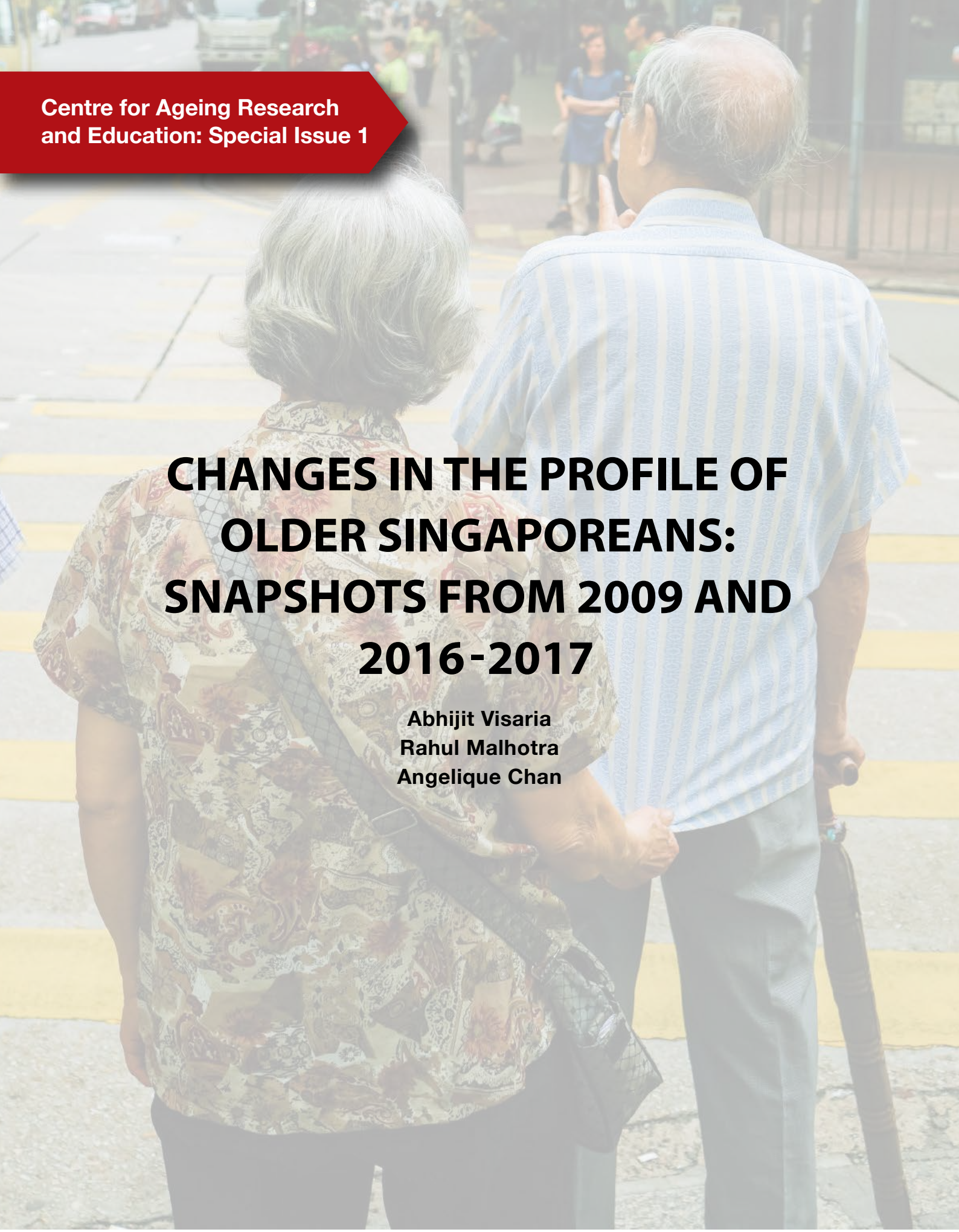

Centre for Ageing Research and Education: Special Issue 1

CHANGES IN THE PROFILE OF OLDER SINGAPOREANS: SNAPSHOTS FROM 2009 AND 2016-2017

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Care Research Areas:

Healthy Ageing
Retirement and Well-being
Caregiving/ Long-term Care
New Models of Integrated Care

Changes in the Profile of Older Singaporeans: Snapshots from 2009 and 2016-2017

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CARE research briefs and Special Issues present policy-oriented summaries of published peer reviewed documents or of a body of published work and work-in-progress

General Editor:
Normala Binte Manap

Key Findings:

- The distribution of the highest level of education shifted upwards over this period, such that more older Singaporeans attained higher levels of education. Current employment among older Singaporeans also increased substantially.
- More older Singaporeans were living alone, with a spouse, or only with a foreign domestic worker in 2016-2017 compared to 2009, and fewer were living with children.
- The extent of social networks that included relatives and friends outside the household weakened for older Singaporeans. Participation in committee and neighbourhood events, and frequent attendance at a place of worship declined.
- Loneliness among older Singaporeans declined over time. The prevalence of clinically relevant depressive symptoms also declined.
- In terms of health, difficulties with basic activities of daily living and instrumental activities of daily living increased. The proportion of older Singaporeans with 3 or more chronic physical ailments including self-reported diabetes increased, and there was also an increase in the prevalence of obesity.

Introduction

Centre for Ageing Research and Education (CARE), Duke-NUS Medical School has conducted two nationally representative longitudinal[1] surveys of older Singaporeans aged 60 years and older in the past 10 years: 1) Panel on Health and Ageing of Singaporean Elderly (PHASE), the first wave of which was conducted in 2009 (hereafter referred to as PHASE – I), enrolling a total of 4990 respondents, and 2) Transitions in Health, Employment, Social Engagement and Intergenerational Transfers in Singapore (THE SIGNS) Study, whose first wave was conducted in 2016-2017 (hereafter referred to as THE SIGNS Study – I), enrolling a total of 4549 respondents.

The two surveys present a unique opportunity to compare and contrast characteristics of two cohorts of older Singaporeans, where the birth year of the youngest cohort members is 7 years apart. PHASE – I represents Singaporeans born between 1908 and 1949 (with a median birth year of 1937), whereas THE SIGNS Study – I represents those born between 1910 and 1956 (with 50% of the respondents born in or after 1946). Although 7-year gap between the birth year of the youngest members of the two cohorts may seem small, given Singapore's rapid socio-economic development, especially post-independence in 1965, the life-course of these two cohorts, in terms of the extent and duration of exposure to education, economic hardships, health risk factors, and health and social care is likely to be different. Thus, it is pertinent to examine the presence and extent of differences in the social and health status between these two cohorts of older Singaporeans.

Both PHASE – I and THE SIGNS Study – I were designed to collect data using the same questions and scales on socio-demographic characteristics, socioeconomic status, measures of social engagement, psychological well-being, and physical health. In this report, we present data from the two surveys to investigate whether and to what extent do the cohorts of older Singaporeans covered by these surveys differ in terms of their socioeconomic status, social engagement, physical health and psychological wellbeing.

[1] That is, the same individuals are followed up over time.

Data

PHASE – I, also known as the Social Isolation, Health and Lifestyles Survey, was commissioned by the Singapore Ministry of Social and Family Development (MSF) (erstwhile Ministry of Community Development, Youth and Sports [MCYS]). A random sample of 8400 Singapore citizens and permanent residents aged 60 years and older, stratified by gender, ethnicity, and 5-year age groups based on the 2007 mid-year population distribution, covering the whole of Singapore, was drawn for participation in the survey. Those aged 75 years and older, Malays and Indians were oversampled by a factor of 2 in order to have sufficient numbers in these sub-groups for analysis. The survey was conducted between January and December 2009. A total of 4990 older adults (including, for health-related reasons, their proxy respondents; n=453, 9%) were interviewed face-to-face by trained interviewers at their residence. Excluding invalid addresses, the response rate for PHASE – I was 69.4%. The National University of Singapore Institutional Review Board (NUS IRB) approved analysis of de-identified data from PHASE – I.

THE SIGNS Study – I entailed contacting a nationally representative sample of 9736 Singapore citizens and permanent residents aged 60 years and older, stratified by gender, ethnicity, and 5-year age groups based on the estimated 2015 mid-year population distribution. Similar to PHASE – I, individuals aged 75 years and older, Malays and Indians were oversampled by a factor of 2. Excluding 814 invalid names or addresses, the response rate for THE SIGNS Study – I was 51.0%. The survey was conducted between July 2016 and September 2017, and 4549 respondents (including, for health-related reasons, their proxy respondents; n=464, 10.2%) were interviewed face-to-face by trained interviewers at their residence. THE SIGNS Study – I was approved by the NUS IRB.

In both surveys, data collection was conducted only after written informed consent. A main questionnaire[2] was administered followed by an optional anthropometry and performance measurement module which included measurements of blood pressure, height, weight, waist circumference (PHASE – I only), hand grip strength, and walking speed (THE SIGNS Study – I only). About 91% of PHASE – I and 98% of THE SIGNS Study – I respondents completed the optional anthropometry and performance measurement module.

[2] THE SIGNS Study – I used a split questionnaire design for the main questionnaire, splitting it into two versions. One of two versions of the questionnaire was assigned to a respondent based on stratified block randomization, with the strata defined by 5-year age groups, gender, and ethnicity. In the analysis in this brief, questions on participation in social activities, depressive symptoms, and personal mastery were administered to about half of the sample, whereas all others were administered to the entire sample

Analytical Approach

In this research brief, we present the weighted mean, standard deviation and range for continuous variables, and weighted percentages for the distribution of categorical variables. We used sampling weights in the analysis, based on the mid-2008 distribution of the population of Singapore citizens and permanent residents for PHASE – I, and based on the mid-2015 distribution for THE SIGNS Study – I. The response options of 'don't know' and 'refused' were marginal proportions in all variables except for income adequacy, and therefore we present them only for income adequacy (Tables 7A and 7B) below. For all categorical variables, we calculated absolute difference as 2016-2017 values minus 2009 values, and relative difference as the absolute difference as a percent of the 2009 values.

The age distribution of the Singapore citizen and permanent resident population aged 60 years and older has changed somewhat between 2008 and 2015, although the indicated differences are less than 1 percentage point within any gender- and ethnicity-specific 5-year age group. Nonetheless, in order to assess the influence of differences in the age distribution between the two time points, we first calculated age-standardized proportions for some variables related to health, using the direct method to weight the age-specific proportions in 2008 by the age distribution in 2015. We observed negligible differences between the unstandardized and age-standardized proportions, and therefore present unstandardized proportions in this brief.

