National Health Survey 2010

SINGAPORE

EPIDEMIOLOGY AND DISEASE CONTROL DIVISION

MINISTRY OF HEALTH

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NATIONAL HEALTH SURVEY 2010
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Foreword

The National Health Survey (NHS) is part of the Ministry of Health's ongoing surveillance of the health status of Singaporeans. It provides regular information on the prevalence of major non-communicable diseases such as diabetes mellitus and hypertension and related risk factors like obesity and smoking from a representative sample of the resident population. Of late, the NHS also captures information on practice of chronic disease screening, use of primary healthcare services, mental health and self-rated overall health. The latest NHS captures, for the first time, data on caregiving, hearing loss and renal impairment among Singapore residents.

This report presents the key findings of the fourth survey in the 6-yearly NHS series. Previous surveys in the series were conducted in 1992, 1998 and 2004. Overall, between 1992 and 2010, there have been favourable trends in hypertension and high blood cholesterol prevalence, and in behavioural risk factors such as smoking and regular exercise. However, obesity and diabetes prevalence is on a rising trend. Smoking prevalence has also risen in the past six years. The findings will help the Ministry to refine current health promotion programmes and develop new strategies that will empower Singaporeans to adopt healthy lifestyles. The survey findings will also help the Ministry monitor its progress towards achievement of long-term targets for control of major non-communicable diseases and their risk factors.

I would like to gratefully acknowledge all who have, in one way or another, contributed to the successful completion of NHS 2010. In particular, I would like to thank all survey participants who have given their time to take part, and whose support makes this report possible.

PROF K SATKU
Director of Medical Services
October 2011

Contents

Executive Summary

The National Health Survey 2010 was conducted to measure the prevalence of major non-communicable diseases such as diabetes mellitus and hypertension, and their associated risk factors among Singaporeans. The survey findings will be used by the Ministry to monitor the health of the population, track progress towards national health targets and for planning and evaluation of health promotion programmes and health care services.

Diabetes Mellitus

The prevalence of diabetes among adults aged 18 to 69 years increased from 8.2% in 2004 to 11.3% in 2010. A higher proportion of males was diabetic (12.3%) compared with females (10.4%). Diabetes was most prevalent among Indians (17.2%), compared with Malays (16.6%) and Chinese (9.7%).

High Blood Pressure (Hypertension)

The prevalence of hypertension among adults aged 30 to 69 years declined from 24.9% in 2004 to 23.5% in 2010. Hypertension was more common in males (26.4%) than in females (20.7%). Among the ethnic groups, Malays had the highest proportion of hypertensives (28.0%), followed by Chinese (23.4%) and Indians (19.3%).

High Total Blood Cholesterol

The proportion of adults aged 18 to 69 years with high total blood cholesterol decreased from 18.7% in 2004 to 17.4% in 2010. The mean total cholesterol level was the same at 5.3 mmol/l in both survey years. The prevalence of high total cholesterol was 18.3% in males and 16.5% in females. High total cholesterol was most prevalent among Malays (22.6%), compared with Chinese (17.1%) and Indians (12.6%).

The prevalence of high LDL-cholesterol among adults aged 18 to 69 years fell from 19.8% in 2004 to 15.2% in 2010. However, the prevalence of low HDL-cholesterol increased from 5.5% in 2004 to 8.1% in 2010.

Obesity

The proportion of obese adults aged 18 to 69 years was 10.8% in 2010. This was significantly higher from the obesity level of 6.9% in 2004. Obesity was more prevalent in males (12.1%) than in females (9.5%). Malays had the highest prevalence of obesity (24.0%) followed by Indians (16.9%) and Chinese (7.9%).

The level of abdominal fatness increased significantly from 11.9% in 2004 to 16.9% in 2010. Abdominal fatness was much more prevalent in females (28.0%) than in males (5.6%). Indians had the highest level of abdominal fatness (26.1%) followed by Malays (18.9%) and Chinese (15.5%).

Regular Exercise

The proportion of adults aged 18 to 69 years who engaged in regular leisure-time exercise of moderate or greater intensity rose slightly from 17.0% in 2004 to 19.0% in 2010. A higher proportion of males exercised regularly (22.8%) compared with females (15.2%). Regular physical exercise was most prevalent among Indians (21.7%) compared with Chinese (19.2%) and Malays (15.3%).

Cigarette Smoking

The proportion of adults aged 18 to 69 years who smoked cigarettes daily increased from 12.6% in 2004 to 14.3% in 2010. Daily cigarette smoking was much more prevalent in males (24.7%) than in females (4.2%). Malay males had the highest prevalence of daily cigarette smoking (45.5%), followed by Chinese males (22.2%) and Indian males (17.3%).

The prevalence of daily smoking in both genders in 2010 was higher than their 2004 levels. The proportion of male smokers increased from 21.8% to 24.7%, and that of female smokers rose from 3.5% to 4.2% in 2010. Of note is the increase in proportion of smokers in the younger 18-29 age group in males (from 18.2% to 25.3%) and in females (from 6.6% to 7.3%). Among females aged 18 to 29 years smoking was most prevalent in Malays (15.6%), compared to 5.4% in Chinese and 7.4% in Indians.

Alcohol Consumption

The proportion of adults aged 18 to 69 years who drank alcohol regularly declined from 3.2% in 2004 to 2.6% in 2010. The proportion of regular alcoholic drinkers in both genders also dropped; from 4.3% in 2004 to 3.8% in 2010 among males and from to 2.0% in 2004 to 1.5% in 2010 among females. The proportion of binge drinkers also decreased from 9.6% in 2004 to 8.7% in 2010.

Prevalence# and mean level of non-communicable diseases and their risk factors among Singapore residents aged 18 to 69 years, 1992, 1998, 2004 and 2010

Disease/Risk Factor	1992	1998	2004	2010
Diabetes mellitus [plasma glucose 2 hours post-OGTT ≥ 11.1 mmol/l]	8.6% (11.5%)	9.0% (11.3%)	8.2% (9.0%)	11.3%
Hypertension# [systolic pressure ≥ 140 mmHg or diastolic pressure ≥ 90 mmHg]	22.2% (27.7%)	27.3% (32.5%)	24.9% (26.8%)	23.5%
Blood cholesterol				
• Total cholesterol ≥ 6.2 mmol/l	19.4% (23.6%)	25.4% (28.2%)	18.7% (19.1%)	17.4%
• Mean total cholesterol (mmol/l)	5.3	5.5	5.3	5.3
• LDL-cholesterol ≥ 4.1 mmol/l	22.9%	26.5%	19.8%	15.2%
• HDL-cholesterol < 1.0 mmol/l	12.8%	11.7%	5.5%	8.1%
Obesity [BMI ≥ 30 kg/m^2]	5.1% (5.5%)	6.0% (6.3%)	6.9% (6.7%)	10.8%
Regular exercise [^{1}exercised ≥ 20 minutes for ≥ 3 days per week, ^{2}exercised ≥ 20 minutes for ≥ 3 days per week moderate or greater intensity]	13.6%^{1} (14.4%)	16.8%^{1} (17.7%)	17.0%^{2} (16.9%)	19.0%^{2}
Cigarette smoking [smoked cigarettes at least once a day]	18.3% (18.1%)	15.2% (15.1%)	12.6% (12.3%)	14.3%
Alcohol consumption				
• Alcohol consumption > 4 days per week	2.7% (3.2%)	2.6% (2.8%)	3.2% (3.3%)	2.6%

Refers to the crude prevalence or the total proportion of people identified with the disease or risk factor of interest in the population, expressed as a percentage. It has not been age standardised.

Figures in brackets refer to age-standardised prevalence. The reference population is the Census 2010 resident population.

Main Report

1
Diabetes Mellitus

Key Points

- One in nine (11.3%) Singapore residents aged 18 to 69 years had diabetes mellitus.
- The proportions of males and females with diabetes mellitus were 12.3% and 10.4% respectively.
- Indians had the highest prevalence of diabetes mellitus (17.2%), followed by Malays (16.6%) and Chinese (9.7%).
- Prevalence of diabetes mellitus increased with age, from 1% in young adults aged 18 to 29 years to 4.3% among those aged 30 to 39 years and peaked at 29.1% among those aged 60 to 69 years.
- Half (51.4%) of Singapore residents who had diabetes mellitus had not been previously diagnosed.
- Close to one in three (32.0%) known diabetics had poor blood sugar control (HbA1c 8.0% or more).

Introduction

Diabetes mellitus represents a group of metabolic disorders characterized by high blood sugar (hyperglycemia) resulting from defects in insulin secretion, insulin action, or both. Diabetes mellitus can lead to death and disability through long-term complications including blindness, kidney failure, coronary heart disease and stroke. Type 2 diabetes is the more common form of diabetes, occurring mainly in older adults and is associated with obesity. In 2010, diabetes was the underlying cause for 1.0% of all deaths in Singapore. Diabetes is estimated to cause about 10% of the disease burden of premature deaths and ill-health in Singapore in 2007, as measured by Disability-Adjusted Life Years lost.

Definition

The WHO Diagnostic Classification criteria for the Oral Glucose Tolerance Test *(WHO 1994, WHO Consultation 1999)* were used. The 2-hour plasma glucose concentration provided the basis for diagnostic classification for diabetes mellitus and impaired glucose tolerance. Table 1.1

Table 1.1: Diagnostic values for the oral glucose tolerance test

Classification	2-hour plasma glucose concentration	
	mmol/l	mg/dl
Normal	< 7.8	< 140
Impaired Glucose Tolerance	7.8 - < 11.1	140 - < 200
Diabetes Mellitus	≥ 11.1	≥ 200

Method Used

After an overnight fast of at least 10 hours, subjects had blood taken by venepuncture to determine their fasting plasma glucose levels. In addition, all subjects had blood taken to determine their glycated haemoglobin (HbA1c) levels. Non-diabetic subjects and diabetic subjects who were not on medication were then given a 296 ml drink with 75 g of glucose (Trutol). Two hours after the glucose load, a second blood sample was taken by venepuncture to determine the plasma glucose level. All blood specimens for plasma glucose measurement were collected in fluoride/oxalate tubes and despatched daily to the Biochemistry Laboratory at Singapore General Hospital for centrifugation and analysis on the same day.

Plasma glucose levels were measured using the Roche Modular DP analyser with the enzymatic colorimetric method, while HbA1c levels were determined by the Roche Cobas C analyser based on the turbidimetric inhibition immunoassay (TINA) for hemolyzed whole blood.

Glucose Tolerance Status

The survey showed that 11.3% of Singapore residents aged 18 to 69 years had diabetes and 14.4% had impaired glucose tolerance. Table 1.2

Table 1.2: Glucose tolerance status (%) of Singapore residents aged 18 to 69 years, by gender, 2010

Glucose Tolerance Status	Males	Females	Total
Normal	74.2	74.5	74.3
Impaired glucose tolerance	13.5	15.2	14.4
Diabetes mellitus[1]	12.3	10.4	11.3

[1] Includes known diabetics on medication

Prevalence of Diabetes Mellitus

A higher proportion of males (12.3%) were diabetic compared to females (10.4%). Indians had the highest prevalence of diabetes among the ethnic groups (17.2% compared to 16.6% in Malays and 9.7% in Chinese). Diabetes prevalence increased sharply with age; from 1.0% among those aged 18 to 29 years to 12.1% of adults in the 40-49 year age group and 29.1% in those aged 60 to 69 years. Graph 1.1; Table 1.3

Graph 1.1: Crude prevalence (%) of diabetes mellitus among Singapore residents aged 18 to 69 years, by gender and ethnic group, 2010

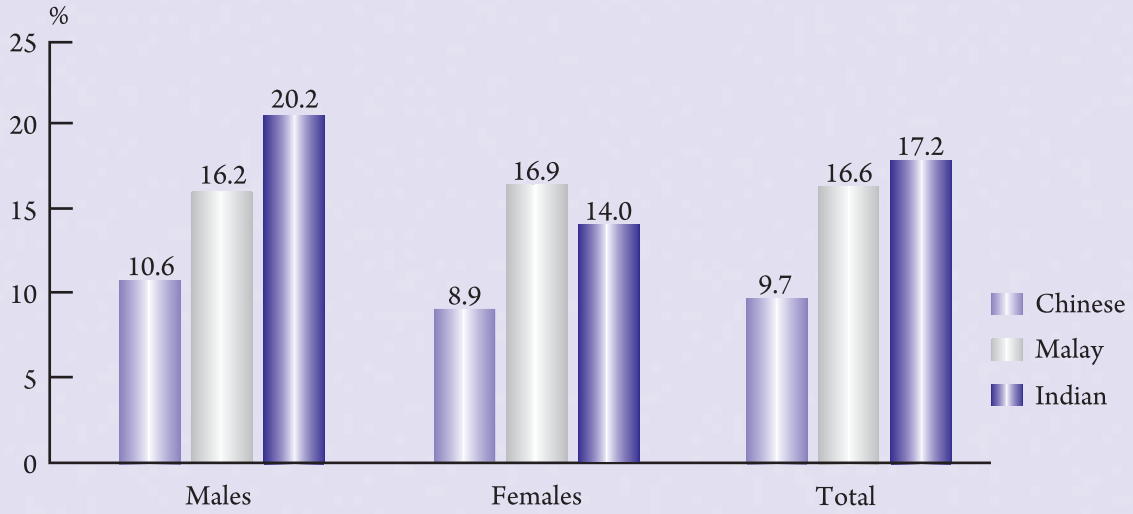


Table 1.3: Age-specific prevalence (%) of diabetes mellitus, by gender, 2010

Age (years)	Males	Females	Total
18 - 29	0.6	1.3	1.0
30 - 39	5.9	2.8	4.3
40 - 49	13.3	11.0	12.1
50 - 59	23.7	15.0	19.3
60 - 69	24.1	33.4	29.1
18 - 69	**12.3**	**10.4**	**11.3**

Trends in Diabetes Mellitus

The crude prevalence of diabetes of 11.3% in 2010 was higher than that of previous survey years which was between 8.2% and 9.0%. Overall, crude diabetes prevalence showed a quadratic increasing trend with survey year (p-value < 0.05). The increase in diabetes prevalence can be attributed to population ageing, as the age-standardised prevalence of diabetes was similar between 1992 and 2010. Table 1.4

Table 1.4: Prevalence (%) of diabetes mellitus, by gender and ethnic group, 1992, 1998, 2004 and 2010

Gender / Ethnic Group	Crude prevalence				Age-standardised prevalence (95% Confidence Interval)			
	1992	1998	2004	2010	1992	1998	2004	2010
Total	**8.6**	**9.0**	**8.2**	**11.3**	**11.5** *(10.4, 12.5)*	**11.3** *(10.4, 12.2)*	**9.0** *(8.1, 9.9)*	**11.3** *(10.3, 12.3)*
Gender								
Males	8.9	8.5	8.9	12.3	11.7 *(10.2, 13.2)*	10.6 *(9.3, 11.8)*	9.7 *(8.4, 11.0)*	12.3 *(10.8, 13.8)*
Females	8.3	9.6	7.6	10.4	11.2 *(9.7, 12.7)*	12.0 *(10.7, 13.3)*	8.3 *(7.1, 9.5)*	10.4 *(9.1, 11.7)*
Ethnic Group								
Chinese	8.1	8.0	7.1	9.7	10.8 *(9.7, 12.0)*	10.0 *(9.0, 10.9)*	7.5 *(6.6, 8.5)*	9.7 *(8.2, 11.2)*
Malay	9.3	11.3	11.0	16.6	11.3 *(10.3, 16.5)*	15.8 *(12.9, 18.7)*	13.2 *(10.2, 16.1)*	16.6 *(14.7, 18.5)*
Indian	12.9	15.8	15.3	17.2	15.5 *(11.1, 20.0)*	20.2 *(16.0, 24.4)*	18.1 *(13.9, 22.2)*	17.2 *(14.6, 19.8)*

Prevalence of Undiagnosed Diabetes

The survey found that 51.4% of Singapore residents who had diabetes mellitus had not been previously diagnosed. In 2004, the proportion of undiagnosed diabetics was 49.4%.

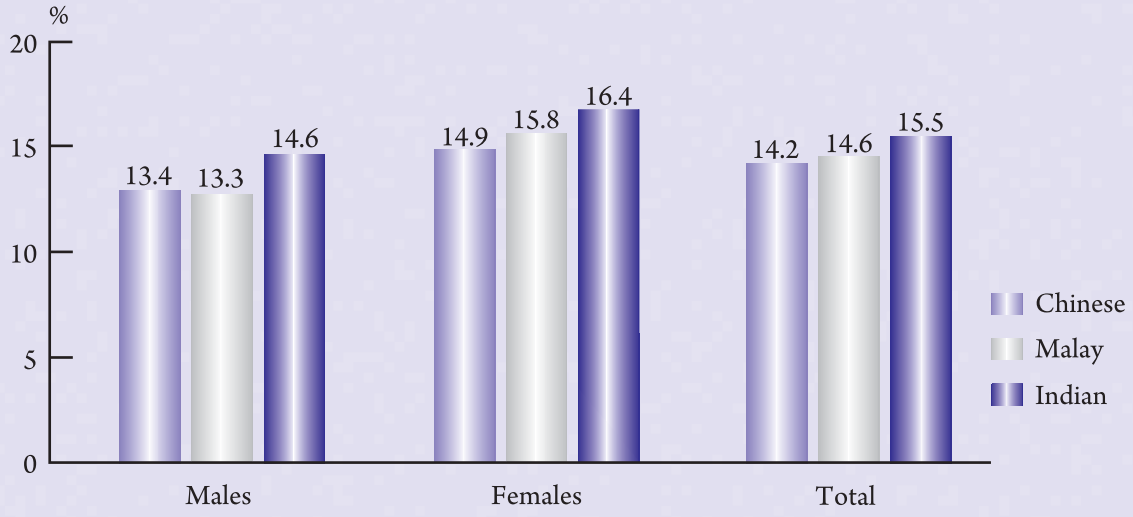
50.3% of female diabetics and 52.5% of male diabetics were unaware of their diabetes status. The proportion of undiagnosed diabetics was higher for Chinese (56.0%) and Malay (43.7%), compared with Indians (40.2%). The mean fasting plasma glucose level in the newly diagnosed diabetics was 7.6 mmol/l in 2010, compared with 8.0 mmol/l in 2004. The mean 2-hour plasma glucose level was 15.0 mmol/l in 2010, compared with 15.4 mmol/l in 2004.

Prevalence of Impaired Glucose Tolerance

Persons with Impaired Glucose Tolerance (IGT) are at high risk of developing diabetes and need regular medical follow-up. These persons may develop complications associated with diabetes such as coronary heart disease and stroke even before onset of clinical diabetes. A recent study has shown that in Singapore, people with IGT have 4.8 times higher risk of developing diabetes compared to people with normal glucose tolerance[2].

The survey found that 14.4% of Singapore residents aged 18 to 69 years had IGT, compared with 12.0% in 2004. The prevalence of IGT was higher in females (15.2%) than in males (13.5%). Among the ethnic groups, the prevalence was highest in Indian (15.5%), followed by Malay (14.6%) and Chinese (14.2%). Graph 1.2

Graph 1.2: Crude prevalence (%) of IGT among Singapore residents aged 18 to 69 years, by gender and ethnic group, 2010



Control of Diabetes in Known Diabetics

Research has proven that good control of blood sugar level is the best way to prevent or delay complications of the diabetes. The Glycated Hemoglobin or the HbA1c test measures the amount of sugar that is attached to the haemoglobin in red blood cells. This test shows the average blood sugar for the past few months (120 days) and unlike the plasma glucose test, it is not affected by short-term changes. The HbA1c value has been shown to predict the risk for development of many of the chronic microvascular complications in diabetes.

The latest Chronic Disease Management Programme (CDMP) protocol on diabetes mellitus

[2] Chew W, Wong SM, Chew SK. Diabetes incidence difference between adults with and without IGT in Singapore IGT follow up study, 1992-2000

recommended optimal glucose control as HbA1c less than 7.0% and acceptable glucose control as HbA1c 7.0% or more but less than 8.0% for the majority of patients with diabetes. HbA1c 8.0% or more is regarded as poor glucose control.

The survey showed that 32.0% of known diabetics had poor blood sugar control in 2010, higher than the proportion of 30.4% in 2004. The proportion with poor blood sugar control among those on drug treatment was 28.6% in 2010, lower than the 29.3% level found in 2004. The mean HbA1c among all known diabetics was 7.7%, about the same as the 7.6% in 2004.

Malay diabetics (47.6%) had the highest proportion of cases with poor blood sugar control, followed by Indian (37.9%) and Chinese diabetics (24.9%).

2
Hypertension

Key Points

- Slightly less than one in four (23.5%) Singapore residents aged 30 to 69 years had hypertension.
- Males (26.4%) had higher hypertension prevalence than females (20.7%).
- Malays (28.0%) had the highest prevalence of hypertension compared with Chinese (23.4%) and Indians (19.3%).
- Prevalence of hypertension increased markedly from age 40 years onwards. More than half (53.4%) of the elderly aged 60 to 69 years had hypertension.
- Slightly more than one in four (26.3%) of Singapore residents who had hypertension had not been previously diagnosed.
- Close to seven in ten (67.4%) known hypertensives had good blood pressure control (systolic blood pressure < 140 mmHg and diastolic blood pressure < 90 mmHg).

Introduction

Hypertension or high blood pressure is a chronic medical condition in which the systemic arterial blood pressure is elevated. Persistent hypertension is one of the risk factors for stroke, myocardial infarction and heart failure. Dietary and lifestyle changes can improve blood pressure control and decrease the risk of associated health complications, although drug treatment may be necessary in patients for whom lifestyle changes prove ineffective or insufficient.

Definition

The WHO Classification criteria for hypertension (WHO, 2003) was used for the survey. Table 2.1

Table 2.1: Diagnostic values for hypertension

Classification	Blood pressure (mmHg)		
	Systolic		Diastolic
Normal	< 140	and	< 90
Hypertension	≥ 140	or	≥ 90

Method Used

The standards prescribed in the WHO MONICA Protocol for measurement of blood pressure was used.

Blood pressure was measured using a standard mercury sphygmomanometer. The subjects were rested adequately before the measurements were taken. Blood pressure was measured with the subject seated and the right arm supported by the table at heart level.

A cuff of suitable size was applied, 2 to 3 cm above the cubital fossa, on the subject's exposed upper arm. The cuff was inflated until the sphygmomanometer reading was 30 mmHg above the level at which the radial pulse disappeared, and then slowly deflated. During this time, the Korotkoff sounds (identifiable as pulses) were monitored with the bell of a stethoscope placed over the brachial artery.

The pressure at which the first Korotkoff sounds were heard was the systolic blood pressure. The diastolic blood pressure was the pressure at which the sounds disappeared.

Two measurements were taken for each subject, with a 30-second interval between them. However, if the systolic pressure between the two measurements differed by more than 25 mmHg or the diastolic pressure by more than 15 mmHg, a third measurement was taken. The mean of the two closest readings was then calculated.

Hypertension Status

The survey found that among Singapore residents aged between 30 and 69 years[1], 23.5% had hypertension[2]. Table 2.2

Table 2.2: Hypertension status (%) of Singapore residents aged 30 to 69 years, by gender, 2010

Hypertension Status	Males	Females	Total
Normal	73.6	79.3	76.5
Hypertension*	26.4	20.7	23.5

* Includes known hypertensives on treatment

[1] The analysis is confined to the 30-69 age group as most cases of hypertension in younger ages are secondary to causes such as kidney diseases, metabolic disorders etc.
[2] 18.9 % of Singapore residents aged between 18 and 69 years old had hypertension in 2010 as compared to 20.1% in 2004, 21.5% in 1998 and 16.1% in 1992.

Prevalence of Hypertension

Hypertension was more common among males (26.4%) than females (20.7%). Overall, Malays had the highest prevalence of hypertension (28.0%), followed by the Chinese (23.4%) and Indians (19.3%). The prevalence of hypertension among females was highest in Malays, followed by Chinese and Indians, whilst the prevalence of hypertension among males was highest in the Chinese, followed by Malays and Indians. The age-specific prevalence for hypertension increased sharply with age. Graph 2.1; Table 2.3

Graph 2.1: Crude prevalence (%) of hypertension among Singapore residents aged 30 to 69 years, by gender and ethnic group, 2010

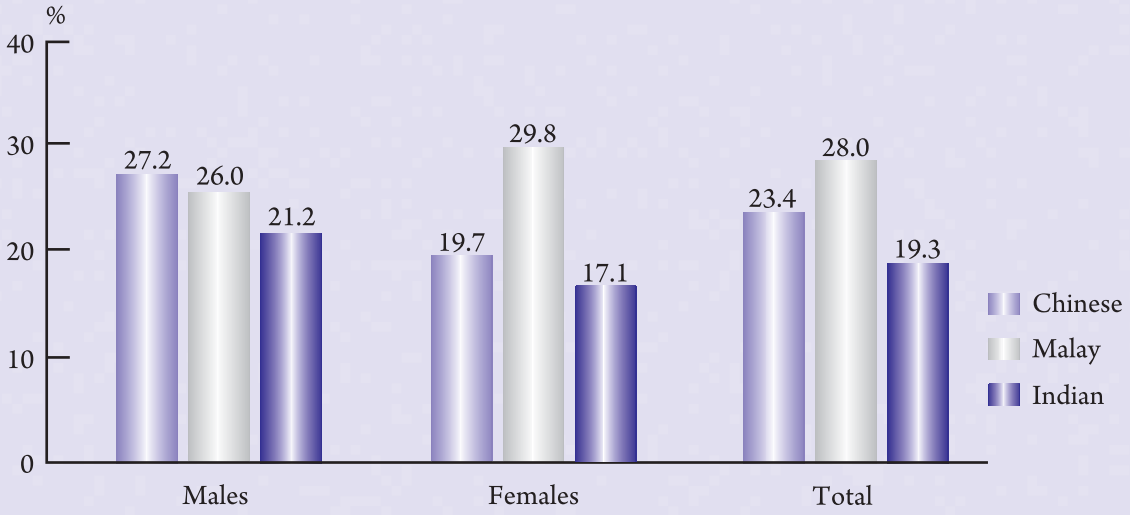


Table 2.3: Age-specific prevalence (%) of hypertension, by gender, 2010

Age (years)	Males	Females	Total
30 - 39	10.9	4.5	7.6
40 - 49	21.9	11.5	16.7
50 - 59	33.1	30.8	31.9
60 - 69	53.8	53.0	53.4
30 - 69	**26.4**	**20.7**	**23.5**

Trends in Hypertension

The crude prevalence of hypertension rose from 22.2% in 1992 to 27.3% in 1998 but declined consecutively in 2004 and 2010. Overall crude hypertension prevalence showed a quadratic decreasing trend with survey year (p-value < 0.01). In terms of age-standardised prevalence, the decline in hypertension prevalence between 1998 and 2010 was even sharper. Table 2.4

Table 2.4: Prevalence (%) of hypertension, by gender and ethnic group, 1992, 1998, 2004 and 2010

Gender / Ethnic Group	Crude prevalence				Age-standardised prevalence (95% Confidence Interval)			
	1992	1998	2004	2010	1992	1998	2004	2010
Total	**22.2**	**27.3**	**24.9**	**23.5**	**27.7** *(25.9, 29.5)*	**32.5** *(30.9, 34.1)*	**26.8** *(25.3, 28.4)*	**23.5** *(21.9, 25.1)*
Gender								
Males	25.7	30.5	29.5	26.4	31.4 *(28.8, 34.0)*	35.3 *(33.1, 37.6)*	25.9 *(29.1, 33.7)*	26.4 *(24.0, 28.8)*
Females	18.7	24.0	20.4	20.7	24.0 *(21.6, 26.4)*	29.6 *(27.4, 31.7)*	22.3 *(20.3, 24.4)*	20.7 *(18.7, 22.7)*
Ethnic Group								
Chinese	22.1	26.9	25.6	23.4	27.5 *(25.5, 29.4)*	31.7 *(30.0, 33.4)*	27.1 *(25.4, 28.9)*	23.4 *(20.7, 26.1)*
Malay	24.0	31.5	22.7	28.0	31.1 *(25.9, 36.3)*	40.5 *(35.9, 45.1)*	25.1 *(20.7, 29.5)*	28.0 *(25.6, 30.4)*
Indian	21.2	24.6	21.6	19.3	24.5 *(18.1, 30.8)*	29.4 *(23.9, 35.0)*	24.1 *(18.9, 29.4)*	19.3 *(16.0, 22.6)*

Prevalence of Undiagnosed Hypertensives

Among those found to have hypertension at the survey, 26.3% had not been previously diagnosed. More male hypertensives (29.2%) than female hypertensives (22.8%) were newly diagnosed.

Malay hypertensives had the highest proportion of newly diagnosed cases (29.6%), followed by Chinese (26.0%) and Indian (23.8%) hypertensives.

The majority (89.4%) of the newly diagnosed hypertensives had Grade 1 hypertension[3]. However, it was noted that a higher proportion of newly diagnosed Malay hypertensives (16.2%) had Grade 2 and 3 hypertension[4] compared with Indian (12.6%) and Chinese (9.3%) hypertensives.

[3] WHO/ISH has defined Grade 1 hypertension as systolic blood pressure of 140-159 mmHg or diastolic blood pressure of 90-99 mmHg *(WHO/ISH, 2003)*

[4] WHO has defined Grade 2 hypertension as systolic blood pressure of 160-179 mmHg or diastolic blood pressure of 100 -109 mmHg and Grade 3 hypertension as systolic blood pressure ≥180 mmHg or diastolic blood pressure ≥110 mmHg *(WHO/ISH, 2003)*

Control of Blood Pressure in Known Hypertensives

The survey found that 67.4% of all known hypertensives had good blood pressure control[5], while the proportion with good control among those on treatment was 69.1%. Among the known hypertensives, Chinese hypertensives (70.0%) had the highest proportion of cases with good blood pressure control, followed by Indian hypertensives (68.9%) and Malay hypertensives (51.5%).

[5] WHO has defined good blood pressure control at the population level as systolic blood pressure < 140 mmHg and diastolic blood pressure < 90 mmHg, although individual blood pressure target would depend on one's cardiovascular risk stratification *(WHO/ISH, 2003)*.

3
Cholesterol

Key Points

- More than one in six (17.4%) Singapore residents aged 18 to 69 years had high total blood cholesterol.
- High total blood cholesterol was more common in males (18.3%) than in females (16.5%).
- Malays had the highest prevalence of high total blood cholesterol (22.6%), followed by Chinese (17.1%) and Indians (12.6%).
- Prevalence of high total blood cholesterol increased with age. The prevalence was highest among older residents aged 50 to 59 years (25.3%).
- The prevalence of low HDL-cholesterol among Singapore residents aged 18 to 69 years was 8.1%.
- The prevalence of high LDL-cholesterol among Singapore residents aged 18 to 69 years was 15.2%.
- The mean total blood cholesterol level, mean HDL-cholesterol level and mean LDL-cholesterol level of Singapore residents aged 18 to 69 years were 5.3 mmol/l, 1.5 mmol/l and 3.2 mmol/l respectively.

Introduction

Hypercholesterolaemia is a major risk factor for coronary heart disease. Elevated blood cholesterol, in particular LDL-cholesterol, causes atherosclerosis and increases the risk for coronary heart disease. HDL-cholesterol has been shown to have a protective effect against coronary heart disease. Low HDL-cholesterol has been shown to be an important independent risk factor for development of coronary heart disease. Diets high in saturated fat is the most common factor for elevated blood cholesterol.

Definition

The classification criteria for blood cholesterol status used in the survey were adapted from the Ministry of Health's Clinical Practice Guidelines on Lipids *(Ministry of Health, Clinical Practice Guidelines on Lipids, 2001)*. Table 3.1

Table 3.1: Classification of blood cholesterol status

Classification	Blood cholesterol concentration	
	mmol/l	mg/dl
Total cholesterol		
Desirable	< 5.2	< 200
Borderline-high	5.2 - 6.1	200 - 239
High	≥ 6.2	≥ 240
HDL-cholesterol		
Desirable	≥ 1.0	≥ 40
Low	< 1.0	< 40
LDL-cholesterol		
Desirable	< 3.3	< 130
Borderline-high	3.3 - 4.0	130 - 159
High	≥ 4.1	≥ 160

Method Used

After an overnight fast of at least 10 hours, subjects had blood taken by venepuncture to determine their fasting total cholesterol, LDL-cholesterol and HDL-cholesterol levels.

All blood specimens were collected in plain tubes and despatched on the same day to the Biochemistry Laboratory in Singapore General Hospital for analysis.

Total blood cholesterol was measured using the Roche modular DP analyser with the enzymatic colorimetric method, while LDL-cholesterol was measured with the homogenous turbidimetric method.

HDL-cholesterol was determined using the same instrument with the homogeneous enzymatic colorimetric method.

Cholesterol Status

The survey found that 17.4% of Singapore residents aged 18 to 69 years had high total cholesterol levels while 34.1% had borderline-high levels and 48.4% desirable levels. Nine out of ten Singapore residents had desirable HDL-cholesterol levels (91.9%). 15.2% of Singapore residents had high LDL-cholesterol levels and 30.2% had borderline-high LDL-cholesterol levels. Table 3.2

Table 3.2: Cholesterol status (%) of Singapore residents aged 18 to 69 years, by gender, 2010

Cholesterol Status	Males	Females	Total
Total cholesterol			
Desirable	46.3	50.5	48.4
Borderline-high	35.4	32.9	34.1
High	18.3	16.5	17.4
HDL-cholesterol			
Desirable	87.3	96.4	91.9
Low	12.7	3.6	8.1
LDL-cholesterol			
Desirable	49.5	59.6	54.6
Borderline-high	33.1	27.4	30.2
High	17.4	13.1	15.2

Prevalence of High Total Cholesterol

High total cholesterol was more common in males (18.3%) than females (16.5%). Malays had the highest prevalence of high total cholesterol (22.6%), followed by Chinese (17.1%) and Indians (12.6%). Prevalence of high total cholesterol levels increased progressively with age, in both genders. Males below 50 years of age tended to have a higher prevalence of high total cholesterol than their female counterparts. However, the reverse was observed in the 50 years and above age groups. Graph 3.1; Table 3.3

Graph 3.1: Crude prevalence (%) of high total cholesterol among Singapore residents aged 18 to 69 years, by gender and ethnic group, 2010

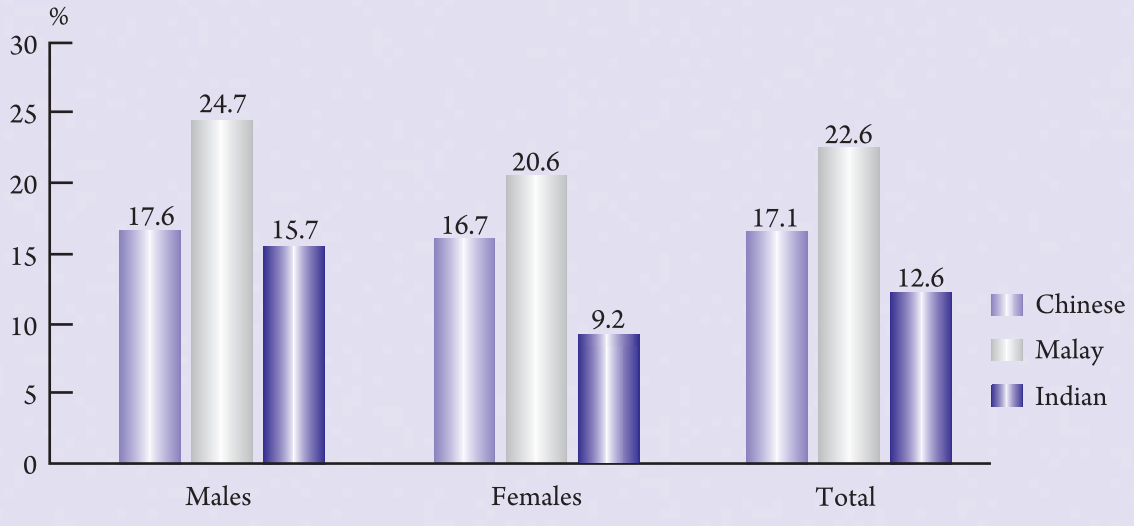


Table 3.3: Age-specific prevalence (%) of high total cholesterol, by gender, 2010

Age (years)	Males	Females	Total
18 - 29	12.0	4.9	8.4
30 - 39	21.2	10.7	15.8
40 - 49	18.5	17.5	18.0
50 - 59	19.8	30.9	25.3
60 - 69	22.9	23.7	23.3
18 - 69	**18.3**	**16.5**	**17.4**

Trends in High Total Cholesterol

The crude prevalence of high total cholesterol rose to peak at 25.4% in 1998 but consistently declined in 2004 and 2010. Overall, high total cholesterol prevalence did not have a statistically significant linear trend over the survey years. Table 3.4

Table 3.4: Prevalence (%) of high total cholesterol, by gender and ethnic group, 1992, 1998, 2004 and 2010

Gender / Ethnic Group	Crude prevalence				Age-standardised prevalence (95% Confidence Interval)			
	1992	1998	2004	2010	1992	1998	2004	2010
Total	**19.4**	**25.4**	**18.7**	**17.4**	**23.6** *(22.2, 25.0)*	**28.2** *(26.9, 29.5)*	**19.1** *(17.9, 20.4)*	**17.4** *(16.2, 18.6)*
Gender								
Males	20.1	27.3	19.8	18.3	23.6 *(21.6, 25.6)*	28.9 *(27.1, 30.7)*	19.7 *(18.0, 21.4)*	18.3 *(16.5, 20.1)*
Females	18.7	23.5	17.5	16.5	23.5 *(21.5, 25.5)*	27.4 *(25.6, 29.2)*	18.6 *(16.9, 20.2)*	16.5 *(14.9, 18.1)*
Ethnic Group								
Chinese	18.7	23.9	18.2	17.1	22.9 *(21.4, 24.5)*	26.6 *(25.2, 28.0)*	18.4 *(17.1, 19.8)*	17.1 *(15.2, 19.0)*
Malay	22.6	35.6	22.8	22.6	27.6 *(23.6, 31.6)*	40.7 *(36.7, 44.6)*	25.1 *(21.3, 28.8)*	22.6 *(20.5, 24.7)*
Indian	21.1	24.4	16.9	12.6	24.5 *(19.2, 29.8)*	26.2 *(21.6, 30.8)*	17.2 *(13.1, 21.2)*	12.6 *(10.3, 14.9)*

Mean Total Cholesterol

The mean total blood cholesterol level of Singapore residents aged 18 to 69 years was 5.3 mmol/l in 2010. This was the same as the 2004 level.

