SOCIETAL AGING AND ITS IMPACT ON SINGAPORE

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NBER Working Paper No. 31958
December 2023
JEL No. I1

ABSTRACT

Societal aging is arguably one of our most critical demographic challenges, and Singapore is aging at a much faster rate compared to other countries. Population aging could negatively affect older adults, contribute to an increase in healthcare expenditure and increase caregivers' financial and emotional burden. This chapter provides an overview of the well-being and health and social care needs of older adults in Singapore. Formulating social and public policies that enhance the health span, extend productive life years, support caregivers, and improve community health and social care services are crucial elements to help older adults age successfully. We analyze how aging affects health, financial security, and well-being, exploring correlations between disability levels and these factors. We then discuss policies the Singapore government has implemented or will implement to help older adults age successfully. Lastly, we provide an overview of formal and informal care provided in Singapore, including assessing the overall cost of LTC in Singapore.

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Introduction

Societal aging is arguably one of our most critical demographic challenges (World Bank, 2016). Singapore is aging at a much faster rate compared to other countries. It will take only 27 years to transition from an 'aging society' in 1999 (7% of the population aged 65+) to a 'super-aged society' in 2026 (with 20% of its population aged 65+) (Tan Teck Boon, 2015). Japan, China, Germany, and the United States took, or will take, 36, 32, 76, and 86 years respectively, to make that transition (East Asia Forum, 2015). The resident population (i.e., Singapore citizens and Permanent Residents) aged 65+ had doubled from 7% in 1999 to 15.2% in 2020 and is projected to increase further to 32% by 2060. The percentage of those aged 85+ among the 65+ population is projected to increase from 9.2% in 2020 to 26.8% in 2060 (Ministry of Manpower Singapore, 2021b). As shown in Figure 1, the total fertility rate in Singapore has fallen steadily from 5.76 children per woman in 1960 to 1.12 children per woman in 2021 (Department of Statistics Singapore, 2021). Figure 2a shows the rising share of the population aged 65+, while Figure 2b highlights the most rapid growth among those aged 85+ (OECD Stat, 2022).

Singapore's Population White Paper published in 2013 warned of a rapidly aging population and shrinking labor force, projecting the old-age support ratio to fall from 5.9 in 2012 to 2.1 by 2030 (Prime Minister's Office Singapore, 2013) Population aging could dampen business activity, cause job and employment opportunities to shrink, and negatively affect older adults and working populations (United Nations, 2017) if governments, policymakers, and societies do not recognize older adults' potential productivity and contributions to the community. Successful aging can be defined as older adults thriving in productive roles and having high levels of physical and mental well-being, social connectedness, and financial security (Chen et al., 2018). Previous research studies have typically focused on the association between physical health, e.g., delaying diseases, and its association with successful aging (Crimmins & Beltran-Sanchez, 2011; Prince et al., 2015). The influence of social and economic factors on successful aging has recently been recognized, but the evidence for Asian countries is lacking.

Singapore has one of the world's highest life expectancies. However, healthcare expenditure has approximately doubled from S$8.5 billion in 2015 (Ministry of Health Singapore, 2018) to $15 billion in 2020 (Ministry of Health Singapore, 2021). Previous research has found that the gains in life expectancy at birth in Singapore have outpaced gains in healthy life expectancy; while life expectancy increased by 8.7 years during 1990-2017, healthy life expectancy, i.e., total life expectancy minus the number of years lived in disability or less than ideal health and years lost to premature mortality, increased by 7.2 years during this time (Epidemiology & Disease Control Division - Ministry of Health Singapore and Institute for Health Metrics and Evaluation, 2019). This gap is attributable to the growing proportion of older adults aged 80+, i.e., the oldest old, in Singapore, and the greater likelihood of chronic diseases and disability at older ages compared to younger ages.

Chen, Lim, et al. (2019) projected that among community-dwelling older persons, 1 in 6 older adults in Singapore would have at least one activity of daily living (ADL) disability, and 1 in 3 older adults would have at least one instrumental ADL (IADL) disability by 2050, an increase from 1 in 12 older adults with ADL disability and 1 in 5 older adults with IADL disability in 2014. The projected prevalence of ADL and IADL disability by 2050 among the oldest-old are 46% and 68%, respectively. The projected increase in disability prevalence is due to Singapore's aging demography and related comorbidities (Freedman et al., 2008; Lin et al., 2016; Yokota et al., 2016). In addition, the average family eldercare is also projected to increase by 41% from 29 to 41 hours per week, where informal family caregivers will disproportionately bear the caregiver burden.

