%)
50 – 59	474	14.9
60 – 69	316	9.9
70 and above	108	3.4
Ethnicity		
Malay	2,039	63.9
Chinese	269	8.4
Indian	142	4.5
Other Bumiputera [a]	536	16.8
Others	205	6.4
Citizenship		
Malaysian	2,988	93.6
Non-Malaysian	203	6.4
Education Level (n = 3,186)		
No formal Education	114	3.6
Primary Education	665	20.9
Secondary Education	1,537	48.2
Tertiary Education	870	27.3
Marital Status [b]		
Single	993	31.1
Married	1,991	62.4
Widow(er)/Divorcee	207	6.5
Occupation [c]		
Government Employee	298	9.4
Private Employee	877	27.6
Self Employed	510	16.0
Unpaid worker/ Homemaker/caregiver	602	18.9
Student	435	13.7
Not working (Unemployed, health problem, old age, child & retiree)	456	14.3

Note:
[a] Other Bumiputera includes Bumiputera Sabah, Bumiputera Sarawak and Orang Asli
[b] Marital Status from 10 years old and above
[c] Occupation from 15 years old and above

COVID-19

The True Burden of COVID-19 in Malaysia: Prevalence of SARS-CoV-2 Infection

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HIGHLIGHTS

- By mid-October 2020, 0.62% of Malaysian population possibly had COVID-19 or were infected with SARS-CoV-2.
- The prevalence of Malaysian population who had neutralising immunity towards SARS-CoV-2 were 0.49%.
- Majority of the people previously infected with SARS-CoV-2 in Malaysia were asymptomatic and were not previously diagnosed with COVID-19.

Keywords: *COVID-19, SARS-CoV-2, Seroprevalence, Burden of disease*

1.1 Introduction

Coronavirus disease 2019 (COVID-19) was first reported in the city of Wuhan, China. It is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). By 11 March 2020, this novel infectious disease was declared a pandemic by the World Health Organisation [1]. Malaysia reported its first imported and local COVID-19 cases on 25 January and 5 February 2020, respectively [2, 3]. Fast forward to the year-end of 2020, the number of reported COVID-19 cases has almost reached 90,000 counts [4].

However, the reported number of COVID-19 cases does not reflect the true burden of this infectious disease. This is because transmission of SARS-CoV-2 can happen silently prior to symptom onset and even in asymptomatic infection. Besides, infected people without symptom or with mild symptoms might not seek health attention [5, 6]. As a result, COVID-19 can spread widely without being recognised in many places.

The true burden of COVID-19 can be estimated by conducting an investigation to detect the percentage of people with antibodies against SAR-CoV-2 in a specific location [7]. One of the earliest seroprevalence study conducted in a community in the United States reported that 2.8% of their residents have previously had COVID-19, around 54 times higher than the number of reported cases [8]. As such, a similar study is needed in Malaysia to help us understand the extent of COVID-19 spread and guide us in the prevention and control of COVID-19 [7].

This module was designed according to the World Health Organisation (WHO) protocol for COVID-19 seroepidemiological study [7] and is part of the WHO UNITY studies. All eligible household members aged one year and over were recruited into this module.

Socio-demographic characteristics and the status of previous COVID-19 diagnosis and presence of symptom were collected using a structured questionnaire via face-to-face interview.

Venous blood was collected in a plain tube, centrifuged, and sent to the Institute for Medical Research, National Institutes of Health in Setia Alam to be tested with Wantai SARS-CoV-2 Total Antibody enzyme-linked immunosorbent assay (ELISA) (sensitivity: 99%, specificity: 99%) [9] and, if positive, confirmed with GenScript SARS-CoV-2 Surrogate Virus Neutralisation Test (sVNT) (sensitivity: 98-99%, specificity: 100%) [10].

1.2 Objectives

1.2.1 General Objective

To provide community-based data and evidence to the Disease Control Division, Ministry of Health Malaysia on the true burden of COVID-19 in Malaysia.

1.2.2 Specific Objectives

- To estimate the prevalence of SARS-CoV-2 infection in Malaysia.
- To estimate the age-specific prevalence of SARS-CoV-2 infection in Malaysia.
- To estimate the prevalence of diagnosed and undiagnosed SARS-CoV-2 infection in Malaysia.
- To estimate the prevalence of symptomatic and asymptomatic SARS-CoV-2 infection in Malaysia.

Definition

- ELISA positive: the presence of binding antibodies, possibly due to previous COVID-19 infection.
- sVNT positive: the presence of neutralising antibodies, confirmation of previous COVID-19 infection and neutralising immunity.
- Diagnosis status: self-reported previous COVID-19 diagnosis.
- Symptom status: self-reported at least one COVID-19-like symptoms since 1st January 2020 (fever, sore throat, runny nose, cough, shortness of breath, chills, vomiting, nausea, diarrhoea, headache, muscle ache, loss of smell, loss of taste and fatigue).

1.3 Findings

Samples of 5,131 individuals recruited from early August to mid-October 2020 were tested for the presence of SARS-CoV-2 antibodies.

1.3.1 Seroprevalence of SARS-CoV-2 Infection in Malaysia by Sociodemographic Characteristics

The overall seroprevalence of SARS-CoV-2 infection in Malaysia according to Wantai SARS-CoV-2 Total Antibody ELISA was 0.62% (95% CI: 0.39-0.99). SARS-CoV-2 infection among those in urban areas (0.69%, 95% CI: 0.41-1.17) was not significantly higher than in rural areas (0.38%, 95% CI: 0.21 -0.70). The total antibody seropositivity among males was 0.69% (95% CI: 0.37-1.26), while adults aged 18 years and over was 0.79% (95% CI: 0.49-1.28) **(Table 1.1)**.

The overall seroprevalence of SARS-CoV-2 infection in Malaysia according to GenScript SARS-CoV-2 sVNT was 0.49% (95% CI: 0.28-0.85). The sVNT seropositivity in urban was 0.55% (95% CI: 0.29-1.02), while among adults aged 18 years and over was 0.63% (95% CI: 0.36-1.11) **(Table 1.2)**.

1.3.2 Seroprevalence of SARS-CoV-2 Infection in Malaysia by Diagnosis and Symptom Status

According to ELISA, among the general population in Malaysia, 0.57% (95% CI: 0.35-0.94) was infected but never diagnosed with COVID-19. On the other hand, 0.50% (95% CI: 0.29-0.87) were infected without symptom **(Table 1.3)**. According to sVNT, 0.44% (95% CI: 0.24-0.80) was infected but undiagnosed. On the other hand, 0.41% (95% CI: 0.22-0.78) were infected without symptom **(Table 1.4)**.

1.4 Conclusion

The prevalence of SARS-CoV-2 infection in Malaysia was low at the end of the year 2020. Among people aged 18 years and above, the prevalence of SARS-CoV-2 infection was relatively higher. The majority of the SARS-CoV-2 infection in Malaysia was undiagnosed and asymptomatic.

1.5 Recommendation

- Reinforce new normal practices among Malaysian population to prevent COVID-19.
- Strengthen contact tracing, quarantine, screening, and patient isolation to control the spread of COVID-19.
- Repeat SARS-CoV-2 seroprevalence study at an interval to monitor the extent of COVID-19 spread and level of herd immunity in Malaysia.

1.6 Study Limitations

- Diagnosis and symptom status were self-reported and subject to recall bias, especially the symptom status.
- Low seroprevalence requires a larger sample size for better precision in the subgroup analyses. Population estimate was not reportable due to inadequate sample size for certain subgroups.

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Table 1.1: Prevalence of SARS-CoV-2 infection (according to binding antibodies) in Malaysia by sociodemographic characteristics

Sociodemographic Characteristics	Binding Antibodies Present				
	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	31	191,279	0.62	0.39	0.99
Location					
Urban	20	164,085	0.69	0.41	1.17
Rural	11	27,194	0.38	0.21	0.70
Sex					
Male	16	109,653	0.69	0.37	1.26
Female	15	–	–	–	–
Age Group					
1-18 years	4	–	–	–	–
18 years and above	27	179,345	0.79	0.49	1.28

Notes:
(a) The denominator for the overall prevalence is 30.8 million Malaysia population represented by 5,131 participants (weighted), while the denominators for the subgroup analyses varied according to their respective subgroups.
(-) Data have been suppressed due to small counts.

Table 1.2: Prevalence of SARS-CoV-2 infection (according to neutralising antibodies) in Malaysia by sociodemographic characteristics

Sociodemographic Characteristics	Neutralising Antibodies Present				
	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	25	150,857	0.49	0.28	0.85
Location					
Urban	16	129,958	0.55	0.29	1.02
Rural	9	–	–	–	–
Sex					
Male	13	–	–	–	–
Female	12	–	–	–	–
Age Group					
1-18 years	3	–	–	–	–
18 years and above	22	142,593	0.63	0.36	1.11

Notes:
(a) The denominator for the overall prevalence is 30.8 million Malaysia population represented by 5,131 participants (weighted), while the denominators for the subgroup analyses varied according to their respective subgroups.
(-) Data have been suppressed due to small counts

Table 1.3: Prevalence of SARS-CoV-2 infection (according to binding antibodies) in Malaysia by diagnosis and symptom status

Category	Binding Antibodies Present				
	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	31	191,279	0.62	0.39	0.99
Previous COVID-19 diagnosis					
Diagnosed	5	–	–	–	–
Undiagnosed	26	176,288	0.57	0.35	0.94
Presence of COVID-19 symptom					
Symptomatic	10	–	–	–	–
Asymptomatic	21	154,635	0.50	0.29	0.87

Notes:
(a) The denominator for the overall and subgroup analyses is 30.8 million Malaysia population represented by 5,131 participants (weighted).
(b) Diagnosed vs undiagnosed and symptomatic vs asymptomatic infections were self-reported.
(c) Symptomatic was defined as having ≥1 of these symptoms since 1/1/2020: fever, sore throat, runny nose, cough, shortness of breath, chills, vomiting, nausea, diarrhoea, headache, muscle ache, loss of smell, loss of taste and fatigue.
(-) Data have been suppressed due to small counts.

Table 1.4: Prevalence of SARS-CoV-2 infection (according to neutralising antibodies) in Malaysia by diagnosis and symptom status

Category	Neutralising Antibodies Present				
	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	25	150,857	0.49	0.28	0.85
Previous COVID-19 diagnosis					
Diagnosed	5	–	–	–	–
Undiagnosed	20	135,866	0.44	0.24	0.80
Presence of COVID-19 symptom					
Symptomatic	8	–	–	–	–
Asymptomatic	17	126,826	0.41	0.22	0.78

Notes:
(a) The denominator for the overall and subgroup analyses is 30.8 million Malaysia population represented by 5,131 participants (weighted).
(b) Diagnosed vs undiagnosed and symptomatic vs asymptomatic infections were self-reported.
(c) Symptomatic was defined as having ≥1 of these symptoms since 1/1/2020: fever, sore throat, runny nose, cough, shortness of breath, chills, vomiting, nausea, diarrhoea, headache, muscle ache, loss of smell, loss of taste and fatigue.
(-) Data have been suppressed due to small counts.

HEPATITIS B

Seroprevalence of Hepatitis B Virus among Adults in Malaysia

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HIGHLIGHTS

Among adults aged 15 years old and above:

- The seroprevalence of Hepatitis B Surface Antigen (HBsAg) was 1.7% with an estimated population of 396,960 adults.
- Undiagnosed HBsAg Malaysia was 1.4% with an estimated population of 331,639 adults.
- The seroprevalence of Anti-HBs was 33.8%.

Keywords: *Prevalence, Hepatitis B, HBsAg, HBsAb, anti HBc IgG antibodies, anti HBc IgM antibodies, Malaysia*

2.1 Introduction

Hepatitis B is an infectious disease caused by the hepatitis B virus (HBV). It may cause acute and chronic hepatitis infection. WHO estimated that in 2015, there were 257 million people with chronic hepatitis B infection [1] and 887,000 deaths, mostly from cirrhosis and hepatocellular carcinoma. The prevalence of infection varies between regions. In high endemic areas, the prevalence of HBV infection is over 8% [2], while Malaysia previous studies reported that HBV seroprevalence of the general population ranged between 1.5-9.8% [3], with one million of the population having chronic hepatitis B infection.

Ministry of Health Malaysia reported that HBV infection is ranked as the third principal cause of death in Malaysian public hospitals for three consecutive years since 2010 [7], and the major route of transmission is reported to be from an infected mother to her unborn child [3].

The Hepatitis B vaccination has been included in the National Immunisation Program (NIP) for children in Malaysia since 1989. The hepatitis vaccine is given in three doses, the first dose is within 24 hours of birth, the second at one month, and the third at the sixth month. The national hepatitis B immunisation coverage among infants is 97.30% (2020) [7].

Since HBV infections are often asymptomatic, a seroepidemiology study is very important to estimate its prevalence in the population. As the country is progressing towards achieving viral hepatitis elimination in 2030, it is imperative to have data on the current estimates of HBV burden in the general population.

In Malaysia, several small-scale population-based studies have been conducted to estimate the prevalence of HBV infection such as seroprevalence study among a population cohort of 35-year-olds [6], and study among those who attended hepatitis screening campaign [5]. This study on the other hand estimated the true hepatitis burden and its prevalence among the adult population in Malaysia. This seroepidemiological study was aimed to provide estimates of HBV infection with an emphasis on the co-existence of hepatitis B surface antigen (HBsAg) and antibody hepatitis B surface antigen (anti-HBs), as well as other HBV serological patterns among adult populations aged 15 and above in Malaysia.

Field data collection was conducted via face-to-face interview using a pre-tested and structured questionnaire adapted from NHANES (CDC) [4]. Information was obtained on the status of hepatitis B infection, treatment and immunisation status. 5 milliliters (ml) of blood was drawn and tested for hepatitis B surface antigen (HBsAg) and antibody to hepatitis B surface antigen (anti-HBs) using a Chemiluminescent Microparticle Immunoassay for HBsAg (The Architect HBsAg Qualitative II Assay), anti-HBc IgM and anti-HBc Total (The Architect) and anti-HBs (The Alinity I for Anti-HBs Assay) for the qualitative detection of hepatitis B. All data were analysed to account for survey weights to obtain population-based estimates.

2.2 Objectives

2.2.1 General Objective

To determine the prevalence of hepatitis B in Malaysia.

2.2.2 Specific Objectives

- To estimate the seroprevalence of HBsAg among adults in Malaysia.
- To estimate the seroprevalence of anti-HBs among adults in Malaysia.
- To determine the prevalence of diagnosed and undiagnosed individual status.
- To determine the prevalence of treated and untreated individual status.
- To determine the prevalence of hepatitis B vaccination individual status.
- To determine the prevalence of hepatitis B infection and immunity.

Definition

- Seroprevalence of hepatitis B: Hepatitis B surface antigen reactive.
- Seroprevalence of antibody to hepatitis B surface antigen: Anti-HBs test with a titer ≥ 10 mIU/ML.
- Prevalence of acute hepatitis B: Detection of HBsAg, anti-HBc Total AND anti-HBc IgM AND no detection of anti-HBs.
- Prevalence of chronic hepatitis B: Detection of HBsAg, anti-HBc Total AND no detection of anti-HBc IgM and anti-HBs.
- Immunity due to natural infection: Detection of anti-HBc Total AND anti-HBs AND no detection of HBsAg.
- Immunity from hepatitis B vaccination: Detection of anti-HBs AND no detection of HBsAg AND anti-HBc Total.
- Chronic hepatitis B infection: Detection of HBsAg AND anti-HBc Total AND no detection of anti-HBs AND anti-HBc IgM.
- Undiagnosed hepatitis B: Never been told to have HBV by a doctor AND the serology result for HbsAg in this survey was reactive.

*Note: CDC Hepatitis Serologic Test Fact Sheet

2.3 Findings

Overall, 5,302 respondents aged 15 years and above were eligible to participate in this survey. Out of these, 4,083 (77%) respondents participated in this survey and had their blood drawn and tested for hepatitis B.

2.3.1 Seroprevalence of HBsAg

The seroprevalence of HBsAg from this study was 1.7% (95% CI: 1.13-2.39) with an estimated population of 396,960 adults aged 15 years old and above in Malaysia. By age group, the seroprevalence of HBsAg among adults aged 31 years and above was 2.4% (95% CI: 1.61-3.39), while only 6 individuals aged ≤ 30 years old were found positive. There was no difference for the HBsAg seropositivity between urban (1.5%, 95% CI: 0.88-2.47) and rural (2.3%, 95% CI: 1.54-3.18) **(Table 2.1)**.

2.3.2 Undiagnosed HBV

The prevalence of undiagnosed HBV infection was 1.4% (95% CI: 0.97-1.49) with an estimated population of 331,639 adults aged 15 years and above in Malaysia. There was no difference in location and sex. The undiagnosed HBV infection among adults aged above 30 years was 1.9% (95% CI: 1.33-2.71) with an estimated population of 282,414 adults **(Table 2.2)**.

2.3.3 Diagnosed of HBV

Of all the HBsAg positive respondents, 10 respondents were aware of their hepatitis B infection status, however, only 4 respondents were on treatment during the survey **(Figure 12)**.

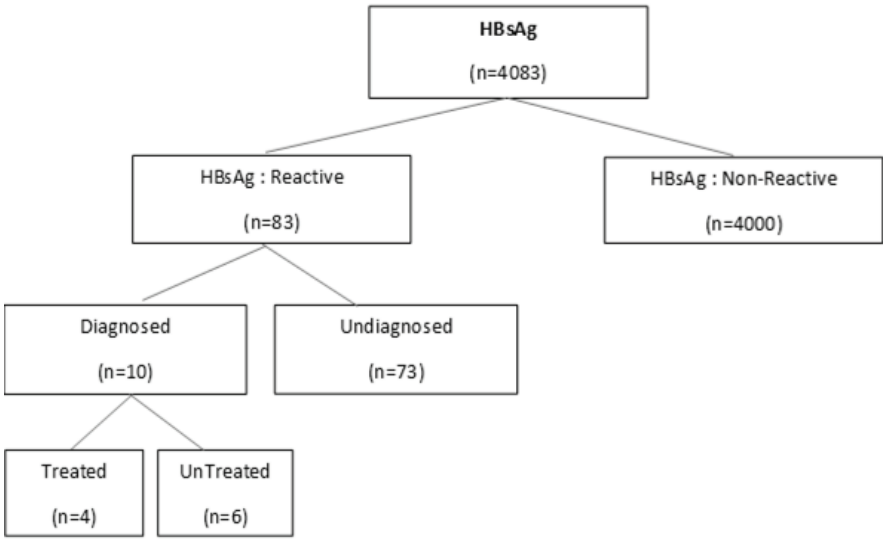
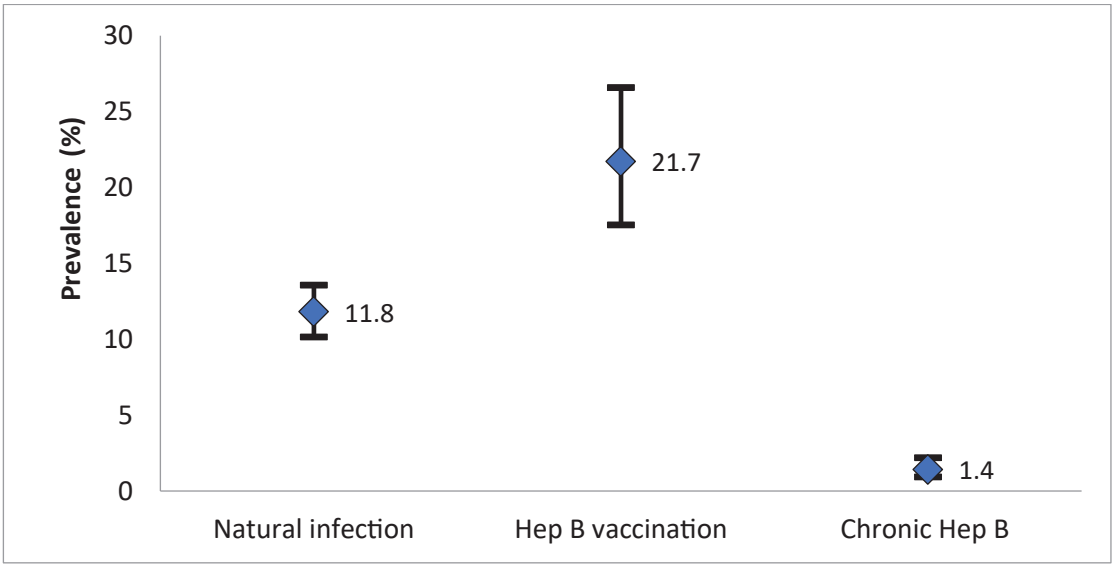


Figure 12: Hepatitis B status among respondents participated in NHMS 2020

2.3.4 Seroprevalence of Anti-HBs

The seroprevalence of anti-HBs in this survey was 33.8% (95%CI: 28.64-39.23). The seroprevalence was higher among adults aged 31 years and above (39.4%, 95% CI: 34.11-45.08), compared to younger adults aged 15 to 30 years (24.6%, 95% CI: 17.95-32.64). There is no significant difference in seroprevalence of anti-HBs among those residing in rural areas (34.5%, 95% CI: 26.96-42.86) and urban areas (33.6%, 95% CI: 27.39-40.24) **(Table 2.3)**.

2.3.5 Prevalence of HBV Infection and Immunity among Adults Aged ≥ 15 Years Old



Note: We did not report acute HBV as the data have been suppressed due to small counts.

Figure 13: Immunity and infection of HBV among adults aged ≥ 15 years old

2.3.5.1 Immunity from Natural Infection

In this survey, 11.8% (95% CI: 10.15 - 13.57) of adults aged 15 years and above had immunity through natural infection and there was no difference among those residing in urban and rural areas. The prevalence was higher among adults aged 30 years old and above (17.4%, 95% CI: 15.27-19.63), compared to younger adults aged 15 to 30 years old (2.9%, 95% CI: 1.61-4.92) **(Table 2.4)**.

2.3.5.2 Immunity from HBV Vaccination

The prevalence of those who acquired immunity from HBV vaccination was 21.8% (95% CI: 17.55-26.59). There was no difference by location whether among those residing in urban (22.8%, 95% CI: 17.8-28.61) or rural (18.2%, 95% CI: 12.05-26.51) and age groups whether adults aged 15 to 30 years old (21.7%, 95% CI: 15.71-29.1), or ≥ 31 years old (21.8%, 95% CI: 17.61-26.59) **(Table 2.5)**.

2.3.5.3 Chronic HBV infection

The prevalence of adults aged 15 years and above chronically infected with HBV was 1.5% (95% CI: 0.95-2.20). There was no difference of chronic HBV infection among those living in urban or rural. The prevalence of chronic hepatitis B among adults aged 30 years old and above was 2.1% (95% CI: 1.36 -3.11) with an estimated population of 306,038 Malaysian residents **(Table 2.6)**.

2.4 Conclusion

This study is the first nationwide population study that includes a wide range of ages from the general population aged 15 years old and above that provide estimates on HBV burden in the country. Malaysia is still under the intermediate endemicity [3] with an HBV infection prevalence of 1.7%, with an estimated population of 369,960 adults. The study also found that many people living with HBV were undiagnosed of their infection status, with a prevalence of 1.4% equivalent to an estimated population of 331,639 adults in Malaysia. After 30 years of inclusion of hepatitis B vaccine in NIP, seroprotective anti-HBs was found to be lower among younger adults aged 15 to 30 years old compared to adults aged 30 years old and above. Further investigation is necessary to verify non-seroconverts or revision on HBV booster shots to ensure lifelong protection against HBV in our efforts to eliminate viral hepatitis in Malaysia by 2030.

2.5 Recommendation

Early detection is essential to prevent and control the transmission of HBV in Malaysia. Early detection could encourage early treatment that inhibit chronic sequalae. Hence, an increase in HBV testing is crucial. Here are recommendations to improve the control of HBV burden in Malaysia:

- Policy for hepatitis B screening during antenatal check-up at all health care facilities in Malaysia to prevent mother-to-child transmission at birth.
- Knowledge of HBV infection is critical to instil awareness on the infection. Advocate campaigns and health education to increase knowledge and awareness of HBV that consequently could improve testing especially among the high-risk group.
- To increase testing among the high-risk groups.

2.6 Study Limitations

- This seroprevalence investigation recruited individuals from the general population that used serological markers as a basis to define the outcome of the infection. Hence, there was no clinical assessment or doctor diagnosis to confirm such infections.
- The study did not verify immunisation records of the HBV vaccination status of the respondents.
- Some data have been suppressed due to small counts.

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Table 2.1: Seroprevalence of HBsAg among adults aged 15 years old and above by sociodemographic characteristics

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	83	396,960	1.7	1.13	2.39
Location					
Urban	33	276,761	1.5	0.88	2.47
Rural	50	120,199	2.3	1.54	3.18
Sex					
Male	41	201,315	1.7	1.10	2.38
Female	42	195,645	1.7	0.90	3.08
Age group					
15 to 30 years old	6	-	-	-	-
Above 30 years old	77	347,734	2.4	1.61	3.39
Citizenship					
Malaysian	70	317,242	1.5	1.02	2.20
Non-Malaysian	13	-	-	-	-

Note: (-) Data have been suppressed due to small counts

Table 2.2: Prevalence of undiagnosed hepatitis B infection by sociodemographic characteristics

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	73	331,639	1.4	0.97	1.49
Location					
Urban	26	219,405	1.2	0.72	1.91
Rural	47	112,235	2.1	1.41	3.03
Sex					
Male	35	161,048	1.3	0.85	1.98
Female	38	170,591	1.5	0.82	2.57
Age group					
15 to 30 years old	6	-	-	-	-
Above 30 years old	67	282,414	1.9	1.33	2.71
Citizenship					
Malaysian	61	254,968	1.2	0.83	1.73
Non-Malaysian	12	-	-	-	-

Note: (-) Data have been suppressed due to small counts

Table 2.3: Seroprevalence of Anti-HBs among adults aged 15 years old and above by sociodemographic characteristics

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	1258	8,146,457	33.8	28.64	39.23
Location					
Urban	633	6,272,892	33.6	27.39	40.24
Rural	625	1,873,565	34.5	26.96	42.86
Age group					
15 to 30 years old	292	2,281,444	24.6	17.95	32.64
Above 30 years old	966	5,865,013	39.4	34.11	45.08
Sex					
Male	636	4,365,157	35.2	29.88	40.74
Female	622	3,781,300	32.3	26.63	38.46
Citizenship					
Malaysian	1133	7,195,911	33.9	28.55	39.61
Non-Malaysian	125	950,546	32.8	21.43	46.56

Table 2.4: Prevalence of immunity due to natural infection

Immunity Due to Natural Infection	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Malaysia	531	2,844,334	11.8	10.15	13.57
Urban	223	1,977,910	10.6	8.79	12.60
Rural	308	866,425	16	12.41	20.23
15 - 30 years old	27	263,141	2.9	1.61	4.92
≥ 31 years old	504	258,1194	17.4	15.27	19.63

Table 2.5: Prevalence of immunity due to vaccination

Immunity due to Hepatitis B Vaccination	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Malaysia	717	5,258,387	21.8	17.55	26.59
Urban	407	4,269,394	22.8	17.80	28.61
Rural	310	988,993	18.2	12.05	26.51
15 - 30 years old	265	2,018,303	21.7	15.71	29.10
≥ 31 years old	452	3,240,084	21.8	17.61	26.59

Table 2.6: Prevalence of chronic hepatitis B infection

Chronically Infected	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Malaysia	70	348,404	1.5	0.95	2.20
Urban	31	258,757	1.4	0.80	2.39
Rural	39	89,648	1.7	1.07	2.55
15 - 30 years old	4	-	-	-	-
≥ 31 years old	66	306,038	2.1	1.36	3.11

Note: (-) Data have been suppressed due to small counts

Personal Risk Factors of Hepatitis B

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HIGHLIGHTS

Out of 83 people who were hepatitis B positive:

- 35.8% had a history of percutaneous exposure:
  - 23.3% had a history of some form of body piercing
- 22.4% had a history of sharp injury at the workplace but none of them were healthcare workers
- 59.1% had histories of receiving medical procedures:
  - 20.0% were related to surgical procedures
  - 53.7% were related to dental procedures
- 21.3% had family members who were hepatitis B positive.
- 1 in 10 had no history of risk factors
- 1 in 5 had at least one history of risk factor
- 1 in 3 had more than one history of risk factor

Keywords: *Risk factor, Hepatitis B, exposure, transmission*

3.1 Introduction

Hepatitis B is a major blood-borne infection that is transmitted through blood and bodily fluids. Many lifestyle activities can be attributed to risk factors to contract hepatitis B virus (HBV). A risk factor is a particular element or behaviour that increases the chance of getting a disease. Risk factors for HBV infection are mainly any action that can transfer infected blood or any other bodily fluids to a non-infected person. Among the groups of risk factors attributable to HBV infection are exposures through percutaneous, occupational, medical procedures, unsafe sexual practices, injectable substance use and family history [1].

Percutaneous exposure can be caused by body piercing, tattooing, blood cupping or acupuncture. It is noted that increased body art prevalence, such as body piercing, has been associated with adverse health risks of using unsterile needles and other piercing instruments that can cause the transmission of HBV [2]. The risk of acquiring HBV infection from occupational exposures is through accidental HBV-contaminated needle-stick injuries among healthcare workers [3], exposure to blood among officers from correctional institutions who were without personal protective gears [4], blood splashes or needle stick injuries among police officers [5, 6], and injuries by sharp instruments among municipal waste workers and scavengers [7].

Exposures through medical procedures is a common occurrence in developing countries as opposed to developed countries and more so prior to the year 2000 when hepatitis B vaccines were not mandatory [8]. Transmission of HBV from a healthcare worker to patient and vice versa has also been documented. The risk of transmission may be associated with the duration and the occurrence of complications during or after medical procedures [9].

Occupational injuries especially among dentists can expose them to HBV through several routes such as oral fluids, contaminated instruments or airborne contaminants [10]. HBV transmission among those who practice unsafe sexual practices and injectable substance use also continues to be a burden to many countries [11]. HBV infection is also strongly related to having a family member infected with HBV [12].

The information on risk factors of HBV infection was targeted to household members aged 15 years and above from randomly selected living quarters. The questionnaires were both in Malay and English languages. Respondents who were illiterate in both languages were considered not eligible. The data was collected using a Self-administered Questionnaire (SAQ) as privacy was critical to ensure confidentiality of respondents' answers. The instrument comprised of 14 questions that cover risk behaviours involving percutaneous exposure (piercing, tattoo, blood cupping and acupuncture), occupational exposure (history of sharp injury at the workplace), medical procedures (haemodialysis, surgical procedure, dental procedures and blood transfusion), unsafe sexual practices (homosexuality, sex with a prostitute, received payment for sex, multiple sex partners, sex partners who were as above, sex partners who use injectable substance and sex partners who are known/possible to HIV, Hep B or Hep C positive), injectable substance use and history of HBV positive family members. The questionnaires require around 5 minutes to complete.

The bilingual questionnaire has been validated through content validity, construct validity, cognitive debriefing, and back-to-back translation; Malay language to English language and English language to Malay language. All of the 14 questions were asked through dichotomous questions form (only Yes or No answer was required).

3.2 Objectives

3.2.1 General Objective

To determine the proportion of risk factors of people with HBV infection in the general population.

3.2.2 Specific Objectives

- To determine the proportion of risk factors through percutaneous exposure.
- To determine the proportion of risk factors through occupational exposure.
- To determine the proportion of risk factors through medical procedures.
- To determine the proportion of risk factors through unsafe sexual practices.
- To determine the proportion of risk factors through injectable substance use.
- To determine the proportion of risk factors through family history.

Definition

- Percutaneous exposure – any process that involves puncturing through the skin.
- Occupational exposure – any potential harmful contaminated sharp injuries at the workplace.
- Medical procedures – any procedures in delivering a type of healthcare.
- Unsafe sexual practices – any high-risk sexual practice.
- Injectable substance use – any illegal substance that is administered intravenously with a needle.
- Family history – any family members with history of hepatitis B.

3.3 Findings

The findings from this study represents 83 respondents who were 15 years and above and hepatitis B positive.

3.3.1 Percentage of Percutaneous Exposure

35.8% (95% CI: 23.97-49.46) had a history of percutaneous exposure, where 23.3% (95% CI: 15.26-33.86) had a history of some form of body piercing. A small percentage of respondents had histories of tattooing, blood cupping or acupuncture.

3.3.2 Percentage of Occupational Exposure

22.4% (95% CI: 13.95-33.87) had histories of sharp injuries at work, though none of these were healthcare workers.

3.3.3 Percentage of Medical Exposure

59.1% (95% CI: 41.79-74.33) had histories of medical procedures. 53.7% (95% CI: 38.58-68.06) were related to dental procedures and 20.0% (95% CI: 10.06-35.71) were related to surgical procedures.

3.3.4 Percentage of Exposure from Unsafe Sexual Practices

None of the respondents reported any history of unsafe sexual practices.

3.3.5 Percentage of Exposure from Injectable Substance Use

None of the respondents reported any history of injectable substance use.

3.3.6 Percentage of Exposure from Family Members

21.3% (95% CI: 10.51-38.4) had family members who were hepatitis B positive.

3.3.7 Proportion of Number of Risk Factors

- 1 in 10 had no history of risk factors
- 1 in 5 had at least one history of risk factor
- 1 in 3 had more than one history of risk factor

3.4 Conclusion

Overall, the highest proportion of the type of risk factors among HBV patients in Malaysia was a history of medical exposure (59.1%), followed by percutaneous exposure (35.8%), occupational exposure (22.4%) and the least was family history (21.3%). The results of this survey give a better understanding of HBV patients and their possible risk factors in Malaysia. These data shows that HBV and certain associated behaviours are still a public health concern for hepatitis B. Nevertheless, these results should be taken with caution as these findings are associated with histories of risk factors rather than the actual mode of transmission of HBV. Therefore, further investigations are needed to identify the actual cause of HBV infection.

3.5 Recommendation

- Strict universal safety regulations of body art and therapy outlets should be emphasised and regularly monitored by the authorities. Strict precautions awareness and knowledge should also be taken by clients receiving body art and therapies that involve percutaneous exposure to prevent transmission of hepatitis B.
- Apart from healthcare workers, mandatory vaccination for HBV should also be considered for other high-risk occupations such as police officers, officers from correctional institutions and municipal waste workers.
- Improvement of regular clinical audit and strict observation of the standard infection control protocols for healthcare practitioners needs to be done to prevent avoidable transmission in the medical and dental fields.
- Enhance health education and awareness in promoting vaccination programmes, especially to specific high-risk groups.
- To update and promote the use of simple, non-invasive diagnostic tests to scale up the screening in the general population.

3.6 Study Limitations

As the questions were deemed as sensitive, they were given as Self-administered Questionnaire (SAQ). Therefore, this study was limited to respondents who were literate in Bahasa Melayu and English only. Misinterpretation of questions may have arisen among the respondents and affect the quality of answers.

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Table 3.1: Percentage of ever had risk exposure among hepatitis B adults aged 15 years old and above in Malaysia

Types of Risk Exposure	Unweighted Count	Percentage (%)	95% CI	
			Lower	Upper
Percutaneous Exposure				
Any types of exposure	23	35.8	23.97	49.46
Body Piercings	16	23.3	15.26	33.86
Tattoos	7	-	-	-
Blood cupping	3	-	-	-
Acupuncture	1	-	-	-
Occupational Exposure				
Sharp injuries	15	22.4	13.95	33.87
Medical Procedures				
Any types of exposure	35	59.1	41.79	74.33
Haemodialysis	0			
Surgical Procedures	15	20.0	10.06	35.71
Dental Procedures	32	53.7	38.58	68.06
Blood Transfusion (before 1994)	3	-	-	-
Unsafe Sexual Practices	0	-	-	-
Injectable drug use				
Injectable drug use	0	-	-	-
Sharing needle(s)/drug preparation equipment(s)	0	-	-	-
Family history of HBV	8	21.3	10.51	38.4

Note: (-) Data have been suppressed due to small counts

HEPATITIS C

Hepatitis C: A Silent Epidemic

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HIGHLIGHTS

- The seroprevalence of anti-HCV among adults aged 15 years old and above was 0.4% with an estimated population of 90,120.
- The seroprevalence of HCV core antigen among adults aged 15 years old and above was 0.2% with an estimated population of 51,675.
- All infected individuals were undiagnosed and untreated.

Keywords: *Hepatitis C, Anti-HCV, HCV core antigen*

4.1 Introduction

Hepatitis C is a liver disease caused by the hepatitis C virus (HCV). Hepatitis C is found worldwide. Globally, the World Health Organization (WHO) has estimated 71 million people have chronic hepatitis C virus infection [1]. The prevalence of HCV in some countries in Central Asia (5.4%), western Africa (5.3%), central Africa (4.2%), Eastern Europe (3.3%), and North Africa/Middle East (3.1%) being higher than countries in North America (1.0%) and western Europe (0.9%) [2].

Hepatitis C virus causes both acute and chronic infection. Typically, acute HCV infection is asymptomatic or associated with non-specific symptoms. Because HCV infection is asymptomatic, individuals can be infected for many years before being diagnosis.

However, some studies found that up to 80% of those infected will also develop chronic infection, which can lead to cirrhosis, liver cancer and death [3, 4]. WHO estimated that in 2016, approximately 399,000 people died from hepatitis C, mostly from cirrhosis and hepatocellular carcinoma [1].

In Malaysia, viral hepatitis, most commonly hepatitis A, B and C, poses a public health concern. In 2010, the notification of viral hepatitis was made mandatory under the First Schedule of Control and Prevention of Communicable Disease Act 1988 [5]. A total of 23,112 hepatitis C cases were notified to the MOH between 2003 and 2017 [6]. The incidence of hepatitis C had increased from 2.56 per 100,000 in 2010 to 6.91 per 100,000 population in 2015 [6].

However, no national HCV prevalence studies have been conducted in the general population of Malaysia, and the true burden of infection is unknown. Thus, we conducted a national cross-sectional study (NHMS 2020: CDC) to estimate HCV seroprevalence in Malaysia's adult population.

The Hepatitis C module was carried out on all respondents aged 15 years and above through face-to-face interview and blood taking (venepuncture) for seroprevalence laboratory testing. The interview was conducted using the questionnaire adopted from the National Health and Nutrition Examination Survey (NHANES) [8]. The questionnaire consisted of 2 items that identify whether the respondents have been diagnosed and received any treatment for hepatitis C. Blood samples were sent to a reference laboratory for hepatitis C virus antibody (anti-HCV) and HCV core antigen testing.

4.2 Objectives

4.2.1 General Objective

The objective of this study is to determine the seroprevalence of hepatitis C among adults in Malaysia.

4.2.2 Specific Objectives

- To estimate the seroprevalence of Anti-HCV among adults aged 15 years old and above in Malaysia.
- To estimate the seroprevalence of HCV core antigen among adults aged 15 years old and above in Malaysia.
- To determine the proportion of diagnosed and undiagnosed individuals' status among those with HCV core antigen detected.
- To determine the proportion of treated and untreated individuals' status among those diagnosed with HCV core antigen detected.

Variable Definition

- No HCV antibody detected was defined as non-reactive of hepatitis C antibody.
- Current HCV infection was defined as reactive of Hepatitis C virus antibody and Hepatitis C core antigen detected.
- No current HCV infection was defined as reactive of Hepatitis C antibody and Hepatitis C core antigen not detected.
- Undiagnosed Hepatitis C was defined as not being told to have hepatitis C by a doctor or other health professional and tested reactive for HCV core antigen.
- Untreated Hepatitis C was defined as never prescribed any medicine to treat hepatitis C.

4.3 Findings

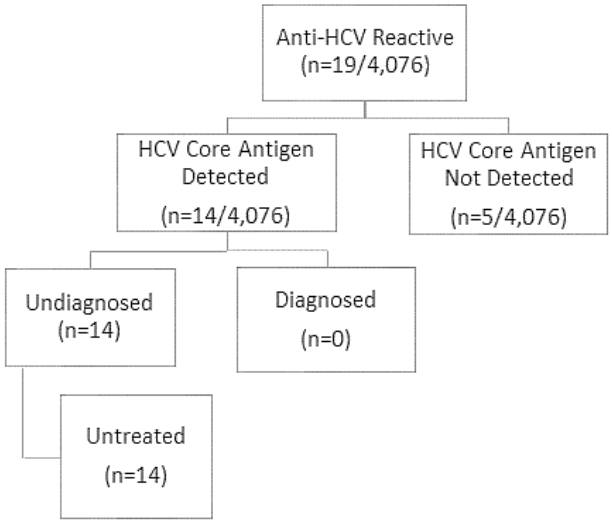

Figure 14: Hepatitis C status among respondents participated in NHMS 2020

4.3.1 Respondents` Characteristics

A total of 4,076 respondents were eligible for the seroprevalence module. Out of 4,076 respondents, 52.9% (n=2,157) were females and 47.1% (n=1,919) were males. More respondents from urban areas (53.6%, n=2,186) compared to rural areas (46.4%, n=1,890). By ethnicity, Malay was the highest (61.7%, n=2,514), followed by Other Bumiputera (17.9%, n=730), Chinese (9.6%, n=391), Others (5.8%, n=238) and Indian (5.0%, n=203). More than half of the respondents (62.8%, n=2,560) were married or living with a partner, while 28.6% (n=1,164) were single and 8.6% (n=351) were widowed or divorce.

4.3.2 Seroprevalence of Anti-HCV

The seroprevalence of hepatitis C in this survey was 0.4% (95% CI: 0.20-0.72) with an estimated population of 90,120 Malaysian residents aged 15 years old and above. In this survey, seropositivity of anti-HCV were found among the Malaysians and there were none among non-Malaysians **(Table 4.1)**.

4.3.3 Seroprevalence of HCV Core Antigen

In this survey, the seroprevalence of hepatitis C core antigen was 0.2% (95% CI: 0.11-0.42) with an estimated population of 51,676 Malaysian residents. In this survey, seropositivity of anti-HCV were found among the Malaysians and there were none among non-Malaysians **(Table 4.2)**.

4.3.4 Undiagnosed and Untreated Hepatitis C

Undiagnosed hepatitis C is defined as those who never been told by a doctor to have hepatitis C but were tested positive for HCV core antigen. In this survey, all of these 14 individuals were undiagnosed and reported never received any treatment for hepatitis C. All the positive respondents were referred for treatment.

4.4 Conclusion

The prevalence of hepatitis C among the general adult population in Malaysia was low as compared to 2.5% reported in other studies. However, the prevalence was consistent with a seroprevalence study published in 2020 that reported a 0.34% prevalence of hepatitis C [10]. Given the low prevalence in the general population, we must assume that it will be significantly higher in the key population. Since 2005, the country's implementation of harm reduction policies may have contributed to the low prevalence of hepatitis C, in parallel to a significant reduction of reported annual HIV/AIDS cases. Hepatitis C screening, diagnosis and treatment will need to be scaled up and expanded to make services more accessible to the general public, with a focus on the key population. Additionally, public awareness of hepatitis C needs to be increased. If no action is taken, chronic hepatitis C prevalence will continue to rise, reaching 528,200 in 2039 **[11]**.

4.5 Recommendation

- Inculcate awareness and enhancing testing for hepatitis C among the key population/high-risk group.
- Decentralize hepatitis C screening, diagnosis, treatment and care in primary health care settings, including closed facility settings.
- Enhance collaboration and strategic partnerships with non-governmental organisation (NGOs), the community, corporate social responsibility (CSR) and industry to prevent, control, test for, treat, and care for hepatitis C.

4.6 Study Limitations

- The sample size of the survey was insufficient to adequately describe the majority variables in the hepatitis C module. This increases the margin of error, effectively nullifying the study. Certain hepatitis analyses had an abnormally large relative standard errors (RSEs), rendering them unsuitable for reporting.
- Self-reported questionnaires were used to collect data on undiagnosed and untreated hepatitis C. No documents (files, reports or medical records) were inspected during the interview. However, the survey used validated NHANES questionnaires to capture information about the current HCV diagnosis and treatment.