We first present data on the background characteristics of the two cohorts. We then present data on their family situation, in terms of marital status, number of children, and living arrangements. Socioeconomic status is presented next, in terms of educational attainment, housing type, employment status, and income adequacy. Comparable data on social engagement is available in terms of social networks, participation in committees/ neighbourhood events, and attendance at a place of worship. We also compare data from the two cohorts on loneliness. A number of indicators are available to compare physical health between the two cohorts: difficulty with activities of daily living, difficulty with instrumental activities of daily living, chronic physical ailments, body mass index, prevalence of hypertension, hand grip strength, as well as frequency of walks for exercise. Finally, psychological well-being is measured in terms of the prevalence of clinically relevant depressive symptoms and personal mastery.

I. Background Characteristics

In Table 1, we present the background characteristics of the 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I) survey cohorts. The average age was fairly similar in both surveys, 70 years in 2009 and 71 years in 2016-2017. About 46% of older Singaporeans at both time points were male. The majority, about 83% were Chinese, followed by about 9.5% Malay, 6% Indian and 1% Others. Nearly all were Singapore citizens. A little more than half followed Buddhism/Taoism, followed by Christianity (16% in 2009; 18% in 2016-2017), Islam, Hinduism and other religions or faiths. There was a small increase between 2009 and 2016-2017 in the proportion of those who reported that they did not have a religion.

We see that the gender, ethnicity, and citizenship status distributions were nearly the same across both surveys. The similar demographic profile of the two cohorts, evident through the data on age, gender, and ethnicity is due to the similar design of the two surveys and is not expected to be different. Further, these similarities in the background characteristics of the two cohorts suggest that it is appropriate to compare aspects related to their socioeconomic status, social engagement, physical health and psychological wellbeing.

Table 1: Background Characteristics of Older Singaporeans, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), weighted %

	2009	2016-2017
N	4990	4549
Age, in years		
Mean	69.9	71.0
SD	7.7	8.0
Range	60-101	60-106
Age group		
60-69 years	57.3	53.0
70-79 years	29.9	30.7
80 years and older	12.8	16.4
Gender		
Male	45.8	46.7
Female	54.2	53.3
Ethnicity		
Chinese	83.0	82.9
Malay	9.5	9.5
Indian	6.2	6.1
Other	1.4	1.4
Citizenship		
Singapore citizen	97.5	97.4
Permanent resident	2.5	2.6
Religion		
Buddhism/Taoism	56.5	54.7
Christianity	16.3	17.7
Islam	11.6	11.5
Hinduism	3.3	3.4
Other	1.5	0.5
No religion	10.8	12.1

II. Family Situation

Marital Status

Overall, the distribution of the marital status of older Singaporeans in 2009 and 2016-2017 shows that a slightly higher proportion were married in 2016-2017 (67%) compared to 2009 (63%). At the same time, a higher proportion had also never married, with 8% having never married in 2016-2017 compared to 5% in 2009, a relative increase of 51% over 2009. The proportion widowed declined by about 7 percentage points, whereas the proportion of separated or divorced was higher in 2016-2017 by 1 percentage point. (Table 2A)

Table 2A: Marital Status, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I) Distribution overall, weighted %

Distribution overall, weighted %				
	2009	**2016-2017**	**Absolute Difference**	**Relative Difference**
N	4990	4549		
Married	63.3	66.9	3.6	5.7
Widowed	28.4	21.1	-7.3	-25.8
Separated / Divorced	3.2	4.2	1.1	33.5
Never married	5.1	7.7	2.6	51.0

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

An increase between 2009 and 2016-2017 in the proportion of older Singaporeans currently married was seen for all three considered age groups and for females, whereas a marginal decrease was seen for males. The increase in the proportion separated or divorced, and never-married, and the decrease in the proportion widowed was also seen for all age groups and for males and females both. As expected, the proportion currently married was the lowest and widowed the highest for those aged 80 years and older. (Table 2B)

Table 2B: Marital Status, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age and Gender					
Distribution by age group, weighted %					
		2009	**2016-2017**	**Absolute Difference**	**Relative Difference**
60-69 years	N	2044	2020		
	Married	74.2	76.2	2.0	2.7
	Widowed	15.2	9.3	-5.9	-38.6
	Separated / Divorced	4.0	5.1	1.1	26.6
	Never married	6.6	9.3	2.7	41.3
70-79 years	N	1862	1501		
	Married	55.5	66.3	10.8	19.5
	Widowed	38.4	22.7	-15.8	-41.0
	Separated / Divorced	2.6	4.1	1.5	59.7
	Never married	3.5	6.9	3.4	95.2
80 years and older	N	1084	1028		
	Married	32.9	38.0	5.1	15.4
	Widowed	64.2	56.2	-8.0	-12.5
	Separated / Divorced	0.7	1.7	1.0	135.6
	Never married	2.2	4.0	1.9	87.0
Distribution by gender, weighted %					
Males	N	2253	2117		
	Married	83.3	82.1	-1.2	-1.5
	Widowed	9.7	7.2	-2.6	-26.5
	Separated / Divorced	2.9	4.2	1.4	47.2
	Never married	4.1	6.6	2.4	59.4
Females	N	2737	2432		
	Married	46.4	53.6	7.2	15.5
	Widowed	44.2	33.3	-10.9	-24.7
	Separated / Divorced	3.4	4.2	0.8	24.4
	Never married	5.9	8.7	2.8	46.5

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

Number of Living Children

The decline in total fertility in Singapore in general is also evident in the difference in average number of living children between the two cohorts of older Singaporeans. It was just over 3 in 2009, and 2.6 in 2016-2017. (Table 3A)

Table 3A: Number of Living Children, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)

Distribution overall		
	2009	**2016-2017**
N	4990	4541
Average	3.2	2.6
SD	2.0	1.8
Range	0-14	0-15

The number of living children was the highest among those aged 80 years in both 2009 and 2016-2017. The decline in absolute terms was the highest for those aged 70-79 years, from 3.7 living children on average in 2009 to 2.7 in 2016-2017. In 2016-2017, older Singaporeans aged 80 years and older had 4.2 living children on average, whereas their younger counterparts aged 60-69 years had 2 children on average. (Table 3B)

Table 3B: Number of Living Children, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age and Gender

Distribution by age group			
		2009	**2016-2017**
60-69 years	N	2044	2018
	Average	2.6	2.0
	SD	1.5	1.2
	Range	0-10	0-7
70-79 years	N	1862	1497
	Average	3.7	2.7
	SD	2.2	1.6
	Range	0-14	0-12
80 years and older	N	1084	1026
	Average	4.7	4.2
	SD	2.6	2.5
	Range	0-13	0-15
Distribution by gender			
Males	N	2253	2115
	Average	3.0	2.4
	SD	1.8	1.5
	Range	0-12	0-15
Females	N	2737	2426
	Average	3.4	2.7
	SD	2.2	2.0
	Range	0-14	0-14

Living Arrangements

The proportion of older Singaporeans living alone increased between 2009 and 2016-2017, with the 1 percentage point difference representing a relative increase of 19%. The proportion living with a foreign domestic worker only had a small increase (0.6%) in absolute terms but 64% in relative terms albeit from a low base of 0.9% in 2009. The proportion of older Singaporeans living with a child decreased between 2009 and 2016-2017, whereas the proportion living with a spouse (but no child) increased. (Table 4A)

Table 4A: Living Arrangements, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)

Distribution overall, weighted %

	2009	2016-2017	Absolute Difference	Relative Difference
N	4990	4543		
Living alone	6.2	7.3	1.2	19.0
Living with…				
Spouse	18.7	22.8	4.1	22.2
Child	26.3	19.6	-6.8	-25.8
child and spouse	43.3	42.4	-0.8	-1.9
foreign domestic worker only	0.9	1.4	0.6	64.4
Others	4.7	6.4	1.7	36.9

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

The increase between 2009 and 2016-2017 in the proportion living alone was over 35% in relative terms for older Singaporeans aged 70-79 years and nearly 50% for those aged 80 years and older. At the same time, the proportion of those aged 80 years and older who lived with a foreign domestic worker only increased more than 1.5 times from 2.2% in 2009 to 5.8% in 2016-2017. The proportion living alone was higher for females compared to males in both 2009 and 2016-2017, and the relative difference was similar at about 20% increase over 2009. A decline in living with a child (without or without a spouse also) was seen for those aged 60-69 years and 80 years and older, as well as males and females both. Overall, in 2016-2017 the highest proportion of those aged 80 years and older lived with a child (47%), followed by a child and a spouse (20%) and a spouse only (16%). In the younger age-group of 60-69 years, the majority lived with a child and a spouse (53%), or with a spouse only (22%) or a child (11%). (Table 4B)

Table 4B: Living Arrangements, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age and Gender					
Distribution by age group, weighted %					
		2009	**2016-2017**	**Absolute Difference**	**Relative Difference**
60-69 years	N	2044	2018		
	Living alone	5.9	6.0	0.1	1.0
	Living with…				
	Spouse	19.7	22.1	2.4	12.3
	Child	14.9	10.6	-4.3	-29.0
	child and spouse	53.2	52.9	-0.3	-0.6
	foreign domestic worker only	0.5	0.3	-0.2	-46.8
	Others	5.8	8.2	2.4	40.7
70-79 years	N	1862	1499		
	Living alone	7.0	9.5	2.5	35.4
	Living with…				
	Spouse	20.1	27.8	7.7	38.1
	Child	34.2	20.2	-14.0	-40.9
	child and spouse	34.1	36.2	2.1	6.3
	foreign domestic worker only	1.1	1.2	0.1	5.5
	Others	3.6	5.2	1.6	46.2
80 years and older	N	1084	1026		
	Living alone	5.2	7.6	2.5	47.8
	Living with…				
	Spouse	10.9	15.9	5.0	45.5
	Child	59.1	47.3	-11.7	-19.9
	child and spouse	20.4	20.4	0.0	0.0
	foreign domestic worker only	2.2	5.8	3.6	167.7
	Others	2.3	2.9	0.7	30.1
Distribution by gender, weighted %					
Males	N	2253	2114		
	Living alone	4.5	5.4	0.9	19.8
	Living with…				
	Spouse	23.0	26.7	3.7	16.0
	Child	9.3	7.4	-1.9	-20.5
	child and spouse	58.2	53.5	-4.7	-8.0
	foreign domestic worker only	0.5	0.8	0.3	58.3
	Others	4.6	6.3	1.8	38.4
Females	N	2737	2429		
	Living alone	7.6	9.1	1.5	19.6
	Living with…				
	Spouse	15.1	19.5	4.4	29.2
	Child	40.7	30.2	-10.5	-25.8
	child and spouse	30.7	32.8	2.1	6.8
	foreign domestic worker only	1.2	2.0	0.8	68.3
	Others	4.8	6.5	1.7	35.9