Population aging has several implications for caregiving in Singapore. A combination of later marriage and childbearing with increased longevity has resulted in a growing "sandwich generation" that simultaneously cares for children and older family members. Social norms related to filial piety and an emphasis in public policy to promote 'aging-in-place' have meant that family caregivers (Mehta, 2006) in Singapore are a primary caregiving source for older adults. The period of caregiving has also lengthened due to increasing longevity, resulting in caregivers' increased financial and emotional burden. Research from Singapore on caregiving experience typologies suggests that while a majority of family caregivers of older adults aged 75+ and with one at least one ADL limitation report a balanced or satisfied caregiving experience, a substantial proportion (nearly a quarter) report a dissatisfied or intensive caregiving experience (Sung et al., 2022). These caregivers also report a lower quality of life and a higher level of depressive symptoms than those who are satisfied (Sung et al., 2022).

This chapter provides an overview of the well-being and health and social care needs of older adults in Singapore. As mentioned above, formulating social and public policies that enhance the health span, extend productive life years (e.g., extending retirement age), support caregivers, and improve community health and social care services are crucial elements to help older adults age successfully.

We analyze how aging affects health, financial security, and well-being, exploring correlations between disability levels and these factors. We then discuss policies the Singapore government has implemented or will implement to help older adults age successfully. Lastly, we provide an overview of formal and informal care provided in Singapore, including assessing the overall cost of LTC in Singapore.

Samples and Definitions of Data

Our primary data come from the Retirement and Health Study (RHS), a longitudinal survey panel established by the Singapore government to understand Singapore residents' retirement and healthcare needs over time. It comprises a nationally representative sample of 15,103 Singapore Citizens and Permanent Residents aged 45 and above at baseline in 2014. The RHS has completed four waves of data collection every two years since then, and data collection for wave five has been ongoing since July 2022.

The sampling frame used for the RHS was the national registration database by the Singapore government. Stratified random sampling (without replacement) was used as the sampling method, based on age group, sex, and ethnicity, to ensure that every race was sufficiently represented. In addition, sampling weights for each respondent indicate how many population units are represented by each sampled unit, with adjustments for non-responses. Weights for the first wave represent cross-sectional weights while the weights for subsequent waves are adjusted for non-responses in each wave.

Respondents were interviewed once every two years from 2014. Wave 2, i.e., the first follow-up survey, was conducted between June 2016 and April 2017 with 12,869 respondents, and Wave 3 was conducted between June 2018 and March 2019. We used data from 11,680 respondents in Wave 3 of the survey. Wave 3 did not survey individuals living in a nursing home, community hospital, or prison; thus, we could not conduct our analyses on institutionalized individuals. In addition, most of our analysis was among those aged 65+.

For some of the analysis in this chapter, we have used data from the first wave (conducted in 2016-2017) of the Transitions in Health, Employment, Social Engagement and Inter-generational Transfers in Singapore Study (THE SIGNS Study), a nationally-representative survey of Singapore residents, i.e., citizens and permanent residents, aged 60 years and older. A representative sample of 9736 Singapore residents was approached to participate in THE SIGNS Study. To recruit a sufficient number of minority sub-groups, older adults aged 75 years and older and those in Malay and Indian ethnic groups were oversampled by a factor of two. A total of 4549 older adults (or their proxy respondents in case the older adult was unable to respond himself/herself due to health-related reasons) were interviewed face-to-face using a structured questionnaire. Further information on THE SIGNS Study is available elsewhere (Chan et al., 2018).

We have also used data from Caregiving Transitions among Family Caregivers of Elderly (TraCE) (conducted in 2019-2020), an in-depth study of 278 informal caregivers of Singapore citizens and permanent residents aged 75 years and older (Malhotra, 2021). TraCE respondents were approached based on 1086 older adults who had participated in two national surveys of older adults in Singapore: the third wave of the Panel on Health and Aging of Singaporean Elderly (PHASE) in 2015 (Chan et al., 2019) and the first wave of THE SIGNS Study in 2016-2017. In addition, a screener assessed older adults' current ADL and IADL status. If an older adult reported receiving human assistance for any ADL or IADL, the study attempted to identify and recruit his/her primary informal caregiver, defined as a family member or friend aged 21 years and older who were involved in at least two of three tasks: direct provision of care, ensuring the provision of care, and making care and treatment decisions for the older adult.