Prevalence of Undiagnosed High Total Cholesterol and Control of Total Cholesterol in Those Known to Have the Condition

The survey included, for the first time, questions on whether participants were ever been told by a doctor (western trained) that they had high blood cholesterol and were prescribed medicine. Based on the responses to the questions and total blood cholesterol concentration from blood specimens, 26.9% of Singapore residents aged 18 to 69 years were found to have high total cholesterol.

Among those found to have high total cholesterol, 44.1% had not been previously diagnosed. Among those known to have the condition, 42.3% had desirable level, 20.1% had borderline-high level and 36.9% had high level.

Prevalence of Low HDL-Cholesterol

The prevalence of low HDL-cholesterol among Singapore residents aged 18 to 69 years was 8.1%. This risk factor was about four times more prevalent in males (12.7%) than females (3.6%). Indians (23.2%) had a higher prevalence of low HDL-cholesterol than Malays (12.0%) and Chinese (5.6%). This ethnic variation was more obvious in males than females. The prevalence of low HDL-cholesterol was consistently higher in males than females for all age groups. Graph 3.2; Table 3.5

Graph 3.2: Crude prevalence (%) of low HDL-cholesterol among Singapore residents aged 18 to 69 years, by gender and ethnic group, 2010

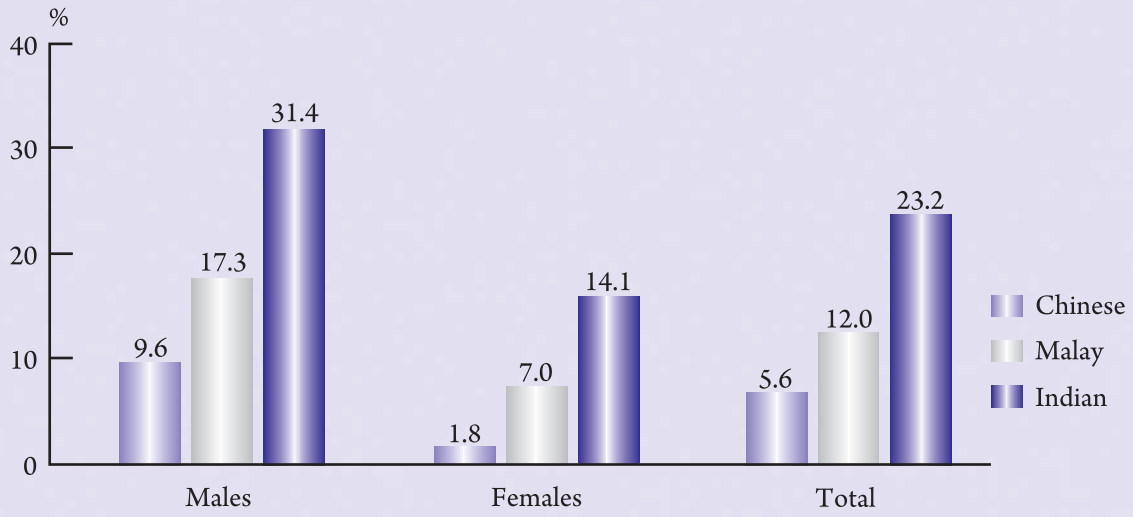


Table 3.5: Age-specific prevalence (%) of low HDL-cholesterol, by gender, 2010

Age (years)	Males	Females	Total
18 - 29	13.5	3.5	8.5
30 - 39	15.3	4.2	9.6
40 - 49	13.3	1.2	7.2
50 - 59	10.6	4.7	7.7
60 - 69	8.5	5.2	6.8
18 - 69	12.7	**3.6**	**8.1**

Trends in Low HDL-Cholesterol

The crude prevalence of low HDL-cholesterol declined between 1992 and 2004 but rose in 2010. Overall, there was no statistically significant declining trend over the survey years. Table 3.6

Table 3.6: Prevalence (%) of low HDL-cholesterol, by gender and ethnic group, 1992, 1998, 2004 and 2010

Gender / Ethnic Group	Crude prevalence				Age-standardised prevalence (95% Confidence Interval)			
	1992	1998	2004	2010	1992	1998	2004	2010
Total	**12.8**	**11.7**	**5.5**	**8.1**	**13.6** *(12.5, 14.7)*	**11.8** *(10.9, 12.7)*	**5.4** *(4.8, 6.2)*	**8.1** *(7.2, 9.0)*
Gender								
Males	20.1	19.0	8.9	12.7	21.3 *(19.4, 23.2)*	19.1 *(17.5, 20.7)*	8.8 *(7.5, 10.0)*	12.7 *(11.1, 14.3)*
Females	5.4	4.4	2.2	3.6	5.8 *(4.7, 6.9)*	4.5 *(3.6, 5.3)*	2.2 *(1.5, 2.8)*	3.6 *(2.8, 4.4)*
Ethnic Group								
Chinese	11.1	9.4	3.9	5.6	11.8 *(10.7, 13.0)*	9.5 *(8.5, 10.4)*	3.8 *(3.1, 4.4)*	5.6 *(4.4, 6.8)*
Malay	19.3	16.7	7.3	12.0	20.5 *(16.8, 24.1)*	17.2 *(14.2, 20.2)*	8.1 *(5.8, 10.5)*	12.0 *(10.4, 13.6)*
Indian	27.5	28.4	19.1	23.2	27.2 *(21.8, 32.7)*	28.3 *(23.6, 33.1)*	18.1 *(13.9, 22.2)*	23.2 *(20.3, 26.1)*

Mean HDL-Cholesterol

The mean HDL-cholesterol level was 1.5 mmol/l in 2010, the same as the 2004 level.

Prevalence of High LDL-Cholesterol

The prevalence of high LDL-cholesterol among Singapore residents aged 18 to 69 years was 15.2%. Males (17.4%) had a higher prevalence of high LDL-cholesterol than females (13.1%). Among the ethnic groups, the prevalence was highest in Malays (22.0%), followed by Indians (15.1%) and Chinese (14.1%). Prevalence of high LDL-cholesterol rose sharply with age in both genders. Females tended to have a lower prevalence of high LDL-cholesterol than males in all age groups except the 50-59 age group. Graph 3.3; Table 3.7

Graph 3.3: Crude prevalence (%) of high LDL-cholesterol among Singapore residents aged 18 to 69 years, by gender and ethnic group, 2010

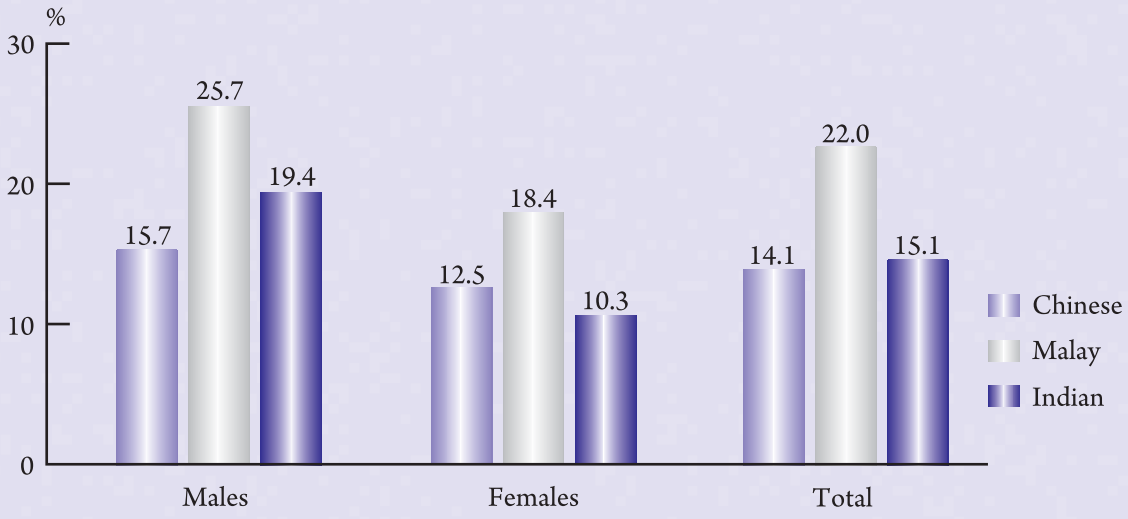


Table 3.7: Age-specific prevalence (%) of high LDL-cholesterol, by gender, 2010

Age (years)	Males	Females	Total
18 - 29	11.3	4.1	7.7
30 - 39	19.3	7.3	13.1
40 - 49	17.5	14.8	16.1
50 - 59	18.1	25.9	22.0
60 - 69	24.7	16.0	20.3
18 - 69	**17.4**	**13.1**	**15.2**

Trends in High LDL-Cholesterol

The crude prevalence of high LDL-cholesterol increased between 1992 and 1998 but consistently decreased in 2004 and 2010. Overall, there was no statistically significant declining trend over the survey years. Table 3.8

Table 3.8: Prevalence (%) of high LDL-cholesterol, by gender and ethnic group, 1992, 1998, 2004 and 2010

Gender / Ethnic Group	Crude prevalence				Age-standardised prevalence (95% Confidence Interval)			
	1992	1998	2004	2010	1992	1998	2004	2010
Total	**22.9**	**26.5**	**19.8**	**15.2**	**27.1** (25.6, 28.5)	**29.1** (27.8, 30.4)	**20.3** (19.1, 21.5)	**15.2** (14.1, 16.3)
Gender								
Males	25.3	30.8	22.4	17.4	28.9 (26.8, 31.1)	32.3 (30.4, 34.2)	22.3 (20.5, 24.1)	17.4 (15.6, 19.2)
Females	20.6	22.3	17.3	13.1	25.2 (23.1, 27.2)	25.7 (24.0, 27.5)	18.3 (16.6, 20.0)	13.1 (11.6, 14.6)
Ethnic Group								
Chinese	21.6	24.2	18.8	14.1	25.7 (24.1, 27.4)	26.6 (25.2, 28.1)	19.1 (17.7, 20.5)	14.1 (12.3, 15.9)
Malay	27.2	39.2	24.4	22.0	32.2 (27.9, 36.5)	43.8 (39.8, 47.7)	26.5 (22.6, 30.3)	22.0 (19.9, 24.1)
Indian	29.6	30.0	22.6	15.1	32.4 (26.6, 38.3)	32.1 (27.2, 37.0)	22.9 (18.4, 27.5)	15.1 (12.6, 17.6)

Mean LDL-Cholesterol

The mean LDL-cholesterol level was 3.2 mmol/l in 2010, compared to 3.4 mmol/l in 2004.

4
Obesity

Key Points

- One in nine (10.8%) Singapore residents aged 18 to 69 years were obese (BMI ≥ 30 kg/m²).
- 12.1% of males and 9.5% of females were obese.
- Obesity was more common among Malays (24.0%) than Indians (16.9%) and Chinese (7.9%).
- Among Singapore residents aged 18 to 69 years, 23.0% were in the high risk Asian BMI category (BMI 27.5 kg/m² or more).

Introduction

Obesity increases the likelihood of various diseases, particularly heart disease, type 2 diabetes, certain types of cancer, and osteoarthritis. Obesity is most commonly caused by a combination of excessive food energy intake, lack of physical activity, and genetic susceptibility. Abdominal fatness (truncal obesity) is a particular area of concern as it is associated with elevated risks to health in comparison to a more peripheral fat distribution.

Definition

The WHO international classification of weight status and abdominal fatness was used *(WHO (B), 1998)*.

Weight status was classified using the Body Mass Index (BMI). BMI = weight (kg) / height (m²). Table 4.1

Table 4.1: Classification of weight status

Classification	Body Mass Index (BMI) (kg/m²)
Underweight	< 18.5
Normal weight	18.5 - 24.9
Overweight	≥ 25
Pre-obese	25 - 29.9
Obese	≥ 30

Abdominal fatness was identified using the waist-hip ratio (WHR). WHR = waist circumference/hip circumference. Table 4.2

Table 4.2: Classification of abdominal fatness, by gender

Gender	Abdominal Fatness
Males	WHR > 1.0
Females	WHR > 0.85

Method Used

The subjects were given clear instructions to wear thin, light clothing. An electronic weighing scale (SECA Model 780) was used to measure weight. The subjects had their weight taken without their shoes on. Height was taken using a stadiometer, which had been mounted on a stable backing board. Each subject was positioned against the board without any footwear and facing straight such that the Frankfurt plane[1] was horizontal. Readings were taken with the examiner's eyes level with the headpiece. Two readings were taken for each subject and the average was calculated. Body Mass Index (BMI) was then calculated from the weight and height measurements.

Waist and hip measurements were taken with a tailor's measuring tape over the subject's thin clothing. Two readings each of waist and hip circumferences were taken for each subject and the average calculated. Waist-hip ratio (WHR) was then calculated from the measurements.

Weight Status

The survey found that among Singapore residents aged 18 to 69 years, 6.4% were underweight (BMI less than 18.5 kg/m^2), while 53.5% had normal weight (BMI 18.5 - 24.9 kg/m^2) and 40.1% were overweight (BMI 25.0 kg/m^2 or more). One in nine (10.8%) Singapore residents were obese (BMI 30.0 kg/m^2 or more). Table 4.3

[1] *Frankfurt plane* is the plane formed when a line is drawn from the external auditory meatus to the orbital bone just below the eye.

Table 4.3: Weight status (%) of Singapore residents aged 18 to 69 years, by gender, 2010

Weight Status	Males	Females	Total
Underweight	4.5	8.2	6.4
Normal weight	48.9	58.0	53.5
Overweight			
Pre-obese	34.5	24.3	29.3
Obese	12.1	9.5	10.8

Prevalence of Obesity

Prevalence of obesity was higher among males (12.1%) than among females (9.5%). Among the ethnic groups, obesity was most prevalent in Malays (24.0%), followed by Indians (16.9%) and Chinese (7.9%). The highest prevalence of obesity was noted in the 30-39 year age group (12.3%). Graph 4.1; Table 4.4

Graph 4.1: Crude prevalence (%) of obesity among Singapore residents aged 18 to 69 years, by gender and ethnic group, 2010

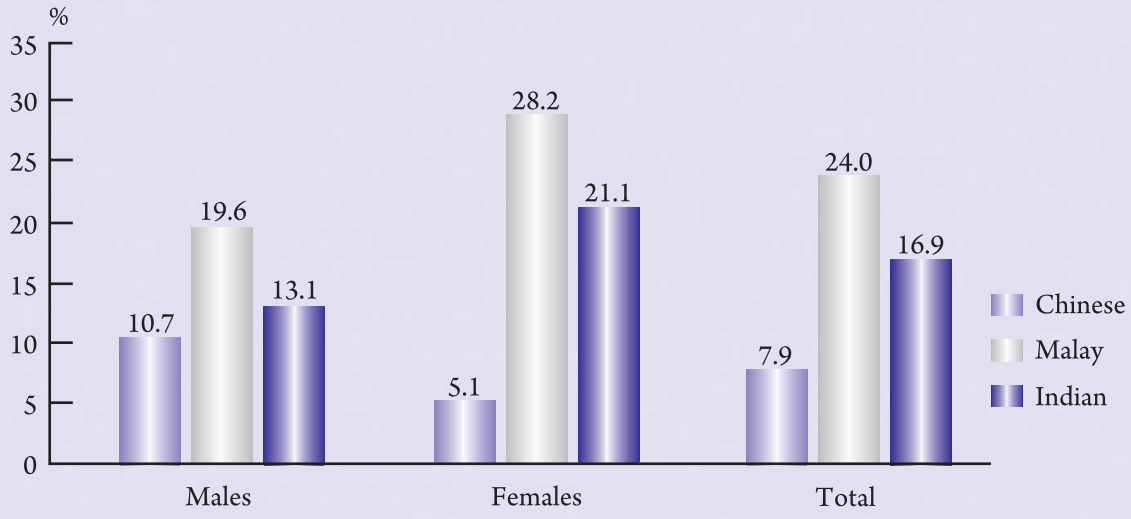


Table 4.4: Age-specific prevalence (%) of obesity, by gender, 2010

Age (years)	Males	Females	Total
18 - 29	15.4	5.8	10.6
30 - 39	16.1	8.7	12.3
40 - 49	10.3	11.1	10.7
50 - 59	9.8	13.2	11.5
60 - 69	5.7	8.7	7.2
18 - 69	**12.1**	**9.5**	**10.8**

Trends in Obesity

The crude prevalence of obesity increased over the period 1992 to 2010. Overall, crude obesity prevalence showed a quadratic increasing trend with survey year (p-value < 0.05). Table 4.5

Table 4.5: Prevalence (%) of obesity, by gender and ethnic group, 1992, 1998, 2004 and 2010

Gender / Ethnic Group	Crude prevalence				Age-standardised prevalence (95% Confidence Interval)			
	1992	1998	2004	2010	1992	1998	2004	2010
Total	**5.1**	**6.0**	**6.9**	**10.8**	**5.5** *(4.7, 6.2)*	**6.3** *(5.6, 7.0)*	**6.8** *(6.0, 7.5)*	**10.8** *(9.8, 11.8)*
Gender								
Males	4.1	5.3	6.4	12.1	4.0 *(3.1, 4.9)*	5.4 *(4.5, 6.3)*	6.3 *(5.2, 7.4)*	12.1 *(10.6, 13.6)*
Females	6.1	6.7	7.3	9.5	6.9 *(5.7, 8.1)*	7.1 *(6.1, 8.1)*	7.2 *(6.1, 8.4)*	9.5 *(8.2, 10.8)*
Ethnic Group								
Chinese	3.5	3.8	4.2	7.9	3.7 *(3.0, 4.4)*	4.0 *(3.4, 4.6)*	4.2 *(3.5, 4.9)*	7.9 *(6.5, 9.3)*
Malay	11.1	16.2	19.1	24.0	13.4 *(10.3, 16.5)*	18.0 *(14.9, 21.1)*	20.0 *(16.6, 23.5)*	24.0 *(21.9, 26.1)*
Indian	11.2	12.2	13.4	16.9	11.5 *(7.6, 15.4)*	12.6 *(9.1, 16.1)*	13.2 *(9.5, 16.8)*	16.9 *(14.3, 19.5)*

Prevalence of Abdominal Fatness

The prevalence of abdominal fatness was more predominant in females (28.0%) than in males (5.6%). Indians (26.1%) had the highest prevalence of abdominal fatness, compared with Malays (18.9%) and Chinese (15.5%). Overall, abdominal fatness rates increased consistently with age. Graph 4.2; Table 4.6

Graph 4.2: Crude prevalence (%) of abdominal fatness among Singapore residents aged 18 to 69 years, by gender and ethnic group, 2010

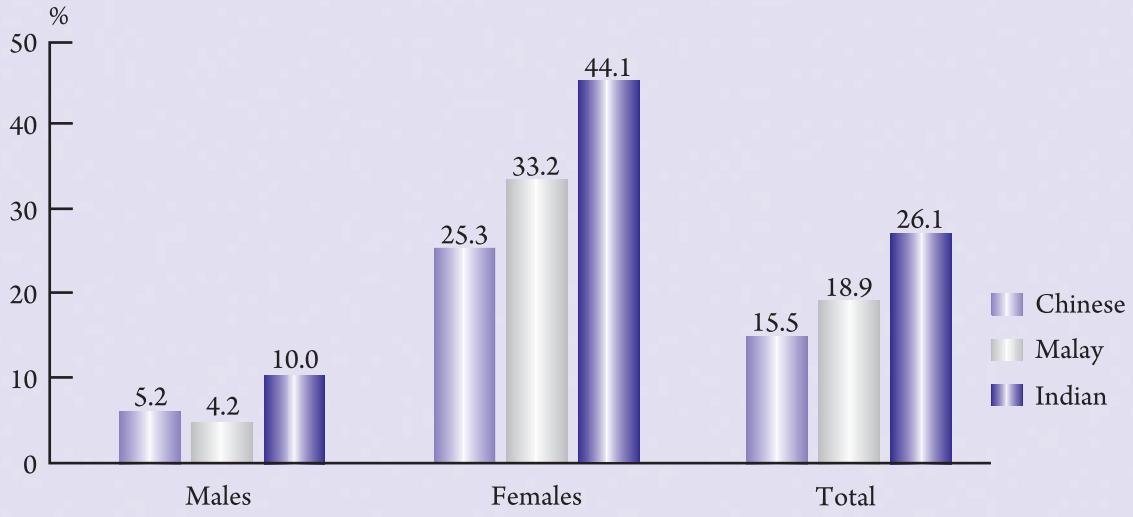


Table 4.6: Age-specific prevalence (%) of abdominal fatness, by gender, 2010

Age (years)	Males	Females	Total
18 - 29	2.4	8.4	5.4
30 - 39	3.5	18.8	11.4
40 - 49	5.7	23.2	14.5
50 - 59	8.8	47.1	27.9
60 - 69	10.0	61.1	36.2
18 - 69	**5.6**	**28.0**	**16.9**

Trends in Abdominal Fatness

The prevalence of abdominal fatness among Singapore residents aged 18 to 69 years rose from 11.9% in 2004 to 16.9% in 2010. There was a significant increase in the age-standardised prevalence of abdominal fatness in both genders, and in all three ethnic groups between 2004 and 2010. Table 4.7

Table 4.7: Prevalence (%) of abdominal fatness, by gender and ethnic group, 1992, 1998, 2004 and 2010

Gender / Ethnic Group	Crude prevalence				Age-standardised prevalence (95% Confidence Interval)			
	1992	1998	2004	2010	1992	1998	2004	2010
Total	**2.6**	**8.1**	**11.9**	**16.9**	**3.4** (2.8, 4.0)	**9.9** (9.1, 10.8)	**13.1** (12.0, 14.1)	**16.9** (15.7, 18.1)
Gender								
Males	0.6	1.8	3.0	5.6	0.7 (0.3, 1.1)	2.3 (1.7, 3.0)	3.5 (2.7, 4.3)	5.6 (4.5, 6.7)
Females	4.6	14.4	20.7	28.0	6.1 (5.0, 7.2)	17.4 (15.9, 19.0)	22.5 (20.7, 24.3)	28.0 (26.0, 30.0)
Ethnic Group								
Chinese	2.1	7.4	11.1	15.5	2.9 (2.2, 3.5)	9.0 (8.1, 10.0)	11.9 (10.8, 13.0)	15.5 (13.6, 17.4)
Malay	3.8	9.5	12.5	18.9	5.2 (3.2, 7.2)	12.4 (9.7, 15.0)	14.3 (11.3, 17.3)	18.9 (16.9, 20.9)
Indian	5.6	12.9	18.7	26.1	6.4 (3.4, 9.4)	13.5 (9.9, 17.1)	19.0 (14.7, 23.2)	26.1 (23.0, 29.2)

New risk categories for obesity

In 2002, WHO convened an expert consultation to review the interpretation of recommended body-mass index cut-off points for determining overweight and obesity in Asian populations. The recommendations were accepted and published in 2004[2]. The expert consultation recommended that the WHO BMI cut-off points should be retained for international classifications of overweight and obesity. The expert consultation also recognised that risks for cardiovascular disease and diabetes mellitus exist at lower body-mass index points for Asian populations and recommended additional ranges of body mass index for determining public health and clinical action. The ranges are given below (Table 4.8).

[2] WHO Expert Consultation. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *Lancet* 2004; 363 : 157 - 163.

Table 4.8: Body-mass index ranges for public health action for Asian populations

Classification	Body Mass Index (BMI) (kg/m²)
Low to moderate risk	18.5 - 27.5
Moderate to high risk	23.0 - 32.5
High to very high risk	27.5 - 37.5

Based on the ranges above, the following risk categories were drawn up (Table 4.9).

Table 4.9: Body-mass index risk categories

Classification	Body Mass Index (BMI) (kg/m²)
Low risk	18.5 - 22.9
Moderate risk	23.0 - 27.4
High risk	≥ 27.5

BMI Risk Category Status

The survey found that among Singapore residents aged 18 to 69 years, 38.3% had low risk BMI (BMI 18.5 - 22.9 kg/m²), 32.3% had moderate risk BMI (BMI 23.0 - 27.4 kg/m²) and 23.0% had high risk BMI (BMI 27.5 kg/m² or more). Table 4.10

Table 4.10: BMI Risk category status (%) of Singapore residents aged 18 to 69 years, by gender, 2010

Risk category	Males	Females	Total
Low risk	32.9	43.6	38.3
Moderate risk	37.9	26.8	32.3
High risk	24.8	21.4	23.0

Prevalence of BMI Risk Categories by Gender and Ethnic Group

Moderate risk

A higher proportion of males were in the moderate risk category compared to females (37.9% vs 26.8%). Indians had the highest proportion of persons in this risk category compared to Chinese and Malays. Table 4.11

Table 4.11: Prevalence (%) of Singapore residents aged 18 to 69 years in the moderate BMI risk category, by gender and ethnic group, 2010

Ethnic group	Males	Females	Total
Chinese	36.9	25.2	30.9
Malay	39.1	30.6	34.8
Indian	44.2	35.8	40.2
Total	**37.9**	**26.8**	**32.3**

High risk

The proportion of males who were in the high risk category was higher than females (24.8% vs 21.4%). Malays had the highest proportion of persons in this risk category compared to Chinese and Indians. Table 4.12

Table 4.12: Prevalence (%) of Singapore residents aged 18 to 69 years in the high BMI risk category, by gender and ethnic group, 2010

Ethnic group	Males	Females	Total
Chinese	22.8	16.1	19.4
Malay	33.8	42.1	38.0
Indian	28.0	38.2	32.8
Total	**24.8**	**21.4**	**23.0**

The Economics of Obesity: Are lower income families at risk of becoming obese?

The role of socio-economic factors in the development of obesity is well established. However, the traditional view of obesity as a consequence of affluence is increasingly being challenged particularly in developed countries. In a study of 11 OECD countries including the United States, large and persistent social inequalities in obesity by education level or socio-economic status exist[3]. Numerous studies done in the United States show that low-income children and adults are far more likely to be overweight than those of greater means[4]. According to the 2009 Korea National Health and Nutrition Examination Survey, the proportion of low income South Koreans who became obese between 1998 and 2009 rose three times faster when compared to their more affluent counterparts.

In Singapore, the 2010 National Health Survey found a modest socio-economic gradient for obesity. The highest prevalence of obese individuals (BMI ≥30.0 kg/m^2) occurred in households earning less than SGD 2,000 per month (14.3%), compared to those earning SGD 6,000 or more per month (8.8%). Similar finding was observed when data obtained on the type of dwelling was reviewed. The proportion of obese individuals was higher among those residing in a 1 to 3 room Housing Development Board (HDB) flat (13.0%) when compared to those residing in 4 to 5 room HDB and other public flats (9.6%), but similar to those residing in private flats, condominiums or landed property (12.8%). Based on education level, a higher proportion of obese individuals were observed among those with PSLE education or below (11.6%) when compared to those who had GCE 'A' Level education and above (9.7%).

Social epidemiologists have recognised that the development of obesity among low income families in developed countries is a reflection of limited choices. In order to stretch their dollar, these families are more likely to consume an excess of nutritionally-depleted, cheap calories from processed foods, junk foods or sodas. The nature of their work may allow them fewer opportunities for physical activity, and lead them to regularly patronize fast food outlets rather than cook their own food. Fortunately, such lifestyle choices, unlike biological or genetic factors, can be amenable to policy interventions. Public education to encourage smarter food choices and physical activity is paramount, as is providing access to healthier and affordable food options.

[3] Marion Devaux and Franco Sassi. Social inequalities in obesity and overweight in 11 OECD countries. *Eur J Public Health* 2011 first published online June 6, 2011.
[4] Youfa Wang and May A. Beydoun. The Obesity Epidemic in the United States — Gender, Age, Socioeconomic, Racial/Ethnic, and Geographic Characteristics: A Systematic Review and Meta-Regression Analysis. *Epidemiol Rev* 2007; 29(1): 6-28.

5
Cigarette Smoking

Key Points

- 14.3% of Singapore residents aged 18 to 69 years smoked cigarettes daily.
- About one in four (24.7%) males were daily smokers compared with one in 24 (4.2%) females.
- Malays had the highest daily smoking prevalence (26.5%), followed by Chinese (12.8%) and Indians (10.1%).
- Daily smoking was most prevalent in young adults aged 18 to 29 years (16.3%) and 30 to 39 years (16.4%) and least prevalent among older adults in the 50 - 59 age group (11.4%) and 60 - 69 age group (11.4%).
- Male daily smokers smoked an average of 12 cigarettes a day whilst female daily smokers smoked an average of 8 cigarettes a day.
- The top reason cited by young smokers in the 18 - 24 age group for smoking was for relaxation or stress relief (35.0%).
- 64.0% of daily smokers indicated that they had abstained from smoking for a period of at least 24 hours in the past twelve months. However, only 16.2% of daily smokers planned to quit smoking within the next twelve months or less.

Introduction

Tobacco is the single greatest cause of preventable death globally. Tobacco use leads most commonly to diseases affecting the heart and lungs, with cigarette smoking being a major risk factor for heart attacks, strokes, chronic obstructive pulmonary disease (COPD), and cancer (particularly lung cancer, cancers of the larynx and mouth, and pancreatic cancer). It also causes peripheral vascular disease and hypertension.

Definition

The WHO classification criteria for cigarette smoking status was used in the survey *(WHO (A), 1998)*. Table 5.1

Table 5.1: Classification of smoking status

Classification	Frequency of cigarette smoking
Daily smoker	Smokes cigarettes at least once a day (including people who smoke every day but have to stop temporarily because of religious fasting or medical reasons)
Occasional smoker	Smokes cigarettes but not every day
Ex-smoker	Formerly a daily smoker, but currently does not smoke at all
Non-smoker	Never smoked before or smoked too little in the past to be regarded as an ex-smoker

Method Used

An interviewer-administered questionnaire was used. The questionnaire was based on WHO's recommended core questions for assessing smoking status *(WHO (A),1998)*.

Smoking Status

The survey showed that among Singapore residents aged 18 to 69 years, 14.3% smoked daily, 2.0% were occasional smokers, 7.7% were ex-smokers and 76.0% were non-smokers. Table 5.2

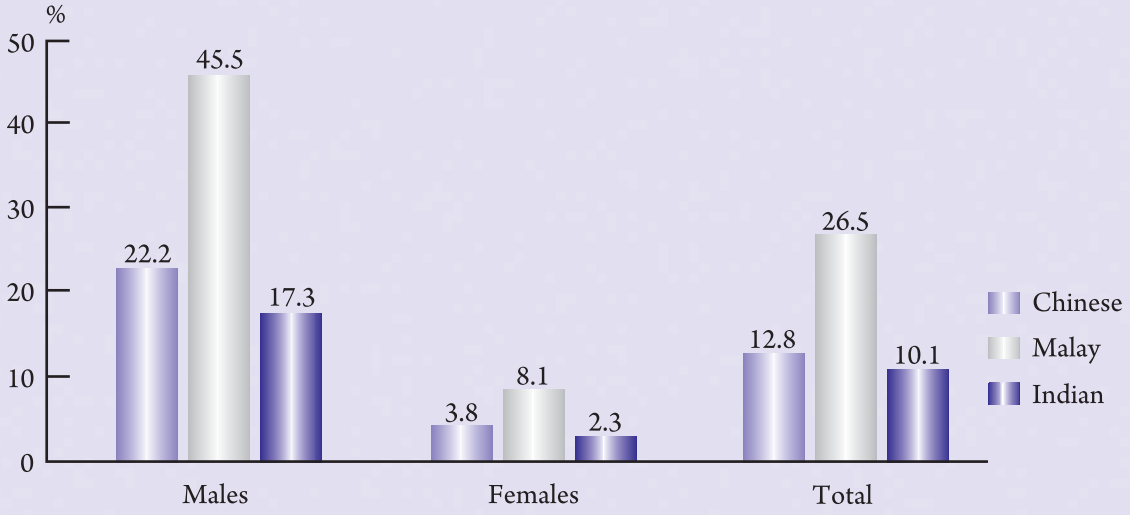
Table 5.2: Smoking Status (%) of Singapore residents aged 18 to 69 years, by gender, 2010

Smoking Status	Males	Females	Total
Daily smoker	24.7	4.2	14.3
Occasional smoker	3.2	0.8	2.0
Ex-smoker	13.1	2.5	7.7
Non-Smoker	59.0	92.6	76.0

Prevalence of Daily Smoking

The crude prevalence of daily smoking among Singapore residents aged 18 to 69 years was 24.7% in males and 4.2% in females. Smoking rate was highest in Malays (26.5%) followed by Chinese (12.8%) and Indian (10.1%). Graph 5.1

Graph 5.1: Crude prevalence (%) of daily smoking among Singapore residents aged 18 to 69 years, by gender and ethnic group, 2010



Smoking prevalence levels were consistently higher among males than females in all age groups. Daily smoking was most prevalent in males aged between 30 and 39 years (29.3%), while in females the highest rate was seen in younger females aged 18 to 29 years old (7.3%). Table 5.3

Table 5.3: Age-specific prevalence (%) of daily smoking, by gender, 2010

Age (years)	Males	Females	Total
18 - 29	25.3	7.3	16.3
30 - 39	29.3	4.3	16.4
40 - 49	24.2	4.8	14.5
50 - 59	21.2	1.5	11.4
60 - 69	22.1	1.2	11.4
18 - 69	**24.7**	**4.2**	**14.3**

Onset of Daily Smoking Among Young Daily Smokers

The mean age at which young smokers aged 18 to 24 years old established their smoking habit was 16 years. Male daily smokers aged 18 to 24 years first tried smoking at the mean age of 15 years while female daily smokers in the same age group first experimented with smoking at the mean age of 16 years.

The top three reasons cited by young smokers in the 18-24 age group for smoking was for relaxation or stress relief (35.0%), addiction/would feel unbearable if they did not smoke (25.1%), and out of habit (20.0%).

Smoking Intensity of Daily Smokers

The mean number of cigarettes consumed by a daily smoker was 12 cigarettes per day. Male smokers tended to smoke more heavily than female smokers (13 cigarettes/day compared with 8 cigarettes/day). Daily smokers in the 50-59 age group smoked the most; 15 cigarettes/day compared to between 10 and 13 cigarettes/day in other age groups.

Trends in Daily Smoking

The crude prevalence of daily smoking declined steadily from 18.3% to 12.6% between 1992 and 2004 but rose to 14.3% in 2010. Overall, daily smoking prevalence exhibited a quadratic increasing trend with survey year (p-value < 0.05). Table 5.4

Table 5.4: Prevalence (%) of daily smoking, by gender and ethnic group, 1992, 1998, 2004 and 2010

Gender / Ethnic Group	Crude prevalence				Age-standardised prevalence (95% Confidence Interval)			
	1992	1998	2004	2010	1992	1998	2004	2010
Total	**18.3**	**15.2**	**12.6**	**14.3**	**18.1** *(16.8, 19.3)*	**15.1** *(14.1, 16.1)*	**12.3** *(11.3, 13.4)*	**14.3** *(13.2, 15.4)*
Gender								
Males	33.2	27.1	21.8	24.7	32.3 *(30.2, 34.5)*	26.9 *(25.1, 28.6)*	21.5 *(19.7, 23.3)*	24.7 *(22.7, 26.7)*
Females	3.1	3.2	3.5	4.2	3.5 *(2.6, 4.3)*	3.2 *(2.5, 3.9)*	3.3 *(2.5, 4.1)*	4.2 *(3.3, 5.1)*
Ethnic Group								
Chinese	16.5	13.8	11.7	12.8	16.6 *(15.2, 18.0)*	13.8 *(12.7, 14.9)*	11.5 *(10.4, 12.6)*	12.8 *(11.1, 14.5)*
Malay	30.8	23.4	18.6	26.5	28.0 *(23.9, 32.0)*	22.1 *(18.7, 25.4)*	17.7 *(14.4, 21.0)*	26.5 *(24.3, 28.7)*
Indian	15.3	16.4	12.1	10.1	15.7 *(11.3, 20.2)*	16.3 *(12.5, 20.2)*	11.8 *(8.3, 15.3)*	10.1 *(8.0, 12.2)*

Quit Intention of Daily Smokers

Daily smokers reported that they had tried quitting smoking an average of two times during the past twelve months preceding the survey. 64.0% of daily smokers indicated that they had abstained from smoking for a period of at least 24 hours in the past twelve months. However, only 16.2% of daily smokers planned to quit smoking within the next twelve months. 38.7% planned to quit smoking in the more distant future. One in four (25.0%) indicated that they did not plan to quit smoking at all but planned to cut down on the number of cigarettes smoked. 16.3% did not plan to quit smoking at all and also did not plan to reduce the number of cigarettes smoked.

The Quest to Quit: Profile of Ex-Smokers in Singapore

In 2010, the proportion of ex-smokers among Singapore residents aged between 18 and 69 years was 7.7%, compared to 5.9% in 2004. Among the ex-smokers, the majority were in the 50-59 age group (27.7%), male (83.9%), Chinese (78.1%), ever married (85.2%), and had GCE 'A' Level education and above (53.5%). Ex-smokers smoked a median of 4.5 years before quitting.

The majority (92.4%) managed to cease smoking successfully on their own, with the rest having availed of smoking cessation programmes (1.2%) or pharmacologic treatment (1.2%). It is worth pointing out, however, that this group of ex-smokers who quit unassisted may represent individuals with stronger motivations compared to those who continue to smoke. Current smokers may likely require the use of nicotine replacement therapy or seek professional help should they decide to stop smoking.

Nonetheless, this observation is not unexpected and is in line with what has been observed as early as 1986 when the American Cancer Society reported that: "Over 90% of the estimated 37 million people who have stopped smoking in this country (United States) since the Surgeon General's first report linking smoking to cancer have done so unaided."[1] Numerous recent studies continue to show that most ex-smokers ceased smoking successfully without assistance (e.g., "cold turkey") and actually found it less difficult than expected[2].

The survey finding on local ex-smokers is in contrast to the commonly held belief that a serious attempt at smoking cessation is difficult and involves using nicotine replacement therapy or drugs, or seeking professional help. Incorporating such positive data in smoking cessation campaigns may re-assure smokers that quitting smoking could be done.

Close to two in ten ex-smokers in Singapore quit smoking for no particularly reason or decided to give up smoking voluntarily (18.5%). The most common reasons cited by ex-smokers for quitting were for health reasons or had experienced ill effects (32.5%), learnt about the harmful effects of smoking (9.1%) and cigarettes had become too expensive (8.2%).

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[1] American Cancer Society (1986) Cancer facts and figures.
Available: http://www.cancer.org/downloads/STT/CAFF2003PWSecured.pdf. Accessed 25 August 2009.
[2] Chapman S and MacKenzie R. The global research neglect of unassisted smoking cessation: causes and consequences. *PLoS Med* 2010; 7(2):e1000216.