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Table 4.1: Seroprevalence of anti-HCV among adults aged 15 years and above by sociodemographic characteristics

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	19	90,120	0.4	0.20	0.72
Location					
Urban	9	-	-	-	-
Rural	10	-	-	-	-
Sex					
Male	14	-	-	-	-
Female	5	-	-	-	-
Citizenship					
Malaysian	19	90,120	0.5	0.23	0.82
Non-Malaysian	0	-	-	-	-

Note: (-) Data have been suppressed due to small counts

Table 4.2: Seroprevalence of hepatitis C core antigen among adults aged 15 years and above by sociodemograhic charateristics

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	14	51,676	0.2	0.11	0.42
Location					
Urban	5	-	-	-	-
Rural	9	-	-	-	-
Sex					
Male	9	-	-	-	-
Female	5	-	-	-	-
Ethnicity					
Malay	9	-	-	-	-
Chinese	0	-	-	-	-
Indian	1	-	-	-	-
Other Bumiputeras	4	-	-	-	-
Others	0	-	-	-	-
Citizenship					
Malaysian	14	51,676	0.3	0.13	0.13
Non-Malaysian	0	-	-	-	-

Note: (-) Data have been suppressed due to small counts

TUBERCULOSIS

TB-like Symptoms

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HIGHLIGHTS

- The prevalence of self-reported individuals who ever had TB was 1.1%.
- 42% of respondents with TB-like symptoms sought treatment from government health clinics.
- The majority of respondents who did not seek early treatment despite having at least one TB-like symptom believed it was not an emergency.

Keywords: *Tuberculosis, Malaysia*

5.1 Introduction

Tuberculosis (TB) is an ancient infectious disease caused by *Mycobacterium tuberculosis* (*M. tuberculosis*). It is one of the top 10 main causes of death worldwide and the biggest infectious agent-related cause of mortality. TB is a treatable and preventable disease. The World Health Organization (WHO) estimates that 10 million people became ill with TB in 2019 and 1.4 million died [1]. Globally, TB incidence is declining at a rate of about 2% per year, with a cumulative reduction of 9% between 2015 and 2019. This was less than halfway to the End TB Strategy's 2020 target of a 20% reduction in TB [2]. Malaysia is classified as having an upper-moderate TB burden [3]. According to the Global Tuberculosis Report 2020, the estimated rate of TB incidence in Malaysia for 2019 was 92/100,000 population [2]. The rate of TB notification in Malaysia has been increasing over the years, particularly from 2015 to 2019. TB is a potentially serious infectious disease that affects primarily the lungs. Individuals with active lung TB will exhibit common symptoms such as coughing up sputum and occasionally blood, chest pains, loss of appetite, weight loss, fever, and night sweats.

TB can be spread via airborne droplets, and a single patient can infect ten or more people per year. This can occur when someone with TB who is untreated coughs, speaks, sneezes, spits, laughs, or sings [4]. It is critical for people to have knowledge and awareness of TB, particularly of the disease's early signs and symptoms, in order to present themselves to health facilities for screening early. This will aid in preventing the spread of TB, lowering the incidence of the disease, and enabling earlier diagnosis and effective treatment. Additionally, delays in seeking health care for TB-related symptoms are caused by both patient and provider factors, including fear of social isolation, economic constraints, and distance to a health facility, insufficient staff, attitudes, and poor quality of health services [5]. Stigma associated with TB patients may also contribute to health-seeking delays.

The TB module was carried out on all respondents aged 15 years and above. From August to October 2020, data were collected via Computer-assisted Telephone Interview (CATI) by trained research assistants using pre-coded questionnaires. The first submodule contains information about the prevalence of TB among respondents. Respondents were asked if they had ever had or were currently infected with TB. Then, respondents were asked if they had experienced one or more TB-like symptoms for the past one month, which included coughing, coughing up phlegm, having a fever or night sweats for 2 weeks, as well as cough up blood or experiencing unexpected weight loss. Individuals with at least one TB-like symptom were asked regarding their health-seeking behaviour. Further investigation was conducted to determine why individuals did not seek treatment despite their symptoms.

5.2 Objectives

5.2.1 General Objective

To determine the prevalence of TB-like symptoms in Malaysia.

5.2.2 Specific Objectives

- To determine the health-seeking behaviour of individuals with TB-like symptoms.
- To identify the reasons behind individuals with TB-like symptoms who did not seek proper treatment.

Definition

- Individuals with TB-like symptoms were defined based on self-reporting of having one or more TB symptoms in the last month. The symptoms include coughing, coughing up phlegm, having a fever and night sweats for more than two weeks, as well as coughing up blood, and unexpected weight loss.

- Individuals with at least one TB-like symptom are defined as having engaged in health-seeking behaviour, which includes self-medication, purchasing medicines from pharmacies, seeking treatment from government and/or private healthcare facilities, facilities, seeking advice and treatment from a traditional healer, and not seeking treatment at all.

5.3 Findings

5.3.1 Prevalence of Ever Had TB (Self-Reported)

A total of 3,085 respondents were involved in the study. In this survey, the prevalence of individuals who reported ever had TB was 1.1% (95% CI: 0.59-1.89) **(Table 5.1)**.

5.3.2 TB-like Symptoms

In this study, the prevalence of at least one TB-like symptom was 2.5% (95% CI: 1.64-3.67) with an estimated of 605,070 individuals in Malaysia. Among all respondents, 81 respondents were found to have at least one TB-like symptom. Cough up phlegm indicates the highest prevalence among respondents (0.9%, 95% CI: 0.57-1.44), followed by dry cough for more than 2 weeks (0.4%, 95% CI: 0.22-0.77), while fever more than 2 weeks (0.3%, 95% CI: 0.15-0.56) were the least reported **(Table 5.2)**.

5.3.3 Health-Seeking Behaviour

This study showed that individuals with at least one TB-like symptom chose to self-medicate (26.2%, 95% CI: 16.56-38.74), followed by purchased medicines from pharmacies (21.8%, 95% CI: 13.15-33.81). In choosing healthcare facilities, most respondents sought treatment from government health clinics (41.9%, 95% CI: 25.36-60.41) compared to other health care facilities; government hospitals (19.2%, 95% CI: 11.57-30.16), and private clinics (14.4%, 95% CI: 7.28-26.55). Of those who reported had TB-like symptoms, 11 respondents did not seek any kind of treatment at all **(Table 5.3)**.

5.3.4 Reasons for Not Seeking Health Care

The main reasons for not seeking treatment among those with at least one TB-like symptom were because they felt like it was not an emergency (78.2%, 95% CI: 63.40-88.13) and a proportion of respondents reported that they did not have time to seek treatment (17.6%, 95% CI: 8.60-32.66) **(Table 5.4)**.

5.4 Conclusion

Coughing up phlegm was the most prevalent TB-like symptom, and individuals with at least one TB-like symptom were more likely to seek treatment at government health clinics. Individuals who did not seek treatment despite having at least one TB-like symptom believed the illness did not require immediate attention and did not perceive it as an emergency. Thus, increasing population awareness and knowledge, particularly about the disease's symptoms and the critical nature of seeking early treatment, will aid in the detection and management of tuberculosis.

5.5 Recommendation

- Increase public awareness of TB disease through ongoing health promotion and educational activities emphasising TB symptoms and the importance of seeking early treatment.
- Advocate for activities aimed at increasing staff knowledge and skills, as well as promoting TB care services available in the community. This is to ensure that the public has early access to and information about the appropriate facility for care.
- To foster active collaboration with private healthcare facilities, community members, and civil society organisations to assist with TB screening and preventive activities.
- Encourage additional research and innovation to increase public awareness and engagement with TB.

5.6 Study Limitations

The survey used standardised TB-like symptom questionnaires, which have also been used to screen suspected TB patients in primary care settings and in the community [6]. Self-reported questionnaires assess acquiescence, social desirability bias, and respondent knowledge and awareness. When using CATI method, sampling bias in terms of non-coverage bias, as well as the degree of anonymity, are unavoidable and may result in a low respondent rate.

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Table 5.1: Prevalence of ever had TB infection (self-reported) aged 15 years and above by sociodemographic characteristics

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	24	261,292	1.1	0.59	1.89
Location					
Urban	9	-	-	-	-
Rural	15	74,197	1.3	0.74	2.36
Sex					
Male	11	-	-	-	-
Female	13	-	-	-	-

Note: (-) Data have been suppressed due to small counts

Table 5.2: Prevalence of TB-like symptoms among adults aged 15 years and above

The Presence of TB-like Symptoms	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Dry cough ≥ 2 weeks	17	101,548	0.4	0.22	0.77
Cough with phlegm ≥ 2 weeks	33	223,566	0.9	0.57	1.44
Cough up blood	5	-	-	-	-
Fever ≥ 2 weeks	13	72,387	0.3	0.15	0.56
Unexpected weight loss	16	-	-	-	-
Drenching night sweet ≥ 2 weeks	15	-	-	-	-
At least one symptom	81	605,070	2.5	1.64	3.67

Note: (-) Data have been suppressed due to small counts

Table 5.3: Percentage of health-seeking behaviour among respondents with TB-like symptoms aged 15 years and above

Health Seeking Behaviour	Count	Percentage (%)	95% CI	
			Lower	Upper
Self-medicated	25	26.2	16.56	38.74
Purchase medicine from pharmacy	21	21.8	13.15	33.81
Seek treatment from government clinic	27	41.9	25.36	60.41
Seek treatment from government hospital	20	19.2	11.57	30.16
Seek treatment from private clinic	11	14.4	7.28	26.55
Seek treatment from private hospital	1	-	-	-
Seek advice and treatment from traditional healer	5	-	-	-
Did not seek treatment	11	-	-	-

Note: (-) Data have been suppressed due to small counts
*Analysis was done among those who reported had at least one TB-like symptoms, n=81

Table 5.4: Percentage of types of reasons for not seeking treatments

Reasons for not seeking treatment	Count	Percentage (%)	95% CI	
			Lower	Upper
Not an emergency	8	78.2	63.40	88.13
Transportation problem	0	-	-	-
Ongoing TB treatment	0	-	-	-
Financial problem	3	-	-	-
Fear/disbelief in treatment	1	-	-	-
Been advised not to seek treatment	1	-	-	-
No time to seek treatment	2	17.6	8.60	32.66

Note: (-) Data have been suppressed due to small counts
*Analysis was done among those who did not seek treatment, n=11.

ANTIBIOTICS USE

Antibiotics Use: Awareness and Practices among Malaysians

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HIGHLIGHTS

- Only 21.5% of respondents were aware of antimicrobial resistance.
- Almost half of the respondents did not know that common cold is normally caused by virus but not bacteria.
- Only 1/3 of the respondents knew that antibiotics do not kill virus.
- 25% of the respondents claimed that they ever consumed antibiotics for common cold for the past 1 year and 34.4% of them stopped their antibiotics once they felt better.

Keywords: *Antimicrobial Resistance, Antibiotics Resistance, Malaysia*

6.1 Introduction

Antibiotics are one of the most frequently prescribed medications, and almost everyone takes them at some point in their lives. Antibiotic drug development aids in the prevention and treatment of bacterial infections in all age groups. However, excessive use and misuse of antibiotics are the primary causes of antimicrobial resistance, which poses a threat to global public health [1]. Antibiotic resistance develops when bacteria adapt to the use of these medications, gaining the ability to resist the drugs that are intended to kill them [2]. Additionally, as a result of the emergence and spread of drug-resistant and multidrug-resistant bacteria, it has developed into a major public health concern.

The WHO's new data revealed significant differences in antibiotic consumption across 65 countries and regions. The large disparity in antibiotic use across countries suggests that some countries are likely overusing antibiotics, while others may lack adequate access to these life-saving medications [2]. Despite this, antibiotics remain effective treatments for a variety of common diseases, with significant implications for human health [3]. The National Surveillance of Antimicrobial Resistance (NSAR) in Malaysia reported that the rate of AMR is rapidly increasing [4]. As a result, it is critical to promote informed decision-making and carefully designed mass education campaigns about antibiotic consumption in order to prevent unnecessary antibiotic use across the country.

WHO has been coordinating a world campaign to raise awareness of antibiotic resistance since 2015 at the World Health Assembly [2]. The main objective of the campaign is to improve and to increase awareness and understanding of the antibiotic resistance issues among the public population. In conjunction with that, the campaign was launched in Malaysia in 2017. This study was part of the NHMS 2020. Data was collected from September to October 2020 via computer-assisted telephone interview (CATI). Consented participants aged 15 years old and above were interviewed by trained research assistants. The questions were adapted from the WHO Antibiotics Resistance: Public Awareness Survey. The type three questionnaire was used, pretested and translated into Bahasa Melayu and validated prior to the actual survey. The questionnaire consisted of 13 questions regarding awareness (1 question), practices (5 questions), and knowledge (7 questions) related to antibiotic resistance.

6.2 Objectives

6.2.1 General Objective

In parallel with the on-going antibiotics awareness campaign in Malaysia which was commenced in 2017, this study was conducted to determine the awareness and common practices of antibiotics use among the population in Malaysia.

6.2.2 Specific Objectives

- To assess practices on antibiotic use for the past one year among the population in Malaysia.
- To estimate the prevalence of awareness of antibiotics/ antimicrobial resistance among the population in Malaysia.

Definition

- Individuals Prevalence of awareness of antibiotics resistance:
  - Whoever answered *"yes"* for the question "have you ever heard of antibiotics resistance?
- Prevalence of antibiotics used for common cold for the past 1 year in Malaysia:
  - Whoever answered "*yes"* to the question "have you ever taken antibiotics for common cold and sore throat for the past 1 year?"
- Knowledge on the antibiotic's resistance, whoever answered **correctly** for the questions:
  - "Most common cold and sore throats are caused by virus but not bacteria"
  - "Does antibiotic kill virus?"
  - "Is antibiotic effective to treat common cold and sore throats?"
  - "Does overuse or misuse of antibiotics among human cause antibiotic resistance (make antibiotic less effective) to treat bacterial infections?"
  - "Does overuse or misuse of antibiotics in animal farming lead to antibiotic resistance in humans and animals?"

6.3 Findings

6.3.1 Prevalence of Awareness of Antibiotic Resistance

Only 533 respondents (21.5%, 95% CI: 17.29-26.37) were aware of antibiotic resistance with a higher prevalence in the urban (23.6%, 95% CI: 18.43-29.67) and among males (22.9%, 95% CI: 17.56-29.20) as compared to the rural (14.3%, 95% CI: 11.17-18.14) and females (20.1%, 95% CI: 15.96-24.89). The highest prevalence (25.2%, 95% CI: 18.84-32.77) of aware of antibiotic resistance belongs to the older age group (60-69 years) while the youngest age group (15-19 years) had the lowest prevalence (11.2%, 95% CI: 6.99-17.37). The prevalence of having awareness of antibiotic resistance was higher among Chinese ethnicity (41.4%, 95% CI: 33.85-49.39) and government employees (30.8%, 95% CI: 24.00-38.51) as compared to than their counterparts **(Table 6.1)**.

6.3.2 Prevalence of Practice on Antibiotics for the Past 1 Year in Malaysia

Table 6.2 shows that only 25% (95% CI: 21.84-28.50) of respondents have taken antibiotics for common cold for the past year. Among those who have taken antibiotics, the majority (95.2%, 95% CI: 92.82-96.88) of them obtained the antibiotics from clinics. A total of 97.1% (95% CI: 95.21-98.32) of them claimed that they were given instructions by professional medical personnel on how to take the antibiotics properly. Despite this, 34.4% (95% CI: 28.96-40.18) of them stopped taking antibiotics once they felt better but did not finish their antibiotics.

In terms of antibiotics balance disposal, 65.9% (95% CI: 60.27-71.07) of respondents claimed that they had no balance left, 17.4% (95% CI: 13.81-21.69) claimed that they simply threw the antibiotics in the garbage, and 15.9% (95% CI: 12.27-20.30) claimed they never disposed of the antibiotics **(Table 6.3)**.

6.3.3 Prevalence of General Knowledge of Antibiotics Resistance in Malaysia

Of the total respondents of 3051 people, about half of them answered correctly to the question that "Most common colds and sore throats are caused by viruses but not bacteria" with 51.3% (95% CI: 47.19-55.36). Less than half (33.9%, 95% CI: 30.97-36.91) of the respondents answered correctly to the question "Do antibiotics kill viruses?" and "Are antibiotics effective to treat common colds and sore throats?" with 22.2% (95% CI: 18.72-26.07) answered correctly. Only 22.7% (95% CI: 18.83-27.03) of respondents correctly answered the question "Does overuse or misuse of antibiotics in humans cause antibiotic resistance (make antibiotics less effective) to treat bacterial infections?" and 36.8% (95% CI: 33.42-40.22) incorrectly answered the question "Does overuse or misuse of antibiotics in animal farming lead to antibiotic resistance?". When asked what they would do if they were not prescribed antibiotics during their doctor's visit, 29.3% (95% CI: 25.85-32.95) said they would request them from the doctor, while 14.1% (95% CI: 12.03-16.50) said they would buy the antibiotics over the counter without a prescription **(Table 6.4)**.

6.4 Conclusion

This survey presented national representative data on antibiotic awareness, knowledge and practices among those aged 15 years and above in Malaysia. The overall awareness of antibiotic/antimicrobial resistance is still low irrespective of the strata, age group, ethnicity, and education level. However, the knowledge of antibiotics and antibiotic resistance was fair that most of them knew that misuse and overuse of the antibiotics would lead to antibiotic resistance. It is important that people should understand the problem of antibiotic resistance which will determine their practices and behaviours towards antibiotic use. This will eventually affect the rate of antibiotic resistance in Malaysia.

6.5 Recommendation

- More campaigns and health education, especially in social media, to tackle most of the population.
- To educate children and young people about antibiotics at a young age and incorporate the topic into their existing school syllabus.
- Indirect campaigns in other established diseases, such as "don't skip your medicine" in TB campaigns, which are actually aimed at lowering the incidence of drug-resistant TB.
- To advertise more health education materials (posters, banners, electronic banners) in public places such as in shopping malls and highway billboards.
- Medical practitioners and pharmacists, especially those in primary care (government and private), help in educating the public on antibiotics usage and resistance.

6.6 Study Limitations

This study was conducted using CATI, hence the limitation on CATI method cannot be avoided such as response bias. The call can be made only to those who have adequate phone network coverage and a telephone. Apart from that, the questions were open ended, and respondents were compelled to choose only from the options provided, rather than from their actual thoughts or practices, which may reveal their misconceptions about this topic.

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Table 6.1: Prevalence of awareness of antibiotics/antimicrobial resistance by sociodemographic characteristics

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	**533**	**5,299,929**	**21.5**	**17.29**	**26.37**
Location					
Urban	340	4,500,927	23.6	18.43	29.67
Rural	193	799,002	14.3	11.17	18.14
Sex					
Male	242	2,874,244	22.9	17.56	29.20
Female	291	2,425,685	20.1	15.96	24.89
Age Group					
15 – 19	32	343,915	11.2	6.99	17.37
20 – 29	103	1,266,474	20.3	14.31	27.99
30 – 39	128	1,286,918	24.4	18.62	31.23
40 – 49	95	936,378	25.0	18.11	33.44
50 – 59	97	720,336	23.3	17.75	29.92
60 – 69	62	503,040	25.2	18.84	32.77
70 and above	16	242,867	19.7	11.11	32.53
Ethnicity					
Malay	318	1,984,531	16.6	13.97	19.72
Chinese	96	2,310,364	41.4	33.85	49.39
Indian	21	263,975	16.7	8.22	30.96
Other Bumiputeras [a]	78	417,488	14.8	10.61	20.23
Others	20	–	–	–	–
Citizenship					
Malaysian	513	4,976,358	22.7	18.38	27.66
Non-Malaysian	20	–	–	–	–
Education Level					
No formal Education	12	–	–	–	–
Primary Education	57	558,770	11.9	7.78	17.92
Secondary Education	220	1,960,750	17.6	13.86	22.15
Tertiary Education	244	268,5026	34.5	27.51	42.21

Table 6.1: Prevalence of awareness of antibiotics/antimicrobial resistance by sociodemographic characteristics (Cont.)

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Marital Status [b]					
Single	139	1,664,855	20.9	15.57	27.48
Married	352	3,192,540	21.3	16.92	26.53
Widow(er)/Divorcee	42	442,535	25.5	18.15	34.46
Occupation [c]					
Government Employee	85	580,835	30.8	24.00	38.51
Private Employee	139	1,865,629	22.1	15.87	29.97
Self Employed	87	761,732	21.2	15.55	28.27
Unpaid worker / Homemaker / caregiver	86	630,124	16.6	12.52	21.75
Student	51	615,630	20.0	14.56	26.88
Not working (Unemployed, health problem, old age, child & retiree)	82	814,498	21.5	14.89	30.05

Note:
[a] Other Bumiputeras includes Bumiputera Sabah, Bumiputera Sarawak and Orang Asli
[b] Marital Status from 10 years old and above
[c] Occupation from 15 years old and above
(-) Data have been suppressed due to small counts

Table 6.2: Prevalence of antibiotics use for the past one year in Malaysia (n = 3,051)

Practices	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
In the past 1 year, have you taken antibiotic for common cold or sore throat?					
Yes	759	6,175,156	25.0	21.84	28.50
No	2,292	18,499,754	75.0	71.50	78.15

Table 6.3: Practices of antibiotics use among antibiotics consumer in the last episode for the past one year (n = 759)

Practices	Unweighted Count	Estimated Population	Proportion (%)	95% CI	
				Lower	Upper
On that occasion, where did you get the antibiotics?					
Clinic	711	5,881,290	95.2	92.82	96.88
Medical store or pharmacy	46	270,416	4.4	2.80	6.79
Stall or hawker	0	–	–	–	–
The internet	0	–	–	–	–
Friend or family member	1	8,620	0.1	0.02	1.01
Saved up from previous time	0	–	–	–	–
Somewhere/ someone else	1	14,830	0.2	0.03	1.70
On that occasion, did you get advice from a doctor, nurse, or pharmacist on how to take them?					
Yes	731	5,999,086	97.1	95.21	98.32
No	28	176,071	2.90	1.68	4.79
On that occasion, when did you stop taking the antibiotic?					
Felt better	267	2,121,277	34.4	28.96	40.18
Taken all the antibiotics as directed	492	4,053,879	65.6	59.82	71.04
Don't know	0	–	–	–	–
On that occasion, was there balance of the antibiotic? If yes, what did you do with it?					
No balance of antibiotics	492	4,067,812	65.9	60.27	71.07
Thrown away in the trash	124	1,074,784	17.4	13.81	21.69
Flush down in the toilet or sink	5	–	–	–	–
Returned to pharmacy or clinic	2	–	–	–	–
Stored / never disposed	133	980,390	15.9	12.27	20.30
Burned	2	–	–	–	–
Don't know	1	–	–	–	–

Note: (-) Data have been suppressed due to small counts

Table 6.4: General knowledge on antibiotics in Malaysia (n = 3,051)

Practices	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Correct Answer for "Most common cold and sore throats are caused by virus but not bacteria"					
Correct Answer	1,581	12,654,632	51.3	47.19	55.36
Incorrect Answer	1,470	12,020,278	48.7	44.64	52.81
Correct Answer for "Does antibiotic kill virus?"					
Correct Answer	1,008	8,358,187	33.9	30.97	36.91
Incorrect Answer	2,043	16,316,723	66.1	63.09	69.03
Correct Answer for "Is antibiotic effective to treat common cold and sore throats?"					
Correct Answer	601	5,471,589	22.2	18.72	26.07
Incorrect Answer	2,450	19,203,321	77.8	73.93	81.28
Correct Answer for "Does overuse or misuse of antibiotics among human cause antibiotic resistance (make antibiotic less effective) to treat bacterial infections?"					
Correct Answer	2,322	19,081,933	77.3	72.97	81.17
Incorrect Answer	729	5,592,977	22.7	18.83	27.03
Correct Answer for "Does overuse or misuse of antibiotic in animal farming lead to antibiotic resistance in humans and animals?"					
Correct Answer	1,980	15,605,439	63.2	59.78	66.58
Incorrect Answer	1,071	9,069,471	36.8	33.42	40.22
You are seeing a doctor for common cold or sore throat. He does not prescribe an antibiotic for you. Would you request for antibiotic from him?					
Yes	995	7,222,828	29.3	25.85	32.95
No	2,049	17,394,715	70.5	66.76	73.97
Refuse to answer	1	–	–	–	–
Don't know	6	–	–	–	–
You are seeing a doctor for common cold or sore throat. He does not prescribe an antibiotic for you. Would you buy it from the pharmacy without a prescription?					
Yes	453	3,483,983	14.1	12.03	16.50
No	2,593	21,144,109	85.7	83.26	87.82
Refuse to answer	0	–	–	–	–
Don't know	5	–	–	–	–

Note: (-) Data have been suppressed due to small counts

HIV

HIV Knowledge in Malaysia

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HIGHLIGHTS

- The overall prevalence of adequate HIV knowledge in Malaysia was low (22.6%).
- Population from urban areas, higher educational group prevalence of adequate HIV knowledge.

Keywords: *HIV/AIDS, Knowledge, Misconceptions, Malaysia*

7.1 Introduction

Human Immunodeficiency Virus (HIV) is a retrovirus that targets the CD4+ of human T-lymphocyte cells of the immune system. The weakening immune system causes susceptibility to multiple infective diseases and cancers. As the disease progresses through the years, infected individuals develop Acquired Immunodeficiency Syndrome (AIDS). AIDS is defined by the development of multiple opportunistic infections (such as *Pneumocystis jirovecii*, tuberculosis, generalised candidiasis, and cerebral toxoplasmosis) and AIDS-related cancers (such as Kaposi's Sarcoma). HIV is transmitted by bodily fluids such as blood, semen, or vaginal secretions and vertical mother-to-child transmission during pregnancy or delivery. It cannot be transmitted by kissing, shaking hands, sharing personal objects, or spread by food or water [1].

The World Health Organization (WHO) estimated by the end of 2019, 38 million people were living with HIV globally, with 1.7 million people were newly infected with the disease, while 690,000 died due to HIV-related diseases in that year alone [1]. Based on the Malaysian Country Progress Report on HIV/AIDS 2019, the cumulative number of reported HIV and AIDS cases were 118,883 and 25,925 respectively [2]. The health promotion regarding HIV/AIDS awareness has been a core indicator for comparing and evaluating the national HIV/AIDS prevention program across countries [3].

In June 2001, 189 countries declared their vows of commitment in battling the spread of the pandemic during the United Nations General Assembly Special Session (UNGASS) on HIV/AIDS [4].

A person with inadequate health knowledge and awareness regarding HIV/AIDS is more vulnerable to acquiring the infection and may spread the pandemic throughout the population [5]. Many HIV knowledge prevalence studies have been done worldwide. Inadequate knowledge was reported to be 67% in Bolivia [6], while adequate knowledge was reported in less than half in South Africa (44.7%) [7] and 51.9% among unmarried young women in Uganda [8]. In 2006, a study among 1075 young Malaysian adults aged 15-24 years reported moderate knowledge of HIV/AIDS, with a mean knowledge score of 20.1 out of 32 points [9]. An online survey using the UNGASS indicators conducted among secondary school students in Malaysia showed that only 50% of them correctly identify both ways of preventing the sexual transmission of HIV and reject major misconceptions about HIV transmission [2].

Data was collected using Computer-assisted Telephone Interview (CATI) method. HIV knowledge was assessed using the UNGASS indicators, which contain five questions on HIV prevention and transmission. There were two questions regarding the association between HIV transmission with sexual practice and behaviour. The remainder was one question, each related to insect bite, meal sharing, and knowledge about the physical appearance of someone with HIV infection. Respondents who correctly answer all five questions were considered to have adequate knowledge about HIV/AIDS.

7.2 Objectives

7.2.1 General Objective

The objective of this study is to determine the prevalence of adequate HIV knowledge in Malaysia.

7.2.2 Specific Objectives

- To determine the prevalence of adequate HIV knowledge among respondents aged 13 years and above by sociodemographic characteristics.
- To determine the proportion of correct responses for each HIV-related knowledge area among respondents aged 13 years and above.

Definition

Adequate HIV knowledge is defined as correctly answer all five questions: “Yes” for items 1 to 3 and “No” " for items 4 and 5.

- **Item 1**: Can the risk of HIV transmission be reduced by having sex with only one uninfected partner who has no other partners?
- **Item 2**: Can a person reduce the risk of getting HIV by using a condom every time they have sex?
- **Item 3**: Can a healthy-looking person have HIV?
- **Item 4**: Can a person get HIV from mosquito bites?
- **Item 5**: Can a person get HIV by sharing food with someone who is infected?

7.3 Findings

7.3.1 Prevalence of Adequate HIV Knowledge among Respondents Aged 13 Years and Above

Overall, the prevalence of adequate HIV knowledge was 22.6% (95% CI: 19.67-25.85) among general population aged 13 years and above. Respondents living in urban areas had a significantly higher likelihood of adequate HIV knowledge (24.9%, 95% CI: 21.40-28.78) than their rural counterparts (14.8%, 95% CI: 11.82-18.42). Meanwhile, the prevalence of adequate HIV knowledge was similar among males (22.7%, 95% CI: 19.46-26.34) and females (22.5%, 95% CI: 18.93-26.54). The age group of 40-44 years had the highest prevalence of adequate HIV knowledge (40.3%, 95% CI: 32.19-49.05), while the lowest prevalence was found among younger age group of 13-14 years (12.2%, 95% CI: 6.29-22.31). By ethnicity, Chinese respondents reported the highest prevalence of adequate HIV knowledge (32.3%, 95% CI: 25.99-39.28), followed by Malays (25.0%, 95% CI: 22.47-27.77) and other Bumiputeras (16.1%, 95% CI: 11.39-22.18). The prevalence of adequate HIV knowledge increased with increasing education level: primary education (12.5%, 95% CI: 9.32-16.57), secondary education (19.8%, 95% CI: 17.06-22.96), and tertiary education (36.5%, 95% CI: 29.38-44.29). Government employees showed a significantly higher prevalence of adequate HIV knowledge (43.2%, 95% CI: 34.45-52.39) compared to other occupational groups **(Table 7.1)**.

7.3.2 Proportion of Correct Response to Each Item of HIV Knowledge among Respondents Aged 13 Years and Above

The question on “Can the risk of HIV transmission be reduced by having sex with only one uninfected partner who has no other partners?” (Item 1) had the highest proportion of respondents who answered correctly (74.9%, 95% CI: 69.52-79.67) compared to other items. There was no significant difference across locality and age group **(Table 7.2)**.

A total of 69.5% of respondents gave a correct response to the question, “Can a person reduce the risk of getting HIV by using a condom every time they have sex?” (Item 2). There was no significant difference across locality and age group **(Table 7.3)**.

The question on “Can a healthy-looking person have HIV?” (Item 3) was correctly answered by 68.9% of respondents. A significantly higher proportion of respondents from urban areas (71.7%, 95% CI: 66.46-76.37) answered this question correctly compared to respondents from rural areas (59.8%, 95% CI: 56.05-63.41). However, there was no significant difference observed between age groups **(Table 7.4)**.

The question on “Can a person get HIV from mosquito bites?” (Item 4) had the second-highest proportion of being answered correctly by respondents (71.7%, 95% CI: 68.79-74.37). There was no significant difference across locality and age group **(Table 7.5)**.

The proportion of respondents who answered the question “Can a person get HIV by sharing food with someone who is infected?” (Item 5) correctly was 62.0% (95% CI: 58.27-65.65). The proportion of respondents who gave a correct response to this question was significantly higher in urban areas (64.8%, 95% CI: 60.46-68.98) compared to their rural counterparts (52.6%, 95% CI: 48.67-56.50). No significant difference was observed between age groups **(Table 7.6)**.

7.4 Conclusion

Overall, the prevalence of adequate HIV knowledge in Malaysia was low, especially among young people. Misconceptions about HIV transmission and prevention among young people are still common. The findings from this survey have important implications for the development of primary HIV/AIDS prevention programs and HIV educational campaigns to increase knowledge and dispel misconceptions about HIV. Such education and intervention programs should target rural areas, the young adult population, less educated, and unemployed groups.

7.5 Recommendation

- Strengthening existing public health policy, for instance update the content of HIV knowledge of "*Pendidikan Kesihatan Reproduktif Dan Sosial (Peers) Dalam Kurikulum Pendidikan Kesihatan*" and Premarital Course Module.
- Creating supportive environments:
    - Diversification of information delivery platforms to various target groups, especially among the younger population, lower education, rural locality, and unemployed groups.
    - Creating web-based education via platforms such as mobile web (webisodes, HIV prevention text messages), website (improve layout and design), social media (Facebook/Instagram/Twitter/Tik-Tok/YouTube).
- Strengthening community action by:
    - Rebranding PROSTAR 2.0 in all states in Malaysia
    - Collaborating with private sectors (CSR) to provide HIV/AIDS Health Promotion such as commercial advertisement & community activities
    - Collaborate with various agencies, including NGOs, to find new ways to disseminate information on HIV/AIDS.
- Strengthening knowledge among young people on HIV/AIDS by improving HIV/AIDS module contents in schools such as Doktor Muda (Secondary schools), PROSTAR, and PROSIS.
- Incorporating HIV knowledge into existing health services such as Health Promoting Clinics & Health Education Unit in hospitals and mobile clinics to deliver HIV/AIDS-related information.

7.6 Study Limitations

For the first time, in response to COVID-19 pandemic, CATI method was used to collect data on HIV knowledge. Therefore, our findings cannot be compared to those of previous studies that employed the self-administered questionnaire method. The time constraints associated with telephone interviews may have an effect on the data's quality. Although the study' sample size was optimal, the CATI method excluded respondents who did not have a phone / who rejected calls.

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Table 7.1: Prevalence of adequate HIV knowledge among respondents aged 13 years and above by sociodemographic characteristics (n = 3,187)

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	692	5,856,527	22.6	19.67	25.85
Location					
Urban	449	4,983,568	24.9	21.40	28.78
Rural	243	872,959	14.8	11.82	18.42
Sex					
Male	325	3,027,947	22.7	19.46	26.34
Female	367	2,828,580	22.5	18.93	26.54
Age Group					
Less than 15	20	173,773	12.2	6.29	22.31
15 – 19	38	324,356	13.5	8.26	21.22
20 – 24	55	409,404	14.4	9.99	20.24
25 – 29	48	580,112	16.4	10.56	24.64
30 – 34	93	818,948	29.6	22.85	37.30
35 – 39	79	747,573	27.9	19.01	39.01
40 – 44	109	829,170	40.3	32.19	49.05
45 – 49	76	492,502	28.4	18.30	41.25
50 and above	174	1,480,689	23.0	18.51	28.13
Ethnicity					
Malay	490	3,134,053	25.0	22.47	27.77
Chinese	80	1,833,777	32.3	25.99	39.28
Indian	16	–	–	–	–
Other Bumiputeras [a]	88	464,566	16.1	11.39	22.18
Others	18	–	–	–	–
Citizenship					
Malaysian	675	5,648,184	24.8	21.98	27.83
Non-Malaysian	17	–	–	–	–
Education Level					
No formal Education	6	–	–	–	–
Primary Education	80	690,982	12.5	9.32	16.57
Secondary Education	311	2,239,912	19.8	17.06	22.96
Tertiary Education	295	2,880,538	36.5	29.38	44.29

Table 7.1: Prevalence of adequate HIV knowledge among respondents aged 13 years and above by sociodemographic characteristics (n = 3,187) (Cont.)

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Marital Status [b]					
Single	173	1,697,527	19.2	15.20	23.98
Married	470	3,743,496	24.5	21.02	28.34
Widow(er)/Divorcee	49	415,504	23.4	15.47	33.67
Occupation [c]					
Government Employee	119	822,052	43.2	34.45	52.39
Private Employee	186	2,037,681	23.2	16.70	31.33
Self Employed	123	944,476	26.1	20.98	32.02
Unpaid worker/ Homemaker/ caregiver	101	649,954	17.1	12.93	22.31
Student	77	672,365	17.8	12.28	25.06
Not working (Unemployed, health problem, old age, child & retiree)	84	707,542	18.2	13.83	23.63

Note:
[a] Other Bumiputeras includes Bumiputera Sabah, Bumiputera Sarawak and Orang Asli
[b] Marital Status from 10 years old and above
[c] Occupation from 15 years old and above
Note: (-) Data have been suppressed due to small counts

Table 7.2: Proportion of correct response to item 1: "Can the risk of HIV transmission be reduced by having sex with only one uninfected partner who has no other partners?" (n = 3,172)

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	2,387	19,294,771	74.9	69.52	79.67
Location					
Urban	1,346	14,986,699	75.4	68.42	81.30
Rural	1,041	4,308,072	73.3	69.32	76.91
Age Group					
Less than 15	100	987,743	69.3	55.46	80.38
15 - 19	187	1,637,600	68.0	57.27	77.13
20 - 24	226	1,808,041	63.5	53.28	72.58
25 - 29	240	2,509,232	71.2	59.48	80.64
30 - 34	261	2,202,902	79.6	72.38	85.39
35 - 39	248	2,087,284	78.0	70.74	83.84
40 - 44	239	1,695,089	82.5	72.31	89.43
45 – 49	206	1,461,789	84.5	75.85	90.46
50 and above	680	4,905,093	77.7	73.12	81.67

Table 7.3: Proportion of correct response to item 2: "Can a person reduce the risk of getting HIV by using a condom every time they have sex?" (n = 3,155)

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	2,172	17,708,701	69.5	65.54	73.25
Location					
Urban	1230	13,811,288	70.4	65.28	75.10
Rural	942	3,897,412	66.5	63.48	69.48
Age Group					
Less than 15	93	822,524	58.0	47.81	67.46
15 – 19	159	1,335,344	55.5	47.22	63.48
20 – 24	188	1,707,788	60.0	51.05	68.42
25 – 29	209	2,226,463	63.4	53.69	72.20
30 – 34	251	2,283,377	82.6	77.62	86.67
35 – 39	237	1,994,388	75.5	67.96	81.77
40 – 44	221	1,550,947	75.4	67.56	81.93
45 – 49	191	1,347,970	79.6	70.33	86.57
50 and above	623	4,439,901	72.4	67.65	76.61

Table 7.4: Proportion of correct response to item 3: "Can a healthy-looking person have HIV?" (n = 3,158)

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	2,142	17,543,340	68.9	64.88	72.73
Location					
Urban	1,273	14,042,968	71.7	66.46	76.37
Rural	869	3,500,372	59.8	56.05	63.41
Age Group					
Less than 15	93	924,019	64.8	52.54	75.44
15 – 19	191	1,649,203	68.5	59.54	76.26
20 – 24	242	2,118,933	74.4	60.72	84.51
25 – 29	233	2,347,030	67.7	56.37	77.36
30 – 34	238	1,929,459	71.6	65.21	77.19
35 – 39	220	1,916,730	71.7	64.45	77.99
40 – 44	220	1,652,362	82.3	75.09	87.70
45 – 49	183	1,128,698	68.6	51.28	81.91
50 and above	522	3,876,906	61.7	57.87	65.46

Table 7.5: Proportion of correct response to item 4: "Can a person get HIV from mosquito bites?" (n = 3,151)

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	2,271	18,189,480	71.7	68.79	74.37
Location					
Urban	1,259	14,087,736	72.0	68.51	75.22
Rural	1,012	4,101,744	70.6	65.78	74.99
Age Group					
Less than 15	110	915,573	64.8	46.07	79.88
15 – 19	206	1,847,092	76.7	70.62	81.87
20 – 24	222	1,817,111	64.3	54.88	72.71
25 – 29	230	2,660,335	77.4	69.75	83.64
30 – 34	235	1,908,963	69.2	61.91	75.67
35 – 39	243	2,085,754	78.8	72.94	83.65
40 – 44	229	1,595,546	78.4	71.34	84.18
45 – 49	178	1,218,689	73.1	65.21	79.76
50 and above	618	4,140,417	66.9	60.97	72.27

Table 7.6: Proportion of correct response to item 5: "Can a person get HIV by sharing food with someone who is infected?" (n = 3,161)

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	1,876	15,824,929	62.0	58.27	65.65
Location					
Urban	1,094	12,743,518	64.8	60.46	68.98
Rural	782	3,081,411	52.6	48.67	56.50
Age Group					
Less than 15	64	621,366	43.7	31.09	57.17
15 - 19	121	1,074,698	45.2	37.98	52.66
20 - 24	167	1,679,290	59.1	51.77	66.11
25 - 29	165	1,938,025	55.6	47.81	63.18
30 - 34	216	1,928,309	70.8	64.80	76.07
35 - 39	213	1,743,227	66.1	57.94	73.48
40 - 44	225	1,597,025	78.1	71.61	83.47
45 - 49	179	1,286,695	76.5	66.59	84.14
50 and above	526	3,956,295	62.8	56.45	68.71

HIV Stigma in Malaysia

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HIGHLIGHTS

- 65.8% of respondents had fear of HIV infection against PLHIV.
- The prevalence of social judgement is 47.7%.
- 44.0% of respondents had perceived stigma.
- The prevalence of anticipated stigma was 56.8%.
- 70.0% of the respondents had experienced stigma.
- The prevalence of discrimination was 59.0%.
- The prevalence of UNAIDS global indicator for discriminatory attitudes towards PLHIV was 78.7%.

Keywords: *HIV/AIDS, Knowledge, Misconceptions, Malaysia*

8.1 Introduction

Reduction of stigma and discrimination is one of the National Strategic Plan's priorities for Ending AIDS 2016- 2030 [1]. Stigma can impede or delay HIV testing, inhibit disclosure and linkage to care, and reduce anti-retroviral therapy (ART) adherence [2].

Stigma is described by the Joint United Nations Programme on HIV/AIDS (UNAIDS) as a dynamic process of devaluation that significantly discredits an individual in the eyes of others [3]. HIV-related stigma can be categorized into multiple relevant domains which are the fear of HIV infection, social judgement, anticipated stigma, perceived stigma, experienced stigma, internalized stigma, and discrimination [4,5].

Previous programmes focused on self-stigma reduction among people living with HIV (PLHIV) but rarely focused on our community [1]. Although there is a smaller-scale study conducted in 2017 [6], we still lack population-based nationwide data to determine the prevalence of HIV stigma in the community. In this study, the targeted population was respondents consisted of respondents aged 13 years and above in Malaysia. A total of 3,743 respondent participated with a response rate of 66.8%.

Data collection was via a Self-administered Questionnaire (SAQ) using a validated questionnaire from The Global Stigma and Discrimination Indicator Working Group (GSDIW) measuring HIV Stigma [5]. The questionnaire consists of six questions from six different relevant domains; 1=fear of HIV infection, 2=social judgement, 3=anticipated stigma, 4=perceived stigma, 5=experienced stigma and 6=discrimination. These questions invited 'Yes/No' responses with the answer of 'Yes' for item 1 to item 4 and 'No' answer for item 5 and 6 representing stigmatizing attitudes towards PLHIV. UNAIDS global indicator for discriminatory attitudes towards PLHIV was defined based on (answered "No") to item 5 & 6.

8.2 Objectives

8.2.1 General Objective

To determine the prevalence of HIV-related stigma against People Living with HIV (PLHIV) in the general population based on six stigmatizing attitudes towards PLHIV.

8.2.2 Specific Objectives

To determine:

- The prevalence of fear of HIV infection from PLHIV among the general population aged 13 years and above.
- The prevalence of social judgement against PLHIV among the general population aged 13 years and above.
- The prevalence of perceived stigma against PLHIV among the general population aged 13 years and above.
- The prevalence of anticipated stigma against PLHIV among the general population aged 13 years and above.
- The prevalence of experienced stigma against PLHIV among the general population aged 13 years and above.
- The prevalence of discrimination against PLHIV among the general population aged 13 years and above.
- The prevalence of discriminatory attitudes based on UNAIDS global indicator.
- The prevalence of each stigmatising attitudes towards PLHIV based on sociodemographic profiles.