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

III. Socioeconomic Status

Educational Attainment

A marked difference between the two cohorts is that of a shift to attainment of higher levels of education. The proportion of older Singaporeans with university or higher education was 3.4% in 2009 and increased to 5% in 2016-2017. This difference of 1.5 percentage points in absolute terms represents a 46% increase over 2009. Similarly, the difference in junior college or polytechnic education from 5.5% in 2009 to 8% in 2016-2017 represents a 41% increase compared to 2009. The shift is also seen with lower proportions of the 2016-2017 cohort having had either no formal education or completed only primary education. (Table 5A)

Table 5A: Highest Educational Attainment, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)

Distribution overall, weighted %

	2009	2016-2017	Absolute Difference	Relative Difference
N	4990	4549		
No formal education	30.8	27.5	-3.3	-10.8
Primary	36.4	30.6	-5.8	-15.9
Secondary / Vocational / ITE	23.6	29.2	5.5	23.4
JC / Poly	5.5	7.7	2.2	40.6
University and above	3.4	4.9	1.5	45.7

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

The difference in educational attainment is seen at all ages, with substantially lower proportions of all three age groups at having no formal education or only primary education within a period of 7 years between 2009 and 2016-2017. The absolute increase in secondary or higher education (i.e. secondary/vocational/ITE, junior college/polytechnic and university and above) for females was about 11%, and 7% for males. (Table 5B)

Table 5B: Marital Status, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age and Gender					
Distribution by age group, weighted %					
		2009	**2016-2017**	**Absolute Difference**	**Relative Difference**
60-69 years	N	2044	2020		
	No formal education	18.6	14.8	-3.8	-20.6
	Primary	39.6	32.9	-6.7	-16.9
	Secondary / Vocational / ITE	30.6	37.4	6.8	22.3
	JC / Poly	7.0	9.3	2.3	33.4
	University and above	4.1	5.6	1.6	38.6
70-79 years	N	1862	1501		
	No formal education	42.1	33.9	-8.1	-19.3
	Primary	34.9	30.4	-4.5	-12.9
	Secondary / Vocational / ITE	16.5	23.7	7.3	44.1
	JC / Poly	3.4	7.5	4.1	120.6
	University and above	3.0	4.5	1.5	48.7
80 years and older	N	1084	1028		
	No formal education	59.3	56.7	-2.7	-4.5
	Primary	26.0	23.8	-2.2	-8.5
	Secondary / Vocational / ITE	11.6	12.7	1.2	10.0
	JC / Poly	1.5	3.0	1.5	104.8
	University and above	1.0	3.2	2.2	224.2
Distribution by gender, weighted %					
Males	N	2253	2117		
	No formal education	13.7	14.6	0.9	6.9
	Primary	42.5	34.9	-7.6	-17.9
	Secondary / Vocational / ITE	31.0	34.0	3.0	9.8
	JC / Poly	7.0	9.5	2.6	37.1
	University and above	5.7	6.9	1.1	19.5
Females	N	2737	2432		
	No formal education	45.3	38.8	-6.5	-14.4
	Primary	31.3	26.9	-4.5	-14.3
	Secondary / Vocational / ITE	18.0	25.0	7.0	38.8
	JC / Poly	3.7	6.1	2.4	64.8
	University and above	1.4	3.2	1.8	133.3

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

Housing Type

In terms of housing type, the proportion of older Singaporeans living in 4 or 5 room Housing Development Board (HDB) flats increased between 2009 and 2016-2017, by a total of 6 percentage points, a relative difference of 11% over 2009. Similarly, the decline of 3 percentage points in the proportion living in 3-room HDB flats represents a 10% difference over 2009. The difference in the proportion living in 1-2 room flats is relatively small in absolute terms. (Table 6A)

Table 6A: Housing Type, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)

Distribution of housing type, overall, weighted %

	2009	2016-2017	Absolute Difference	Relative Difference
N	4990	4547		
1-2 room HDB	7.0	7.6	0.6	-8.1
3 room HDB	26.6	23.8	-2.7	-10.3
4-5 room HDB	53.6	59.6	6.0	11.3
Private housing	12.9	9.0	-3.9	-30.2

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

The largest absolute differences in housing type categories were seen for living in 4-5 room HDB flats for all the three considered age groups. There were also marginal increases in the proportion of those aged 60-69 years and 80 years and older living in 1-2 room HDB flats. In 2016-2017, the distribution of housing type for males and females was fairly similar. (Table 6B)

Table 6B: Housing Type, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age and Gender					
Distribution by age group, weighted %					
		2009	**2016-2017**	**Absolute Difference**	**Relative Difference**
60-69 years	N	2044	2020		
	1-2 room HDB	6.0	7.0	1.0	17.1
	3 room HDB	26.1	22.7	-3.4	-13.1
	4-5 room HDB	56.3	62.4	6.1	10.8
	Private housing	11.7	8.0	-3.7	-31.4
70-79 years	N	1862	1501		
	1-2 room HDB	8.6	8.2	-0.4	-4.3
	3 room HDB	28.5	25.5	-2.9	-10.3
	4-5 room HDB	49.1	57.7	8.5	17.3
	Private housing	13.8	8.6	-5.2	-37.8
80 years and older	N	1084	1026		
	1-2 room HDB	7.9	8.3	0.4	4.5
	3 room HDB	24.1	24.3	0.2	0.7
	4-5 room HDB	52.0	54.6	2.6	5.0
	Private housing	16.0	12.9	-3.1	-19.5
Distribution by gender, weighted proportions					
Males	N	2253	2117		
	1-2 room HDB	7.9	8.5	0.6	7.2
	3 room HDB	24.9	23.1	-1.8	-7.3
	4-5 room HDB	54.3	60.0	5.7	10.4
	Private housing	12.9	8.5	-4.4	-34.1
Females	N	2737	2430		
	1-2 room HDB	6.3	6.8	0.5	8.6
	3 room HDB	28.0	24.5	-3.5	-12.4
	4-5 room HDB	53.0	59.3	6.4	12.0
	Private housing	12.8	9.4	-3.5	-26.9

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

Employment

A substantively larger proportion of older Singaporeans in 2016-2017 were working either full-time or part-time compared to those in 2009. The difference between 2009 and 2016-2017 in working full-time was about 7 percentage points and in working part-time 3.5 percentage points; each of these represents a 38% increase in 2016-2017 over 2009. At the same time, the proportion of older Singaporeans who were retired and not working was higher in 2016-2017 at 55% compared to 47% in 2009. Another major difference in the working profile of older Singaporeans was that the proportion of those who had never worked was substantially lower in 2016-2017 at 8% compared to 26.5% in 2009. This absolute difference of 18.2 percentage points represents at 69% decline over 2009. Overall, a higher proportion of older Singaporeans in 2016-2017 were working and fewer had never worked compared to 2009. (Table 7A)

Table 7A: Employment Status, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)

Distribution of employment status, overall, weighted %				
	2009	**2016-2017**	**Absolute Difference**	**Relative Difference**
N	4990	4549		
Working full-time	17.6	24.3	6.8	38.4
Working part-time	8.9	12.5	3.5	39.4
Retired and not working	47.0	54.8	7.8	16.6
Homemaker/never worked^	26.5	8.3	-18.2	-68.6

Note: In 2009, the question asked to respondents was "are you currently working?" and the four response options were working full-time, working part-time, retired and not working, and 'homemaker'. In 2016-2017, the question asked was "what is your current work status?" The first three response options were the same as in 2009, and the fourth option was "never worked". Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

The increase in the proportion of older Singaporeans who were working full-time was seen for those aged 60-69 years and 70-79 years and for both males and females. In the age group of 80 years and older, the proportion of those working full-time declined, whereas the proportion of those working part-time increased. The proportion who had never worked declined between 2009 and 2016-2017 for each of the three age groups. For males, there was no difference between 2009 and 2016-17 in the proportion who had never worked, whereas this proportion was lower among females in 2016-17 versus 2009, a relative decline of 68%. (Table 7B)

Table 7B: Employment Status, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age and Gender

		2009	2016-2017	Absolute Difference	Relative Difference
Distribution by age group, weighted %					
60-69 years	N	2044	2020		
	Working full-time	25.6	37.5	11.9	46.3
	Working part-time	13.1	16.2	3.1	23.7
	Retired and not working	39.8	43.1	3.4	8.4
	Homemaker / never worked	21.5	3.2	-18.4	-85.2
70-79 years	N	1862	1501		
	Working full-time	8.8	13.7	4.9	55.1
	Working part-time	4.2	11.5	7.3	174.8
	Retired and not working	57.6	65.5	8.0	13.8
	Homemaker / never worked	29.5	9.4	-20.1	-68.2
80 years and older	N	1084	1028		
	Working full-time	2.0	1.7	-0.3	-12.6
	Working part-time	1.5	2.2	0.7	49.3
	Retired and not working	54.9	72.7	17.7	32.2
	Homemaker / never worked	41.6	22.9	-18.7	-44.9
Distribution by gender, weighted %					
Males	N	2253	2117		
	Working full-time	26.8	35.7	8.9	33.1
	Working part-time	10.8	11.8	1.0	9.2
	Retired and not working	62.2	52.2	-9.9	-16.0
	Homemaker / never worked	0.3	0.3	0.0	0.0
Females	N	2737	2432		
	Working full-time	9.7	14.3	4.6	47.2
	Working part-time	7.4	13.1	5.7	76.6
	Retired and not working	34.2	57.1	22.8	66.7
	Homemaker / never worked	48.7	15.4	-33.3	-68.4

Note: In 2009, the question asked to respondents was "are you currently working?" and the four response options were working full-time, working part-time, retired and not working, and 'homemaker'. In 2016-2017, the question asked was "what is your current work status?" The first three response options were the same as in 2009, and the fourth option was "never worked". Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

Income Adequacy

Income adequacy was measured by asking respondents if they thought they had adequate income to meet their monthly household expenses. The data indicates that compared to 2009, a substantially higher proportion of older Singaporeans in 2016-2017 reported that they had enough money with some left over. The absolute increase of about 10 percentage points represents a 51% increase over 2009. At the same time, compared about 58% who reported in 2009 that they had just enough money, the proportion was lower at 49% in 2016-2017. The proportion reporting that they had some difficulty was similar in 2009 and 2016-2017. On the other hand, although the proportion of those who reported much difficulty in meeting monthly household expenses was higher in 2016-2017 compared to 2009 by only 1.4 percentage points, it represents a 61% increase over 2009. Given the high proportion in 2009 of those who did not answer the question, we present this data as well. The proportion of don't know or refused responses halved between 2009 and 2016-2017. (Table 8A)