6
Alcohol Consumption

Key Points

- 2.6% of Singapore residents aged 18 to 69 years consumed alcohol regularly.
- Among Singapore residents who consumed alcohol, the most preferred alcoholic drink was beer (48.9%), followed by wine (27.5%), spirits (15.2%), and stout (1.4%).
- Binge drinking was reported by 8.7% of Singapore residents (males: 13.3%, females: 4.3%).
- Binge drinking was more common among Indians (9.6%) and Chinese (9.2%) compared to Malays (4.9%).
- Young adults in the 18 - 29 age group (15.5%) were the most likely to binge drink compared to other age groups.

Introduction

Excessive alcohol consumption is associated with an increased risk of hypertension, stroke and certain cancers. It may lead to liver cirrhosis, inflammation of the pancreas and damage to the brain and heart. Excessive alcohol intake can also cause mental disorders such as alcohol dependence and other alcohol-induced disorders such as amnesia.

Definition

Alcohol consumption was classified according to the frequency of alcohol intake. Table 6.1

Table 6.1: Classification of alcohol consumption

Classification	Frequency of alcohol consumption
Regular drinker	> 4 days a week
Frequent Drinker	1-4 days a week
Occasional drinker	≤ 3 days a month

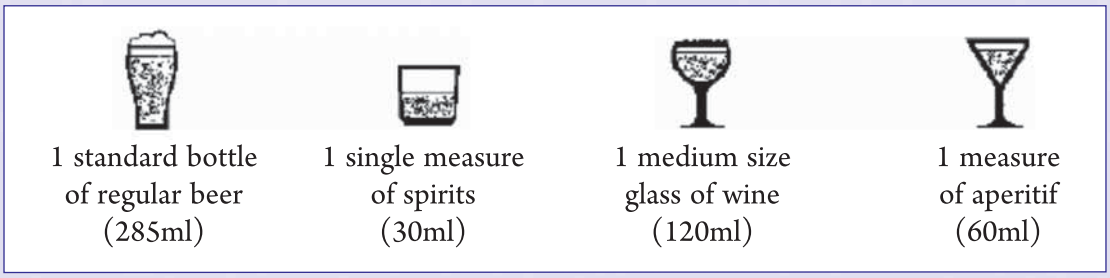
Binge drinking was defined as consumption of five or more alcoholic drinks[1] for males or four or more alcoholic drinks for females in any one drinking session during the past month preceding the survey.

[1] One alcoholic drink refers to 1 can/small bottle (~285 mls) of beer or 1 glass (~120 mls) of wine or 1 measure (~30 mls) of spirits.

Method Used

An interviewer-administered questionnaire was used. Respondents were shown a card with pictures of standard alcoholic drinks (Diagram 1) and asked questions on alcohol consumption within the past twelve months at the time of the survey.

Diagram 1: Alcohol Card



Alcohol Consumption

The survey found that among Singapore residents aged between 18 and 69 years old, 2.6% consumed alcohol regularly, 7.6% frequently and 35.9% occasionally and 54.0% were non-drinkers. Table 6.2

Table 6.2: Alcohol consumption (%) of Singapore residents aged 18 to 69 years, by gender, 2010

Alcohol Consumption	Males	Females	Total
Non-drinker	42.3	65.5	54.0
Occasional drinker	42.2	29.7	35.9
Frequent drinker	11.8	3.4	7.6
Regular drinker	3.8	1.5	2.6

Prevalence of Regular Alcohol Consumption

Among Singapore residents aged between 18 and 69 years, 3.8% of males and 1.5% of females consumed alcohol regularly. A higher proportion of Indian (3.3%) and Chinese (2.9%) consumed alcohol regularly compared to Malays (0.6%).

Regular alcohol intake was most common in males in the 60-69 age group (5.2%) while in females, regular alcohol intake was most common in the 30-39 age group (2.4%). Graph 6.1; Table 6.3

Graph 6.1: Crude prevalence (%) of regular alcohol consumption among Singapore residents aged 18 to 69 years, by gender and ethnic group, 2010

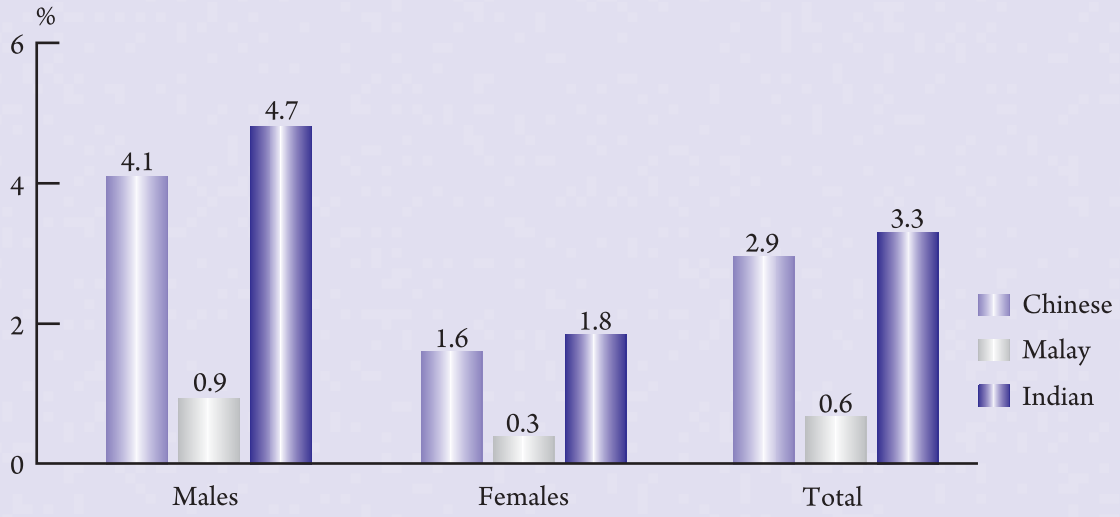


Table 6.3: Age-specific prevalence (%) of regular alcohol consumption, by gender, 2010

Age (years)	Males	Females	Total
18 - 29	1.8	0.6	1.2
30 - 39	3.7	2.4	3.0
40 - 49	4.2	1.5	2.8
50 - 59	4.9	1.0	2.9
60 - 69	5.2	2.1	3.6
18 - 69	**3.8**	**1.5**	**2.6**

Trends in Regular Alcohol Consumption

The crude prevalence of regular alcohol consumption has remained below 3% except in 2004 when the level rose to 3.2%. Overall, there was no statistically significant linear trend over the survey years. Table 6.4

Table 6.4: Prevalence (%) of regular alcohol consumption, by gender and ethnic group, 1992, 1998, 2004 and 2010

Gender / Ethnic Group	Crude prevalence				Age-standardised prevalence (95% Confidence Interval)			
	1992	1998	2004	2010	1992	1998	2004	2010
Total	**2.7**	**2.6**	**3.2**	**2.6**	**3.2** (2.6, 3.8)	**2.8** (2.4, 3.3)	**3.3** (2.8, 3.9)	**2.6** (2.1, 3.1)
Gender								
Males	4.6	4.3	4.3	3.8	5.6 (4.6, 6.7)	4.7 (3.9, 5.6)	4.6 (3.7, 5.6)	3.8 (2.9, 4.7)
Females	0.7	0.8	2.0	1.5	0.8 (0.4, 1.2)	0.9 (0.5, 1.3)	2.0 (1.4, 2.6)	1.5 (1.0, 2.0)
Ethnic Group								
Chinese	3.2	2.9	3.6	2.9	3.7 (3.0, 4.4)	3.1 (2.6, 3.7)	3.7 (3.0, 4.3)	2.9 (2.0, 3.8)
Malay	0.3	0.5	0.6	0.6	0.3 (0.0, 0.8)	0.6 (0.0, 1.2)	0.7 (0.0, 1.4)	0.6 (0.2, 1.0)
Indian	1.6	2.9	2.7	3.3	2.0 (0.3, 3.7)	3.3 (1.4, 5.1)	3.5 (1.5, 5.5)	3.3 (2.1, 4.5)

Prevalence of Binge Drinking

The prevalence of binge drinking was 8.7% in 2010. Binge drinking was more prevalent among males (13.3%) than females (4.3%). Binge drinking was more common among Indians (9.6%) and Chinese (9.2%) compared to Malays (4.9%). Both males and females had the largest proportions of binge drinkers in the 18-29 age group. Graph 6.2 and Table 6.5

Graph 6.2: Crude prevalence (%) of binge drinking among Singapore residents aged 18 to 69 years, by gender and ethnic group, 2010

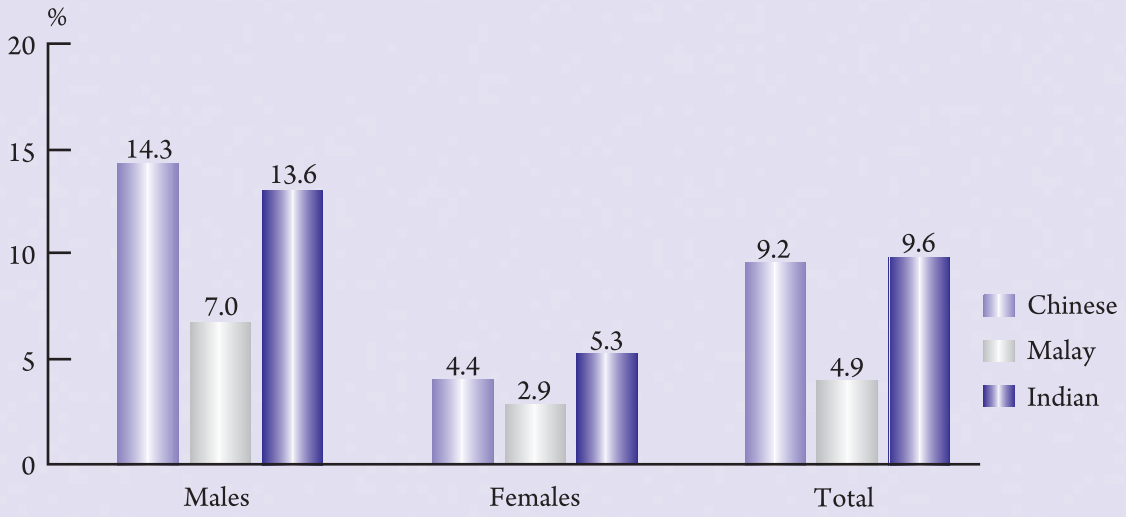


Table 6.5: Age-specific prevalence (%) of binge drinking, by gender, 2010

Age (years)	Males	Females	Total
18 - 29	18.7	12.2	15.5
30 - 39	13.5	2.6	7.9
40 - 49	13.6	1.0	7.3
50 - 59	9.8	2.9	6.3
60 - 69	7.3	0.4	3.8
18 - 69	**13.3**	**4.3**	**8.7**

Preferred Alcoholic Drink

Among Singapore residents who consumed alcohol, the most preferred alcoholic drink was beer (48.9%), followed by wine (27.5%), spirits (15.2%), and stout (1.4%). 5.6% of the drinkers did not have any specific preference for alcoholic drinks.

7
Physical Activity

Key Points

- One in five (19.0%) Singapore residents aged 18 to 69 years engaged in regular exercise during their leisure time.
- Leisure-time regular exercise was more prevalent among males (22.8%) than females (15.2%).
- Indians had the highest prevalence of leisure-time regular exercise (21.7%), followed by Chinese (19.2%) and Malays (15.3%).
- Including physical activity at work (paid or unpaid work including household chores) and walking or cycling while travelling to and from places in addition to leisure-time physical activity, 60.9% of Singapore residents had sufficient total physical activity.
- More than half (54.0%) of Singapore residents did not exercise during their leisure time.
- The three main reasons for not doing any leisure-time sports, exercise or walking were "No time due to work / family commitment" (58.0%), "Too lazy" (13.3%) and "No interest" (8.1%).

Introduction

Physical activity is important for maintaining good health. It has been shown to reduce the risk of premature death in general and in particular the risk of coronary heart disease, hypertension, and diabetes mellitus. In addition physical activity improves mental health, prevents unhealthy weight gain and is important for the health of muscles, bones and joints *(US Department of Health and Human Services 1996; Wellington National Health Committee 1998)*. Participation in physical activity can also improve the quality of life among children and adults *(Hassmen et al. 2000; Laforge et al. 1999)*

Definition

The classification for leisure-time physical activity was adapted from the American College of Sports Medicine's classification *(American College of Sports Medicine, 1998)*. Table 7.1

Table 7.1: Classification of leisure-time physical activity participation

Classification	Frequency of leisure-time physical activity
Regular exercise	Participation in any form of sports or exercise for at least 20 minutes per occasion, for 3 or more days a week
Occasional exercise	Participation in any form of sports or exercise for at least 20 minutes per occasion, for less than 3 days a week
No exercise (physically inactive)	No participation in any form of sports or exercise that lasted for at least 20 minutes per occasion

Method Used

An interviewer-administered questionnaire was used. Respondents were asked about the type, frequency, duration and intensity of physical activity that they did during their leisure time. Sedentary respondents were asked their main reason for not doing any leisure-time physical activity.

Leisure-time Physical Activity Participation Status

The survey found that among Singapore residents aged 18 to 69 years, nearly one-fifth (19.0%) exercised regularly, 27.0% exercised occasionally, and about half (54.0%) did not exercise at all. Table 7.2

Table 7.2: Physical activity participation status (%) of Singapore residents aged 18 to 69 years, by gender, 2010

Physical Activity Participation	Males	Females	Total
Regular exercise	22.8	15.2	19.0
Occasional exercise	30.3	23.9	27.0
No exercise (physically inactive)	47.0	60.9	54.0

Prevalence of Leisure-time Regular Exercise

A higher proportion of males (22.8%) than females (15.2%) exercised regularly. Among the ethnic groups, Indians had the highest participation level in regular exercise (21.7%), followed by Chinese (19.2%) and Malay (15.3%). Prevalence of regular exercise decreased from 22.0% among young adults aged 18 to 29 years to 15.0% among adults in the 30-39 age group before increasing to peak at 24.5% among older adults aged 60 to 69 years. This pattern was seen in both males and females. Graph 7.1; Table 7.3

Graph 7.1: Crude prevalence (%) of leisure-time regular exercise among Singapore residents aged 18 to 69 years, by gender and ethnic group, 2010

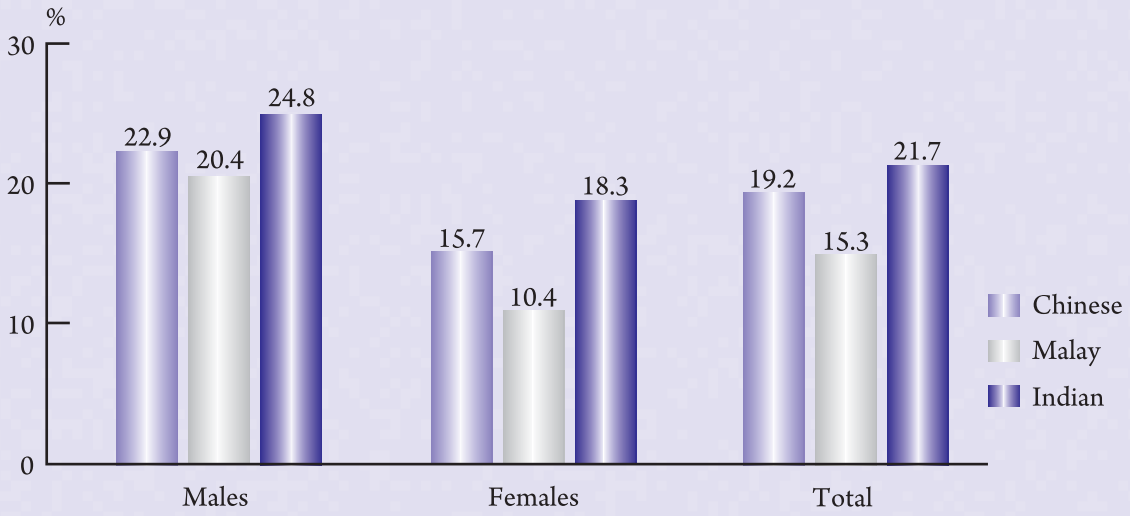


Table 7.3: Age-specific prevalence (%) of regular exercise, by gender, 2010

Age (years)	Males	Females	Total
18 - 29	28.1	15.9	22.0
30 - 39	16.7	13.4	15.0
40 - 49	17.7	15.7	16.7
50 - 59	23.9	14.7	19.3
60 - 69	32.2	17.3	24.5
18 - 69	**22.8**	**15.2**	**19.0**

Trends in Leisure-time Regular Exercise

The crude prevalence of leisure-time regular exercise increased over the period 1992 to 2010. Overall, the leisure-time regular exercise prevalence showed a quadratic increasing trend with survey year (p-value < 0.01). Table 7.4

Table 7.4: Prevalence (%) of leisure-time regular exercise, by gender and ethnic group, 1992, 1998, 2004 and 2010

Gender / Ethnic Group	Crude prevalence				Age-standardised prevalence (95% Confidence Interval)			
	1992	1998	2004	2010	1992	1998	2004	2010
Total	**13.6**	**16.8**	**17.0**	**19.0**	**14.4** (13.3, 15.6)	**17.7** (16.7, 18.8)	**16.9** (15.8, 18.1)	**19.0** (17.7, 20.3)
Gender								
Males	18.6	20.1	21.4	22.8	19.1 (17.3, 21.0)	21.2 (19.6, 22.9)	21.4 (19.6, 23.2)	22.8 (20.8, 24.8)
Females	8.4	13.6	12.6	15.2	9.6 (8.2, 11.0)	14.3 (12.9, 15.7)	12.6 (11.1, 14.0)	15.2 (13.6, 16.8)
Ethnic Group								
Chinese	12.9	15.9	16.4	19.2	14.1 (12.8, 15.4)	16.9 (15.7, 18.1)	16.6 (15.3, 17.9)	19.2 (17.3, 21.3)
Malay	14.5	18.7	19.9	15.3	13.3 (10.2, 16.3)	18.4 (15.3, 21.5)	18.0 (14.7, 21.3)	15.3 (13.3, 16.9)
Indian	19.1	24.0	18.4	21.7	19.7 (14.8, 24.6)	24.3 (19.8, 28.8)	17.0 (12.9, 21.0)	21.7 (18.8, 24.6)

Prevalence of Leisure-time Physical Inactivity

Among Singapore residents aged 18 to 69 years old, 54.0% did not participate in any leisure-time physical activity. A higher proportion of females (60.9%) than males (47.0%) were physically inactive during their leisure time. Among the ethnic groups, close to six in ten Malays (59.6%), six in ten Indians (56.9%) and about one in two Chinese (52.7%) did not engage in leisure-time physical activity. Physical inactivity increased with age, with the prevalence rising from 38.8% among adults aged between 18 and 29 years to 67.0% among adults aged between 60 and 69 years. Table 7.5

Table 7.5: Age-specific prevalence (%) of leisure-time physical inactivity, by gender, 2010

Age (years)	Males	Females	Total
18 - 29	30.0	47.6	38.8
30 - 39	48.4	63.3	56.1
40 - 49	55.8	59.1	57.4
50 - 59	49.3	66.7	58.0
60 - 69	56.8	76.6	67.0
18 - 69	**47.0**	**60.9**	**54.0**

Reasons for Not Doing Any Leisure-time Physical Activity

Singapore residents aged 18 to 69 years old who did not participate in any sports or exercise during their leisure time cited the following three main reasons for their physical inactivity:

1) "No time due to work / family commitment" (58.0%);
2) "Too lazy" (13.3%); and
3) "No interest" (8.1%).

Total Physical Activity

There have been changes in international guidelines to recognise that physical activity with benefits to health could also occur in domains such as walking while commuting to and from places, and performing household chores and at work. The physical activity could be accumulated in bouts of at least ten minutes throughout the day. The recommendation for sufficient total physical activity is at least 30 minutes of at least moderate-intensity activities or equivalent for at least five days a week (150 minutes per week).

Physical activity participation in all three domains - at work (paid or unpaid work including household chores), walking while travelling to and from places and leisure-time physical activity - was assessed using the Global Physical Activity Questionnaire (GPAQ) developed by the World Health Organization (WHO). The three levels of total physical activity classification are low, moderate and high. The criteria for these levels are in Table 7.6.

Table 7.6: Classification of total physical activity

Classification	Criteria
High	Vigorous-intensity activity on at least 3 days achieving a minimum of at least 1,500 MET*-minutes/week **OR** 7 or more days of any combination of walking, moderate- or vigorous- intensity activities achieving a minimum of at least 3,000 MET-minutes per week.
Moderate	Not meeting the criteria for the "high" category, but meeting any of the following criteria is classified in this category: 3 or more days of vigorous intensity activity of at least 20 minutes per day **OR** 5 or more days of moderate-intensity activity or walking of at least 30 minutes per day **OR** 5 or more days of any combination of walking, moderate- or vigorous- intensity activities achieving a minimum of at least 600 MET-minutes per week.
Low	Not meeting any of the above mentioned criteria.

[* MET (Metabolic Equivalents) is the ratio of a person's working metabolic rate relative to the resting metabolic rate. One MET is defined as the energy cost of sitting quietly, and is equivalent to a caloric consumption of 1 kcal/kg/hour.]

In 2010, the proportion of Singapore residents aged 18 to 69 years who engaged in high, moderate and low total physical activity were 20.4%, 40.5% and 39.1% respectively. Table 7.7

Table 7.7: Total physical activity level (%) of Singapore residents aged 18 to 69 years, by gender, 2010

Total physical activity level	Males	Females	Total
High	23.0	17.8	20.4
Moderate	35.5	45.4	40.5
Low	41.5	36.7	39.1

Three in five Singaporeans (60.9%) had sufficient (high and moderate) total physical activity. A higher proportion of females (63.2%) had sufficient total physical activity than males (58.5%). Among the ethnic groups, Indians (65.3%) had the highest level of sufficient total physical activity, followed by the Malays (64.8%) and Chinese (59.8%). Young adults in the 18 - 29 age group had the highest level of sufficient total physical activity (64.0%). Graph 7.2; Table 7.8

Graph 7.2: Crude prevalence (%) of sufficient* total physical activity level among Singapore residents aged 18 to 69 years, by gender and ethnic group, 2010

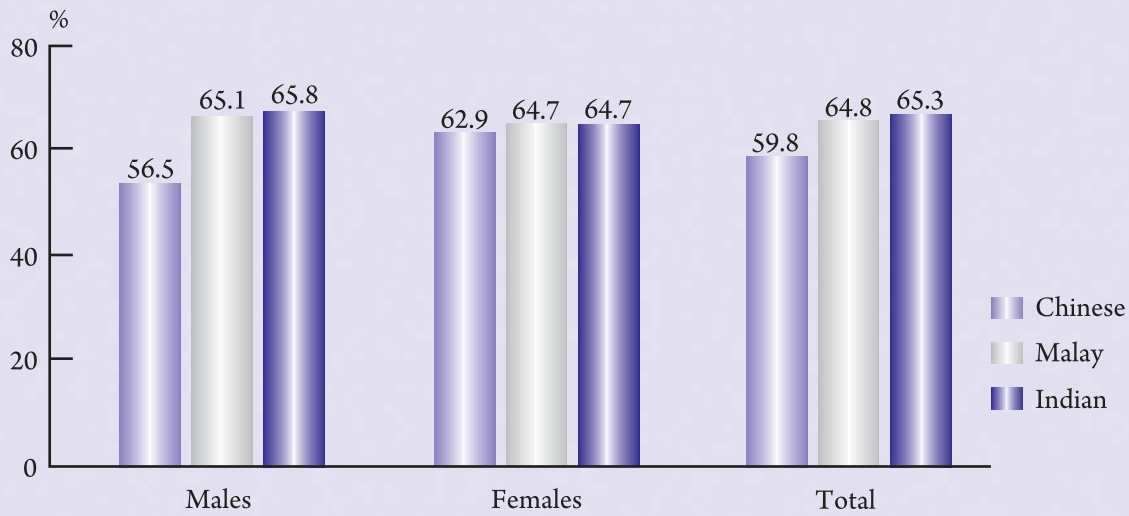


Table 7.8: Age-specific prevalence (%) of sufficient* total physical activity level, by gender, 2010

Age (years)	Males	Females	Total
18 - 29	66.9	61.1	64.0
30 - 39	55.2	60.6	57.9
40 - 49	54.2	71.8	63.0
50 - 59	56.7	61.1	58.9
60 - 69	59.9	60.0	60.0
18 - 69	**58.5**	**63.2**	**60.9**

*Sufficient: High and moderate

8
Asthma

Key Points

- One in ten (10.5%) of Singapore residents aged 18 to 69 years reported that they previously been diagnosed with asthma ("lifetime asthma").
- 11.7% of males and 9.4% of females had lifetime asthma.
- The prevalence of lifetime asthma was the highest in Malays (15.6%), followed by Indians (12.3%) and Chinese (9.5%).
- The prevalence of reported current asthma was 3.9% among Singapore residents aged 18 to 69 years.
- 3.4% of males and 4.4% of females had current asthma.
- Malays (7.9%) and Indians (7.3%) had higher prevalence of current asthma than Chinese (2.8%).
- Young adults aged 18 to 29 years had the highest prevalence of lifetime asthma (19.2%) and current asthma (5.2%).
- Close to half (47.9%) of Singapore residents with reported current asthma had no asthma attack or episode during the twelve months preceding the survey.

Introduction

Asthma is a chronic disease involving the respiratory system in which the airways occasionally constrict and become inflamed, often in response to one or more triggers such as an allergen, environmental tobacco smoke, perfume, cold air, exertion, or emotional stress. The airway narrowing causes symptoms such as wheezing, shortness of breath, chest tightness, and coughing. The symptoms of asthma, which can range from mild to life threatening, can usually be controlled with a combination of drugs and environmental changes. Most people who have asthma are able to manage the disease and can live normal, active lives.

Method Used

An interviewer-administered questionnaire was used. Respondents were asked whether they had ever been told by a doctor (western trained) that they had asthma and still have asthma. Respondents who answered "yes" to the first question were classified as having "reported lifetime asthma", and those who answered "yes" to both questions were classified as having "reported current asthma". Additional questions on visits to A&E or a doctor's clinic for urgent treatment and use of asthma medication were also asked.

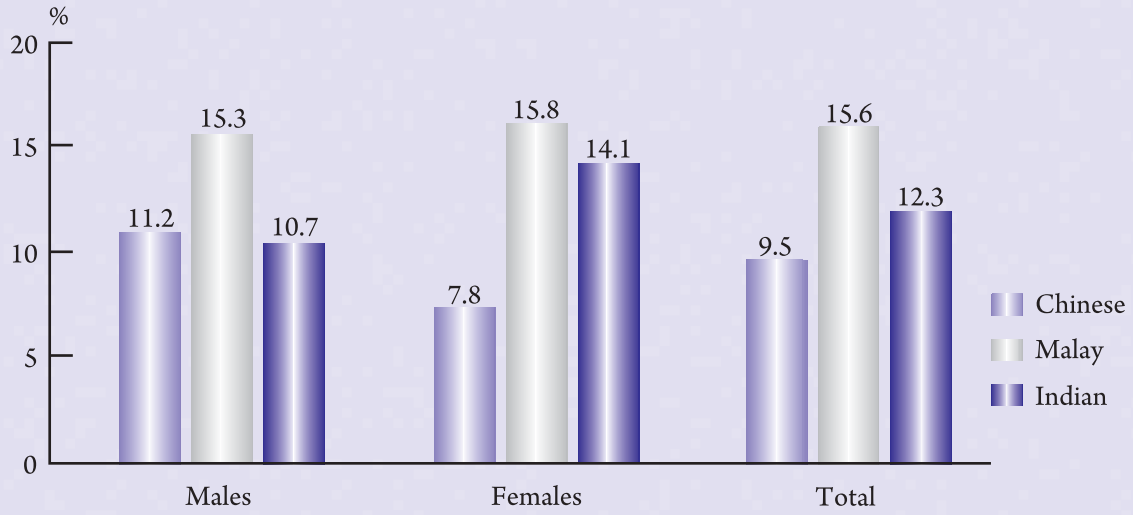
Prevalence of Reported Lifetime Asthma

Overall, 10.5% of Singapore residents aged 18 to 69 years reported that they had lifetime asthma. Males (11.7%) were more likely than females (9.4%) to have reported lifetime asthma. Malays (15.6%) had the highest prevalence of reported lifetime asthma followed by Indians (12.3%) and Chinese (9.5%). Lifetime asthma was most prevalent in young adults aged 18 to 29 years (19.2%). Table 8.1; Graph 8.1

Table 8.1: Age-specific prevalence (%) of reported lifetime asthma, by gender, 2010

Age (years)	Males	Females	Total
18 - 29	23.9	14.6	19.2
30 - 39	15.5	10.2	12.8
40 - 49	5.2	6.3	5.8
50 - 59	4.5	9.9	7.2
60 - 69	5.9	2.3	4.1
18 - 69	**11.7**	**9.4**	**10.5**

Graph 8.1: Crude prevalence (%) of reported lifetime asthma among Singapore residents aged 18 to 69 years, by gender and ethnic group, 2010



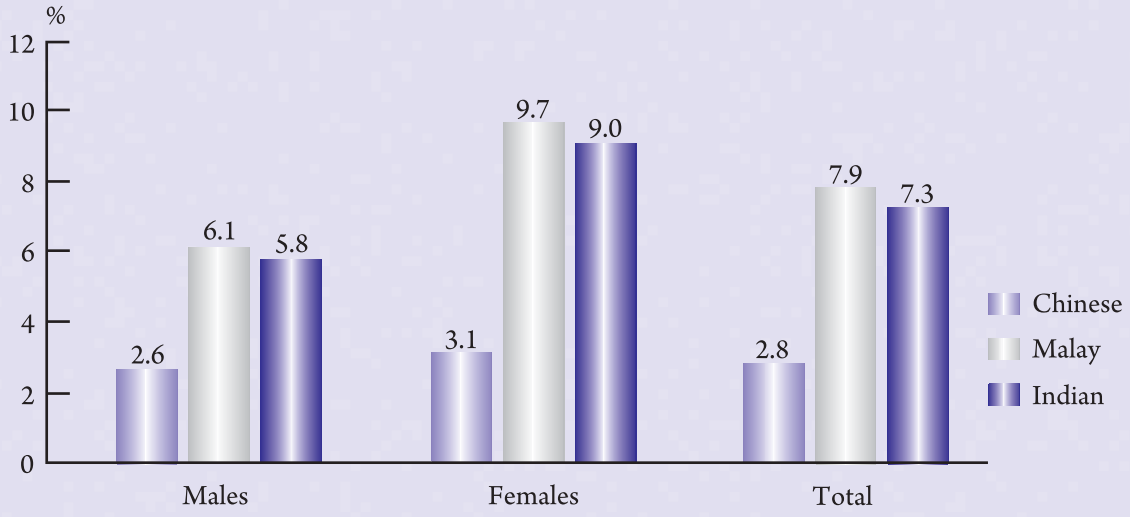
Prevalence of Reported Current Asthma

The prevalence of reported current asthma among Singapore residents aged 18 to 69 years was 3.9%. Current asthma was more common in the younger age groups and was most prevalent in those aged 18 to 29 years (5.2%). 3.4% of males and 4.4% of females reported that they had current asthma. Malays (7.9%) had the highest prevalence, followed by Indians (7.3%) and Chinese (2.8%). Table 8.2; Graph 8.2

Table 8.2: Age-specific prevalence (%) of reported current asthma, by gender, 2010

Age (years)	Males	Females	Total
18 - 29	5.1	5.4	5.2
30 - 39	4.8	4.6	4.7
40 - 49	1.5	4.4	2.9
50 - 59	1.8	5.2	3.5
60 - 69	3.9	1.2	2.5
18 - 69	**3.4**	**4.4**	**3.9**

Graph 8.2: Crude prevalence (%) of reported current asthma among Singapore residents aged 18 to 69 years, by gender and ethnic group, 2010



Asthma Control

47.9% of Singapore residents with reported current asthma indicated that they had no asthma attack or episode during the twelve months preceding the survey. Among those who reported current asthma and had an asthma attack or episode during the twelve months preceding the survey, 70.7% indicated that they did not have to visit A&E or a doctor's clinic for urgent treatment of asthma. 37.4% reported that they did not need to use inhaler medication for quick relief of asthma symptoms over the past one month preceding the survey and 70.0% reported that the symptoms of asthma did not make it difficult for them to stay asleep. 50.0% reported that they were on a long term preventive medication for asthma everyday.

9 Chronic Kidney Disease (Renal Impairment)

Key Points

- One in forty three (2.3%) Singapore residents aged 18 to 69 years had renal impairment, as defined by estimated GFR less than 60 mL/min/1.73m^2.
- 2.8% of males and 1.7% of females had renal impairment.
- Prevalence of renal impairment increased with age and was highest among senior residents aged 55 to 69 years (6.8%).
- Malays had higher renal impairment prevalence (4.1%) compared with Chinese (2.0%) and Indians (2.0%).
- The prevalence of renal impairment was higher among diabetic residents relative to those without the condition (7.4% versus 1.5%). The same was found for hypertensive residents (7.6% versus 1.0%). Renal impairment was also more common among overweight residents compared with those with normal weight (2.8% versus 1.9%).

Introduction

Chronic kidney disease (CKD) is becoming recognised as a public health issue globally *(Eknoyan G et al. 2004)*. Hypertension and diabetes are the two major causes of CKD. Given the pathogenic progression of kidney disease, patients with CKD are at higher risk for progression to the end stage renal disease (ESRD) - a condition requiring dialysis or kidney transplantation to maintain patients' long-term survival. Early detection and intervention of CKD can prevent or slow kidney disease progression and should reduce the burden of the disease *(Ruggenenti P et al. 2001; Remuzzi G et al. 2002)*.

Definition

CKD was determined based on estimated glomerular filtration rate (eGFR). GFR was estimated from serum creatinine concentration using the Modification of Diet in Renal Disease (MDRD) Equation for standardised creatinine defined as follows:

$$175 \times (\text{serum creatinine in mg/dL})^{-1.154} \times (\text{Age})^{-0.203} \times (0.742, \text{if subject is female})$$

The classification system established by the United States' National Kidney Foundation Kidney Disease Outcome Quality Initiative (K/DOQI) Advisory Board classifies CKD into five stages as follows:

Stage 1 : eGFR >=90 mL/min/1.73 m^2 and presence of kidney damage for ≥ 3 months;

Stage 2 : eGFR 60-89 mL/min/1.73 m^2 and presence of kidney damage for ≥ 3 months;

Stage 3 : eGFR 30-59 mL/min/1.73 m^2;

Stage 4 : eGFR 15-29 mL/min/1.73 m^2; and

Stage 5 : eGFR < 15 mL/min/1.73 m^2.

According to K/DOQI, kidney damage is defined as pathologic abnormalities or makers of damage, including abnormalities in blood or urine tests or imaging studies. CKD stages 3 to 5 (eGFR < 60 mL/min/1.73 m^2) is also known as renal impairment.

Method Used

The blood specimens for creatinine measurements were collected in plain tubes by venepuncture and despatched on the same day to the Biochemistry Laboratory in Singapore General Hospital for centrifugation followed by analysis. Serum creatinine was measured using the Roche modular DP analyser based on the Jaffe reaction, a kinetic colorimetric assay which was standardised against ID-MS.

While spot untimed urine samples were collected in sterile containers for determination of albumin using the MICRAL-TEST, an Accu-chek product, the readings were not used for CKD classification in this report due to limitations of specificity with respect to the duration of kidney damage in the survey. As such, only the prevalence of Stage 3 CKD and above, that is, renal impairment, is reported in this survey.

Prevalence of Rental Impairment (CKD stages 3 to 5)

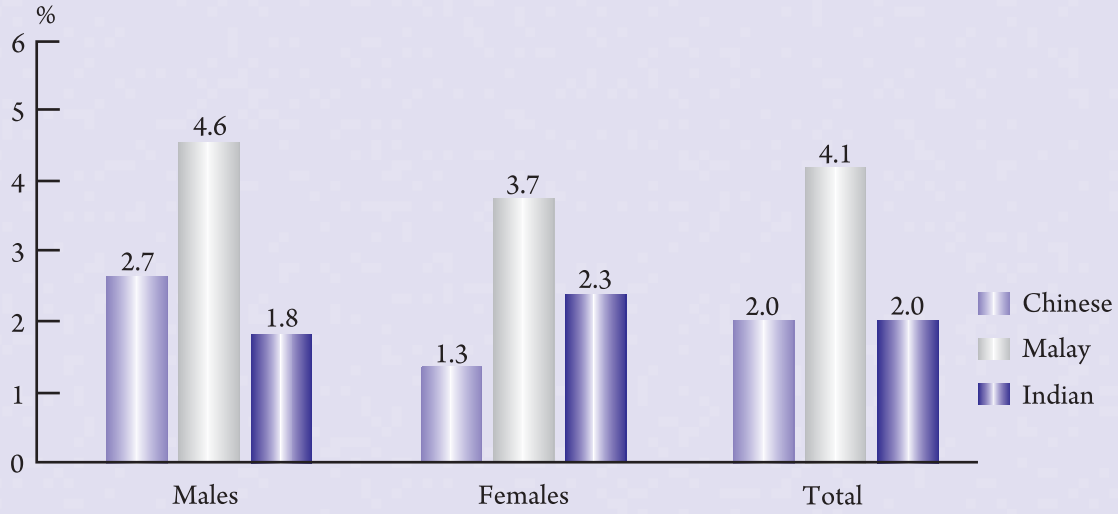
The prevalence of renal impairment among Singapore residents aged 18 to 69 years was 2.3%. Males (2.8%) had a slightly higher prevalence of renal impairment than females (1.7%).

The prevalence of renal impairment increased with age from 0.4% among those under 40 years of age to 2.0% among those aged 40 to 54 years and 6.8% among senior residents aged 55 to 69 years. Malays had higher renal impairment prevalence (4.1%) compared with Chinese (2.0%) and Indians (2.0%). Table 9.1; Graph 9.1

Table 9.1: Age-specific prevalence (%) of renal impairment, by gender, 2010

Age (years)	Males	Females	Total
18 - 39	0.2	0.5	0.4
40 - 54	3.2	0.8	2.0
55 - 69	8.0	5.7	6.8
18 - 69	**2.8**	**1.7**	**2.3**

Graph 9.1: Crude prevalence (%) of renal impairment among Singapore residents aged 18 to 69 years, by gender and ethnic group, 2010



Renal impairment was more common among diabetic residents (7.4%) relative to non-diabetic residents (1.5%). Hypertensive residents similarly had higher renal impairment prevalence (7.6%) compared with their non-hypertensive counterparts (1.0%).