Definition

- Fear of HIV infection refers to the fear of casual transmission or refusal of contact with PLHIV.
- Social judgement refers to the act of shame, blame, prejudice and stereotypes towards PLHIV.
- Anticipated stigma refers to the individual's expectation that they would experience prejudice from others if they are infected with HIV.
- Perceived stigma refers to the PLHIV's perception of social disqualification, denial or limitations of opportunities due to their HIV status.
- Experienced stigma refers to the experience of discrimination based on a person's HIV status that falls outside the purview of the law.
- Discrimination refers to the experience of discrimination based on a person's HIV status that falls within the purview of the law.
- UNAIDS global indicator for discriminatory attitudes among respondents aged 15-49 years old refers to a respondent categorized as either having experienced stigma or discrimination.

8.3 Findings

8.3.1 Fear of HIV Infection

Overall, the prevalence of fear of HIV infection from PLHIV was 65.8% (95% CI: 62.09-69.37). Higher prevalence was observed among respondents in rural (75.1%, 95% CI: 70.03 - 79.54) compared to respondents in urban areas (63.3%, 95%CI: 58.91-67.39). By ethnicity, Other Bumiputeras had the highest prevalence (77.8%, 95% CI: 73.79-81.34) while Indian reported the lowest (44.5%, 95% CI: 31.37-58.48). Other sociodemographic variables showed no significant differences **(Table 8.1)**.

8.3.2 Social Judgement

The national prevalence of social judgement against PLHIV among respondents was 47.7% (95% CI: 44.84-50.67), with higher prevalence found in rural (56.0%, 95% CI: 51.41-60.42) compared to urban areas [45.5% (95% CI: 42.06-48.92)]. By ethnicity, Others had the highest prevalence (57.9%, 95% CI: 48.08-67.21) while Chinese reported the lowest (30.2%, 95% CI: 23.63-37.66). It was also noted that widowed or divorced respondents showed higher stigma (55.3%, 95% CI: 47.79-62.52) compared to single respondents (41.4%, 95% CI: 37.27-45.71). Other sociodemographic variables showed no significant differences **(Table 8.2)**.

8.3.3 Perceived Stigma

Overall, the prevalence of perceived stigma in Malaysia was 44.0% (95% CI: 41.60-46.38). Widowed/divorcee reported higher stigma (53.4%, 95% CI: 46.02-60.58) in comparison to single persons (37.9%, 95% CI: 34.67-41.14). Respondents aged 50 and above reported higher prevalence (51.9%, 95% CI: 47.03-56.75) than those aged 13-19 years (38.7%, 95% CI: 33.85-43.79).

By occupation, students had the lowest prevalence (38.2%, 95% CI: 32.26-44.42), while the highest prevalence was among those who were unpaid worker/homemaker/caregiver (51.1%, 95% CI: 46.33-55.84). Other sociodemographic variables showed no significant differences **(Table 8.3)**.

8.3.4 Anticipated Stigma

The prevalence of anticipated stigma nationwide was 56.8% (95% CI: 53.64-59.89). By ethnicity, Other Bumiputeras had the highest prevalence (64.3%, 95% CI: 60.22-68.20) while Indian reported the lowest (43.0%, 95% CI: 33.13-53.41). By occupation, self-employed had the lowest prevalence (53.1%, 95% CI: 46.56-59.51), while the highest prevalence was among students (70.2%, 95% CI: 64.85- 75.06). Other sociodemographic variables showed no significant differences **(Table 8.4)**.

8.3.5 Experienced Stigma

Overall, the prevalence of experienced stigma in Malaysia was 70.0% (95% CI: 66.99-72.81), with significantly higher prevalence in rural (76.7%, 95% CI: 73.94-79.31) compared to urban areas (68.1%, 95% CI: 64.42-71.58). Respondents aged 13-19 years reported higher prevalence (79.3%, 95% CI: 73.79-83.98) than those aged 50 and above (66.5%, 95% CI: 59.8-72.58).

By ethnicity, others had the highest prevalence (80.3%, 95% CI: 74.01-85.36) while Chinese reported the lowest (57.2%, 95% CI: 48.27-65.74). The non-Malaysian citizen also had higher prevalence (80.7%, 95% CI: 74.11-85.99) in comparison to Malaysian citizen (69.0%, 95% CI: 65.89-71.87).

By education level, respondents without formal education reported the highest prevalence at 90.9% (95% CI: 79.44-96.27), while those with tertiary education showed the lowest prevalence (60.0%, 95% CI: 54.98-64.74).

Among the respondents, those who were not working recorded the highest stigma (77.7%, 95% CI: 72.73-82.05) as opposed to those who were working in Government sectors (61.3%, 95% CI: 55.19-67.15). Other sociodemographic variables showed no significant differences **(Table 8.5)**.

8.3.6 Discrimination

The national prevalence of discrimination against PLHIV was 59.0% (95% CI: 56.42-61.60), with rural areas disclosing notably higher prevalence (66.3%, 95% CI: 62.89-69.63) in contrast to urban areas (57.0%, 95% CI: 53.86-60.11). Respondents aged 13-19 reported higher prevalence (75.2%, 95% CI: 69.66-80.03) than aged 50 and above (49.4%, 95% CI: 44.95-53.95).

By ethnicity, higher prevalence was found among others (72.1%, 95% CI: 65.23-78.11), while the lowest prevalence was among Chinese (54.4%, 95% CI: 46.21-62.30). The Non-Malaysian citizen also had higher prevalence (72.9%, 95% CI: 65.71-79.08) in comparison to Malaysian citizen (57.7%, 95% CI: 55.20-60.18).

Respondents without formal education recorded the highest prevalence (78.7%, 95% CI: 57.76- 90.89), while those with tertiary education reported the lowest (45.6%, 95% CI: 41.33-49.98). It was also noted that widowed or divorced respondents showed higher stigma (67.2%, 95% CI: 59.64-73.92) compared to married respondents (55.6%, 95% CI: 52.24-58.95).

By occupation, government employees had the lowest prevalence (44.1%, 95% CI: 37.66-50.80), while the highest prevalence was among those who were unemployed (60.3%, 95% CI: 55.21-65.23). Other sociodemographic variables showed no significant differences **(Table 8.6)**.

8.3.7 UNAIDS Global Indicator for Discriminatory Attitudes Towards PLHIV

The prevalence of discriminatory attitudes towards PLHIV (by UNAIDS global indicator definition) was 78.7% (95% CI: 75.57-81.50), with rural areas reporting higher prevalence (86.2%, 95% CI: 83.81-88.25) compared to urban areas (76.6%, 95% CI: 72.72-80.12).

By age group, respondents aged 15-19 years recorded the highest prevalence (87.4%, 95% CI: 80.35 -92.21), while the least prevalence was among those aged 25-49 years (77.4%, 95% CI: 74.04-80.37).

The highest prevalence was reported among those with no formal education (100%, 95% CI: 100.00-100.00) and the least among those with tertiary education (67.7%, 95% CI: 62.36-72.65). By occupation, government employees had the lowest prevalence (69.1%, 95% CI: 62.56-74.89), while the highest prevalence was among those who were not working (84.6%, 95% CI: 77.08-89.96). Other sociodemographic variables showed no significant differences **(Table 8.7)**.

8.4 Conclusion

More than three-quarters of respondents aged 15-49 years old in Malaysia showed discriminatory attitudes towards PLHIV based on the UNAIDS indicator. The prevalence was significantly different based on the locality where respondents in the rural areas recorded higher stigma in general compared to urban areas. The same trend seen in terms of higher prevalence among the younger population and unemployed. The stigma level among those without a formal education is significantly higher than those with at least primary education.

8.5 Recommendation

- Strengthen health curriculum by updating/improving the current HIV/AIDS module, i.e., HIV/AIDS epidemiology, which has become a "forgotten epidemic", stigma & discrimination and HIV transmission trend.
- Diversify and strengthen information delivery platforms sensitive to various target groups' needs & supportive settings, i.e., younger age, low education level, non-Malaysian, unemployed, and rural populations.
    - Targeted intervention should address the unique risk communication among those populations, i.e., Kafe@Teen (LPPKN), rural mosque and community hall, mobile clinic/outreach team.
    - Web-based education such as mobile web, social media education (Facebook/Instagram/Twitter/Youtube) leveraging provocative headlines "Ask Your Doctor Live!" with public figures' creative involvement.
    - Simple & effective communication such as continuous educational talk "one week, one fact,".
    - Rebranding (in terms of module content & method of delivery) for Doktor Muda and PROSIS.
- Re-establish and monitoring school health KPIs, i.e., "5 Essential knowledge on HIV/AIDS".
- Intervention studies and follow-up surveys on targeted or general population should postulate the trends and serve as an outcome evaluation of the subsequent measures and intervention.
- Strengthen collaboration with private/commercial sectors as well as Non-Governmental Organization (NGO) such as Malaysian AIDS Council to boost HIV/AIDS health promotion such as a portal for HIV/ADIS information, advertisement and community activities.

8.6 Study Limitations

This is the first data provided by NHMS therefore the comparison or trend analysis was limited with reference to other local studies. The non-respondents' characteristics was unable to be determined therefore limits the external validity of the findings.

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Table 8.1: Prevalence of fear from HIV infection from PLHIV by sociodemographic characteristics

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	2,674	14,302,482	65.8	62.09	69.37
Location					
Urban	1,450	10,754,435	63.3	58.91	67.39
Rural	1,224	3,548,047	75.1	70.03	79.54
Sex					
Male	1,246	7,009,138	63.1	58.36	67.51
Female	1,428	7,293,344	68.7	64.59	72.59
Age Group					
13 – 19	507	2,571,322	74.5	67.38	80.54
20 – 29	566	3,682,712	65.8	59.22	71.81
30 – 39	515	3,124,258	64.0	59.84	67.93
40 – 49	388	1,810,231	56.0	49.09	62.74
50 and above	698	3,113,959	68.2	62.41	73.47
Ethnicity					
Malay	1,825	8,387,874	71.5	69.16	73.64
Chinese	165	2,197,765	50.2	40.28	60.12
Indian	79	580,292	44.5	31.37	58.48
Other Bumiputeras [a]	466	1,865,592	77.8	73.79	81.34
Others	139	1,270,959	66.5	56.70	75.14
Citizenship					
Malaysian	2,536	13,040,529	65.7	61.82	69.36
Non-Malaysian	138	1,261,953	67.2	57.28	75.86
Education Level					
No formal Education	42	287,391	71.7	47.45	87.63
Primary Education	592	2,689,519	68.2	61.83	74.04
Secondary Education	1,358	7,030,035	69.3	65.27	72.97
Tertiary Education	679	4,271,352	59.7	54.01	65.08

Table 8.1: Prevalence of fear from HIV infection from PLHIV by sociodemographic characteristics (Cont.)

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Marital Status [b]					
Single	976	5,527,826	68.6	63.26	73.45
Married	1,517	7,832,055	63.5	59.15	67.58
Widow(er)/Divorcee	181	942,601	71.0	62.72	78.03
Occupation [c]					
Government Employee	233	1,148,685	63.3	56.08	69.97
Private Employee	713	4,588,086	63.0	56.67	68.84
Self Employed	389	1,906,805	62.3	56.70	67.63
Unpaid worker / Homemaker / Caregiver	461	2,089,248	67.6	61.15	73.49
Student	340	2,044,568	72.0	63.57	79.19
Not working (Unemployed, health problem, old age, child & retiree)	374	1,780,637	66.1	59.84	71.88

Note:
[a] Other Bumiputeras includes Bumiputera Sabah, Bumiputera Sarawak and Orang Asli
[b] Marital Status from 10 years old and above
[c] Occupation from 15 years old and above

Table 8.2: Prevalence of social judgement against PLHIV by sociodemographic characteristics

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	1,985	10,382,063	47.7	44.84	50.67
Location					
Urban	1,037	7,735,737	45.5	42.06	48.92
Rural	948	2,646,326	56.0	51.41	60.42
Sex					
Male	985	5,422,436	48.8	45.21	52.41
Female	1,000	4,959,627	46.6	43.36	49.96
Age Group					
13 – 19	310	1,653,242	48.2	43.01	53.49
20 – 29	357	2,378,502	42.3	38.02	46.71
30 – 39	383	2,314,423	47.6	43.03	52.13
40 – 49	322	1,456,529	44.7	37.31	52.37
50 and above	613	2,579,367	56.4	50.94	61.80
Ethnicity					
Malay	1,404	6,404,664	54.4	50.94	57.79
Chinese	98	1,314,757	30.2	23.63	37.66
Indian	65	426,510	32.8	25.89	40.44
Other Bumiputeras [a]	300	1,129,426	47.1	40.31	53.99
Others	118	1,106,706	57.9	48.08	67.21
Citizenship					
Malaysian	1,869	9,299,568	46.8	43.80	49.84
Non-Malaysian	116	1,082,495	57.7	48.17	66.65
Education Level					
No formal Education	31	229,140	57.5	36.40	76.16
Primary Education	448	2,132,148	54.3	48.43	59.99
Secondary Education	1,031	5,122,929	50.4	47.00	53.75
Tertiary Education	473	2,887,145	40.3	35.98	44.73

Table 8.2: Prevalence of social judgement against PLHIV by sociodemographic characteristics (Cont.)

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Marital Status [b]					
Single	592	3,335,010	41.4	37.27	45.71
Married	1,247	6,314,282	51.1	47.35	54.75
Widow(er)/Divorcee	146	732,771	55.3	47.79	62.52
Occupation [c]					
Government Employee	185	891,019	48.6	41.49	55.79
Private Employee	491	3,067,538	42.1	37.81	46.50
Self Employed	321	1,672,935	54.4	47.63	60.92
Unpaid worker / Homemaker / Caregiver	371	1,598,042	51.7	45.77	57.62
Student	203	1,199,217	42.1	34.97	49.60
Not working (Unemployed, health problem, old age, child & retiree)	312	1,437,840	53.5	47.51	59.32

Note:
[a] Other Bumiputeras includes Bumiputera Sabah, Bumiputera Sarawak and Orang Asli
[b] Marital Status from 10 years old and above
[c] Occupation from 15 years old and above

Table 8.3: Prevalence of perceived stigma against PLHIV by sociodemographic characteristics

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	1,740	9,551,946	44.0	41.60	46.38
Location					
Urban	948	7,342,302	43.2	40.39	46.07
Rural	792	2,209,644	46.8	42.90	50.68
Sex					
Male	804	4,707,802	42.3	39.10	45.56
Female	936	4,844,143	45.8	43.15	48.37
Age Group					
13 – 19	259	1,329,576	38.7	33.85	43.79
20 – 29	309	2,145,174	38.0	33.60	42.56
30 – 39	364	2,199,265	45.5	41.51	49.49
40 – 49	297	1,520,811	46.7	42.45	50.99
50 and above	511	2,357,120	51.9	47.03	56.75
Ethnicity					
Malay	1,183	5,481,358	46.7	44.14	49.28
Chinese	110	1,721,092	39.3	32.94	46.08
Indian	72	481,704	37.5	26.75	49.63
Other Bumiputeras [a]	282	1,039,593	43.4	38.06	48.92
Others	93	828,198	43.0	35.10	51.30
Citizenship					
Malaysian	1,648	8,732,754	44.0	41.59	46.53
Non-Malaysian	92	819,192	43.3	34.94	52.05
Education Level					
No formal Education	30	192,537	46.2	39.00	53.63
Primary Education	356	1,690,327	43.0	37.07	49.14
Secondary Education	879	4,430,156	43.7	40.64	46.89
Tertiary Education	473	3,219,513	44.9	39.91	50.03

Table 8.3: Prevalence of perceived stigma against PLHIV by sociodemographic characteristics (Cont.)

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Marital Status [b]					
Single	526	3,058,775	37.9	34.67	41.14
Married	1,078	5,786,784	47.0	43.93	50.08
Widow(er)/Divorcee	136	706,386	53.4	46.02	60.58
Occupation [c]					
Government Employee	170	873,471	48.1	40.01	56.33
Private Employee	435	2,984,680	40.8	37.06	44.71
Self Employed	280	1,442,117	46.8	41.44	52.28
Unpaid worker / Homemaker / Caregiver	335	1,552,879	51.1	46.33	55.84
Student	176	1,086,470	38.2	32.26	44.42
Not working (Unemployed, health problem, old age, child & retiree)	268	1,275,420	47.5	40.21	54.87

Note:
[a] Other Bumiputeras includes Bumiputera Sabah, Bumiputera Sarawak and Orang Asli
[b] Marital Status from 10 years old and above
[c] Occupation from 15 years old and above

Table 8.4: Prevalence of anticipated stigma against PLHIV by sociodemographic characteristics

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	2,139	12,322,242	56.8	53.64	59.89
Location					
Urban	1,247	9,703,247	57.1	53.22	60.88
Rural	892	2,618,995	55.7	51.52	59.78
Sex					
Male	971	6,000,247	54.0	49.55	58.31
Female	1,168	6,321,995	59.8	56.68	62.79
Age Group					
13 – 19	401	2,174,352	63.0	58.02	67.74
20 – 29	487	3,318,426	59.1	53.96	63.98
30 – 39	425	2,781,063	57.5	52.42	62.42
40 – 49	332	1,622,145	50.0	41.90	58.01
50 and above	494	2,426,257	53.4	49.08	57.66
Ethnicity					
Malay	1,437	7,005,420	59.7	56.64	62.66
Chinese	151	2,250,676	51.4	42.58	60.17
Indian	71	547,419	43.0	33.13	53.41
Other Bumiputeras [a]	380	1,539,436	64.3	60.22	68.20
Others	100	979,291	51.1	43.73	58.47
Citizenship					
Malaysian	2,041	11,361,164	57.3	54.09	60.53
Non-Malaysian	98	961,077	51.1	43.38	58.68
Education Level					
No formal Education	28	193,144	45.0	30.37	60.46
Primary Education	434	2,220,683	56.6	49.95	63.07
Secondary Education	995	5,365,312	53.1	49.70	56.44
Tertiary Education	680	4,523,690	63.2	58.66	67.46
Marital Status [b]					
Single	828	4,953,948	61.3	57.79	64.65
Married	1,170	6,564,405	53.4	48.80	57.84
Widow(er)/Divorcee	141	803,888	61.5	53.00	69.29

Table 8.4: Prevalence of anticipated stigma against PLHIV by sociodemographic characteristics (Cont.)

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Occupation [c]					
Government Employee	215	1,084,813	59.4	51.87	66.49
Private Employee	559	3,931,734	53.9	46.96	60.74
Self Employed	308	1,626,068	53.1	46.56	59.51
Unpaid worker / Homemaker / Caregiver	345	1,639,043	53.7	48.69	58.60
Student	308	1,999,237	70.2	64.85	75.06
Not working (Unemployed, health problem, old age, child & retiree)	288	1,483,447	55.5	50.94	59.87

Note:
[a] Other Bumiputeras includes Bumiputera Sabah, Bumiputera Sarawak and Orang Asli
[b] Marital Status from 10 years old and above
[c] Occupation from 15 years old and above

Table 8.5: Prevalence of experienced stigma against PLHIV by sociodemographic characteristics

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	2,706	15,179,396	70.0	66.99	72.81
Location					
Urban	1,481	11,564,890	68.1	64.42	71.58
Rural	1,225	3,614,506	76.7	73.94	79.31
Sex					
Male	1,249	7,506,975	67.5	63.51	71.30
Female	1,457	7,672,421	72.6	68.93	75.92
Age Group					
13 – 19	538	2,739,856	79.3	73.79	83.98
20 – 29	569	4,003,551	71.4	65.45	76.66
30 – 39	514	3,251,607	67.2	62.23	71.74
40 – 49	397	2,158,556	66.7	61.62	71.40
50 and above	688	3,025,827	66.5	59.81	72.58
Ethnicity					
Malay	1,777	8,336,331	71.1	68.79	73.29
Chinese	175	2,491,792	57.2	48.27	65.74
Indian	136	984,242	75.3	62.19	85.00
Other Bumiputeras [a]	459	1,833,519	76.6	71.62	80.97
Others	159	1,533,513	80.3	74.01	85.36
Citizenship					
Malaysian	2,549	13,664,098	69.0	65.89	71.87
Non-Malaysian	157	1,515,299	80.7	74.11	85.99
Education Level					
No formal Education	53	364,508	90.9	79.44	96.27
Primary Education	630	3,031,186	76.7	71.04	81.55
Secondary Education	1,358	7,416,647	73.4	69.96	76.56
Tertiary Education	657	4,290,177	60.0	54.98	64.74
Marital Status [b]					
Single	983	5,628,935	69.9	64.49	74.73
Married	1,544	8,574,223	69.7	66.27	72.91
Widow(er) / Divorcee	179	976,239	73.4	66.15	79.62

Table 8.5: Prevalence of experienced stigma against PLHIV by sociodemographic characteristics (Cont.)

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Occupation [c]					
Government Employee	225	1115,109	61.3	55.19	67.15
Private Employee	695	4,993,760	68.7	64.01	73.02
Self Employed	395	2,084,189	68.1	62.78	72.91
Unpaid worker / Homemaker / caregiver	475	2,254,271	73.8	67.69	79.16
Student	342	1,874,742	65.8	56.29	74.25
Not working (Unemployed, health problem, old age, child & retiree)	408	2,095,603	77.7	72.73	82.05

Note:
[a] Other Bumiputeras includes Bumiputera Sabah, Bumiputera Sarawak and Orang Asli
[b] Marital Status from 10 years old and above
[c] Occupation from 15 years old and above

Table 8.6: Prevalence of discrimination against PLHIV by sociodemographic characteristics

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	2,221	12,843,657	59.0	56.42	61.60
Location					
Urban	1,188	9,716,298	57.0	53.86	60.11
Rural	1,033	3,127,359	66.3	62.89	69.63
Sex					
Male	1,051	6,610,598	59.5	55.97	62.92
Female	1,170	6,233,059	58.6	55.17	61.86
Age Group					
13 – 19	492	2,595,191	75.2	69.66	80.03
20 – 29	491	3,578,275	63.4	58.40	68.22
30 – 39	432	2,848,980	58.4	53.39	63.22
40 – 49	299	1,576,907	48.6	43.91	53.24
50 and above	507	2,295,173	49.4	44.95	53.94
Ethnicity					
Malay	1,417	6,686,000	56.9	54.45	59.28
Chinese	162	2,369,040	54.4	46.21	62.30
Indian	113	857,792	65.1	56.78	72.55
Other Bumiputeras [a]	384	1,540,019	64.2	58.47	69.58
Others	145	1,390,806	72.1	65.23	78.11
Citizenship					
Malaysian	2,077	11,461,856	57.7	55.20	60.18
Non-Malaysian	144	1,381,800	72.9	65.71	79.08
Education Level					
No formal Education	48	339,853	78.7	57.76	90.89
Primary Education	579	2,843,784	72.1	67.61	76.10
Secondary Education	1,107	6,324,994	62.4	59.57	65.22
Tertiary Education	480	3,271,632	45.6	41.33	49.98
Marital Status [b]					
Single	853	5,094,255	62.9	59.03	66.61
Married	1,210	6,859,623	55.6	52.24	58.95
Widow(er) / Divorcee	158	889,778	67.2	59.64	73.92

Table 8.6: Prevalence of discrimination against PLHIV by sociodemographic characteristics (Cont.)

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Occupation [c]					
Government Employee	160	805,354	44.1	37.66	50.80
Private Employee	587	4,360,558	59.7	54.41	64.79
Self Employed	328	1,810,724	59.0	52.57	65.06
Unpaid worker / Homemaker / caregiver	390	1,818,997	59.0	53.59	64.26
Student	292	1,695,501	59.5	50.13	68.30
Not working (Unemployed, health problem, old age, child & retiree)	305	1,621,460	60.3	55.21	65.23

Note:
[a] Other Bumiputeras includes Bumiputera Sabah, Bumiputera Sarawak and Orang Asli
[b] Marital Status from 10 years old and above
[c] Occupation from 15 years old and above

Table 8.7: Prevalence of discriminatory attitudes against PLHIV among respondents aged 15 - 49 years Old (UNAIDS Global Indicator) by sociodemographic characteristics

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	2,076	12,868,908	78.7	75.57	81.50
Location					
Urban	1,145	9,830,053	76.6	72.72	80.12
Rural	931	3,038,855	86.2	83.81	88.25
Sex					
Male	968	6,522,126	78.3	74.05	82.07
Female	1,108	6,346,782	79.1	74.93	82.66
Age Group					
15-19	413	2,269,214	87.4	80.35	92.21
20-24	311	1,970,216	75.7	66.37	83.03
25-49	1,352	8,629,478	77.4	74.04	80.37
Ethnicity					
Malay	1,295	6,624,624	78.9	76.25	81.25
Chinese	133	2,321,496	70.7	60.25	79.39
Indian	99	757,167	80.5	67.79	89.00
Other Bumiputeras [a]	400	1,668,622	83.6	77.58	88.21
Others	149	1,496,999	86.3	78.68	91.51
Citizenship					
Malaysian	1,929	11,390,123	77.8	74.52	80.78
Non-Malaysian	147	1,478,785	86.2	78.52	91.39
Education Level					
No formal Education	28	296,305	100.0	100.00	100.00
Primary Education	272	1,617,342	86.1	78.88	91.12
Secondary Education	1,156	6,652,158	84.6	81.59	87.27
Tertiary Education	613	4,232,351	67.7	62.36	72.65
Marital Status [b]					
Single	899	5,545,145	78.0	72.87	82.40
Married	1,106	6,862,961	78.7	75.09	81.99
Widow(er) / Divorcee	71	460,802	86.8	76.15	93.13

Table 8.7: Prevalence of discriminatory attitudes against PLHIV among respondents aged 15 - 49 years old (UNAIDS Global Indicator) by sociodemographic characteristics (Cont.)

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Occupation [c]					
Government Employee	201	1,046,217	69.1	62.56	74.89
Private Employee	705	5,195,416	78.7	74.20	82.64
Self Employed	306	1,799,260	81.4	75.32	86.20
Unpaid worker / Homemaker / Caregiver	362	1,911,509	84.3	78.65	88.70
Student	373	2,147,425	75.4	65.35	83.29
Not working (Unemployed, health problem, old age, child & retiree)	120	706,263	84.6	77.08	89.96

Note:
[a] Other Bumiputeras includes Bumiputera Sabah, Bumiputera Sarawak and Orang Asli
[b] Marital Status from 10 years old and above
[c] Occupation from 15 years old and above

MALARIA

Sustaining Knowledge of Malaria: Vital Challenge towards Malaria Elimination Certification

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HIGHLIGHTS

- 24% of Malaysian residents had never heard of malaria.
- Only 1 in 5 knew of symptoms of malaria.
- 1 in 3 knew of risk activities associated with malaria.
- 1 in 2 knew how malaria is transmitted.
- 1 in 2 knew how to prevent malaria.

Keywords: *Malaria, Malaria Elimination, Malaysia*

9.1 Introduction

Malaria is a tropical disease caused by *Plasmodium* parasites and globally known as one of the most important infectious diseases. There were an estimated 229 million malaria cases in 2019 in 87 malaria-endemic countries, a 4% reduction of cases compared to the year 2000 [1]. At the Global Technical Strategy for malaria 2016–2030 (GTS), there were 218 million estimated malaria cases in 2015 [2]. The WHO South-East Asia Region contributed about 3% of the burden of malaria cases globally. In the South-East Asia region, malaria cases were reduced by 73%, from 23 million in 2000 to 6.3 million in 2019. Moreover, malaria incidence in this region were reduced by 78%, from 18 cases per 1000 population at risk in 2000 to 4 cases in 2019 [1].

Malaysia has started a malaria control program since 1901. Since 1901, our nation has achieved significant success in malaria control and reported an immense reduction in the number of malaria cases, from 300,000 cases in 1961 to 6,000 cases since 2003 [3]. Malaysia has managed to maintain the status of zero local (indigenous) human malaria infection since 2018. This success in remaining having zero cases since 2018 for three consecutive years has qualified Malaysia for the Certification of Human Malaria Elimination from the WHO in 2021 [1].

However, the elimination of malaria requires a combination of several measures to ensure the implementation of that strategy. The population's knowledge about malaria is considered an important assessment component in malaria elimination certification. WHO reported that a sustainable malaria elimination programme would require communities to have good knowledge on malaria prevention, causes, signs and symptoms, mode of transmission, and have a positive health-seeking behaviour. This will greatly increase the sustainability of malaria elimination programs [4,5].

Therefore, this community-based study was conducted to provide a baseline data on the level of awareness and knowledge about malaria among Malaysians. These findings could be utilized by MOH to strengthen current strategies to achieve the WHO Certification Malaria Elimination. Data were collected by using six structured questionnaires adapted from Malaria Indicator Survey [6]. The questionnaire was validated and pre-tested using both Bahasa Melayu and English. The data was then collected by using the Computer-Assisted Telephone Interview (CATI) method. Pre-selected participants were contacted from all over the country and interviewers were guided using a standardised manual.

9.2 Objectives

9.2.1 General Objective

To assess the Malaysian residents' level of awareness and correct knowledge about malaria disease.

9.2.2 Specific Objectives

- To estimate the prevalence of "ever heard of malaria" in Malaysia.
- To assess the correct knowledge on malaria transmission, symptoms, risk activities and preventive measures.

Definition

- **Malaria**: Malaria is a mosquito-borne infectious disease. Individuals are infected with the *Plasmodium* parasite after being bitten by a female *Anopheles* mosquito. Symptoms of malaria include fever, fatigue, vomiting, headache, cold and chills.
- **Malaria Elimination**: Interruption of local transmissions (reduction to zero incidences of indigenous case) of a specified (human) malaria parasite in a defined geographical area.
- **National Strategic Plan for Elimination of Malaria**: This national plan was drafted to achieve zero local human malaria transmission (Indigenous) in Malaysia by 2020 [7].

9.3 Findings

9.3.1 Prevalence of "Ever Heard of Malaria" In Malaysia by Sociodemographic Characteristics

3,194 respondents participated in the CATI survey. The module response rate was 95.7%. Out of 3,057 respondents who participated in the malaria module, 2,491 responded to "ever heard of malaria" questionnaire and further analysis was based on this figure. The overall prevalence of "ever heard of malaria" in Malaysia was 76.1% (95%CI: 70.51-80.94). People living in urban areas showed a lower prevalence of "ever heard of malaria" at 74.6% (95%CI: 67.72-80.42) compared to those living in rural areas at 81.3% (95%CI: 75.77-85.82). Unfortunately, that difference was not statistically significant.

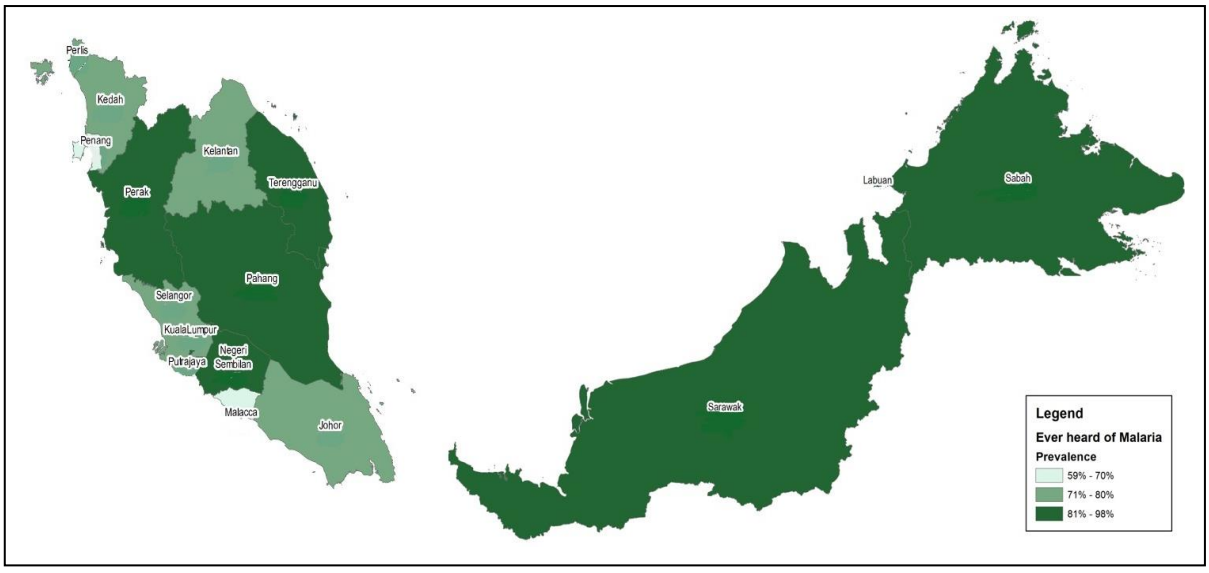

Figure 15: Prevalence of "ever heard of malaria" by state

Figure 15 shows Penang, Kuala Lumpur and Malacca had the lowest prevalence of "ever heard of malaria" **(Table 9.1)**. There was a higher prevalence of malaria awareness among males (76.2, 95%CI: 70.45-81.11) compared to females (76.0%, 95%CI: 69.47-81.56).

With regards to age groups, the prevalence of "ever heard of malaria" was highest among the 40-49 years-old group at 83.6% (95%CI: 74.71-89.82). In comparison, the age group with the lowest prevalence was those between 15-19 years-old (68.5%, 95%CI: 56.05-78.79). Unfortunately, the gender and age group differences were not statistically significant upon standardisation.

Among the major ethnic group in Malaysia, the Chinese ethnic group recorded the lowest prevalence at 56.2% (95%CI: 44.52-67.18), of which the difference was statistically significant. In terms of nationality, Malaysian citizens (77.5%, 95%CI: 71.79-82.38) showed a higher prevalence of "ever heard of malaria" as compared to non-Malaysian (64.8%, 95%CI: 51.43-76.27). Most of the participants who had "ever heard of malaria" were married (78.9%, 95%CI: 73.14-83.73), followed by widowed/divorced (72.8%, 95%CI: 61.22-81.98) and single individuals (71.6%, 95%CI: 65.05- 77.32). However, the differences were not statistically significant.

Prevalence of "ever heard of malaria" for both tertiary and secondary education levels were significantly higher compared to those with no formal education (54.5%, 95%CI: 47.21-61.65). The prevalence of "ever heard malaria" were highest among individuals with tertiary education at 84.6% (95%CI: 78.37-89.33), followed by secondary education (76.9%, 95%CI: 70.49-82.23).

By occupation, those who were government employees had a significantly higher prevalence of malaria awareness with 93.8% (95%CI: 88.97-96.58) compared to other occupations. The lowest prevalence was among private employees at 72.6% (95%CI: 67.16-77.51) **(Table 9.2)**.

9.3.2 Prevalence of Correct Knowledge and Awareness on Malaria Prevention, Transmission, Symptoms, and Risky Activities by Location among Those Who Have "Ever Heard of Malaria"

Among those who had heard of malaria, the prevalence of correct knowledge regarding malaria transmission was 53.9% (95%CI: 50.16-57.69). It was higher in urban residents (55.2%, 95%CI: 50.54-59.72) compared to rural (50.1%, 95%CI: 44.31-55.90). With regards to correct knowledge on malaria symptoms, the overall prevalence was 24.1% (95%CI: 21.18-27.23). People who lived in rural areas had higher prevalence at 26.5% (95%CI: 23.30-29.91) compared to those living in the urban areas (23.3%, 95%CI: 19.7-27.3).

Prevalence of correct knowledge on risky activities that would lead to malaria infection was only 34.0% (95%CI: 29.2-39.07). People who lived in urban areas were better informed with higher prevalence at 36.2% (95%CI: 30.29-42.56) compared to those who lived in the rural areas (27.1%, 95%CI: 22.24-32.55). For correct knowledge on preventive measures, the overall prevalence was 59.7% (95%CI: 55.5-63.7). It was higher in rural areas (63.2%, 95%CI: 58.19-67.86) compared to urban areas (58.5%, 95%CI: 53.26-63.62) **(Table 9.3)**.

9.4 Conclusion

This study revealed that 76% of Malaysians had heard of malaria. Generally, the correct knowledge regarding malaria prevention, transmission, symptoms, and risky activities related to malaria were considered inadequate. Therefore, targeted research or educational innovations aimed at specific vulnerable community or groups should be the way forward. This study had managed to identify the specific education level, age, ethnicity and vulnerable locality that malaria programme managers could plan and focus on in preparation for a sustainable malaria elimination initiative.

All individuals living in Malaysia should be equipped with the correct knowledge on malaria prevention, transmission, symptoms, and activities that could put them at risk of malaria infection. Individuals living in malaria receptive areas should be able to take preventive measures and the right health seeking behaviour to ensure that malaria elimination in 2021 could be achieved and sustained. Findings from this study would assist researchers to generate research questions for further studies.

9.5 Recommendation

- Further research needs to be developed to address the relatively low knowledge of malaria based on socio-demographic characteristics identified such as localities, ethnicity and education level as well as targeted groups or communities with malaria high-risk activities.
- Diversify delivery methods on malaria core key messaging by implementing latest technology and social media approaches that are relevant to the community at risk.

9.6 Study Limitations

This study used the Computer-assisted Telephone Interview (CATI) method for data collection. The method was used because of the COVID-19 pandemic situation where face-to-face approach was not feasible. This had possibly led to a low coverage in the response rate for the malaria module. Some questions required detailed explanation to respondents using a pictured code book for easy understanding, which was not able to be performed using this method. Therefore, the study acknowledged that face-to-face or physical interviews would have been the preferred better method.

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Table 9.1: Prevalence of "ever heard of malaria" by state

State	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Johor	263	2,064,195	75.4	65.6	83.1
Kedah	170	1,195,843	75.5	60.9	86.0
Kelantan	177	710,925	75.8	65.1	84.0
Melaka	97	467,465	60.4	48.8	70.9
Negeri Sembilan	171	576,461	80.0	65.1	89.6
Pahang	82	447,873	83.4	55.1	95.4
Penang	67	1,295,959	59.4	40.7	75.8
Perak	127	1,346,035	85.8	76.4	91.9
Perlis	49	106,744	77.1	41.7	94.1
Selangor	319	4,003,550	74.9	59.9	85.7
Terengganu	71	561,355	82.2	70.5	90.0
Sabah	348	2,981,404	85.5	77.4	91.1
Sarawak	387	1,771,953	81.0	72.6	87.3
WP Kuala Lumpur	104	1,139,086	67.8	50.7	81.1
WP Labuan	40	55,908	97.8	97.8	97.8
WP Putrajaya	19	79,074	88.8	88.8	88.8

Table 9.2: Prevalence of "ever heard of malaria" in Malaysia by sociodemographic characteristics (n = 3,057)

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
MALAYSIA	2,491	18,803,830	76.1	70.52	80.94
Location					
Urban	1,379	14,255,550	74.6	67.74	80.43
Rural	1,112	4,548,280	81.3	75.77	85.82
Sex					
Male	1,137	9,589,342	76.2	70.45	81.11
Female	1,354	9,214,487	76.1	69.48	81.58
Age Group					
15 – 19	246	2,110,747	68.5	56.05	78.79
20 – 29	495	4,487,333	71.9	65.24	77.79
30 – 39	557	4,185,946	79.2	72.86	84.33
40 – 49	465	311,714	83.6	74.71	89.82
50 – 59	399	2,489,660	80.4	71.40	87.11
60 – 69	256	1,535,894	76.4	65.44	84.65
70 and above	73	852,546	69.2	53.88	81.18
Ethnicity					
Malay	1,607	9,981,868	83.5	78.17	87.80
Chinese	158	3,134,194	56.2	44.52	67.18
Indian	118	1,400,837	88.1	80.05	93.13
Other Bumiputeras [a]	474	2,502,986	88.6	83.96	92.08
Others	134	1,783,944	64.6	51.13	76.15
Citizenship					
Malaysian	2,358	1,703,3598	77.5	71.79	82.38
Non-Malaysian	133	1,770,231	64.8	51.43	76.27
Marital Status [b]					
Single	681	570,0871	71.6	65.05	77.32
Married	1,650	11,828,477	78.9	73.14	83.73
Widow(er)/Divorcee	160	1,274,481	72.8	61.22	81.98

Table 9.2: Prevalence of "ever heard of malaria" in Malaysia by sociodemographic characteristics (n = 3,057) (Cont.)