Part I: Health and Financial Security

Disability and well-being at older ages.

As the Singapore population has aged, there is an increasing burden with ADLs and IADLs limitations (Visaria et al., 2019). Our ADLs measures included six tasks: walking across the room, dressing, bathing, eating, getting in and out of bed, and toileting. Respondents who stated they needed help with each of the respective ADLs are classified as having difficulty with the ADL. Individuals can claim long-term care insurance under Singapore's CareShield Life scheme (described later) if they cannot perform at least three of these six ADLs.

The IADL tasks assessed were using the telephone, shopping, preparing food, traveling, managing medication, and managing finances. Respondents were asked about their ability to do each of the respective IADLs. Only respondents who stated they were completely unable to complete the IADL task are classified as having difficulty with that particular IADL.

Most older adults 65+ (90%) were independent and did not need any help with ADLs or IADLs, while 4% of them needed help with IADLs only, and 6% needed help with at least 1 ADL(s) (Table 1). However, among the oldest-old 85+ group, 46% needed help with ADLs or IADLs. Of these, 14% needed help with at least one IADL but did not have any ADL limitations, and approximately 33% needed help with at least 1 ADL. In addition, 1 in 10 adults in the oldest-old 85+ group needed help with all 6 ADLs. It is estimated that about 60,000 older adults aged 65+ and 30,000 older adults 80+ needed help with either an ADL or IADL (Figure 3). Among those who needed help with at least one ADL, 71.3% needed help walking around the house and taking a shower (70.7%) (Table 2). Among those who needed help with at least one IADL, the highest proportion came

from managing finances (68.4%), followed by managing medication (45.5%) for those aged 65+. Results were similar for those aged 85+, with a higher prevalence of needing help for most ADL or IADL tasks.

Unsurprisingly, individuals with 3+ limitations in age groups 65+ and 85+ were more likely to have poorer self-reported health, worse cognition, and higher depression (Table 3). Compared to the 65+ population, the proportion of older adults with 3+ limitations was less likely to report their health as good, very good, or excellent (17% vs. 55%), was also much less likely to have normal cognition (20% vs. 78%), and was 2.7 times more likely to report having depression (8% vs. 3%). Such differences were also seen among those aged 85+. However, the oldest-old was much less likely compared to the 65+ to report good or very good or excellent health (34% vs. 55%), was less likely to have normal cognition (33% vs. 78%), and was more likely to have depression (6% vs. 3%). Similarly, the oldest-old group with 3+ limitations tends to have worse self-reported health.

Promoting functional adaptations among older adults may benefit from proactive interventions (Mathieson et al., 2002). For example, initiatives to enhance independence with ADLs among older adults in Singapore include a scheme that subsides on home modifications in government-built Housing Development Board (HDB) flats. Under the Enhancement for Active Seniors (EASE) scheme, older residents can install grab bars, slip-resistant treatment to floor tiles in toilets, and ramps to navigate steps and different levels within homes (Housing & Development Board Singapore, 2023).

Financial Security at Older Ages
Incomes were higher for the 18-64 population than for 65+ (Table 4a). This was expected as the labor force participation rate decreased with age, from 91% among 30-34 years to 46.1% among those aged 65-69 and 17.6% among 70+ in 2018 (Ministry of Manpower Singapore, 2020). The income ratio between those 65+ and those aged 18-64 increases as the income percentile increases. For instance, the income of the 50th percentile of those aged 18-64 was about four times more than those 65+, but the income of the 90th percentile of those aged 18-64 was only about two times more than those 65+. For seniors with low incomes during their working years, resulting in less retirement pension, the government introduced the Silver Support Scheme in 2016 (Silver Support Singapore, 2022). This scheme is meant to support the bottom one-third of Singaporeans aged 65+ with quarterly cash supplements and was enhanced in 2021 to further support seniors with lesser means. Eligible seniors will receive support per quarter depending on household income type of housing ranging from S$180 to S$900 (Silver Support Singapore, 2022). The quarterly cash supplements benefitted nearly 250,000 Singaporeans aged 65+, totaling S$2.2 billion since 2016. In addition, all Singaporeans aged 65 and above who are ComCare Long Term Assistance (LTA) will receive support of $360 per quarter, regardless of their flat type. This Silver Support Scheme constitutes the fourth component of Singapore's social security system, complementing the first three components: CPF retirement income, home ownership, and healthcare coverage (discussed in the next section).