Overweight residents (BMI ≥25 kg/m^2) also had higher renal impairment prevalence (2.8%) than residents with normal weight (BMI 18.5 to 24.9 kg/m^2) whose renal impairment prevalence was 1.9%.

10
Hearing Loss

Key Points

- The prevalence of at least mild hearing loss among Singapore residents aged 18 to 69 years was 26.5% for at least three out of four frequencies of 500 Hz, 1000 Hz, 2000 Hz and 4000 Hz affected in at least one ear.
- The prevalence of at least moderate hearing loss among Singapore residents aged 18 to 69 years was 9.7% for at least three out of four frequencies of 500 Hz, 1000 Hz, 2000 Hz and 4000 Hz affected in at least one ear.
- Prevalence of at least mild and moderate hearing loss increased rapidly with age.

Introduction

Hearing loss imposes limitations on the individual's ability to interact with the community. As a consequence of hearing loss, the ability to communicate with other people, to listen and respond to speaking is reduced. For hearing-impaired individuals, the reduced ability to communicate with ease could result in frustration, withdrawal from social activities, reduced functional health and need for support services. A hearing problem which is not fully recognised and compensated for may impede the hearing-impaired individual's quality of life, and may even limit potential employment prospects, and restrict participation in relationships.

Definition

Reference was made to the American Speech-Language-Hearing Association and the British Society of Audiology and the following three criteria were used to classify hearing loss detected at two screening sound levels of 25 dB and 40 dB:

(1) At least three out of four frequencies of 500 Hz, 1000 Hz, 2000 Hz and 4000 Hz affected in at least 1 ear;

(2) At least three out of four frequencies of 500 Hz, 1000 Hz, 2000 Hz and 4000 Hz affected in better hearing ear; and

(3) All four frequencies (500 Hz,1000 Hz, 2000 Hz and 4000 Hz) affected in both ears.

Where a criterion is met for screening level of 25 dB, the hearing loss is defined as at least mild hearing loss (≥25 dB) for the criterion. Where a criterion is met for screening level of 40 dB, the hearing loss is defined as at least moderate hearing loss (≥40 dB) for the criterion.

Method Used

Audiological assessments were performed in a quiet room using a portable sound level meter (Welch Allyn Audioscope 3 Screening Audiometer). Air conduction hearing thresholds were measured in each ear, at four frequencies: 500Hz, 1000Hz, 2000Hz and 4000Hz for three screening sound levels: 20 dB, 25 dB and 40 dB.

Subjects were screened to the baseline screening sound level of 20 dB for all four frequencies in both ears. Where a subject indicated that he/she could not hear at least one out of the four frequencies in at least one ear, subject was screened at the next higher sound level of 25 dB at all four frequencies in both ears. Similarly, where a subject indicated that he/she could not hear at least one out of the four frequencies in at least one ear at 25 dB, the subject was screened at 40 dB for all four frequencies in both ears.

Prevalence of Hearing Loss

The prevalence of at least mild hearing loss among Singapore residents aged 18 to 69 years was 26.5% for at least three frequencies out of four affected in at least one ear, 11.6% for at least three frequencies out of four affected in better ear and 5.3% for all four frequencies affected in both ears. The corresponding prevalence of at least moderate hearing loss were 9.7%, 2.9% and 0.8%. Table 10.1

Table 10.1: Crude prevalence (%) of hearing loss among Singapore residents aged 18 to 69 years, by severity level, 2010

Definition	At least mild hearing loss (≥ 25 dB)	At least moderate hearing loss (≥ 40 dB)
At least 3 frequencies out of 4 affected in at least 1 ear	26.5%	9.7%
At least 3 frequencies out of 4 affected in better ear	11.6%	2.9%
All 4 frequencies affected in both ears	5.3%	0.8%

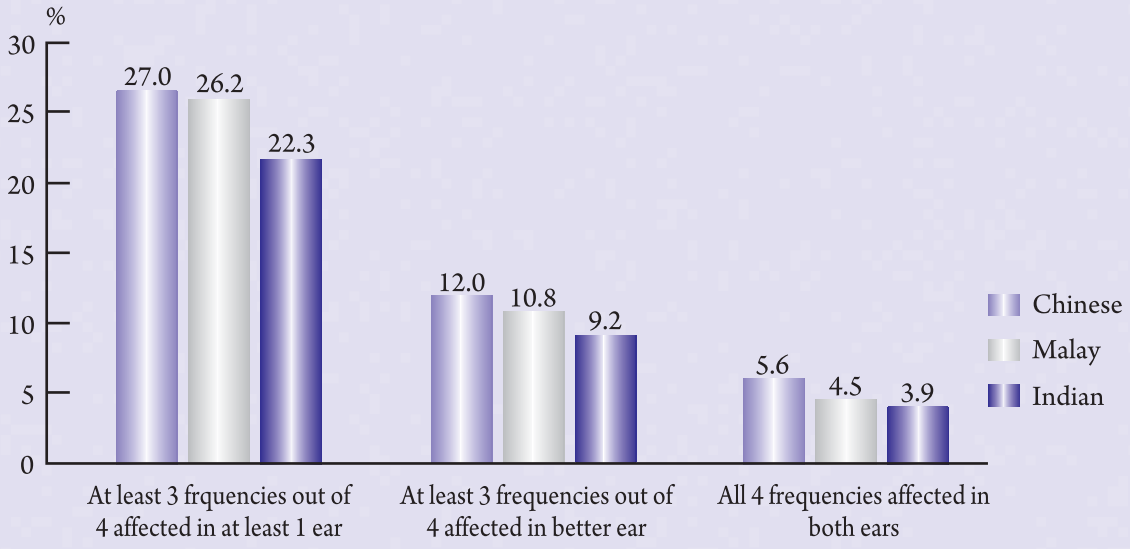
Prevalence of hearing loss increased rapidly with age for at least mild hearing loss for the three definitions. The same was observed for at least moderate hearing loss for at least three frequencies out of four affected in at least one ear and all four frequencies affected in both ears. Table 10.2

Table 10.2: Age-specific prevalence (%) of hearing loss, by severity level, 2010

Age (years)	At least 3 frequencies out of 4 affected in at least 1 ear		At least 3 frequencies out of 4 affected in better ear		All 4 frequencies affected in both ears	
	At least mild hearing loss (≥ 25 dB)	At least moderate hearing loss (≥ 40 dB)	At least mild hearing loss (≥ 25 dB)	At least moderate hearing loss (≥ 40 dB)	At least mild hearing loss (≥ 25 dB)	At least moderate hearing loss (≥ 40 dB)
18 - 29	12.7%	4.8%	4.3%	1.2%	0.7%	0.1%
30 - 39	12.4%	4.3%	2.3%	0.7%	1.1%	0.2%
40 - 49	26.4%	8.9%	10.2%	2.8%	4.5%	1.2%
50 - 59	36.6%	14.9%	20.1%	4.0%	8.8%	1.9%
60 - 69	64.2%	23.2%	32.9%	9.6%	18.6%	1.0%

At least mild hearing loss was most common among Chinese for the three definitions. Indians had the lowest prevalence of at least mild hearing loss for all the three definitions. Graph 10.1

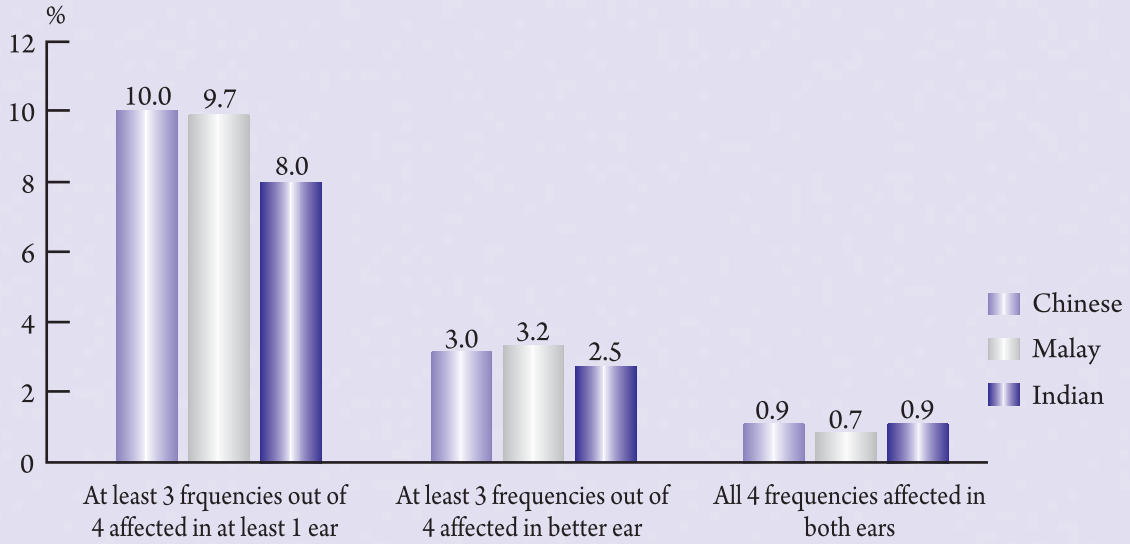
Graph 10.1: Crude prevalence (%) of at least mild hearing loss among Singapore residents aged 18 to 69 years, by ethnic group, 2010



The prevalence of at least moderate hearing loss for at least three frequencies out of four affected in at least one ear was about the same in Chinese (10.0%) and Malays (9.7%). Indians had lower prevalence at 8.0%.

Among the ethnic groups, the prevalence of at least moderate hearing loss was about 3.0% for at least three frequencies out of four affected in better ear and less than 1% for all four frequencies in both ears. Graph 10.2

Graph 10.2: Crude prevalence (%) of at least moderate hearing loss among Singapore residents aged 18 to 69 years, by ethnic group, 2010



Awareness of Hearing Loss and Use of Hearing Aids

The majority of residents with at least mild or moderate hearing loss did not feel they had the condition and use of hearing aid was not common. Close to eight in ten residents with at least mild hearing loss for the three definitions (75.3% to 79.8%) reported that they did not feel they had hearing loss. Not more than one in sixty of them (0.6% to 1.7%) wore a hearing aid.

Between six and seven in ten residents with at least moderate hearing loss for the three definitions (56.9% to 73.2%) indicated that they did not feel they had hearing loss. At most one in thirty with the condition (1.1% to 3.3%) wore a hearing aid.

11
Breast Cancer Screening

Key Points

- Nine in ten (90.9%) Singapore woman residents aged 50 to 69 years were aware of mammography as a screening test for breast cancer.
- Better educated women tended to be more aware of mammography compared to their less educated counterparts. The awareness level rose from 87.2% among those with PSLE or lower education to 98.0% among those with GCE 'A' level or higher education.
- Two in three (66.3%) Singapore women in the 50 - 69 age group reported that they had gone for mammography at least once.
- Close to four in ten (39.6%) women aged 50 to 69 years reported that they had undergone mammography within the last two years, in accordance with the recommended frequency.
- The top three reasons cited by women in the 50 - 69 age group who had never undergone mammography were:
  1. "Not necessary as I am healthy" (38.9%);
  2. "Painful test" (12.5%); and
  3. "No time due to work/family commitment" (10.3%).

Introduction

Breast cancer is the most common cancer among Singapore women today. For the five-year period from 2005 to 2009, the age-standardised incidence of breast cancer was 60.0 per 100,000 women per year *(NRDO, 2011)* and an average of 354 women died from the disease each year.

Breast cancer has been linked to a number of risk factors including age, family history of breast cancer, smoking, high-fat diets and obesity. The earlier breast cancer is diagnosed the better the chances for successful treatment. As early breast cancer usually does not present with any symptoms, screening for early disease is therefore very important. Mammography for women over 50 years old is widely accepted as appropriate and beneficial.

Method Used

An interviewer-administered questionnaire was used. Female subjects were asked on their knowledge and practice of mammography, and the reasons for not going for mammography (if applicable).

Knowledge and Practice of Mammography

90.9% aged 50 to 69 years were aware of mammography. Younger women aged 50 to 59 years (94.0%) were more likely to be aware of mammography compared to their older peers in the 60-69 age group (85.5%). A higher proportion of Indian women (92.0%) were aware of mammography compared with Chinese women (91.6%) and Malay women (85.3%). A higher proportion of never-married women (94.8%) than ever-married women (90.5%) demonstrated awareness of mammography.

Better educated women tended to be aware of mammography compared to their less educated counterparts. The awareness level rose from 87.2% among those with PSLE or lower education to 98.0% among those with GCE 'A' level or higher education.

Two in three Singapore women in the 50 - 69 age group (66.3%) reported that they had gone for mammography at least once. A higher proportion of Chinese women (68.3%) and Indian women (73.0%) had undergone mammography compared with their Malay counterparts (48.6%). Never-married women (71.8%) were more likely to have undergone mammography than ever-married women (65.8%). Women with higher education were also more likely to have had the screening at least once.

Overall two in five women aged 50 to 69 years (39.6%) reported that they had undergone mammography within the last two years, in accordance with the recommended frequency of mammography in this age group. Table 11.1

Table 11.1: Knowledge and practice of mammography among Singapore women aged 50 to 69 years, by socio-demographic and socio-economic characteristics (%), 2010

Characteristic	Knowledge of mammography	Ever undergone mammography	Had mammography within the last 2 years
Total	**90.9%**	**66.3%**	**39.6%**
Age (years)			
50 - 59	94.0%	66.2%	40.4%
60 - 69	85.5%	66.6%	38.1%
Ethnic group			
Chinese	91.6%	68.3%	41.7%
Malay	85.3%	48.6%	22.9%
Indian	92.0%	73.0%	41.9%
Marital status			
Never married	94.8%	71.8%	39.0%
Ever married	90.5%	65.8%	39.7%
Educational qualification			
No formal education/primary/PSLE	87.2%	61.8%	29.7%
Secondary, GCE 'O'/'N' level	91.6%	66.2%	41.0%
GCE 'A' Level, polytechnic & other diploma, degree & professional qualification	98.0%	77.0%	59.8%

Trends in Knowledge and Practice of Mammography

The proportion of women aged 50 to 69 years who knew about mammography as a means of screening for breast cancer increased greatly between 2004 and 2010 (79.9% vs 90.9%). The proportion of women who had gone for mammogram at least once was 66.3% in 2010, up from 54.2% in 2004. The proportion of women who had mammography within the last two years rose from 36.4% in 2004 to 39.6% in 2010.

Reasons For Not Doing A Mammography

Of those women aged 50 to 69 years who had never undergone mammography, the commonly cited reasons were:

1. "Not necessary as I am healthy" (38.9%);
2. "Painful test" (12.5%);
3. "No time due to work/family commitment" (10.3%);
4. "Not at risk" (8.7%); and
5. "Never thought about it" (7.5%).

12
Cervical Cancer Screening

Key Points

- 87.1% women aged 25 to 69 years were aware of Pap smear tests.
- Women with secondary or higher education (91.6%-92.8%) were also more likely to know what a Pap smear was compared with those with PSLE or lower education (69.3%).
- Seven in ten (71.3%) women reported that they ever had a Pap smear test.
- 47.9% of women aged 25 to 69 years had undergone the test within the past three years, in accordance with the recommended frequency.
- The top three reasons cited by women who had never had a Pap smear test were:
  1. "Not necessary as I am healthy" (25.4%);
  2. "Never heard about Pap smear test" (11.5%); and
  3. "Not sexually active" (10.9%).

Introduction

Cervical cancer is the seventh most common cancer among women in Singapore today. In the five-year period from 2005 to 2009, the age-standardised incidence of cervical cancer in the resident population was 7.8 per 100,000 women *(NRDO, 2011)* and an average of 73 women died from the disease each year.

Major risk factors for cervical cancer include having sexual intercourse at an early age, having multiple sexual partners and infection with human papilloma virus or HPV (the cause of genital warts). Long term consumption of combined oral contraceptive pills and cigarette smoking are also risk factors. If cervical cancer is detected before it becomes invasive, it is almost certainly curable. Screening for cervical cancer with the Papanicolaou (Pap) smear test is inexpensive and is widely accepted as being effective and beneficial.

Method Used

An interviewer-administered questionnaire was used. Female subjects were asked on their knowledge and practice of Pap smear tests, and the reasons for not performing a Pap smear test (if applicable).

Awareness and Practice of PAP Smear Testing

The survey found that 87.1% women aged 25 to 69 years were aware of Pap smear tests. A higher proportion of Chinese women (87.6%) were aware of Pap smear tests compared with Malay and Indian women. Ever-married women (88.7%) were more likely than never-married women (79.8%) to be aware of Pap smear. Women with secondary or higher education (91.6%-92.8%) were also more likely to know what a Pap smear was compared with those with PSLE or lower education (69.3%).

Among women aged 25 to 69 years, 71.3% had undergone Pap smear tests. Chinese women (72.3%) were more likely to have undergone Pap smear tests compared to Malay women (67.2%) and Indian women (67.5%). Women aged 35 to 49 years were the most likely to have undergone Pap smear tests (80.8%).

The proportion of women who had undergone Pap smear tests was more than three times higher among ever-married women (81.0%), compared with never-married women (25.0%). Women with secondary, GCE 'O' or 'N' level education (75.8%) had the highest proportion of having undergone a Pap smear test at least once.

Overall, 47.9% of women aged 25 to 69 years had undergone the test within the past three years, in accordance with the recommended frequency. Table 12.1

Table 12.1: Knowledge and practice of Pap Smear tests among Singapore women aged 25 to 69 years, by socio-demographic and socio-economic characteristics (%), 2010

Characteristic	Knowledge of Pap Smear	Ever had Pap Smear	Had Pap Smear within the last 3 years
Total	**87.1%**	**71.3%**	**47.9%**
Age (years)			
25 -34	83.3%	52.6%	46.7%
35 - 49	92.9%	80.8%	57.2%
50 -69	83.4%	73.4%	38.4%
Ethnic group			
Chinese	87.6%	72.3%	49.1%
Malay	87.1%	67.2%	39.4%
Indian	83.1%	67.5%	48.2%
Marital status			
Never married	79.8%	25.0%	17.2%
Ever married	88.7%	81.0%	54.5%
Educational qualification			
No formal education/primary/PSLE	69.3%	67.2%	34.2%
Secondary, GCE 'O'/'N' level	92.8%	75.8%	51.6%
GCE 'A' Level, polytechnic & other diploma, degree & professional qualification	91.6%	69.9%	52.1%

Trends in the Practice of Pap Smear Tests

The proportion of women aged 25 to 69 years who had undergone Pap smear tests at least once was 71.3% in 2010, slightly higher than the 70.1% proportion in 2004. The proportion of women who had Pap smear within the last three years declined from 52.0% in 2004 to 47.9% in 2010.

Reasons For Not Doing Pap Smear Tests

Women who had never had a Pap smear test cited the following reasons for not doing the test:

1. "Not necessary as I am healthy" (25.4%);
2. "Never heard about Pap smear test" (11.5%);
3. "Not sexually active" (10.9%);
4. "No plan / Never thought about it" (9.8%); and
5. "Too young" (9.6%).

13
Colorectal Cancer Screening

Key Points

- 27.8% of Singapore residents aged 50 to 69 years (30.0% of males and 25.7% of females) reported that they ever had a Faecal Occult Blood Test (FOBT).
- Those with higher education were more likely to report that they ever had a FOBT: 44.6% of Singaporeans with 'A' level, polytechnic & other diploma, degree and professional qualification had the test at least once compared to 20.1% among those with PSLE or lower education.
- Among those who reported having undergone FOBT at least once, close to four in ten (37.3%) had the procedure done in the past year.
- 14.2% of Singapore residents aged 50 to 69 years (13.7% of males and 14.8% of females) reported that they had undergone colonoscopy or sigmoidoscopy at least once.
- The practice of colonoscopy or sigmoidoscopy was more prevalent among Singapore residents who had higher education, rising from 9.6% among those with PSLE or lower education to 23.9% among those with GCE 'A' level & above.
- Among those who had undergone colonoscopy or sigmoidoscopy at least once, the majority (86.3%) reported having had the procedure within the last ten years.
- 10.3% of Singapore residents aged 50 to 69 years had FOBT within the past one year and 12.3% had colonoscopy or sigmoidoscopy within the past ten years. Overall, 19.7% had FOBT within the past one year or colonoscopy/sigmoidoscopy within the past ten years.

Introduction

Colorectal cancer is the most common and second most common cancer among Singapore men and women respectively today. For the five year period from 2005- 2009, the age-standardised incidence of colon cancer was 40.1 per 100,000 men and 28.6 per 100,000 women respectively per year *(NRDO, 2011)*. The incidence was highest among the Chinese for both genders. An average of 362 men and 313 women died from the disease each year.

Factors that have been associated with higher risk of this cancer include specific hereditary conditions, older age, inflammatory bowel diseases, regular high saturated fat, low fiber diet, excessive alcohol intake and sedentary lifestyle. However, more than 75% of people who develop colon or rectal cancer have no known predisposing factors to the disease.

Faecal Occult Blood Test (FOBT), sigmoidoscopy and colonoscopy are able to detect the cancer at an early, curable stage. The Ministry of Health's Clinical Practice Guidelines on Cancer Screening (2010) recommend annual screening for colorectal cancer using FOBT for people aged 50 and older who are at average risk for colorectal cancer. For a person who is positive for FOBT, sigmoidoscopy and colonoscopy are the confirmatory diagnostic investigations.

Method Used

An interviewer administered questionnaire was used. Respondents were asked whether they had ever done FOBT, sigmoidoscopy and colonoscopy, and how long ago it had been since their last tests.

Practice of FOBT

In 2010, 27.8% of Singaporeans aged 50 to 69 years reported having had a FOBT at least once, higher than the 17.3% proportion in 2004. A higher proportion of males (30.0%) had undergone FOBT compared with females (25.7%). Chinese (30.7%) were more likely to have undergone the test compared to Malays (9.2%) and Indians (23.2%).

Singaporeans with higher education were more likely to report that they ever had a FOBT. More than four in ten (44.6%) Singaporeans with 'A' level, polytechnic & other diploma, degree and professional qualification had the test at least once compared to two in ten (20.1%) among those with PSLE or lower education. Table 13.1

Among those who reported having undergone FOBT at least once, close to four in ten (37.3%) had the procedure done in the past year. This proportion was higher than the corresponding proportion of 22.0% in 2004. 10.3% of Singapore residents in the 50-69 age group had FOBT within the past one year, up from 3.8% in 2004.

Table 13.1: Practice of FOBT among Singapore residents aged 50 to 69 years, by socio-demographic and socio-economic characteristics (%), 2010

Characteristic	Ever had FOBT	Had FOBT within the past 1 year
Total	**27.8%**	**10.3%**
Age (years)		
50 - 59	26.3%	10.4%
60 - 69	30.6%	10.3%
Gender		
Males	30.0%	12.8%
Females	25.7%	8.0%
Ethnic group		
Chinese	30.7%	11.3%
Malay	9.2%	2.9%
Indian	23.2%	1.1%
Educational qualification		
No formal education/primary/PSLE	20.1%	4.8%
Secondary, GCE 'O'/'N' level	24.5%	10.2%
GCE 'A' Level, polytechnic & other diploma, degree & professional qualification	44.6%	19.1%

Practice of Colonoscopy or Sigmoidoscopy

In 2010, 14.2% of Singaporeans aged 50 to 69 reported to have undergone colonoscopy or sigmoidoscopy at least once. In 2004, the proportion was 11.2%. About the same proportion of males (13.7%) and females (14.8%) had the examination. Chinese (15.6%) were more likely than Indians (11.6%) and Malays (5.9%) to have undergone the procedure. The practice of colonoscopy or sigmoidoscopy was more prevalent among Singaporeans who had higher education. Among those in 2010 who had undergone colonoscopy or sigmoidoscopy at least once, the majority (86.3%) reported having had the procedure within the last ten years. In 2004, the proportion was 85.0%. The proportion of Singapore residents in the 50 - 69 age group who had sigmoidoscopy or colonoscopy within the past ten years rose from 9.4% in 2004 to 12.3% in 2010. Table 13.2

Table 13.2: Practice of sigmoidoscopy or colonoscopy among Singapore residents aged 50 to 69 years, by socio-demographic and socio-economic characteristics (%), 2010

Characteristic	Ever had sigmoidoscopy or colonoscopy	Had sigmoidoscopy or colonscopy within the past 10 years
Total	**14.2%**	**12.3%**
Age (years)		
50 - 59	13.8%	12.0%
60 - 69	15.0%	12.7%
Gender		
Males	13.7%	12.6%
Females	14.8%	11.9%
Ethnic group		
Chinese	15.6%	13.5%
Malay	5.9%	4.5%
Indian	11.6%	10.3%
Educational qualification		
No formal education/primary/PSLE	9.6%	7.4%
Secondary, GCE 'O'/'N' level	12.5%	11.2%
GCE 'A' Level, polytechnic & other diploma, degree & professional qualification	23.9%	21.4%

Overall, the survey found that 19.7% of Singapore residents aged 50 to 69 years had either FOBT within the past one year or sigmoidoscopy/colonoscopy within the past ten years. This proportion was higher than the 12.3% level in 2004.

14
Utilisation of Primary Healthcare Services

Key Points

- Among Singapore residents aged 18 to 69 years who consulted primary healthcare providers in the past year preceding the survey, 74.6% last visited private GP clinics, 25.0% last sought treatment from government polyclinics and 0.4% saw doctors at SAF/SCDF medical centre or camps.
- The use of private GP services was highest among adults aged 30 to 39 years (87.1%), but consistently declined in subsequent age groups. In tandem, the use of government polyclinic services increased with age; from 12.5% among those aged 30 to 39 years to 51.8%, the highest, among the older residents aged 60 to 69 years.
- About eight in ten residents who had upper respiratory tract infections (84.5%) or fever (78.1%) sought treatment at private GP clinics. In contrast, less than four in ten (37.9%) of those with chronic diseases (diabetes mellitus, high blood cholesterol or hypertension) sought treatment at private GP clinics.
- Close to two in five (39.0%) residents reported that they had a regular family doctor/GP whom they visited four times a year on average.

Introduction

Primary healthcare involves the provision of primary medical treatment, preventive healthcare and health education. In Singapore, primary healthcare is provided by private medical practitioner's clinics and government outpatient polyclinics located in the city, housing estates and satellite towns. They provide a range of primary medical care services including immunization, health screening, treatment for common health complaints like sore throat and fever and chronic conditions such as hypertension and diabetes mellitus.

Method Used

An interviewer-administered questionnaire was used. Respondents were asked when they last consulted a primary healthcare physician at a private general practitioner (GP) clinic or a government polyclinic and the main medical condition they last sought treatment

for. Respondents were also asked whether they have a regular family doctor/GP whom they would consult when they have a health problem and the estimated number of times they visit their regular family doctor/GP per year.

Use of Private GP and Government Polyclinic Services

Among Singapore residents aged 18 to 69 years who consulted primary healthcare providers in the past year preceding the survey, 74.6% last visited private GP clinics, 25.0% last sought treatment from government polyclinics and 0.4% saw doctors at SAF/SCDF medical centre or camps.

Between the genders, a higher proportion of females consulted private GPs (77.2% vs 71.9%). Among the ethnic groups, the highest proportion of adults who last used private GP services was found in the Chinese (76.5%). The proportions were lower in Indians (73.3%) and Malays (64.2%).

The use of private GP services was highest among adults aged 30 to 39 years (87.1%), but consistently declined in subsequent age groups. In tandem, the use of government polyclinic services increased with age; from 12.5% among those aged 30 to 39 years to 51.8%, the highest, among the older residents aged 60 to 69 years. This could reflect the greater affordability of government primary care among older adults who were more likely to seek frequent treatment or follow-up consultation for their chronic diseases such as hypertension and diabetes mellitus. Better educated residents were found to be more likely to use private GP services compared to their less educated peers. This could be due to the easier affordability of private GP services among residents with higher educational attainment. Table 14.1

Among residents who visited a primary healthcare provider within the past year of the survey, eight in ten (84.5%) who had upper respiratory tract infections consulted private GPs. Close to eight in ten (78.1%) of those who had fever also sought treatment at private GPs. Among those who sought treatment for chronic diseases (diabetes mellitus, high blood cholesterol or hypertension), close to four in ten (37.9%) did so at private GP clinics. Table 14.2

Regular Family Doctor

Close to two in five (39.0%) Singapore residents aged 18 to 69 years indicated that they had a regular family doctor/GP whom they would consult when they have a health problem. 35.5% of male adults and 42.4% of female adults reported they had a regular family doctor/GP. Among the ethnic groups, 38.8% of Chinese, 40.7% of Malays and 37.6% of Indians indicated that they had a regular family doctor/GP. Higher educated

Singapore residents were more likely to have a regular family doctor compared to their lower educated peers (27.9%, 34.5% and 45.4% for PSLE & below, Secondary & GCE 'O'/'N' level, and GCE 'A' level & above respectively). Singapore residents estimated that they visit their regular family doctor/ GP four times a year on average.

Table 14.1: Use of private GP and government polyclinic services (%) by Singapore residents aged 18 to 69 years who visited a healthcare physician in the past year preceding the survey, by socio-demographic and socio-economic characteristics, 2010

Characteristic	Use of private GP services	Use of government polyclinic services
Total	**74.6**	**25.0**
Gender		
Males	71.9	27.5
Females	77.2	22.6
Age (years)		
18 - 29	77.5	21.4
30 - 39	87.1	12.5
40 - 49	78.9	21.1
50 - 59	63.2	36.8
60 - 69	48.2	51.8
Ethnic group		
Chinese	76.5	23.2
Malay	64.2	34.7
Indian	73.3	26.4
Educational qualification		
No formal education/primary/PSLE	53.5	46.5
Secondary, GCE 'O'/'N' level	66.5	33.4
GCE 'A' Level, polytechnic & other diploma, degree & professional qualification	84.3	15.2

Table 14.2: Use of private GP and government polyclinic services (%) by Singapore residents aged 18 to 69 years who visited a healthcare physician in the past year preceding the survey, by main medical condition for which consultation was sought, 2010

Main medical condition	Use of private GP services	Use of government polyclinic services
Upper respiratory tract infections	84.5	15.4
Fever	78.1	21.8
Routine medical check-up and blood tests	52.2	45.7
Chronic diseases* of which	37.9	62.1
Diabetes mellitus	21.0	79.0
High blood cholesterol	22.0	78.0
Hypertension	49.4	50.6

**Refers to diabetes mellitus, high blood cholesterol or hypertension, any two of the three diseases and all three diseases*

15
Community Health Screening

Key Points

- Among Singapore residents aged 40 to 69 years without known diabetes (not told by a doctor that they had the disease), 63.5% had a blood check for diabetes within the past three years.
- Among Singapore residents aged 40 to 69 years without known high blood cholesterol, 61.2% had been screened within the past three years.
- Among Singapore residents aged 40 to 69 years without known hypertension, 70.8% did their blood pressure check in the past year.

Introduction

Health screening is an important strategy for disease prevention in the population. It is important to go for appropriate and regular health screening as some diseases do not have early recognisable symptoms. Regular screening helps to discover these diseases early even when there are no symptoms. Early detection of risk factors or diseases such as high blood pressure or diabetes mellitus could result in effective treatment, reduced complications and better outcomes.

Method Used

An interviewer-administered questionnaire was used. Respondents were asked whether they were ever told by a doctor that they had diabetes, hypertension or high blood cholesterol. Respondents who reported that they were not told by a doctor that they have diabetes or high blood cholesterol were asked on the last time they had a blood test for the condition. Those who were not told by a doctor that they had hypertension were asked on the last time they did their blood pressure check.

Practice of Health Screening

Health screening practice was relatively common among Singapore residents aged 40 to 69 years who were not told by a doctor that they had chronic diseases (diabetes, hypertension or high blood cholesterol). Among adults without known diabetes, 63.5% had been screened for diabetes within the past three years. Among adults without known high

blood cholesterol, 61.2% had been screened within the past three years. 70.8% of those without known hypertension had their blood pressure checked in the past year.

Health screening practice was found to be more prevalent among older adults. Adults in the 60 - 69 age group were more likely to have had their blood checked for the chronic disease compared to the younger age groups. Health screening for the chronic disease also generally rose in tandem with education attainment. Table 15.1

Table 15.1: Health screening practice by Singapore residents aged 40 to 69 years, by socio-demographic and socio-economic characteristics (%), 2010

Characteristic	Diabetes screening at least once in the past 3 years	Hypertension screening at least once in the past year	High blood cholesterol screening at least once in the past 3 years
Total	**63.5%**	**70.8%**	**61.2%**
Age (years)			
40 - 49	58.1%	68.9%	59.2%
50 - 59	64.5%	72.7%	62.9%
60 - 69	74.3%	72.5%	63.9%
Gender			
Males	64.3%	70.0%	62.8%
Females	62.8%	71.6%	59.7%
Ethnic group			
Chinese	63.8%	70.5%	61.6%
Malay	54.2%	66.5%	53.6%
Indian	74.4%	80.3%	68.5%
Marital status			
Never married	57.9%	74.7%	61.2%
Ever married	64.0%	70.5%	61.2%
Educational qualification			
No formal education/primary/PSLE	58.3%	61.7%	54.6%
Secondary, GCE 'O'/'N' level	61.1%	70.9%	60.7%
GCE 'A' Level, polytechnic & other diploma, degree & professional qualification	70.3%	77.3%	66.7%

16
Mental Health

Key Points

- Based on the 12-item General Health Questionnaire scale, (GHQ-12), the prevalence of poor mental health was 12.9% among Singapore residents aged 18 to 69 years.
- A higher proportion of females (14.1%) had poor mental health compared to males (11.5%).
- The prevalence of poor mental health decreased with age and was highest among the young adults aged 18 to 29 years (18.4%).

Introduction

The World Health Organisation defines mental health as "not just the absence of mental disorder. It is defined as a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community" *(WHO, 2001)*. The level of mental health of a person at any point of time is affected by multiple social, psychological, and biological factors. Stressful work conditions, gender discrimination, social exclusion and unhealthy lifestyle could result in poor mental health.

Method Used

The 12-item General Health Questionnaire (GHQ-12) was used to measure mental health. Cut-off for poor mental health was based on an earlier validation study conducted in 2003 (scored larger than 3).

Prevalence of Poor Mental Health

The prevalence of poor mental health as measured on the GHQ-12 among Singapore residents aged 18 to 69 years was 12.9%. A higher proportion of females (14.1%) had poor mental health compared to males (11.5%). Among the ethnic groups, Indians (11.5%) had the lowest prevalence of poor mental health compared to Malays (13.0%) and Chinese (13.0%). The prevalence of poor mental health was highest among the younger adults aged 18 to 29 years (18.4%). Graph 16.1; Table 16.1

Graph 16.1: Crude prevalence (%) of poor mental health among Singapore residents aged 18 to 69 years, by gender and ethnic group, 2010

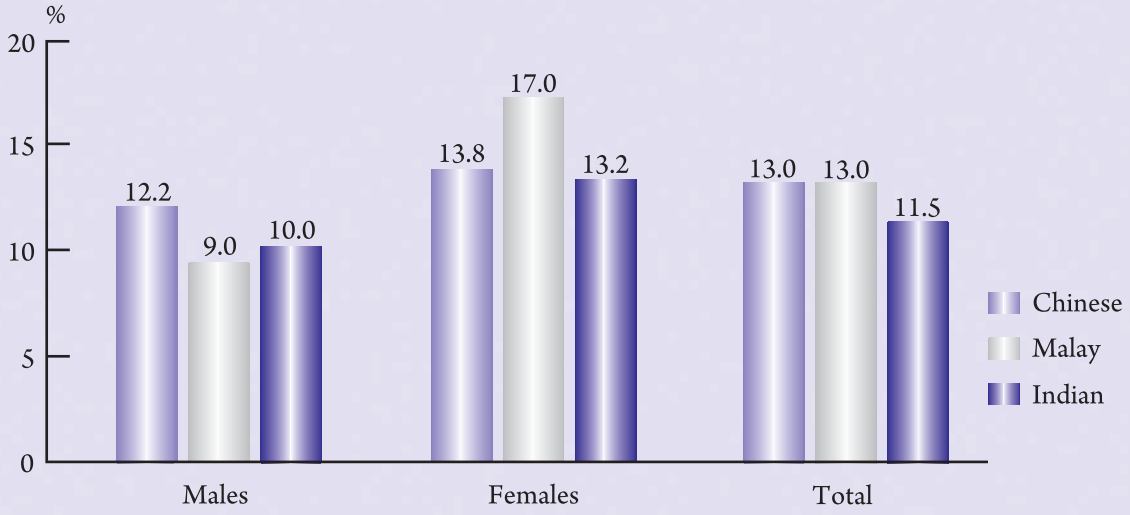


Table 16.1: Age-specific prevalence (%) of poor mental health, by gender, 2010

Age (years)	Males	Females	Total
18 - 29	14.1	22.6	18.4
30 - 39	13.9	18.4	16.2
40 - 49	14.6	10.9	12.7
50 - 59	5.3	7.8	6.5
60 - 69	6.8	6.3	6.6
18 - 69	**11.5**	**14.1**	**12.9**

17
Self-rated Overall Health

Key Points

- 61.7% of Singapore residents aged 18 to 69 years perceived their overall health to be "very good" or "good", 36.0% rated their overall health to be "moderate", and 2.3% rated theirs as "bad" or "very bad".
- A slightly higher proportion of males (63.8%) compared to females (59.8%) felt that their overall health was "very good" or "good".
- The proportion of residents who rated their overall health to be "very good" or "good" declined with age.
- Among the ethnic groups, 77.7% of Indians rated their overall health status to be "very good" or "good". The proportions in Malays (75.4%) and Chinese (57.6%) were comparatively lower.

Introduction

Information on self-rated health is useful in estimating future and latent demand for health services and for subsequent planning and health policy development. Such information is also helpful in examining differentials within and between populations, in monitoring trends over time and in assessing changes in response to health policy and practice. The latter is achieving increasing significance as health systems move to a more evidence-based and outcome-focused approach to service delivery.

Subjective health assessment has become an important component of contemporary health research *(Albrecht 1994)*, and has been found to be as reliable as biomedical measures *(Epstein 1990)*. Self-rating of health has been shown to have high reliability, validity and predictive power for a variety of morbidity and mortality *(Lundberg and Manderbacka, 1996; Idler and Kasl, 1995; McCallum et al, 1994)*.