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
Education Level					
No formal Education	63	562,035	54.5	47.21	61.65
Primary Education	415	3,082,736	65.7	51.57	77.58
Secondary Education	1,243	8,561,765	76.9	70.49	82.23
Tertiary Education	770	6,597,294	84.6	78.37	89.33
Occupation [c]					
Government Employee	279	1,784,825	93.8	88.97	96.58
Private Employee	693	6,132,346	72.6	67.16	77.51
Self Employed	405	2,650,965	73.7	64.39	81.23
Unpaid worker / Homemaker / caregiver	492	3,085,135	81.4	74.38	86.85
Student	260	2,255,971	73.4	59.72	83.64
Not working (Unemployed, health, problem, old age, child & retiree)	353	2,794,748	73.8	64.30	81.48

Note:
[a] Other Bumiputeras includes Bumiputera Sabah, Bumiputera Sarawak and Orang Asli
[b] Marital Status from 10 years old and above
[c] Occupation from 15 years old and above

Table 9.3: Prevalence of correct knowledge and awareness on malaria transmission, symptoms, risk activities and preventions by location among those who ever hear of malaria (n = 2,491)

Sociodemographic Characteristics	Unweighted Count	Estimated Population	Prevalence (%)	95% CI	
				Lower	Upper
a. Knowledge on Transmission					
MALAYSIA	**1,361**	10,144,441	53.9	50.16	57.69
Urban	771	7,865,398	55.2	50.54	59.72
Rural	590	2,279,043	50.1	44.31	55.90
b. Knowledge on Symptoms					
MALAYSIA	**658**	4,527,257	24.1	21.18	27.23
Urban	350	3,323,153	23.3	19.73	27.32
Rural	308	1,204,104	26.5	23.30	29.91
c. Knowledge on Risk Activities					
MALAYSIA	**757**	6,392,053	34.0	29.26	39.07
Urban	463	5,160,038	36.2	30.29	42.56
Rural	294	1,232,015	27.1	22.24	32.55
d. Knowledge on Prevention Measures					
MALAYSIA	**1,522**	11,217,161	59.7	55.47	63.70
Urban	814	8,344,802	58.5	53.26	63.62
Rural	708	2,872,360	63.2	58.19	67.86

DATA ANALYTICS GUIDELINE

VOLUME I

OPERATIONAL DEFINITION: MODULE COVID-19

- Target population age one year and above
- Weight (cs plan): phase1_nhms2020.csaplan

Variable Name	Command / Definition
covid19_ELISA_final	* Denominator : respondents who successfully taken blood for COVID-19 antibody test ELISA_Interpretation = POSITIVE OR NEGATIVE OR BORDELINE *Condition: covid19_ELISA_final = positive [1] IF ELISA_Interpretation = POSITIVE covid19_ELISA_final = negative [2] IF ELISA_Interpretation = NEGATIVE OR BORDELINE
covid19_cPASS_final	* Denominator : respondents who successfully taken blood for COVID-19 antibody test ELISA_Interpretation = POSITIVE OR NEGATIVE OR BORDELINE Or, covid19_ELISA_final = positive [1] OR negative [2] *Condition: covid19_cPASS_final = positive [1] IF CPASS_Interpretation= POSITIVE covid19_cPASS_final = negative [2] IF CPASS_Interpretation = NEGATIVE

Variable Name	Command / Definition
diagnosed_ELISA	* Denominator : respondents who successfully taken blood for COVID-19 antibody test covid19_ELISA_final = positive [1] OR negative [2] *Condition: diagnosed_ELISA = Yes, ever been diagnosed & positive ELISA [1] IF C0004a = 1 AND covid19_ELISA_final = 1 ELSE, diagnosed_ELISA = No [0]
undiagnosed_ELISA	* Denominator : respondents who successfully taken blood for COVID-19 antibody test covid19_ELISA_final = positive [1] OR negative [2] *Condition: undiagnosed_ELISA = Yes, never been diagnosed but positive ELISA [1] IF C0004a = 2 AND covid19_ELISA_final = 1 ELSE, undiagnosed_ELISA = No [0]
diagnosed_cPASS	* Denominator : respondents who successfully taken blood for COVID-19 antibody test covid19_ELISA_final = positive [1] OR negative [2] *Condition: diagnosed_cPASS = Yes, ever been diagnosed & positive cPASS [1] IF C0004a = 1 AND covid19_cPASS_final = 1 ELSE, diagnosed_cPASS = No [0]
undiagnosed_cPASS	* Denominator : respondents who successfully taken blood for COVID-19 antibody test covid19_ELISA_final = positive [1] OR negative [2] *Condition: undiagnosed_cPASS = Yes, never been diagnosed but positive cPASS [1] IF C0004a = 2 AND covid19_cPASS_final = 1 ELSE, undiagnosed_cPASS = No [0]

Variable Name	Command / Definition
symptomatic_covid	*Need to compute for symptomatic status first Symptomatic : Yes to any 14 symptoms (fever, sore throat, runny nose, cough, SOB, Chills, vomitting, nausea, diarhea, headhache, muscle ached, loss of smell, loss of taste and fatigue) symtomatic_covid = Yes [1], IF B1001a = 1 OR B1001b = 1 OR B1001c = 1 OR B1001d = 1 OR B1001e = 1 OR B1001g = 1 OR B1001h = 1 OR B1001i = 1 OR B1001j = 1 OR B1001k = 1 OR B1001n = 1 OR B1001q = 1 OR B1001r = 1 OR B1001t = 1 ELSE, symtomatic_covid = No[0]
symptomatic_ELISA	* Denominator : respondents who successfully taken blood for COVID-19 antibody test covid19_ELISA_final = positive [1] OR negative [2] *Condition: symptomatic_ELISA = Yes, symptomatic & positive ELISA [1] IF symtomatic_covid = 1 AND covid19_ELISA_final = 1 ELSE, symtomatic_ ELISA = No [0]
asymptomatic_ELISA	* Denominator : respondents who successfully taken blood for COVID-19 antibody test covid19_ELISA_final = positive [1] OR negative [2] *Condition: asymptomatic_ELISA = Yes, asymptomatic & positive ELISA [1] IF symtomatic_covid = 0 AND covid19_ELISA_final = 1 ELSE, asymtomatic_ ELISA = No [0]

Variable Name	Command / Definition
symptomatic_cPASS	* Denominator : respondents who successfully taken blood for COVID-19 antibody test covid19_ELISA_final = positive [1] OR negative [2] *Condition: symptomatic_cPASS= Yes, symptomatic & positive cPASS [1] IF symtomatic_covid = 1 AND covid19_cPASS_final = 1 ELSE, symtomatic_cPASS = No [0]
asymptomatic_cPASS	* Denominator : respondents who successfully taken blood for COVID-19 antibody test covid19_ELISA_final = positive [1] OR negative [2] *Condition: Asymptomatic_cPASS= Yes, asymptomatic & positive cPASS [1] IF symtomatic_covid = 0 AND covid19_cPASS_final = 1 ELSE, asymtomatic_cPASS = No [0]

OPERATIONAL DEFINITION: MODULE HEPATITIS B

- Target population age 15 years and above AND those who have laboratory results
- Weight (cs plan): phase1_nhms2020.csaplan

Variable Name	Command / Definition
age_hep	Recode age (A1005) to categorical variable 1 = 15-30 years old 2 = 31 years and above
HBsAg_antigen_I _new	[respondents aged 15 years & above and those who have "HBsAg_antigen_I" results] Hepatitis B Antigen 0 = Non-reactive 1 = Reactive
HBsAb_antibody_new	[respondents aged 15 years & above and those who have "HBsAb_antibody" results] Antibody Hepatitis B (Anti-HBs) 0 = Insufficient 1 = Non-Reactive 2 = Reactive Anti-HBs: HBsAb_antibody Reactive >10.0 mIU/mL Insufficient: Not enough sample
HBc_IgM_Ab_I_new	[respondents aged 15 years & above and those who have "HBc_IgM_Ab_I" results] Antibody Hepatitis B core (IgM) (HBc IgM) 0 = Non-reactive 1 = Reactive
HBc_IgG_Ab_I_new	[respondents aged 15 years & above and those who have "HBc_IgG_Ab_I" results] Antibody Hepatitis B core (IgG) (HBc IgG) 0 = Non-reactive 1 = Reactive HBc IgG = Anti-HBc =Anti HBc Total

Variable Name	Command / Definition
status_diagnosedHepB	[respondents aged 15 years & above and those who response to Question D0001 in Hepatitis Module (yes or no) & have "HBsAg_antigen_I" results] Status of diagnosed Hepatitis B among HBsAg_antigen_I _new reactive 0 = Not Applicable 1 = Diagnosed 2 = Undiagnosed status_diagnosedHepB = Diagnosed with HBsAg_antigen_I_new reactive AND aware that they had Hepatitis B (D0001 = Yes)
status_treatedHepB	[respondents aged 15 years & above and those who response to Question D0002 in Hepatitis Module (yes or no) & have "HBsAg_antigen_I" results] Status of treated Hepatitis B among HBsAg_antigen_I _new reactive 0 = Not Applicable 1 = Treated 2 = Untreated status_treatedHepB = Diagnosed with HBsAg_antigen_I_new reactive AND received treatment for Hepatitis B (D0002 = Yes)
acute_hepB	Acute Hepatitis B 0 = No 1 = Yes acute_hepB = HBsAg_antigen_I _new reactive AND HBc IgG reactive AND HBc_IgM_Ab_I reactive AND Anti-HBs non-reactive
chronic_hepB	Chronic Hepatitis B 0 = No 1 = Yes chronic_hepB = HBsAg_antigen_I _new reactive AND HBc IgG reactive AND HBc_IgM_Ab_I non-reactive AND Anti-HBs non-reactive
immune_natural_infection_hepB	Immune due to natural infection Hepatitis B 0 = No 1 = Yes immune_natural_infection_hepB = HBsAg_antigen_I _new non-reactive AND HBc IgG reactive AND Anti-HBs reactive

Variable Name	Command / Definition
immune_hepB_vaccine	Immune due to Hepatitis B vaccination 0 = No 1 = Yes immune_hepB_vaccine = HBsAg_antigen_I _new non-reactive AND HBc IgG non-reactive AND Anti-HBs reactive
susceptible_hepB	Susceptible Hepatitis B 0 = No 1 = Yes susceptible_hepB = HBsAg_antigen_I _new non-reactive AND HBc IgG non-reactive AND Anti-HBs non-reactive

OPERATIONAL DEFINITION: MODULE PERSONAL RISK FACTOR

- Target population age 15 years and above AND those who have laboratory results
- Weight (cs plan): phase1_nhms2020.csaplan

Variable Name	Command / Definition
atleastone_riskfactorHepB	Denominator for risk factor Hepatitis B (Any 'yes' to E0001 to E0013) atleastone_riskfactorHepB = E0001_new (Yes) OR E0002_new (Yes) OR E0003_new (Yes) OR E0004_new (Yes) OR E0005_new (Yes) OR E0006_new (Yes) OR E0007_new (Yes) OR E0008_new (Yes) OR E0009_new (Yes) OR E0010_new (Yes) OR E0011_new (Yes) OR E0012_new (Yes) OR E0013_new (Yes)
percutaneous_exposure	Percutaneous exposure (Any 'yes' to body piercing, tatoo, blood cupping & acupunture) 0 = No 1 = Yes percutaneous_exposure = E0001_new (Yes) OR E0002_new (Yes) OR E0003_new (Yes) OR E0004_new (Yes)
occupational_exposure	Occupational exposure ('Yes' to sharps injury at workplace) 0 = No 1 = Yes occupational_exposure = E0009_new (Yes)
medical_procedure	Medical procedure exposure (Any 'yes' to hemodialysis, surgical procedures, dental procedures & blood transfusion) 0 = No 1 = Yes medical_procedure = E0005_new (Yes) OR E0006_new (Yes) OR E0007_new (Yes) OR E0008_new (Yes)
unsafe_sexual	Unsafe sexual practices ('Yes' to any high risk sexual activities) 0 = No 1 = Yes unsafe_sexual = E0010_new (Yes)

Variable Name	Command / Definition
injectable_drug	Injectable drug use (Any 'yes' to injectable drug use and sharing needles) 0 = No 1 = Yes injectable_drug = E0011_new (Yes) OR E0012_new (Yes)
history_HBV	Family history of Hepatitis B ('Yes' to Family history of Hepatitis B) 0 = No 1 = Yes history_HBV = E0013_new (Yes)
atleastone_riskfactorHepC	Denominator for risk factor Hepatitis C (Any 'yes' to E0001 to E0014 except for E0013) atleastone_riskfactorHepC = E0001_new (Yes) OR E0002_new (Yes) OR E0003_new (Yes) OR E0004_new (Yes) OR E0005_new (Yes) OR E0006_new (Yes) OR E0007_new (Yes) OR E0008_new (Yes) OR E0009_new (Yes) OR E0010_new (Yes) OR E0011_new (Yes) OR E0012_new (Yes) OR E0014_new (Yes)
history_HCV	Family history of Hepatitis C ('Yes' to Family history of Hepatitis C) 0 = No 1 = Yes history_HCV = E0014_new (Yes)
numberofrisk_HBV	Cumulative Risk Exposure for Hepatitis B (numberofrisk_HBV = percutaneous_exposure + occupational_exposure + medical_procedure + unsafe_sexual + injectable_drug + history_HBV)
numberofrisk_HBV_cat	Recode numberofrisk_HBV into categorical Number of Risk for Hepatitis B (category) 0 = No risk 1 = Only one type of risk factor 2 = More than one type of risk factor

OPERATIONAL DEFINITION: MODULE HEPATITIS C

- Target population age 15 years and above AND those who have laboratory results
- Weight (cs plan): phase1_nhms2020.csaplan

Variable Name	Command / Definition
anti_HCV_new	[respondents aged 15 years & above and those who have "HCV_antibody_I" results] Anti-HCV 0 = Non-reactive 1 = Reactive
HCVcore_antigen_new	[respondents aged 15 years & above and those who have "HCV_Antigen_I" results] HCV Core Antigen 0 = Non-detected 1 = Detected
status_diagnosedHCV_new	[respondents aged 15 years & above and those who response to Question D0004 in Hepatitis Module (yes or no) & have "HCV_Antigen_I" results] Status of diagnosed Hepatitis C among HCVcore_antigen_new detected 0 = Not Applicable 1 = Diagnosed 2 = Undiagnosed status_diagnosedHepC = Diagnosed with HCVcore_antigen_new detected AND aware that they had Hepatitis C (D0004 = Yes)
status_treatmentHCV_new	[respondents aged 15 years & above and those who response to Question D0005 in Hepatitis Module (yes or no) & have "HCV_Antigen_I" results] Status of treated Hepatitis C among HCVcore_antigen_new detected 0 = Not Applicable 1 = Treated 2 = Untreated status_diagnosedHepC = Diagnosed with HCVcore_antigen_new detected AND received treatment for Hepatitis C (D0005 = Yes)

OPERATIONAL DEFINITION: MODULE TB-LIKE SYMPTOM

- Target population age 15 years and above
- Weight (cs plan): NHMS2020_CATI.csaplan

Variable Name	Command / Definition
Ever had TB	*Denominator = H0001a =1 OR H0001a = -7 (TT) [respondents aged 15 years & above (already controlled by system) and those who response to TB-like symptoms module (yes, no or don't know, exclude those who refuse to answer to question H0001a)]
Current TB	*Denominator = H0001b =1 OR H0001b = -7 (TT)
TB-like symptoms	• Coughing more than 2 weeks : H0002a = 1 (Yes) • Coughing with phlegm more than 2 weeks : H0002b = 1 (Yes) • Cough up blood : H0002c = 1 (Yes) • Having fever of more than 2 weeks : H0002d = 1 (Yes) • Unexpected weight loss : H0002e = 1 (Yes) • Drenching night sweat for more than 2 weeks : H0002f = 1 (Yes) * Denominator = same with denominator ever had TB and current TB
Health-seeking behaviour	• Self-medicated : H0003a = 1 (Yes) • Purchase medicine from pharmacy : H0003b = 1 (Yes) • Seek treatment from government clinic : H0003c = 1 (Yes) • Seek treatment from government hospital : H0003d = 1 (Yes) • Seek treatment from private clinic : H0003e = 1 (Yes) • Seek treatment from private hospital : H0003f = 1 (Yes) • Seek advice and treatment from traditional healer : H0003g = 1 (Yes) • Did not seek treatment : H0003h = 1 (Yes) * Denominator = among those who presented with at least one TB-like symptom (H0002a = 1 OR H0002b = 1 OR H0002c = 1 OR H0002d = 1 OR H0002e = 1 OR H0002f = 1 OR H0002g = 1 OR H0002h = 1)
Reason for not seeking treatment	• Not an emergency : H0004a = 1 (Yes) • Transportation problem : H0004b = 1 (Yes) • Financial problem : H0004c = 1 (Yes) • Ongoing TB treatment : H0004d = 1 (Yes) • Fear/disbelief in treatment : H0004e = 1 (Yes) • Been advised not to seek treatment : H0004f = 1 (Yes) • No time to seek treatment : H0004g = 1 (Yes) *Denominator = among those who did not seek treatment (H0003h = 1)

OPERATIONAL DEFINITION: MODULE ANTIBIOTICS USE

- Target population age 15 year and above
- Weight (cs plan): NHMS2020_CATI.csaplan

Variable Name	Command / Definition
I0001_new	*Denominator = 3051 (all respondents who answered the antibiotic module) “In the past 1 year, have you taken antibiotic for common cold or sore throat?” [respondents aged 15 years & above (already controlled by system) and those who response to antibiotics use module (yes, no or don’t know, exclude those who refuse to answer to question I0001)] Respondents who answered never were put together in group 2 (No)
I0002_new	*Denominator = 759 (whoever answered yes for question I0001) “On that occasion, where did you get the antibiotics?” 1= Clinics 2=Medical store or pharmacy 3= Stalls or hawkers 4=Internet 5=Friend or family member 6=I had them save up from a previous time 7=Somewhere or someone else Respondents who answered don’t know and refuse to answer were treated as missing
I0003_new	*Denominator = 759 (whoever answered yes for question I0001) “On that occasion, did you get advice from a doctor, nurse or pharmacist on how to take them?” 1= Yes 2=No Respondents who answered don’t know and refuse to answer were treated as missing
I0004_new	*Denominator = 759 (whoever answered yes for question I0001) “On that occasion, when did you stop taking the antibiotic?” 1= When you felt better 2= When you've taken all the antibiotics as directed by qualified health staffs 3= Don't know Respondents who refused to answer were treated as missing

Variable Name	Command / Definition
I0005_new	*Denominator = 759 (whoever answered yes for question I0001) “On that occasion, was there balance of the antibiotic? If yes, what did you do with it?” 1= No, there was no balance of the antibiotic 2=Thrown away in the trash 3=Flushed down in the sink or toilet 4= returned to a pharmacy or clinic 5= Stored or never disposed 6= Burned 7= Don't know
I0006_new	*Denominator = 3051 (all respondents who answered the antibiotic module) “Most common colds and sore throats are caused by viruses and not bacteria” 1 = correct answer (whoever answered yes) 2 = incorrect answer (whoever answered other than yes)
I0007_new	*Denominator = 3051 (all respondents who answered the antibiotic module “Does antibiotic kill viruses?” 1 = correct answer (whoever answered no) 2 = incorrect answer (whoever answered other than no)
I0008_new	*Denominator = 3051 (all respondents who answered the antibiotic module “Is Antibiotic effective to treat common cold and sore throats?” 1 = correct answer (whoever answered no) 2 = incorrect answer (whoever answered other than no)
I0009	*Denominator = 3051 (all respondents who answered the antibiotic module “You are seeing a doctor for a common cold and sore throats. He does not prescribe antibiotic for you. Would you request for antibiotic from him?” 1 = Yes 2 = No -7 = Don’t know -9 = Refuse to answer

Variable Name	Command / Definition
I0010	*Denominator = 3051 (all respondents who answered the antibiotic module “You are seeing a doctor for a common cold and sore throats. He does not prescribe antibiotic for you. Would you buy it from the pharmacy without a prescription?” 1 = Yes 2 = No -7 = Don’t know -9 = Refuse to answer
I0011_new	*Denominator = 3051 (all respondents who answered the antibiotic module “Have you ever heard of antibiotics/ antimicrobial resistance?” 1= Yes 2= No (respondents who answered other than yes)
I0012_new	*Denominator = 3051 (all respondents who answered the antibiotic module “Does overuse or misuse of antibiotic among human cause antibiotic resistance (make antibiotic less effective) to treat bacterial infections?” 1 = correct answer (whoever answered yes) 2 = incorrect answer (whoever answered other than yes)
I0013_new	*Denominator = 3051 (all respondents who answered the antibiotic module “Does overuse or misuse of antibiotic in animal farming lead to antibiotic resistance in human & animals” 1 = correct answer (whoever answered yes) 2 = incorrect answer (whoever answered other than yes)

OPERATIONAL DEFINITION: MODULE HIV KNOWLEDGE

- Target population age 13 year and above
- Weight (cs plan): NHMS2020_CATI.csaplan

Variable Name	Command / Definition
HIV Knowledge	*Denominator = J1001 = 1 AND J1002 = 2 AND J1003 = 2 AND J1004 = 1 AND J1005 = 1 [respondents aged 13 years & above and those who response correctly to all five questions in HIV Knowledge module (yes,no, exclude those answer don't know) HIV Knowledge = J1001 = 1 (Yes) AND J1002 = 2 (No) AND J1003 = 2 (No) AND J1004 = 1 (Yes) AND J1005 = 1 (Yes) Refer variable name: J1001=Healthy looking person have HIV J1002=Person get HIV from mosquito bites J1003=Person get HIV by sharing food with someone who infected J1004=HIV transmission reduce by using condom J1005=HIV transmission reduce by having sex with only one uninfected partner who has no other partner

OPERATIONAL DEFINITION: MODULE HIV STIGMA

- Target population age one year and above
- Weight (cs plan): phase1_nhms2020.csaplan

Variable Name	Command / Definition
G0001	[respondents aged 13 years & above and those who response to Question G0001 in HIV Stigma Module (yes or no)] Fear of HIV infection = G0001 = 1 (Yes) Fear of HIV infection refers to the fear of causal transmission or refusal of contact with PLHIV.
G0002	[respondents aged 13 years & above and those who response to Question G0002 in HIV Stigma Module (yes or no)] Social judgment = G0002 =1 (Yes) Social judgement refers to the act of shame, blame, prejudice and stereotypes towards PLHIV.
G0003	[respondents aged 13 years & above those who response to Question G0003 in HIV Stigma Module (yes or no)] Anticipated Stigma = G0003 =1 (Yes) Anticipated stigma refers to the individual's expectation that they would experience prejudice from others if they are infected with HIV.
G0004	[respondents aged 13 years & above and those who response to Question G0004 in HIV Stigma Module (yes or no)] Perceived stigma = G0004 =1 (Yes) Perceived stigma refers to the PLHIV's perception of social disqualification, denial or limitations of opportunities due to their HIV status

Variable Name	Command / Definition
G0005	[respondents aged 13 years & above and those who response to Question G0005 in HIV Stigma Module (yes or no)] Experienced stigma= G0005=0 (No) Experienced stigma refers to the experience of discrimination based on a person's HIV status that falls outside the purview of the law.
G0006	[respondents aged 13 years & above and those who response to Question G0006 in HIV Stigma Module (yes or no)] Discrimination = G0006 =0 (No) Discrimination refers to the experience of discrimination based on a person's HIV status that falls within the purview of the law
UNAIDS_Indicator	*Denominator = among aged 15-49 years [respondents aged 15-49 years and those who response to Questions G0005 and G0006 in HIV Stigma Module (yes or no)] UNIADS Indicator = G0005 = 0 (No) OR G0006 = 0 (No) UNAIDS global indicator for discriminatory attitudes among respondents aged 15-49 years old refers to a respondent categorized as either having experienced stigma or discrimination.

OPERATIONAL DEFINITION: MODULE MALARIA

- Target population age 15 year and above
- Weight (cs plan): NHMS2020_CATI.csaplan

Variable Name	Command / Definition
K0001 (Ever heard of malaria)	Refer to question K0001 1 = Yes 2 = No Respondent who responds yes to question K0001.
Transmission_Correct	Refer to question K0002 1 = Yes 2 = No Transmission_Correct = K0002c =1
Symptom_Correct	Refer to question K0003 1 = Yes 2 = No Symptom_Correct = K0003b =1 AND K0003d = 1
Risk_Correct	Refer to question K0004 1 = Yes 2 = No Risk_Correct = K0004b =1 AND K0004c = 1 AND K0004e = 1
Prevention_Correct	Refer to question K0005 1 = Yes 2 = No Risk_Correct = K0005a =1 AND K0005b = 1 AND K0005c = 1 AND K0005d = 1 AND K0005e = 1
K0006 (Aware of prevention and control activities)	Refer to question K0006 1 = Yes 2 = No Respondent who responds yes to question K0006.

DATA DICTIONARY PHASE 1: SOCIODEMOGRAPHIC AND HOME LIVING

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
ID & Individu Status (Original from server)						
1	NEGERI		ID state	string		negeri [2 digit]
2	DPDB		ID DPDB	string		Daerah Pentadbiran (DP) [2 Digit] & Daerah Banci (DB) [3 digit]
3	BP		ID BP	string		Blok Perhintungan (BP) [4 digit]
4	UB		ID UB	string		Unit Bangunan (UB) [3 digit)
5	TK		ID TK	string		Tempat Kediaman (TK) [3 digit]
6	ST		ID strata	string		Strata [1 digit]
7	IRIND		ID IR & Individu	string		Isi Rumah (IR) [2 digit] & Individu (IND) [2 digit]
8	NAMARA		RA name	string		RA name
9	KOORDINAT		coordinate	string		Coordinate
10	TARIKH		date	yyyy-mm-dd		Date of interview
11	MASA		time	hh:mm		Time of Interview
12	ZON		zone/region	numeric	1=Selatan 2=Timur 3=Utara 4=Tengah 5= Sabah & Labuan 6= Sarawak	
13	S0001		TK status	numeric	1= successful, 2= fail	Living Quarters (LQ) status?
14	STKa		sebab TK gagal	numeric	1=TK Enggan 2=TK Berkunci 3=TK Roboh 4=TK Kosong 5=Bukan TK 6=Tidak Ditemui	Sila nyatakan sebab TK gagal
15	S0002		Idv status	numeric	1= successful, 2= fail	Has the respondent been succesfully interviewed?
16	S0002a		sbb idv gagal	numeric	1=Enggan 2=Tiada Dirumah 3=Masalah Bahasa & Masalah Kesihatan	If the respondent has not been successfully interviewed, what was the reason?
17	S0003		Agree for CATI	numeric	1= Yes 2= No	Adakah responden bersetuju untuk ditemuramah melalui telefon untuk NHMS202 Fasa 2
18	S0004		name	string		Nama Responden
19	S0005		Prefered time	string		Bilakah waktu yang sesuai untuk responden dihubungi? (masa/hari/tarikh)

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
20	S0006		Contact no	string		No telefon yang boleh dihubungi
21	S0007		Prefered language	string		Bahasa yang dipilih untuk temubual
22	S0008a		SAQ CAB	numeric	1= Yes 2= No	Adakah borang selidik berikut telah diberikan kepada responden? CAB
23	S0008b		SAQ Risk factor & HIV	numeric	1= Yes 2= No	Adakah borang selidik berikut telah diberikan kepada responden? Faktor risiko & HIV stigma
	S0008c		SAQ CAB		1= Yes 2= No	Adakah borang CAB telah dipulangkan kepada pasukan pengumpulan data di lapangan
24	S0009		TK/Idv Enggan- to end module	numeric	1= Yes (Jika TK/Responden Gagal) 2= No (Jika TK/Responden Berjaya)	Adakah status TK gagal disebabkan ENGGAN/Responden tidak berjaya disebabkan ENGGAN~
Module A Sociodemography (Original from server)						
25	A1000	A1000	responden yang menjawab	numeric	1= Ahli isirumah sendiri 2= Ahli isirumah dibantu oleh penterjemah 3= Proksi (bagi pihak ahli isirumah) 4= Proksi dengan bantuan penterjemah	Siapakah yang telah menjawab borang soal selidik ini?
26	A1001	A1001	name	string		Name of household member
27	A1002	A1002	sex	numeric	1=male, 2 =female	Gender
28	A1003	A1003	relationship	numeric	TT=-7, EJ=-9 1= Head of Household 2= Spouse 3= Parent 4= Child 5= Grand or great-grandparent 6= Grand or great-grandchild 7= Siblings 8= Parent-in-law 9= Son or Daughter in-law 10= Brother- or Sister-in-law 11= Other relatives 12= Friend 13= Workers (live-in housemaid, gardener, driver, others) 14= Others	What is your relationship to… (name of head of household)?

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
29	A1003a	A1003	relationship-others	string		Others. Please specify
30	A1004	A1004	DOB	yyyy-mm-dd		When is your birth date?
31	A1005	A1004	age	numeric	allowed 0-150 years	How old are you? (years)
32	A1006a	A1006	NRIC	string	TT=-7, EJ=-9	What is your identification number? New Identification Card / MyKid What is your identification number? Passport No.
33	A1006b	A1006	passport	string	TT=-7, EJ=-9	What is your identification number? Passport no What is your identification number? Passport No.
34	A1006c	A1006	other card	string	TT=-7, EJ=-9	What is your identification number? Other identification card no. (Army / Police / Birth cert / Others)
35	A1007	A1007	ethnic	numeric	1= Malay 2= Chinese 3= Indian 4= Orang Asli/Semenanjung Aborigines 5= Bumiputera of Sabah, 6= Bumiputera of Sarawak, 7= Others	What is your ethnicity?
36	A1007a	A1007a	ethnic - code	string	allowed (1-57)	Jika Bumiputera Sabah, Sarawak, sila nyatakan kod
37	A1007b	A1007	ethnic - specify other	string		Please specify if other ethnic
38	A1008	A1008	citizenship	numeric	TT=-7, EJ=-9 1= Malaysian Citizen 2= Permanent Resident of Malaysia 3= Non-Malaysian Citizen	What is your citizenship status?
39	A1009	A1009	marital	numeric	TT=-7, EJ=-9 1= Never married 2= Married 3= Separated 4= Duda / Divorcee 5= Widow / Widower 6= Living with partner	What is your marital status?

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
40	A1010	A1010	education	numeric	TT=-7, EJ=-9 1= Child not at school 2= Still schooling 3= Never attended school 4= Did not complete primary school 5= Completed standard 6 6= Completed form 3 7= Completed form 5 8= Completed form 6 / certificate / diploma 9= Completed Bachelor's degree 10= Completed Master's degree 11= Completed Doctoral qualification (PhD) 10= Others	What is your highest education level?
41	A1011	A1011	occupation	numeric	1=yes, 2 =no, TT=-7, EJ=-9	Are you working?
42	A1012	A1012	reason not working	numeric	TT=-7, EJ=-9 1= Health problems/disabled 2= Care for the sick/disabled/elderly 3= Homemaker/care for children, grandchildren, other family members 4= Have a job, but not working 5= Unemployed 6= Student 7= Pensioner 8= Old age 9= Child not at school 10= Others	If not working, why?
43	A1013	A1013	If working, occupation - types	numeric	TT=-7, EJ=-9 1 = Government employee 2 = Semi-government employee 3 = Private employee 4 = Self-employed 5 = Unpaid worker 6 = Unpaid family worker	Are you a…
44	A1014	A1014	healthcare worker	numeric	TT=-7, EJ=-9, TB= -6 1= Yes 2= No	Are you a health-care worker exposed to blood through patient care?
45	A1015	A1015	income -from work	numeric	TT=-7, EJ=-9	Income from work (wage / salary) or pension (RM) / Monthly

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
46	A1016	A1016	income-from HH	numeric	TT=-7, EJ=-9	Money received from household members (RM) / Monthly
47	A1017	A1017	income-other source	numeric	TT=-7, EJ=-9	Money from other sources, such as from asset rental collection, non-household family members, scholarship, community /social welfare, Baitulmal, dividend and others (RM) / Monthly
Module A - Part B Home Living & Environment (Original from server)						
48	A2001	A2001	types house	numeric	1= Flat, apartment, condominium 2= Detached house, bungalow, traditional house 3= Town house, Terrace, link house, cluster 4= Semi-D 5= Shop house 6= Water house 7= Squatters 8= Longhouse	Type of house
49	A2002	A2002	floor level	numeric	TT=-7, EJ=-9, Missing/NA = -6 (Allowed range 1-99)	For Flat, apartment, condominium - Which floor / level do you live?
50	A2003	A2003	no of doors	numeric	TT=-7, EJ=-9, Missing/NA = -6 (Allowed range 1-99)	For Longhouse, how many doors in this longhouse?
51	A2004	A2004	no of rooms	numeric	TT=-7, EJ=-9, Missing/NA = -6 (Allowed range 1-99)	Number of rooms in the household?
52	A2005	A2005	ownership house	numeric	TT=-7, EJ=-9 1= Owned or being bought 2= Rented 3= A government/ employer-provided staff quarters 4= living for free in a house owned by non-household members	What is the ownership status of this house?
53	A2006	A2006	no. household member	numeric	TT=-7, Missing =-6 (Allowed range 1-99)	Total number of people living in your household?
54	A2007	A2007	source of drinking water	numeric	1 = Piped water 2 = Dug well 3 = Water from spring 4 = Rainwater collection 5 = Water taken directly from pond or stream 6 = Delivered water 7 = Water kiosk 8 = Packaged water 9 = Surface water 10 = Others	What is the main source of drinking water for members of your household?

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
55	A2008	A2008	toilet facility	numeric	1 = Flush toilet and connected to the main sewerage system 2 = Flush toilet with septic tank 3 = Pour flush toilet 4 = Bore hole toilet with closed lid 5 = Bore hole toilet without cover 6 = Bucket latrine 7 = Container based sanitation 8 = Hanging latrine 9 = No facility toilet/ bush/ field	What kind of toilet facility do you and members of your household usually use?
56	A2009	A2009	share facility with others	numeric	1 = Yes 2 = No	Do you share this facility with others who are not members of your household?
57	A2010	A2010	soap or detergent for washing hands	numeric	1 = Yes 2 = No	Do you have soap or detergent in your household for washing hands?
Computed new variables for Sociodemography						
127	state		State	numeric	1 = Johor 2 = Kedah 3 = Kelantan 4 = Melaka 5 = Negeri Sembilan 6 = Pahang 7 = Penang 8 = Perak 9 = Perlis 10 = Selangor 11 = Terengganu 12 = Sabah 13 = Sarawak 14 = KL 15 = Labuan 16 = Putrajaya	From original variable: "NEGERI"
128	zon_gp		Zon all categories	numeric	1=Selatan 2=Timur 3=Utara 4=Tengah 5= Sabah & Labuan 6= Sarawak	From original variable: "ZON"
129	zone_3grp		Zon 3 categories	numeric	1=Peninsular Malaysia 2=Sabah & Labuan 3=Sarawak	From original variable: "ZON" 1,2,3,4 = Peninsular Malaysia (1) 5= Sabah & Labuan (2) 6= Sarawak (3)
130	strata		Strata	numeric	1= Urban 2=Rural	From original variable: "ST" 1,2 = Urban (1) Else = Rural (2)

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
131	sex		Gender	numeric	1= Male 2 = Female	From original variable: "A1002"
132	age		Age (Numerical)	numeric	allowed 0-150 years	From original variable: "A1005"
133	agegp		Age group (10 years gap)	numeric	1 = 1-9 2 = 10-19 3 = 20-29 4 = 30-39 5 = 40-49 6 = 50-59 7 = 60-69 8 = 70 & above	From original variable: "A1005"
134	ethnic		Ethnicity 7 groups	numeric	1 = Malay 2 = Chinese 3 = Indian 4 = Bumiputera Sabah 5 = Bumiputera Sarawak 6 = Orang Asli 7 = Others	From original variable: "A1007"
135	ethnic2		Ethnicity 5 groups	numeric	1 = Malay 2 = Chinese 3 = Indian 4 = Other Bumiputeras 5 = Others	From original variable: "A1007" *Other Bumiputeras = Bumi Sabah + Bumi Sarawak + Orang Asli
	ethnic3		Ethnicity 5 groups	numeric	1 = Malay 2 = Chinese 3 = Indian 4 = Other Bumiputeras 5 = Others	From origional variable: "A1007" *Other Bumiputeras = Bumi Sabah + Bumi Sarawak + Orang Asli and all non-citizenship code as others ethnicity
136	citizenship		citizenship 3 groups	numeric	1= Malaysian Citizen 2= Permanent Resident of Malaysia 3= Non-Malaysian Citizen	From original variable: "A1008"
137	citizenship2		citizenship 2 groups	numeric	1= Malaysian Citizen 2= Non-Malaysian Citizen	From origional variable: "A1008" *Non-Malaysian Citizen combine with Permanent resident
138	education		Education 4 groups	numeric	1 = No formal education 2 = Primary education 3 = Secondary education 4 = Tertiary education 5 = Unclassified (Missing)	From original variable: "A1010" 1 Child not at school = No formal education (1) 2 Still schooling = Primary Education (2) 3 Never attended school = No formal education (1) 4 Did not complete primary school = Primary Education (2) 5 Completed standard 6 = Primary Education (2)

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
						6 Completed form 3 = Secondary Education (3) 7 Completed form 5 = Secondary Education (3) 8 Completed form 6 / certificate / diploma = Tertiary education (4) 9 Completed Bachelor's degree = Tertiary education (4) 10 Completed Master's degree = Tertiary education (4) 11 Completed Doctoral qualification (PhD) = Tertiary education (4) 10 Others = Unclassified (Declared Missing)
139	marital		Marital status 6 groups	numeric	EJ=-9 1= Never married 2= Married 3= Separated 4= Duda Divorcee 5= Widow/Widower 6= Living with partner	From original variable: "A1009"
140	marital2		Marital status 3 groups	numeric	EJ=-9 1= Single 2= Married 3= Widowed (er)/divorcee	From original variable: "A1009" *Valid age 10 years and above 1 Never married = Single (1) 2 Married = Married (2) 3 Separated = Widowed (er)/divorcee (3) 4 Duda Divorcee = Widowed (er)/divorcee (3 5 Widow/Widower = Widowed (er)/divorcee (3 6 Living with partner = Married (2)
141	occupation		Occupation 8 groups	numeric	1 = Government employee 2 = Private employee 3 = Self-employed 4 = Unpaid worker/Homemaker/caregiver 5 = Retiree 6 = Student 7 = Not working (unemployed, health problem, old age & child) 8 = Others	From original variable: "A1011, A1012, A1012"
142	occupation2		Occupation 8 groups	numeric	1 = Government employee 2 = Private employee 3 = Self-employed	From original variable: "A1011, A1012, A1012" *Valid age 15 years & above

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
					4 = Unpaid worker/Homemaker/ caregiver 5 = Student 6 = Not working (unemployed, health problem, old age, retiree) 7 = Others (missing)	
143	total_income		Total Individual income (Numerical)	numeric		From original variable: "A1015 + A1017" Summation of income from work (A1015) and Money from other sources (A1017)
144	HHincome		Total Household Income (Numerical)	numeric		From original variable: "A1015 + A1017" * total individual income from each household member * HH income less than 0, declared as missing
145	HHincome_ gp		Household income in group	numeric	1 = Less than RM 1000 2 = RM 1000 - RM 1999 3 = RM 2000 - RM 2999 4 = RM 3000 - RM 3999 5 = RM 4000 - RM 4999 6 = RM 5000 - RM 5999 7 = RM 6000 - RM 6999 8 = RM 7000 - RM 7999 9 = RM 8000 - RM 8999 10 = RM 9000 - RM 9999 11 = RM 10000 and above	From total household income ("HHincome")
146	HHinc_quint ile		Household income in quintile	numeric	1 = Quintile 1 2 = Quintile 2 3 = Quintile 3 4 = Quintile 4 5 = Quintile 5	From total household income ("HHincome")
147	B40_state		Threshold of monthly gross income (based on each state cut off point)	numeric	1 = Bottom 40% 2 = Middle 40% 3 = Top 20%	From total household income ("HHincome") * Cut of point based on each state (DOSM, 2016)
148	B40_national		Threshold of monthly gross income (based on national cut off point)	numeric	1 = Bottom 40% 2 = Middle 40% 3 = Top 20%	From total household income ("HHincome") * Cut of point based on national (DOSM, 2016) B40% <RM 4360, M40% RM4360-9619, T20% ≥ RM9620

DATA DICTIONARY PHASE 1: MODULE COVID-19

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
Module B - Health Screening (Original from server)						
1	B0001a	B0001a	known- DM	numeric	TT=-7, EJ=-9 1= Yes 2= No	Have you ever been told or diagnosed by a doctor or medical practitioner that you have…Diabetes
2	B0001b	B0001b	known- Hypertension	numeric	TT=-7, EJ=-9 1= Yes 2= No	Have you ever been told or diagnosed by a doctor or medical practitioner that you have…Hypertension
3	B0001c	B0001c	known- heart disease	numeric	TT=-7, EJ=-9 1= Yes 2= No	Have you ever been told or diagnosed by a doctor or medical practitioner that you have…Heart disease
4	B0001d	B0001d	known- Asthma	numeric	TT=-7, EJ=-9 1= Yes 2= No	Have you ever been told or diagnosed by a doctor or medical practitioner that you have…Asthma
5	B0001e	B0001e	known- Chronic pulmonary or lung disease	numeric	TT=-7, EJ=-9 1= Yes 2= No	Have you ever been told or diagnosed by a doctor or medical practitioner that you have…Chronic pulmonary or lung disease
6	B0001f	B0001f	known- kidney disease	numeric	TT=-7, EJ=-9 1= Yes 2= No	Have you ever been told or diagnosed by a doctor or medical practitioner that you have…Kidney disease
7	B0001g	B0001g	known- Liver disease	numeric	TT=-7, EJ=-9 1= Yes 2= No	Have you ever been told or diagnosed by a doctor or medical practitioner that you have…Liver disease
8	B0001h	B0001h	known- Cancer	numeric	TT=-7, EJ=-9 1= Yes 2= No	Have you ever been told or diagnosed by a doctor or medical practitioner that you have…Cancer
9	B0002a	B0002a	ever smoking	numeric	TT=-7, EJ=-9 1= Yes 2= No	Have you ever smoked?
10	B0002b	B0002b	Current smoking	numeric	TT=-7, EJ=-9 1= Yes 2= No	Do you currently smoke?
11	B1001a	B1001a	Symptom - Fever	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Fever
12	B1001b	B1001b	Symptom - Sore throat	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Sore throat
13	B1001c	B1001c	Symptom - Runny nose	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Runny nose

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
14	B1001d	B1001d	Symptom - Cough	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Cough
15	B1001e	B1001e	Symptom - Shortness of breath	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Shortness of breath
16	B1001f	B1001f	Symptom - Other respiratory symptoms	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Other respiratory symptoms
17	B1001fa	B1001f	Symptom - specify	string		Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? please specify Other respiratory symptoms
18	B1001g	B1001g	Symptom - Chills	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Chills
19	B1001h	B1001h	Symptom - Vomiting	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Vomiting
20	B1001i	B1001i	Symptom - Nausea	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Nausea
21	B1001j	B1001j	Symptom - Diarrhea	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Diarrhea
22	B1001k	B1001k	Symptom - Headache	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Headache
23	B1001l	B1001l	Symptom - Skin rash	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Skin rash
24	B1001m	B1001m	Symptom - Conjunctivitis	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Conjunctivitis
25	B1001n	B1001n	Symptom - Muscle aches	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Muscle aches

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
26	B1001o	B1001o	Symptom - Joint ache	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Joint ache
27	B1001p	B1001p	Symptom - Loss of appetite	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Loss of appetite
28	B1001q	B1001q	Symptom - Loss of smell	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Loss of smell
29	B1001r	B1001r	Symptom - Loss of taste	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Loss of taste
30	B1001s	B1001s	Symptom - Nose bleed	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Nose bleed
31	B1001t	B1001t	Symptom - Fatigue	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Fatigue
32	B1001u	B1001u	Symptom - Seizures	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Seizures
33	B1001v	B1001v	Symptom - Altered consciousness	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Altered consciousness
34	B1001w	B1001w	Symptom - Other symptoms	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? Other symptoms
35	B1001wa	B1001w	Symptom - please state other symptoms	numeric	TT=-7, EJ=-9 1= Yes 2= No	Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms? please state
36	B1002	B1002	Screening for date symptom	numeric	1= Proceed to B1002a (if any Yes) 2= End module (if all answer No)	Did the respondent answer “Yes” to any of the above symptoms?
37	B1002a	B1002a	remember date	numeric	1= Yes 2= No	Do the respondents remember the date the symptoms began and disappeared?
38	B1002b	B1002b	onset symptom	date	yyyy-mm-dd	When did you start to experience the above symptoms?