Table 8A: Income Adequacy for Meeting Monthly Expenses, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)

Distribution of income adequacy, overall, weighted %				
	2009	2016-2017	Absolute Difference	Relative Difference
N	4990	4549		
Enough money, with some left over	19.5	29.5	10.0	51.1
Just enough money, no difficulty	58.1	49.3	-8.8	-15.2
Some difficulty	13.8	14.6	0.8	5.8
Much difficulty	2.4	3.8	1.4	60.8
Don't know/refused	6.2	2.9	-3.4	-54.1

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

The increase from 2009 to 2016-17 in the proportion of older Singaporeans reporting that they had more than adequate money for household expenses was consistent across each of the three considered age groups. We also see that the overall increase in the proportion between the two cohorts of those reporting that they had enough money with some left over, as seen in Table 8A, was due to the sharp rise among males: the proportion increased 3 times from 9% in 2009 to 40% in 2016-2017. On the other hand, among females, the proportion declined from 28% to 20%. The proportion of older Singaporeans reporting difficulty in meeting monthly expenses increased across each of the three age groups and for females. Between 2009 and 2016-2017, the relative increase in the proportion reporting some or much difficulty was the highest for those aged 80 years and older. (Table 8B)

Table 8B: Income Adequacy for Meeting Monthly Expenses, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age and Gender					
Distribution by age group, weighted %					
		2009	**2016-2017**	**Absolute Difference**	**Relative Difference**
60-69 years	N	2044	2020		
	Enough money, with some left over	20.3	32.9	12.6	61.8
	Just enough money, no difficulty	62.6	48.5	-14.1	-22.5
	Some difficulty to meet expenses	13.6	13.8	0.2	1.7
	Much difficulty to meet expenses	2.1	3.1	1.0	44.8
	Don't know/refused	1.4	1.8	0.4	24.5
70-79 years	N	1862	1501		
	Enough money, with some left over	18.9	26.0	7.1	37.6
	Just enough money, no difficulty	56.8	50.1	-6.7	-11.8
	Some difficulty to meet expenses	14.7	15.9	1.2	8.1
	Much difficulty to meet expenses	3.2	5.1	1.9	59.5
	Don't know/refused	6.4	2.9	-3.5	-54.4
80 years and older	N	1084	1028		
	Enough money, with some left over	17.5	25.2	7.7	44.0
	Just enough money, no difficulty	41.3	50.4	9.0	21.9
	Some difficulty to meet expenses	12.4	14.5	2.1	16.5
	Much difficulty to meet expenses	1.5	3.8	2.2	146.7
	Don't know/refused	27.1	6.2	-20.8	-76.9
Distribution by gender, weighted %					
Males	N	2253	2117		
	Enough money, with some left over	9.4	39.8	30.4	323.2
	Just enough money, no difficulty	63.7	39.5	-24.2	-38.1
	Some difficulty to meet expenses	19.0	14.5	-4.6	-24.1
	Much difficulty to meet expenses	3.3	5.4	2.2	66.0
	Don't know/refused	4.6	0.9	-3.7	-80.9
Females	N	2737	2432		
	Enough money, with some left over	28.1	20.4	-7.6	-27.2
	Just enough money, no difficulty	53.4	57.9	4.5	8.4
	Some difficulty to meet expenses	9.3	14.7	5.3	57.4
	Much difficulty to meet expenses	1.6	2.4	0.8	48.1
	Don't know/refused	7.6	4.61	-3.0	-39.3

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

IV. Social Engagement

Social Networks with Relatives and Friends outside the Household

Social networks are a measure of the social relationships and ties that an individual has. There is considerable evidence for a positive relationship between the extent and strength of social networks and better health among older persons, with the link mediated through healthier habits, higher healthcare utilization, reduced stress, greater psychological wellbeing and greater and timely availability of instrumental support [1-4].

In both PHASE-I and THE SIGNS Study-I, the extent of social networks with relatives and friends outside the household was measured using the Lubben Social Network Scale – Revised (LSNS-R) [5]. In the 12-item LSNS-R, the items are equally divided among those that query the size of the network and the frequency of contact. The LSNS-R score ranges from 0 to 60, with higher scores indicating a greater extent of social networks.

There was a slight decrease in the extent of social networks with relatives and friends outside the household of older Singaporeans between 2009 and 2016-2017. (Table 9A)

Table 9A: Social Networks, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)

Distribution overall		
	2009	**2016-2017**
N	4537	4039
Average	29.5	26.6
SD	12.5	11.2
Range	0-60	0-60

The decrease in the extent of social networks with relatives and friends outside the household from 2009 to 2016-2017 was observed consistently among all the three age groups, and among both males and females. In 2016-2017, while the extent of social networks was similar among males and females, it declined with age, being the least among those aged 80 years and older. (Table 9B)

Table 9B: Social Networks, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age and Gender			
Distribution by age group			
		2009	**2016-2017**
60-69 years	N	2009	1970
	Average	30.7	27.6
	SD	12.2	11.0
	Range	0-60	0-60
70-79 years	N	1728	1384
	Average	28.6	26.3
	SD	12.6	11.4
	Range	0-60	0-60
80 years and older	N	800	685
	Average	24.7	23.0
	SD	13.1	10.8
	Range	0-60	0-60
Distribution by gender			
Males	N	2101	1960
	Average	30.7	26.6
	SD	12.0	11.3
	Range	0-60	0-60
Females	N	2436	2079
	Average	28.4	26.6
	SD	12.9	11.1
	Range	0-60	0-60

Social Participation

Social participation has been defined as "a person's involvement in activities that provide interaction with others in society or the community" [6]. Previous studies have found that social participation by older adults is positively associated with better physical and psychological health, including improved self-rated health, reduced difficulties in instrumental activities of daily living, a beneficial effect on cognitive decline, and reduced stress and depressive symptoms [7-10].

Social participation is operationalized in this analysis using the two measures that are available in both PHASE – I and THE SIGNS Study – I: participation in residents' committee, community club or community development council and neighbourhood events, and attendance at a place of worship.

Participation in Committee or Neighbourhood Events

A majority of older Singaporeans did not attend committee / neighbourhood events in both 2009 and 2016-2017. Between 2009 and 2016-2017, there was a relative increase of nearly 10% in the proportion that who did not attend committee / neighbourhood events. In 2016-2017, about 5% older Singaporeans reported that they attended committee/ neighbourhood events every week, about 4% attended every month, and 8% less than once a month. (Table 10A)

Table 10A: Participation in Committee / Neighbourhood Events, 2009 (PHASE - I) and 2016-2017 (THE SIGNS Study - I)

Distribution overall, weighted %

	2009	2016-2017	Absolute Difference	Relative Difference
N	4990	2272		
At least once a week	5.9	5.3	-0.6	-9.7
Less than once a week but at least once a month	5.5	3.7	-1.8	-32.1
Less than once a month	12.7	7.7	-5.0	-39.5
Not at all	76.0	83.1	7.1	9.3

Note: Participation is shown in mutually-exclusive categories, based on frequency of attendance of resident's committee, community club, community development council, neighbourhood events. THE SIGNS Study – I from 2016-2017 also included "neighbourhood committee" in the question whereas PHASE – I did not. Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

The low participation of older Singaporeans in committee / neighbourhood events was observed among all the considered age groups and among older males and females in both 2009 and 2016-2017. An increase in the proportion who did not attend committee / neighbourhood events from 2009 to 2016-2017 was observed for all the older adult sub-groups, except for those aged 80 years and older, among whom there was a slight increase in attendance. In 2016-2017, across age groups, the proportion of non-attendance was the lowest (80%) among those aged 70-79 years, and it was higher for males (87%) compared to females (80%). (Table 10B)

Table 10B: Participation in Committee / Neighbourhood Events, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age and Gender					
Distribution by age group, weighted %					
		2009	**2016-2017**	**Absolute Difference**	**Relative Difference**
60-69 years	N	2044	1000		
	At least once a week	6.9	5.1	-1.9	-27.2
	Less than once a week but at least once a month	6.3	3.8	-2.5	-40.4
	Less than once a month	13.7	7.3	-6.3	-46.3
	Not at all	73.1	83.8	10.7	14.6
70-79 years	N	1862	747		
	At least once a week	5.3	6.0	0.8	14.5
	Less than once a week but at least once a month	4.9	4.7	-0.3	-5.1
	Less than once a month	13.3	8.6	-4.7	-35.2
	Not at all	76.5	80.3	3.8	4.9
80 years and older	N	1084	525		
	At least once a week	2.5	4.8	2.3	93.9
	Less than once a week but at least once a month	2.9	1.7	-1.2	-40.9
	Less than once a month	7.1	7.1	0.0	-0.1
	Not at all	87.6	85.8	-1.7	-2.0
Distribution by gender, weighted %					
Males	N	2253	1058		
	At least once a week	5.2	2.9	-2.4	-45.4
	Less than once a week but at least once a month	7.1	3.1	-4.0	-56.5
	Less than once a month	8.0	6.7	-1.3	-16.3
	Not at all	79.7	87.2	7.5	9.5
Females	N	2737	1214		
	At least once a week	6.4	7.4	1.1	16.5
	Less than once a week but at least once a month	4.1	4.3	0.2	3.9
	Less than once a month	16.7	8.5	-8.1	-48.8
	Not at all	72.9	79.4	6.5	9.0

Note: Participation is shown in mutually-exclusive categories, based on frequency of attendance of resident's committee, community club, community development council, neighbourhood events. THE SIGNS Study – I data from 2016-2017 also includes the option of "neighbourhood committee". Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

Attendance at a Place of Worship

Around 70% of older Singaporeans attended a place of worship in both 2009 and 2016-2017. However, during this period, there was a decline, by 22%, in the proportion who attended a place of worship at least once a week. Concurrently, infrequent attendance increased – the proportion who attended a place of worship less than once a month increased by nearly 50%. (Table 11A)

Table 11A: Attendance at a Place of Worship, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)

Distribution overall, weighted %

	2009	2016-2017	Absolute Difference	Relative Difference
N	4990	2277		
At least once a week	30.0	23.3	-6.7	-22.2
Less than once a week but at least once a month	16.1	14.9	-1.2	-7.4
Less than once a month	22.2	33.1	10.9	48.8
Not at all	31.7	28.3	-3.5	-11.0