Method Used

An interviewer-administered questionnaire was used. Respondents were asked to rate their overall health including both physical health and mental health as "very good", "good", "moderate", "bad", or "very bad".

Self-rated Overall Health

Six in ten (61.7%) Singapore residents aged 18 to 69 years rated their overall health to be either "very good" or "good". 36.0% of residents reported their overall health as "moderate" and 2.3% felt that their overall health was "bad" or "very bad".

A slightly higher proportion of males (63.8%) compared to females (59.8%) perceived their overall health as "very good" or "good". The proportion of Singapore residents who rated their overall health to be "very good" or "good" declined with age.

Among the ethnic groups, the proportion of residents who rated their overall health to be "very good" or "good" was highest in Indians (77.7%). The proportions in Malays (75.4%) and Chinese (57.6%) were comparatively lower. Table 17.1

Table 17.1: Self-rated health status (%) of Singapore residents aged 18 to 69 years, by social demographics, 2010

Characteristic	Very Good	Good	Moderate	Bad / Very Bad
Total	**10.9**	**50.8**	**36.0**	**2.3**
Gender				
Males	12.9	50.9	34.0	2.1
Females	9.0	50.8	38.0	2.3
Age (years)				
18 - 29	15.8	51.9	28.9	3.4
30 - 39	10.7	53.5	34.7	1.1
40 - 49	9.9	48.1	39.5	2.5
50 - 59	9.0	50.2	38.9	1.9
60 - 69	6.7	50.2	40.8	2.3
Ethnic Group				
Chinese	8.9	48.7	40.0	2.4
Malay	18.1	57.3	23.0	1.6
Indian	17.9	59.8	20.6	1.7

Trends in Self-rated Overall Health

The proportion of Singapore residents who rated their overall health as "very good" or "good" fell from 66.7% in 2007 to 61.7% in 2010. There were significant declines in the age-standardised proportions in both genders and the ethnic groups between the two years. Table 17.2

Table 17.2: Prevalence (%) of "Very Good" or "Good" self-rated overall health, by gender and ethnic group, 2007 and 2010

Characteristic	2007	2010
Total	**66.7**	**61.7**
Gender		
Males	68.3	63.8
Females	65.2	59.8
Age (years)		
18 - 29	74.5	67.7
30 - 39	70.9	64.2
40 - 49	64.9	58.0
50 - 59	60.2	59.2
60 - 69	57.4	56.9
Ethnic Group		
Chinese	65.4	57.6
Malay	70.9	75.4
Indian	72.7	77.7

18 Caregiving

Key Points

- 8.1% of Singapore residents aged 18 to 69 years reported that they provided regular care or assistance to friends or family members.
- Close to eight in ten (78.8%) caregivers indicated that their caregiving tasks were supported by other family members (70.4%) and/or live-in maids (14.1%).
- Most caregiving was provided by close family members; one in two caregivers (52.6%) provided care to their parents, 7.2% to their parent-in-laws, 8.5% to their children, and 11.0% to their spouses.
- The top three areas that the caregivers reported that their care recipients most needed help in were:
  1. Taking care of his/her residence or personal living spaces (60.3%);
  2. Transportation outside of the home (41.5%); and
  3. Relieving/ decreasing anxiety or depression (34.4%).

Introduction

Caregiving refers to the provision of assistance to another person who is ill, disabled, or needs help with daily activities. It often requires attention to the physical, mental, social, and psychological needs and well-being of the care recipients. Many Singaporeans are informal caregivers - providing unpaid help to older persons who live in the community or looking after children with special needs, the disabled and the mentally and terminally ill. The number of informal caregivers is likely to increase sharply with the ageing of the population and the concomitant increase in physical and mental disabilities especially among the elderly.

Method Used

An interviewer-administered questionnaire was used. Respondents were asked whether they are providing regular care or assistance to a friend or family member who has a health problem, long-term illness, or disability. Those who answered "Yes" were then asked who they provide care to, the areas of care that they provide, the amount of time they spent on providing care and the areas of care that they would like to be trained in. Information on the profile of care recipients and the areas they most need help on was also captured.

Profile of Caregivers

8.1% of Singapore residents aged 18 to 69 years indicated that they provided regular care or assistance to friends or family members. 7.5% of males and 8.7% of females in this age group reported that they were caregivers. Most caregivers were between 40 and 59 years old. A slightly higher proportion of caregivers were females (54.3%).

The majority of caregivers were currently married (68.8%) and a quarter (25.6%) were singles. Close to three quarters of the caregivers (74.2%) were employed. One in ten caregivers (11.4%) were retired or not working. This means that most caregivers juggled employment with family and caregiving tasks. On the whole, caregivers are more likely to be in older age groups compared to non-caregivers. Table 18.1

Table 18.1: Profile of caregivers and non-caregivers, 2010

	Caregivers (%)	Non-caregivers (%)
Age (years)		
18 - 29	14.0	23.9
30 - 39	15.4	22.7
40 - 49	28.8	22.5
50 - 59	31.9	19.4
60 - 69	9.9	11.4
Gender		
Males	45.7	49.8
Females	54.3	50.2
Marital status		
Ever married*	5.3	4.4
Currently married	68.8	67.2
Never married	25.6	28.1
Work Status		
Working	74.2	71.7
Homemaker / Housewife	14.3	12.2
Retired / Umemployed^	11.4	16.1

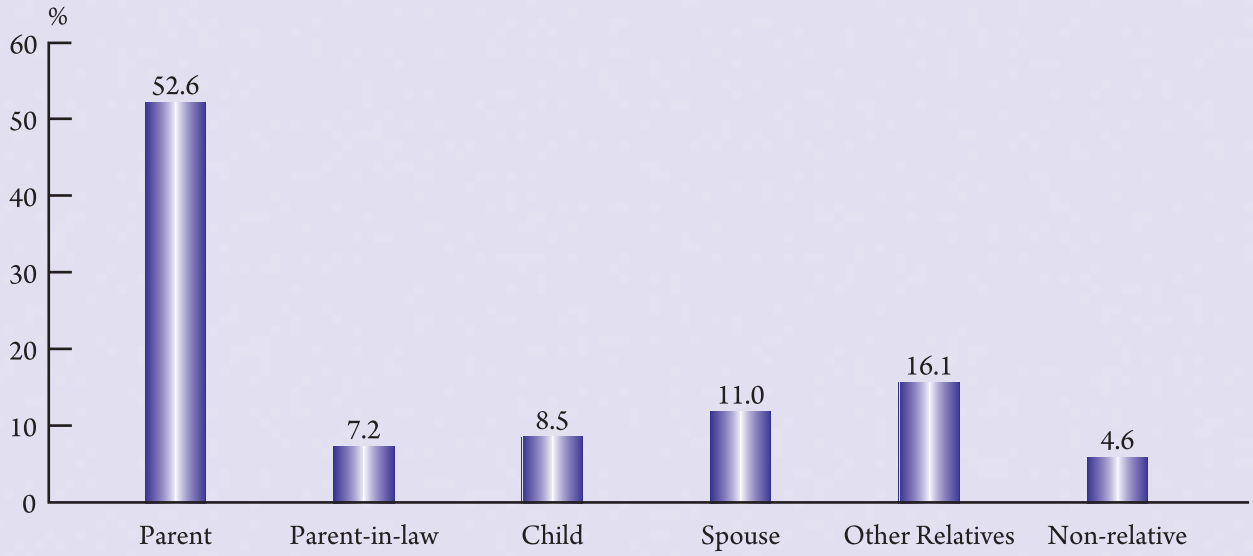
* Separated, divorced or widowed.
^ Includes full-time students and National Service men.

Caregiving Characteristics

The majority of caregivers (78.8%) indicated that their caregiving tasks were supported by other family members (70.4%) and/or live-in maids (14.1%). One in five caregivers (21.2%) reported that they were the only person providing care to his/her care recipient.

Most caregiving was provided by close family members; one in two caregivers (52.6%) provided care to their parents, 7.2% to their parent-in-laws, 8.5% to their children, and 11.0% to their spouses. 16.1% of caregivers provided care to other relatives including siblings and grandparents and 4.6% to non-relatives. Graph 18.1

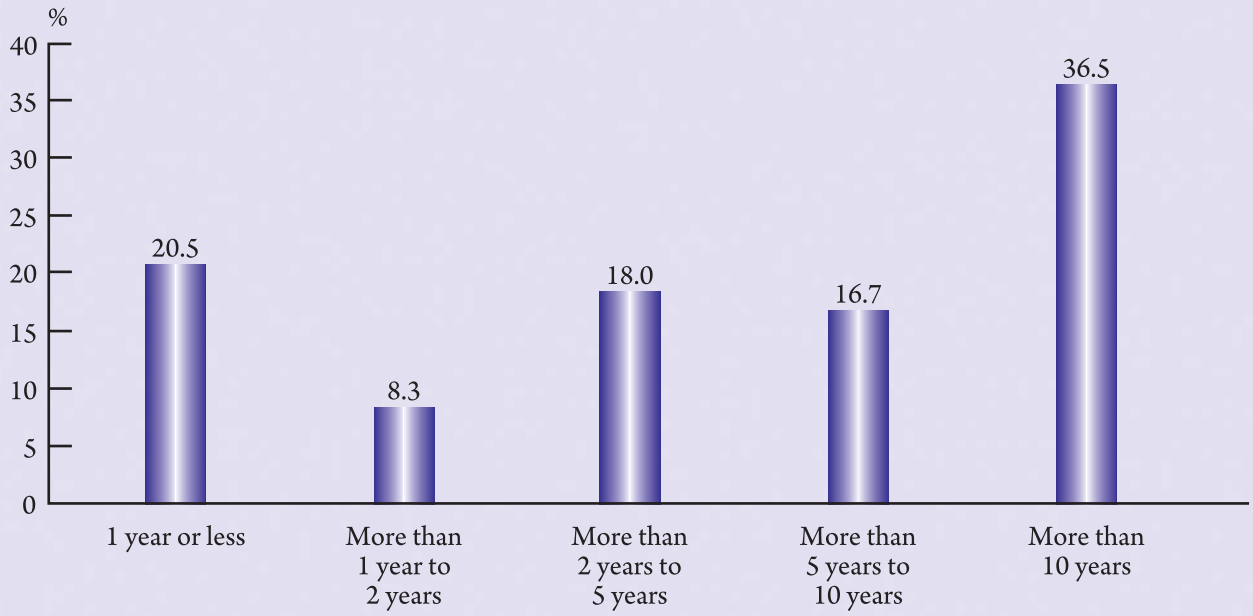
Graph 18.1: Relationship of care recipients to caregivers, 2010



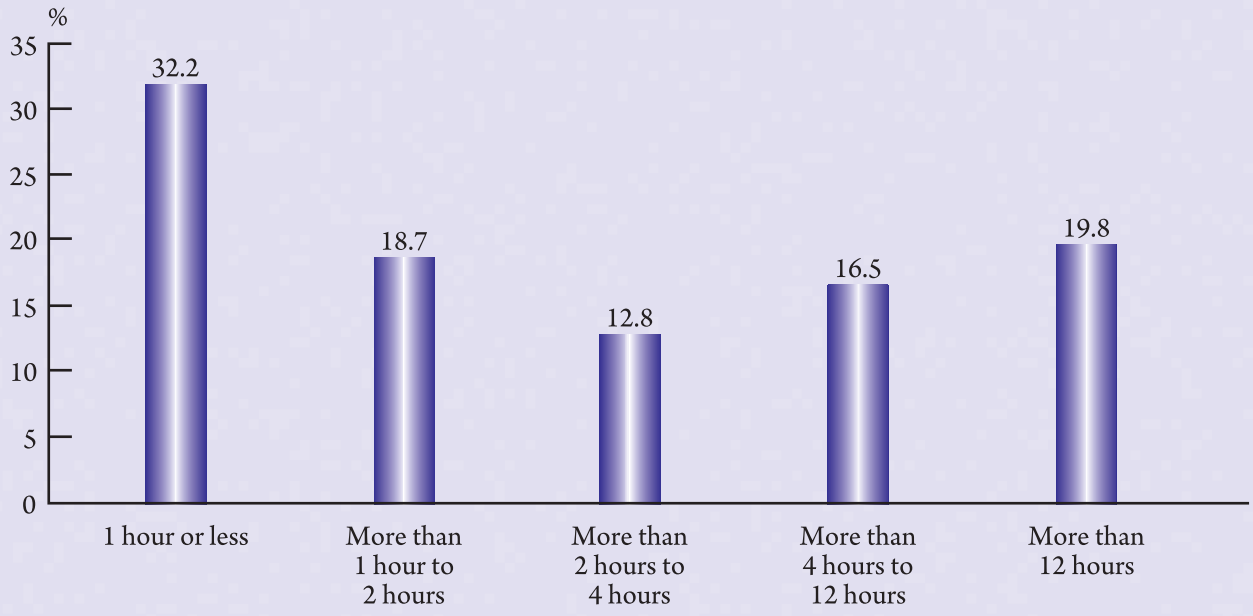
More than one in three caregivers (36.5%) reported that they had been providing care to their care recipients for more than ten years. One in five caregivers (20.5%) indicated that they had been caring for their care recipient for one year or less. Graph 18.2

On average, caregivers provided care for about 6.8 hours per day in a typical week. Female caregivers spent more time each day caring for their care recipients compared to male caregivers (7.6 hours versus 5.8 hours). About one in five caregivers (19.8%) provided care to their care recipients for more than 12 hours per day. Graph 18.3

Graph 18.2: Length of time caregivers provided care to care recipients, 2010



Graph 18.3: Average number of hours per day in a typical week caregivers provided care to care recipients, 2010



Areas that Care Recipients Most Needed Help in

Caregivers performed a range of tasks in caring for others: personal care, tasks inside the house, tasks outside the house, transportation and care management. The top five areas that the caregivers reported that their care recipients most needed help in were:

1. Taking care of his/her residence or personal living spaces (60.3%);
2. Transportation outside of the home (41.5%);
3. Relieving/ decreasing anxiety or depression (34.4%);
4. Taking care of himself/herself, such as eating, dressing, or bathing (31.4%); and
5. Communicating with others (29.7%).

Training that Caregivers Felt They Should Be Given

Caregiving presents new experiences and challenges to many caregivers. Caregivers should be given appropriate training so that they could be successful in their roles and to be able to provide the best quality of care possible to their loved ones. The top five areas that the caregivers indicated that they should be given training in were:

1. Taking care of others' residence or personal living spaces (31.3%);
2. Communicating with others (28.1%);
3. Taking care of others, e.g. eating, dressing, or bathing (26.8%);
4. Relieving / decreasing anxiety or depression of others (23.2%); and
5. Moving others around within the home (15.8%).

Profile of Care Recipients

Six out of ten care recipients (63.3%) were women. The mean age of the care recipients were 64 years old. One in ten care recipients (10.9%) were less than 30 years old. Close to one in four (24.1%) were in the age group 30 to 64 years. Nearly two in three care recipients (65.0%) were elderly aged 65 years and above. Close to seven out of ten of the elderly care recipients (68.8%) were females. This could be due to the higher life expectancy of elderly female care recipients. Table 18.2

Table 18.2: Profile of Care Recipients, 2010

	%
Age (years)	
0 - 29	10.9
30 - 64	24.1
65 - 74	22.8
75 - 84	25.7
85 and above	16.5
Gender	
Males	36.7
Females	63.3

Care recipients require assistance for a range of health problems, illnesses or disabilities. The five major doctor-diagnosed health problems that care recipients had, as reported by caregivers, were:

1. Diabetes (13.0%);
2. Stroke (9.7%);
3. Heart Disease (6.9%);
4. Cancer (6.7%); and
5. Arthritis / Rheumatism (6.6%).

19 Survey Methodology And Data Quality Control

Study Design, Objectives and Scope of Survey

The National Health Survey 2010 was a national cross-sectional survey conducted between 17 March and 13 June 2010. The reference population of the survey was the 2010 resident Singapore population aged 18 to 79 years.

The main objectives of the survey were to monitor the health of Singaporeans and to track progress towards achieving national health targets in the areas of:

(i) risk behaviour such as physical inactivity, obesity, cigarette smoking and alcohol consumption;

(ii) health and disease conditions such as hypertension and diabetes mellitus;

(iii) preventive health behaviour such as health screening, breast cancer screening, cervical cancer screening and colorectal cancer screening.

The survey also assessed the mental health and self-rated overall health of Singapore residents. Care giving, chronic kidney disease and hearing loss among Singapore residents were covered for the first time. The survey results were presented for the age group 18 to 69 years for most of the chapters.

Survey Sites

For purposes of convenience and easy accessibility for the survey participants, six locations comprising five polyclinics and one community club were selected as the survey sites. They were Woodlands Polyclinic, Bukit Batok Polyclinic, Tampines Polyclinic, Hougang Polyclinic, Outram Polyclinic and Toa Payoh South Community Club. These sites were selected because they were equipped with the necessary amenities for the survey and were geographically well spread out across Singapore. The household units in the vicinity of these polyclinics also provided a good combination of the different types of housing and the three major ethnic groups (Chinese, Malays and Indians) in Singapore.

Sample Selection

The sample selection was divided into two phases.

In phase 1, a sample of 47,500 household addresses was selected from the National Database on Dwellings in Singapore maintained by the Department of Statistics. The sample selection was based on a two-stage stratified design. The primary selection units (PSUs) for the first stage consisted of geographic zones based on the planning areas used by the Urban Redevelopment Authority of Singapore while the secondary selection units (SSUs) for the second stage comprised the residential dwelling units.

During the first stage selection, the PSUs within three to five km of the six survey sites were selected. For the second stage selection, a fixed number of dwelling units was selected using simple random sampling without replacement proportionately from defined broad dwelling type groups within each selected geographic zone from the first stage of sample selection.

The modified two-stage stratified design yielded an overall equal probability and self-weighting sample which was representative of the national dwelling type distribution.

A random sample of 17,000 household addresses of the residential dwelling units was selected for an enumeration exercise after incorporating ethnicity information on household members residing at the addresses. All selected households were notified by post. This was followed up by house visits to enumerate all household members within the age group of 18 to 79 years.

In phase 2, a random sample of 7,695 persons was selected from all individuals identified in Phase 1 to participate in the survey. The sampling design was based on a disproportionate stratified sampling design, where all individuals identified in Phase I were first stratified by age, gender and ethnic group, and then systematically selected. The Malays and Indians were over-sampled to ensure sufficient sample size for reliable prevalence estimates for these minority groups. The ethnic composition of the sample was 30% Chinese, 30% Malays, 30% Indians and 10% Others.

Survey Protocol and Procedures

The procedures and protocol used in the National Health Survey 2010 closely followed that of the National Health Survey 2004. The protocol was based on the WHO recommended model protocol for diabetes and other non-communicable disease field survey as well as the WHO MONICA Protocol on Population Survey.

Ethics and Regulatory Approval

The NHS 2010 methodology, protocol and procedures were approved by the Health Promotion Board (HPB) Medical Dental Board Ethics Committee.

Questionnaire

A structured questionnaire was used in the survey to elicit information on the demographic, socio-economic, lifestyle practices relating to the major non-communicable diseases and risk factors, health conditions, knowledge, attitude and practices on health screening as well as the general well-being of the participants. The questionnaire, adapted from that of the National Health Survey 2004 and the National Health Surveillance Survey 2007, also included elements of the instruments used in the WHO STEPwise approach to Surveillance of Non-Communicable Diseases (STEPS) Instrument for Non-Communicable Disease Risk Factors, WHO's Global Physical Activity Questionnaire (GPAQ) and the 12-item General Health Questionnaire (GHQ12).

Invitation and Publicity

Enumeration Exercise

About three weeks before the start of the Enumeration Exercise, a notification letter was sent to all 17,000 selected households, informing on the purpose of the exercise and requesting for co-operation to complete a Household Members List form that was enclosed. Households could fax or mail the completed form to Ministry of Health using a self-addressed envelope provided. Alternatively, households could log on to a designated website to fill up an online form using a pre-assigned login identification and password indicated in the letter. Households that did not sent the completed form by fax or mail, or complete the online form after about two weeks were visited by trained interviewers. The interviewers assisted to complete and collect the forms from the households.

The Enumeration Exercise was publicised in the mass media. A press release statement and a Frequently-Asked-Questions (FAQs) section on the Enumeration Exercise were also posted on the website of the Ministry of Health. Publicity posters were also put up on notice boards of community centres and community clubs.

Survey Fieldwork

About three weeks before the start of the survey fieldwork, an invitation letter was mailed to each of the 7,695 selected survey subjects. The invitation letter informed the subjects of their survey appointment date, time and venue and fasting instructions. A letter addressed to their employers was also enclosed to facilitate subjects who were working to take time off from work to attend the survey.

Reminder letters were sent to the subjects two weeks prior to their appointment date to remind them to attend the survey. In addition, about three days before the survey appointment, trained members of a hotline team telephoned the subjects to remind them of their appointment and to provide them with final instructions for attending the survey.

The survey was publicised in the mass media to inform the public of the survey and to reach out to the selected subjects and employers to seek their support and co-operation for the survey. A press release statement and a Frequently-Asked-Questions (FAQs) section on the Survey were also posted on the website of the Ministry of Health. In addition, publicity posters were put up on notice boards of HDB flats near the six survey sites with the help of the respective Town Councils.

Training

All survey fieldworkers were briefed extensively on the survey methodology and underwent rigorous training in the survey procedures assigned to them. This was to ensure strict compliance to the standards and procedures of the survey. Training on measurement techniques for anthropometry and blood pressure, and interviewing techniques to elicit accurate response to the survey questionnaires were conducted by the Health Promotion & Preventive Care Department of the National Healthcare Group Polyclinics (NHGP) and the Epidemiology and Disease Control Division of the Ministry of Health respectively. Training on phlebotomy was carried out by the Department of Pathology of the Singapore General Hospital. Training on hearing loss measurement techniques was provided by the Ear Nose Throat-Head Neck Surgery Department of the National University Singapore and Hospital.

To sharpen the skills of the field workers and to familiarize them with the survey procedures, a one-day pilot trial of the survey was conducted before the start of the fieldwork. A post-trial feedback session was held and all procedural hiccups were identified and suggestions for better implementation of the fieldwork procedures were evaluated. Recommendations on rectifying procedure gaps and improvement were put up for concurrence by all concerned and subsequently disseminated to all relevant fieldworkers. The methodology for each survey procedure is given in the relevant chapters in this report.

Blood Specimen Analysis

All blood specimens collected for the survey were sent to the Biochemistry Laboratory of the Department of Pathology, Singapore General Hospital for analysis on the same day. The test results, upon receipt by the Epidemiology and Disease Control Division of the Ministry of Health,

were checked for completeness and consistency before being uploaded into a computer database. The methodology for each biochemical analysis is described in detail in the specific chapters in this report.

Survey Schedule and Data Collection

The survey fieldwork was conducted on Wednesdays to Sundays including two Tuesdays (6 April and 25 May) over a three-month period from 17 March to 13 June 2010. The fieldwork hours were from 0800 hours each morning to 1300 hours in the afternoon. The average workload was 60 respondents daily.

All respondents gave informed consent to participate in the survey on their actual survey day. During the survey, the participants underwent a health screening and answered questionnaires on their lifestyle practices and dietary patterns. The health screening involved tests for diabetes, blood lipids and urinary proteins; assessment on hearing loss; and measurement of blood pressure, waist, hip, height and weight. The fieldwork was carried out by staff of the National Healthcare Group Polyclinics and fieldwork supervision was carried out by the Epidemiology and Disease Control Division of the Ministry of Health and the Research & Strategic Planning Division of the Health Promotion Board.

At the conclusion of each respondent's procedures, the respondent's checklist and survey questionnaire were checked for completeness. Basic results (weight, height, body mass index, waist, hip, blood pressure, blood glucose levels, lipid profile, serum creatinine, urinary microalbumin and hearing test results) were sent to the respondents within three weeks of their participation.

Data Quality Control and Confidentiality

Survey responses recorded on each questionnaire on each survey day were manually checked for missing values, data-entry errors and consistency at the survey sites. Data anomalies were clarified through direct verification with the respondents whenever necessary.

Data recorded on the questionnaires were input by double-entry method into a formatted database. 20% of the questionnaire records that were entered into the database were then randomly selected and all data items of each questionnaire record were manually checked against that recorded on the corresponding hardcopy questionnaire. Any data entry errors were verified and corrected. The resultant database was further subjected to a series of range, logic and consistency checks.

Throughout all stages of the survey, strict confidentiality on individual subject information and test results was maintained. All information from the survey was only used in aggregate form without reference to or disclosure of individual information.

Age Standardisation

Age-standardisation of prevalence rates takes into account the changing age distribution of the population over the years and allows for more meaningful trend comparison, especially with an ageing population where prevalence rates of chronic diseases such as hypertension, diabetes and high cholesterol can be expected to increase. Age-standardisation of prevalence was calculated by the direct method, using the 2010 Census Singapore resident population as the standard (reference) population.

20 Response Rate, Respondent And Non-Respondent Comparison And Sample Weights

Response Rate

The sample of the National Health Survey (NHS) 2010 comprised 7,695 Singapore residents aged 18 to 79 years. 183 persons from the original sample were ineligible for the survey for reasons such as pregnancy, recent birth delivery, institutionalised (in hospital, nursing home, prison), death, and overseas sojourn during the survey period. A total of 4,337 persons out of an eventual sample of 7,512 eligible Singapore residents took part in NHS 2010, yielding an overall response rate of 57.7%.

Comparison of Socio-demographic Profile between Survey Respondents and Resident Population

Table 20.1 shows the percentage distribution of the survey sample (unweighted) and the Singapore resident population by demographic characteristics. To adjust for the under sampling of Chinese and over sampling of Malays, Indians and other races in the survey and differential response levels, the survey sample was weighted to the age, ethnic group and gender distribution of the 2010 Census Singapore resident population (Singapore residents and permanent residents) to yield an age by gender by ethnic group distribution similar to that of the resident population. This was to ensure that the survey results apply to the general population.

Table 20.1: Socio-demographic profile (%) of survey respondents and the Singapore resident population aged 18 to 79 years

Characteristic	Survey Sample (Unweighted)	Resident Population (Census 2010)
Gender		
Males	48.4	49.2
Females	51.6	50.8
Age (years)		
18 - 29	18.2	21.6
30 - 39	22.8	21.4
40 - 49	25.2	21.9
50 - 59	18.4	19.1
60 - 69	8.5	10.5
70 - 79	6.9	5.5
Ethnic Group		
Chinese	31.2	75.6
Malay	29.9	12.3
Indian	31.2	8.8
Others	7.8	3.2

Comparison of Socio-economic Profile between Survey Respondents and Resident Population

Table 20.2 shows the percentage distribution of the survey sample (weighted) and the Singapore resident population by dwelling type and highest educational qualification attained.

The proportions of respondent sample living in public housing (HDB flats) and private housing (condominium, private flats, landed property and others) were similar to that of the resident population in terms of dwelling type. The respondent sample was also similar to the resident population in educational qualification distribution. Table 20.2

Table 20.2: Socio-economic profile (%) of survey respondents aged 18 to 79 years and the Singapore resident population

	Respondents (Weighted)	Resident Population (Census 2010)
Dwelling Type		
HDB Flats		
1-3 room	21.0	21.0
4 room	34.2	34.2
5 room, executive flats and other public flats	27.8	27.6
Condominium and private flats	11.1	9.4
Landed property and others	5.9	7.8
Educational qualification		
No formal education/primary/PSLE	19.2	20.8
Secondary, GCE 'O'/'N' level	31.3	29.5
GCE 'A' Level, polytechnic & other diploma, degree & professional qualification	49.5	49.7

Comparison of Socio-demographic Profile between Survey Respondents and Non-Respondents

There were some differences between the socio-demographic characteristics of the respondents (unweighted) and the non-respondents (unweighted). Compared with the non-respondents, the respondents had higher representations of females, Chinese and adults in the 40-49, 50-59 and 60-69 age groups. Table 20.3

Table 20.3: Socio-demographic profile (%) of survey respondents and non-respondents aged 18 to 79 years, 2010

Characteristic	Respondents	Non-Respondents
Total (number)	**4,337**	**3,175**
Gender		
Males	48.4	49.9
Females	51.6	50.1
Age (years)		
18 - 29	18.2	27.6
30 - 39	22.8	22.5
40 - 49	25.2	19.0
50 - 59	18.4	13.9
60 - 69	8.5	7.4
70 - 79	6.9	9.6
Ethnic Group		
Chinese	31.2	29.8
Malay	29.9	32.0
Indian	31.2	28.8
Others	7.8	9.4

Comparison of Socio-economic Profile between Survey Respondents and Non-Respondents

The socio-economic profile of the survey respondents (unweighted) in terms of dwelling type was compared with that of the non-respondents (unweighted). The respondents had lower representation in the HDB 1 - 3 room flat. The proportion of respondents living in public housing flats (93.0%) was higher than that of the non-respondents (90.9%). Table 20.4

Table 20.4: Socio-economic profile (%) of survey respondents and non-respondents aged 18 to 79 years, 2010

Characteristic	Respondents	Non-Respondents
Total (number)	**4,337**	**3,175**
HDB Flats		
1-3 room	24.9	28.5
4 room	39.3	35.6
5 room, executive & other public flats	28.8	26.8
Condominium and private flats	5.6	6.9
Landed property and others	1.5	2.2

Non-Respondent Follow-up Survey

A non-respondent follow-up survey was conducted between September and October 2010. The main objective was to find out the reasons for non-participation in the National Health Survey 2010 and to assess the potential impact of non-response on the results of the main survey.

Sample Design

All 3,175 non-respondents of the National Health Survey 2010 were stratified by sex, age and ethnic group, and a random sample of 999 persons aged 18 to 79 years was drawn.

Survey Protocol and Procedures

The survey was conducted via telephone interview by a trained interviewer using a structured questionnaire. A minimum of five attempts were made to contact each selected individual to obtain a complete interview at different times of the day or different days of the week whenever necessary.

The recorded information on the questionnaires was manually checked for missing values and consistency before data entry. Data anomalies were confirmed through direct verification with the participants through telephone and subsequently amended. The resultant database was subjected to further consistency and verification checks.

Throughout the stages of the survey, strict confidentiality on individual's information was maintained. All information from the survey was only used in aggregate form without reference to or disclosure of individual information.

For analysis and reporting, the sample of participants of the follow-up survey was weighted to the age, ethnic group and gender distribution of the Census 2010 Singapore resident population (Singapore residents and permanent residents).

Survey Response

Of the 999 persons selected to take part in the survey, an eventual total of 648 persons participated in the survey. The response rate was 64.9%.

Main Findings

Reasons for Non-Participation in the National Health Survey 2010

Participants were asked the reason for not participating in the National Health Survey 2010. The top three reasons cited were as follows:

1. "Not free or no time to attend" (50.6%);
2. "Had recent health screening" (7.9%);
3. "Not in Singapore during survey period" (7.3%);

Cigarette Smoking

A sensitivity analysis showed that including the participants of the Non-Respondent Follow-up Survey to the main survey, the prevalence of daily smoking remained about the same at 14.2%. Prevalence of smoking among males declined whilst that among females increased. Table 20.5

Table 20.5: Prevalence of Smoking among respondents and non-respondents aged 18 to 69 years, 2010

Cigarette Smoking	Gender	NHS10 (%) (1)	NHS10 & NRS10 (%) (2)	Difference (%) (2) - (1)
Daily Smoker	Total	14.3	14.2	-0.1
	Male	24.7	24.1	-0.6
	Female	4.2	4.6	0.4

NHS10 : National Health Survey 2010
NRS10 : Non-Respondent Follow-up Survey to NHS10

Chronic Disease (self-reported)

A sensitivity analysis on the prevalence of chronic diseases (self-reported) showed that including the participants of the Non-Respondent Follow-up Survey to the main survey, the prevalence of reported diabetes and reported high cholesterol increased by 0.3 percentage point whilst that of reported hypertension remained almost the same at 13.1%. Table 20.6

Table 20.6: Prevalence of self-reported chronic diseases among respondents and non-respondents aged 18 to 69 years, 2010

Chronic Disease (told by doctor to have the condition and on medication)	Gender	NHS10 (%) (1)	NHS10 & NRS10 (%) (2)	Difference (%) (2) - (1)
Reported Diabetes				
	Both	4.6	4.9	0.3
	Male	4.9	5.4	0.5
	Female	4.3	4.5	0.2
Reported Hypertension				
	Both	13.0	13.1	0.1
	Male	14.0	14.1	0.1
	Female	12.1	12.2	0.1
Reported High Cholesterol				
	Both	11.2	11.5	0.3
	Male	11.7	11.8	0.1
	Female	10.8	11.1	0.3

Health Screening Practice

A sensitivity analysis on health screening practices showed that including the participants of the Non-Respondent Follow-up Survey to the main survey, diabetes and high cholesterol screening practices rose by 0.8 and 1.9 percentage point respectively whilst hypertension screening practice dropped by 0.5 percentage point. Cancer screening practice among females fell; by 1.9 percentage point and 1.2 percentage point for mammography and Pap smear test respectively. Table 20.7

Table 20.7: Health screening practice among respondents and non-respondents, 2010

Type of Health Screening	Gender	NHS10 (%) (1)	NHS10 & NRS10 (%) (2)	Difference (%) (2) - (1)
Diabetes screening [1] (at least once in the past three years)				
	Both	63.5	64.3	0.8
	Male	64.3	66.1	1.8
	Female	62.8	62.5	-0.3
Hypertension screening [1] (at least once in the past year)				
	Both	70.8	70.3	-0.5
	Male	70.0	68.8	-1.2
	Female	71.6	71.7	0.1
Cholesterol screening [1] (at least once in the past three years)				
	Both	61.2	63.1	1.9
	Male	62.8	65.7	2.9
	Female	59.7	60.6	0.9
Breast cancer screening [2] (Had mammography within the last two years)				
	Female	39.6	37.7	-1.9
Cervical cancer screening [3] (Had Pap Smear within the last three years)				
	Female	47.9	46.7	-1.2

[1] 40 - 69 years, [2] 50 - 69 years, [3] 25 - 69 years

Sample Weights

Sample weights were calculated for the household enumeration exercise and subsequently for the survey fieldwork. For the household enumeration exercise, sample weights (W_{EE}) comprise weights for unequal probability of selection and non-response that were computed based on two attributes, namely the geographic zones (planning areas used by the Urban Redevelopment Authority of Singapore) and dwelling type. For the survey fieldwork, sample weights (W_{SF}) comprise weights for unequal probability of selection and non-response that were computed based on four attributes - age, gender and ethnic group by survey site. Post-stratification weights (W_{PS}) were computed based on the age, gender, ethnic group and dwelling type attributes. The overall sample weights is the product of W_{EE} , W_{SF} and W_{PS}.