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
39	B1002c	B1002c	end symptom	date	yyyy-mm-dd	When did you the above symptoms resolve?
40	B1002d	B1002d	required medical attention	numeric	TT=-7, EJ=-9 1= Yes 2= No	*Did any of these symptoms require you to seek medical attention?*
41	B1002e	B1002e	required miss work/school	numeric	TT=-7, EJ=-9 1= Yes 2= No	Did any of these symptoms require you to miss work or school?
42	B1002f	B1002f	required to be hospitalized	numeric	TT=-7, EJ=-9 1= Yes 2= No	Did any of these symptoms require you to be hospitalized?
Module C - COVID-19 (Original from server)						
43	C0001	C0001	close contact with COVID19	numeric	TT=-7, EJ=-9 1= Yes 2= No	*Have you had close contact with anyone with suspected or confirmed COVID-19 virus infection?*
44	C0002	C0002	attended mass gathering	numeric	TT=-7, EJ=-9 1= Yes 2= No	Have you ever attended any festivals or mass gathering since January 2020, where a known COVID-19 case has been detected?
45	C0003	C0003	travelled internationally	numeric	TT=-7, EJ=-9 1= Yes 2= No	*Have you travelled internationally since January 2020?*
46	C0004a	C0004a	Diagnosed COVID-19	numeric	TT=-7, EJ=-9 1= Yes 2= No	Have you ever been diagnosed as a COVID-19 patient?
47	C0004b	C0004b	tested for COVID-19	numeric	TT=-7, EJ=-9 1= Yes 2= No	Have you ever get tested for COVID-19?
48	C0004c	C0004c	type of sample for COVID19	numeric	TT=-7, EJ=-9 1 = Throat or nasopharyngeal swab 2 = Blood 3 = Both	What type of sample was taken?
Module F - Biomarker for COVID-19 and Hepatitis (Original from server)						
49	F1001	F1001	Consent for Biomarker	numeric	1= Yes 2= No	Do you understand with all the statements given on your participation in this blood taking testing? AND do you allow our medical staff to collect your blood via venipuncture for the purpose of this testing?
50	F1002	F1002	received token	numeric	1= Yes 2= No 3 = not applicable	Did you receive RM 30 as a token of appreciation for your participation in this blood taking testing? Please sign if you have received the token money in the given forms
51	F2001	F2001	temperature	numeric	TT=-7, EJ=-9 (Allowed range 30 - 50)	Please state the body temperature

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
52	F2002a	F2003a	Blood for Hepatits	numeric	TT=-7, EJ=-9 1= Yes 2= No	Type of blood test that was taken - Hepatitis B & Hepatitis C
53	F2002b	F2003c	Blood for COVID19	numeric	TT=-7, EJ=-9 1= Yes 2= No	Type of blood test that was taken - Serology COVID-19
54	F3000		Bar code	string		Please insert the respondent's specimen barcode reading
55	F4000a		Done RTK	numeric	1 = Ya, garisan (c) muncul dan keputusan dapat dibaca 2 = Ya, tetapi garisan (c) tidak muncul 3 = Ya tetapi keputusan tidak dapat dibaca 4 = Tidak dilakukan	Adakah responden telah menjalani ujian RTK antibodi COVID-19?
56	F5000		Screening RTK - to end module if not related	numeric	1= Yes (end module) 2= No	Adakah responden menjawab SELAIN daripada pilihan " 1 (Ya, garisan c muncul dan keputusan dapat dibaca?"
57	F5000a		RTK first	numeric	1 = Positive 2 = Negative	Bacaan keputusan ujian RTK dari pembaca pertama
58	F5000b		RTK second	numeric	1 = Positive 2 = Negative	Bacaan keputusan ujian RTK dari pembaca kedua
59	F5000c		RTK third	numeric	1 = Positive 2 = Negative 3 = Tidak berkenaan	Bacaan keputusan ujian RTK dari pembaca ketiga (jika perlu)
60	F6000		Alamat responden	string	TT=-7, EJ=-9	Respondent's address (for those who taking blood)
Biomarker for COVID-19 (Original from Laboratory)						
61	IDNo_covid		Id lab Covid-19 (IC Number)	string		N/A
62	ELISA_AbsorbanceA		ELISA Absorbance value	string		N/A
63	ELISA_Calulation		ELISA Calculation value	string		N/A
64	ELISA_Interpretation		Interpretation ELISA	string	POSITIVE NEGATIVE	N/A
65	ELISA_NC_AVERAGE		ELISA Average value	string		N/A
66	ELISA_CUTOFF		ELISA cut off point value	string		N/A
67	ELISA_BATCH		ELISA Batch number	string		N/A
68	ELISA_CATATAN		ELISA - Notes	string		N/A
69	CPASS_AbsorbanceA		CPASS Absorbance value	string		N/A

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
70	CPASS_Calculation		CPASS Calculation value	string		N/A
71	CPASS_Interpretation		Interpretation CPASS	string	POSITIVE NEGATIVE	N/A
Computed new variables for COVID-19						
72	diagnosed_COVID19		Diagnosed and undiagnosed Covid19	numeric	1 = Diagnosed 2 = Undiagnosed	Ever been diagnosed COVID-19 *From original variable: "C0004a"
73	symtomatic_covid		Symptomatic and asymptomatic Covid19	numeric	0 = Asymptomatic 1 = Symptomatic	Symptomatic COVID (yes to any symptom fever, sore throat, runny nose, cough, SOB, Chills, vomiting, nausea, diarhea,headhache, muscle ached, loss of smell, loss of taste and fatigue) *From origional variable: "B1001a-w"
74	covid19_ELISA		ELISA Interpretation COVID-19 (3 groups)	numeric	1 = Reactive 2 = Borderline 3 = Non-reactive	ELISA original Interpretation from lab test for COVID-19 antibody *From original variable: "ELISA_Interpretation"
75	covid19_ELISA_final		ELISA Interpretation COVID-19 (2 groups)	numeric	1 = Positive 2 = Negative	Final ELISA test for COVID-19 antibody [Denom: among all respondents with blood result] *From original variable: "ELISA_Interpretation"
76	covid19_cPASS		cPASS Interpretation COVID-19 (2 groups)	numeric	1 = Positive 2 = Negative	cPASS ori lab result for COVID19 neutralization antibody (sVNT) [Denom: among Positive ELISA test] *From original variable: "CPASS_Interpretation"
77	covid19_cPASS_final		cPASS Interpretation COVID-19 (2 groups)	numeric	0 = Negative 1 = Positive	Final cPASS test for COVID-19 neutralization antibody (sVNT) [Denom: among all respondents with blood result]

DATA DICTIONARY PHASE 1: MODULE HEPATITIS B AND C

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
Module D - Hepatitis						
1	D0001	D0001	Ever had Hepatitis B	numeric	TT=-7, EJ=-9 1= Yes 2= No	Has a doctor or other health professional ever told you that you have Hepatitis B?
2	D0002	D0002	Ever had Hepatitis B treatment	numeric	TT=-7, EJ=-9 1= Yes 2= No	Were you ever prescribed any medicine to treat Hepatitis B?
3	D0003	D0003	Vaccination for Hepatitis B	numeric	TT=-7, EJ=-9 1 = Yes, completed 3 doses 2 = Yes, either 1 or 2 shots 3 = Never get shot for Hepatitis B 4 = Not sure	Have you ever get vaccinated with Hepatitis B shot?
4	D0004	D0004	Ever had Hepatitis C	numeric	TT=-7, EJ=-9 1= Yes 2= No	Has a doctor or other health professional ever told you that you have Hepatitis C?
5	D0005	D0005	Ever had Hepatitis B treatment	numeric	TT=-7, EJ=-9 1= Yes 2= No	Were you ever prescribed any medicine to treat hepatitis C?
Biomarker for Hepatitis (Original from Laboratory)						
6	HBsAg_antigen			String	Range 0.1- 850	Hepatitis B Surface antigen test
7	HBsAg_antigen_I			String	Non-Reacti Non-Reactive Non-Reactive Reactive Reactive *	Hepatitis B Surface antigen test interpretation
8	HBsAb_antibody			String	*Mix continouse & String Insufficient	Antibody Hepatitis B surface test
9	HBc_IgM_Ab			String	*Mix continouse & String Insufficient	Antibody Hepatitis B core (IgM) test
10	HBc_IgM_Ab_I			String	Insufficient Non Reacti Non Reactive Non-Reactive Reactive	Antibody Hepatitis B core (IgM) test interpretation
11	HBc_IgG_Ab			String	*Mix continouse & String Insufficient	Antibody Hepatitis B core (IgG) test
12	HBc_IgG_Ab_I			String	Insufficient Non Reacti Non Reactive Non-Reactive Reactive	Antibody Hepatitis B core (IgG) test interpretation
13	HCV_antibody			String	*Mix continouse & String Insufficient	Antibody Hepatitis C surface test

No	Variable Name	Quest No	Variable Label briefly	Measurement Unit	Allowed Value	Description
14	HCV_antibody_I			String	Insufficient Non Reacti Non Reactive Non-Reactive Presumptive Reactive Reactive Weak React	Antibody Hepatitis C surface test interpretation
15	HCV_Antigen			String	Range 0.00 - 75.00 0 = Missing/NA	Hepatitis C Surface antigen test
16	HCV_Antigen_I			String	0 = Missing/NA Grayzone Non Reacti Non-Reactive Non-Reactive Reactive	Hepatitis C Surface antigen test interpretation
Computed new variables for Hepatitis B						
17	age_hep		age for hepatitis B	Numeric	1 = 15-30 yrs 2 = 31 years and above	From original variable: "A1005"
18	HBsAg_antigen_I_new		Hepatitis B Antigen	Numeric	0 = Non-Reactive 1 = Reactive	Hepatitis B Surface antigen test interpretation From original variable: "HBsAg_antigen_I"
19	HBsAb_antibody_new		Anti_HBs	Numeric	0 = Insufficient 1 = Non-Reactive 2 = Reactive	Antibody Hepatitis B surface test From original variable: "HBsAb_antibody"
20	HBc_IgM_Ab_I_new		HBc_IgM_Ab_I	Numeric	0 = Non-Reactive 1 = Reactive	Antibody Hepatitis B core (IgM) test interpretation From original variable: "HBc_IgM_Ab_I"
21	HBc_IgG_Ab_I_new		HBc_IgG_Ab_I	Numeric	0 = Non-Reactive 1 = Reactive	Antibody Hepatitis B core (IgG) test interpretation From original variable: "HBc_IgG_Ab_I"
22	D0001_new	D0001	Aware that one has Hepatitis B	Numeric	1 = Yes 2 = No	Has a doctor or other health professional ever told you that you have Hepatitis B?
23	status_diagnosedHepB		Status of diagnosed Hepatitis B among HBsAg Reactive	Numeric	0 = Not Applicable 1 = Diagnosed 2 = Undiagnosed	Diagnosed with Hepatitis B Antigen reactive and aware that they had Hepatitis B
24	D0002_new	D0002	Aware that one Hepatitis B is under treatment	Numeric	1 = Yes 2 = No	Were you ever prescribed any medicine to treat Hepatitis B?
25	status_treatedHepB		Status of treated Hepatitis B among HBsAg Reactive (Self-claimed)	Numeric	0 = Not Available 1 = Treated 2 = Untreated 3 = Not Applicable	Diagnosed with Hepatitis B Antigen reactive and received treatment for Hepatitis B

No	Variable Name	Quest No	Variable Label briefly	Measurement Unit	Allowed Value	Description
26	D0003_new	D0003	Hepatitis B vaccination individual status	Numeric	1 = Fully vaccinated 2 = Not fully vaccinated 3 = Never get Hepatitis vaccination 4 = Unsure	Have you ever get vaccinated with Hepatitis B shot?
27	acute_hepB		Acute Hepatitis B	Numeric	0 = No 1 = Yes	HBsAg_antigen_I _new reactive AND HBc IgG reactive AND HBc_IgM_Ab_I reactive AND Anti-HBs non-reactive
28	chronic_hepB		Chronic Hepatitis B	Numeric	0 = No 1 = Yes	HBsAg_antigen_I _new reactive AND HBc IgG reactive AND HBc_IgM_Ab_I non-reactive AND Anti-HBs non-reactive
29	immune_natural_infection_hepB		Immune due to natural infection Hepatitis B	Numeric	0 = No 1 = Yes	HBsAg_antigen_I _new non-reactive AND HBc IgG reactive AND Anti-HBs reactive
30	immune_hepB_vaccine		Immune due to Hepatitis B vaccination	Numeric	0 = No 1 = Yes	HBsAg_antigen_I _new non-reactive AND HBc IgG non-reactive AND Anti-HBs reactive
31	susceptible_hepB		Susceptible Hepatitis B	Numeric	0 = No 1 = Yes	HBsAg_antigen_I non-reactive AND HBc IgG non-reactive AND Anti-HBs non-reactive
Computed new variables for Hepatitis C						
32	anti_HCV_new		Anti-HCV	Numeric	0 = Non-Reactive 1 = Reactive	From original variable: "HCV_antibody_I"
33	HCVcore_antigen_new		HCV Core Antigen	Numeric	0 = Non-detected 1 = Detected	From original variable: "HCV_Antigen_I "
34	D0004_new	D0004	Aware that one has Hepatitis C	Numeric	1 = Yes 2 = No	Has a doctor or other health professional ever told you that you have Hepatitis C?
35	status_diagnosedHCV_new		Status of diagnosed among HCV Core Antigen detected	Numeric	0 = Not Applicable 1 = Diagnosed 2 = Undiagnosed	Diagnosed with HCV Core Antigen detected and aware that they had Hepatitis C
36	D0005_new	D0005	Aware of treatment status for Hepatitis C	Numeric	1 = Yes 2 = No	Were you ever prescribed any medicine to treat hepatitis C?
37	status_treatmentHCV_new		Status of treatment among HCV Core Antigen detected	Numeric	0 = Not Applicable 1 = Treated 2 = Untreated	Diagnosed with HCV Core Antigen detected and received treatment for Hepatitis C

DATA DICTIONARY PHASE 1: MODULE HEPATITIS B (PERSONAL RISK FACTOR)

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
Module E Risk Factor for Hepatitis (SAQ)						
1	E0001	E0001	Piercing	Numeric	0 = No 1 = Yes	Have you ever had any procedures as mentioned below? Piercing in any body parts
2	E0002	E0002	Tattoo	Numeric	0 = No 1 = Yes	Have you ever had any procedures as mentioned below? Tattoo
3	E0003	E0003	Blood cupping	Numeric	0 = No 1 = Yes	Have you ever had any procedures as mentioned below? Blood cupping
4	E0004	E0004	Acupuncture	Numeric	0 = No 1 = Yes	Have you ever had any procedures as mentioned below? Acupuncture
5	E0005	E0005	Hemodialysis	Numeric	0 = No 1 = Yes	Have you ever had any procedures as mentioned below? Haemodialysis
6	E0006	E0006	Surgical/ Operation	Numeric	0 = No 1 = Yes	Have you ever had any procedures as mentioned below? Any surgical procedure or operation
7	E0007	E0007	Dental procedure	Numeric	0 = No 1 = Yes	Have you ever had any procedures as mentioned below? Any dental procedures
8	E0008	E0008	Blood transfusion	Numeric	0 = No 1 = Yes	Received any blood transfusion more than 25 years ago (before the year 1994)
9	E0009	E0009	Needle injury	Numeric	0 = No 1 = Yes	Have you ever had any injury from a needle or other sharp objects at the workplace?
10	E0010	E0010	High risk practice	Numeric	0 = No 1 = Yes	Have you ever had any of the high-risk practices as below? 1. Homosexuality 2. Sex with a prostitute 3. Paid or received payment for sex 4. Had more than one sex partner in 6 months) 5. Have a partner who had any high-risk behaviours as above 6. Have a partner who had injected illegal drugs 7. Have a partner who have tested positive or possibly positive for HIV, Hepatitis B or Hepatitis C)?

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
11	E0011	E0011	Inject drug	Numeric	0 = No 1 = Yes	Have you ever injected yourself with illegal drugs?
12	E0012	E0012	share needle	Numeric	0 = No 1 = Yes	Have you ever shared needles or other drug preparation items with somebody else?
13	E0013	E0013	Family with Hepatitis B	Numeric	0 = No 1 = Yes	Has any of your family members been diagnosed with or currently being treated with below: - Hepatitis B?
14	E0014	E0014	Family with Hepatitis C	Numeric	0 = No 1 = Yes	Has any of your family members been diagnosed with or currently being treated with below: - Hepatitis C?
Computed new variables for Risk factor						
15	E0001_new	E0001	Body Piercing	Numeric	0 = No 1 = Yes	Have you ever had any procedures as mentioned below? Piercing in any body parts
16	E0002_new	E0002	Tattoo	Numeric	0 = No 1 = Yes	Have you ever had any procedures as mentioned below? Tattoo
17	E0003_new	E0003	Blood cupping	Numeric	0 = No 1 = Yes	Have you ever had any procedures as mentioned below? Blood cupping
18	E0004_new	E0004	Acupuncture	Numeric	0 = No 1 = Yes	Have you ever had any procedures as mentioned below? Acupuncture
19	E0005_new	E0005	Haemodialysis	Numeric	0 = No 1 = Yes	Have you ever had any procedures as mentioned below? Haemodialysis
20	E0006_new	E0006	Surgical Procedures	Numeric	0 = No 1 = Yes	Have you ever had any procedures as mentioned below? Any surgical procedure or operation
21	E0007_new	E0007	Dental procedures	Numeric	0 = No 1 = Yes	Have you ever had any procedures as mentioned below? Any dental procedures
22	E0008_new	E0008	Blood transfusion	Numeric	0 = No 1 = Yes	Received any blood transfusion more than 25 years ago (before the year 1994)
23	E0009_new	E0009	Sharps injury at workplace	Numeric	0 = No 1 = Yes	Have you ever had any injury from a needle or other sharp objects at the workplace?

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
24	E0010_new	E0010	Any high-risk sexual activities	Numeric	0 = No 1 = Yes	Have you ever had any of the high-risk practices as below? 1. Homosexuality 2. Sex with a prostitute 3. Paid or received payment for sex 4. Had more than one sex partner in 6 months) 5. Have a partner who had any high-risk behaviours as above 6. Have a partner who had injected illegal drugs 7. Have a partner who have tested positive or possibly positive for HIV, Hepatitis B or Hepatitis C)?
25	E0011_new	E0011	Injectable drug use	Numeric	0 = No 1 = Yes	Have you ever injected yourself with illegal drugs?
26	E0012_new	E0012	Sharing needles	Numeric	0 = No 1 = Yes	Have you ever shared needles or other drug preparation items with somebody else?
27	E0013_new	E0013	Family infected with Hepatitis B	Numeric	0 = No 1 = Yes	Has any of your family members been diagnosed with or currently being treated with below: - Hepatitis B?
28	E0014_new	E0014	Family infected with Hepatitis C	Numeric	0 = No 1 = Yes	Has any of your family members been diagnosed with or currently being treated with below: - Hepatitis C?
29	atleastone_riskfactorHepB		Had at least 1 risk factor for Hepatitis B	Numeric	0 = No 1 = Yes	Denominator for risk factor Hepatitis B (Any 'yes' to E0001 to E0013)
30	percutaneous_exposure		Percutaneous Exposure	Numeric	0 = No 1 = Yes	Percutaneous exposure (Any 'yes' to body piercing, tattoo, blood cupping & acupuncture)
31	occupational_exposure		Occupational Exposure	Numeric	0 = No 1 = Yes	Occupational exposure ('Yes' to sharps injury at workplace)
32	medical_procedure		Medical Procedure	Numeric	0 = No 1 = Yes	Medical procedure exposure (Any 'yes' to haemodialysis, surgical procedures, dental procedures & blood transfusion)
33	unsafe_sexual		Unsafe Sexual Practices	Numeric	0 = No 1 = Yes	Unsafe sexual practices ('Yes' to any high-risk sexual activities)
34	injectable_drug		Injectable Drug Use	Numeric	0 = No 1 = Yes	Injectable drug use (Any 'yes' to injectable drug use and sharing needles)
35	history_HBV		Family History of Hepatitis B	Numeric	0 = No 1 = Yes	Family history of Hepatitis B ('Yes' to Family history of Hepatitis B)

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
36	atleastone_riskfactorHepC		Had at least 1 risk factor for Hepatitis C	Numeric	0 = No 1 = Yes	Denominator for risk factor Hepatitis C (Any 'yes' to E0001 to E0014 except for E0013)
37	history_HCV		Family History of Hepatitis C	Numeric	0 = No 1 = Yes	Family history of Hepatitis C ('Yes' to Family history of Hepatitis C)
38	numberofrisk_HBV		Number of Risk for Hepatitis B	Numeric	Continuous	Cumulative Risk Exposure for Hepatitis B (number of risk_HBV = percutaneous_exposure + occupational_exposure + medical_procedure + unsafe_sexual + injectable_drug + history_HBV)
39	numberofrisk_HBV_cat		Number of Risk for Hepatitis B (category)	Numeric	0 = No risk 1 = Only one type of risk factor 2 = More than one type of risk factor	Number of Risk for Hepatitis B (category)
40	numberofrisk_HCV		Number of Risk for Hepatitis C	Numeric	Continuous	Cumulative Risk Exposure for Hepatitis C (numberofrisk_HCV=percutaneous_exposure + occupational_exposure + medical_procedure + unsafe_sexual + injectable_drug + history_HCV)
41	numberofrisk_HCV_cat		Number of Risk for Hepatitis C (category)	Numeric	0 = No risk 1 = Only one type of risk factor 2 = More than one type of risk factor	Number of Risk for Hepatitis C (category)

DATA DICTIONARY PHASE 1: MODULE HIV STIGMA

No	Variable Name	Quest No	Variable Label Briefly	Measurement Unit	Allowed Value	Description
Module HIV Stigma (SAQ)						
1	G0001	G0001	Fear of HIV infection	Numeric	1= Yes 0= No	Do you fear that you could contract HIV if you come into contact with the saliva of a person living with HIV?
2	G0002	G0002	Social judgement	Numeric	1= Yes 0= No	Do you agree or disagree with the following statement? “I would be ashamed if someone in my family had HIV.”
3	G0003	G0003	Anticipated stigma	Numeric	1= Yes 0= No	In your opinion, are people hesitant to take an HIV test due to fear of people’s reaction if the test result is positive for HIV?
4	G0004	G0004	Perceived stigma	Numeric	1= Yes 0= No	Do people living with or thought to be living with HIV lose respect or standing?
5	G0005	G0005	Experienced stigma	Numeric	1= Yes 0= No	Would you buy fresh vegetables from a shopkeeper or vendor if you knew that this person had HIV?
6	G0006	G0006	Discrimination	Numeric	1= Yes 0= No	Do you think children living with HIV should be able to attend school with children who are HIV negative?
Computed new variables for HIV stigma						
7	UNAIDS_Indicator		Discriminatory attitudes towards PLHIV	Numeric	1= Yes have discriminatory attitudes toward PLHIV 0= No discriminatory attitudes toward PLHIV	Discriminatory attitudes towards People Living with HIV (PLHIV) based on UNAIDS global indicator

DATA DICTIONARY PHASE 2: SOCIODEMOGRAPHIC AND HOME LIVING

No.	Variable Name	Question No.	Variable Label Briefly	Measurement Unit	Allowed Value	Description
ID & Individu Status (Original from server)						
1	NEGERI	N/A	ID state	string		negeri [2 digit]
2	DPDB	N/A	ID DPDB	string		Daerah Pentadbiran (DP) [2 Digit] & Daerah Banci (DB) [3 digit]
3	BP	N/A	ID BP	string		Blok Perhintungan (BP) [4 digit]
4	UB	N/A	ID UB	string		Unit Bangunan (UB) [3 digit)
5	TK	N/A	ID TK	string		Tempat Kediaman (TK) [3 digit]
6	ST	N/A	ID strata	string		Strata [1 digit]
7	IRIND	N/A	ID IR & Individu	string		Isi Rumah (IR) [2 digit] & Individu (IND) [2 digit]
8	NAMA RESPONDEN	N/A	RESPONDEN name	string		RESPONDENT name
10	TARIKH	N/A	date	yyyy-mm-dd		Date of interview
11	MASA	N/A	time	hh:mm		Time of Interview
12	ZON	N/A	Zone/Region	numeric	1=Selatan 2=Timur 3=Utara 4=Tengah 5=Borneo 1 6=Borneo 2	
13	NAMARA	N/A	RA name	string		RA name
Module A Sociodemography (Original from server)						
14	AI1001	AI1002	responden berjaya dihubungi	numeric	1=Yes, 2 =No	Adakah responden berjaya dihubungi?
15	AI1002	AI1003	sebab responden tidak berjaya dihubungi	numeric	1=Enggan 2=Tidak menjawab telefon 3=Tiada no tel dalam perkhidmatan	Sebab responden tidak berjaya dihubungi?
16	AI1003	AI1004	responden mempunyai maklumat sosiodemo	numeric	1=Yes, 2 =No	Adakah responden mempunyai maklumat sosiodemografi?
17	A1000	A1001	responden yang menjawab	numeric	1= Ahli isirumah sendiri 2= Ahli isirumah dibantu oleh penterjemah 3= Proksi (bagi pihak ahli isirumah) 4= Proksi dengan bantuan penterjemah	Siapakah yang telah menjawab borang soal selidik ini?

No.	Variable Name	Question No.	Variable Label Briefly	Measurement Unit	Allowed Value	Description
18	A1001	A1001	name	string		Name of household member
19	A1002	A1002	sex	numeric	1=male, 2 =female	Gender
20	A1003	A1003	relationship	numeric	TT=-7, EJ=-9 1= Head of Household 2= Spouse 3= Parent 4= Child 5= Grand- or great-grandparent 6= Grand- or great-grandchild 7= Siblings 8= Parent-in-law 9= Son- or Daughter in-law 10= Brother- or Sister-in-law 11= Other relatives 12= Friend 13= Workers (live-in housemaid, gardener, driver, others) 14= Others	What is your relationship to… (Name of head of household)?
21	A1003a	A1003a	relationship-others	string		Others. Please specify
22	A1004	A1004	DOB	yyyy-mm-dd		When is your birth date?
23	A1005	A1005	age	numeric	allowed 0-150 years	How old are you? (years)
24	A1006a	A1006a	NRIC	string	TT=-7, EJ=-9	What is your identification number?New Identification Card / MyKid
25	A1006b	A1006b	passport	string	TT=-7, EJ=-9	What is your identification number?Passport no
26	A1006c	A1006c	other card	string	TT=-7, EJ=-9	What is your identification number? Other identification card no. (Army / Police / Birth cert / Others)
27	A1007	A1008	ethnic	numeric	1= Malay 2= Chinese 3= Indian 4= Orang Asli/Semenanjung Aborigines 5= Bumiputera of Sabah, 6= Bumiputera of Sarawak, 7= Others	What is your ethnicity?
28	A1007a	A1007a	ethnic - code	string	allowed (1-57)	Jika Bumiputera Sabah, Sarawak, sila nyatakan kod
29	A1007b	A1007b	ethnic - specify other	string		Please specify if other ethnic

No.	Variable Name	Question No.	Variable Label Briefly	Measurement Unit	Allowed Value	Description
30	A1008	A1008	citizenship	numeric	TT=-7, EJ=-9 1= Malaysian Citizen 2= Permanent Resident of Malaysia 3= Non-Malaysian Citizen	What is your citizenship status?
31	A1009	A1009	marital	numeric	TT=-7, EJ=-9 1= Never married 2= Married 3= Separated 4= Divorcee 5= Widow/Widower 6= Living with partner	What is your marital status?
32	A1010	A1010	education	numeric	TT=-7, EJ=-9 1= Never attended school 2= Did not complete primary school 3= Completed standard 6 4= Completed form 3 5= Completed form 5 6= Completed form 6 / certificate / diploma 7= Completed Bachelor's degree 8= Completed Master's degree 9= Completed Doctoral qualification (PhD) 10= Others	What is your highest education level?
33	A1010a	A1010a	education-specify others	string		Please specify if other education
34	A1011	A1011	occupation	numeric	1=yes, 2 =no, TT=-7, EJ=-9	Are you working?
35	A1012	A1012	reason not working	numeric	TT=-7, EJ=-9 1= Health problems/disabled 2= Care for the sick/disabled/elderly 3= Homemaker/care for children, grandchildren, other family members 4= Have a job, but not working 5= Unemployed 6= Student 7= Pensioner 8= Old age 9= Child not at school 10= Others	If not working, why?
36	A1012a	A1012a	reason not working-specify others	string		please specify if other reason not working

No.	Variable Name	Question No.	Variable Label Briefly	Measurement Unit	Allowed Value	Description
37	A1013	A1013	If working, occupation - types	numeric	TT=-7, EJ=-9 1 = Government employee 2 = Semi-government employee 3 = Private employee 4 = Self-employed 5 = Unpaid worker 6 = Unpaid family worker	Are you a…
38	A1014	A1014	healthcare worker	numeric	TT=-7, EJ=-9, TB= -6 1= Yes 2= No	Are you a health-care worker exposed to blood through patient care?
39	A1015	A1015	income -from work	numeric	TT=-7, EJ=-9	Income from work (wage / salary) or pension (RM) / Monthly
40	A1016	A1016	income-from HH	numeric	TT=-7, EJ=-9	Money received from household members (RM) / Monthly
41	A1017	A1017	income-other source	numeric	TT=-7, EJ=-9	Money from other sources, such as from asset rental collection, non-household family members, scholarship , community/social welfare, Baitulmal, dividend and others (RM) / Monthly
42	A2001	A2001	types house	numeric	1= Flat, apartment, condominium 2= Detached house, bungalow, traditional house 3= Town house, Terrace, link house, cluster 4= Semi-D 5= Shop house 6= Water house 7= Squatters 8= Longhouse	Type of house
43	A2002	A2002	floor level	numeric	TT=-7, EJ=-9 (Allowed range 1-99)	For Flat, apartment, condominium - Which floor / level do you live?
44	A2003	A2003	no of doors	numeric	TT=-7, EJ=-9 (Allowed range 1-99)	For Longhouse, How many doors in this longhouse?
45	A2004	A2004	no of rooms	numeric	TT=-7, EJ=-9 (Allowed range 1-99)	Number of rooms in the household?
46	A2006	A2006	no. household member	numeric	TT=-7, EJ=-9 (Allowed range 1-99)	Total number of people living in your household?
47	A2007	A2007	source of drinking water	numeric	1 = Piped water 2 = Dug well 3 = Water from spring 4 = Rainwater collection 5 = Water taken directly from pond or stream	What is the main source of drinking water for members of your household?

No.	Variable Name	Question No.	Variable Label Briefly	Measurement Unit	Allowed Value	Description
					6 = Delivered water 7 = Water kiosk 8 = Packaged water 9 = Surface water 10 = Others	
48	A2008	A2008	toilet facility	numeric	1 = Flush toilet and connected to the main sewerage system 2 = Flush toilet with septic tank 3 = Pour flush toilet 4 = Bore hole toilet with closed lid 5 = Bore hole toilet without cover 6 = Bucket latrine 7 = Container based sanitation 8 = Hanging latrine 9 = No facility toilet/ bush/ field	What kind of toilet facility do you and members of your household usually use?
49	A2009	A2009	share facility with others	numeric	1 = Yes 2 = No	Do you share this facility with others who are not members of your household?
50	A2010	A2010	soap or detergent for washing hands	numeric	1 = Yes 2 = No	Do you have soap or detergent in your household for washing hands?
51	state	N/A	State	numeric	1 = Johor 2 = Kedah 3 = Kelantan 4 = Melaka 5 = Negeri 9 6 = Pahang 7 = Penang 8 = Perak 9 = Perlis 10 = Selangor 11 = Terengganu 12 = Sabah 13 = Sarawak 14 = KL 15 = Labuan 16 = Putrajaya	From original variable: "NEGERI"
52	zon_gp	N/A	Zon all categories	numeric	1=Selatan 2=Timur 3=Utara 4=Tengah 5= Sabah & Labuan 6= Sarawak	From original variable: "ZON"
Computed new variables for Sociodemography						
53	zone_3grp	N/A	Zon 3 categories	numeric	1=Peninsular Malaysia 2=Sabah & Labuan 3=Sarawak	From original variable: "ZON" 1,2,3,4 = Peninsular Malaysia (1) 5= Sabah & Labuan (2) 6= Sarawak (3)
54	strata	N/A	Strata	numeric	1= Urban 2=Rural	From original variable: "ST" 1,2 = Urban (1) Else = Rural (2)

No.	Variable Name	Question No.	Variable Label Briefly	Measurement Unit	Allowed Value	Description
55	sex	N/A	Gender	numeric	1= Male 2 = Female	From origional variable: "A1002"
56	age	N/A	Age (Numerical)	numeric	allowed 0-150 years	From origional variable: "A1005"
57	agegp	N/A	Age group (10 years gap)	numeric	1 = 1-9 2 = 10-19 3 = 20-29 4 = 30-39 5 = 40-49 6 = 50-59 7 = 60-69 8 = 70 & above	From origional variable: "A1005"
58	ethnic	N/A	Ethnicity 7 groups	numeric	1 = Malay 2 = Chinese 3 = Indian 4 = Bumiputera Sabah 5 = Bumiputera Sarawak 6 = Orang Asli 7 = Others	From origional variable: "A1007"
59	ethnic2	N/A	Ethnicity 5 groups	numeric	1 = Malay 2 = Chinese 3 = Indian 4 = Other Bumiputeras 5 = Others	From origional variable: "A1007" *Other Bumiputeras = Bumi sabah + Bumi Sarawak + Orang Asli
60	ethnic3	N/A	Ethnicity 5 groups	numeric	1 = Malay 2 = Chinese 3 = Indian 4 = Other Bumiputeras 5 = Others	From origional variable: "A1007" *Other Bumiputeras = Bumi sabah + Bumi Sarawak + Orang Asli and all non-citizenship code as others ethnicity
61	citizenship	N/A	citizenship 3 groups	numeric	1= Malaysian Citizen 2= Permanent Resident of Malaysia 3= Non-Malaysian Citizen	From origional variable: "A1008"
62	citizenship 2	N/A	citizenship 2 groups	numeric	1= Malaysian Citizen 2= Non-Malaysian Citizen	From origional variable: "A1008" *non-Malaysia combine with Permanent resident
63	education	N/A	Education 4 groups	numeric	1 = No formal education 2 = Primary education 3 = Secondary education 4 = Tertiary education 5 = Unclassified (Missing)	From origional variable: "A1010" 1. Child not at school = No formal education (1) 2. Still schooling = Primary Education (2) 3. Never attended school = No formal education (1) 4. Did not complete primary school = Primary Education (2) 5. Completed standard 6 = Primary Education (2) 6. Completed form 3 = Secondary Education (3) 7. Completed form 5 = Secondary Education (3)

No.	Variable Name	Question No.	Variable Label Briefly	Measurement Unit	Allowed Value	Description
						8. Completed form 6 / certificate / diploma = Tertiary education (4) 9. Completed Bachelor's degree = Tertiary education (4) 10. Completed Master's degree = Tertiary education (4) 11. Completed Doctoral qualification (PhD) = Tertiary education (4) 10 Others = Unclassified (Declared Missing)
64	marital	N/A	Marital status 6 groups	numeric	EJ=-9 1= Never married 2= Married 3= Separated 4= Duda / Divorcee 5= Widow / Widower 6= Living with partner	From origional variable: "A1009"
65	marital2	N/A	Marital status 3 groups	numeric	EJ=-9 1= Single 2= Married 3= Widowed (er)/divorcee	From origional variable: "A1009" *Valid age 10 years and above 1 Never married = Single (1) 2 Married = Married (2) 3 Separated = Widowed (er) / divorcee (3) 4 Duda Divorcee = Widowed (er)/divorcee (3 5 Widow/Widower = Widowed (er)/divorcee (3 6 Living with partner = Married (2)
66	occupation	N/A	Occupation 8 groups	numeric	1 = Government employee 2 = Private employee 3 = Self-employed 4 = Unpaid worker/Homemaker/caregiver 5 = Retiree 6 = Student 7 = Not working (unemployed, health problem, old age & child) 8 = Others	From original variable: "A1011, A1012, A1012"
67	occupation2	N/A	Occupation 8 groups	numeric	1 = Government employee 2 = Private employee 3 = Self-employed 4 = Unpaid worker/Homemaker/caregiver 5 = Student 6 = Not working (unemployed, health problem, old age, retiree) 7 = Others (missing)	From original variable: "A1011, A1012, A1012" *Valid age 15 years & above

No.	Variable Name	Question No.	Variable Label Briefly	Measurement Unit	Allowed Value	Description
68	total_income	N/A	Total Individual income (Numerical)	numeric		From original variable: "A1015 + A1017" Summation of income from work (A1015) and Money from other sources (A1017)
69	HHincome	N/A	Total Household Income (Numerical)	numeric		From original variable: "A1015 + A1017" * total individual income from each household member * HH income less than 0, declared as missing
70	HHincome_gp	N/A	Household income in group	numeric	1 = Less than RM 1000 2 = RM 1000 - RM 1999 3 = RM 2000 - RM 2999 4 = RM 3000 - RM 3999 5 = RM 4000 - RM 4999 6 = RM 5000 - RM 5999 7 = RM 6000 - RM 6999 8 = RM 7000 - RM 7999 9 = RM 8000 - RM 8999 10 = RM 9000 - RM 9999 11 = RM 10000 and above	From total household income ("HHincome")
71	HHinc_quintile	N/A	Household income in quintile	numeric	1 = Quintile 1 2 = Quintile 2 3 = Quintile 3 4 = Quintile 4 5 = Quintile 5	From total household income ("HHincome")
72	B40_state	N/A	Threshold of monthly gross income (based on each state cut off point)	numeric	1 = Bottom 40% 2 = Middle 40% 3 = Top 20%	From total household income ("HHincome") * Cut of point based on each state (DOSM, 2016)
73	B40_national	N/A	Threshold of monthly gross income (based on national cut off point)	numeric	1 = Bottom 40% 2 = Middle 40% 3 = Top 20%	From total household income ("HHincome") * Cut of point based on national (DOSM, 2016) B40% <RM 4360, M40% RM4,360-9619, T20% >= 9620

DATA DICTIONARY PHASE 2: MODULE TUBERCULOSIS

No.	Variable Name	Question No.	Variable Label briefly	Measurement Unit	Allowed Value	Description
Module H - Tuberculosis (Original from server)						
1	H0001a	H0001b	Told by doctor to have TB	numeric	0= No 1=Yes	Are/Have you ever been told by doctor that you have tuberculosis?
2	H0001b	H0001a	On TB treatment	numeric	0= No 1=Yes	Are/Have you on tuberculosis treatment?
3	H0002a	H0002a	Dry cough more than 2 weeks	numeric	0= No 1=Yes	For the past one (1) month, do you have cough more than two weeks?
4	H0002b	H0002b	Cough with sputum more than 2 weeks	numeric	0= No 1=Yes	For the past one (1) month, do you have cough up phlegm or sputum more than 2 weeks?
5	H0002c	H0002c	Cough up blood	numeric	0= No 1=Yes	For the past one (1) month, do you have cough up blood?
6	H0002d	H0002d	Fever more than 2 weeks	numeric	0= No 1=Yes	For the past one (1) month, do you have fever of more than two weeks?
7	H0002e	H0002e	Unexpected weight loss	numeric	0= No 1=Yes	For the past one (1) month, do you have unexpected loss of weight?
8	H0002f	H0002f	Sweats at night more than 2 weeks	numeric	0= No 1=Yes	For the past one (1) month, do you have drenching sweats at night for more than two weeks?
9	H0002g		SCREENING QUESTION - If any symptom YES (H0001a-H0002f)	numeric	0= No 1=Yes	SCREENING QUESTION - If any symptom YES for questions H0001a-H0001f, go to question H0003, If NO, end of module
10	H0003a	H0003a	Self-Medicate	numeric	0= No 1=Yes	In the past two weeks, for TB problem, did you self-medicate?
11	H0003b	H0003b	Purchase medication from pharmacy	numeric	0= No 1=Yes	In the past two weeks, for TB problem, did you purchase medicine from any pharmacy?
12	H0003c	H0003c	Seek treatment from government clinic	numeric	0= No 1=Yes	In the past two weeks, for TB problem, did you seek treatment from Gov health clinic?
12	H0003c	H0003c	Seek treatment from government clinic	numeric	0= No 1=Yes	In the past two weeks, for TB problem, did you seek treatment from Gov health clinic?
13	H0003d	H0003d	Seek treatment from government hospital	numeric	0= No 1=Yes	In the past two weeks, for TB problem, did you seek treatment from Gov hospital?
14	H0003e	H0003e	Seek treatment from private clinic	numeric	0= No 1=Yes	In the past two weeks, for TB problem, did you seek treatment from private clinic
15	H0003f	H0003f	Seek treatment from private hospital	numeric	0= No 1=Yes	In the past two weeks, for TB problem, did you seek treatment from private hospital

No.	Variable Name	Question No.	Variable Label briefly	Measurement Unit	Allowed Value	Description
16	H0003g	H0003g	Seek advice and treatment from traditional healer	numeric	0= No 1=Yes	In the past two weeks, for TB problem, did you get advice & treatment from traditional healers
17	H0003h	H0003h	Do nothing	numeric	0= No 1=Yes	In the past two weeks, for TB problem, did you do nothing?
18	H0004a	H0004a	Not an emergency	numeric	0= No 1=Yes	Main reason for not seeking treatment (It **is** not an emergency)
19	H0004b	H0004b	Transportation problem	numeric	1= Yes 2=No TT=-7, EJ=-9	Main reason for not seeking treatment (Transportation problem)
20	H0004c	H0004c	Financial problem	numeric	1= Yes 2=No TT=-7, EJ=-9	Main reason for not seeking treatment (Financial problem)
21	H0004d	H0004d	Ongoing TB treatment	numeric	1= Yes 2=No TT=-7, EJ=-9	Main reason for not seeking treatment (Ongoing TB treatment)
22	H0004e	H0004e	Fear / Do not believe in medical treatment	numeric	1= Yes 2=No TT=-7, EJ=-9	Main reason for not seeking treatment (Fear/does not believe in treatment/medical practitioners?)
23	H0004f	H0004f	Been advised not to go	numeric	1= Yes 2=No TT=-7, EJ=-9	Main reason for not seeking treatment (Been advised not to go)
24	H0004g	H0004g	No time to seek treatment	numeric	1= Yes 2=No TT=-7, EJ=-9	Main reason for not seeking treatment (Busy/no time to seek treatment)
Computed new variables for TB						
25	H0001c		Ever had TB	numeric	0= No 1=Yes	
26	H0005a		Cough AND Fever	numeric	0= No 1=Yes	
27	H0005b		Cough AND Weight Loss	numeric	0= No 1=Yes	
28	H0005c		Cough AND Night Sweats	numeric	0= No 1=Yes	
29	H0005d		Cough AND Fever AND Weight Loss	numeric	0= No 1=Yes	
30	H0005e		Cough AND Fever AND Night Sweats	numeric	0= No 1=Yes	
31	H0005f		Cough AND Fever AND Weight Loss AND Night Sweats	numeric	0= No 1=Yes	
32	H0002h		Any symptom	numeric	0= No 1=Yes	
33	H0003i		Any symptom AND did nothing	numeric	0= No 1=Yes	

DATA DICTIONARY PHASE 2: MODULE ANTIBIOTIC USE

No.	Variable Name	Question No.	Variable Label Briefly	Measurement Unit	Allowed Value	Description
Module I - Antibiotic Use (Original from server)						
1	I0001	I0001	Have taken antibiotic for common cold or sore throat in the past 1 year	numeric	1= Yes 2=No 3= Never TT=-7, EJ=-9	In the past 1 year, have you taken antibiotic for common cold or sore throat?
2	I0002	I0002	Where get the antibiotics	numeric	1= Clinics 2=Medical store or pharmacy 3=Other shops, stalls or hawkers 4=Internet 5=Friend or family member 6=I had them save up from a previous time 7=Somewhere or someone else TT=-7, EJ=-9	On that occasion, where did you get the antibiotics?
3	I0003	I0003	Get advice from a doctor, nurse or pharmacist on how to take them	numeric	1= Yes 2=No TT=-7, EJ=-9	On that occasion, did you get advice from a doctor, nurse or pharmacist on how to take them?
4	I0004	I0004	When stop taking the antibiotic	numeric	1= When you felt better 2= When you've taken all the antibiotics as directed by qualified health staffs TT=-7, EJ=-9	On that occasion, when did you stop taking the antibiotic?
5	I0005	I0005	Balance of antibiotics? If yes, what did you do	numeric	1= No, there was no balance of the antibiotic 2=Thrown away in the trash 3=Flushed down in the sink or toilet 4= returned to a pharmacy or clinic 5= Given away to friend, family or charity 6=Stored or never disposed 7= Burned TT=-7, EJ=-9	on that occasion, was there balance of the antibiotic? If yes, what did you do with it?
7	I0007	I0007	Antibiotic kill viruses	numeric	1= Yes 2=No TT=-7, EJ=-9	Does antibiotic kill viruses?
8	I0008	I0008	Antibiotic effective to treat common cold and sore throats	numeric	1= Yes 2=No TT=-7, EJ=-9	Is Antibiotic effective to treat common cold and sore throats?

No.	Variable Name	Question No.	Variable Label Briefly	Measurement Unit	Allowed Value	Description
9	I0009	I0009	Request antibiotic from doctor	numeric	1= Yes 2=No TT=-7, EJ=-9	You are seeing a doctor for a common cold and sore throat. He does not prescribe antibiotic for you. Would you request for antibiotic from him?
10	I0010	I0010	Buy antibiotic from pharmacy without a prescription	numeric	1= Yes 2=No TT=-7, EJ=-9	You are seeing a doctor for a common cold and sore throat. He does not prescribe antibiotic for you. Would **you buy** it from the pharmacy without a prescription?
11	I0011	I0011	Know what antibiotic resistance	numeric	1= Yes 2=No TT=-7, EJ=-9	Do you know what antibiotic resistance is?
12	I0012	I0012	Overuse or misuse antibiotic among human cause antibiotic resistance to threat bacterial infection	numeric	1= Yes 2=No TT=-7, EJ=-9	Does overuse or misuse of antibiotic among human cause antibiotic resistance (make antibiotic less effective) to treat bacterial infections?
13	I0013	I0013	Overuse or misuse of antibiotic in animal farming led to antibiotic resistance in human & animals	numeric	1= Yes 2=No TT=-7, EJ=-9	Does overuse or misuse of antibiotic in animal farming lead to antibiotic resistance in human & animals
14	I0001_new		Have taken antibiotic for common cold or sore throat in the past 1 year	numeric	1= Yes 2=No	In the past 1 year, have you taken antibiotic for common cold or sore throat?
15	I0002_new		Where get the antibiotics	numeric	1= Clinics 2=Medical store or pharmacy 3= Stalls or hawkers 4=Internet 5=Friend or family member 6=I had them save up from a previous time 7=Somewhere or someone else	On that occasion, where did you get the antibiotics?
16	I0003_new		Get advice from a doctor, nurse or pharmacist on how to take them	numeric	1= Yes 2=No	On that occasion, did you get advice from a doctor, nurse or pharmacist on how to take them?