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

While the proportion who attended a place of worship at least once a week declined from 2009 to 2016-2017 among those aged 60-69 and 70-79 years, this proportion remained stable among those aged 80 years and older. In context of gender, the decline in this proportion was much greater among females (31%) relative to males (10%). The proportion who did not attend a place of worship at all declined from 2009 to 2016-2017 among all the three considered age groups and among older males, however, it increased slightly among older females. In 2016-2017, the proportion who did not attend a place of worship at all went up with age, reaching 50% among those aged 80 years and older, and was similar, around 28-29%, among older males and older females. (Table 11B)

Table 11B: Attendance at a Place of Worship, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age and Gender					
Distribution by age group, weighted %					
		2009	**2016-2017**	**Absolute Difference**	**Relative Difference**
60-69 years	N	2044	1020		
	At least once a week	31.9	25.0	-6.9	-21.6
	Less than once a week but at least once a month	17.8	16.7	-1.1	-6.1
	Less than once a month	23.4	34.9	11.5	48.9
	Not at all	26.9	22.9	-4.0	-14.9
70-79 years	N	1862	754		
	At least once a week	30.3	21.8	-8.5	-28.1
	Less than once a week but at least once a month	15.3	16.0	0.7	4.4
	Less than once a month	21.8	35.7	13.9	63.8
	Not at all	32.6	26.1	-6.5	-19.8
80 years and older	N	1084	503		
	At least once a week	20.8	20.9	0.1	0.4
	Less than once a week but at least once a month	10.1	6.8	-3.3	-32.3
	Less than once a month	17.9	22.2	4.3	24.0
	Not at all	51.2	49.7	-1.5	-3.0
Distribution by gender, weighted %					
Males	N	2253	1059		
	At least once a week	27.9	25.1	-2.8	-10.1
	Less than once a week but at least once a month	16.9	14.3	-2.7	-15.7
	Less than once a month	16.6	33.0	16.4	98.6
	Not at all	38.6	27.5	-11.0	-28.6
Females	N	2737	1218		
	At least once a week	31.7	21.8	-9.9	-31.3
	Less than once a week but at least once a month	15.3	15.4	0.1	0.5
	Less than once a month	27.0	33.2	6.2	22.9
	Not at all	26.0	28.9	2.9	11.2

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

Loneliness

Loneliness is the extent to which an individual perceives being socially isolated and relates to the perception of unsatisfying and/or unmet social relationships [11]. Loneliness has been recognized as a major public health issue among older adults [1, 12] with a link with a number of negative outcomes such as greater risk of depression, cognitive decline, reduced healthcare utilization, higher incidence of disability chronic physical ailments and even mortality [13-16].

Loneliness was measured in both surveys using the University of California Los Angeles (UCLA) 3-item loneliness scale [17]. Each item pertains to a specific dimension of loneliness: relational connectedness, social connectedness and self-perceived loneliness. Respondents answered on a 5-point Likert scale where response options were never (scored as 0), rarely, occasionally, fairly often, and always (scored as 4). The total score can range from 0 to 12. The median of scores of ≥1 is 3 in both PHASE – I and THE SIGNS Study – I. The scores are thus classified as not lonely (total score = 0), sometimes lonely (total score = 1 to 3) and mostly lonely (total score = 4 or more).

Overall, there was a major decline between 2009 and 2016-2017, of 32% in relative terms, in the proportion of older Singaporeans who reported being either sometimes lonely and 36% in the proportion of those who reported being mostly lonely. In 2009, nearly 1 in 2 older Singaporeans (51%) reported being either sometimes lonely or mostly lonely. In 2016-2017, this proportion was markedly lower, with 1 in 3 older Singaporeans (34%) experiencing loneliness. The decline in those who reported being sometimes lonely (10 percentage point decline) was greater than the decline in those who reported being mostly lonely (7 percentage point decline). (Table 12A)

Table 12A: Loneliness, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)

Distribution overall, weighted %

	2009	2016-2017	Absolute Difference	Relative Difference
N	4536	2030		
Never lonely	49.0	66.1	17.1	35.0
Sometimes lonely	32.1	21.8	-10.3	-32.0
Mostly lonely	19.0	12.1	-6.9	-36.1

Note: Never lonely = score of 0 on the UCLA 3-item Loneliness Scale. Sometimes lonely = score in the range of 1 to 3, i.e. the median of scores of 1+. Mostly lonely = score in the range of 3 to 12. Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

The decline in loneliness (or the increase in the proportion of those who reported being never lonely) was observed consistently among all the three considered age groups. The extent varied, ranging from 40.3% for those aged 70-79 years to 33% for those aged 80 years and older. The proportion who reported being sometimes or mostly lonely declined at all ages with a relatively lower decline among those aged 80 years and above.

While both older males and females experienced a decline in loneliness from 2009 to 2016-2017, the decline was more marked for males than for females except for reporting being mostly lonely where the relative decline was higher for females (50%) compared to males (15%). With males more likely to experience loneliness in 2009, the greater decline among males resulted in a narrowing of the gender gap in terms of the proportion experiencing loneliness in 2016-2017. (Table 12B)

Table 12B: Loneliness, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age and Gender

		2009	2016-2017	Absolute Difference	Relative Difference
Distribution by age group, weighted %					
60-69 years	N	2009	986		
	Never lonely	50.8	67.8	17.0	33.4
	Sometimes lonely	32.2	21.6	-10.7	-33.1
	Mostly lonely	17.0	10.7	-6.3	-37.2
70-79 years	N	1728	692		
	Never lonely	46.7	65.5	18.8	40.3
	Sometimes lonely	31.9	21.9	-10.0	-31.3
	Mostly lonely	21.4	12.6	-8.9	-41.4
80 years and older	N	799	352		
	Never lonely	44.8	59.6	14.8	32.9
	Sometimes lonely	31.4	22.4	-9.0	-28.7
	Mostly lonely	23.8	18.0	-5.8	-24.3
Distribution by gender, weighted %					
Males	N	2101	988		
	Never lonely	41.9	62.7	20.8	49.7
	Sometimes lonely	42.3	23.8	-18.5	-43.7
	Mostly lonely	15.8	13.5	-2.3	-14.7
Females	N	2435	1042		
	Never lonely	55.2	69.3	14.1	25.6
	Sometimes lonely	23.1	19.9	-3.2	-14.0
	Mostly lonely	21.7	10.8	-10.9	-50.1

Note: Never lonely = score of 0 on the UCLA 3-item Loneliness Scale. Sometimes lonely = score in the range of 1 to 3, i.e. the median of scores of 1+. Mostly lonely = score in the range of 3 to 12. Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

V. Physical Health

Basic Activities of Daily Living and Instrumental Activities of Daily Living

Basic activities of daily living (ADLs) are fundamental daily self-care activities whereas instrumental activities of daily living (IADLs) represent more complex tasks requiring participation in the larger environment, greater external coordination and organization. All activities of daily living are an important dimension of the wellbeing of older persons, as an indicator of their ability to live and perform their everyday tasks independently as well as a predictor of future disability, morbidity, and mortality [18-20].

Difficulty in BADLs was measured in terms of difficulty (yes or no) in performing daily self-care activities due to a health or physical condition without the assistance of a person or assistive device. Six activities were assessed in both the surveys: take a bath/shower; dress up; eat; stand up from a bed/chair or sitting down on a chair; walk (around the house); and use the sitting toilet.

From 2009 to 2016-2017, there was a decrease, of 3 percentage points, in the proportion of older Singaporeans who had no difficulty in any of the six considered BADLs. And, there was an increase in the proportions who reported difficulty with 1-2 BADLs and with 3 or more BADLs; the increase, in terms of percentage points, was nearly equal for these two categories from 2009 to 2016-2017. In terms of relative difference, the increase from 2009 to 2016-2017 was higher for 1-2 BADL difficulties (55%) than for 3 or more BADL difficulties (39%). (Table 13A)

Table 13A: Difficulty in Basic Activities of Daily Living (BADLs), 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)

Distribution overall, weighted %				
	2009	2016-2017	Absolute Difference	Relative Difference
N	4990	4545		
None	93.7	90.7	-2.9	-3.1
1-2	2.8	4.4	1.6	55.4
3 or more	3.5	4.9	1.4	38.7

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

Similar to the change observed overall, from 2009 to 2016-2017, there was a decrease in the proportion who had no difficulty in any of the six considered BADLs and an increase in the proportions who reported difficulty with 1-2 BADLs and with 3 or more BADLs among all the considered age groups and older females. Among older males, the increase was only for the proportion who reported difficulty with 3 or more BADLs. In 2016-2017, the proportions who reported difficulty with 1-2 BADLs and with 3 or more BADLs increased with age, reaching 12% and 19% respectively among those aged 80 years and older, and were twice to thrice higher for older females relative to older males. (Table 13B)

Table 13B: Difficulty in Basic Activities of Daily Living (BADLs), 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age and Gender

		2009	2016-2017	Absolute Difference	Relative Difference
Distribution by age group, weighted %					
60-69 years	N	2044	2019		
	None	97.4	96.6	-0.8	-0.9
	1-2	1.4	2.1	0.6	44.4
	3 or more	1.1	1.3	0.2	18.6
70-79 years	N	1862	1501		
	None	93.6	91.8	-1.8	-1.9
	1-2	2.9	4.5	1.6	56.8
	3 or more	3.5	3.7	0.2	4.5
80 years and older	N	1084	1025		
	None	77.0	69.7	-7.3	-9.5
	1-2	8.8	11.5	2.8	31.6
	3 or more	14.3	18.8	4.5	31.8
Distribution by gender, weighted %					
Males	N	2253	2117		
	None	95.4	94.7	-0.7	-0.8
	1-2	2.4	2.2	-0.2	-9.8
	3 or more	2.1	3.1	1.0	45.8
Females	N	2737	2428		
	None	92.2	87.2	-4.9	-5.3
	1-2	3.1	6.3	3.2	101.6
	3 or more	4.7	6.5	1.8	37.3

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

Difficulty in instrumental activities of daily living (IADLs) was measured in terms of difficulty (yes or no) in performing daily activities of independent living, due to a health or physical condition and without the assistance of a person or assistive device. The following seven activities were assessed in both the surveys: prepare own meals; leave the home to purchase necessary items or medication; take care of financial matters e.g. paying utilities (electricity, water); use the phone; dust, clean-up and other light housework; take public transport to leave home; and take medication as prescribed. Individuals who reported that they did not perform the activity due to a non-health reason (potentially due to gender roles in the family, availability of domestic help, etc.) were considered not to have difficulty due to a health/physical reason.