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Annexes

Annex A
Detailed Tables

Table I : Diabetes Mellitus : Age-specific rates by gender and ethnic group

percent

	Age (years)					
	18-29	30-39	40-49	50-59	60-69	**18-69**
Males						
Chinese						
Normal	92.2	85.8	75.0	58.8	64.4	**76.0**
Impaired Glucose Tolerance	7.1	9.5	13.7	20.9	16.8	**13.4**
Diabetes Mellitus	0.8	4.7	11.4	20.3	18.8	**10.6**
Malay						
Normal	92.2	83.6	65.3	48.2	39.1	**70.4**
Impaired Glucose Tolerance	7.8	8.9	20.3	16.5	13.2	**13.3**
Diabetes Mellitus	0.0	7.5	14.4	35.4	47.8	**16.2**
Indian						
Normal	96.2	75.7	56.6	32.5	19.9	**65.2**
Impaired Glucose Tolerance	3.8	13.2	17.7	24.7	22.8	**14.6**
Diabetes Mellitus	0.0	11.0	25.7	42.8	57.3	**20.2**
All Ethnic Groups						
Normal	92.6	84.1	71.8	55.6	59.0	**74.2**
Impaired Glucose Tolerance	6.8	10.0	15.0	20.7	16.9	**13.5**
Diabetes Mellitus	0.6	5.9	13.3	23.7	24.1	**12.3**
Females						
Chinese						
Normal	93.1	86.0	77.4	67.7	40.5	**76.1**
Impaired Glucose Tolerance	5.4	12.2	13.1	21.2	29.4	**14.9**
Diabetes Mellitus	1.5	1.9	9.5	11.0	30.1	**8.9**
Malay						
Normal	94.0	69.2	63.8	49.5	31.1	**67.4**
Impaired Glucose Tolerance	5.2	21.7	17.7	19.7	21.2	**15.8**
Diabetes Mellitus	0.8	9.1	18.5	30.8	47.6	**16.9**
Indian						
Normal	89.5	78.0	66.1	46.1	29.2	**69.5**
Impaired Glucose Tolerance	9.7	18.6	20.7	19.1	14.7	**16.5**
Diabetes Mellitus	0.8	3.4	13.2	34.8	56.0	**14.0**
All Ethnic Groups						
Normal	92.8	83.3	74.7	64.1	38.9	**74.5**
Impaired Glucose Tolerance	5.9	13.9	14.3	20.9	27.7	**15.2**
Diabetes Mellitus	1.3	2.8	11.0	15.0	33.4	**10.4**
Total						
Chinese						
Normal	92.6	85.9	76.3	63.3	51.6	**76.1**
Impaired Glucose Tolerance	6.2	10.9	13.4	21.1	23.6	**14.2**
Diabetes Mellitus	1.2	3.2	10.4	15.6	24.8	**9.7**
Malay						
Normal	93.1	76.0	64.6	48.9	34.9	**68.9**
Impaired Glucose Tolerance	6.5	15.7	18.9	18.1	17.4	**14.6**
Diabetes Mellitus	0.4	8.4	16.5	33.0	47.7	**16.6**
Indian						
Normal	92.7	76.8	60.9	39.2	24.8	**67.3**
Impaired Glucose Tolerance	6.9	15.7	19.1	21.9	18.6	**15.5**
Diabetes Mellitus	0.4	7.6	20.0	38.9	56.6	**17.2**
All Ethnic Groups						
Normal	92.7	83.7	73.3	59.9	48.3	**74.3**
Impaired Glucose Tolerance	6.3	12.0	14.6	20.8	22.6	**14.4**
Diabetes Mellitus	1.0	4.3	12.1	19.3	29.1	**11.3**

Table II : Hypertension : Age-specific rates by gender and ethnic group

percent

	Age (years)				
	30-39	40-49	50-59	60-69	**30-69**
Males					
Chinese					
Normal	88.4	78.7	67.1	45.0	**72.8**
Hypertension	11.6	21.3	32.9	55.0	**27.2**
Malay					
Normal	89.9	75.6	65.3	53.9	**74.0**
Hypertension	10.1	24.4	34.7	46.1	**26.0**
Indian					
Normal	92.2	77.3	67.3	51.0	**78.8**
Hypertension	7.8	22.7	32.7	49.0	**21.2**
All Ethnic Groups					
Normal	89.1	78.1	66.9	46.2	**73.6**
Hypertension	10.9	21.9	33.1	53.8	**26.4**
Females					
Chinese					
Normal	95.4	90.6	70.8	49.8	**80.3**
Hypertension	4.6	9.4	29.2	50.2	**19.7**
Malay					
Normal	94.2	76.4	59.2	24.7	**70.2**
Hypertension	5.8	23.6	40.8	75.3	**29.8**
Indian					
Normal	97.4	88.8	68.7	44.6	**82.8**
Hypertension	2.6	11.2	31.3	55.4	**17.2**
All Ethnic Groups					
Normal	95.5	88.5	69.2	47.0	**79.3**
Hypertension	4.5	11.5	30.8	53.0	**20.7**
Total					
Chinese					
Normal	92.0	84.7	69.0	47.4	**76.6**
Hypertension	8.0	15.3	31.0	52.6	**23.4**
Malay					
Normal	92.2	76.0	62.2	38.4	**72.0**
Hypertension	7.8	24.0	37.8	61.6	**28.0**
Indian					
Normal	94.5	82.4	67.9	47.7	**80.7**
Hypertension	5.5	17.6	32.1	52.3	**19.3**
All Ethnic Groups					
Normal	92.4	83.3	68.1	46.6	**76.5**
Hypertension	7.6	16.7	31.9	53.4	**23.5**

Table III : Total Cholesterol : Age-specific rates by gender and ethnic group

percent

	Age (years)					
	18-29	30-39	40-49	50-59	60-69	**18-69**
Males						
Chinese						
Desirable	63.7	41.2	42.1	39.0	42.0	**46.0**
Borderline-high	23.3	38.3	41.3	43.4	35.0	**36.4**
High	13.0	20.5	16.6	17.6	23.0	**17.6**
Malay						
Desirable	67.2	25.8	34.5	34.9	44.6	**43.6**
Borderline-high	21.0	39.7	37.0	36.4	25.9	**31.7**
High	11.8	34.5	28.5	28.8	29.5	**24.7**
Indian						
Desirable	67.5	42.8	46.1	49.7	69.3	**52.1**
Borderline-high	28.3	42.0	34.5	21.0	18.6	**32.2**
High	4.3	15.2	19.4	29.2	12.1	**15.7**
All Ethnic Groups						
Desirable	64.6	39.8	41.5	39.3	43.9	**46.3**
Borderline-high	23.4	39.0	40.0	40.9	33.2	**35.4**
High	12.0	21.2	18.5	19.8	22.9	**18.3**
Females						
Chinese						
Desirable	70.6	59.9	49.2	28.2	35.5	**50.2**
Borderline-high	24.3	28.4	35.2	40.0	42.0	**33.2**
High	5.0	11.7	15.6	31.8	22.4	**16.7**
Malay						
Desirable	62.6	49.4	36.1	33.0	38.7	**45.7**
Borderline-high	30.8	39.9	34.2	36.0	23.0	**33.7**
High	6.5	10.8	29.7	31.0	38.3	**20.6**
Indian						
Desirable	80.2	67.8	43.5	41.0	60.6	**61.0**
Borderline-high	18.1	28.9	41.3	39.3	22.2	**29.8**
High	1.7	3.3	15.2	19.7	17.1	**9.2**
All Ethnic Groups						
Desirable	70.4	59.6	46.9	29.7	37.4	**50.5**
Borderline-high	24.7	29.7	35.6	39.5	38.9	**32.9**
High	4.9	10.7	17.5	30.9	23.7	**16.5**
Total						
Chinese						
Desirable	67.2	51.0	45.7	33.6	38.7	**48.1**
Borderline-high	23.8	33.1	38.2	41.7	38.6	**34.7**
High	9.0	15.9	16.1	24.7	22.7	**17.1**
Malay						
Desirable	65.0	38.0	35.3	33.9	41.4	**44.6**
Borderline-high	25.8	39.8	35.6	36.2	24.4	**32.7**
High	9.2	22.2	29.1	29.9	34.2	**22.6**
Indian						
Desirable	74.1	54.1	44.9	45.5	64.9	**56.3**
Borderline-high	23.0	36.1	37.6	29.9	20.4	**31.1**
High	2.9	9.8	17.5	24.6	14.6	**12.6**
All Ethnic Groups						
Desirable	67.5	50.0	44.2	34.5	40.6	**48.4**
Borderline-high	24.1	34.2	37.8	40.2	36.1	**34.1**
High	8.4	15.8	18.0	25.3	23.3	**17.4**

Table IV : HDL-Cholesterol : Age-specific rates by gender and ethnic group

percent

	Age (years)					
	18-29	30-39	40-49	50-59	60-69	**18-69**
Males						
Chinese						
Desirable	87.1	89.9	89.5	93.8	93.4	**90.4**
Low	12.9	10.1	10.5	6.2	6.6	**9.6**
Malay						
Desirable	88.2	82.2	84.3	73.6	81.1	**82.7**
Low	11.8	17.8	15.7	26.4	18.9	**17.3**
Indian						
Desirable	78.7	58.5	69.3	67.6	80.2	**68.6**
Low	21.3	41.5	30.7	32.4	19.8	**31.4**
All Ethnic Groups						
Desirable	86.5	84.7	86.7	89.4	91.5	**87.3**
Low	13.5	15.3	13.3	10.6	8.5	**12.7**
Females						
Chinese						
Desirable	98.4	100.0	100.0	95.9	94.9	**98.2**
Low	1.6	0.0	0.0	4.1	5.1	**1.8**
Malay						
Desirable	91.2	86.1	98.0	95.7	93.7	**93.0**
Low	8.8	13.9	2.0	4.3	6.3	**7.0**
Indian						
Desirable	90.9	75.1	89.2	86.5	95.5	**85.9**
Low	9.1	24.9	10.8	13.5	4.5	**14.1**
All Ethnic Groups						
Desirable	96.5	95.8	98.8	95.3	94.8	**96.4**
Low	3.5	4.2	1.2	4.7	5.2	**3.6**
Total						
Chinese						
Desirable	92.8	95.2	94.8	94.8	94.2	**94.4**
Low	7.2	4.8	5.2	5.2	5.8	**5.6**
Malay						
Desirable	89.7	84.2	91.3	84.8	87.9	**88.0**
Low	10.3	15.8	8.7	15.2	12.1	**12.0**
Indian						
Desirable	85.1	66.0	78.1	76.7	87.9	**76.8**
Low	14.9	34.0	21.9	23.3	12.1	**23.2**
All Ethnic Groups						
Desirable	91.5	90.4	92.8	92.3	93.2	**91.9**
Low	8.5	9.6	7.2	7.7	6.8	**8.1**

Table V : LDL-Cholesterol : Age-specific rates by gender and ethnic group

percent

	Age (years)					
	18-29	30-39	40-49	50-59	60-69	**18-69**
Males						
Chinese						
Desirable	64.8	41.2	52.4	43.0	49.3	**50.4**
Borderline-high	23.4	43.6	32.4	41.5	25.6	**33.9**
High	11.8	15.3	15.2	15.5	25.0	**15.7**
Malay						
Desirable	59.2	28.3	37.6	36.8	44.4	**42.8**
Borderline-high	29.4	28.9	35.5	34.5	26.0	**31.5**
High	11.4	42.8	26.9	28.7	29.5	**25.7**
Indian						
Desirable	69.9	45.2	41.1	46.8	71.3	**51.8**
Borderline-high	22.4	31.9	37.2	24.8	15.1	**28.8**
High	7.8	22.9	21.6	28.4	13.7	**19.4**
All Ethnic Groups						
Desirable	64.4	40.4	49.2	42.5	50.3	**49.5**
Borderline-high	24.3	40.4	33.3	39.4	25.0	**33.1**
High	11.3	19.3	17.5	18.1	24.7	**17.4**
Females						
Chinese						
Desirable	82.1	73.3	57.7	34.9	44.6	**60.1**
Borderline-high	13.7	19.3	29.7	39.6	41.1	**27.4**
High	4.2	7.4	12.6	25.5	14.3	**12.5**
Malay						
Desirable	72.2	58.7	41.4	38.3	50.8	**53.6**
Borderline-high	23.4	32.6	32.5	29.6	17.5	**28.1**
High	4.4	8.7	26.1	32.1	31.7	**18.4**
Indian						
Desirable	82.7	64.3	48.4	48.0	63.3	**63.1**
Borderline-high	14.4	30.1	33.9	33.0	23.3	**26.6**
High	3.0	5.6	17.8	19.0	13.4	**10.3**
All Ethnic Groups						
Desirable	80.6	70.7	54.7	36.2	46.4	**59.6**
Borderline-high	15.3	21.9	30.4	37.9	37.6	**27.4**
High	4.1	7.3	14.8	25.9	16.0	**13.1**
Total						
Chinese						
Desirable	73.5	58.0	55.1	38.9	46.9	**55.3**
Borderline-high	18.6	30.9	31.0	40.5	33.5	**30.6**
High	8.0	11.1	13.9	20.5	19.6	**14.1**
Malay						
Desirable	65.5	44.1	39.5	37.6	47.8	**48.2**
Borderline-high	26.5	30.8	34.0	32.0	21.5	**29.8**
High	8.0	25.1	26.5	30.4	30.7	**22.0**
Indian						
Desirable	76.5	53.8	44.3	47.4	67.3	**57.2**
Borderline-high	18.2	31.1	35.7	28.8	19.2	**27.8**
High	5.3	15.1	19.9	23.9	13.5	**15.1**
All Ethnic Groups						
Desirable	72.5	56.0	52.0	39.4	48.3	**54.6**
Borderline-high	19.8	30.9	31.9	38.7	31.5	**30.2**
High	7.7	13.1	16.1	22.0	20.3	**15.2**

Table VI : Weight Status : Age-specific rates by gender and ethnic group

percent

	Age (years)					
	18-29	30-39	40-49	50-59	60-69	**18-69**
Males						
Chinese						
Underweight	5.0	5.5	4.7	2.6	7.3	**4.8**
Normal	56.5	43.1	41.2	55.7	58.8	**50.3**
Pre-obese	22.8	35.7	46.2	33.5	30.8	**34.2**
Obese	15.7	15.7	7.9	8.2	3.1	**10.7**
Malay						
Underweight	7.8	5.0	3.1	1.7	3.0	**4.6**
Normal	45.7	43.2	39.3	34.6	42.1	**41.3**
Pre-obese	26.8	30.2	38.9	46.4	31.7	**34.5**
Obese	19.6	21.6	18.8	17.4	23.2	**19.6**
Indian						
Underweight	2.2	2.4	1.2	0.7	0.0	**1.6**
Normal	69.3	46.6	39.0	45.1	28.8	**48.3**
Pre-obese	23.4	36.7	43.3	38.4	55.6	**37.0**
Obese	5.1	14.3	16.6	15.8	15.5	**13.1**
All Ethnic Groups						
Underweight	5.2	5.0	4.1	2.4	6.5	**4.5**
Normal	55.9	43.6	40.7	52.4	55.4	**48.9**
Pre-obese	23.5	35.2	44.9	35.4	32.5	**34.5**
Obese	15.4	16.1	10.3	9.8	5.7	**12.1**
Females						
Chinese						
Underweight	19.9	12.4	7.5	2.6	0.0	**9.3**
Normal	69.5	63.3	66.0	58.6	58.8	**63.7**
Pre-obese	8.9	19.9	20.1	29.9	37.6	**21.8**
Obese	1.6	4.4	6.5	8.8	3.6	**5.1**
Malay						
Underweight	12.4	4.0	0.9	1.1	1.1	**4.9**
Normal	53.0	37.9	31.3	22.4	23.0	**36.4**
Pre-obese	15.8	30.5	40.0	40.7	30.9	**30.5**
Obese	18.8	27.6	27.8	35.8	45.0	**28.2**
Indian						
Underweight	6.8	1.0	3.7	0.0	2.8	**3.1**
Normal	48.4	37.8	35.7	32.3	29.2	**38.6**
Pre-obese	29.9	40.3	33.7	43.0	47.9	**37.1**
Obese	14.9	20.9	26.9	24.7	20.1	**21.1**
All Ethnic Groups						
Underweight	17.4	10.3	6.2	2.2	0.3	**8.2**
Normal	64.6	57.8	58.8	52.4	53.4	**58.0**
Pre-obese	12.2	23.2	23.9	32.1	37.6	**24.3**
Obese	5.8	8.7	11.1	13.2	8.7	**9.5**
Total						
Chinese						
Underweight	12.5	9.2	6.1	2.6	3.6	**7.1**
Normal	63.0	53.7	53.8	57.2	58.8	**57.1**
Pre-obese	15.8	27.4	32.9	31.7	34.3	**27.9**
Obese	8.7	9.7	7.2	8.5	3.4	**7.9**
Malay						
Underweight	10.1	4.5	2.0	1.4	2.0	**4.8**
Normal	49.3	40.5	35.3	28.4	32.0	**38.8**
Pre-obese	21.4	30.3	39.4	43.5	31.3	**32.5**
Obese	19.2	24.7	23.3	26.7	34.8	**24.0**
Indian						
Underweight	4.6	1.8	2.3	0.4	1.4	**2.3**
Normal	58.4	42.6	37.5	39.0	29.0	**43.7**
Pre-obese	26.8	38.3	39.1	40.6	51.7	**37.1**
Obese	10.2	17.3	21.1	20.1	17.8	**16.9**
All Ethnic Groups						
Underweight	11.3	7.7	5.2	2.3	3.3	**6.4**
Normal	60.3	50.9	49.8	52.4	54.4	**53.5**
Pre-obese	17.8	29.0	34.4	33.8	35.1	**29.3**
Obese	10.6	12.3	10.7	11.5	7.2	**10.8**

Table VII : BMI Risk Category : Age-specific rates by gender and ethnic group

percent

	Age (years)					
	18-29	30-39	40-49	50-59	60-69	**18-69**
Males						
Chinese						
Underweight	5.0	5.5	4.7	2.6	7.3	**4.8**
Low Risk	49.6	29.3	27.6	31.7	42.2	**35.5**
Moderate Risk	24.5	36.2	42.9	44.3	36.2	**36.9**
High Risk	20.9	29.0	24.8	21.4	14.3	**22.8**
Malay						
Underweight	7.8	5.0	3.1	1.7	3.0	**4.6**
Low Risk	29.3	19.0	20.2	18.3	21.0	**22.5**
Moderate Risk	30.0	41.3	44.5	42.9	43.4	**39.1**
High Risk	32.9	34.7	32.2	37.1	32.6	**33.8**
Indian						
Underweight	2.2	2.4	1.2	0.7	0.0	**1.6**
Low Risk	47.4	20.4	18.8	21.9	18.7	**26.1**
Moderate Risk	33.2	50.9	46.3	48.0	34.9	**44.2**
High Risk	17.2	26.4	33.7	29.4	46.4	**28.0**
All Ethnic Groups						
Underweight	5.2	5.0	4.1	2.4	6.5	**4.5**
Low Risk	45.9	27.0	25.7	29.4	38.8	**32.9**
Moderate Risk	26.2	38.8	43.4	44.4	36.8	**37.9**
High Risk	22.6	29.2	26.8	23.8	18.0	**24.8**
Females						
Chinese						
Underweight	19.9	12.4	7.5	2.6	0.0	**9.3**
Low Risk	59.5	54.7	47.3	45.7	32.3	**49.4**
Moderate Risk	13.9	20.2	27.3	27.6	46.2	**25.2**
High Risk	6.7	12.6	18.0	24.1	21.5	**16.1**
Malay						
Underweight	12.4	4.0	0.9	1.1	1.0	**4.9**
Low Risk	37.3	19.8	18.2	15.1	7.3	**22.5**
Moderate Risk	25.4	33.7	36.9	25.4	34.4	**30.6**
High Risk	24.9	42.5	44.0	58.4	57.2	**42.1**
Indian						
Underweight	6.8	1.0	3.7	0.0	2.8	**3.1**
Low Risk	33.9	21.7	18.2	18.5	11.6	**22.9**
Moderate Risk	35.1	41.1	34.1	32.5	30.5	**35.8**
High Risk	24.2	36.1	44.0	49.0	55.0	**38.2**
All Ethnic Groups						
Underweight	17.4	10.3	6.2	2.2	0.3	**8.2**
Low Risk	53.2	47.4	40.9	40.1	28.5	**43.6**
Moderate Risk	18.0	23.9	29.2	27.6	44.1	**26.8**
High Risk	11.5	18.4	23.7	30.0	27.1	**21.4**
Total						
Chinese						
Underweight	12.5	9.2	6.1	2.6	3.6	**7.1**
Low Risk	54.6	42.7	37.6	38.7	37.1	**42.6**
Moderate Risk	19.2	27.8	34.9	35.9	41.3	**30.9**
High Risk	13.8	20.4	21.3	22.7	18.0	**19.4**
Malay						
Underweight	10.1	4.5	2.0	1.4	2.0	**4.8**
Low Risk	33.2	19.4	19.2	16.7	13.7	**22.5**
Moderate Risk	27.7	37.4	40.7	34.0	38.6	**34.8**
High Risk	28.9	38.8	38.2	47.9	45.7	**38.0**
Indian						
Underweight	4.6	1.8	2.3	0.4	1.4	**2.3**
Low Risk	40.3	21.0	18.5	20.3	15.1	**24.6**
Moderate Risk	34.2	46.5	40.9	40.6	32.7	**40.2**
High Risk	20.9	30.8	38.2	38.8	50.8	**32.8**
All Ethnic Groups						
Underweight	11.3	7.7	5.2	2.3	3.3	**6.4**
Low Risk	49.6	37.5	33.3	34.7	33.5	**38.3**
Moderate Risk	22.1	31.1	36.3	36.0	40.5	**32.3**
High Risk	17.0	23.6	25.2	26.9	22.6	**23.0**

Table VIII : Abdominal Fatness : Age-specific rates by gender and ethnic group

percent

	Age (years)					
	18-29	30-39	40-49	50-59	60-69	**18-69**
Males						
Chinese						
No Abdominal Fatness	97.4	97.2	94.8	92.1	90.6	**94.8**
Abdominal Fatness	2.6	2.8	5.2	7.9	9.4	**5.2**
Malay						
No Abdominal Fatness	97.9	93.9	97.4	93.3	93.1	**95.8**
Abdominal Fatness	2.1	6.1	2.6	6.7	6.9	**4.2**
Indian						
No Abdominal Fatness	98.6	95.1	86.8	78.6	77.5	**90.0**
Abdominal Fatness	1.4	4.9	13.2	21.4	22.5	**10.0**
All Ethnic Groups						
No Abdominal Fatness	97.6	96.5	94.3	91.2	90.0	**94.4**
Abdominal Fatness	2.4	3.5	5.7	8.8	10.0	**5.6**
Females						
Chinese						
No Abdominal Fatness	94.3	85.8	80.3	55.5	41.9	**74.7**
Abdominal Fatness	5.7	14.2	19.7	44.5	58.1	**25.3**
Malay						
No Abdominal Fatness	87.4	74.8	69.3	44.4	23.1	**66.8**
Abdominal Fatness	12.6	25.2	30.7	55.6	76.9	**33.2**
Indian						
No Abdominal Fatness	78.3	53.7	56.2	37.9	22.8	**55.9**
Abdominal Fatness	21.7	46.3	43.8	62.1	77.2	**44.1**
All Ethnic Groups						
No Abdominal Fatness	91.6	81.2	76.8	52.9	38.9	**72.0**
Abdominal Fatness	8.4	18.8	23.2	47.1	61.1	**28.0**
Total						
Chinese						
No Abdominal Fatness	95.9	91.2	87.4	73.8	65.8	**84.5**
Abdominal Fatness	4.1	8.8	12.6	26.2	34.2	**15.5**
Malay						
No Abdominal Fatness	92.7	84.0	83.2	68.5	55.9	**81.1**
Abdominal Fatness	7.3	16.0	16.8	31.5	44.1	**18.9**
Indian						
No Abdominal Fatness	88.0	76.5	73.3	59.2	49.6	**73.9**
Abdominal Fatness	12.0	23.5	26.7	40.8	50.4	**26.1**
All Ethnic Groups						
No Abdominal Fatness	94.6	88.6	85.5	72.1	63.8	**83.1**
Abdominal Fatness	5.4	11.4	14.5	27.9	36.2	**16.9**

Table IX : Cigarette Smoking : Age-specific rates by gender and ethnic group

percent

	Age (years)					
	18-29	30-39	40-49	50-59	60-69	**18-69**
Males						
Chinese						
Non-smoker	72.8	57.9	62.7	59.3	53.4	**62.0**
Ex-smoker	4.2	10.8	9.8	20.6	25.8	**13.1**
Occasional Smoker	1.9	2.2	6.5	1.5	0.0	**2.7**
Daily Smoker	21.2	29.1	21.0	18.5	20.8	**22.2**
Malay						
Non-smoker	38.5	28.7	33.8	35.0	33.4	**34.5**
Ex-smoker	6.1	10.0	14.9	23.9	24.1	**13.8**
Occasional Smoker	6.8	9.0	4.6	3.3	10.5	**6.3**
Daily Smoker	48.7	52.3	46.7	37.8	32.1	**45.5**
Indian						
Non-smoker	73.9	70.0	63.4	63.8	58.7	**67.5**
Ex-smoker	6.3	13.5	16.5	10.8	16.2	**12.4**
Occasional Smoker	4.6	3.9	1.3	1.7	0.0	**2.8**
Daily Smoker	15.1	12.5	18.8	23.8	25.1	**17.3**
All Ethnic Groups						
Non-smoker	67.1	56.5	58.9	56.8	51.9	**59.0**
Ex-smoker	4.7	11.1	11.2	20.3	25.0	**13.1**
Occasional Smoker	3.0	3.2	5.7	1.7	1.0	**3.2**
Daily Smoker	25.3	29.3	24.2	21.2	22.1	**24.7**
Females						
Chinese						
Non-smoker	91.2	90.2	91.5	97.5	97.5	**93.1**
Ex-smoker	2.8	4.6	3.1	0.7	1.1	**2.6**
Occasional Smoker	0.6	1.1	0.0	0.5	0.0	**0.5**
Daily Smoker	5.4	4.1	5.5	1.4	1.4	**3.8**
Malay						
Non-smoker	73.0	85.5	94.7	95.1	99.0	**87.1**
Ex-smoker	6.5	3.4	0.5	0.5	0.0	**2.7**
Occasional Smoker	4.9	1.5	0.6	0.7	0.0	**2.0**
Daily Smoker	15.6	9.5	4.2	3.6	1.0	**8.1**
Indian						
Non-smoker	88.0	97.0	98.4	100.0	100.0	**95.6**
Ex-smoker	1.1	0.8	0.5	0.0	0.0	**0.6**
Occasional Smoker	3.5	1.3	1.1	0.0	0.0	**1.5**
Daily Smoker	7.4	0.9	0.0	0.0	0.0	**2.3**
All Ethnic Groups						
Non-smoker	87.9	90.4	92.5	97.4	97.8	**92.6**
Ex-smoker	3.2	4.0	2.5	0.6	0.9	**2.5**
Occasional Smoker	1.6	1.2	0.2	0.5	0.0	**0.8**
Daily Smoker	7.3	4.3	4.8	1.5	1.2	**4.2**
Total						
Chinese						
Non-smoker	82.0	74.9	77.2	78.4	76.0	**77.9**
Ex-smoker	3.5	7.5	6.4	10.6	13.1	**7.7**
Occasional Smoker	1.2	1.6	3.2	1.0	0.0	**1.6**
Daily Smoker	13.3	16.0	13.1	9.9	10.9	**12.8**
Malay						
Non-smoker	55.5	58.1	64.6	65.5	68.3	**61.2**
Ex-smoker	6.3	6.6	7.6	12.1	11.3	**8.2**
Occasional Smoker	5.9	5.1	2.6	2.0	4.9	**4.1**
Daily Smoker	32.4	30.1	25.2	20.5	15.6	**26.5**
Indian						
Non-smoker	81.3	82.2	78.9	81.2	79.8	**80.8**
Ex-smoker	3.6	7.8	9.4	5.6	7.9	**6.8**
Occasional Smoker	4.0	2.8	1.2	0.9	0.0	**2.2**
Daily Smoker	11.1	7.3	10.5	12.4	12.3	**10.1**
All Ethnic Groups						
Non-smoker	77.5	74.0	75.7	77.1	75.5	**76.0**
Ex-smoker	4.0	7.5	6.9	10.5	12.6	**7.7**
Occasional Smoker	2.3	2.2	2.9	1.1	0.5	**2.0**
Daily Smoker	16.3	16.4	14.5	11.4	11.4	**14.3**

Table X : Alcohol Consumption : Age-specific rates by gender and ethnic group

percent

	Age (years)					
	18-29	30-39	40-49	50-59	60-69	**18-69**
Males						
Chinese						
Non-drinker	19.9	31.1	35.5	41.8	51.9	**34.5**
Occasional Drinker	71.7	46.1	42.0	41.6	31.0	**48.0**
Frequent Drinker	6.4	18.4	17.8	12.1	11.5	**13.4**
Regular Drinker	2.0	4.5	4.7	4.6	5.6	**4.1**
Malay						
Non-drinker	70.3	79.9	89.4	95.9	97.4	**83.7**
Occasional Drinker	27.3	16.6	7.7	2.1	2.6	**13.8**
Frequent Drinker	1.1	3.5	1.4	1.2	0.0	**1.5**
Regular Drinker	1.3	0.0	1.6	0.8	0.0	**0.9**
Indian						
Non-drinker	52.5	47.6	50.2	35.0	72.5	**49.1**
Occasional Drinker	39.0	40.7	30.1	25.3	16.6	**33.6**
Frequent Drinker	7.7	9.6	15.4	25.1	3.5	**12.6**
Regular Drinker	0.8	2.1	4.2	14.6	7.3	**4.7**
All Ethnic Groups						
Non-drinker	31.5	38.6	44.3	47.7	57.3	**42.3**
Occasional Drinker	61.1	42.2	36.2	35.7	27.6	**42.2**
Frequent Drinker	5.6	15.5	15.3	11.8	9.9	**11.8**
Regular Drinker	1.8	3.7	4.2	4.9	5.2	**3.8**
Females						
Chinese						
Non-drinker	37.0	48.0	65.7	75.5	80.8	**59.5**
Occasional Drinker	54.7	43.5	28.6	22.8	17.0	**35.0**
Frequent Drinker	8.3	5.4	3.9	0.4	0.0	**4.0**
Regular Drinker	0.0	3.0	1.8	1.2	2.3	**1.6**
Malay						
Non-drinker	80.8	93.2	98.2	100.0	100.0	**92.7**
Occasional Drinker	16.1	4.6	0.9	0.0	0.0	**5.8**
Frequent Drinker	2.1	2.2	0.9	0.0	0.0	**1.2**
Regular Drinker	0.9	0.0	0.0	0.0	0.0	**0.3**
Indian						
Non-drinker	66.3	82.0	82.0	88.6	85.0	**79.0**
Occasional Drinker	25.2	16.4	16.3	11.4	11.9	**17.6**
Frequent Drinker	4.0	1.0	1.0	0.0	0.0	**1.6**
Regular Drinker	4.6	0.6	0.8	0.0	3.1	**1.8**
All Ethnic Groups						
Non-drinker	47.2	56.6	71.5	79.4	82.9	**65.5**
Occasional Drinker	45.4	36.4	23.8	19.2	15.0	**29.7**
Frequent Drinker	6.8	4.6	3.2	0.4	0.0	**3.4**
Regular Drinker	0.6	2.4	1.5	1.0	2.1	**1.5**
Total						
Chinese						
Non-drinker	28.5	40.0	50.7	58.6	66.7	**47.2**
Occasional Drinker	63.2	44.8	35.3	32.2	23.8	**41.4**
Frequent Drinker	7.4	11.6	10.8	6.3	5.6	**8.6**
Regular Drinker	1.0	3.7	3.2	2.9	3.9	**2.9**
Malay						
Non-drinker	75.5	86.8	93.8	98.0	98.8	**88.3**
Occasional Drinker	21.8	10.4	4.3	1.0	1.2	**9.7**
Frequent Drinker	1.6	2.8	1.1	0.6	0.0	**1.4**
Regular Drinker	1.1	0.0	0.8	0.4	0.0	**0.6**
Indian						
Non-drinker	59.7	63.1	64.2	60.8	78.9	**63.3**
Occasional Drinker	31.8	29.8	24.0	18.6	14.2	**26.0**
Frequent Drinker	5.7	5.7	9.0	13.0	1.7	**7.3**
Regular Drinker	2.8	1.4	2.7	7.6	5.2	**3.3**
All Ethnic Groups						
Non-drinker	39.4	47.9	57.9	63.6	70.5	**54.0**
Occasional Drinker	53.2	39.2	30.0	27.5	21.1	**35.9**
Frequent Drinker	6.2	9.9	9.3	6.1	4.8	**7.6**
Regular Drinker	1.2	3.0	2.8	2.9	3.6	**2.6**

Table XI : Leisure-time Physical Activity : Age-specific rates by gender and ethnic group percent

	Age (years)					
	18-29	30-39	40-49	50-59	60-69	**18-69**
Males						
Chinese						
No Exercise	28.9	49.4	55.4	46.6	53.7	**46.2**
Occasional Exercise	44.6	35.0	27.2	28.3	10.8	**30.9**
Regular Exercise	26.5	15.6	17.5	25.1	35.4	**22.9**
Malay						
No Exercise	33.6	40.5	61.5	60.9	75.9	**50.2**
Occasional Exercise	37.3	39.4	22.7	21.8	15.0	**29.4**
Regular Exercise	29.1	20.2	15.8	17.3	9.1	**20.4**
Indian						
No Exercise	31.6	49.3	51.3	60.2	71.3	**49.1**
Occasional Exercise	30.5	30.5	27.1	18.2	7.1	**26.1**
Regular Exercise	37.9	20.3	21.6	21.6	21.5	**24.8**
All Ethnic Groups						
No Exercise	30.0	48.4	55.8	49.3	56.8	**47.0**
Occasional Exercise	42.0	34.9	26.6	26.8	11.0	**30.3**
Regular Exercise	28.1	16.7	17.7	23.9	32.2	**22.8**
Females						
Chinese						
No Exercise	42.8	63.3	57.3	64.3	74.4	**59.1**
Occasional Exercise	38.9	24.9	27.3	20.3	6.8	**25.2**
Regular Exercise	18.3	11.9	15.4	15.4	18.8	**15.7**
Malay						
No Exercise	63.5	66.3	62.5	78.2	89.0	**68.8**
Occasional Exercise	28.8	22.6	22.4	13.4	2.0	**20.8**
Regular Exercise	7.7	11.1	15.1	8.4	8.9	**10.4**
Indian						
No Exercise	56.3	60.6	70.0	73.7	86.0	**65.6**
Occasional Exercise	31.5	13.0	10.7	9.2	4.7	**16.2**
Regular Exercise	12.2	26.4	19.3	17.1	9.3	**18.2**
All Ethnic Groups						
No Exercise	47.6	63.3	59.1	66.7	76.6	**60.9**
Occasional Exercise	36.5	23.3	25.2	18.7	6.2	**23.9**
Regular Exercise	15.9	13.4	15.7	14.7	17.3	**15.2**
Total						
Chinese						
No Exercise	35.9	56.7	56.4	55.4	64.3	**52.7**
Occasional Exercise	41.7	29.7	27.2	24.3	8.7	**28.0**
Regular Exercise	22.4	13.6	16.4	20.3	26.9	**19.2**
Malay						
No Exercise	48.3	53.8	62.0	69.6	82.9	**59.6**
Occasional Exercise	33.1	30.7	22.5	17.5	8.1	**25.0**
Regular Exercise	18.5	15.5	15.4	12.8	9.0	**15.3**
Indian						
No Exercise	44.5	54.4	59.6	66.7	78.8	**56.9**
Occasional Exercise	31.0	22.6	19.9	13.9	5.9	**21.4**
Regular Exercise	24.5	23.0	20.6	19.4	15.3	**21.7**
All Ethnic Groups						
No Exercise	38.8	56.1	57.4	58.0	67.0	**54.0**
Occasional Exercise	39.2	28.9	25.9	22.7	8.5	**27.0**
Regular Exercise	22.0	15.0	16.7	19.3	24.5	**19.0**

Old definition

Table XII : Total Physical Activity : Age-specific rates by gender and ethnic group percent

	Age (years)					
	18-29	30-39	40-49	50-59	60-69	**18-69**
Males						
Chinese						
Low Level	34.1	48.2	49.0	44.2	41.1	**43.5**
Moderate Level	41.4	29.3	30.0	39.7	39.9	**35.7**
High Level	24.5	22.5	21.0	16.2	18.9	**20.8**
Malay						
Low Level	29.0	39.3	36.7	37.6	35.2	**34.9**
Moderate Level	25.4	23.9	28.4	32.5	47.8	**29.0**
High Level	45.5	36.8	34.9	29.8	17.0	**36.1**
Indian						
Low Level	32.5	31.0	34.9	42.9	32.5	**34.2**
Moderate Level	26.7	49.2	48.0	39.3	49.6	**42.4**
High Level	40.9	19.8	17.1	17.8	17.9	**23.4**
All Ethnic Groups						
Low Level	33.1	44.8	45.8	43.3	40.1	**41.5**
Moderate Level	37.3	31.5	31.7	38.8	41.2	**35.5**
High Level	29.6	23.7	22.5	17.9	18.7	**23.0**
Females						
Chinese						
Low Level	39.0	43.4	27.0	40.0	36.3	**37.1**
Moderate Level	46.7	44.1	51.2	41.4	40.9	**45.3**
High Level	14.3	12.5	21.8	18.6	22.8	**17.6**
Malay						
Low Level	37.4	24.8	32.4	35.5	58.9	**35.4**
Moderate Level	46.5	46.8	41.5	46.6	27.4	**43.7**
High Level	16.1	28.4	26.1	17.9	13.7	**21.0**
Indian						
Low Level	41.0	25.7	32.9	33.2	60.3	**35.3**
Moderate Level	46.0	59.4	51.0	46.2	22.9	**49.0**
High Level	12.9	14.9	16.1	20.6	16.8	**15.7**
All Ethnic Groups						
Low Level	38.9	39.4	28.2	39.0	40.0	**36.7**
Moderate Level	46.6	46.1	49.9	42.4	38.5	**45.4**
High Level	14.5	14.5	21.9	18.7	21.5	**17.8**
Total						
Chinese						
Low Level	36.6	45.6	37.8	42.1	38.7	**40.2**
Moderate Level	44.1	37.1	40.8	40.5	40.4	**40.6**
High Level	19.4	17.3	21.4	17.4	20.9	**19.2**
Malay						
Low Level	33.2	31.9	34.5	36.5	47.8	**35.1**
Moderate Level	35.8	35.7	35.0	39.7	37.0	**36.4**
High Level	31.0	32.5	30.5	23.8	15.3	**28.4**
Indian						
Low Level	36.8	28.6	34.0	38.2	46.7	**34.7**
Moderate Level	36.6	53.8	49.3	42.6	36.0	**45.5**
High Level	26.6	17.6	16.7	19.2	17.3	**19.8**
All Ethnic Groups						
Low Level	36.0	42.1	37.0	41.1	40.0	**39.1**
Moderate Level	42.0	39.0	40.8	40.6	39.8	**40.5**
High Level	22.0	18.9	22.2	18.3	20.2	**20.4**

New definition

Table XIII : Self-rated Overall health : Age-specific rates by gender and ethnic group

percent

	Age (years)					
	18-29	30-39	40-49	50-59	60-69	**18-69**
Males						
Chinese						
Good/Very Good	60.1	62.8	58.3	59.1	54.3	**59.3**
Moderate	35.1	36.1	39.5	39.5	43.7	**38.3**
Bad/Very Bad	4.8	1.1	2.3	1.4	2.0	**2.4**
Malay						
Good/Very Good	81.3	70.1	73.5	82.8	84.0	**77.9**
Moderate	17.4	28.5	24.6	17.2	14.6	**20.9**
Bad/Very Bad	1.3	1.4	1.9	0.0	1.4	**1.2**
Indian						
Good/Very Good	82.6	84.4	77.7	77.6	78.6	**81.0**
Moderate	14.8	14.1	21.2	21.7	17.2	**17.4**
Bad/Very Bad	2.5	1.5	1.2	0.7	4.2	**1.7**
All Ethnic Groups						
Good/Very Good	65.8	66.6	62.3	63.3	58.5	**63.8**
Moderate	30.2	32.2	35.6	35.5	39.4	**34.0**
Bad/Very Bad	4.0	1.1	2.1	1.2	2.1	**2.1**
Females						
Chinese						
Good/Very Good	69.2	59.3	49.1	48.6	51.5	55.9
Moderate	28.8	39.6	47.6	48.7	45.4	41.7
Bad/Very Bad	2.1	1.1	3.4	2.7	3.0	2.4
Malay						
Good/Very Good	68.3	70.5	70.2	82.4	81.4	73.0
Moderate	27.4	27.6	29.8	15.9	18.7	25.1
Bad/Very Bad	4.3	1.8	0.0	1.7	0.0	1.9
Indian						
Good/Very Good	75.0	71.5	71.8	84.0	66.4	74.1
Moderate	20.4	28.4	26.4	14.7	33.6	24.1
Bad/Very Bad	4.5	0.0	1.8	1.3	0.0	1.8
All Ethnic Groups						
Good/Very Good	69.6	61.9	53.9	55.2	55.4	59.8
Moderate	27.7	37.1	43.4	42.3	42.1	38.0
Bad/Very Bad	2.7	1.0	2.8	2.5	2.5	2.3
Total						
Chinese						
Good/Very Good	64.6	61.0	53.5	53.9	52.9	57.6
Moderate	31.9	37.9	43.6	44.1	44.6	40.0
Bad/Very Bad	3.5	1.1	2.8	2.1	2.5	2.4
Malay						
Good/Very Good	74.9	70.3	71.8	82.6	82.6	75.4
Moderate	22.4	28.0	27.3	16.5	16.8	23.0
Bad/Very Bad	2.8	1.6	0.9	0.9	0.7	1.6
Indian						
Good/Very Good	78.7	78.6	75.1	80.8	72.3	77.7
Moderate	17.7	20.6	23.5	18.3	25.6	20.6
Bad/Very Bad	3.6	0.7	1.4	1.0	2.0	1.7
All Ethnic Groups						
Good/Very Good	67.7	64.2	58.0	59.2	56.9	61.7
Moderate	28.9	34.7	39.5	38.9	40.8	36.0
Bad/Very Bad	3.3	1.1	2.4	1.8	2.3	2.2

Annex B
Consent Form

Ministry of Health

NATIONAL HEALTH SURVEY 2010
CONSENT FORM

I, *(name)* _____ *(NRIC no.)* _____ consent to participate in the National Health Survey 2010 conducted by the Ministry of Health. I have received a letter explaining the purpose of the survey and the procedures to be carried out during the survey.