No.	Variable Name	Question No.	Variable Label Briefly	Measurement Unit	Allowed Value	Description
Computed new variables for Antibiotic						
17	I0004_new		When stop taking the antibiotic	numeric	1= When you felt better 2= When you've taken all the antibiotics as directed by qualified health staffs 3= Don't know	On that occasion, when did you stop taking the antibiotic?
18	I0011_new		Ever heard of antibiotics/ antimicrobial resistance?	numeric	1= Yes 2=No	Have you ever heard of antibiotics/ antimicrobial resistance?
19	I0005_new		Balance of antibiotics? If yes, what did you do	numeric	1= No, there was no balance of the antibiotic 2=Thrown away in the trash 3=Flushed down in the sink or toilet 4= returned to a pharmacy or clinic 5= Stored or never disposed 6= Burned 7= Don't know	On that occasion, was there balance of the antibiotic? If yes, what did you do with it?
20	I0006_new		Common colds and sore throats caused by viruses not bacteria	numeric	1= Correct answer 2= Incorrect answer	Most common colds and sore throats are caused by viruses and not bacteria
21	I0007_new		Antibiotic kill viruses	numeric	1= Correct answer 2= Incorrect answer	Does antibiotic kill viruses
22	I0008_new		Antibiotic effective to treat common cold and sore throats	numeric	1= Correct answer 2= Incorrect answer	Is Antibiotic effective to treat common cold and sore throats
23	I0012_new		Overuse or misuse antibiotic among human cause antibiotic resistance to threat bacterial infection	numeric	1= Correct answer 2= Incorrect answer	Does overuse or misuse of antibiotic among human cause antibiotic resistance (make antibiotic less effective) to treat bacterial infections?
24	I0013_new		Overuse or misuse of antibiotic in animal farming led to antibiotic resistance in human & animals	numeric	1= Correct answer 2= Incorrect answer	Does overuse or misuse of antibiotic in animal farming lead to antibiotic resistance in human & animals

DATA DICTIONARY PHASE 2: MODULE HIV KNOWLEDGE

No.	Variable Name	Question No.	Variable Label briefly	Measurement Unit	Allowed Value	Description
Module J - HIV Knowledge (Original from server)						
1	J1001	J1003	Healthy looking person have HIV	numeric	1= Yes 2=No TT=-7	Can a healthy-looking person have HIV?
2	J1002	J1004	Person get HIV from mosquito bites	Numeric	1= Yes 2=No TT=-7	Can a person get HIV from mosquito bites?
3	J1003	J1005	Person get HIV by sharing food with someone who infected	Numeric	1= Yes 2=No TT=-7	Can a person get HIV by sharing food with someone who is infected?
4	J1004	J1002	HIV transmission reduce by using condom	Numeric	1= Yes 2=No TT=-7	Can a person reduce the risk of getting HIV by using a condom every time they have sex?
5	J1005	J1001	HIV transmission reduce by having sex with only one uninfected partner who has no other partner	Numeric	1= Yes 2=No TT=-7	Can the risk of HIV transmission be reduced by having sex with only one uninfected partner who has no other partner
Computed new variables for HIV Knowledge						
6	HIV Knowledge		Adequate HIV Knowledge	numeric	0= Not Adequate 1= Adequate	Adequate HIV knowledge is defined as answering five items correctly: “Yes” for Question J1001, J1004 & J1005 and “No” for Question J1002 & J1003
7	J1001_correct		Correct response Healthy looking	numeric	0= Incorrect response 1= Correct response	Correct response for questionnaire 'Can a healthy-looking person have HIV?'
8	J1002_correct		Correct response Mosquito bites	numeric	0= Incorrect response 1= Correct response	Correct response for questionnaire 'Can a person get HIV from mosquito bites?'
9	J1003_correct		Correct response Sharing food	numeric	0= Incorrect response 1= Correct response	Correct response for questionnaire 'Can a person get HIV by sharing food with someone who is infected?'
10	J1004_correct		Correct response Using condom	numeric	0= Incorrect response 1= Correct response	Correct response for questionnaire 'Can a person reduce the risk of getting HIV by using a condom every time they have sex?'
11	J1005_correct		Correct response Having sex with only one uninfected partner	numeric	0= Incorrect response 1= Correct response	Correct response for questionnaire 'Can the risk of HIV transmission be reduced by having sex with only one uninfected partner who has no other partner'

DATA DICTIONARY PHASE 2: MODULE MALARIA

No.	Variable Name	Question No.	Variable Label briefly	Measurement Unit	Allowed Value	Description
Module K - Malaria (original from server)						
1	K0001	K0001	Ever heard of Malaria	numeric	1= Yes 2=No TT=-7, EJ=-9	Have you ever heard of Malaria disease?
2	K0002a	K0002a	Through airborne	numeric	1= Yes 2=No TT=-7, EJ=-9	How malaria transmitted to human? (Through airborne)
3	K0002b	K0002b	Through food/waterborne	numeric	1= Yes 2=No TT=-7, EJ=-9	How malaria transmitted to human? (Through food/waterborne)
4	K0002c	K0002c	Through mosquito bites	numeric	1= Yes 2=No TT=-7, EJ=-9	How malaria transmitted to human? (Through mosquito bites)
5	K0002d	K0002d	Through body contact	numeric	1= Yes 2=No TT=-7, EJ=-9	How malaria transmitted to human? (Through body contact)
6	K0003a	K0003a	Prolong cough and constipation	numeric	1= Yes 2=No TT=-7, EJ=-9	What are the signs or symptoms of malaria? (Prolong cough and constipation)
7	K0003b	K0003b	Fever, chill and rigor	numeric	1= Yes 2=No TT=-7, EJ=-9	What are the signs or symptoms of malaria? (Fever, chill and rigor)
8	K0003c	K0003c	Flu and rashes	numeric	1= Yes 2=No TT=-7, EJ=-9	What are the signs or symptoms of malaria? (Flu and rashes)
9	K0003d	K0003d	Diarrhea and loss of appetite	numeric	1= Yes 2=No TT=-7, EJ=-9	What are the signs or symptoms of malaria? (Diarrhea and loss of appetite)
10	K0004a	K0004a	Eating contaminated food	numeric	1= Yes 2=No TT=-7, EJ=-9	Eating contaminated food may cause the person contracted with malaria?
11	K0004b	K0004b	Recreational activities in the forest area	numeric	1= Yes 2=No TT=-7, EJ=-9	Recreational activities in the forest area may cause the person contracted with malaria?
12	K0004c	K0004c	Fishing in the swamp or forest area	numeric	1= Yes 2=No TT=-7, EJ=-9	Fishing in the swamp or forest area may cause the person contracted with malaria?
13	K0004d	K0004d	Inhaling polluted air	numeric	1= Yes 2=No TT=-7, EJ=-9	Inhaling polluted air may cause the person contracted with malaria?
14	K0004e	K0004e	Collecting agricultural produce in the farm/forest	numeric	1= Yes 2=No TT=-7, EJ=-9	Collecting agricultural produce in the farm/forest may cause the person contracted with malaria?
15	K0005a	K0005a	Disposing plastics containing water around the house	numeric	1= Yes 2=No TT=-7, EJ=-9	Disposing plastics containing water around the house are the malaria prevention measure?

No.	Variable Name	Question No.	Variable Label briefly	Measurement Unit	Allowed Value	Description
16	K0005b	K0005b	Taking anti-malarial drug or applying mosquito repellent while carry out activities in the forest area	numeric	1= Yes 2=No TT=-7, EJ=-9	Taking anti-malarial drug or applying mosquito repellent while carry out activities in the forest area are the malaria prevention measure?
17	K0005c	K0005c	Spraying insecticide on the wall surface	numeric	1= Yes 2=No TT=-7, EJ=-9	Spraying insecticide on the wall surface are the malaria prevention measure?
18	K0005d	K0005d	Sleeping under insecticide treated nets	numeric	1= Yes 2=No TT=-7, EJ=-9	Sleeping under insecticide treated nets are the malaria prevention measure?
19	K0005e	K0005e	Wearing protective clothing while carry out activities outdoor or in the farm/forest area	numeric	1= Yes 2=No TT=-7, EJ=-9	Wearing protective clothing while carry out activities outdoor or in the farm/forest area are the malaria prevention measure?
20	K0006	K0006	Aware of prevention & control activities held by MOH Malaysia to eliminate malaria disease	numeric	1= Yes 2=No TT=-7, EJ=-9	Do you aware of prevention and control activities held by MOH Malaysia to eliminate malaria disease?
Computed new variables for malaria						
22	Transmission Correct		Transmission malaria to human (through mosquito bites)	numeric	1= Yes 2=No TT=-7, EJ=-9	How malaria transmitted to human?
24	Risk Correct		Risk activities may cause the person contracted with malaria	numeric	1= Yes 2=No TT=-7, EJ=-9	What are the risk activities may cause the person contracted with malaria? 1) Recreational activities in the forest area. 2) Fishing in the swamp or forest area. 3) Collecting agricultural produce in the farm/forest
28	Symptom Correct		Signs or symptoms of malaria	numeric	1= Yes 2=No TT=-7, EJ=-9	What are the signs or symptoms of malaria? 1) Fever, chill and rigor. 2) Diarrhea and loss of appetite)
30	Prevention Correct		Malaria prevention measures	numeric	1= Yes 2=No TT=-7, EJ=-9	What is the malaria prevention measures? 1) Disposing plastics containing water around the house. 2) Taking anti-malarial drug or applying mosquito repellent while carry out activities in the forest area. 3) Spraying insecticide on the wall surface. 4) Sleeping under insecticide treated nets. 5) Wearing protective clothing while carry out activities outdoor or in the farm/forest area

SUPPLEMENT

ANNEX A: SURVEY QUESTIONNAIRES & CODEBOOK

MODUL A: SOSIODEMOGRAFI, TEMPAT KEDIAMAN DAN PERSEKITARAN ***SOCIODEMOGRAPHY, HOME AND ENVIRONMENT***		
KRITERIA KELAYAKAN: KESEMUA AHLI ISI RUMAH ***ELIGIBILITY CRITERIA: ALL HOUSEHOLD MEMBERS***		
Pilih SATU jawapan sahaja *Choose ONE answer only*		
BAHAGIAN 1 *SECTION 1*		
A1000	Siapakah yang telah menjawab borang soal selidik ini? *Who answered this questionnaire?*	1. Ahli isirumah sendiri *Household* 2. Ahli isi rumah dibantu oleh penterjemah (boleh jadi sesiapa sahaja) / *Household assisted by translator (could be anyone)* 3. Proksi (bagi pihak ahli isi rumah) *Proxy (on behalf of household)* 4. Proksi dengan bantuan penterjemah *Proxy assisted by translator*
A1001	Nama ahli isi rumah: *Name of household member:*	
A1002	Apakah jantina anda? *What is your gender?*	1. Lelaki *Male* 2. Female *Female* (-7) TT (-9) EJ
A1003	Apakah hubungan anda dengan... (nama ketua isi rumah)? *What is your relationship to… (name of head of household)?*	1. Ketua isi rumah *Head of Household* 2. Suami atau isteri *Spouse* 3. Ibu bapa *Parent* 4. Anak *Child* 5. Datuk/nenek atau moyang *Grand- or great-grandparent* 6. Cucu atau cicit *Grand- or great-grandchild* 7. Adik-beradik *Siblings* 8. Mertua *Parent-in-law* 9. Menantu *Son- or Daughter in-law* 10. Ipar-Duai *Brother- or Sister-in-law* 11. Saudara-mara lain *Other relatives* 12. Kawan *Friend* 13. Pekerja (pembantu rumah, tukang kebun, pemandu, lain-lain) *Workers (live- in housemaid, gardener, driver, others)* 14. Lain-lain *Others,* Sila nyatakan: *Please specify:* ..... (-7) TT (-9) EJ
A1004	Bila tarikh lahir anda? *When is your birth date?*	☐☐ Hari ☐☐ Bulan ☐☐☐☐ Tahun
[PENEMURAMAH: Sekiranya 'TT' tuliskan '01/06' untuk hari '07' untuk bulan '9999/ 999/ 2999' untuk tahun]		
A1005	Berapa umur…? *How old are…?*	☐☐ Tahun Genap (-7) TT (-9) EJ

A1006	Apakah nombor kad pengenalan anda? *What is your identification number?*	1. No. Kad Pengenalan Baru/MyKid *New Identification Card/ My Kid* 2. No. Passport/ *Passport No.* 3. No. Kad Pengenalan lain (Tentera/ Polis/ Sijil lahir/ Lain-lain) *Other identification card no. (Army/Police/Birth cert/Others)* (-7) TT (-9) EJ
[PERINGATAN: Pastikan nombor pengenalan BETUL]		
A1007	Apakah bangsa anda? *What is your ethnicity?*	1. Melayu *Malay* 2. Cina *Chinese* 3. India *Indian* 4. Orang Asli Semenanjung *Aborigines* 5. Bumiputera Sabah 6. Bumiputera Sarawak 7. Lain-lain *Others* Sila nyatakan: *Please specify:…* (-7) TT (-9) EJ
A1007a	Jika Bumiputera Sabah atau Sarawak, sila nyatakan kod [Sila rujuk buku kod] *[Please refer code book]*	☐☐
A1008	Apakah taraf **kewarganegaraan** anda? *What is your **citizenship** status?*	1. Warganegara Malaysia/ *Malaysian Citizen* 2. Permastautin tetap/ *Permanent Resident of Malaysia* 3. Bukan warganegara Malaysia *Non-Malaysian Citizen* (-7) TT (-9) EJ
A1009	Apakah **taraf perkahwinan** anda? *What is your **marital status**?*	1. Tidak pernah berkahwin *Never married* 2. Berkahwin *Married* 3. Berpisah *Separated* 4. Janda Duda *Divorcee* 5. Balu *Widow/ Widower* 6. Tinggal bersama pasangan *Living with partner* (-7) TT (-9) EJ
A1010	Apakah tahap **pendidikan tertinggi** anda? *What is your **highest education level**?*	1. Kanak-kanak tidak bersekolah/*Child not at school* 2. Kanak-kanak atau remaja yang masih bersekolah *Still schooling* 3. Tidak pernah bersekolah *Never attended school* 4. Tidak habis sekolah rendah *Did not complete primary school* 5. Tamat darjah 6 *Completed standard 6* 6. Tamat tingkatan 3 *Completed form 3* 7. Tamat tingkatan 5 *Completed form 5* 8. Tamat tingkatan 6/ sijil/ diploma *Completed form 6/ certificate / diploma* 9. Tamat pengajian peringkat sarjana muda *Completed Bachelor's degree* 10. Tamat pengajian peringkat sarjana *Completed Master degree* 11. Tamat pengajian peringkat kedoktoran (PhD) *Completed doctoral qualification (PhD)* 12. Lain-Lain *Others* Sila nyatakan: *Please specify:* (-7) TT (-9) EJ
A1011	Adakah anda bekerja? *Are you working?*	1. Ya *Yes*… **sila ke A1013** 2. Tidak *No*… **sila ke A1012** (-7) TT…**sila ke A1015** (-9) EJ…**sila ke A1015**

A1012	Jika tidak, kenapa? *If not, why?* Pilih satu jawapan **UTAMA** sahaja. *Choose only one **MAIN** answer.*	1. Masalah kesihatan/ kurang upaya *Health problems/ disabled* 2. Menjaga pesakit/ orang kurang upaya/ orang tua *Care for the sick/ disabled/ elderly* 3. Menjaga rumah/ anak-anak, cucu, ahli keluarga lain *Homemaker/ care for children, grandchildren, other family members* 4. Mempunyai pekerjaan tapi tidak bekerja *Have a job, but not working* 5. Menganggur *Unemployed* 6. Pelajar *Student* 7. Pesara *Pensioner* 8. Tua *Old age* 9. Kanak-kanak tidak bersekolah *Child not at school* 10. Lain-lain *Others* (-7) TT (-9) EJ Selepas ini **sila ke A1015**
A1013	Adakah anda… *Are you a…* Pilih satu jawapan **UTAMA** sahaja. *Choose only one **MAIN** answer.*	1. Pekerja kerajaan *Government employee* 2. Pekerja separa kerajaan *Semi-government employee* 3. Pekerja swasta *Private employee* 4. Bekerja sendiri *Self-employed* 5. Pekerja tanpa gaji *Unpaid worker* 6. Pekerja keluarga tanpa gaji *Unpaid family worker* (-7) TT…**sila ke A1015** (-9) EJ…**sila ke A1015**
A1014	Adakah anda pekerja kesihatan yang terdedah kepada darah atau cairan badan melalui penjagaan pesakit? *Are you a health-care worker exposed to blood through patient care?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ (-8) TB
Berapakah **purata pendapatan kasar bulanan** anda, dari segi… *What is your **average personal gross monthly income**, in terms of…*		
A1015	Pendapatan daripada bekerja (upah/ gaji) atau pencen. *Income from work (wage/salary) or pension.*	RM ☐☐☐☐☐☐☐☐☐.☐☐ Sebulan *Monthly* **Sekiranya TIADA pendapatan tuliskan '0'** (-7) TT (-9) EJ
A1016	Wang yang diterima daripada ahli isirumah. *Money received from household members.*	RM ☐☐☐☐☐☐☐☐☐.☐☐ Sebulan *Monthly* **Sekiranya TIADA pendapatan tuliskan '0'** (-7) TT (-9) EJ

A1017	Wang daripada sumber lain, contohnya daripada kutipan sewa aset, wang daripada ahli keluarga bukan isirumah, biasiswa, kebajikan masyarakat/ sosial, Baitulmal, dividen dan lain-lain. *Money from other sources, such as from asset rental collection, non-household family members, scholarship, community/social welfare, Baitulmal, dividend and others.*	RM ☐☐☐☐☐☐☐☐☐.☐☐ Sebulan *Monthly* **Sekiranya TIADA pendapatan tuliskan '0'** (-7) TT (-9) EJ
BAHAGIAN 2 *SECTION 2*		
A2001	Jenis tempat tinggal *Type of house* **[Pemerhatian oleh penemuramah/** ***to be observed by interviewer]***	1. Rumah pangsa, pangsapuri, kondominium *Flat, apartment, condominium*…**sila ke A2002** 2. Rumah sesebuah, banglo, rumah kampung *Detached house, bungalow, traditional house*…**sila ke A2004** 3. Rumah bandar, teres, deret atau berangkai, rumah berkelompok *Town house, Terrace, link house, cluster*…**sila ke A2004** 4. Rumah berkembar *Semi-D*…**sila ke A2004** 5. Rumah Kedai *Shop house*…**sila ke A2004** 6. Rumah atas air *Water house* …**sila ke A2004** 7. Rumah setinggan *Squatters*…**sila ke A2004** 8. Rumah panjang *Longhouse*…**sila ke A2003**
A2002	**Perhatian: Untuk rumah pangsa, pansapuri, kondominium/** ***For Flat, apartment, condominium*** Tingkat berapakah rumah yang anda tinggal? *Which floor / level do you live?* **[Pemerhatian oleh penemuramah** ***to be observed by interviewer]***	☐☐ Tingkat *Floor/Level* (-7) TT (-9) EJ
A2003	**Perhatian: Untuk Rumah Panjang/ *Longhouse*** Jika rumah panjang, ada berapa bilangan pintu di rumah panjang/ unit bangunan ini? *How many doors in this longhouse?* **[Pemerhatian oleh penemuramah *to be observed by interviewer]***	☐☐ Bil pintu *No of doors* (-7) TT (-9) EJ (Pembantu penyelidik akan mengira bilangan pintu rumah panjang berdasarkan pemerhatian)
A2004	Bilangan bilik di rumah ini? *Number of rooms in the household ?* Catatan: Termasuk ruang tamu, dapur, bilik tidur, bilik bacaan, bilik air, bilik sembahyang dan lain-lain.	☐☐ Bil bilik *No of Rooms* (-7) TT (-9) EJ

A2005	Apakah status pemilikan rumah ini? *What is the ownership status of this house?*	1. Pemilikan sendiri *Owned or being bought* 2. Disewa *Rented* 3. Kuarters kakitangan kerajaan/ majikan *A government/ employer-provided staff quarters* 4. Tinggal secara percuma di rumah yang dimiliki oleh orang yang bukan ahli isi rumah ini *Living for free in a house owned by non-household members* (-7) TT (-9) EJ
A2006	Jumlah isi rumah yang tinggal di rumah ini? *Total number of people living in your household?* **[Penemuramah mengisi maklumat berdasarkan Jadual Isi rumah** ***Interviewer fills out information based on Household Schedule]***	☐☐ Orang / *people* (-7) TT (-9) EJ
A2007	Apakah sumber bekalan air minum yang utama untuk semua isi rumah di rumah ini? *What is the main source of drinking water for members of your household?* **[Sila rujuk buku kod]** ***[Please refer code book]***	1. Paip air *Piped water* 2. Telaga *Dug well* 3. Air mata air *Water from spring* 4. Takungan air hujan *Rainwater collection* 5. Air dari tasik atau sungai *Water taken directly from pond or stream* 6. Air yang dihantar *Delivered water* 7. Kios air *Water kiosk* 8. Air berbotol *Packaged water* 9. Air permukaan *Surface water* 10. Lain-lain *Etc*
A2008	Apakah jenis tandas yang anda dan ahli isi rumah biasa gunakan? *What kind of toilet facility do you and members of your household usually use?* **[Sila rujuk buku kod]** ***[Please refer code book]***	1. Tandas pam dan disambung ke sistem kumbahan pusat *Flush toilet and connected to the main sewerage system* 2. Tanda pam dengan tangki kumbahan (tanki septik) *Flush toilet with septic tank* 3. Tandas curah *Pour flush toilet* 4. Tandas lubang tertutup *Bore hole toilet with closed lid* 5. Tandas lubang tidak tertutup *Bore hole toilet without cover* 6. Tandas angkut/ tong *Bucket latrine* 7. Bekas sanitasi *Container based sanitation* 8. Tandas gantung terus ke sungai/ laut *Hanging latrine* 9. Tiada kemudahan tandas/ semak/ kawasan terbuka *No facility toilet/ bush/ field*
A2009	Adakah anda berkongsi tandas berkenaan dengan bukan ahli isi rumah? *Do you share this facility with others who are not members of your household?*	1. Ya *Yes* 2. Tidak *No*
A2010	Adakah anda mempunyai sabun atau bahan pencuci khas untuk mencuci tangan? *Do you have soap or detergent in your household for washing hands?*	1. Ya *Yes* 2. Tidak *No*
Tamat, Ke Modul Seterusnya ***End, Go to the Next Module***		

MODUL B: SARINGAN KESIHATAN *HEALTH SCREENING*			
KRITERIA KELAYAKAN: KESEMUA AHLI ISIRUMAH YANG BERUMUR 1 TAHUN DAN KE ATAS ***ELIGIBILITY CRITERIA: ALL HOUSEHOLD MEMBERS AGED 1 YEAR AND ABOVE***			
Pilih **SATU** jawapan sahaja *Choose **ONE** answer only*			
B0001	Adakah anda pernah diberitahu oleh doktor atau pengamal perubatan yang anda menghidapi… *Have you ever been told or diagnosed by a doctor or medical practitioner that you have…*		
	B0001a	Kencing manis *Diabetes*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B0001b	Tekanan darah tinggi *Hypertension*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B0001c	Penyakit jantung *Heart disease*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B0001d	Asma atau lelah *Asthma*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B0001e	Penyakit Kronik system pernafasan atau paru-paru *Chronic pulmonary or lung disease*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B0001f	Penyakit buah pinggang *Kidney disease*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B0001g	Penyakit hati *Liver disease*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B0001h	Kanser *Cancer*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
B0002a	Pernahkah anda merokok? *Have you ever smoked?*		1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
B0002b	Adakah anda masih merokok? *Do you currently smoke?*		1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ

B1001	Sejak dari 1 Januari 2020 sehingga… [Tarikh temuramah], pernahkah anda mengalami sebarang gejala berikut? *Since 1 January 2020 until… [Date of interview], have you had any of the following symptoms?*		
	B1001a	Demam *Fever*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001b	Sakit tekak *Sore throat*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001c	Selesema *Runny nose*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001d	Batuk *Cough*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001e	Sesak atau susah bernafas *Shortness of breath*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001f	Gejala pernafasan yang lain, sila nyatakan *Other respiratory symptoms, please state*	1. Ya *Yes* Sila nyatakan *Please state:…* 2. Tidak *No* (-7) TT (-9) EJ
	B1001g	Menggigil *Chills*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001h	Muntah *Vomiting*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001i	Mual atau loya *Nausea*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001j	Cirit-birit *Diarrhea*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001k	Sakit kepala *Headache*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ

	B1001l	Ruam kulit *Skin rash*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001m	Konjungtivitis atau merah mata *Conjunctivitis*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001n	Sakit otot *Muscle aches*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001o	Sakit sendi *Joint ache*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001p	Hilang selera makan *Loss of appetite*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001q	Hilang deria bau *Loss of smell*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001r	Hilang deria rasa *Loss of taste*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001s	Hidung berdarah *Nose bleed*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001t	Kepenatan *Fatigue*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001u	Sawan *Seizures*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001v	Kesedaran berubah *Altered consciousness*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	B1001w	Gejala-gejala lain, sila nyatakan *Other symptoms, please state*	1. Ya *Yes* Sila nyatakan *Please state:...* 2. Tidak *No* (-7) TT (-9) EJ

B1002	Adakah responden menjawab "Ya" untuk mana-mana satu gejala di atas? *Did the respondent answer "Yes" to any of the above symptoms?* Jika jawab "Ya" untuk mana-mana satu gejala, teruskan menjawab B1002a. Jika jawab "Tidak" untuk semua simptom, tamat modul.	1. Ya *Yes*…**sila ke B1002a** 2. Tidak *No*… **Modul ini tamat**
B1002a	Adakah responden ingat tarikh gejala bermula dan hilang? *Do the respondents remember the date the symptoms began and disappeared?* Jika jawab "Ya", teruskan menjawab B1002b & c. Jika "Tidak", ke B1002d.	1. Ya *Yes*…**sila ke B1002b & B1002c** 2. Tidak *No*…**sila ke B1002d**
B1002b	Bilakah anda bermula mengalami gejala-gejala di atas? *When did you start to experience the above symptoms?*	☐ Tarikh
B1002c	Bilakah gejala di atas hilang? *When did you the above symptoms resolve?*	☐ Tarikh
B1002d	Adakah gejala yang anda hadapi menyebabkan anda mendapatkan rawatan? *Did any of these symptoms require you to seek medical attention?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
B1002e	Adakah gejala yang anda hadapi menyebabkan anda tidak hadir bekerja atau ke sekolah? *Did any of these symptoms require you to miss work or school?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
B1002f	Adakah gejala yang anda hadapi menyebabkan anda di masukkan ke hospital? *Did any of these symptoms require you to be hospitalized?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
Tamat, Ke Modul Seterusnya ***End, Go to the Next Module***		

MODUL C: JANGKITAN VIRUS COVID-19 *COVID-19 VIRUS INFECTION*		
KRITERIA KELAYAKAN: KESEMUA AHLI ISIRUMAH YANG BERUMUR 1 TAHUN DAN KE ATAS ***ELIGIBILITY CRITERIA: ALL HOUSEHOLD MEMBERS AGED 1 YEAR AND ABOVE***		
Pilih **SATU** jawapan sahaja *Choose **ONE** answer only*		
C0001	Pernahkah anda berhubung rapat dengan orang yang disyaki atau mempunyai penyakit COVID-19? *Have you had close contact with anyone with suspected or confirmed COVID-19 virus infection?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
C0002	Pernahkah anda menghadiri sebarang aktiviti perayaan atau majlis keramaian sejak Januari 2020, di mana pesakit COVID-19 telah dikesan? *Have you ever attended any festivals or mass gathering since January 2020, where a known COVID-19 case has been detected?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
C0003	Pernahkah anda berjalan ke luar negara sejak bulan Januari 2020? *Have you travelled internationally since January 2020?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
C0004a	Pernahkah anda diberitahu anda menghidap COVID-19? *Have you ever been diagnosed as a COVID-19 patient?*	1. Ya *Yes*…**sila ke Modul D** 2. Tidak *No*…**sila ke C0004b** (-7) TT (-9) EJ
C0004b	Pernahkah anda mengambil ujian untuk COVID-19? *Have you ever get tested for COVID-19?*	1. Ya *Yes*…**sila ke C0004c** 2. Tidak *No*…**sila ke Modul D** (-7) TT (-9) EJ
C0004c	Apakah jenis sampel yang telah diambil? *What type of sample was taken?*	1. Swab tekak atau dalam hidung/ *Throat or nasopharyngeal swab* 2. Darah/ *Blood* 3. Kedua-duanya/ *Both* (-7) TT (-9) EJ
Tamat, Ke Modul Seterusnya ***End, Go to the Next Module***		

MODUL D: HEPATITIS B & C *HEPATITIS B & C*		
KRITERIA KELAYAKAN: AHLI ISI RUMAH BERUMUR 15 TAHUN DAN KE ATAS ***ELIGIBILITY CRITERIA: HOUSEHOLD MEMBERS AGED 15 YEARS AND ABOVE***		
Pilih **SATU** jawapan sahaja *Choose **ONE** answer only*		
D0001	Pernahkan anda diberitahu oleh doktor atau pengamal perubatan yang lain bahawa anda menghidap Hepatitis B? *Has a doctor or other health professional ever told you that you have Hepatitis B?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
D0002	Sila lihat ubat yang diberi untuk Hepatitis B pada buku kod ini [Sila rujuk buku kod] *Please look at the drug in code book that are prescribed for Hepatitis B (Please refer code book)* Pernahkah anda diberi sebarang ubat untuk merawat Hepatitis B? *Were you ever prescribed any medicine to treat Hepatitis B?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
D0003	Pernahkah anda mendapatkan suntikan imunisasi Hepatitis B? *Have you ever get vaccinated with Hepatitis B shot?*	1. Ya dengan 3 dos *Yes, completed 3 doses* 2. Ya dengan 1 atau 2 dos *Yes, either 1 or 2 shots* 3. Tidak pernah mendapatkan suntikan untuk Hepatitis B *Never get shot for Hepatitis B* 4. Tidak pasti *Not sure* (-7) TT (-9) EJ
D0004	Pernahkan anda diberitahu oleh doktor atau pengamal perubatan yang lain bahawa anda mengihap Hepatitis C? *Has a doctor or other health professional ever told you that you have Hepatitis C?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
D0005	Sila lihat ubat yang diberi untuk Hepatitis C pada buku kod. *Please look at the drug in code book that are prescribed for Hepatitis C.* Pernahkah anda diberi sebarang ubat untuk merawat Hepatitis C? *Were you ever prescribed any medicine to treat hepatitis C?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
Tamat, Ke Modul Seterusnya ***End, Go to the Next Module***		

MODUL E: FAKTOR RISIKO PERIBADI
PERSONAL RISK FACTORS

KRITERIA KELAYAKAN: AHLI ISI RUMAH BERUMUR 15 TAHUN DAN KE ATAS
ELIGIBILITY CRITERIA: HOUSEHOLD MEMBERS AGED 15 YEARS AND ABOVE

Pilih **SATU** jawapan sahaja *Choose **ONE** answer only*

Pernahkah anda menjalani prosedur-prosedur yang dinyatakan di bawah?
Have you ever had any procedures as mentioned below?

E0001	Bertindik di mana-mana bahagian badan *Piercing in any body parts*	1. Ya *Yes* 2. Tidak *No*
E0002	Tatu *Tattoo*	1. Ya *Yes* 2. Tidak *No*
E0003	Berbekam *Blood cupping*	1. Ya *Yes* 2. Tidak *No*
E0004	Akupuntur *Acupuncture*	1. Ya *Yes* 2. Tidak *No*
E0005	Hemodialisis *Hemodialysis*	1. Ya *Yes* 2. Tidak *No*
E0006	Sebarang rawatan pembedahan *Any surgical procedure or operation*	1. Ya *Yes* 2. Tidak *No*
E0007	Sebarang rawatan pergigian *Any dental procedures*	1. Ya *Yes* 2. Tidak *No*
E0008	Menerima pemindahan (transfusi) darah lebih dari 25 tahun yang lepas (sebelum tahun 1994) *Received any blood transfusion more than 25 years ago (before the year 1994)*	1. Ya *Yes* 2. Tidak *No*
E0009	Pernahkah anda mendapat kecederaan akibat tertusuk jarum atau lain-lain alatan tajam di tempat kerja? *Have you ever had any injury from a needle or other sharp objects at the workplace?*	1. Ya *Yes* 2. Tidak *No*
E0010	Pernahkah anda mengamalkan salah satu daripada aktiviti berisiko tinggi seperti di bawah? *Have you ever had any of the high-risk practices as below?* 1. Hubungan sejenis *Homosexuality* 2. Melanggan pelacur *Sex with a prostitute* 3. Membayar atau menerima bayaran untuk seks *Paid or received payment for sex* 4. Mempunyai lebih dari seorang pasangan seks dalam 6 bulan *Had more than one sex partner in 6 months)* 5. Mempunyai pasangan yang mengamalkan apa-apa aktiviti seperti di atas *Have a partner who had any high risk behaviours as above* 6. Mempunyai pasangan yang pernah menyuntik dadah terlarang *Have a partner who had injected illegal drugs* 7. Mempunyai pasangan yang pernah positif atau berkemungkinan positif untuk HIV, Hepatitis B atau Hepatitis C *Have a partner who have tested positive or possibly positive for HIV, Hepatitis B or Hepatitis C)?*	1. Ya *Yes* 2. Tidak *No*
E0011	Pernahkah anda menyuntik diri anda dengan dadah yang terlarang? *Have you ever injected yourself with illegal drugs?*	1. Ya *Yes* 2. Tidak *No*

E0012	Pernahkah anda berkongsi jarum atau lain-lain alat penyediaan dadah dengan orang lain? *Have you ever shared needles or other drug preparation items with somebody else?*	1. Ya *Yes* 2. Tidak *No*
Adakah ahli keluarga anda pernah menghidap atau sedang dirawat untuk penyakit berikut: *Has any of your family members been diagnosed with or currently being treated with below:*		
E0013	Hepatitis B? *Hepatitis B?*	1. Ya *Yes* 2. Tidak *No*
E0014	Hepatitis C? *Hepatitis C?*	1. Ya *Yes* 2. Tidak *No*
Tamat, Ke Modul Seterusny ***End, Go to the Next Module***		

MODUL F: BIOMARKER *BIOMARKER*

KRITERIA KELAYAKAN: AHLI ISI RUMAH BERUMUR 1 TAHUN DAN KE ATAS
ELIGIBILITY CRITERIA: HOUSEHOLD MEMBERS AGED 1 YEAR AND ABOVE

Sila jawab soalan berikut *Please answer the questions*

BAHAGIAN 1: SOALAN KEPADA RESPONDEN
SECTION 1: QUESTION FOR RESPONDENT

Tujuan pengambilan darah ini adalah untuk mengesan Hepatitis B & C dan antibodi jangkitan virus COVID-19. Pemeriksaan ini adalah percuma dan semua keputusan ujian adalah sulit dan akan dimaklumkan terus kepada responden.
The purpose of this blood taking is to test for hepatitis B& C and antibody for COVID-19 virus infection. This testing is free and test result is strictly confidential. We will inform the test result directly to you once the test result is available.

Jika anda berumur 18 tahun ke bawah, keputusan ujian akan dimaklumkan kepada ibu/ bapa/ penjaga anda.
If you are below 18 years old, we will inform your parents / your guardian pertaining to your test results.

Jika responden didapati positif, anda akan dirujuk ke fasiliti kesihatan kerajaan yang terdekat untuk tujuan rawatan bagi mengelakkan anda mendapat komplikasi penyakit dari jangkitan ini. Kos rawatan adalah percuma jika anda adalah warga Malaysia.
If you are found positive, we will refer you to the nearest government health clinic or hospital for treatment. This is to prevent further medical complications from hepatitis infection. Cost of treatment is free if you are Malaysian citizen.

F1001	Adakah anda telah memahami penyataan-penyataan berkenaan pengambilan darah anda dalam tinjauan ini? DAN adakah anda membenarkan darah anda diambil sebanyak 5 ml oleh petugas perubatan kami secara tusukan vena bagi tujuan ujian pengesanan ini? *Do you understand with all the statements given on your participation in this blood taking testing? AND do you allow our medical staff to collect 5 ml of your blood via venipuncture for the purpose of this testing?*	1. Ya *Yes* 2. Tidak *No*…**Modul ini tamat**
F1002	Adakah anda menerima token wang sebanyak RM30 sebagai tanda penghargaan bagi meluangkan masa untuk pengambilan darah ini? Sila menandatangani bagi penerimaan token wang di borang yang disediakan *Did you receive RM30 as a token of appreciation for your participation in this blood taking testing? Please sign if you have received the token money in the given forms*	1. Ya *Yes* 2. Tidak *No* (-8) TB

BAHAGIAN 2: DIISI OLEH PETUGAS KESIHATAN
SECTION 2: TO BE FILL BY HEALTH OFFICER

F2000	Sila catatkan suhu badan *Please state the body temperature*		
F2001	Bacaan 1: *1st reading:*		☐ °C
F2002	Bagi kanak-kanak, sila timbang berat badan kanak-kanak atau bayi berkenaan: Nyatakan berat badan kanak-kanak atau bayi berkenaan *Please weigh the children or baby:* *Specify the weight of the child or baby concerned* (Rujuk jadual pelan pengambilan darah bagi kanak-kanak atau bayi berkenaan): *(Refer to schedule of blood intake for the child or baby):*		
	F2002a	Bacaan 1: *1st reading:*	☐ Kg
	F2002b	Bacaan 2: *2nd reading:*	☐ Kg

	F2002c	Bacaan 3: *3rd reading:*	☐ Kg
F2003	Jenis ujian darah yang diambil *Type of blood test that was taken*		
	F2003a	Hepatitis B *Hepatitis B*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	F2003b	Hepatitis C *Hepatitis C*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	F2003c	Serologi COVID-19 *Serology COVID-19*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
Tamat, Ke Modul Seterusny ***End, Go to the Next Module***			

MODUL G: STIGMA HIV *HIV STIGMA*		
KRITERIA KELAYAKAN: AHLI ISI RUMAH BERUMUR 13 TAHUN DAN KE ATAS ***ELIGIBILITY CRITERIA: HOUSEHOLD MEMBERS AGED 13 YEARS AND ABOVE***		
Pilih **SATU** jawapan sahaja *Choose **ONE** answer only*		
G0001	Adakah anda takut bahawa anda boleh dijangkiti HIV jika terkena air liur seseorang yang menghidap HIV? *Do you fear that you could contract HIV if you come into contact with the saliva of a person living with HIV?*	1. Ya *Yes* 2. Tidak *No*
G0002	Adakah anda bersetuju atau tidak dengan pernyataan berikut?: “Saya akan berasa malu jika ahli keluarga saya menghidap HIV.” *Do you agree or disagree with the following statement ?: “I would be ashamed if someone in my family had HIV.”*	1. Ya *Yes* 2. Tidak *No*
G0003	Pada pendapat anda, adakah seseorang berasa ragu-ragu untuk membuat ujian HIV kerana takut akan reaksi masyarakat jika keputusan ujian adalah positif HIV? *In your opinion, are people hesitant to take an HIV test due to fear of people’s reaction if the test result is positive for HIV?*	1. Ya *Yes* 2. Tidak *No*
G0004	Adakah orang yang menghidap atau disyaki menghidap HIV akan hilang kehormatan atau kedudukan? *Do people living with or thought to be living with HIV lose respect or standing?*	1. Ya *Yes* 2. Tidak *No*
G0005	Adakah anda akan membeli sayur-sayuran segar dari pekedai atau pembekal tersebut jika anda mengetahui bahawa dia menghidap HIV? *Would you buy fresh vegetables from a shopkeeper or vendor if you knew that this person had HIV?*	1. Ya *Yes* 2. Tidak *No*
G0006	Adakah anda berpendapat bahawa kanak-kanak penghidap HIV sepatutnya boleh bersekolah bersama dengan kanak-kanak yang bukan penghidap HIV? *Do you think children living with HIV should be able to attend school with children who are HIV negative?*	1. Ya *Yes* 2. Tidak *No*
Tamat, Ke Modul Seterusnya ***End, Go to the Next Module***		

MODUL H: TUBERKULOSIS *TUBERCULOSIS*			
KRITERIA KELAYAKAN: AHLI ISI RUMAH BERUMUR 15 TAHUN DAN KE ATAS ***ELIGIBILITY CRITERIA: HOUSEHOLD MEMBERS AGED 15 YEARS AND ABOVE***			
Sila jawab soalan berikut *Please answer the questions*			
H0001	Adakah anda… *Are / Have you…*		
	H0001a	sedang mendapat rawatan tuberkulosis? *on tuberculosis treatment?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	H0001b	pernah diberitahu oleh doktor anda menghidap tuberkulosis? *ever been told by doctor that you have tuberculosis?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
H0002	Dalam tempoh satu (1) bulan lepas. adakah anda menghadapi simptom seperti berikut : *For the past one (1) month, do you have any of the following symptoms?*		
	H0002a	Batuk lebih dari dua (2) minggu *Cough more than two (2) weeks*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	H0002b	Batuk berkahak lebih dari dua (2) minggu *Cough up phlegm or sputum more than two (2) weeks*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	H0002c	Batuk berdarah *Cough up blood*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	H0002d	Demam lebih dari dua (2) minggu *Fever of more than two (2) weeks*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	H0002e	Turun berat badan yang tidak dijangka *Unexpected loss of weight*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	H0002f	Berpeluh pada waktu malam lebih dari dua (2) minggu *Drenching sweats at night for more than two (2) weeks*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
PERINGATAN: Bagi soalan H0001a hingga H0002f, jika salah satu jawab 'Ya', sila ke H0003. Jika tiada 'Ya', soalan tamat dan sila ke Modul seterusnya			

H0003	Dalam tempoh dua (2) minggu yang lepas bagi masalah di atas, adakah anda… *In the past two (2) weeks, for the above problem, did you…*		
	H0003a	…mengubati sendiri? *…self-medicate?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	H0003b	…membeli ubat dari farmasi? *…purchase medicine from any pharmacy?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	H0003c	…mendapatkan rawatan dari klinik kesihatan kerajaan? *…seek treatment from government health clinic?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	H0003d	…mendapatkan rawatan dari hospital kerajaan? *…seek treatment from government hospital?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	H0003e	…mendapatkan rawatan dari klinik swasta? *…seek treatment from private clinic?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	H0003f	…mendapatkan rawatan dari hospital swasta? *…seek treatment from private hospital?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	H0003g	…mendapatkan nasihat dan rawatan dari pengamal perubatan tradisional? *…get advice and treatment from traditional healers?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	H0003h	…tiada buat apa-apa? *…do nothing?*	1. Ya *Yes* …sila ke H0004 2. Tidak *No* …sila ke Modul I (-9) EJ (-7) TT
PERINGATAN: Soalan H0004 hanya untuk responden yang jawab 'Ya' pada soalan H0003h. Jika jawab selain 'Ya', modul tamat dan sila ke modul seterusnya.			
H0004	Sebab utama tidak mendapatkan rawatan? *Main reason for not seeking treatment?*		
	H0004a	Menganggap masalah di atas tidak penting *It is not an emergency*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	H0004b	Masalah pengangkutan *Transportation problem*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ

	H0004c	Masalah kewangan *Financial problem*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	H0004d	Sedang dalam rawatan penyakit Tuberkulosis *Ongoing Tuberculosis treatment*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	H0004e	Takut/ tidak percaya kepada rawatan/ pengamal perubatan *Fear / does not believe in treatment / medical practitioners?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	H0004f	Dinasihatkan supaya tidak pergi *Been advised not to go*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	H0004g	Kesibukan/ tiada masa *Busy / no time to seek treatment*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
Tamat, Ke Modul Seterusnya ***End, Go to Next Module***			

MODUL I: PENGGUNAAN ANTIBIOTIK *ANTIBIOTIC USE*		
KRITERIA KELAYAKAN: AHLI ISI RUMAH BERUMUR 15 TAHUN DAN KE ATAS ***ELIGIBILITY CRITERIA: HOUSEHOLD MEMBERS AGED 15 YEARS AND OLD***		
Pilih SATU jawapan sahaja *Choose ONE answer only*		
I0001	Adakah anda telah mengambil antibiotik untuk rawatan selesema atau sakit tekak, dalam masa setahun yang lalu? *In the past 1 year, have you taken antibiotic for common cold or sore throat?*	1. Ya *Yes*…sila ke I0002 2. Tidak *No* 3. Tidak pernah *Never*...sila ke I0006 (-7) TT (-9) EJ
I0002	Pada waktu itu, dari manakah anda mendapat antibiotik? *On that occasion, where did you get the antibiotics?*	1. Klinik *Clinic* 2. Kedai perubatan atau farmasi *Medical store or pharmacy* 3. Kedai- kedai lain, gerai atau penjaja *Other shops, stalls or hawkers* 4. Internet *Internet* 5. Teman atau ahli keluarga *Friend or family member* 6. Saya simpan dari waktu sebelumnya *I had them save up from a previous time* 7. Tempat atau orang lain *Somewhere or someone else* (-7) TT (-9) EJ
I0003	Pada waktu itu, adakah anda menerima nasihat daripada doktor, jururawat atau ahli farmasi tentang cara mengambil antibiotik? *On that occasion, did you get advice from a doctor, nurse, or pharmacist on how to take them?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
I0004	Pada waktu itu, bilakah anda berhenti makan antibiotik? *On that occasion, when did you stop taking the antibiotic?*	1. Apabila anda merasa sudah sihat *When you felt better* 2. Apabila anda telah mengambil semua antibiotik seperti yang disarankan oleh staf kesihatan yang layak *When you've taken all the antibiotics as directed by qualified health staffs* (-7) TT (-9) EJ
I0005	Pada waktu itu, adakah terdapat lebihan ubat antibiotik? Jika ya, apakah yang anda lakukan dengan ubat tersebut? *On that occasion, was there balance of the antibiotic? If yes, what did you do with it?*	1. Tidak, tiada lebihan ubat antibiotik *No, there was no balance of the antibiotic* 2. Buang ke dalam tong sampah *Thrown away in the trash* 3. Buang ke dalam sinki atau tandas *Flushed down in the sink or toilet* 4. Memulangkan kembali ubat ke farmasi atau klinik *Returned to a pharmacy or clinic* 5. Memberikan ubat antibiotik kepada teman, ahli keluarga atau kebajikan *Given away to friend, family or charity* 6. Simpan atau tidak pernah buang *Stored or never disposed* 7. Bakar *Burned* (-7) TT (-9) EJ

I0006	Kebanyakan selesema dan sakit tekak disebabkan oleh kuman virus dan bukan bakteria. *Most common colds and sore throats are caused by viruses and not bacteria.*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
I0007	Adakah antibiotik membunuh kuman virus? *Does antibiotic kill viruses?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
I0008	Adakah antibiotik berkesan untuk merawat selesema dan sakit tekak? *Is antibiotic effective to treat common cold and sore throats?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
I0009	Anda berjumpa doktor untuk rawatan selesema dan sakit tekak. Doktor tidak memberi antibiotik. Adakah anda akan meminta antibiotik daripada doktor tersebut? *You are seeing a doctor for a common cold and sore throat. He does not prescribe antibiotic for you. Would you request for antibiotic from him?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
I0010	Anda berjumpa doktor untuk rawatan selesema dan sakit tekak. Doktor tidak memberi antibiotik. Adakah anda akan membeli antibiotik dari farmasi tanpa preskripsi? *You are seeing a doctor for a common cold and sore throat. He does not prescribe antibiotic for you. Would you buy it from the pharmacy without a prescription?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
I0011	Adakah anda tahu mengenai kerintangan antibiotik? *Do you know what antibiotic resistance is?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
I0012	Adakah penggunaan antibiotik yang berlebihan atau penyalahgunaan antibiotik menyebabkan kerintangan antibiotik (antibiotik kurang berkesan) untuk merawat jangkitan bakteria? *Does overuse or misuse of antibiotic among human cause antibiotic resistance (make antibiotic less effective) to treat bacterial infections?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
I0013	Adakah penggunaan antibiotik yang berlebihan atau penyalahgunaan antibiotik di dalam penternakan haiwan menyebabkan kerintangan antibiotik (antibiotik kurang berkesan) terhadap manusia dan haiwan? *Does overuse or misuse of antibiotic in animal farming lead to antibiotic resistance in humans and animals?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
Tamat, Ke Modul Seterusnya ***End, Go to Next Module***		

MODUL J: PENGETAHUAN HIV *HIV KNOWLEDGE*		
KRITERIA KELAYAKAN: AHLI ISI RUMAH BERUMUR 13 TAHUN DAN KE ATAS ***ELIGIBILITY CRITERIA: HOUSEHOLD MEMBERS AGED 13 YEARS AND ABOVE***		
Pilih SATU jawapan sahaja *Choose ONE answer only*		
J1001	Bolehkah risiko jangkitan HIV dikurangkan dengan melakukan hubungan seks bersama pasangan yang tidak dijangkiti dan tidak mempunyai pasangan lain. *Can the risk of HIV transmission be reduced by having sex with only one uninfected partner who has no other partners?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
J1002	Bolehkah risiko jangkitan HIV dikurangkan dengan menggunakan kondom setiap kali melakukan hubungan seks? *Can a person reduce the risk of getting HIV by using a condom every time they have sex?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
J1003	Bolehkah seseorang yang kelihatan sihat itu ada HIV? *Can a healthy –looking person have HIV?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
J1004	Bolehkah seseorang dijangkiti HIV melalui gigitan nyamuk? *Can a person get HIV from mosquito bites?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
J1005	Bolehkah seseorang mendapat HIV jika berkongsi makanan dengan orang yang dijangkiti HIV? *Can a person get HIV by sharing food with someone who is infected?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
Tamat, Ke Modul Seterusnya ***End, Go to Next Module***		

MODUL K: MALARIA *MALARIA*			
KRITERIA KELAYAKAN: AHLI ISIRUMAH BERUMUR 15 TAHUN DAN KE ATAS ***ELIGIBILITY CRITERIA: HOUSEHOLD MEMBERS AGED 15 YEARS AND ABOVE***			
Pilih SATU jawapan sahaja *Choose ONE answer only*			
K0001	Adakah anda pernah mendengar tentang penyakit malaria/ demam kura-kura/ demam ketar? *Have you ever heard of malaria disease?*		1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
K0002	Bagaimana manusia mendapat jangkitan malaria? *How malaria transmitted to human?*		1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	K0002a	Melalui udara *Through airborne*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	K0002b	Melalui makanan/ minuman *Through food / waterborne*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	K0002c	Melalui gigitan nyamuk *Through mosquito bites*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	K0002d	Melalui sentuhan *Through body contact*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
K0003	Apakah gejala-gejala atau simptom-simptom malaria? *What are the signs or symptoms of malaria?*		
	K0003a	Batuk berpanjangan dan sembelit *Prolong cough and constipation*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	K0003b	Demam, sejuk dan menggigil *Fever, chill and rigor*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	K0003c	Selsema dan ruam *Flu and rashes*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	K0003d	Cirit-birit dan hilang selera makan *Diarrhea and loss of appetite*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ

K0004	Apakah aktiviti-aktiviti berisiko yang berkemungkinan menyebabkan seseorang mendapat jangkitan malaria? *What are the risk activities may cause the person contracted with malaria?*		
	K0004a	Makan makanan tercemar *Eating contaminated food*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	K0004b	Aktiviti rekseasi di kawasan hutan seperti merentas hutan, larian denai dan mendaki *Recreational activities in the forest area such as jungle trekking, trail running and hiking* (sila rujuk manual untuk definisi aktiviti rekreasi di kawasan hutan)	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	K0004c	Memancing di kawasan paya atau hutan *Fishing in the swamp or forest area*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	K0004d	Menghirup udara tercemar *Inhaling polluted air*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	K0004e	Memungut hasil pertanian di ladang / hutan *Collecting agricultural produce in the farm / forest area* (sila rujuk manual untuk definisi memungut hasil pertanian di ladang/ hutan)	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
K0005	Apakah kaedah-kaedah pencegahan malaria? *What are the malaria prevention measure?*		
	K0005a	Memusnahkan bekas-bekas plastik menakung air yang terdapat di sekitar rumah *Disposing plastics containing water around the house*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	K0005b	Memakan ubat anti-malaria atau menggunakan bahan penghalau nyamuk ketika menjalankan aktiviti di kawasan hutan *Taking anti-malarial drug or applying mosquito repellent while carry out activities in the forest area* (sila rujuk manual untuk definisi memakan ubat anti-malaria atau menggunakan bahan penghalau nyamuk)	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	K0005c	Menyembur racun serangga di permukaan dinding rumah *Spraying insecticide on the wall surface* (sila rujuk manual untuk definisi menyembur racun serangga di permukaan dinding)	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	K0005d	Tidur dalam kelambu berubat (kelambu yang dicelup dengan racun serangga) *Sleeping under insecticide treated nets* (sila rujuk manual untuk definisi tidur dalam kelambu berubat)	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ

	K0005e	Memakai pakaian perlindungan diri ketika berada di luar rumah atau semasa menjalankan aktiviti di Kawasan lading / hutan *Wearing protective clothing while carry out activities outdoor or in the farm / forest area* (sila rujuk manual untuk definisi memakai pakaian perlindungan diri)	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
	K0006	Adakah anda mengetahui tentang aktiviti pencegahan dan kawalan yang sedang dilaksanakan oleh Kementerian Kesihatan Malaysia bagi membasmi penyakit malaria? *Do you aware of prevention and control activities held by Ministry of Health Malaysia to eliminate malaria disease?*	1. Ya *Yes* 2. Tidak *No* (-7) TT (-9) EJ
Tamat ***End***			

MODUL A
SOSIODEMOGRAFI, TEMPAT KEDIAMAN & PERSEKITARAN

Soalan A1007 : Kod Etnik

Kod	Etnik	Kod	Etnik
1	Melayu	Bumiputera Sarawak	
2	Cina	31	Bidayuh
3	India	32	Bisayah (Sarawak)
4	Orang Asli (Semenanjung)	33	Bukitan
		34	Iban
		35	Kadayan
Bumiputera Sabah		36	Kajang
11	Bajau / Sama	37	Kanowit
12	Bugis	38	Kayan
13	Bisaya / Bisayah	39	Kejaman
14	Dusun	40	Kalabit
15	Kadazan	41	Kenyah
16	Kadayan / Kedayan	42	Lahanan
17	Brunei / Melayu Brunei	43	Lisum
18	Suluk	44	Lugat
19	Tidung	45	Lun Bawang / Murut
20	Bulongan	46	Melanau
21	Balabak / Molbog	47	Penan
22	Idahan	48	Punan
23	Iranun	49	Sebup
24	Lundayuh / Lundayeh	50	Sekapan
25	Murut	51	Sian
26	Orang Sungai	52	Sipeng
27	Rungus	53	Tabun
28	Bumiputera Sabah lain	54	Tagal
		55	Tanjong
		56	Ukit
		57	Bumiputera Sarawak lain

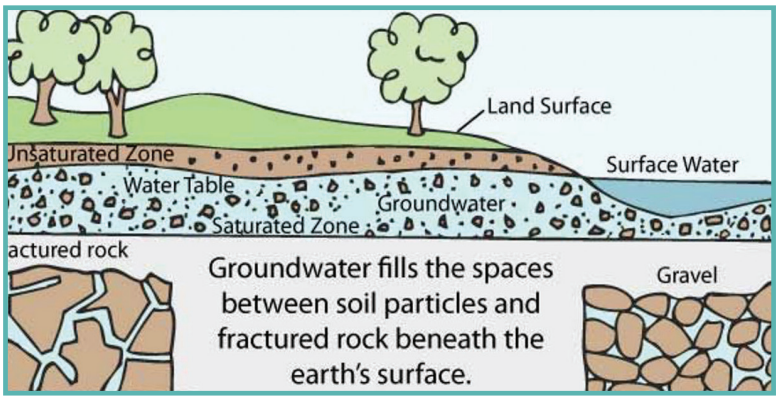
Soalan A2007 : Sumber bekalan air minum

	
Paip air	Telaga
	
Mata air	Takungan air hujan
	
Air dari tasik atau sungai	Air yang dihantar

Soalan A2007 : Sumber bekalan air minum

Kios air

Air berbotol

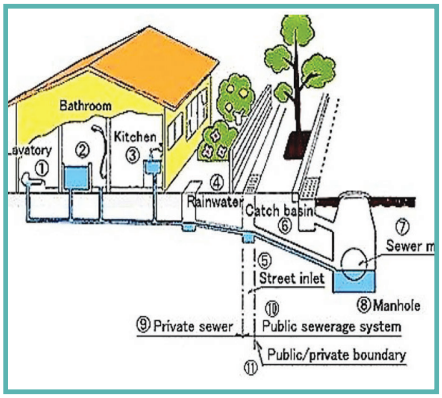


Air permukaan

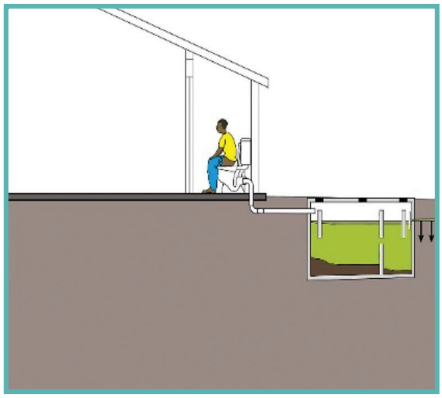
Soalan A2008 : Jenis tandas

Bekas sanitasi

Tandas gantung terus sungai / laut



Tandas pam dan disambung ke sistem kumbahan pusat

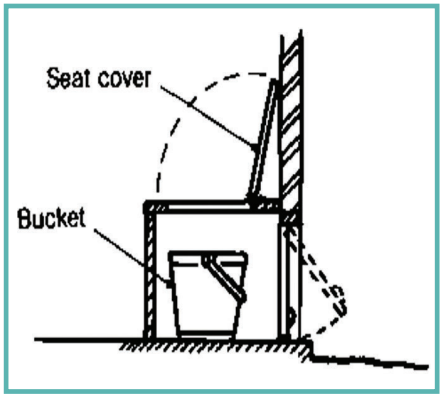


Tandas pam dengan tangki kumbahan (tangki septik)

Tandas curah (tiada pam)

Tandas lubang tertutup

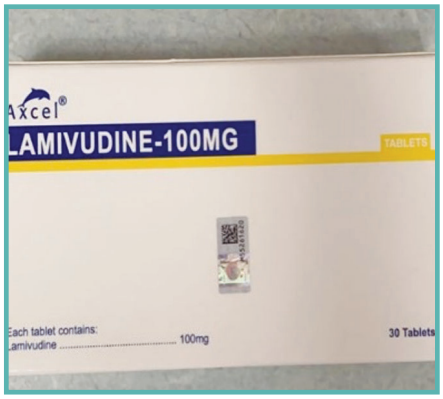
Tandas lubang tidak tertutup



Tandas angkut / tong

MODUL D
HEPATITIS B & C

Soalan D0002 : Contoh ubat hepatitis B



Lamivudine

Entecavir

Tenofovir

Soalan D0005 : Contoh ubat hepatitis C

Daclatasvir

Ribavirin

MODUL E
FAKTOR RISIKO PERIBADI

Soalan E0001

Bertindik

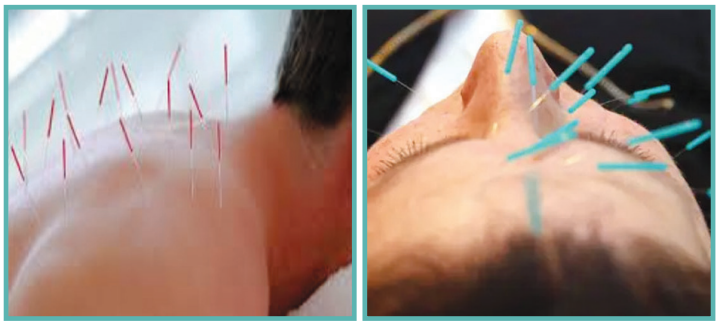
Soalan E0002

Bertatu

Soalan E0003

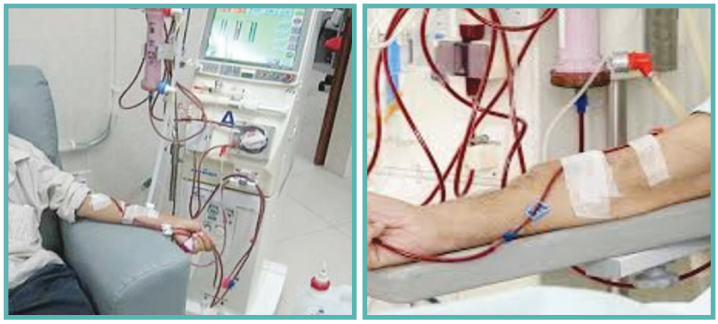
Berbekam

Soalan E0004



Akupuntur

Soalan E0005



Hemodialisis

Soalan E0006

Rawatan Pembedahan

Soalan E0007

Rawatan Pergigian

Soalan E0008

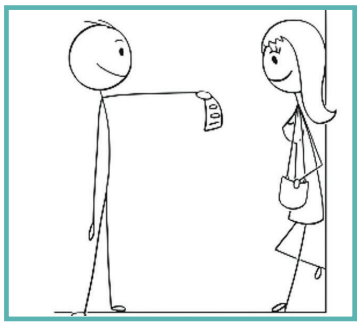
Tranfusi Darah

Soalan E0009

Luka tusukan jarum / alatan tajam di tempat kerja

Soalan E00010

Hubungan Sejenis/Homosexual



Melanggan Pelacur/ Membayar atau menerima bayaran untuk seks

Mempunyai lebih dari seorang pasangan

ANNEX B: STUDY INFORMATION SHEET (BAHASA MELAYU & ENGLISH)

RISALAH MAKLUMAT PESERTA

1. Tajuk Penyelidikan:
Tinjauan Kebangsaan Kesihatan dan Morbiditi 2020 (Penyakit Berjangkit).

2. Nama Penyelidik dan Institusi:
Penyelidik utama: En. Mohd Hatta Bin Abdul Mutalip, Institut Kesihatan Umum, Institut Kesihatan Negara, Kementerian Kesihatan Malaysia.
Penyelidik bersama:

i. Dr. Noor Aliza Binti Lodz, Institut Kesihatan Umum, Institut Kesihatan Negara, Kementerian Kesihatan Malaysia.
ii. Dr. Chong Zhuo Lin, Institut Kesihatan Umum, Institut Kesihatan Negara, Kementerian Kesihatan Malaysia.
iii. Albeny Joslyn Panting, Institut Penyelidikan Tingkahlaku Kesihatan, Institut Kesihatan Negara, Kementerian Kesihatan Malaysia.

3. Nama Penaja: Kementerian Kesihatan Malaysia

4. Pengenalan:
Kementerian Kesihatan Malaysia (KKM) sedang menjalankan Tinjauan Kebangsaan Kesihatan dan Morbiditi 2020 dengan skop tinjauan berkaitan penyakit berjangkit. Maklumat berikut akan menjelaskan hal-hal berkenaan tinjauan tersebut dengan lebih mendalam. Adalah penting untuk anda memahami mengapa tinjauan ini dilakukan dan apa yang perlu anda lakukan. Sila ambil masa yang secukupnya untuk membaca dengan teliti penerangan yang diberi sebelum anda bersetuju untuk menyertai tinjauan ini. Jika anda mempunyai sebarang kemusykilan ataupun memerlukan maklumat lanjut, anda boleh bertanya dengan mana-mana ahli kumpulan tinjauan ini. Setelah anda memahami maklumat tinjauan ini dan berhasrat untuk mengambil bahagian, anda perlu menandatangani **Borang Persetujuan Responden** yang disertakan pada muka surat terakhir risalah ini. Penyertaan anda dalam tinjauan ini adalah secara sukarela dan anda boleh menarik diri pada bila-bila masa. Anda boleh untuk tidak menjawab mana-mana soalan atau menarik diri dari pemeriksaan yang disebutkan sekiranya tidak mahu. Keengganan anda untuk mengambil bahagian, atau penarikan diri anda tidak akan menjejaskan sebarang manfaat perubatan atau kesihatan yang merupakan hak anda. Anda boleh menarik diri sekiranya enggan mengambil bahagian. Tinjauan ini ditaja sepenuhnya oleh Kementerian Kesihatan Malaysia dan telah mendapat kelulusan Jawatankuasa Etika dan Penyelidikan Perubatan, Kementerian Kesihatan Malaysia.

5. Apakah tujuan tinjauan ini dilakukan ?
Tujuan tinjauan ini dijalankan adalah untuk memperolehi maklumat berkaitan dengan penyakit-penyakit berjangkit di Malaysia seperti jangkitan penyakit Hepatitis B dan C. Tinjauan ini juga bertujuan menilai tahap kognitif, keberkesanan dan tingkahlaku (CAB) anda berkaitan pencegahan penyakit berjangkit yang berkaitan dengan denggi dan penyakit zoonosis bawaan haiwan peliharaan. Kajian seroprevalens antibodi COVID 19 juga akan dijalankan bersama-sama dengan tinjauan ini. Maklumat yang diperolehi ini akan dikaji dan dinilai bagi meningkatkan lagi taraf perkhidmatan kesihatan di negara ini. Tinjauan ini akan berlangsung kira-kira 5 bulan (2 bulan bagi tempoh tinjauan di lapangan dan 3 bulan bagi kaedah temuramah menerusi telefon) dan seramai 5,000 responden daripada tempat kediaman terpilih akan terlibat di dalam tinjauan ini di seluruh Malaysia.

6. Apakah prosedur penyelidikan yang akan saya terima ?
Tinjauan ini melibatkan dua (2) kaedah pengumpulan data di lapangan dan temuramah menerusi telefon.

6.1 Pengumpulan data di lapangan:

- **Temuramah secara bersemuka:**
  - Maklumat sosiodemografi dan tempat kediaman.
  - Hepatitis B dan C
  - Jangkitan virus COVID-19

- **Soalan diisi sendiri (Sulit):**
  - Faktor risiko hepatitis B dan C
  - Stigma HIV

- **Soalan diisi sendiri (CAB):**
  - Pencegahan denggi
  - Jangkitan zoonotik daripada haiwan peliharaan

- **Pengambilan spesimen biologi:**
  - Sampel darah

6.2 Temuramah menerusi telefon:
- Gejala seperti Tuberkulosis
- Penggunaan antibiotik
- Pengetahuan HIV
- Kesedaran penyakit Malaria

7. Apakah yang terjadi sekiranya saya bersetuju untuk menyertai kajian ini ?
Sebelum pengumpulan data bermula, anda akan diberi penerangan terperinci berkaitan prosedur pengumpulan data.

a) Sesi temuramah:
   - Memberi maklumbalas dan maklumat semasa sesi temuramah
   - Sesi temuramah secara bersemuka di pusat pengumpulan data mengambil masa selama sekurang-kurangnya 5 minit
   - Temuramah menerusi telefon mengambil masa selama 10 hingga 15 minit

b) Soalan diisi sendiri:
   - Soalan berbentuk diisi sendiri merupakan soalan sulit yang bertanyakan soalan-soalan yang sensitif berkaitan jangkitan penyakit hepatitis B dan C serta stigma HIV.
   - Masa diambil adalah selama 5 minit.
   - Bagi modul-modul CAB, anda bebas mengisi sendiri borang kaji selidik di rumah anda.

c) Pengambilan darah:
   Semua responden yang berumur 1 tahun dan ke atas akan diambil darah. Rujuk jadual di bawah bagi tujuan pengambilan darah daripada responden dengan kaedah tusukan vena mengikut prosedur yang bebas kuman bagi memastikan kebersihan dan pencegahan jangkitan silang:

#	Kumpulan umur	Jumlah (ml)	Anggaran
1.	≥ 15 tahun	10	Dua sudu teh
2.	Kanak-kanak < 7 tahun	3.5	¾ sudu teh
3.	Kanak-kanak 7 – 15 tahun	5	Satu sudu teh

Pengambilan darah mengambil masa sekurang-kurangnya 2 minit. Jika anda bersetuju, sebarang baki sampel darah ini akan disimpan bagi tujuan penyelidikan kajian penyakit berjangkit sahaja. Keputusan ujian darah ini akan dimaklumkan kepada anda dan jika keputusan adalah positif, anda akan dirujuk kepada fasiliti kesihatan kerajaan yang terdekat untuk tindakan susulan dan rawatan lanjut.

8. Apakah tanggungjawab saya sewaktu menyertai kajian ini ?
Adalah amat penting untuk setiap peserta memahami dan mematuhi arahan Pasukan Penyelidik. Peserta diingatkan untuk menjawab soalan dengan jujur dan lengkap. Untuk peserta yang terpilih bagi pengambilan darah, peserta diingatkan untuk mengekalkan rutin harian seperti biasa dan dilarang berpuasa pada hari-hari pengumpulan data. Sekiranya pengambilan darah tidak dapat dilakukan pada hari yang telah ditetapkan atas sebab kesihatan atau sebarang kesulitan, peserta perlu memaklumkan kepada pasukan kajian untuk menetapkan tarikh baharu. Apa-apa keraguan atau pertanyaan boleh ditujukan kepada Penyelidik Utama atau Pasukan Penyelidik.

9. Apakah risiko dan kesan-kesan sampingan menyertai tinjauan ini ?
Tiada risiko jika anda menjawab soalan-soalan secara bersemuka. Soalan berbentuk jawab sendiri mengandungi soalan yang sangat sensitif dan peribadi. Semua jawapan dan maklumat yang diterima dari anda adalah **SULIT**. Maklumat-maklumat yang diterima akan disimpan rapi dan tidak akan dikongsi dengan orang lain. Kami akan memastikan keperibadian dan kerahsiaan anda. Kejujuran anda dalam menjawab semua soalan-soalan ini adalah amat dihargai. Jika anda terpilih untuk pengambilan darah, jururawat atau ahli perubatan yang terlatih akan mengambil sampel darah anda secara tusukan salur darah (vena). Terdapat sedikit ketidakselesaan dan mungkin sedikit bengkak kecil pada kawasan tusukan, dan adalah sangat jarang anda mengalami jangkitan kuman atau pengsan daripada prosedur berkenaan.

Masalah pendarahan boleh terjadi kepada individu yang mempunyai gangguan pembekuan darah atau juga kepada individu yang mengambil ubat cair darah seperti Aspirin, Warfarin (Coumadin) dan sebagainya. Jika peserta mengalami sebarang masalah yang berkaitan dengan penyelidikan ini semasa pengumpulan data dilakukan, anda dinasihatkan untuk memaklumkan kepada Pasukan Penyelidik.

10. Apakah yang akan terjadi sekiranya saya tercedera semasa menyertai kajian ini ?
Risiko pengambilan darah adalah seperti yang diterangkan di atas manakala tiada risiko atau kesan sampingan yang diketahui daripada prosedur kajian yang selainnya. Jika terdapat ketidakselesaan ketika pengambilan darah, anda boleh memaklumkan kepada Pasukan Penyelidik untuk melengkapkan pengambilan sampel darah ini. Peserta juga adalah dinasihati untuk memaklumkan kepada Pasukan Penyelidik dalam tempoh tiga hari jika tidak sihat atau mengalami apa-apa kesusahan bagi tujuan pengambilan darah. Ini adalah bertujuan bagi mengelakkan anda terdedah kepada penyakit akibat daripada tinjauan ini.

Jika anda tercedera kerana penyertaan anda dalam penyelidikan ini, anda hendaklah menghubungi Pasukan Penyelidik anda. Sekiranya kecederaan fizikal / badan atau penyakit terhasil secara langsung akibat daripada prosedur dalam kajian ini, penyelidik akan menguruskan rawatan yang diperlukan dan berpatutan. Tetapi pihak penaja tidak akan bertanggungjawab terhadap perbelanjaan perubatan bagi penyakit atau rawatan yang telah wujud sebelum penyertaan anda dalam kajian ini, ataupun mana-mana proses rawatan yang sedang anda ikuti, ataupun sebarang masalah yang timbul sama ada

daripada kecuaian anda sendiri atau salah laku yang disengajakan, ataupun kecuaian atau salah laku yang disengajakan sama ada oleh Pasukan Penyelidik anda, pihak tapak/lokasi/pusat penyelidikan, mahupun mana-mana pihak ketiga yang terlibat. Walau bagaimanapun, anda tetap tidak kehilangan mana-mana hak anda di sisi undang-undang untuk mendapatkan pampasan sekalipun anda sudah menandatangani borang ini.

11. Apakah manfaatnya saya menyertai tinjauan ini ?

Tiada manfaat kesihatan atau kewangan secara terus yang anda perolehi apabila menyertai tinjauan ini. Walaubagaimanapun, segala maklumat yang diperolehi dapat membantu pembuat dasar kesihatan negara untuk merancang bagi meningkatkan lagi taraf perkhidmatan kesihatan dan aktiviti kawalan penyakit berjangkit di negara ini.

Jika sampel darah anda diambil, anda boleh mengetahui status kesihatan anda berkaitan jangkitan hepatitis B dan C. Penyertaan anda dalam kajian ini akan memberikan maklumat berkaitan pembentukan antibodi virus COVID-19, dimana maklumat ini dapat digunakan bagi tujuan kawalan penyakit dan pengurusan klinikal pesakit.

Jika anda didapati positif:

- Surat rujukan akan diberikan kepada anda supaya anda boleh mendapatkan rawatan susulan di fasiliti kesihatan kerajaan yang terdekat.
- Tiada sebarang kos akan dikenakan kepada ahli keluarga anda sama ada saringan atau rawatan perubatan dijalankan ke atas keluarga dan jika anda warganegara Malaysia.

12. Siapakah yang membiayai kajian ini ?

Kajian ini ditaja sepenuhnya oleh Kementerian Kesihatan Malaysia. Mana-mana prosedur dan rawatan lain yang tidak diperlukan untuk kajian ini tetapi merupakan sebahagian daripada rawatan harian anda, adalah tanggungan anda sendiri ataupun pihak insurans anda. Kami amat menghargai kerjasama dan masa yang anda luangkan untuk kajian ini. Tiada sumbangan kewangan yang akan diberi kepada peserta kajian ini, tetapi pihak kami akan memberikan bahan pendidikan kesihatan bagi setiap tempat kediaman yang terpilih dalam tinjauan ini. Jika anda terlibat dalam pengambilan darah, anda akan diberikan imbalan balik sebanyak RM 30 atas penglibatan, masa yang diluangkan dan ketidakselesaan semasa pengambilan darah semasa tinjauan ini.

13. Apakah tahap penyertaan saya di dalam kajian ini ?

Penyertaan anda dalam kajian ini adalah secara sukarela dan tidak akan ditamatkan, melainkan anda tidak memenuhi kriteria kelayakan selepas dilibatkan di dalam kajian ini.

14. Adakah maklumat saya akan dirahsiakan ?

Segala maklumat anda yang diperolehi dalam penyelidikan ini akan disimpan dan dikendalikan secara sulit, bersesuaian dengan peraturan-peraturan dan/ atau undang-undang yang berkenaan. Sekiranya hasil penyelidikan ini diterbitkan atau dibentangkan kepada orang ramai, identiti anda tidak akan didedahkan tanpa kebenaran anda terlebih dahulu. Pihak-pihak tertentu seperti individu yang terlibat dalam penyelidikan dan rawatan perubatan anda, juruaudit dan jurupantau yang terlatih, pihak penaja atau pihak gabungannya, pihak berkuasa kerajaan atau undang-undang, boleh memeriksa maklumat anda jika berkenaan dan diperlukan. Hanya anda dan Pasukan Penyelidik akan mengetahui mengenai keputusan semua ujian dari kajian ini. Jika anda terlibat dalam pengambilan darah, keputusan ujian akan dimaklumkan kepada anda secara sulit. Anda hanya akan dimaklumkan keputusan ujian dan pemeriksaan sendiri dan bukan keputusan ujian atau pemeriksaan peserta lain.

15. Siapakah akan saya hubungi sekiranya saya mempunyai sebarang pertanyaan?
Sekiranya anda mempunyai sebarang pertanyaan mengenai kajian ini, sila hubungi Penyelidik Utama, En. Mohd Hatta Bin Abdul Mutalip, atau Penyelidik bersama, Dr. Noor Aliza Lodz, Penyelidik Utama Seroprevalens Jangkitan COVID-19; Dr. Chong Zhuo Lin dari Institut Kesihatan Umum, Kompleks Kesihatan Negara, Kementerian Kesihatan Malaysia, No 1, Jalan Setia Murni U13/52, Seksyen U13 Setia Alam 40170, Shah Alam, Selangor di talian **03-3362 8793.**

Sekiranya anda mempunyai sebarang pertanyaan berkaitan dengan hak-hak anda sebagai peserta dalam kajian ini, sila hubungi:

Jawatankuasa Etika & Penyelidikan Perubatan
Kompleks Institut Kesihatan Negara (NIH),
No 1, Jalan Setia Murni U13/52, Seksyen U13 Setia Alam, 40170 Shah Alam,
Selangor.
No. Tel: 03-33628407/ 33628205/ 33628888

STUDY INFORMATION SHEET

1. Title of Study:
National Health & Morbidity Survey 2020 (Communicable Diseases)

2. Name of Investigator and Institution:
Principle Investigator: En. Mohd Hatta Bin Abdul Mutalip, Institute for Public Health, National Institutes of Health Malaysia, Ministry of Health Malaysia.

Co-Investigators:

iv. Dr. Noor Aliza Lodz, Institute for Public Health, National Institutes of Health Malaysia, Ministry of Health Malaysia.
v. Dr. Chong Zhuo Lin, Institute for Public Health, National Institutes of Health Malaysia, Ministry of Health Malaysia.
vi. Albeny Joslyn Panting, Institute for Behavioral Health Research, National Institutes of Health Malaysia, Ministry of Health Malaysia.

3. Name of Sponsor: Ministry of Health, Malaysia

4. Introduction:
The Ministry of Health (MoH) is conducting a National Health and Morbidity Survey (NHMS) 2020 this year with a scope of communicable diseases. This leaflet will explain the details of this survey. It is important for you to understand why the survey is being done and what will be involved. Please take your time to read through and consider this information carefully before you decide if you are willing to participate. If you have any questions or need more information, you can ask any team member of this survey. Once you understand the survey information and you wish to participate, you must sign a **consent form** which is included on the last page of this information sheet. Your participation is voluntary and you may withdraw at any time. You may opt to not answer any of the questions or withdraw if you choose to do so. Your refusal to participate or withdrawal will not affect your existing rights to any medical or health care. This study is fully sponsored by the Ministry of Health Malaysia and has been approved by the Medical Research and Ethics Committee, Ministry of Health Malaysia.

5. What is the purpose of the survey?
The purpose of this study is to obtain information on communicable diseases in Malaysia including health status related to Hepatitis B and C infections. This study will also assess respondent's cognitive, affective and behavioral (CAB) pertaining to communicable diseases prevention related to dengue and zoonoses infection. The seroprevalence COVID-19 antibody serosurvey will also be carried out in this survey. This information will be reviewed and evaluated in order to improve the health service in our country. This survey will last for 5 months (Duration of the on-site data collection is 2 months while phone interview will take approximately 3 months) and about 5,000 respondents will be involved in this study throughout Malaysia.

6. What kind of procedures will I receive?
This survey involves two (2) methods; on-site data collection and phone interview.

6.1 On-site data collection:

- **Face to face interview:**
  - Sociodemographic profiles and living arrangement
  - Hepatitis B and C
  - COVID-19 virus infection

- **Self-administered questionnaire (Confidential):**
  - Risk factors of hepatitis B and C
  - HIV stigma

- **Self-administered questionnaire (CAB):**
  - Dengue prevention practices
  - Zoonotic infections related to household pet

- **Biological specimen:**
  - Blood sample

6.2 **Phone interview:**

- TB-like-symptoms
- Antibiotic use
- HIV knowledge
- Malaria awareness

7. What will happen if I decide to take part?

Before collecting data, you will be explained in detail about the data collection procedure.

d) Face to face interview:
- To give feedback during the face to face interview session
- Interview session during on-site data collection will take around 5 minutes
- Phone interview will take around 10 to 15 minutes

e) Self-Administered Questionnaires (SAQ):
- The SAQ questionnaires will ask about sensitive information about the risks of hepatitis B and C infections and your stigma on HIV.
- SAQ is estimated will take around 5 minutes.
- For CAB modules, you are free to respond to all questions conveniently at home.

f) Blood collection:

All respondents aged 1 years old and above will be recruited for blood collection. Blood will be drawn from a venipuncture procedure following aseptic principles to ensure cleanliness and prevent cross-infection. Please refer to the table below for the volume of blood that will be drawn according to age and weight of the respondent.

#	Age category	Volume (ml)	Approximate
1.	≥ 15 years old	10	Two teaspoons
2.	Children < 7 years old	3.5	¾ teaspoon
3.	Children 7 – 15 years old	5	One teaspoon

Blood taking is approximately will take for at least 2 minutes. If we get further consent from you, excessive blood from blood investigation will be kept for future testing or study for Infectious diseases. You will be informed the result of blood testing and you will be referred to the nearest government health clinic for further management and treatment if you are found positive from your blood testing.

8. What are my responsibilities when taking part in this survey?

It is important that every participant to follow the instruction which has been given by the study team. Participant is also reminded to answer the questions honestly and completely. For participant recruited

for blood investigation, participant is reminded to maintain their usual daily routine and must not fast during data collection days. If there are any circumstances that blood taking cannot be made on the appointed date due to sickness or any difficulties, participant must inform the study team for a new arrangement or consultation. Any doubt or enquiries can be addressed to the Principal Investigator or study staff in each site. Participation in this survey will definitely not incur any cost to you.

9. What are the potential risks and side effects of being in this survey?

There is no risk if you participate in the face to face interview in this survey. The self-administered questionnaires consist of very sensitive and personal questions. All information and answers we receive from you are treated **CONFIDENTIAL**. The information will be kept safe and will not be shared with others including your family members or friends. We will ensure your privacy and confidentiality. Your honesty in answering all these questions are greatly appreciated. If you are selected for blood investigation, a trained phlebotomist or nurse will collect your blood from a venipuncture procedure. There will be a slight discomfort at the site of puncture, possible bruising and swelling around the puncture site, rarely and infection and very uncommonly faintness from the procedure.

Ongoing bleeding can be a problem for people with bleeding disorders. Aspirin, warfarin (Coumadin), and other blood-thinning medicines can make bleeding more likely. If you have bleeding or clotting problems, or if you take blood-thinning medicine, tell the medical staffs before your blood sample is taken. If participants face any problems relating to this study during the data collection period, participants are advised to report it to the data collectors.

10. What if I am injured in this study?

The risks or side effects from blood taking are as stated above where else other procedures has no known risks or side effects. In the event of other unspecified discomfort, especially during biological specimen collection participants are advised to discuss with the study team to select their best date to complete the biological sample collection. Participants are advised to inform the study team in the case of illness or any other difficulties that occur on the three days. This is to assure that you are not imposed to illness directly resulting from this study.

However, if you are injured or ill directly from the study procedure required for this study, we will incur the cost for the necessary treatment. The study team is not responsible for medical expenses due to pre-existing medical conditions, any underlying diseases, any ongoing treatment process, and your negligence or willful misconduct.

11. What are the benefits of being in this survey?

There will be no direct health benefits if you take part in this survey. However, information obtained from this study will help the policy makers to plan towards improving health services and disease control program activity in this country.

If you are recruited for blood investigation, you will get information on your health status related to hepatitis B and C infections. Participation in this study provides extra information on the presence or absence of COVID-19 antibodies in your body, which will greatly help in determining subsequent disease control and clinical management for the Ministry of Health Malaysia.

- If you are found positive:
    - We will refer you to the nearest government health clinic or hospital for further treatment and management.
    - No cost will incur for any screening or treatment for you and your family members if you are Malaysian.

12. Who is funding this study?
This study is funded by research grant from the Ministry of Health Malaysia. Whichever procedure and treatment that is not required by this study but is part of participants' daily needs, it should be covered by participant or participant's insurance. We appreciate your time spent on this study. There are no monetary incentives for participating in this study but as a sign of appreciation, a health education token will be given to each participant who takes part in this study. If you participated in blood investigation, you will be compensated a total amount of RM 30 for your participation in the study, time spent and discomfort experience during blood taking.

13. Can the study or my participation be terminated early?
Your participation in this study is voluntary and no termination will be applied unless you are known to have any non-eligibility criteria after study recruitment.

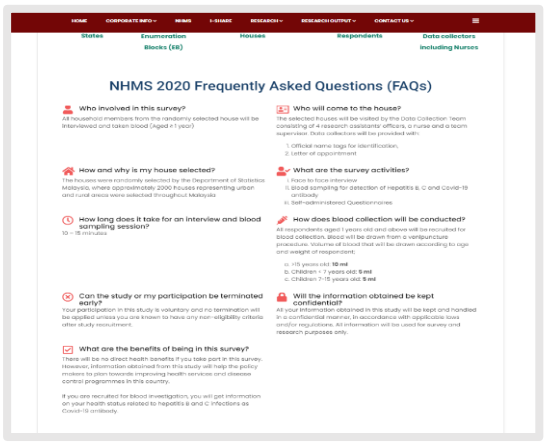
14. Will my study information be kept private?
All your information obtained in this study will be kept and handled in a confidential manner, in accordance with applicable laws and/or regulations. Your identity as a participant in the study is strictly confidential. All information available in the study records will always be kept confidential and used only for research purposes. When publishing or presenting the study results, your identity will not be revealed without your expressed consent. Individuals involved in this study and in your medical care, qualified monitors and auditors, the sponsor or its affiliates and governmental or regulatory authorities may inspect and copy your medical records, where appropriate and necessary. Only you and the study team involved will gain all the result and it will be distributed in a confidential manner. If you participated in blood investigation, we will inform you the results of the respective testing using a standardized format after the study is completed. You will only be given your own results and not results from other participants.

15. Who should I call if I have questions?
If you have any enquiries about this study or if you want further information, please contact Principal Investigator, Mohd Hatta Bin Abdul Mutalip, or Co-Investigator, Dr. Noor Aliza Lodz, or Principle Investigator Seroprevalence COVID-19; Dr. Chong Zhuo Lin from Institute for Public Health, National Institutes of Health, Ministry of Health Malaysia, No 1, Jalan Setia Murni U13/52, Seksyen U13 Setia Alam 40170, Shah Alam, Selangor at **03-3362 8793.**

If you have any questions regarding your rights as a patient in this survey, please contact:

Medical Research & Ethics Committee,
Ministry of Health Malaysia,
Kompleks Institut Kesihatan Negara (NIH),
No 1, Jalan Setia Murni U13/52, Seksyen U13 Setia Alam, 40170 Shah Alam,
Selangor.