Older adults' income is less ideal as a measure of financial security since many would have retired. Although older adults no longer have a wage income, they may have assets in retirement savings plans, and these asset variables will be used to finance their consumption. Therefore, in Table 4b, we report the distribution of wealth among older adults. Relative to the income measures, the wealth distribution for older adults was more skewed, with the wealth of the lowest 5% of the 65+ sample valued at SGD 11,700 and the highest 5% at least approximately SGD 2.3 million. Similarly, the lowest 5% of the 85+ sample had SGD 4,000 valued in wealth, and the highest 5% held at least approximately SGD 2.5 million in wealth.

In Table 5, Panel 1 reports the household income from work as a percentage of the median household income by the number of ADLs. Each column sums to 100%. Among those in worst health, i.e., with three or more ADL limitations, 44% had incomes less than 50% below the median, while 13% had incomes higher than twice the median income. Panel 2 reports the wealth as a percentage of the median wealth by the number of ADLs. Among those with three or more ADL limitations, 34% had incomes less than 50% below the median, while 14% had incomes higher than twice the median income. The proportion of those with incomes below the median household income indicated a clear negative gradient in the relationship between the extent of functional limitations and income. Individuals' financial security and access to care depend on their income, wealth, health status, and living arrangements.

Part II: Policy approaches for Successful Aging in Singapore

Individual responsibility
Singapore's stance on implementing policies for older adults, be it for financial security or healthcare, is individual responsibility for his/her finances in preparation for the challenges that come with old age without over-burdening family members, the community, and the state (Ministry of Social and Family Development Singapore, 1999). Various policies implemented throughout the years help older adults financially, especially during their retirement period, so they are not compelled to work at an old age to fund their living expenses. This also helps to reduce the reliance on their caregivers.

Central Provident Fund (CPF)
Singapore's pension system is based on defined contributions. Established in 1955, the Central Provident Fund (CPF) is a compulsory social security savings scheme and a crucial part of Singapore's social security system (Ministry of Manpower Singapore, 2022). Singaporeans and their employers pay into the accounts under the CPF. These funds can be withdrawn at older ages or used to finance a home, pay for medical expenses, or other approved investments (Haskins, 2011). Monthly, 20% of an employee's salary will be allocated to one's CPF account for employees aged 55 and below with a minimum monthly salary of $750. The employer contributes another 17% of the employee's salary into the employee's CPF account. The employee and employer's contribution rates will decrease as the employee's age increases. Monthly CPF contributions will go to an Ordinary Account (used for retirement, housing, insurance, and investment), Special Account (used for retirement), and MediSave Account (used for healthcare). A retirement account is also created for the employee when he or she turns 55. Older adults will receive monthly payouts from CPF savings when he or she turns 65 years old (Central Provident Fund Board, 2022a). These monthly payouts will stop when savings run out. However, the earlier scheme has now been expanded to CPF LIFE, a national longevity insurance annuity scheme that provides individuals monthly payouts no matter how long they live. When one passes away, the CPF LIFE premium balance (if any) and any remaining CPF savings will be distributed to loved ones (Central Provident Fund Board, 2022b).

Homeownership and monetization
The homeownership scheme was introduced in 1964, providing grants and subsidies for most Singaporeans to own property. As a result, 89.3% of Singaporean households own their own houses, and 90.9% of those staying in public housing own their flat in 2022(Singapore Department of Statistics, 2022b). In addition, most Singaporeans take up housing loans and can finish paying for their homes by the time they retire. As such, they need not worry about paying for rent post-retirement and can use their pension from their CPF account for daily expenses and medical bills. This was a critical public priority during the early years of post-independence nation-building, to

provide the population, which was then staying in slums, to move to decent housing. This policy created a nation of homeowners and reduced the incidence of homelessness, where 81% of the population stayed in public housing; 79% of households owned their apartments, with only 2% renting from the government (Haskins, 2011).

The Singapore Government has also introduced various ways for older adults to monetize their public housing flats for retirement. Various schemes include the silver housing bonus, renting out flats/bedrooms, and the lease buyback scheme (Housing & Development Board Singapore, 2022b). For the Silver Housing bonus, households can receive an additional maximum of 30 thousand SGD in cash provided if they top up their proceeds from selling their old flat and buying a smaller flat into their CPF retirement account (Housing & Development Board Singapore, 2022c), whereas, for the lease buyback scheme, older homeowners can sell a portion of his or her flat's lease back to HDB, which continuing to reside in the flat (Housing & Development Board Singapore, 2022a). These measures alleviate older adults' concerns about paying rent for their houses during their retirement period and supplement the older adult's income which they can use for living and medical expenses.