I understand that

a) My participation in this survey is voluntary and I can withdraw from the survey at any time with no penalty.

b) The examination that I will receive involves tests for diabetes, blood lipids (fat) and urinary protein; measurement of blood pressure, height and weight, abdomen, waist and hip circumference, and a screening test for hearing loss; and answering questionnaires on my lifestyle and dietary practices. To perform the various blood tests, about 15 cc (approx. 3 teaspoons) of blood will be withdrawn.

c) A copy of the results of all tests done on me will be sent to me for my information and retention.

d) Any information that is gathered from the survey will be used to assess the health status of Singapore's population and to help the Ministry of Health to draw up appropriate health policies and programmes for the future.

e) The Ministry of Health may perform data linkage between the information collected from me in this survey, and information about me contained in its own databases such as the National Registry of Diseases Office, electronic medical records of public sector hospitals, or other government databases such as the Births and Deaths Registry; the information obtained from this data linkage will only be used to assess the health of Singapore's population and/or to plan and develop national health policies and programmes.

f) Any remaining blood sample taken during the National Health Survey 2010 may be stored and used for future analysis, if necessary, for assessing the health of Singapore's population and/or for the planning and evaluation of national health policies and programmes.

g) Except as provided by law, all information provided by me and all my test results as well as results of any future analysis will be kept strictly confidential and any reporting would be done by way of anonymised (unidentifiable) data from all the participants in the study on a collective basis.

h) I may be recontacted in the future for any follow-up studies. I may however, choose not to participate in such studies when contacted.

Your signature on this form indicates that you have understood to your satisfaction the information regarding your participation in the National Health Survey 2010 and agree to participate in it.

Participant's Signature _____ Date _____

Witness:

Name _____

NRIC No. _____

Signature _____ Date _____

Annex C
Survey Questionnaire

Ministry of Health

Interviewer ID: | | | | |

Subject Survey ID: | | | | | | | |

NATIONAL HEALTH SURVEY 2010
SURVEY QUESTIONNAIRE

1. Registration

Individual information collected for the Survey will be kept strictly confidential and only aggregated data will be published.

Identification

Could you please show me the invitation letter and your NRIC, so that we can properly identify you?

1000. Name: _____

1001. NRIC No.: | | | | | | | | | | |

1002. Date of birth: | | | | | | | | |

D D M M Y Y Y Y

Age: | | |

1003. Date of registration: | | | | | 2 | 0 | 1 | 0 |

D D M M Y Y Y Y

1004. Survey Site **[SA]**

- ☐ 1) Woodlands Polyclinic
- ☐ 2) Hougang Polyclinic
- ☐ 3) Toa Payoh South Community Club
- ☐ 4) Outram Polyclinic
- ☐ 5) Tampines Polyclinic
- ☐ 6) Bukit Batok Polyclinic

1005. Gender **[SA]**

- ☐ 1) Male
- ☐ 2) Female

Epidemiology and Disease Control Division

1006. Ethnic group (as listed in IC) **[SA]**

☐ 1) Chinese ☐ 3) Indian

☐ 2) Malay ☐ 4) Others

1007. Are you a Singapore citizen? **[SA]**

☐ 1) Yes, I am a Singapore citizen ➜ **Go to 1007a**

☐ 2) No, I am a permanent resident ➜ **Go to 1008**

1007a. Did you previously hold citizenship of another country? **[SA]**

☐ 1) Yes ➜ **Go to 1007b** ☐ 2) No ➜ **Go to 1009**

1007b. What is the country of your previous citizenship? **[SA]**

☐ 1) Malaysia

☐ 2) Other Southeast Asian countries (e.g. Indonesia, Thailand, Philippines)

☐ 3) China

☐ 4) Hong Kong, Taiwan, Japan or South Korea

☐ 5) India

☐ 6) Other Asian countries (e.g. Pakistan, Russia, Saudi Arabia) excluding countries listed in (1) to (5) above

☐ 7) Australia or New Zealand

☐ 8) European countries (e.g. United Kingdom, France, Germany)

☐ 9) USA or Canada

☐ 10) South American countries (e.g. Brazil, Argentina, Mexico)

☐ 11) African countries (e.g. Egypt, South Africa, Nigeria)

☐ 12) Others (please specify: _____)

1007c. In which year did you take up Singapore citizenship?

_____ ➜ **Go to 1009**

1008. What is the country of your current citizenship? **[SA]**

- ☐ 1) Malaysia
- ☐ 2) Other Southeast Asian countries (e.g. Indonesia, Thailand, Philippines)
- ☐ 3) China
- ☐ 4) Hong Kong, Taiwan, Japan or South Korea
- ☐ 5) India
- ☐ 6) Other Asian countries (e.g. Pakistan, Russia, Saudi Arabia) countries listed in (1) to (5) above
- ☐ 7) Australia or New Zealand
- ☐ 8) European countries (e.g. United Kingdom, France, Germany)
- ☐ 9) USA or Canada
- ☐ 10) South American countries (e.g. Brazil, Argentina, Mexico)
- ☐ 11) African countries (e.g. Egypt, South Africa, Nigeria)
- ☐ 12) Others (please specify: _____)

Height and weight measurements

1009. What is your height? _____Cm / _____ Ft _____ Inches

- ☐ 1) Refused
- ☐ 2) Don't know

1010. What is your weight? _____Kg / _____ Lbs

- ☐ 1) Refused
- ☐ 2) Don't know

1011. Have you ever been told by a doctor (western trained) that you are overweight or you need to lose weight? **[SA]**

- ☐ 1) Yes
- ☐ 2) No
- ☐ 3) Refused
- ☐ 4) Don't know/not sure

END OF SECTION 1. GO TO SECTION 2.

2. Demographics

Now I would like to ask questions on socio-economic status.

2001. What is your current marital status? **[SA]**

- ☐ 1) Never married
- ☐ 2) Currently married
- ☐ 3) Separated
- ☐ 4) Divorced
- ☐ 5) Widowed
- ☐ 6) Refused

2002. What is the highest level of education* that you have attained? **[SA]**
[USE SHOWCARD]

- ☐ 1) No formal education / primary
- ☐ 2) PSLE
- ☐ 3) Secondary
- ☐ 4) 'O' / 'N' level or NTC 3 certificate or its equivalent
- ☐ 5) 'A' level or NTC 1-2 or Certificate in office/ business skills or its equivalent
- ☐ 6) Polytechnic diploma
- ☐ 7) Other diploma & professional qualification
- ☐ 8) University & above
- ☐ 9) Refused

* Refers to the highest level or standard which a person had passed or attained and awarded a certificate, either through attendance at an institution of learning or through correspondence or self-study.

2003. How many years of school, including higher education, have you completed?

_____ Number of years

- ☐ 1) Refused
- ☐ 2) Don't know

2004. Which of the following best describes your main work status over the last 12 months? **[SA]**
[USE SHOWCARD]

- ☐ 1) Working (specify current occupation: _____)
- ☐ 2) Student (full-time)
- ☐ 3) National Service
- ☐ 4) Homemaker/Housewife
- ☐ 5) Retired (specify previous occupation: _____)
- ☐ 6) Unemployed (able to work) (specify previous occupation: _____)
- ☐ 7) Unemployed (unable to work because of disability or other medical conditions)
- ☐ 8) Refused

2005. Over the last 12 months, can you tell me what the average earnings (S$) of the household have been per month? **[SA]**

[READ AND SHOW TABLE CARD TO RESPONDENT]

- ☐ 1) Below 2,000 per month
- ☐ 2) 2,000 - 3,999 per month
- ☐ 3) 4,000 - 5,999 per month
- ☐ 4) 6,000 - 9,999 per month
- ☐ 5) 10,000 & above
- ☐ 6) Refused
- ☐ 7) Don't know

2006. Remarks

END OF SECTION 2. GO TO SECTION 3.

3. Physical Activity

I would like to assure that all information provided is confidential and will only be used for research purposes.

Let me start by asking about your physical activity participation in three settings -
1. Activity at work, 2. Travel to and from places, and 3. Recreational activities

Think first about the time you spend doing work. Think of work as the things that you **have to do** such as paid or unpaid work, household chores, or looking for a job. In answering the following questions, 'vigorous-intensity activities' are activities that require hard physical effort and cause large increases in breathing or heart rate, 'moderate-intensity activities' are activities that require moderate physical effort and cause small increases in breathing or heart rate.

3000. Does your work involve *vigorous*-intensity activity that causes large increases in breathing or heart rate, like [heavy lifting, digging or construction work] for at least 10 minutes continuously? **[SA]**
[INSERT EXAMPLES & USE SHOWCARD]

☐ 1) Yes ☐ 2) No ➜ **Go to Q3002**

3001. In a typical week, on how many days do you do *vigorous*-intensity activities as part of your work?

_____ Days a week

3001a. On a typical day on which you do *vigorous*-intensity activities, how much time (in total) do you spend doing such work?

_____ Hrs _____ Mins

[Go to Q3004]

3002. Does your work involve *moderate*-intensity activity that causes small increases in breathing or heart rate like mopping the floor [or carrying light loads] for at least 10 minutes at a time? **[SA]**
[INSERT EXAMPLES & USE SHOWCARD]

☐ 1) Yes ☐ 2) No ➜ **Go to Q3004**

3003. In a typical week, on how many days do you do *moderate*-intensity activities as part of your work?

_____ Days a week

3003a. On a typical day on which you do *moderate*-intensity activities, how much time (in total) do you spend doing such work?

_____ Hrs _____ Mins

The next questions exclude the physical activities at work that you have already mentioned. Now, I would like to ask you about the usual way you travel to and from places. For example, going to work, shopping, market, or church, temple or mosque or going out for lunch.

3004. In a usual week, on how many days do you walk or bicycle (pedal cycle) for at least 10 minutes continuously to get to and from places?

_____ Days a week **[If 0, go to Q3100]**

3004a. On a typical day when you walk or bicycle (pedal cycle) for at least 10 minutes continuously, how much time (in total) do you spend walking?

_____ Hrs _____ Mins

The next questions exclude the work and transport activities that you have already mentioned. Now, I would like to ask you about sports, fitness and recreational activities (leisure) like swimming and badminton.

3100. In the past 3 months, did you participate in any sports, exercise or walking during your leisure time? **[SA]**

☐ 1) Yes ➜ **Go to Q3101** ☐ 2) No ➜ **Go to Q3100a**

If NO:

3100a. What is your main reason for not doing any leisure physical activity? **[SA]**
[DO NOT READ OUT]

☐ 1) No time due to work / family commitment
☐ 2) No companion to exercise with
☐ 3) Too lazy
☐ 4) Too tired because of work commitment etc
☐ 5) Too old
☐ 6) Poor health
☐ 7) Doctor advised not to exercise
☐ 8) Have enough exercise at work
☐ 9) Lack of facilities
☐ 10) Weather is too hot / humid
☐ 11) No interest
☐ 12) Accident/ short-term injuries
☐ 13) Others (please specify: _____)

[Go to Q3107]

If YES in Q3100:

3101. Do you do any *vigorous*-intensity sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate such as running or football, for at least 10 minutes continuously? **[SA]**

[USE SHOWCARD]

☐ 1) Yes ☐ 2) No ➜ **Go to Q3104**

3102. In a typical week, on how many days do you do *vigorous*-intensity sports, fitness or recreational (leisure) activities?

_____ Days a week

3103. How much time do you spend doing *vigorous*-intensity sports, fitness or recreational activities (leisure) on a typical day?

_____ Hrs _____ Mins

[Go to Q3107]

3104. Do you do any *moderate*-intensity sports, fitness or recreational (leisure) activities that cause small increases in breathing or heart rate such as brisk walking, for at least 10 minutes continuously? **[SA]**

[USE SHOWCARD]

☐ 1) Yes ☐ 2) No ➜ **Go to Q3107**

3105. In a typical week, on how many days do you do *moderate*-intensity sports, fitness or recreational (leisure) activities?

_____ Days a week

3106. How much time do you spend doing *moderate*-intensity sports, fitness or recreational (leisure) activities on a typical day?

_____ Hrs _____ Mins

The following question is about sitting or reclining at work, at home, getting to and from places, or with friends, including time spent [sitting at a desk, sitting with friends, travelling in car, bus, train, reading, playing cards or watching television], but do not include time spent sleeping.

3107. How much time do you usually spend sitting or reclining on a typical day?

_____ Hrs _____ Mins

END OF SECTION 3. GO TO SECTION 4.

4. Cigarette Smoking

Now, I would like to ask questions on smoking.

4000. Have you ever smoked cigarettes? **[SA]**

☐ 1) Yes ☐ 2) No ➜ **Go to Q4021**

IF YES:
Now I would like to ask you some questions about your cigarette consumption patterns and the reasons for picking the habit if you are a daily smoker or quitting the habit if you are an ex-smoker.

4001. Have you ever smoked at least 100 cigarettes (about 5 packs) in your whole life? **[SA]**

☐ 1) Yes ☐ 2) No ➜ **Go to Q4021**

4002. Have you ever smoked cigarettes daily? **[SA]**

☐ 1) Yes ☐ 2) No

4003. Do you smoke now? **[SA]**

☐ 1) Daily* ➜ **Go to Q4004 [Daily Smoker]**
☐ 2) Occasionally ➜ **Go to Q4011 [Occasional Smoker]**
☐ 3) Have stopped smoking completely ➜ **Go to Q4016 [Ex-Smoker]**

* includes respondents who have to stop smoking daily temporarily because of religious fasting or medical reasons

Daily Smoker Only

4004. On average, how many cigarettes do you smoke per day?

_____ Cigarettes

4005. How old were you when you first tried (i.e. experimented with) smoking?

_____ Years old

4006. At what age did you start smoking daily?

_____ Years old

4007. What is your main reason for smoking now? **[SA]**
[DO NOT READ OUT]

- ☐ 1) To feel **relaxed**/ to **relieve stress**/ to help me cope with problems
- ☐ 2) To help me **concentrate**
- ☐ 3) Addiction/ would feel **unbearable** if I do not smoke
- ☐ 4) Smoking is **enjoyable**
- ☐ 5) **Boredom**
- ☐ 6) To feel **confident**/ **grown up**/ important
- ☐ 7) To be like my **family members**/ relatives
- ☐ 8) To model **film**/ **TV stars**
- ☐ 9) To **be like**/ to **impress**/ to **fit in**/ to **bond with** my boyfriend/ girlfriend/ friends/colleagues
- ☐ 10) To **entertain** clients/ friends
- ☐ 11) Out of habit
- ☐ 12) To **lose weight**
- ☐ 13) Others (please specify: _____)

4008. Which of the following best describes you? **[SA]**
[READ AND SHOW TABLE CARD TO RESPONDENT]

- ☐ 1) I plan to quit smoking within the next month
- ☐ 2) I plan to quit smoking within the next 6 months
- ☐ 3) I plan to quit smoking within the next 12 months
- ☐ 4) I plan to quit smoking within the next 5 years
- ☐ 5) I plan to quit smoking sometime in the future
- ☐ 6) I do not plan to quit smoking at all but plan to cut down on the number of cigarettes smoked
- ☐ 7) I do not plan to quit smoking at all and do not plan to cut down on the number of cigarettes smoked

4009. Have you abstained from smoking for a period of at least 24 hours in the past 12 months? **[SA]**

☐ 1) Yes ☐ 2) No

4010. How many times did you try quitting smoking during the past 12 months?

_____ Times ➜ **Go to Q4021**

Occasional Smoker Only

4011. On average, how many cigarettes do you smoke?

_____ Cigarettes

☐ 1) per week
☐ 2) per month
☐ 3) Don't know/not sure
☐ 4) Refused

4012. How old were you when you first tried (i.e. experimented with) smoking?

_____ Years old

4013. What is your main reason for smoking now? **[SA]**
[DO NOT READ OUT]

☐ 1) To feel **relaxed**/ to **relieve stress**/ to help me cope with problems
☐ 2) To help me **concentrate**
☐ 3) Addiction/ Would feel **unbearable** if I do not smoke
☐ 4) Smoking is **enjoyable**
☐ 5) **Boredom**
☐ 6) To feel **confident**/ **grown up**/ important
☐ 7) To be like my **family members**/ relatives
☐ 8) To model **film**/ **TV stars**
☐ 9) To **be like**/ to **impress**/ to **fit in**/ to **bond with** my boyfriend/ girlfriend/ friends/ colleagues
☐ 10) To **entertain** clients/ friends
☐ 11) Out of habit
☐ 12) To **lose weight**
☐ 13) Others (please specify: _____)

4014. Which of the following best describes you? **[SA]**
[READ AND SHOW TABLE CARD TO RESPONDENT]

☐ 1) I plan to quit smoking within the next month
☐ 2) I plan to quit smoking within the next 6 months
☐ 3) I plan to quit smoking within the next 12 months
☐ 4) I plan to quit smoking within the next 5 years
☐ 5) I plan to quit smoking sometime in the future
☐ 6) I do not plan to quit smoking at all but plan to cut down on the number of cigarettes smoked
☐ 7) I do not plan to quit smoking at all and do not plan to cut down on the number of cigarettes smoked

4015. How many times did you try quitting smoking during the past 12 months?

_____ Times **[If 0, go to Q4021]**

4015a What was the main reason for which you attempted to stop smoking? **[SA]**
[DO NOT READ OUT]

- ☐ 1) Advised to stop smoking by my **doctor**
- ☐ 2) **Learnt** about the **harmful effects** of smoking
- ☐ 3) **Health reasons**/experienced the ill effects of smoking
- ☐ 4) Concerned about the health of those around me (through **passive smoking**)
- ☐ 5) Cigarettes have become too **expensive**
- ☐ 6) Smoking is a **waste of money**
- ☐ 7) Pressure/ advice to stop from **family**/ **friends**/ **colleague**
- ☐ 8) **No particular reason**/ decided to give up smoking **voluntarily**
- ☐ 9) **Social stigma** associated with smoking
- ☐ 10) Pressure to stop from the environment (e.g. **smoking bans**)
- ☐ 11) Others (please specify: _____)

[Go to Q4021]

Ex-Smoker Only

4016. How long has it been since you last smoked daily?

_____ Years _____ Months

4017. How long did you smoke daily before you gave up smoking?

_____ Years _____ Months

4018. What was the main reason for which you stopped smoking completely? **[SA]**
[DO NOT READ OUT]

- ☐ 1) Advised to stop smoking by my **doctor**
- ☐ 2) **Learnt** about the **harmful effects** of smoking
- ☐ 3) **Health reasons**/experienced the ill effects of smoking
- ☐ 4) Concerned about the health of those around me (through **passive smoking**)
- ☐ 5) Cigarettes have become too **expensive**
- ☐ 6) Smoking is a **waste of money**
- ☐ 7) Pressure/ advice to stop from **family**/ **friends**/ **colleague**
- ☐ 8) **No particular reason**/ decided to give up smoking **voluntarily**
- ☐ 9) **Social stigma** associated with smoking
- ☐ 10) Pressure to stop from the environment (e.g. **smoking bans**)
- ☐ 11) Others (please specify: _____)

4019. How did you quit smoking? **[MA]**
[DO NOT READ OUT]

- ☐ 1) Abstained from smoking on own accord
- ☐ 2) Attended smoking cessation programme/counselling in public/private hospitals
- ☐ 3) Attended smoking cessation programme/counselling in public/private clinics
- ☐ 4) Attended smoking cessation programme/counselling in the workplace
- ☐ 5) Attended smoking cessation programme/counselling through a community pharmacy (retail/polyclinic)
- ☐ 6) Through talking to a quit advisor at Quitline
- ☐ 7) By nicotine replacement therapy (e.g. nicotine patch, inhaler)
- ☐ 8) By herbal remedy
- ☐ 9) Used medication (e.g. Bupropion/ Zyban, Varenicline/Champix)
- ☐ 10) Other methods (please specify:_____)

4020. How many times did you try to quit smoking before you succeeded?

_____ Times

4021. Have you ever smoked any of the following other tobacco products besides cigarettes? **[MA]**

List of other tobacco products	Yes			No
	Daily	Occasionally	Have stopped using other smoked tobacco products	
a) Cigars	☐	☐	☐	☐
b) Cigarillos	☐	☐	☐	☐
c) Shisha (waterpipe)	☐	☐	☐	☐
d) Beedis	☐	☐	☐	☐
e) Rolled cigarettes/ Ang Hun (loose tobacco)	☐	☐	☐	☐
f) Others (please specify: _____)	☐	☐	☐	☐

END OF SECTION 4. GO TO SECTION 5.

5. ALCOHOL CONSUMPTION

Now, I would like to ask questions on alcohol consumption.

5000. Have you ever consumed alcohol? **[SA]**

☐ 1) Yes ☐ 2) No ➜ **Go to Q6000**

5001. Have you consumed alcohol within the past 12 months? **[SA]**

☐ 1) Yes ☐ 2) No ➜ **Go to Q6000**

5002. What is your main alcoholic drink? **[SA]**

☐ 1) Beer
☐ 2) Stout
☐ 3) Wines (champagne, port)
☐ 4) Spirits (gin, whisky, rum, brandy, vodka)
☐ 5) Alcopops/ other premixed drinks
☐ 6) Other (please specify: _____)
☐ 7) No specific preference

5003. In the past 12 months, how frequently have you had at least one drink? **[SA]**
[READ RESPONSES]

☐ 1) 5 or more days a week ☐ 3) 1-3 days a month
☐ 2) 1-4 days per week ☐ 4) Less than once a month

5004. On the days that you drank alcohol, how many drinks on average did you have in a day? **[SA]**
[USE SHOWCARD]

_____ Number

5005. During the past month, have you ever had **X [X = 5 for men, X = 4 for women]** drinks or more (all types of alcoholic drinks) in any one drinking session? **[SA]**

☐ 1) Yes ☐ 2) No ➜ **Go to Q6000**

If YES:

5006. How many times during the past month did you have **X [X = 5 for men, X = 4 for women]** or more drinks (all types of alcoholic drinks) in any one drinking session?

_____ Times in the past month

END OF SECTION 5. GO TO SECTION 6.

6. DIABETES

Now, I would like to ask questions on diabetes.

DIABETES — Diabetes occurs when there is excess sugar in the blood which needs regulating with insulin medication.

6000. Has anyone in your family ever had diabetes? **[SA]**

- ☐ 1) Yes
- ☐ 2) No ➜ **Go to Q6001**
- ☐ 3) Don't know ➜ **Go to Q6001**

If YES:

6000a. Can you tell me who in your family had diabetes? **[MA]**

- ☐ 1) Father
- ☐ 2) Mother
- ☐ 3) Brother
- ☐ 4) Sister
- ☐ 5) Son
- ☐ 6) Daughter

6001. Have you ever been told by a doctor (western trained) that you have diabetes? **[SA]**
[If 'Yes' and respondent is female, prompt "Was this only when you are pregnant"?]

- ☐ 1) Yes ➜ **Go to Q6001a**
- ☐ 2) Yes, but only during pregnancy
- ☐ 3) No
- ☐ 4) No, pre-diabetes and borderline diabetes
- ☐ 5) Don't know

➜ **Go to Q6006**

6001a. What type of medication are you on? **[SA]**

- ☐ 1) None
- ☐ 2) Insulin injections
- ☐ 3) Oral hypoglycemic agents
- ☐ 4) Both insulin injections & oral hypoglycemic agents
- ☐ 5) Others (please specify: _____)
- ☐ 6) Refused to answer
- ☐ 7) Don't know

6001b. How many years have you had diabetes?

_____ Years

6001c. Besides medication prescribed by doctor (if any), what other ways do you do to control your diabetes? **[MA]**
[READ OUT]

- ☐ 1) Lose weight/maintain ideal weight
- ☐ 2) Reduce intake of sugar, rice, bread
- ☐ 3) Increase intake of wholemeal bread, brown rice, vegetables and high fibre food
- ☐ 4) Reduce fat intake
- ☐ 5) Cutting down/stop smoking
- ☐ 6) Exercise
- ☐ 7) Reduce alcohol intake
- ☐ 8) None
- ☐ 9) Others (please specify: _____)

6002. About how often do you check your blood for glucose or sugar yourself?
Include times when checked by family member or friend, but do not include times when checked by health professional.

_____ Times

- ☐ 1) per day
- ☐ 2) per week
- ☐ 3) per month
- ☐ 4) per year
- ☐ 5) Don't know

6003. About how many times in the past 12 months have you seen a doctor for your diabetes?

_____ Number of times ☐ 1) Don't know

6004. Where do you seek treatment for your diabetes most of the time? **[SA]**
[DO NOT READ OUT]

- ☐ 1) Private GP
- ☐ 2) Government polyclinic
- ☐ 3) Specialist outpatient clinic (restructured hospital)
- ☐ 4) Specialist outpatient clinic (private hospital)
- ☐ 5) Others (please specify: _____)
- ☐ 6) None

6005. A test for haemoglobin "A one C" measures the average level of blood sugar over the past three months. About how many times in the past 12 months has a doctor, nurse or health professional checked you for haemoglobin "A one C"?

_____ Number of times

☐ 1) Don't know

☐ 2) Never heard of this test

[Go to SECTION 7]

6006. When was the last time you had a blood test to check for diabetes? **[SA]**
[READ ONLY IF NECESSARY]

☐ 1) 1 year ago or less

☐ 2) More than 1 year to 2 years

☐ 3) More than 2 years to 3 years

☐ 4) More than 3 years to 5 years

☐ 5) More than 5 years

☐ 6) Never been checked ➜ **Go to Q6009**

6007. Why did you go for your last blood test to check for diabetes? **[MA]**
[DO NOT READ OUT]

☐ 1) Know the **importance** of screening

☐ 2) Advised by **doctors**/ **nurses**

☐ 3) My **family members**/ **friends**/ **colleagues** encouraged me

☐ 4) **Read**/ **heard** about it/ saw an **advertisement** about checking for diabetes

☐ 5) **Ad-hoc** health screening

☐ 6) **Routine** check-up

☐ 7) **Company**/ **application** health screening (e.g. pre-employment or permanent residency application)

☐ 8) Others (please specify: _____)

6008. Where did you go for your last blood test for diabetes? **[SA]**
[DO NOT READ OUT]

- ☐ 1) Private GP (Integrated screening programme)
- ☐ 2) Private GP (non-integrated screening programme)
- ☐ 3) Government polyclinic
- ☐ 4) Specialist outpatient clinic (restructured hospital)
- ☐ 5) Specialist outpatient clinic (private hospital)
- ☐ 6) Workplace
- ☐ 7) Community venue
- ☐ 8) Others (please specify: _____)
- ☐ 9) None

[Go to SECTION 7]

If "Never been checked" in Q6006:

6009. What are the reasons for not having a blood test to check for diabetes? **[MA]**
[DO NOT READ OUT]

- ☐ 1) **Never heard** about it
- ☐ 2) **Not necessary** as I am **healthy**
- ☐ 3) **Not at risk**
- ☐ 4) Too **old**
- ☐ 5) Too **young**
- ☐ 6) **Cost** of the **test** is **too expensive**
- ☐ 7) **Not suggested** by doctors
- ☐ 8) **Afraid** of **knowing the results**
- ☐ 9) **Inconvenient** (e.g. clinic/hospital too far away, wait at clinic/hospital too long, English signs at clinic/hospital too confusing)
- ☐ 10) **Not important**
- ☐ 11) **No time** due to **work**/ **family commitment** (e.g. need to take leave, make alternative arrangement with family members)
- ☐ 12) **Cannot do anything** if diabetes is detected
- ☐ 13) Don't know **where** to go
- ☐ 14) **Painful** test
- ☐ 15) **Fated** if I get diabetes
- ☐ 16) **Can't afford** the **treatment** for diabetes
- ☐ 17) Others (please specify: _____)

END OF SECTION 6. GO TO SECTION 7.

7. HYPERTENSION

Next, I would like to ask questions on hypertension, also commonly known as high blood pressure.

HIGH BLOOD PRESSURE (HYPERTENSION) — High blood pressure occurs when the arterial blood pressure is above the accepted norm of 140/ 90 mmHg.

7000. Has anyone in your family ever had high blood pressure? **[SA]**

- ☐ 1) Yes
- ☐ 2) No ➜ **Go to Q7001**
- ☐ 3) Don't know ➜ **Go to Q7001**

If YES:

7000a. Can you tell me who in your family had high blood pressure? **[MA]**

- ☐ 1) Father
- ☐ 2) Mother
- ☐ 3) Brother
- ☐ 4) Sister
- ☐ 5) Son
- ☐ 6) Daughter

7001. Have you ever been told by a doctor (western trained) that you have high blood pressure? **[SA]**
[If 'Yes' and respondent is female, prompt "Was this only when you are pregnant"?]

- ☐ 1) Yes ➜ **Go to Q7001a**
- ☐ 2) Yes, but only during pregnancy
- ☐ 3) No
- ☐ 4) No, borderline high blood pressure
- ☐ 5) Don't know

➜ **Go to Q7004**

7001a. How many years have you had high blood pressure?

_____ Years

7001b. Does your doctor currently prescribe tablets for your high blood pressure? **[SA]**

- ☐ 1) Yes
- ☐ 2) No
- ☐ 3) Don't know

7001c. Besides medication prescribed by your doctor (if any), what do you do to control your blood pressure?
[MA] [READ OUT]

- ☐ 1) Lose Weight
- ☐ 2) Reduce salt intake
- ☐ 3) Reduce fat intake
- ☐ 4) Exercise
- ☐ 5) Cutting down/ stop smoking
- ☐ 6) Reduce alcohol intake
- ☐ 7) Reduce/ cope with stress
- ☐ 8) None
- ☐ 9) Others (please specify: _____ _____)

7001d. About how long ago was your most recent blood pressure check done? **[SA]**

- ☐ 1) Less than 1 month
- ☐ 2) 1 to 3 months
- ☐ 3) 4 to 6 months
- ☐ 4) More than 6 months

7002. How many times in the past 12 months have you seen a doctor for your high blood pressure?

_____ Number of Times

☐ 1) Don't know

7003. Where do you seek treatment for your high blood pressure most of the time? **[SA]**
[DO NOT READ OUT]

- ☐ 1) Private GP
- ☐ 2) Government polyclinic
- ☐ 3) Specialist outpatient clinic (restructured hospital)
- ☐ 4) Specialist outpatient clinic (private hospital)
- ☐ 5) Others (please specify: _____)
- ☐ 6) None

[Go to SECTION 8]

7004. When was the last time you had your blood pressure checked? **[SA]**
[READ ONLY IF NECESSARY]

- ☐ 1) 1 year ago or less
- ☐ 2) More than 1 year to 2 years
- ☐ 3) More than 2 years to 3 years
- ☐ 4) More than 3 years to 5 years
- ☐ 5) More than 5 years
- ☐ 6) Never been checked ➜ **Go to Q7007**

7005. Why did you last check your blood pressure? **[MA]**
[DO NOT READ OUT]

- ☐ 1) Know the **importance** of screening
- ☐ 2) Advised by **doctors**/ **nurses**
- ☐ 3) My **family members**/ **friends**/ **colleagues** encouraged me
- ☐ 4) **Read**/ **heard** about it/ saw an **advertisement** about checking for hypertension
- ☐ 5) **Ad-hoc** health screening
- ☐ 6) **Routine** check-up
- ☐ 7) **Company**/ **application** health screening (e.g. pre-employment or permanent residency application)
- ☐ 8) Others (please specify: _____)

7006. Where did you go for your last blood pressure check-up? **[SA]**

[DO NOT READ OUT]

- ☐ 1) Private GP (Integrated screening programme)
- ☐ 2) Private GP (non-integrated screening programme)
- ☐ 3) Government polyclinic
- ☐ 4) Specialist outpatient clinic (restructured hospital)
- ☐ 5) Specialist outpatient clinic (private hospital)
- ☐ 6) Workplace
- ☐ 7) Community venue
- ☐ 8) Others (please specify: _____)
- ☐ 9) None

[GO TO SECTION 8]

If "Never been checked" in Q7004:

7007. What are the reasons for not checking your blood pressure? **[MA]**

[DO NOT READ OUT]

- ☐ 1) **Never heard** about it
- ☐ 2) **Not necessary** as I am **healthy**
- ☐ 3) **Not at risk**
- ☐ 4) Too **old**
- ☐ 5) Too **young**
- ☐ 6) Cost of the test is too **expensive**
- ☐ 7) **Not suggested** by doctors
- ☐ 8) **Afraid** of **knowing the results**
- ☐ 9) **Inconvenient** (e.g. clinic/hospital too far away, wait at clinic/hospital too long, English signs at clinic/ hospital too confusing)
- ☐ 10) **Not important**
- ☐ 11) **No time** due to **work/ family commitment** (e.g. need to take leave, make alternative arrangement with family members)
- ☐ 12) **Cannot do anything** if high blood pressure is detected
- ☐ 13) **Fated** if I get high blood pressure
- ☐ 14) **Can't afford** the **treatment** for high blood pressure
- ☐ 15) Others (please specify: _____)

END OF SECTION 7. GO TO SECTION 8.

8. HEALTH CONDITIONS

Next, I would like to ask questions on health conditions.

High blood cholesterol or Lipids

8000. Have you ever been told by a doctor (western trained) that you have high blood cholesterol or lipids? **[SA]**

- ☐ 1) Yes
- ☐ 2) No ➜ **Go to Q8004**
- ☐ 3) Don't know ➜ **Go to Q8004**

8001. Does your doctor currently prescribe tablets for your high blood cholesterol or lipids? **[SA]**

- ☐ 1) Yes
- ☐ 2) No
- ☐ 3) Don't know

8002. How many times in the past 12 months have you seen a doctor for your high blood cholesterol or lipids?

_____ Number of times

- ☐ 1) Don't know

8003. Where do you seek treatment for your high blood cholesterol or lipids most of the time? **[SA]**
[DO NOT READ OUT]

- ☐ 1) Private GP
- ☐ 2) Government polyclinic
- ☐ 3) Specialist outpatient clinic (restructured hospital)
- ☐ 4) Specialist outpatient clinic (private hospital)
- ☐ 5) Other (please specify: _____)
- ☐ 6) None

[GO TO Q8008]

8004. When was the last time you had your blood cholesterol checked? **[SA]**
[READ ONLY IF NECESSARY]

- ☐ 1) 1 year ago or less
- ☐ 2) More than 1 year to 2 years
- ☐ 3) More than 2 years to 3 years
- ☐ 4) More than 3 years to 5 years
- ☐ 5) More than 5 years
- ☐ 6) Never been checked ➜ **Go to Q8007**

8005. Why did you go for your last blood test to check for cholesterol? **[MA]**

[DO NOT READ OUT]

- ☐ 1) Know the **importance** of screening
- ☐ 2) Advised by **doctors**/ **nurses**
- ☐ 3) My **family members**/ **friends**/ **colleagues** encouraged me
- ☐ 4) **Read**/ **heard** about it/ saw an **advertisement** about checking for cholesterol
- ☐ 5) **Ad-hoc** health screening
- ☐ 6) **Routine** check-up
- ☐ 7) **Company**/ **application** health screening (e.g. pre-employment or permanent residency application)
- ☐ 8) Others (please specify: _____)

8006. Where did you go for your last blood test to check for cholesterol? **[SA]**

[DO NOT READ OUT]

- ☐ 1) Private GP (Integrated screening programme)
- ☐ 2) Private GP (non-integrated screening programme)
- ☐ 3) Government polyclinic
- ☐ 4) Specialist outpatient clinic (restructured hospital)
- ☐ 5) Specialist outpatient clinic (private hospital)
- ☐ 6) Workplace
- ☐ 7) Community venue
- ☐ 8) Others (please specify: _____)
- ☐ 9) None

[GO TO Q8008]

If "Never been checked" in Q8004:

8007. What are the reasons for not having your blood cholesterol checked? **[MA]**

[DO NOT READ OUT]

- ☐ 1) **Never heard** about it
- ☐ 2) **Not necessary** as I am **healthy**
- ☐ 3) **Not at risk**
- ☐ 4) Too **old**
- ☐ 5) Too **young**
- ☐ 6) Cost of the test is too **expensive**
- ☐ 7) **Not suggested** by doctors
- ☐ 8) **Afraid** of **knowing the results**
- ☐ 9) **Inconvenient** (e.g. clinic/hospital too far away, wait at clinic/hospital too long, English signs at clinic/hospital too confusing)
- ☐ 10) **Not important**
- ☐ 11) **Cannot do anything** if high blood cholesterol is detected
- ☐ 12) Don't know **where** to go
- ☐ 13) **No time** due to **work**/ **family commitment** (e.g. need to take leave, make alternative arrangement with family members)
- ☐ 14) **Fated** if I get high blood cholesterol
- ☐ 15) **Can't afford** the **treatment** for high blood cholesterol
- ☐ 16) Others (please specify: _____)

Cardiovascular diseases

	Have you ever been told by a doctor (western trained) that you: **[SA]**	1) Yes	2) No	3) Refused	4) Don't know /not sure
8008.	had chest pain due to heart problems?	☐	☐	☐	☐
8009.	had a heart attack?	☐	☐	☐	☐
8010.	had a stroke	☐	☐	☐	☐

Joint Pain

8011. In the past 12 months, have you had pain, aching, stiffness or swelling in or around a joint (e.g. hip, knee, shoulder, elbow, wrist, fingers)? **[SA]**

☐ 1) Yes ☐ 2) No ➜ **Go to Q8012**

If YES:

8011a. Do you feel that these symptoms were caused by work? **[SA]**

☐ 1) Yes ☐ 3) Don't know/ not sure
☐ 2) No

8011b. Were these symptoms present on most days for at least one month? **[SA]**

☐ 1) Yes ☐ 2) No

8011c. Did these symptoms start **only** because of an injury? **[SA]**

☐ 1) Yes ☐ 2) No

8011d. Do you feel that the injury was caused by work? **[SA]**

☐ 1) Yes ☐ 3) Don't know/ not sure
☐ 2) No

8011e. Were you limited in your usual activities because of joint symptoms? **[SA]**

☐ 1) Yes ☐ 2) No

8011f. Have you had knee pain on most days of the month? **[SA]**

☐ 1) Yes ☐ 2) No

Arthritis / Gout / Kidney Disease

8012. Have you ever been told by a doctor (western trained) that you have arthritis? **[SA]**

- ☐ 1) Yes
- ☐ 2) No ➜ **Go to Q8012b**
- ☐ 3) Refused ➜ **Go to Q8012b**
- ☐ 4) Don't know/ not sure ➜ **Go to Q8012b**

If YES:

8012a. Have you ever been told by a doctor (western trained) that you have **[MA]**

- ☐ 1) osteoarthritis (wear and tear arthritis) of the knee
- ☐ 2) osteoarthritis (wear and tear arthritis) of the hip
- ☐ 3) rheumatoid arthritis

8012b. Have you ever been told by a doctor (western trained) that you have gout? **[SA]**

- ☐ 1) Yes
- ☐ 2) No
- ☐ 3) Refused
- ☐ 4) Don't know/ not sure

8012c. Have you ever been told by a doctor (western trained) that you had weak or failing kidneys? Do not include kidney stones, bladder infections, or incontinence. **[SA]**

- ☐ 1) Yes
- ☐ 2) No
- ☐ 3) Refused
- ☐ 4) Don't know/ not sure

8013. Have you ever been told by a doctor (western trained) or other health professional that you have osteoporosis? **[SA]**

- ☐ 1) Yes
- ☐ 2) No
- ☐ 3) Refused
- ☐ 4) Don't know/ not sure

8014. In the past 1 month (30 days), have you had low back pain that lasted a whole day or more? **[SA]**

- ☐ 1) Yes
- ☐ 2) No ➜ **Go to Q8015**

If YES:

8014a. Do you feel that the pain was caused by work? **[SA]**

- ☐ 1) Yes
- ☐ 2) No
- ☐ 3) Don't know/ not sure

8014b. About how many days did you experience this pain?