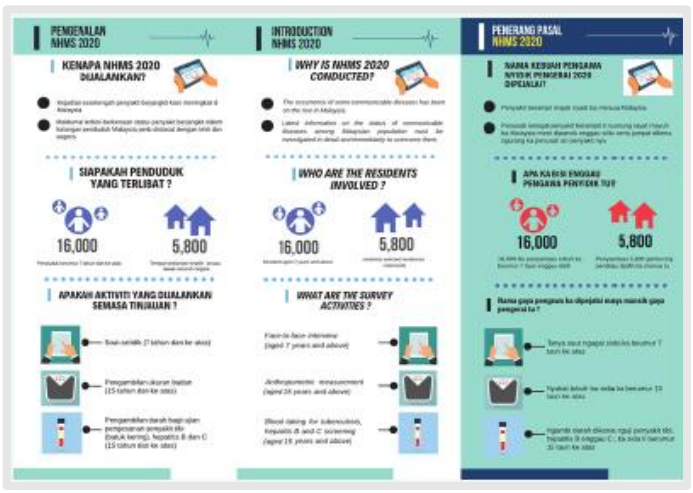
ANNEX C: PUBLICITY MATERIAL AND MEDIA COVERAGE



Official Website of NHMS 2020

Media Kit (Liason Officer)

Media Kit (Field Supervisor)



Brochure on NHMS 2020

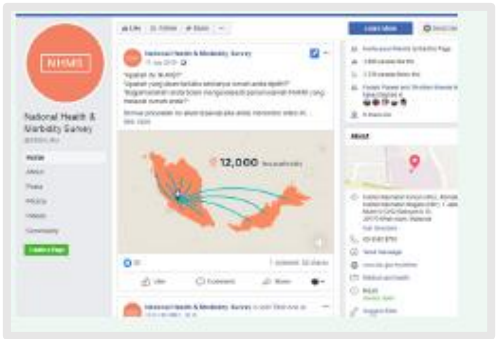
Quick Facts on Communicable Diseases Brochure

NHMS 2020 and Covid-19 Flyers

Posters (Peninsular, Sabah & Sarawak Versions)

Banner

Car Sticker



Facebook Page

Instagram

Radio Interviews


Covid-19 #kitamestimenang

Kementerian Kesihatan perlu masa kaji jangkitan pantas pandemik

Kajian kluster super-spreader


malay mail

Malaysia among first in SE Asia to conduct Covid-19 seroprevalence study, says Health deputy D-G


Kosmo!

MediaMulia

TERKINI NEGARA K2 HIB CLAM DUNIA SUKAN NIAGA AHAD VIDEO PREMIUM

NEGARA

NHMS kaji bebanan penyakit berjangkit negara


malaysiakini

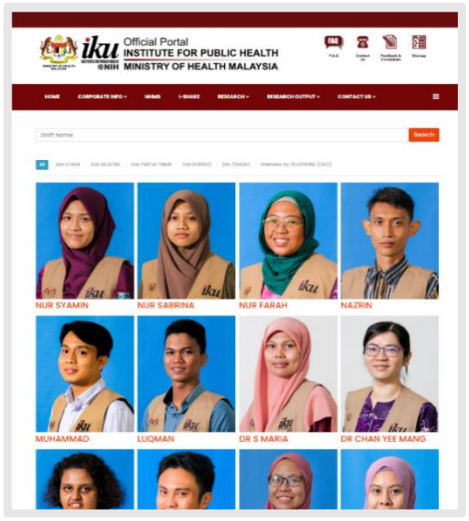
news and views that matter

NEWS

M'sia among first SEA countries to conduct Covid-19 seroprevalence study

Bernama

Media Coverage


ikn Official Portal INSTITUTE FOR PUBLIC HEALTH MINISTRY OF HEALTH MALAYSIA

NUR SYAMIN NUR SABRINA NUR FARAH NAZRIN

MUHAMMAD LUQMAN DR S MARIA DR CHAN YEE MANG


No.IKU ZB16

KEMENTERIAN KESIHATAN MALAYSIA

INSTITUT KESIHATAN UMUM (IKU)

www.iku.gov.my/nhms

PENGUMPUL DATA

NHMS 2020

VYNNESA

96

Sah: OGOS - OKT 2020

Data Collectors Information | **ID Card**

ANNEX D: LIST OF SELECTED ENUMERATION BLOCKS (EBS) FOR NHMS 2020

Zone	State	Bandar / Mukim	DP	DB	BP	Strata
South	Johor	Sri Medan	01	001	J 0001	4
		Chaah Bahru	01	002	J 0002	4
		Jelutong	02	056	J 0003	2
		Ulu Benut	03	059	J 0004	2
		Bukit Kepong	06	037	J 0005	4
		Bandar	06	046	J 0006	1
		Parit Bakar	06	071	J 0007	3
		Pontian	07	076	J 0008	2
		Sedenak	09	007	J 0009	2
		Sedenak	09	007	J 0010	3
	Melaka	Taboh Naning	01	013	M 0001	2
		Sungai Rambai	02	022	M 0002	3
		Duyong	03	019	M 0003	2
		Bukit Katil	03	010	M 0004	2
	Negeri Sembilan	Juasseh	02	013	NS 0001	4
		Kepis	02	013	NS 0002	4
		Port Dickson	03	004	NS 0003	4
		Ampangan	05	022	NS 0004	1
		Setul	05	007	NS 0005	1
		Seremban	05	011	NS 0006	1
Central	Selangor	Rawang	01	011	SG 0001	2
		Bandar Petaling Jaya	05	016	SG 0002	1
		Sungai Besar (Sabak Bernam)	06	026	SG 0003	2
		Ampang	08	051	SG 0004	1
		Cheras	08	029	SG 0005	1
		Tanjung Dua Belas	03	139	SG 0006	4
		Tanjung Dua Belas	03	139	SG 0007	4
		Telok Panglima Garang	03	140	SG 0008	4
		Tanjung Sepat	03	168	SG 0009	4
		Selayang Baru	01	167	SG 0010	1
		Gombak Setia / Tmn Perwira	01	166	SG 0011	2

Zone	State	Bandar/Mukim	DP	DB	BP	Strata
		Bandar Saujana Utama	04	105	SG 0012	2
		Gombak	01	091	SG 0013	1
		Klang	02	002	SG 0014	1
		Cheras	08	029	SG 0015	1
		Rawang	01	093	SG 0016	2
		Ampang	08	120	SG 0017	1
	WP Kuala Lumpur	Setapak	01	051	WPK 0001	1
		Kampung Baru	01	039	WPK 0002	1
		Setapak	01	027	WPK 0003	1
		Petaling	01	022	WPK 0004	1
		Batu	01	002	WPK 0005	1
	WP Putrajaya	WP Putrajaya	01	001	WPP 0001	1
North	Perak	Pangkor	02	058	PR 0001	3
		Ipoh	03	051	PR 0002	1
		Simpang Pulai	03	008	PR 0003	1
		Bagan Serai	04	052	PR 0004	4
		Ulu Sepetang	06	041	PR 0005	1
		Kamunting	06	021	PR 0006	1
		Gerik	08	031	PR 0007	4
		Pengkalan Hulu	08	030	PR 0008	3
	Kedah	Sungai Petani	04	035	KD 0001	1
		Ulu Melaka, Langkawi	07	017	KD 0002	4
		Sungai Layar	04	012	KD 0003	1
		Langkawi	07	017	KD 0004	1
		Sik	09	019	KD 0005	3
		Yan	10	021	KD 0006	4
		Pendang	11	024	KD 0006	4
	Pulau Pinang	Bukit Mertajam	01	022	PP 0001	1
		Balik Pulau	05	015	PP 0002	3
		Bayan Lepas	05	044	PP 0003	1
	Perlis	Padang Besar	01	001	PL 0001	4
		Kangar	01	003	PL 0002	1
East	Pahang	Bentong	01	001	PH 0002	2
		Pulau Tawar	03	022	PH 0003	4
		Sungai Karang	04	036	PH 0004	1
		Kuala Kuantan	04	024	PH 0005	1
		Gali	07	027	PH 0006	2

Zone	State	Bandar/Mukim	DP	DB	BP	Strata
		Semantan	08	043	PH 0007	4
		Endau	09	013	PH 0008	4
		Temerloh	08	045	PH 0009	2
	Terengganu	Keluang	01	012	T 0001	2
		Kemaman	03	018	T 0002	4
		Bukit Besar	04	008	T 0003	1
		Pulau Kerengga	05	009	T 0004	4
		Chukai	03	016	T 0005	1
	Kelantan	Ketereh	01	015	KT 0001	4
		Kota Bharu	02	005	KT 0002	2
		Pasir Mas	02	030	KT 0003	2
		Pasir Puteh	04	027	KT 0004	4
		Bachok	05	009	KT 0005	4
		Tanah Merah	06	011	KT 0006	4
		Tumpat	07	013	KT 0007	2
Borneo	Sabah	Tawau	01	031	SB 0001	5
		Tawau	01	001	SB 0002	1
		Embara Budi	02	066	SB 0003	5
		Lahad Datu	02	051	SB 0004	5
		Lahad Datu	02	034	SB 0005	1
		Semporna	03	035	SB 0006	5
		Kota Kinabalu	07	039	SB 0007	1
		Kota Kinabalu	07	041	SB 0008	1
		Tuaran	10	017	SB 0009	5
		Penampang	11	044	SB 0010	1
		Papar	12	019	SB 0011	5
		Beaufort	16	023	SB 0012	5
	WP Labuan	Labuan	01	001	WPL 0001	2
	Sarawak	Kuching	01	071	SW 0001	1
		Kuching	01	073	SW 0002	1
		Bau	02	009	SW 0003	3
		Serian	05	014	SW 0004	6
		Lubok Antu	08	023	SW 0005	5
		Sibu	15	041	SW 0006	1
		Mukah	17	045	SW 0007	5
		Bintulu	19	048	SW 0008	1
		Tatau	20	050	SW 0009	6

Zone	State	Bandar/Mukim	DP	DB	BP	Strata
		Sungai Asap	23	082	SW 0010	6
		Miri	24	055	SW 0011	1
		Limbang	26	063	SW 0012	2
		Asajaya	29	013	SW 0013	5
		Kuching	01	073	SW 0014	1
		Betong	09	028	SW 0015	5
		Bintangor	12	035	SW 0016	5
		Kuching	01	004	SW 0017	1

ANNEX E: MEMBERS OF STEERING COMMITTEE

1. Director General of Health, Ministry of Health Malaysia
2. Deputy Director General (Research & Technical Support) Division, Ministry of Health Malaysia
3. Deputy Director General of Health (Public Health) Division, Ministry of Health Malaysia
4. Deputy Director General of Health (Medical) Division, Ministry of Health Malaysia
5. Principal Director, Oral Health Programme, Ministry of Health Malaysia
6. Principal Director, Pharmaceutical Services Programme, Ministry of Health Malaysia
7. Principal Director, Food Safety and Quality Division, Ministry of Health Malaysia
8. Director, Disease Control Division, Ministry of Health Malaysia
9. Director, Medical Development Division, Ministry of Health Malaysia
10. Director, Medical Development Division, Ministry of Health Malaysia
11. Director, Planning Division, Ministry of Health Malaysia
12. Director, Family Health Development Division, Ministry of Health Malaysia
13. Director, Nutrition Division, Ministry of Health Malaysia
14. Representative of State Health Director, Ministry of Health Malaysia
15. Director, Institute for Public Health, Ministry of Health Malaysia
16. Dean, Faculty of Medicine, University of Malaya
17. Dean, Faculty of Medicine, National University of Malaysia
18. Principal Investigator of NHMS

Steering Committee

The NHMS Steering Committee, chaired by the Director-General of Health was set up at the national level to approve on the scopes of NHMS 2020 and to facilitate the implementation of the survey.

Term of Reference for NHMS 2020 Steering Committee

- To approve the objectives and scopes of NHMS 2019 – 2022
- To facilitate inter and intra sectorial collaboration
- To monitor the implementation of the NHMS 2019-2022
- To facilitate the utilization of the NHMS 2019-2022 findings

ANNEX F: MEMBERS OF NHMS 2020 CENTRAL COORDINATING TEAM (CCT)

1. **Dr. Noor Ani Ahmad**
   Director, Institute for Public Health
2. **Dr. Manimaran Krishnan Kaudan**
   Director, Institute for Health and Behavioral Research
3. **Dr. Muhammad Fadhli Mohd Yusoff**
   Advisor, Methodology and Statistics
4. **Dr. Shubash Shander Ganapathy**
   Advisor, Data Processing & Quality
   Central Field Supervisor (Southern Zone)
5. **Mohd Hatta Abdul Mutalip**
   Principal Investigator NHMS 2020 (Communicable Disease)
6. **Dr. Chong Zhuo Lin**
   Principal Investigator Seroprevalence COVID-19 Virus Infection
7. **Dr. Noor Aliza Lodz**
   Co-Principal Investigator NHMS 2020
8. **Albeny Joslyn Panting**
   Co-Principal Investigator NHMS 2020 (CAB)
9. **Eida Nurhadzira Muhammad**
   Project Manager NHMS 2020
10. **Mohd Amierul Fikri Mahmud**
    Media and Publicity I
11. **Norzawati Yoep**
    Procurement & Logistic
    Central Field Supervisor (Borneo-Sarawak)
12. **Hasmah Mohamed Haris**
    Laboratory Manager
13. **Wan Shakira Rodzlan Hasani**
    Data Manager I
14. **Muhammad Faiz Mohd Hisham**
    Data Manager II
15. **Norhafizah Sahril**
    Data Manager (CATI)
16. **Abu Bakar Rahman**
    Data Manager (CAB)
17. **Hamizatul Akmal Abd Hamid**
    Field Data Monitoring
18. **Dr. Halizah Mat Rifin**
    SCS System Development Manager
19. **Rafidah Ali**
    SCS System Development (CATI)
20. **Dr. Fazila Haryati Ahmad**
    Coordinator, Scanning Station & CATI
21. **Syafinaz Mohd Sallehuddin**
    Scanning Station Supervisor
22. **Saiful Adli Suhaimi**
    Scanning Station Supervisor (CAB)
23. **Nur Shahida Abdul Aziz**
    Station Supervisor (CATI)
24. **Dr. Maznieda Mahjom**
    Central Field Supervisor (Central Zone)
25. **Lim Kuang Kuay**
    Central Field Supervisor (East-Coast Zone)

26. **Ruhaya Salleh**
Central Field Supervisor (Northern Zone)

27. **Hasimah Ismail**
Central Field Supervisor (Borneo-Sabah)

28. **Dr. Mohd Shaiful Azlan Kassim**
Principal Investigator NHMS (Maternal & Child Health, 2022)

Not a CCT member, but involved in the planning of NHMS 2020 field data collection:

29. **Norazizah Ibrahim Wong**
Sampling Advisor

30. **Mohamad Fuad Mohamad Anuar**
Coordinator, Questionnaire Design and Pretesting

31. **Faizul Akmal Abdul Rahim**
Data Collection Operation Manager
Field Supervisor (Southern Zone)

32. **Mohd Hazrin Hasim @ Hashim**
Mapping & GIS

33. **Norbaidurah Ithnain**
Media and Publicity II

34. **Mohamad Naziran Hasni Junai**
Media and Publicity III

35. **Hafis Zuhdi Badrul Hisham**
Training

36. **Muhammad Asyraff Mohd Sarif**
ICT

37. **Nik Nor Natasha Nasaruddin**
Recruitment

38. **Amalina Mohamad**
Finance

39. **Andy Mustaming**
System Support

Central Coordinating Team (CCT)

A working committee within the Institute for Public Health was established to coordinate the implementation of the survey according to scheduled Gantt-chart. The Operation Centre was set up as a base by the CCT for coordinating and monitoring the progress of the survey.

Terms of Reference for NHMS 2020 Central Coordinating Team

1. Project Management and Finance
    - Arrange employment and prepare materials of recruitment for the temporary Research Assistant.
    - Prepare letters, meeting minutes and engagement with research team members, stakeholders, liaison officers.
    - Arrange training and procurement process related to training activities.
    - Assist PI on administrative work related to NHMS 2020 and finance.

2. Question development, Pre -trial testing and Pilot Study
    - Coordinate activities related to the formation of questions and research instruments for NHMS 2020 (Back-to-back translation, validation and suitability of study instruments, cognitive debriefing and pilot study).
    - Collect and prepare any aid materials such as codebooks and flashcards.
    - Provide a list of variables for the purpose of NHMS system development.

3. Methodology, Sampling and Mapping
    - Calculate sample size, determine sample distribution and manage the list of maps and inlist received from the Department of Statistics Malaysia (DOSM) for selected localities for NHMS 2020.
    - Provide SOPs, manual and training materials for data collectors.

4. Data collection and operation
    - Plan data collection activities in the field based on the sampling plan.
    - Prepare SOPs, forms and provide equipment lists for field data collection activities.

5. Procurements and logistics
    - Manage procurements for NHMS 2020.
    - Receive and inspect equipment or items that have been purchased from suppliers and record in inventory records.
    - Ensure items are in good condition and ready for use in the field, including conducting calibration and verification tests.
    - Manage and monitor the distribution of stocks of goods for the needs of the data collection team in the field.
    - Manage and conduct inspections of vehicles received from suppliers and distribute to data collection teams in the field.

6. Data management and processing
    - Develop the NHMS 2020 module in Survey Creation System (SCS) software.
    - Perform system application installation for NHMS 2020 module on tablet and assist in QC data processing activities including data verification.
    - Carrying out a "troubleshooting system" during the study and monitor the operation of the SCS system to run smoothly.

7. Laboratory Management
    - Provide SOPs and manuals for biospecimens collection and cold chain management to ensure sample quality at an optimal level.
    - Monitor and ensure sample analysis is carried out according to the set timing.
    - Ensure test results are released on time and the results are kept confidential with the officer in charge.

8. Surveillance and case notification management
    - Receive, review and record laboratory results.
    - Make case notifications to the State CDC officer for positive/ reactive cases.
    - Prepare a line listing for positive/ reactive cases and send it to the State CDC officer for case management follow-up.
    - Provide counselling to any respondents with positive results.

9. Data management and analysis
    - Monitoring of data received on the server.
    - Conduct periodic data reviews and verifications.
    - Assist the module leader in conducting data analysis according to objectives and dummy tables.
    - Check the syntax for data analysis purposes and provide sampling weight for complex data analysis.
    - Prepare all materials for data repository such as variable lists and definitions based on the cleaned datasets.

10. Media and Publicity
    - Preparing media kit including the design and printing of publicity materials for the NHMS such as pamphlets, posters, banners, question books, codebooks, manuals, media kits for the use of field supervisors.
    - Coordinating e-publicity: NHMS website, MOH postmaster, social media graphics and NHMS 2020 short videos.
    - Responsible for public media coverage of NHMS 2020 involving print and electronic media such as newspaper content, TV interviews, and radio slots.
    - Designing, formatting, proofreading of printed materials for dissemination of research results such as technical reports, research highlights, infographic brochures, fact sheets.

ANNEX G: RESEARCH TEAM MEMBERS

ADVISORS

1. Dr. Noor Ani Ahmad
2. Dr. Tahir Aris
3. Datuk Dr. Norhayati Rusli

PRINCIPAL INVESTIGATOR

Mohd Hatta Abdul Mutalip

MODULE SOCIODEMOGRAPHY, HOME AND ENVIRONMENT

1. Dr. Muhammad Fadhli Mohd Yusoff
2. Mohd Hatta Abdul Mutalip
3. Mohd Ruhaizie Riyadzi
4. Nor Hanizah Abu Hanit
5. Norazizah Ibrahim Wong
6. Norzawati Yeop
7. Zuraida Che Hassan
8. Ahzairin Ahmad

MODULE COVID-19

1. Dr. Chong Zhuo Lin **(Head of Module)**
2. Wan Shakira Rodzlan Hasani (Data Analyst)
3. Dr. Hasrina Hassan
4. Dr. Jeyanthi Suppiah
5. Dr. Khebir Verasahib
6. Dr. Noor Aliza Lodz
7. Dr. Halizah Mat Rifin
8. Dr. Ravindan Thayan @ Sukumaran
9. Dr. Tania Gayle Robert Lourdes
10. Eida Nurhadzira Muhammad
11. Hasmah Mohamed Haris
12. Mohd Hatta Abdul Mutalip
13. Prof. Dr. Jamal I-Ching Sam
14. Zarina Mohd Zawawi

MODULE HEPATITIS B

1. Hasmah Mohamed Haris **(Head of Module)**
2. Hamizatul Akmal Abd Hamid (Data analyst)
3. Chan Huan Keat
4. Dato` Dr. Suresh Kumar Chidambaran
5. Datuk Dr. Muhammad Radzi Abu Hassan
6. Dr. Fazila Haryati Ahmad
7. Dr. Jamiatul Aida Md Sani
8. Dr. Maznieda Mahjom
9. Dr. Muhammad Solihin Rezali
10. Dr. Rozainanee Mohd Zain
11. Dr. Rozita Zakaria
12. Eida Nurhadzira Muhammad
13. Mohd Arman Kamaruddin
14. Mohd Hatta Abdul Mutalip
15. Muhammad Faiz Mohd Hisham
16. Nazihah Abdul Jalal
17. Nazirah Alias
18. Nor'Ain Ab Wahab
19. Wan Shakira Rodzlan Hasani

MODULE HEPATITIS C

1. Eida Nurhadzira Muhammad **(Head of Module)**
2. Hamizatul Akmal Abd Hamid (Data Analyst)
3. Chan Huan Keat
4. Dato` Dr. Suresh Kumar Chidambaran
5. Datuk Dr. Muhammad Radzi Abu Hassan
6. Dr. A'aishah Senin
7. Dr. Fazidah Yuswan
8. Dr. Maznieda Mahjom
9. Dr. Rozainanee Mohd Zain
10. Dr. Rozita Zakaria
11. Hasmah Mohamed Haris
12. Mohd Arman Kamaruddin
13. Mohd Hatta Abdul Mutalip
14. Muhammad Faiz Mohd Hisham
15. Nazihah Abdul Jalal
16. Nazirah Alias
17. Wan Shakira Rodzlan Hasani

MODULE PERSONAL RISK FACTORS (HEPATITIS B)

1. Dr. Fazila Haryati Ahmad **(Head of Module)**
2. Hamizatul Akmal Abd Hamid (Data Analyst)
3. Dato` Dr. Suresh Kumar Chidambaran
4. Dr. Abdul Aziz Harith
5. Dr. Chong Zhuo Lin
6. Dr. Fazidah Yuswan
7. Dr. Nik Adilah Shahein
8. Dr. Rohaya Abdullah
9. Dr. Rosnawati Muhamad Robat
10. Dr. Zaharah Zainuddin
11. Dr. Zuraida Mohamed
12. Lalitha Palaniveloo
13. Muhammad Faiz Mohd Hisham
14. Munawara Pardi
15. Nur Shahida Abd Aziz
16. Syafinaz Mohd Sallehuddin
17. Wan Shakira Rodzlan Hasani

MODULE TB-LIKE-SYMPTOMS

1. Muhammad Faiz Mohd Hisham **(Head of Module)**
2. Dr. Shubash Shander Ganapathy (Data Analyst)
3. Dr. Asmah Razali
4. Dr. Mohamed Naim Abdul Kadir
5. Dr. Noorliza Noordin
6. Dr. Nur Huda Ismail
7. Dr. S. Maria Awaluddin
8. Dr. Thilaka Chinniyah
9. Dr. Zamzurina Abu Bakar
10. Eida Nurhadzira Muhammad
11. Jayvikramjit Singh Manjit Singh
12. Khairul Hasnan Amali
13. Mohd Hatta Abdul Mutalip
14. Siti Balkhis Shafie

MODULE ANTIBIOTIC USE

1. Dr. Noor Aliza Lodz **(Head of Module & Data Analyst)**
2. Azli Baharudin @ Shaharudin
3. Dr. Benedict Sim Lim Heng
4. Dr. Fatin Athirah Tahir
5. Dr. Maznieda Mahjom
6. Dr. Muhd Hafizuddin Taufik Ramli
7. Dr. Shubash Shander Ganapathy
8. Dr. Suraya Amir Husin
9. Prof Dr. Sasheela Sri La Sri Ponnampalavanar
10. Suhaila Abdul Ghaffar

MODULE HIV KNOWLEDGE

1. Mohd Hazrin Hasim @ Hashim **(Head of Module)**
2. Norhafizah Sahril (Data Analyst)
3. Dr. Ahmad Ali Zainuddin
4. Chan Ying Ying
5. Dr. Anita Suleiman
6. Dr. Chan Yee Mang
7. Dr. Mohd Shaiful Azlan Kassim
8. Dr. Nur Liana Ab Majid
9. Mohamad Aznuddin Abd Razak
10. Mohd Ruhaizie Riyadzi
11. Dr. Norsyamlina Che Abdul Rahim
12. Nur Faraeein Zainal Abidin

MODULE HIV STIGMA (SAQ)

1. Dr. Mohd Shaiful Azlan Kassim **(Head of Module)**
2. Norhafizah Sahril (Data Analyst)
3. Chan Ying Ying
4. Cheong Siew Man
5. Datuk Dr. Nor Asiah Muhamad
6. Dr. Anita Suleiman
7. Dr. Fazila Haryati Ahmad
8. Dr. Maznieda Mahjom
9. Dr. Muhammad Solihin Rezali
10. Dr. Muhd Hafizuddin Taufik Ramli
11. Dr. Thamil Arasu Saminathan
12. Hasimah Ismail
13. Mohamad Aznuddin Abd Razak
14. Mohd Haniff Bistari
15. Mohd Hazrin Hasim @ Hashim
16. Norliza Shamsuddin
17. Nurul Iffah Baharom
18. Prof. Dr. Azlinda Azman

MODULE MALARIA AWARENESS

1. Faizul Akmal Abdul Rahim **(Head of Module)**
2. Mohd Amierul Fikri Mahmud (Data Analyst)
3. Cyril Sibon
4. Dr. Jenarun Jelip
5. Dr. Khairiah Ibrahim
6. Dr. Tam Jenn Zhuen
7. Fadzillah Abd Jaafar
8. Lim Kuang Kuay
9. Mohd Farihan Md Yatim
10. Norzawati Yoep
11. Rafidah Ali
12. Tanrang Yusin
13. Tuan Mohd Amin Tuan Lah

Research Team Members

Research team members were established for each topic under the NHMS 2020, with a Chairperson (Principal Investigator) and head of module (for every module). The research team was responsible for the technical input for the development of the manual to assist during data collection.

Term of Reference for NHMS 2020 Research Team Members

Set appropriate objectives according to the needs of stakeholders.

Provide ideas and opinions in creating survey questionnaire for research.

Perform data analysis.

Involve in the write up such as final reports, infographics, research highlights and fact sheet.

ANNEX H: STATE LIAISON OFFICERS

1. **Dr. Ikmal Hakim Abd Rahman**
   Perlis State Health Department
2. **Dr. Mohd Fairuz Adnan**
   Kedah State Health Department
3. **Dr. Rozaini Mat Shah**
   Pulau Pinang State Health Department
4. **Abdul Wahid Sudin**
   Perak State Health Department
5. **Dr. Nik Mohd Hafiz Mohd Fuzi**
   Kelantan State Health Department
6. **Dr. Wan Norhafizah Wan Baharuddin**
   Terangganu State Health Departmen
7. **Dr. Wan Abdul Rahim Wan Muhammad**
   Pahang State Health Department
8. **Dr. Hanis Syazwani Ab Fatah**
   Selangor State Health Department
9. **Dr. Zulfadli Nasir**
   Federal Territory of Kuala Lumpur & Putrajaya State Health Department
10. **Dr. Muhamad Ismail**
    Negeri Sembilan State Health Department
11. **Zulbahri Zakaria**
    Melaka State Health Department
12. **Dr. Lily Rafidah Mohamed Zaki**
    Johor State Health Department
13. **Dr. Rosnelizaide Ramely**
    Federal Territory of Labuan State Health Department
14. **Dr. S Muhammad Izuddin Rabbani Mohd Zali**
    Sabah State Health Department
15. **Alimuda Mahrip**
    Sarawak State Health Department

State Liaison Officer

All State Liaison Officers act as liaison officers between the Institute of Public Health (IKU) and the state in the planning and implementation of data collection activities for the National Health and Morbidity Survey (NHMS) during the pre-survey, survey and post-survey phases.

Term of Reference for NHMS 2020 State Liaison Officer

- Assist the NHMS 2020 working group committee based on activities at the state level for the implementation of NHMS 2020.
- Assist the NHMS 2020 implementation process at the state level in the pre-survey, during the survey and post-survey.
- Responsible for providing feedback on the progress of NHMS 2020 to the State Director of Health in their respective states
- Assist in NHMS 2020 publicity activities at the respective state levels.
- To manage all notified positive cases for HBV, HCV and COVID-19 virus infection.
- To arrange case finding for further medical assessment and evaluation with the District Health Office.

ANNEX I: CENTRAL TEAM

NHMS 2020 OPERATION ROOM

1. Amir Jazali Zaili
2. Daniel Sia Pong Chai
3. Hamizi Hafezah
4. Khairul Amar Musa
5. Megat Rusydi Megat Radzi
6. Muhamad Mustaqim Hussain
7. Muhammad Noriduan Nor'amilin
8. Nashrah Adilah Ismail
9. Noraznie Nordin
10. Noor Ainna Shamsudin
11. Nor Suhaili Abdul Aziz
12. Syaheerah Mohd Sallehuddin

IN-TRANSIT LABORATORY

1. Abdul Mun'im Zambri
2. Badjie Xaetieqieuallah Ibadallah
3. Intan Nabihah Muhammad Suria Sukma
4. Mohammad Syahmi Salim
5. Muhammad Adib Haiqal Aziz
6. Nur Haziqah Mohd Rosli

LABORATORY (VIROLOGY, IMR)

1. Asma Quzaiffa Baharuddin
2. Azim Haziq Ghafar
3. Nizatul Syuhada Anuar

COMPUTER-ASSISTED TELEPHONE INTERVIEW (CATI)

FIELD SUPERVISOR

1. Nur Shahida Abdul Aziz (Station Supervisor)
2. Cheong Siew Man
3. Nazirah Alias
4. Dr. Norsyamlina Che Abdul Rahim
5. Suhaila Abdul Ghaffar
6. Syafinaz Mohd Sallehuddin

RESEARCH ASSISTANTS

1. Adriana Batrisyia Mohd Faisal
2. Ajun Chin
3. Azwar Ahza Mardzukee
4. Farhana Ismail
5. Hema Karthicasu
6. Muhammad Jahid Jamaludin
7. Nurnisa Helmee
8. Nurul Iffah Baharom
9. Sofeanna Long Chi Tyeng
10. Syaheerah Mohd Sallehuddin

OPTICAL MARK READER (OMR) SCANNING SYSTEM

FIELD SUPERVISOR

1. Syafinaz Mohd Sallehuddin (Station Supervisor)
2. Komathi Perialathan
3. Masitah Ahmad
4. Nadia Amirudin
5. Nor Haryati Ahmad Sanusi
6. Nurashma Juatan
7. Rosnani Kassim

RESEARCH ASSISTANTS

1. Adni Khairiah Mohd Kassim
2. Adni Nurili Mohd Kassim
3. Ain Aqiela Ahmad
4. Amirah Husna Ahmad Razali
5. Dalina Puteri Aripin
6. Dr. Maryam Pisol

7. Fauzan Haziq Mardin
8. Gayathri Selvaraju
9. Hairulanuar Kamaruddin
10. Hajira Ramlan
11. Hasdi Jamal Aripin
12. Hasnul Amri Jamaluddin
13. Iqbal Zharif Bunaim
14. Khairul Amar Musa
15. Mohd Fairuz Danik
16. Muhammad Idris Shah Abdullah
17. Muhammmad Hafiz Helmi Ibrahim
18. Nur Adila Ramli
19. Nur Arina Bakeri
20. Nur Farah Syahira Selamat
21. Nur Izzati Mohammed
22. Nur Izzati Norshamsul

.

23. Nur Nadirah Ismail
24. Nurfahana Norddin
25. Nursaleha Mohd Sabri
26. Nurul Aqilah Yunos
27. Nurul Nadhirah Nasir
28. Nurul Syafiqah Kamaruddin
29. Nurulfarhana Zakaria
30. Siti Nor Ain Ab Rahman
31. Siti Nur Nabilah Mohd Yunus
32. Siti Rohana Rubaidi
33. Siti Sara Mat Lazim
34. Wan Izzati Syakirah Wan Syaiful Akmal
35. Wan Nurul Syafinaz Ahmad Zubir
36. YM Tengku Puteri Nadiah Tengku Baharudin Shah
37. Zafirah Muhd

Research Assistants

Research assistants are responsible in assisting officers in Institute for Public Health (central) for managing matters related to the operational and management of NHMS 2020.

Terms of Reference for Central NHMS 2020 Research Assistants

Research assistants working at the center (Institute for Public Health) will assist officers in all matters related to NHMS 2020, including in terms of:

- Administration and finance
- Laboratory management
- Logistics and transportation
- Publicity and media
- Data collection through CATI and OMR systems
- Data analysis dan data management

ANNEX J: DATA COLLECTION TEAMS

NORTH ZONE

CENTRAL FIELD SUPERVISOR

1. Ruhaya Salleh

FIELD SUPERVISORS

1. Azli Baharudin @ Shaharudin
2. Lalitha Palaniveloo
3. Mohd Amierul Fikri Mahmud
4. Siti Nur Farhana Harun

PHLEBOTOMISTS

1. Ahmad Roshahewan Ahmad Kamal
2. Ahmad Rosidi Ibrahim
3. Ainon Hayati Nasir
4. Amir Sharifuddin Ahmad
5. Arunaan Segaran
6. Azmawi Hashim
7. Cik Haslinda Yaakub
8. Haslinda Sumery
9. Mariani Yaakub
10. Mohamad Amirul Hakim Othman
11. Mohamad Syazwan Mohd Ehsa
12. Mohammad Nuramirul Khairudin
13. Mohammad Tarmizi Ahmad
14. Mohd Afizan Zanol Abidin
15. Mohd Rahimy Ab Rahim
16. Muhammad Harith Fazilah
17. Muhammad Shafifi Razali
18. Muhammad Za`im Jalaluddin Zakaria
19. Noor Mas Ayu Daud
20. Norain Shafiqah Yusof
21. Norhafizah Indera
22. Siti Rabi'ah Abdul Bashir
23. Siti Sarah Che Johan
24. Siti Solehah Khairuddin
25. Syed Mohd Naimullah Syed Azhar
26. Syuhaida Md Saad
27. Tina Anak Minggu
28. Wan Balqis Wan Abdullah

RESEARCH ASSISTANTS

1. Intan Shamira Tajudin
2. Mohamad Hafiezi Shairy Awang
3. Muhamad Baihaqi Ahmad Pauzi
4. Muhammad Haniff Samsuddin
5. Muhammad Izzat Mat Yusoff
6. Nur Aishah Solihah Mohmad Nezan
7. Dr. Nurul Syafiqah Hashim
8. Siti Aisyah Ibrahim
9. Siti Hawa Karim

EAST COAST ZONE

CENTRAL FIELD SUPERVISOR

1. Lim Kuang Kuay

FIELD SUPERVISORS

1. Kamarul Zaman Salleh
2. Mohamad Hasnan Ahmad
3. Mohd Ruhaizie Riyadzi
4. Muhammad Faiz Mohd Hisham

PHLEBOTOMISTS

1. Ahmad Khairi Noor Mohamad
2. Ahmad Shafiq Salehuddin
3. Asiah Razali
4. Azila Aziz
5. Azlan Abu Bakar

6. Lokman Omar
7. Mazlihan Ismail
8. Mohamad Azhan Mohamad
9. Muhammad Asyraf Abdul Hamid
10. Muhammad Faiq Aizat Mohd Falahurradzi
11. Musmina Muda
12. Nik Nor Irmawati Nik Muhammad
13. Norlizawati Abd Syukor
14. Nurulatina Mat Wee
15. Rozilah Deraman
16. Siti Aishah Kasa

RESEARCH ASSISTANTS

1. Mohamad Afendi Zainurin
2. Dr. Mohd 'Ulul 'Ilmie Ahmad Nazri
3. Muhamad Fateh Mustafa
4. Nur Amalina Rashidi
5. Nur Nabilah Mohamad
6. Nur Syafiqah Ishak
7. Nurrul Afeefah Baharom
8. Saiful Amin Ab Rani

CENTRAL ZONE

CENTRAL FIELD SUPERVISOR

1. Dr. Maznieda Mahjom

FIELD SUPERVISORS

1. Dr. Chan Yee Mang
2. Dr. Jane Ling Miaw Yin
3. Dr. Muhd Hafizuddin Taufik Ramli
4. Dr. Nur Hamizah Nasaruddin
5. Dr. Tania Gayle Robert Lourdes
6. Fadly Ehzan Halim
7. Mohd Hazrin Hasim @ Hashim
8. Siti Balkhis Shafie

PHLEBOTOMISTS

1. Abu Bakar Abd Salam
2. Ahmad Ridhuan Ismail
3. Asif Bakhiar Che Ab Rahman
4. Charlonna Charles
5. Cyril Banus
6. Dr. Wan Afiqah Wan Md Sabri
7. Fionna Jannat Anak Jimbat
8. Hafiz A Hadi
9. Liyana Abd Rahim
10. Michael Manganting
11. Mohamad Ilman Hasri
12. Mohammad Firdaus Zulkipli
13. Muhammad Hisyamuddin Saberi
14. Musturah Abdillah
15. Noorshasliza Abdul Razak
16. Nor'Ain Abdul Wahab
17. Nur Fadila Jalal
18. Nursakinah Norazhar
19. Nurul Izzaty Nasri
20. Nurul Syabiha Mohd Rom
21. Rozida Abdullah
22. Siti Aishah Mohd Khan
23. Zaidatul Akma Zaid
24. Zulhelmi Yahya

RESEARCH ASSISTANTS

1. Afzufira Amran
2. Ahmad Aiman Akmal Ahmad
3. Aisamuddin Zainal
4. Annabelle Georgianna Michael
5. Mac Amirul Bin Igun Dudu @ Mohd Saifullah
6. Mohammad Luqman Abdul Aziz
7. Mohammad Nazrin Nazmuding
8. Mohd Pauzan Razali
9. Mohd Taufik Mokhtar
10. Muhammad Jamaluddin
11. Navina Anne Raj Raja Gopal
12. Nur Farah Hasanah Mohd Zarmi
13. Nur Sabrina Halimi
14. Nur Syamim Ab Rahim
15. Nur Syuhada Zahid
16. Siti Hawa Karim

SOUTH ZONE

CENTRAL FIELD SUPERVISOR

1. Dr. Shubash Shander Ganapathy

FIELD SUPERVISORS

1. Faizul Akmal Abdul Rahim
2. Munawara Pardi

PHLEBOTOMISTS

1. Amirul Amin Abdul Wahab
2. Emazulisa Saem
3. Khairul Akaml Azit
4. Mahirah Ismail
5. Md Firdaus Md Nadzar
6. Mohamad Faizal Ariffin
7. Mohamad Yunus Senin
8. Mohamad Zuhairi Hamzah
9. Mohd Aiman Adip Poniran
10. Mohd Ros Azwan Azroy Muhammad
11. Nor Amirah Zawawi
12. Nor Shahidatul Akmal Ghazali
13. Norsyazwani Mohamad
14. Nurul Izani Abdul Ghafor
15. Siti Haryati Hamid
16. Siti Noor Atekah Kodiran
17. Sukri Taib
18. Thaqif Harithah Ab Wahab

RESEARCH ASSISTANTS

1. Azmarhani Abd Rahman
2. Mohd Yusry Mahdi
3. Muhamad Khairul Faezi Mohd Tamin
4. Muhammad Azrizal Hamdan
5. Nur Aimi Aliah Zainurin
6. Nuur Aqilah Izzati Othman
7. Prevena Pandian
8. Raja Nor Fatihah Raja Omar

BORNEO ZONE

CENTRAL FIELD SUPERVISOR

1. Hasimah Ismail
2. Norzawati Yeop

FIELD SUPERVISORS

1. Ariifin Sedek
2. Dr. Fatin Athira Tahir
3. Dr Muhammad Solihin Rezali
4. Lavendar Joecy Aymen Baba
5. Mohd Farihan Md Yatim
6. Mohd Hazrin Hasim @ Hashim
7. Faizah Paiwai

PHLEBOTOMISTS

1. Adil Madsanto
2. Ahmad Ajmal Afifi Yabainus
3. Angela Jimmy
4. Angelia Lim
5. Christelle Yvone Jitol
6. Christine Renny Supain
7. Dara Pon
8. Deffney Jeff Sitoun
9. Dona Allen Rantai
10. Falmon Manuel Maringgan
11. Fredo Jumon
12. Hellory Manji
13. Jaime Ee See Ping
14. Jane Lasang
15. Jayelin Paungin
16. Jumiati Johanese
17. Laura Nuil
18. Lawson Laji Pilang
19. Lisa Taeng
20. Magdalin Anchai
21. Mariatty Abdul Rahman
22. Martha Titus Raymond Jayim
23. Mohammad Hafiz Affendi
24. Mohd Noh Rasul
25. Mohd Solehin Assroff
26. Mohd Yassir Dullah

27. Morris Senabong
28. Muhammad Fikri Ag Ahmat
29. Muhammad Nureeis Talip
30. Norashikin Chee
31. Norfarhaniyati Abd Rasid
32. Norhemie Chau
33. Nurain Amar
34. Nurin Izzati Abdullah
35. Qiara Izara Tan Abdullah
36. Rosley Saparan
37. Shanttey Jimmy
38. Siti Hawa Abdullah
39. Siti Nur Hafizah Ali
40. Stephanie Barim
41. Suriati Usop
42. Tiawa Mahmud
43. Watson Andam
44. Wendylya Ridyle Untel

RESEARCH ASSISTANTS

1. Aelsa Anthony
2. Ahmad Tang Bakri
3. Arnny Yushidayah Dahalan
4. Doris Sabat
5. Erwatty Dumin
6. Grace Bebey
7. Ling Song Jing
8. Mazlan Abdul Halim Chin
9. Mohammed Hefalani Mohd Azman
10. Nur Erisa Aiman Ahmad Rhobinuddin
11. Paul Beatrix Pernando Oppei
12. Siti Ayuni Saplie
13. Steve Glantdenventur E Benjamin
14. Vynnesa Sharon Daud
15. Warren Pelima Luta
16. Winston Bunyau Jayan

State Data Collection Teams

There was a total of 5 data collection teams for NHMS 2020. The teams were distributed throughout the country to implement the data collection process.

Terms of Reference for NHMS 2020 State Data Collection Teams

1. Central Field Supervisor
    - Directly responsible to the NHMS 2020 Principal Investigator.
    - To plan field activities with Field Supervisors.
    - To provide solutions of problems that occur during data collection .
    - To monitor data collection activities and to provide solutions to improve response rate.
    - To provide progress report on data collection activities at the CCT meeting.

2. Field supervisor
    - Responsible with the entire data collection operation process and the welfare of data collection team.
    - To work closely with the LOs on publicity activities.
    - To plan field data collection and ensure progress and quality of the fieldwork.
    - To perform data QC before submission to the SCS server.

3. Phlebotomist
    - Responsible for taking blood from eligible respondents through venipuncture procedure.
    - To perform RTK antibody testing, interpret the results and counsel respondents with positive results.
    - To adhere SOPs related to biospecimen collection.

4. Research assistant
    - To assist Field supervisor in scouting activity prior actual data collection at the data collection center.
    - Conduct face-to-face interview and ensure accuracy of data captured during data collection.
    - Ensure all activities at the data collection center are conducted in accordance to the SOPs.
    - Ensure adequate equipment to be used for data collection activities.
    - Ensure the transportation always in good condition for data collection activities.

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