From 2009 to 2016-2017, there was an absolute decrease, of about 2 percentage points, in the proportion of older Singaporeans who had no difficulty in any of the seven considered IADLs. While the proportion who reported difficulty with 1-2 IADLs remained relatively stable from 2009 to 2016-2017, there was an increase, of 2 percentage points, which represents a relative difference of 29%, in the proportion who reported difficulty with 3 or more IADLs. (Table 14A)

Table 14A: Difficulty in Instrumental Activities of Daily Living, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)

Distribution overall, weighted %				
	2009	**2016-2017**	**Absolute Difference**	**Relative Difference**
N	4990	4545		
None	87.4	85.6	-1.7	-2.0
1-2	6.3	6.1	-0.1	-2.2
3 or more	6.4	8.3	1.9	29.5

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

While the distribution of IADL difficulty status was similar in 2009 and 2016-2017 for those aged 60-69 years, among those aged 70-79 years and 80 years and older, there was an increase in the proportion with difficulty in 3 or more IADLs. And, in 2016-2017, those aged 80 years and older were the most likely to have difficulty in IADLs, with nearly 1 in 3 having difficulty in 3 or more IADLs.

There was an increase, from 2009 to 2016-2017, in the proportion with difficulty in 3 or more IADLs among both males and females, the increase being much higher among older males (128%) than older females (13%). Nonetheless, a gender disparity was still observed in 2016-2017, with the proportion with difficulty in 3 or more IADLs being more than twice among older females (11%) relative to older males (5%). (Table 14B)

Table 14B: Difficulty in Instrumental Activities of Daily Living, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age and Gender

		2009	2016-2017	Absolute Difference	Relative Difference
Distribution by age group, weighted %					
60-69 years	N	2044	2019		
	None	95.2	95.4	0.1	0.2
	1-2	2.7	2.6	-0.1	-2.6
	3 or more	2.1	2.0	-0.1	-3.8
70-79 years	N	1862	1501		
	None	86.3	85.9	-0.4	-0.5
	1-2	7.5	6.9	-0.6	-8.7
	3 or more	6.2	7.3	1.1	17.3
80 years and older	N	1084	1025		
	None	54.8	53.5	-1.2	-2.3
	1-2	19.3	16.1	-3.2	-16.5
	3 or more	26.0	30.4	4.4	17.0
Distribution by gender, weighted %					
Males	N	2253	2117		
	None	93.9	90.1	-3.8	-4.0
	1-2	4.0	5.2	1.2	28.9
	3 or more	2.1	4.7	2.6	128.2
Females	N	2737	2428		
	None	81.8	81.7	-0.1	-0.2
	1-2	8.2	7.0	-1.2	-14.7
	3 or more	10.0	11.4	1.4	13.4

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

Chronic Physical Ailments *(based on self-report)*

The number of chronic physical ailments were based on self-report of 'ever diagnosis' by a health professional for a list of 20 ailments asked in both surveys.[3]

There was a decrease in the proportion of older Singaporeans who did not report any health professional diagnosed chronic physical ailment from 2009 to 2016-2017, from 26% to 18%. While there was also a decrease in the proportions who reported 1 ailment and 2 ailments, there was an increase in the proportion was reported 3 or more ailments over this period, from 20% to 38%, representing a relative increase of nearly 90% over 2009. (Table 15A)

Table 15A: Chronic Physical Ailments, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)

Distribution overall, weighted %

	2009	2016-2017	Absolute Difference	Relative Difference
N	4990	4546		
None	25.6	17.8	-7.8	-30.5
1	29.4	21.7	-7.7	-26.3
2	25.2	22.9	-2.2	-8.9
3 or more	19.8	37.6	17.8	89.6

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

[3] The considered physical ailments were: heart attack/angina/myocardial infarction; heart failure; other forms of heart diseases; cancer; cerebrovascular disease; high blood pressure/hypertension; high blood sugar/diabetes; high blood cholesterol or lipids; chronic respiratory illness; chronic back pain; joint pain/arthritis/rheumatism/nerve pain; osteoporosis; glaucoma; age-related macular degeneration; autommune disorder; chronic skin conditions; epilepsy; thyroid disorders; migraine; and Parkinson's disease.

The pattern observed overall, i.e. a decrease in the proportions of those not reporting any ailment, 1 ailment and 2 ailments and an increase in the proportion reporting 3 or more ailments from 2009 to 2016-2017 was also observed among all the three age groups, older males and older females. In 2016-2017, with increasing age, there was a decrease in the proportion of those not reporting any ailment and an increase in the proportion reporting 3 or more ailments. The relative increase was the highest for those aged 60-69 years, with a doubling in the proportion of 3 or more ailments from 15% in 2009 to 31% in 2016-2017. The distribution of the number of health professional diagnosed chronic physical ailments in 2016-2017 was relatively similar for older males and females, but a sharp increase was seen for males, from 13.5% in 2009 to 37.5% in 2016-2017. (Table 15B)

Table 15B: Chronic Physical Ailments, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age and Gender

		2009	2016-2017	Absolute Difference	Relative Difference
Distribution by age group, weighted %					
60-69 years	N	2044	2019		
	None	30.9	21.7	-9.3	-30.0
	1	30.8	24.7	-6.1	-19.8
	2	22.9	22.3	-0.6	-2.5
	3 or more	15.4	31.3	15.9	103.7
70-79 years	N	1862	1501		
	None	19.3	14.9	-4.4	-23.0
	1	27.4	18.9	-8.5	-31.0
	2	28.9	23.9	-5.0	-17.2
	3 or more	24.4	42.3	17.9	73.2
80 years and older	N	1084	1025		
	None	16.5	10.7	-5.8	-35.2
	1	27.5	16.8	-10.7	-38.9
	2	26.9	23.3	-3.7	-13.7
	3 or more	29.2	49.3	20.2	69.2
Distribution by gender, weighted %					
Males	N	2253	2117		
	None	30.3	18.8	-11.5	-37.9
	1	33.2	22.2	-11.0	-33.1
	2	23.0	21.5	-1.5	-6.4
	3 or more	13.5	37.5	24.0	177.4
Females	N	2737	2429		
	None	21.6	16.9	-4.8	-22.0
	1	26.1	21.2	-5.0	-19.0
	2	27.0	24.2	-2.9	-10.5
	3 or more	25.2	37.8	12.6	49.9

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

Hypertension *(based on measured blood pressure)*

Hypertension is linked to an increased risk of cardiovascular ailments, in particular an increased risk of heart attack, heart failure, and stroke [21]. Importantly, hypertension is treatable and lowering blood pressure among older adults who have hypertension can reduce the incidence of stroke and major coronary events such as heart attack, ischaemic heart failure, and unstable angina [22, 23].

In both surveys, blood pressure was measured for each willing respondent three times, at 1-minute intervals between measurements, using the same digital blood pressure monitor (Omron HEM-762). Respondents were classified as having hypertension if the average value of the second and third systolic readings was greater than 140 mm Hg, or if the average value of the second and third diastolic readings was greater than 90 mm Hg, or if respondents with blood pressure measurements reported that they were currently on antihypertension medication.

The data indicated that the prevalence of hypertension declined slightly from 73.5% in 2009, but still remained high at about 72% in 2016-2017. (Table 16A)

Table 16A: Hypertension, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)

	2009	2016-2017	Absolute Difference	Relative Difference
N	4488	4373		
Prevalence overall, weighed %	73.5	71.6	-2.2	-3.0

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

Distribution of the prevalence of hypertension by age group suggests that in absolute as well as relative terms, the difference between 2009 and 2016-2017 was small. Notably though, the decline was about 4% for the age-groups of 60-69 years and 70-79 years, as well as for females. (Table 16B)

Table 16B: Hypertension, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age and Gender					
Prevalence by age groups, weighted %					
		2009	**2016-2017**	**Absolute Difference**	**Relative Difference**
60-69 years	N	1910	1989		
		67.6	64.8	-2.8	-4.2
70-79 years	N	1686	1448		
		80.9	78.0	-2.8	-3.5
80 years and older	N	892	936		
		84.3	82.7	-1.6	-1.9
Prevalence by gender, weighted %					
Males	N	2050	2026		
		73.2	72.6	-0.6	-0.9
Females	N	2438	2347		
		73.7	70.7	-2.9	-4.0

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

Diabetes *(based on self-report)*

The prevalence of diabetes was measured on self-report of ever having been diagnosed with high blood sugar or diabetes by a health professional.

The prevalence of diabetes increased by about 3 percentage points between 2009 and 2016-2017, a relative difference of about 15%. In 2016-2017, 1 in 4 older Singaporeans reported that they had been diagnosed by a medical professional with diabetes. (Table 17A)

Table 17A: Diabetes, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)				
	2009	**2016-2017**	**Absolute Difference**	**Relative Difference**
N	4990	4549		
Prevalence overall, weighed %	21.8	25.1	3.3	14.9

The increase in the prevalence of diabetes increased for all the three considered age groups, by about 17% in relative terms for those aged 60-69 years, 15% for those aged 80 years and above, and 10% for those aged 70-79 years. The relative increase was smaller for females (7%) compared to males (24%). (Table 17B)

Table 17B: Diabetes, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age and Gender					
Prevalence by age groups, weighted %					
		2009	**2016-2017**	**Absolute Difference**	**Relative Difference**
60-69 years	N	2044	2020		
		19.9	23.3	3.4	16.9
70-79 years	N	1862	1501		
		24.7	27.1	2.4	9.6
80 years and older	N	1084	1028		
		23.5	26.9	3.4	14.7
Prevalence by gender, weighted %					
Males	N	2253	2117		
		21.6	26.9	5.2	24.1
Females	N	2737	2432		
		22.0	23.5	1.5	7.0

Body Mass Index

PHASE and THE SIGNS Study – I included measurements of the height and weight of individuals who consented to an anthropometry and performance measurement module at the end of the main questionnaire. Both height and weight measurements were completed for about 88.5% of the PHASE respondents, and 85% of THE SIGNS Study – I respondents.

Body Mass Index (BMI), calculated as weight in kilograms divided by height in meters-squared, is a measure of nutritional status. BMI is used as a risk indicator for non-communicable diseases; specifically, having pre-obesity or obesity places one at a higher risk of cardiovascular diseases such as heart disease and stroke, diabetes, osteoarthritis, and some cancers [24-26]. According to the World Health Organization international classification for adults, BMI values are categorized as underweight (BMI ≤18.5 kg/m2), normal weight (BMI: 18.5-24.9), pre-obesity (BMI: 25-29.9) and obesity (BMI ≥30.0) [27].