_____ Days

8014c. Were you limited in your usual activities because of low back pain? **[SA]**

- ☐ 1) Yes
- ☐ 2) No

Asthma

8015. Have you ever been told by a doctor (western trained) that you have asthma? **[SA]**

☐ 1) Yes ☐ 2) No ➜ **Go to Q8016**

If YES:

8015a. How old were you when you were first told you had asthma?

_____ Years old

8015b. Do you still have asthma? **[SA]**

☐ 1) Yes ☐ 2) No ➜ **Go to Q8016**

8015c. During the last 12 months, have you had an episode of asthma or an asthma attack? **[SA]**

☐ 1) Yes ☐ 2) No ➜ **Go to Q8016**

If YES:

8015d. Do you feel that the episode of asthma or asthmatic attack was caused by or made worse by work? **[SA]**

☐ 1) Yes ☐ 3) Don't know/ not sure

☐ 2) No

8015e. During the last 12 months, how many times did you have to visit A&E or a doctor's clinic for urgent treatment of asthma?

_____ Times **[If 0, go to Q8015g)**

8015f. During the last 12 months, how many times were you hospitalized for treatment of asthma?

_____ Times

8015g. Over the past 1 month, on average, how many times **per week** do you need to use your inhaler medication for quick relief of asthma symptoms?

_____ **Times per week**

8015h. During the past 30 days, on how many days did symptoms of asthma make it difficult for you to stay asleep?

_____ Days

8015i. Are you taking a long term preventive medication for asthma everyday? **[SA]**

☐ 1) Yes ☐ 3) Don't know/ not sure

☐ 2) No

Vision

8016. Have you ever been told by a doctor that you have cataract? **[SA]**

☐ 1) Yes ☐ 2) No

8017. Do you wear glasses or contact lenses? **[SA]**

☐ 1) Yes ☐ 2) No ➜ **Go to Q8018**

If YES:

8017a. Why do you need to wear glasses or contact lenses? **[MA]**

☐ 1) Short-sighted

☐ 2) Long-sighted

☐ 3) Other (please specify: _____)

Hearing

8018. Do you feel you have hearing loss? **[SA]**

☐ 1) Yes ☐ 2) No ➜ **Go to Q8020**

8019. Do you feel that the hearing loss was caused by work? **[SA]**

☐ 1) Yes ☐ 3) Don't know/ not sure

☐ 2) No

8020. Do you have difficulty following conversations in the presence of background noise? (e.g. Noise from a TV or radio; traffic noise in the street; people talking at other tables in a crowded restaurant) **[SA]**

☐ 1) Yes ☐ 2) No

8021. Do you wear a hearing aid? **[SA]**

☐ 1) Yes ☐ 2) No

If respondent is female & aged 40 and above, go to Q8022. If not, go to Section 9.

8022. Have your periods stopped because of menopause? **[SA]**

☐ 1) Yes ➜ **Go to Q8022a**
☐ 2) No ➜ **Go to Q9001**
☐ 3) Refused ➜ **Go to Q9001**
☐ 4) Don't know/ not sure ➜ **Go to Q9001**

8022a. At what age did your periods stop? _____ Years old

☐ 1) Refused
☐ 2) Don't know/ not sure

END OF SECTION 8. GO TO SECTION 9.

9. HEALTH SCREENING PROGRAMMES

Now, I would like to ask for your opinions on some health screening programmes and whether you have participated in these programmes.

Please state respondent age: _____

☐ 1) Male ☐ 2) Female

IF respondent is male & aged 50 and above, go to Q9004.
IF respondent is male & aged below 50, go to Section 10.

IF respondent is female, go to Q9000.

FOR FEMALE RESPONDENTS ONLY

Cervical Cancer Screening

9000. Do you know what is a PAP smear? **[SA]**

☐ 1) Yes ☐ 3) Not sure
☐ 2) No ➜ **Go to Q9001**

If YES or NOT SURE:

9000a. Can you describe to me what you think a PAP smear test is? **[SA]**
[DO NOT READ OUT]

☐ 1) Test for **detecting cervical cancer** but don't know exactly what it involves
☐ 2) Examination of the **cervix** to detect cervical cancer
☐ 3) Examination of the **womb** to detect cervical cancer
☐ 4) Test involving the **scrapping of cells** from the cervix / mouth of womb to detect cervical cancer
☐ 5) Test involving the scrapping of cells from the cervix / mouth of womb for **microscopic examination** to detect cervical cancer
☐ 6) Test to **check** if my womb / cervix **is all right**
☐ 7) Other (please specify: _____)

[READ OUT TO RESPONDENT]
A PAP smear test is a simple test involving the scrapping of cells from the mouth of the womb to detect cervical cancer. This test is done to detect cervical cancer.

9001. Have you ever had a PAP smear test? **[SA]**

☐ 1) Yes ➜ **Go to Q9001a** ☐ 3) Don't know ➜ **Go to Q9002**
☐ 2) No ➜ **Go to Q9001b**

If YES:

9001a.

i) How long ago did you have your last smear done? **[SA]**
[READ ONLY IF NECESSARY]

- ☐ 1) 1 year ago or less
- ☐ 2) More than 1 year to 2 years
- ☐ 3) More than 2 years to 3 years
- ☐ 4) More than 3 years to 4 years
- ☐ 5) More than 4 years to 5 years
- ☐ 6) More than 5 years

ii) Where did you go for your last PAP smear? **[SA]**
[DO NOT READ OUT]

- ☐ 1) Private GP (Integrated screening programme)
- ☐ 2) Private GP (non-integrated screening programme)
- ☐ 3) Government polyclinic
- ☐ 4) Specialist outpatient clinic (restructured hospital)
- ☐ 5) Specialist outpatient clinic (private hospital)
- ☐ 6) Workplace
- ☐ 7) Community venue
- ☐ 8) Other (please specify: _____)
- ☐ 9) None

iii) Why did you go for your last PAP smear test? **[MA]**
[DO NOT READ OUT]

- ☐ 1) Know the **importance** of screening
- ☐ 2) Have current / previous **gynecological problem**
- ☐ 3) Advised by **doctors**/ **nurses**
- ☐ 4) My **family members**/ **friends**/ **colleagues** encouraged me
- ☐ 5) **Read**/ **heard** about it/ saw an **advertisement** about Pap smear test
- ☐ 6) Received a **letter** to encourage me to go for screening
- ☐ 7) **Ad-hoc** health screening
- ☐ 8) **Routine** check-up
- ☐ 9) Other (please specify: _____)

iv) Can you tell me how often women of your age should go for Pap smear test?

Once every _____ years

IF female respondent is aged 40 and above, go to Q9002.
IF female respondent is aged below 40, go to Section 10.

If "NO" in Q9001:

9001b. What are your reasons for not doing a PAP smear test? **[MA]**

[DO NOT READ OUT]

- ☐ 1) **Never heard** about it
- ☐ 2) **Not necessary** as I am **healthy**
- ☐ 3) **Not at risk**
- ☐ 4) Too **old**
- ☐ 5) Too **young**
- ☐ 6) Cost of the test is too **expensive**
- ☐ 7) Afraid of possible **side effects**
- ☐ 8) **Afraid** of **knowing the results**
- ☐ 9) **Inconvenient** (e.g. clinic/hospital too far away, wait at clinic/hospital too long, English signs at clinic/hospital too confusing)
- ☐ 10) **Not important**
- ☐ 11) **No time** due to **work/ family commitment** (e.g. need to take leave, make alternative arrangement with family members)
- ☐ 12) Don't know **where** to go
- ☐ 13) Don't have a **companion** to go with
- ☐ 14) **Painful** test
- ☐ 15) **Embarrassing** (e.g. need to undress for the procedure, operator may not be female)
- ☐ 16) **Not sexually active**
- ☐ 17) Others (please specify: _____)

IF female respondent is aged 40 and above, go to Q9002.
IF female respondent is aged below 40, go to Section 10.

Breast Cancer Screening

9002. Do you know what is a mammogram? **[SA]**

- ☐ 1) Yes
- ☐ 2) No ➜ **Go to Q9003**
- ☐ 3) Not sure

If YES or NOT SURE:

9002a. Can you describe to me what you think is a mammogram? **[SA]**

[DO NOT READ OUT]

- ☐ 1) Test for **detecting breast cancer** but don't know exactly what it involves
- ☐ 2) **X-ray** of the breast for detecting breast lumps / cancer
- ☐ 3) Others (please specify: _____)

[READ OUT TO RESPONDENT]
A mammogram is an x-ray of each breast to look for breast cancer.

Epidemiology and Disease Control Division

9003. Have you ever had a mammogram? **[SA]**

☐ 1) Yes ➜ **Go to Q9003a**

☐ 2) No ➜ **Go to Q9003b**

☐ 3) Don't know ➜ **Go to Q9003a (v)**
[If female respondent is aged 50 and above, go to Q9004.
Otherwise, go to Section 10. Please state respondent age: _____]

If YES:
9003a.

i) Why did you go for your last mammogram? **[MA]**
[DO NOT READ OUT]

☐ 1) Know the **importance** of screening

☐ 2) Have current / previous **gynecological problem**

☐ 3) Advised by **doctors**/ **nurses**

☐ 4) My **family members**/ **friends**/ **colleagues** encouraged me

☐ 5) **Read**/ **heard** about it/ saw an **advertisement** about mammogram

☐ 6) Received a **letter** to encourage me to go for screening

☐ 7) **Ad-hoc** health screening

☐ 8) **Routine** check-up

☐ 9) Others (please specify: _____)

ii) How long has it been since you had your last mammogram? **[SA]**
[READ ONLY IF NECESSARY]

☐ 1) 1 year ago or less
☐ 2) More than 1 year to 2 years
→ **Go to Q9003aiv**

☐ 3) More than 2 years to 3 years
☐ 4) More than 3 years to 4 years
☐ 5) More than 4 years to 5 years
☐ 6) More than 5 years
→ **Go to Q9003aiii**

iii) What are your reasons for not doing another mammogram since your last mammogram? **[MA]**
[DO NOT READ OUT]

- ☐ 1) **Not necessary** as I know my previous result
- ☐ 2) Too **old**
- ☐ 3) Cost of the test is too **expensive**
- ☐ 4) Afraid of possible **side effects**
- ☐ 5) **Inconvenient** (e.g. clinic/hospital too far away, wait at clinic/hospital too long, English signs at clinic/hospital too confusing)
- ☐ 6) **Not important**
- ☐ 7) **No time** due to **work/ family commitment** (e.g. need to take leave, make alternative arrangement with family members)
- ☐ 8) Don't have a **companion** to go with
- ☐ 9) **Painful** test
- ☐ 10) **Embarrassing** (e.g. need to undress for the procedure, radiographer may not be female)
- ☐ 11) **Not sexually active**
- ☐ 12) Others (please specify: _____)

iv) Where did you go for your last mammogram? **[SA]**
[DO NOT READ OUT]

- ☐ 1) Polyclinic
- ☐ 2) Restructured hospital
- ☐ 3) Private hospital
- ☐ 4) Private X-ray centre
- ☐ 5) Mammobus
- ☐ 6) Workplace
- ☐ 7) Community venue
- ☐ 8) Others (please specify: _____)

v) Can you tell me how often women of your age should go for mammogram?

Once every _____ years

IF female respondent is <u>aged 50 and above</u>, go to Q9004.
IF female respondent is <u>aged below 50</u>, go to Section 10.

If "NO" in Q9003:

9003b. What are your reasons for not doing a mammogram? **[MA]**
[DO NOT READ OUT]

- ☐ 1) **Never heard** about mammograms
- ☐ 2) **Not necessary** as I am **healthy**
- ☐ 3) **Not at risk**
- ☐ 4) Too **old**
- ☐ 5) Too **young**
- ☐ 6) Cost of the test is too **expensive**
- ☐ 7) Afraid of possible **side effects**
- ☐ 8) **Afraid** of **knowing the results**
- ☐ 9) **Inconvenient** (e.g. clinic/hospital too far away, wait at clinic/hospital too long, English signs at clinic/hospital too confusing)
- ☐ 10) **Not important**
- ☐ 11) **No time** due to **work/ family commitment** (e.g. need to take leave, make alternative arrangement with family members)
- ☐ 12) **Cannot do anything** if breast cancer is detected
- ☐ 13) Don't know **where** to go
- ☐ 14) Don't have a **companion** to go with
- ☐ 15) **Painful** test
- ☐ 16) **Embarrassing** (e.g. need to undress for the procedure, radiographer may not be female)
- ☐ 17) **Not suggested** by doctors
- ☐ 18) **Not sexually active**
- ☐ 19) **Never thought** about it
- ☐ 20) Others (please specify: _____)

IF female respondent is aged 50 and above, go to Q9004.
IF female respondent is aged below 50, go to Section 10.

FOR ALL RESPONDENTS

All respondents are aged 50 and above, go to Q9004.
IF respondent is aged below 50, go to Section 10.

Please state respondent age: _____

☐ 1) Male ☐ 2) Female

Colorectal Cancer Screening

9004. A blood stool test is a test to determine whether the stool contains blood. Have you ever had this test? **[SA]**

☐ 1) Yes
☐ 2) No ➜ **Go to Q9007**
☐ 3) Refused ➜ **Go to Q9007**
☐ 4) Don't know/ not sure ➜ **Go to Q9007**

9005. Why did you go for your last blood stool test? **[MA]**
[DO NOT READ OUT]

☐ 1) Know the **importance** of screening
☐ 2) Advised by **doctors**/ **nurses**
☐ 3) My **family members**/ **friends**/ **colleagues** encouraged me
☐ 4) **Read**/ **heard** about it/ saw an **advertisement** about blood stool test
☐ 5) Show **symptom** of stool containing blood
☐ 6) **Routine** check-up
☐ 7) **Company**/ **application** health screening (e.g. pre-employment or permanent residency application)
☐ 8) Other (please specify: _____)

9006. How long has it been since you had your last blood stool test? **[SA]**
[READ ONLY IF NECESSARY]

☐ 1) 1 year ago or less
☐ 2) More than 1 year to 2 years
☐ 3) More than 2 years to 5 years
☐ 4) More than 5 years
☐ 5) Refused
☐ 6) Don't know/ not sure

9007. Sigmoidoscopy and colonoscopy are examinations in which a tube is inserted in the rectum to view the colon for signs of cancer or other health problems. Have you ever had either of these examinations? **[SA]**

☐ 1) Yes
☐ 2) No
☐ 3) Refused
☐ 4) Don't know/ not sure

➜ **Go to Q10000**

9008. Why did you go for sigmoidoscopy or colonoscopy examinations? **[MA]??**
[DO NOT READ OUT]

- ☐ 1) Routine check-up
- ☐ 2) Show symptom
- ☐ 3) I have symptom due to the blood stool test
- ☐ 4) Others (please specify: _____)

9009. How long has it been since you had your last sigmoidoscopy or colonoscopy? **[SA]**
[READ ONLY IF NECESSARY]

- ☐ 1) 1 year ago or less
- ☐ 2) More than 1 year to 2 years
- ☐ 3) More than 2 years to 5 years
- 4) More than 5 years to 10 years
- ☐ 5) More than 10 years
- ☐ 6) Refused
- ☐ 7) Don't know/ not sure

END OF SECTION 9. GO TO SECTION 10.

10. HEALTH SERVICES UTILISATION PRACTICES

Now, I would like to ask questions on your most recent visit to consult your doctor.

10000. When was the last time you visited a private general practitioner (GP) or the government polyclinic for a medical condition? **[SA]**
[Visits for screening or immunisation are excluded]

☐ 1) Weeks ago (please state number of weeks ago:_____)
☐ 2) Months ago (please state number of months ago: _____)
☐ 3) Don't know ➜ **Go to Q10003**

10001. Whom did you last consult? **[SA]**

☐ 1) Private GP (includes company doctor)
☐ 2) Government polyclinic doctor
☐ 3) Other (please specify: _____)

10002. What was the main medical condition for which you last sought treatment from doctor?

Please specify: _____

_____

10003. Do you have a regular family doctor / GP whom you will consult when you have a health problem? **[SA]**

☐ 1) Yes ☐ 2) No ➜ **Go to Q10006**

10004. When was the last time you visited your regular family doctor/ GP? **[SA]**

☐ 1) Weeks ago (please state number of weeks ago: _____)
☐ 2) Months ago (please state number of months ago: _____)
☐ 3) Don't know

10005. What is the estimated number of times you visit your regular family doctor/ GP per year?

_____ Times per year

10006. Would you usually visit a private GP clinic or a polyclinic when/ if you have a mild illness such as cold or cough? **[SA]**

☐ 1) Yes ☐ 2) No

10007. What would you do if you have a possible medical emergency after office hours (6pm), e.g. sudden spike of high fever? **[SA]**
[DO NOT READ OUT]

- ☐ 1) See a GP/ 24-hour GP clinic
- ☐ 2) Go direct to a 24-hour clinic at a private hospital
- ☐ 3) Go direct to a restructured hospital A&E
- ☐ 4) Go direct to a private hospital A&E

10008. What would you do if you think you may have a potentially serious (non-emergency) medical problem, e.g. you think you have some symptoms of cancer? **[SA]**
[DO NOT READ OUT]

- ☐ 1) Make a private walk-in appointment with a restructured hospital Specialist Outpatient Clinic (SOC)
- ☐ 2) See a private hospital specialist
- ☐ 3) See a GP / Family doctor
- ☐ 4) See a polyclinic doctor
- ☐ 5) Go direct to a restructured hospital A&E
- ☐ 6) Go direct to a private hospital A&E

Traditional Chinese Medicine

I would like to ask questions on consultations with a traditional Chinese medicine (TCM) practitioner. A TCM practitioner could be a TCM physician, a Chinese sinseh / herbalist / bone setter or an acupuncturist.

10100. Have you ever visited a TCM practitioner for a medical condition before? **[SA]**

- ☐ 1) Yes
- ☐ 2) No ➜ **Go to Q11000**
- ☐ 3) Don't know ➜ **Go to Q11000**

10101. When was your last visit to a TCM practitioner for a medical condition? **[SA]**
[READ ONLY IF NECESSARY]

- ☐ 1) Less than 6 months ago
- ☐ 2) 6 months to less than 1 year ago
- ☐ 3) 1 year to less than 2 years ago
- ☐ 4) 2 years to less than 5 years ago
- ☐ 5) At least 5 years ago

➜ **Go to Q10103**

10102. During the last 12 months, how many times did you visit a TCM practitioner for a medical condition? **[SA]**

- ☐ 1) 1 to 5 times a year
- ☐ 2) 6 to 10 times a year
- ☐ 3) More than 10 times a year

10103. How were you referred to the TCM practitioner? **[SA]**

- ☐ 1) Self referral
- ☐ 2) Referred by a Western doctor
- ☐ 3) Referred by friends or relatives
- ☐ 4) Referred by others (please specify: _____)

10104. What were the medical conditions you sought treatment from a TCM practitioner? **[MA]**

- ☐ 1) Acute minor illness like flu / cough / cold
- ☐ 2) Acute major illness like pneumonia / heart attack
- ☐ 3) Acute minor injuries like sprains / strains
- ☐ 4) Acute major injuries like fractures / dislocation
- ☐ 5) Chronic illness like hypertension / diabetes / cancer
- ☐ 6) Chronic aches and pain like headache / backache / rheumatism
- ☐ 7) General well-being
- ☐ 8) Others (please specify: _____)

10105. Does the TCM practitioner usually prescribe/ perform the following during your consultation? **[MA]**

- ☐ 1) Herbal Medicine
- ☐ 2) Acupuncture
- ☐ 3) TCM tuina / massage / bone setting
- ☐ 4) Others (please specify: _____)

10106. Where do you usually go to see a TCM practitioner? **[SA]**
[DO NOT READ OUT]

- ☐ 1) Free clinics such as Thong Chai, Chung Hwa or Public Free Clinic
- ☐ 2) TCM clinics (including those found in Chinese medical halls) in HDB estates
- ☐ 3) TCM clinics in hospitals and nursing homes
- ☐ 4) TCM clinics in specialist medical centres such as Paragon in Orchard Road and Camden Medical Centre
- ☐ 5) Others (please specify: _____)

10107. What is the main reason for you to see a TCM practitioner? **[SA]**
[DO NOT READ OUT]

- ☐ 1) TCM is effective for the condition I am suffering from
- ☐ 2) TCM is holistic and takes care of the whole body
- ☐ 3) TCM products has less side effects than Western medicine
- ☐ 4) I have tried Western medicine but it does not work
- ☐ 5) I have been seeing a TCM practitioner since I was young
- ☐ 6) It is cheaper to see a TCM practitioner than a Western doctor
- ☐ 7) Others (please specify: _____)

10108. How much do you usually pay for each visit to the TCM practitioner?

$ _____ per visit

10109. Do you think it is cheaper to see a TCM practitioner than to see a Western doctor? **[SA]**

☐ 1) Yes ☐ 2) No

10110. Do you usually see a Western doctor and a TCM practitioner for the same medical conditions? **[SA]**

☐ 1) Yes ☐ 2) No ➜ **Go to Q10113**

10111. Do you tell your Western doctor that you are also seeing a TCM practitioner for the same medical conditions? **[SA]**

☐ 1) Yes ☐ 2) No

10112. Why do you usually see a Western doctor and a TCM practitioner for the same medical condition? **[MA]**
[DO NOT READ OUT]

☐ 1) Western medical treatment not effective

☐ 2) Need the Western doctor to issue medical certificate as medical certificate issued by the TCM practitioner is not valid

☐ 3) Want a second opinion

☐ 4) Other (please specify: _____)

10113. Have you ever experienced any side effects after seeking treatment from a TCM practitioner? **[SA]**

☐ 1) Yes ➜ **Go to Q10114** ☐ 2) No ➜ **Go to Q11000**

10114. Do you need to be hospitalised for these side effects that you experienced? **[SA]**

☐ 1) Yes ☐ 2) No

END OF SECTION 10. GO TO SECTION 11.

11. HEALTH STATE DESCRIPTIONS

Now, I would like to ask questions on your state of health.

Overall Health

The first question is about your overall health, including both your physical health and mental health.

11000. In general, how would you rate your health today? **[SA]**

[READ AND SHOW SCALE CARD TO RESPONDENT]

- ☐ 1) Very Good
- ☐ 2) Good
- ☐ 3) Moderate
- ☐ 4) Bad
- ☐ 5) Very Bad
- ☐ 6) Refused
- ☐ 7) Don't know

Mental Health

11101. I would like to know if you have any medical complaints, and how your health has been in general, over the past 6 weeks.

[READ AND SHOW TABLE CARD TO RESPONDENT]

Please answer all the questions simply by ticking the answers which you think most nearly apply to you. Remember that I want to know about present and recent complaints, not those you had in the past.

[READ OUT TO RESPONDENT, IF NECESSARY]

Have you recently (in the past 6 weeks) **[SA]**	(a) 0	(b) 0	(c) 1	(d) 1
1. Been able to concentrate on whatever you're doing?	☐ Better than usual	☐ Same as usual	☐ Less than usual	☐ Much less than usual
2. Lost much sleep over worry?	☐ Not at all	☐ No more than usual	☐ Rather more than usual	☐ Much more than usual
3. Felt that you are playing a useful part in things?	☐ More so than usual	☐ Same as usual	☐ Less useful than usual	☐ Much less useful
4. Felt capable of making decisions about things?	☐ More so than usual	☐ Same as usual	☐ Less so than usual	☐ Much less capable
5. Felt constantly under strain?	☐ Not at all	☐ No more than usual	☐ Rather more than usual	☐ Much more than usual

Have you recently (in the past 6 weeks) (cont'd) **[SA]**	(a) 0	(b) 0	(c) 1	(d) 1
6. Felt you couldn't overcome your difficulties?	☐ Not at all	☐ No more than usual	☐ Rather more than usual	☐ Much more than usual
7. Been able to enjoy your normal day-to-day activities?	☐ More so than usual	☐ Same as usual	☐ Less so than usual	☐ Much less than usual
8. Been able to face up to your problems?	☐ More so than usual	☐ Same as usual	☐ Less able than usual	☐ Much less able
9. Been feeling unhappy and depressed?	☐ Not at all	☐ No more than usual	☐ Rather more than usual	☐ Much more than usual
10. Been losing confidence in yourself?	☐ Not at all	☐ No more than usual	☐ Rather more than usual	☐ Much more than usual
11. Been thinking of yourself as a worthless person?	☐ Not at all	☐ No more than usual	☐ Rather more than usual	☐ Much more than usual
12. Been feeling reasonably happy, all things considered?	☐ More so than usual	☐ About same as usual	☐ Less so than usual	☐ Much less than usual

Total Score: _____

END OF SECTION 11. GO TO SECTION 12.

12. CHRONIC DISEASE MANAGEMENT

Now, I would like to ask questions on Medisave and chronic diseases.

12000a. Do you know that Medisave can be used to pay part of the outpatient costs for chronic diseases under the Medisave for Chronic Disease Management Programme? **[SA]**

☐ 1) Yes
☐ 2) No ➜ **Go to Q12001**
☐ 3) Don't know ➜ **Go to Q12001**

12000b. Name the chronic diseases included in the Medisave for Chronic Disease Management Programme.
[MA]
[DO NOT READ OUT]

☐ 1) Diabetes
☐ 2) High blood pressure
☐ 3) High blood cholesterol
☐ 4) Stroke
☐ 5) Asthma
☐ 6) Chronic obstructive pulmonary disease
☐ 7) Schizophrenia
☐ 8) Major depression
☐ 9) Other (please specify: _____)
☐ 10) Don't know

12001. Are you currently seeing a doctor for your diabetes, hypertension, high blood cholesterol or stroke, asthma, chronic obstructive pulmonary disease, schizophrenia and major depression on a regular basis? **[SA]**

☐ 1) Yes ➜ **Go to Q12002**
☐ 2) No, I have at least one of the conditions mentioned but do not see a doctor on a regular basis ➜ **Go to Q13000**
☐ 3) No, I do not have any of the conditions ➜ **Go to Q13000**

12002. How often do you check your weight? Include times when checked by family member or friend, but do not include times when checked by health professional. **[SA]**

_____ times

☐ 1) per day
☐ 2) per week
☐ 3) per month
☐ 4) per day
☐ 5) Refused/ don't know

12003. Do you or your caregiver (exclude doctor, nurse or health professional) keep any of the following records? **[MA]**

- ☐ 1) Weight
- ☐ 2) Blood pressure
- ☐ 3) Blood cholesterol
- ☐ 4) Blood glucose
- ☐ 5) HbA1c

12004. Do you use Medisave to pay for your outpatient treatment of chronic diseases? **[SA]**

- ☐ 1) Yes
- ☐ 2) No
- ☐ 3) Refused

12005. Do you have any of the following hospitalization insurance coverage? **[MA]**

- ☐ 1) CPF Medishield
- ☐ 2) Enhanced Medishield offered by private insurance firm
- ☐ 3) Other personal hospitalization insurance plan that reimburses your hospitalization and treatment expenses; with or without paying daily hospitalization cash/income benefit (exclude critical illness, disability and personal accident insurance plans)
- ☐ 4) Employer provided medical insurance
- ☐ 5) None of the above
- ☐ 6) Don't know

END OF SECTION 12. GO TO SECTION 13.

13. CARE GIVING

Care giving

Now, I would like to ask you on care giving (i.e. providing regular care or assistance to a friend or family member who has a health problem, long-term illness, or disability.)

13000. During the past month, did you provide any such care or assistance to a friend or family member? **[SA]**

- ☐ 1) Yes
- ☐ 2) No ➜ **End of survey**
- ☐ 3) Refused ➜ **End of survey**
- ☐ 4) Don't know/ not sure ➜ **End of survey**

13001. How many persons are you providing care to?

_____ Person(s)

Care recipient 1

13002a Are you the **only** person providing care for this person? **[SA]**

- ☐ 1) Yes ➜ **Go to 13002c**
- ☐ 2) No ➜ **Go to 13002b**

IF NO

13002b Who else provides care to this person? **[MA]**

- ☐ 1) Other family members
- ☐ 2) Live-in maid
- ☐ 3) Nurse/ other nursing professional
- ☐ 4) Day-care & other institutions
- ☐ 5) Others (please specify: _____)

13002c. What age is the person to whom you are giving care? **[SA]**

_____ Years old

- ☐ 1) Refused
- ☐ 2) Don't know/ not sure

13002d. Is this person whom you giving care to male or female? **[SA]**

- ☐ 1) Male
- ☐ 2) Female
- ☐ 3) Refused

13002e. What is his/her relationship to you? For example is he/she your (mother/daughter or father/son)? **[SA]**

- ☐ 1) Parent
- ☐ 2) Parent-in-law
- ☐ 3) Child
- ☐ 4) Spouse
- ☐ 5) Sibling
- ☐ 6) Grandparent
- ☐ 7) Grandchild
- ☐ 8) Other Relative
- ☐ 9) Non-relative
- ☐ 10) Don't know/ not sure
- ☐ 11) Refused

13002f. How long have you provided care for this friend or family member? **[SA]**

- ☐ 1) 1 year or less
- ☐ 2) More than 1 year to 2 years
- ☐ 3) More than 2 years to 5 years
- ☐ 4) More than 5 years to 10 years
- ☐ 5) More than 10 years
- ☐ 6) Don't know/ not sure

13002g. In an average week, how many hours do you provide care for this person?

_____ hours per week

- ☐ 1) Refused
- ☐ 2) Don't know/ not sure

13002h. What is the major health problem, long-term illness, or disability that the person you care for has according to the doctor? **[SA]**
[READ ONLY IF NECESSARY]

- ☐ 1) Arthritis/ Rheumatism
- ☐ 2) Cancer
- ☐ 3) Diabetes
- ☐ 4) Heart Disease
- ☐ 5) Hypertension/ High Blood Pressure
- ☐ 6) Lung Disease/ Emphysema
- ☐ 7) Osteoporosis
- ☐ 8) Parkinson's Disease
- ☐ 9) Stroke
- ☐ 10) Eye/ Vision Problem (blindness)
- ☐ 11) Hearing Problems (deafness)
- ☐ 12) Multiple Sclerosis (MS)
- ☐ 13) Spinal Cord Injury
- ☐ 14) Fracture
- ☐ 15) Traumatic Brain Injury (TBI)
- ☐ 16) Alzheimer's Disease or Dementia
- ☐ 17) Learning Disabilities (LD)
- ☐ 18) Cerebral Palsy (CP)
- ☐ 19) Down's Syndrome
- ☐ 20) Anxiety/ Depression
- ☐ 21) Others (please specify : _____ _____)
- ☐ 22) Don't know/ not sure
- ☐ 23) Refused

13002i. In which of the following areas does the person you care for most need your help? **[MA]**
[READ ONLY IF NECESSARY]

- ☐ 1) Taking care of himself/herself, such as eating, dressing, or bathing
- ☐ 2) Taking care of his/her residence or personal living spaces, such as cleaning, managing money or preparing meals
- ☐ 3) Communicating with others
- ☐ 4) Learning or remembering
- ☐ 5) Seeing or hearing
- ☐ 6) Moving around within the home
- ☐ 7) Transportation outside of the home
- ☐ 8) Relieving/ decreasing anxiety or depression
- ☐ 9) Don't know/ not sure
- ☐ 10) Refused

13002j. Currently, is there any form of help given to you (the care giver)? **[SA]**

☐ 1) Yes ☐ 2) No

13002k. In which of the following areas do you think you (the care giver) should be given training in order to provide care to others? **[MA]**
[DO NOT READ OUT]

- ☐ 1) Taking care of others, e.g. eating, dressing, or bathing
- ☐ 2) Taking care of others' residence or personal living spaces, e.g. cleaning, managing money or preparing meals
- ☐ 3) Communicating with others
- ☐ 4) Moving others around within the home
- ☐ 5) Transportation others outside of the home
- ☐ 6) Relieving/ decreasing anxiety or depression of others
- ☐ 7) Other (please specify: _____)
- ☐ 8) Don't know/ not sure
- ☐ 9) Refused

Care recipient 2

13003a Are you the **only** person providing care for this person? **[SA]**

☐ 1) Yes ➜ **Go to 13003c** ☐ 2) No ➜ **Go to 13003b**

IF NO

13003b Who else provides care to this person? **[MA]**

- ☐ 1) Other family members
- ☐ 2) Live-in maid
- ☐ 3) Nurse/ other nursing professional
- ☐ 4) Day-care & other institutions
- ☐ 5) Others (please specify: _____)

13003c. What age is the person to whom you are giving care? **[SA]**

_____ Years old

- ☐ 1) Refused
- ☐ 2) Don't know/ not sure

13003d. Is this person whom you giving care to male or female? **[SA]**

- ☐ 1) Male
- ☐ 2) Female
- ☐ 3) Refused

13003e. What is his/her relationship to you? For example is he/she your (mother/daughter or father/son)? **[SA]**

- ☐ 1) Parent
- ☐ 2) Parent-in-law
- ☐ 3) Child
- ☐ 4) Spouse
- ☐ 5) Sibling
- ☐ 6) Grandparent
- ☐ 7) Grandchild
- ☐ 8) Other Relative
- ☐ 9) Non-relative
- ☐ 10) Don't know/ not sure
- ☐ 11) Refused

13003f. How long have you provided care for this friend or family member? **[SA]**

- ☐ 1) 1 year or less
- ☐ 2) More than 1 year to 2 years
- ☐ 3) More than 2 years to 5 years
- ☐ 4) More than 5 years to 10 years
- ☐ 5) More than 10 years
- ☐ 6) Don't know/ not sure

13003g. In an average week, how many hours do you provide care for this person?

_____ hours per week

- ☐ 1) Refused
- ☐ 2) Don't know/ not sure

13003h. What is the major health problem, long-term illness, or disability that the person you care for has according to the doctor? **[SA]**

[READ ONLY IF NECESSARY]

- ☐ 1) Arthritis/ Rheumatism
- ☐ 2) Cancer
- ☐ 3) Diabetes
- ☐ 4) Heart Disease
- ☐ 5) Hypertension/ High Blood Pressure
- ☐ 6) Lung Disease/ Emphysema
- ☐ 7) Osteoporosis
- ☐ 8) Parkinson's Disease
- ☐ 9) Stroke
- ☐ 10) Eye/ Vision Problem (blindness)
- ☐ 11) Hearing Problems (deafness)
- ☐ 12) Multiple Sclerosis (MS)
- ☐ 13) Spinal Cord Injury
- ☐ 14) Fracture
- ☐ 15) Traumatic Brain Injury (TBI)
- ☐ 16) Alzheimer's Disease or Dementia
- ☐ 17) Learning Disabilities (LD)
- ☐ 18) Cerebral Palsy (CP)
- ☐ 19) Down's Syndrome
- ☐ 20) Anxiety/ Depression
- ☐ 21) Others (please specify : _____ _____)
- ☐ 22) Don't know/ not sure
- ☐ 23) Refused

13003i. In which of the following areas does the person you care for most need your help? **[MA]**

[READ ONLY IF NECESSARY]

- ☐ 1) Taking care of himself/herself, such as eating, dressing, or bathing
- ☐ 2) Taking care of his/her residence or personal living spaces, such as cleaning, managing money or preparing meals
- ☐ 3) Communicating with others
- ☐ 4) Learning or remembering
- ☐ 5) Seeing or hearing
- ☐ 6) Moving around within the home
- ☐ 7) Transportation outside of the home
- ☐ 8) Relieving/ decreasing anxiety or depression
- ☐ 9) Don't know/ not sure
- ☐ 10) Refused

13003j. Currently, is there any form of help given to you (the care giver)? **[SA]**

- ☐ 1) Yes
- ☐ 2) No

13003k. In which of the following areas do you think you (the care giver) should be given training in order to provide care to others? **[MA]**

[DO NOT READ OUT]

- ☐ 1) Taking care of others, e.g. eating, dressing, or bathing
- ☐ 2) Taking care of others' residence or personal living spaces, e.g. cleaning, managing money or preparing meals
- ☐ 3) Communicating with others
- ☐ 4) Moving others around within the home
- ☐ 5) Transportation others outside of the home
- ☐ 6) Relieving/ decreasing anxiety or depression of others
- ☐ 7) Other (please specify: _____)
- ☐ 8) Don't know/ not sure
- ☐ 9) Refused

END OF SURVEY.

Annex D
Survey Project Team

Survey Project Team

Survey Planning & Preparation	Survey Pilot Trial
Dr Derrick Heng Dr Stefan Ma Dr Lim Wei Yen Fong Chee Weng Lily Chua Zhao Zheng Irene Soh	Fong Chee Weng Lily Chua Zhao Zheng Justin Lee
Survey Fieldwork	**Survey Report**
Fong Chee Weng Lily Chua Zhao Zheng Justin Lee	**Editorial** Fong Chee Weng (Editor) Dr Derrick Heng Dr Stefan Ma **Writers** Fong Chee Weng Zhao Zheng Lily Chua Dr Albert Ty
Survey Report Proof Reading, Printing Co-ordination and Distribution	
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