In absolute terms, the proportion of older Singaporeans in most of the BMI categories did not change substantially between 2009 and 2016-2017. The change was less than 1 percentage point for the underweight and normal weight categories. The prevalence of pre-obesity declined between 2009 and 2016-2017 by 2 percentage points, a relative decline of 6.3% over 2009. However, there was an increase in the prevalence of obesity among older Singaporeans. The 1.7 percentage point difference in the prevalence of obesity between 7.6% in 2009 and 9.3% in 2016-2017 represents a 22.6% increase since 2009. (Table 18A)

Table 18A: BMI Categories, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)

	2009	2016-2017	Absolute Difference	Relative Difference
N	4420	3854		
Underweight	6.6	6.6	0.0	-0.5
Normal weight	53.6	53.9	0.3	0.6
Pre-obesity	32.3	30.2	-2.0	-6.3
Obesity	7.6	9.3	1.7	22.6

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

The distribution of BMI categories by age group reveals that the increase in the prevalence of obesity was the highest among those aged 60-69 years. The proportion of older Singaporeans aged 60-69 years who had underweight, normal weight or pre-obesity declined over time. On the other hand, the increase from about 8% in the obesity category in 2009 to 10.5% in 2016-2017 represents a relative increase of 34% over 2009. Among those aged 70-79 years, the proportion in the normal weight category increased in 2016-2017 by about 6% in relative terms over 2009, and declined in the pre-obesity category by about 13%. However, the prevalence of obesity was higher in 2016-2017, with the 1 percentage point difference between 8% in 2009 and 9% in 2016-2017 representing a nearly 15% relative increase. The prevalence of obesity among males was higher by about 50% in 2016-2017 compared to 2009, whereas the comparable relative difference was 10% among females. (Table 18B)

Table 18B: BMI Categories, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age and Gender					
Distribution by age group, weighted %					
		2009	**2016-2017**	**Absolute Difference**	**Relative Difference**
60-69 years	N	1891	1821		
	Underweight	5.2	4.7	-0.5	-9.2
	Normal weight	53.2	51.5	-1.7	-3.2
	Pre-obesity	33.8	33.3	-0.5	-1.5
	Obesity	7.8	10.5	2.7	34.1
70-79 years	N	1671	1298		
	Underweight	7.6	7.4	-0.2	-2.9
	Normal weight	53.2	56.3	3.1	5.8
	Pre-obesity	31.5	27.5	-4.0	-12.8
	Obesity	7.7	8.8	1.1	14.7
80 years and older	N	858	735		
	Underweight	11.3	12.4	1.0	9.1
	Normal weight	56.4	58.2	1.8	3.3
	Pre-obesity	26.2	23.9	-2.3	-8.8
	Obesity	6.1	5.5	-0.6	-9.2
Distribution by gender, weighted %					
Males	N	2038	1723		
	Underweight	6.5	6.4	-0.1	-0.9
	Normal weight	56.8	56.5	-0.3	-0.5
	Pre-obesity	31.9	29.8	-2.1	-6.7
	Obesity	4.9	7.3	2.5	50.2
Females	N	2382	2131		
	Underweight	6.7	6.7	0.0	-0.1
	Normal weight	50.8	51.9	1.0	2.0
	Pre-obesity	32.6	30.6	-2.0	-6.1
	Obesity	9.9	10.9	1.0	9.8

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

Hand Grip Strength

Hand grip strength is a marker of the nutritional status, and serves as a 'useful single indicator of frailty' among older adults [28, 29]. In both PHASE-I and THE SIGNS Study – I hand grip strength was measured using a Smedley spring-type dynamometer (Hand Grip Meter, No. 6103 [75 kg]; TANITA, Tokyo]. Hand grip strength was dichotomized into low (or high) hand grip strength based on the measured value being less than or equal to (or greater than) the single-year age- and gender-specific 20th percentile normative value for hand grip strength that has been defined for healthy older Singaporeans [30]. We present the prevalence of low hand grip strength below.

There was a small decline in the prevalence of low hand grip strength among older Singaporeans between 2009 and 2016-2017, about 1 percentage point or 6% in relative terms over 2009. In 2016-17, 1 in 5 older Singaporeans had low hand grip strength. (Table 19A)

Table 19A: Low Hand Grip Strength, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)

	2009	2016-2017	Absolute Difference	Relative Difference
N	4485	4297		
Prevalence overall, weighed %	22.9	21.6	-1.3	-5.7

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

The improvement in hand grip strength seen overall, was seen consistently through the decline in prevalence of low hand grip strength across the three age groups. For females, the decline was about 4 percentage points, representing a decline of 18% over 2009. On the other hand, there is a slight increase in the prevalence of low hand grip strength among males, with the difference of about 2 percentage points between 2009 and 2016-2017. While 1 in 5 Singaporeans aged 60-69 and 70-79 years had low hand grip strength, 1 in 4 of those aged 80 years and older had it. Similarly, while 1 in 5 older males had low hand grip strength, 1 in 4 older females had it. (Table 19B)

Table 19B: Low Hand Grip Strength, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age and Gender					
Prevalence by age groups, weighted %					
		2009	**2016-2017**	**Absolute Difference**	**Relative Difference**
60-69 years	N	1922	1971		
		22.2	21.0	-1.2	-5.4
70-79 years	N	1692	1425		
		23.3	21.4	-1.9	-8.2
80 years and older	N	871	901		
		25.9	24.4	-1.5	-5.8
Prevalence by gender, weighted %					
Males	N	2031	2006		
		24.5	26.1	1.6	6.5
Females	N	2454	2291		
		21.7	17.7	-4.0	-18.4

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

Walking for Exercise

There was a decrease from 2009 to 2016-2017 in the proportion of older Singaporeans who reported going for walks for exercise every day and an increase in the proportion who reported not going for walks for exercise at all – the extent of change in both these proportions was 35%. In 2016-2017, nearly 50% of older Singaporeans reported not going for walks for exercise at all. Overall, among 26% went for walk for exercise every day and about 20% every week. (Table 20A)

Table 20A: Walking for Exercise, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)				
Distribution overall, weighted %				
	2009	**2016-2017**	**Absolute Difference**	**Relative Difference**
N	4990	2272		
Every day	39.3	25.7	-13.6	-34.5
Every week	17.7	19.4	1.7	9.6
Every month	3.7	3.7	0.0	0.3
Less than once a month	4.4	3.6	-0.7	-16.8
Not at all	35.0	47.4	12.4	35.2

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

The decrease from 2009 to 2016-2017 in the proportion of those who reported going for walks for exercise every day and increase in the proportion who reported not going for walks for exercise at all was observed for all the considered age groups and for older males. For older females, the frequency of going for walks for exercise remained relatively stable from 2009 to 2016-2017. (Table 20B)

Table 20B: Walking for Exercise, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age Group and Gender

		2009	2016-2017	Absolute Difference	Relative Difference
Distribution by age group, weighted %					
60-69 years	N	2044	1000		
	Every day	40.0	25.2	-14.8	-36.9
	Every week	20.6	21.2	0.6	2.8
	Every month	3.8	4.4	0.6	15.7
	Less than once a month	3.8	3.4	-0.4	-9.3
	Not at all	31.8	45.6	13.8	43.5
70-79 years	N	1862	747		
	Every day	41.4	29.0	-12.4	-29.9
	Every week	15.4	18.7	3.4	22.0
	Every month	3.4	3.5	0.2	4.4
	Less than once a month	5.0	3.8	-1.2	-24.8
	Not at all	34.9	44.8	9.9	28.4
80 years and older	N	1084	525		
	Every day	31.2	21.4	-9.9	-31.6
	Every week	9.8	14.7	4.9	50.6
	Every month	3.6	1.6	-2.0	-55.9
	Less than once a month	5.4	4.0	-1.5	-26.7
	Not at all	50.0	57.8	7.7	15.4
Distribution by gender, weighted %					
Males	N	2253	1058		
	Every day	57.8	29.1	-28.7	-49.6
	Every week	15.5	19.6	4.1	26.5
	Every month	2.1	3.2	1.1	51.4
	Less than once a month	2.3	3.1	0.8	35.2
	Not at all	22.4	45.1	22.7	101.5
Females	N	2737	1214		
	Every day	23.7	22.8	-0.9	-3.7
	Every week	19.5	19.2	-0.3	-1.7
	Every month	5.0	4.2	-0.9	-17.2
	Less than once a month	6.1	4.1	-2.0	-33.2
	Not at all	45.8	49.4	3.7	8.0

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

VI. Psychological Wellbeing

Depressive Symptoms

Depression is an important indicator of psychological wellbeing among older adults; it is linked with adverse health consequences including disability, functional decline, greater healthcare utilization, and with weaker social networks and family disruptions [31-33].

Depressive symptoms were measured in both surveys using the 11-item Centre for Epidemiologic Studies-Depression (CES-D) scale which has been designed as a measure for screening of depressive symptoms [34]. Respondents were asked to respond to what extent were eleven statements pertaining to poor appetite, restless sleep, feeling that doing everything was an effort, feeling sad, lonely, feeling that people were unfriendly, being disliked by others, feeling happy, enjoying life, etc. true for them in the week preceding the survey. Response options included none/rarely (corresponding to a score of 0), sometimes (1) and often (2). The total scores can range from 0 to 22, with higher scores indicating a higher level of depressive symptoms. A score of 7 and above is used to indicate a cut-off for clinically relevant depressive symptoms [35].

A comparison of the 2009 and 2016-2017 data indicates that the prevalence of clinically relevant depressive symptoms among older Singaporeans has declined. We see that 15% of older Singaporeans in 2009 had clinically relevant depressive symptoms. In 2016-2017, the proportion was lower at about 12%. This 3 percentage point decrease represents a relative decline of about 22% over 2009. (Table 21A)

Table 21A: Clinically Relevant Depressive Symptoms, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)

	2009	2016-2017	Absolute Difference	Relative Difference
N	4537	2033		
	15.0	11.7	-3.3	-22.2

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

The decline in the proportion of older Singaporeans with clinically relevant depressive symptoms was seen across age groups and for males and females both. The proportion of those aged 60-69 years with clinically relevant depressive symptoms declined from about 13% in 2009 to 10% in 2016-2017, a relative decline of about 20%. The relative decline compared to 2009 was 32% for those aged 80 years and older, from a prevalence of about 22% in 2009 to 15% in 2016-2017. The proportion of clinically relevant depressive symptoms for males was 11% in 2016-2017 compared to about 13% in 2009, whereas that for females was 12% in 2016-2017 compared to 17% in 2009. The relative difference over 2009 was thus 28% for women, and the gender difference considerably narrower in 2016-2017 compared to 2009. (Table 21B)

Table 21B: Clinically Relevant Depressive Symptoms, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I), by Age Group and Gender

		2009	2016-2017	Absolute Difference	Relative Difference
Prevalence by age groups, weighted %					
60-69 years	N	1922	985		
		12.6	10.2	-2.5	-19.5
70-79 years	N	1692	697		
		17.4	13.1	-4.3	-24.6
80 years and older	N	871	351		
		21.9	14.9	-7.0	-32.1
Prevalence by gender, weighted %					
Males	N	2031	991		
		12.6	10.9	-1.7	-13.2
Females	N	2454	1042		
		17.1	12.4	-4.7	-27.6

Note: Absolute difference is calculated as 2016-2017 values minus 2009 values. Relative difference is calculated as the absolute difference as a percent of the 2009 values. % may not add up to 100 as responses of 'don't know' or 'refused' are not shown.

Personal Mastery

Personal mastery, i.e. extent to which individuals feel in control of their own lives, is positively associated with mental health, particularly lower anxiety, reduced loneliness, and a reduced risk of cognitive decline among older adults [36-38]. Personal mastery was measured in PHASE-I and THE SIGNS Study – I using the 5-item Pearlin Mastery Scale [39]. Respondents were asked how strongly they agreed or disagreed with statements that related to having control over things that happened to them, being able to resolve problems, changing important things in their lives, feeling helpless in dealing with problems in life, and feeling of being pushed around. Response choices included strongly agree (scored as 0), agree (1), disagree (2), and strongly disagree (3). The total scores can range from 0 to 15, with higher scores indicating greater personal mastery.

We see little difference in the distribution of the personal mastery scores in 2009 and 2016-2017 overall, with an average score of 9.3 in 2009 and 9.2 in 2016-2017. (Table 22A)

Table 22A: Personal Mastery Scores, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I)

Distribution overall, weighted %		
	2009	**2016-2017**
N	4510	1969
Average	9.3	9.2
SD	2.6	2.2
Range	0-15	0-15

Across age-groups, the average score declined marginally by 0.2 points for older Singaporeans aged 60-69 years and increased by 0.1 for those aged 80 years and older. Between 2009 and 2016-2017, there was thus a narrowing of the difference in personal mastery scores across the three age groups. The distribution of scores by gender shows that while the average score for males in 2016-2017 was higher than in 2009, it was lower for women, with the gap between males and females thus narrower in 2016-2017 compared to 2009. (Table 22B)

Table 22B: Personal Mastery, 2009 (PHASE – I) and 2016-2017 (THE SIGNS Study – I) by Age Group and Gender			
Distribution by age groups, weighted %			
		2009	**2016-2017**
60-69 years	N	2003	974
	Average	9.5	9.3
	SD	2.5	2.3
	Range	0-15	0-15
70-79 years	N	1718	672
	Average	9.1	9.1
	SD	2.7	2.2
	Range	0-15	0-15
80 years and older	N	789	323
	Average	8.9	9.0
	SD	2.7	2.2
	Range	0-15	0-15
Distribution by gender, weighted %			
Males	N	2101	981
	Average	9.0	9.2
	SD	2.3	2.4
	Range	0-15	0-15
Females	N	2409	988
	Average	9.6	9.3
	SD	2.7	2.0
	Range	0-15	0-15

Disussion and Policy Implications

Over the 2009 to 2016-2017 period, a notable difference that we see is the upward shift in the educational profile of older Singaporeans. Employment at older ages increased substantially with higher proportions working full-time or part-time in 2016-2017 compared to 2009. A marked decline was also seen in the proportion of older females who had never worked. In terms of housing type, there has been an increase in the proportion of those living in 4-room and larger public housing units. The data on income adequacy shows a mixed picture. On the one hand, income 'abundance' (indicating the response that there was enough money to meet monthly expenses with some left over) increased over this period but there was also an increase among those who reported much difficulty

Overall, these data point to an improvement in the socioeconomic status of older Singaporeans over the 2009 to 2016-2017 period. Higher educated individuals are likely able to sustain in the workforce for longer and be able to access and acquire greater financial resources. At the same time, one must be cognisant of the possibility that while increasing employment at older ages may represent more workforce opportunities as well as individual capabilities for continued employment at older ages, the increase in the proportion of older Singaporeans who are working may mask financial constraints and thus the necessity for continued work.

At the same time, it is important to note that the proportion of older Singaporeans who reported much income 'inadequacy' (much difficulty in meeting expenses) also increased for the entire population, albeit by a small proportion in absolute terms but substantial in relative terms. For those aged 80 years and above, the proportion of income inadequacy more than doubled, indicating that financial vulnerability may especially increase at later years of life. The increase in income inadequacy also serves as a reminder that the socioeconomic status improvements the data suggests are not necessarily experienced by everyone. There may be several factors that explain an increase in financial inadequacy: for instance, increased healthcare expenses among the oldest-old, constancy or even decline in income sources as expenses rise, lower savings, and differences in consumption patterns. Given the introduction by the Singapore government of healthcare-related cost-mitigation initiatives for the Pioneer Generation and more recently, the Merdeka Generation, their downstream benefits, changes in the financial burden of healthcare costs, healthcare utilization patterns and ultimately health outcomes, need to be studied in further detail.

The analysis of living arrangements showed a shift from 2009 to 2016-17 towards living alone, and a decline in living with children. There was a substantive increase in living alone among older Singaporeans aged 70 years and above, and a greater proportion of older women lived alone compared to men. There was also an increase, albeit off a low base, in living only

with a foreign domestic worker. While these changes in living arrangements may suggest a shift towards greater independence, they may also reflect declining family size or family relationships. The elucidation of the exact reasons as well as of the impact of these changes in living arrangements on wellbeing and health forms an important part of the research as well as policy agenda on older Singaporeans.

The comparison of data on older Singaporeans' social engagement in 2009 and 2016-2017 presented a picture of general decline. Among those aged 60-69 years, the extent of social networks, any participation in committee and neighbourhood events, and frequent attendance at a place of worship all declined. The only increase in social engagement for those aged 60-69 years was in the proportion of infrequent attendance at a place of worship. The current form and content of committee and neighbourhood events may need to evolve to cater more directly to the interests of the younger old in particular. Making social activities such as committee and neighbourhood events more engaging, and flexible to the needs as well as time constraints imposed by family and work commitments are possible directions to explore.

The proportion of older Singaporeans who reported being sometimes lonely or mostly lonely declined substantially during this period. Among those aged 80 years and above, the decline in any loneliness was lower than that of the two younger age groups considered in this analysis. Given the link of loneliness with adverse health outcomes, the decline over time in the proportion of older Singaporeans experiencing loneliness is encouraging. Nonetheless, with 1 in 3 older Singaporeans still experiencing loneliness in 2016-2017 there is a need to further understand aspects that cause loneliness, factors that may lead to loneliness being transient or chronic, and interventions that may mitigate this social issue.

Over the considered period, functional limitations measured in terms of difficulty with ADLs and IADLs, as well as the proportion with 3 or more chronic physical ailments increased. The prevalence of hypertension remained relatively stable, but was still quite high. There was also an increase in the prevalence of obesity and self-reported diabetes among older Singaporeans. The observed increases could partly reflect an increase in the awareness and accessibility of health screening, resulting in more individuals being aware of their chronic physical ailments. Nevertheless, the possibility of older Singaporeans adopting less healthy behaviours resulting in the observed increases cannot be ruled out. For instance, the proportion who walked for exercise declined for all the considered age groups and males. The improvement in hand grip strength may be the result of the overall increase in socio-economic status, as studies have reported a positive link between them [41]. Psychologically, the distribution of personal mastery scores also remained relatively stable over the two time points, and the prevalence of clinically relevant depressive symptom scores declined.

Conclusion

This review comparing two parallel cohorts of older Singaporeans aged 60 years and older in 2009, and in 2016-2017, highlights several key issues.

First, the physical health of our older population is not improving. Older people have increasingly more ADL limitations and chronic physical ailments and the prevalence of obesity and self-reported diabetes has increased over time. Loneliness and depressive symptoms have declined over time, but must remain a priority area of intervention, especially for the oldest-old.

Second, social engagement among the young-old (60-69 year olds), in particular has decreased, which points to the need to re-think programming for these more educated older adults. They are likely to have different attitudes and perceptions towards social engagement than those in the older age groups. Further research would be important to reveal preferences and expectations of young-old Singaporeans.

Third, there has been an increase over time in living alone among the older age-groups with a marked decline in living with children. To the extent that older Singaporeans prefer to 'age-in-place' in familiar surroundings, there is a need to ensure that living alone does not isolate them from social connections, support, and physical and mental stimulation. It is certainly encouraging that the proportion of older adults who reported being lonely was lower in 2016-2017 compared to 2009. Future research matching these individuals with befriending and outreach programmes available in Singapore may allow us to make more concrete statements about the value of these programmes.

Fourth, findings on income adequacy suggest that income disparities may be increasing among older persons in Singapore. Various initiatives have been rolled out to relieve some of the financial strains faced by Singaporeans as they aged. Tracking and evaluating the impact of these measures are important to ensure that they achieve the desired outcomes.

This report serves to highlight that two recent snapshots reveal that the profile of older Singaporeans is changing over time. Researchers, practitioners, and policy makers should be attuned to the changing characteristics of Singapore's older population. Indeed, continued collection of multi-faceted longitudinal data in future years, such as through future waves of THE SIGNS Study, impact evaluation of programs, combined with qualitative insights, will enable a comprehensive and updated picture of the physical, social, psychological and economic wellbeing of older Singaporeans. This will also ensure that future policy and programmes for older persons in Singapore are informed by scientific evidence.

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Funding

PHASE-I was funded or supported by the Ministry of Social and Family Development, Singapore. Funding for dynamometers and electronic blood pressure monitors was through a grant obtained by the Nihon University Population Research Institute from the "Academic Frontier" Project for Private Universities: matching fund subsidy from Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT), 2006-2010.

THE SIGNS Study – I was funded by Singapore's Ministry of Health (MOH) under the agreement number MOH-NUS RL2015-053. Funding for dynamometers and electronic blood pressure monitors used in THE SIGNS Study was through a grant obtained by the Nihon University Population Research Institute from the "Academic Frontier" Project for Private Universities: matching fund subsidy from Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT), 2006-2010.

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