Healthcare

In 2015, the Government of Singapore launched an Action Plan for Successful Aging (Ministry of Health Singapore, 2016), which outlined areas of focus for policymaking and program development: employability, lifelong learning, volunteerism, health and wellness, social engagement and inclusion, aged care services, housing transport, public spaces, and research on aging. Singapore's long-term care (LTC) landscape consists of nursing homes, inpatient hospice palliative care service (IHPCS), center-based care facilities, home care providers, and home palliative care providers. In addition, various services are provided under the intermediate and LTC frameworks. The Ministry of Health launched the Agency for Integrated Care in 2008 to enhance and integrate the LTC sector. It is currently Singapore's National Care Integrator and is responsible for discharge planning and assisting the movement of patients from inpatient facilities to the community (Agency for Integrated Care Singapore, 2022). The agency aims to improve access to care and support patients and their caregivers while developing the primary and community care sectors. Much effort has been invested in developing a robust home- and community-care ecosystem that allows older adults to live in the community for as long as possible.

The government aims to ensure that excellent and affordable health care is available to all citizens through subsidies., and schemes such as MediSave, MediShield Life, and MediFund. **Subsidies** are means-tested and can cover up to 80% of hospitalization charges in public hospitals, up to 80% for non-residential LTC, such as center-based and home care services, and up to 75% for residential LTC. **MediSave** is a national healthcare savings scheme established in 1984 to help individuals set aside a part of their income for their and their family members' healthcare expenditures and approved health insurance premiums, supplemented by employer contributions. In 1990, the government established **MediShield** to cover exceptionally high-cost hospital expenditures. The scheme was substantially enhanced in 2015 to form **MediShield Life** which provides universal coverage for all Singaporeans, regardless of age or health condition. In addition, for those unable to afford their remaining subsidized medical bills, the government established a medical endowment fund in 1993, **MediFund**, to serve as a final safety net for needy Singaporeans (Tan et al., 2021).

In 2017, the operating expenditure of LTC was estimated to be around $580 million (Ministry of Health Singapore, 2020), approximately 0.12% of Singapore's GDP. The Singapore government

has taken steps to strengthen the LTC insurance system. As a result, many financing sources support LTC needs, including **ElderShield** (disability insurance), ElderShield Supplement plans, private disability insurance, private cash savings, central provident fund payouts, charity donations, and family support. Recent research, as shown in Figure 4, suggested the following financing mix: out-of-pocket spending (40%), government spending and subsidies (42%), LTC insurance (9%), and charitable donations (9%).

Public Long-term Care Insurance

CareShield Life was introduced in 2020, which provides enhanced coverage for LTC costs compared to ElderShield. CareShield Life payouts start at SGD600 per month in 2020., and increase till age 67, or when one successfully claims, whichever is earlier. ElderShield is not a mandatory scheme. Although individuals were automatically enrolled at age 40, they could complete the opt-out form in the ElderShield package. The Interim Disability Assistance Scheme for the Elderly (IDAPE) assisted people who could not join ElderShield, namely those who were too old or had existing disabilities as of 30 Sep 2002. IDAPE provides S$150 or S$250 monthly for up to 72 months, depending on household income. IDAPE payments assist with out-of-pocket expenses associated with medical bills and nursing costs or subsidize the costs of hiring a migrant domestic worker.

All Singapore Citizens and Permanent Residents born in 1980 and after must have LTC insurance under CareShield Life. They are automatically enrolled into CareShield Life on 1 Oct 2020 or when they turn 30, whichever is later. Premiums can be fully payable by MediSave, a national healthcare savings scheme. In addition, premium subsidies are available for lower-income residents to ensure that no one loses coverage due to a genuine inability to pay premiums. Individuals receive CareShield Life payouts when they develop substantial limitations in their ability to perform at least three basic activities of daily living. Benefits are paid out in cash to maximize flexibility. For individuals in residential care, benefits can be paid directly to the residential care facility to help lower out-of-pocket expenses for the patient and their families. In addition, individuals could complement their basic CareShield Life plan with other benefits, such as higher monthly payout amounts, by purchasing additional coverage through Supplement plans, which private insurers administer.

Table 6 presents estimates for the number and proportion of individuals with long-term care insurance. Approximately 65% of older adults had LTC Insurance. Table 7 reports descriptive characteristics for the insured and uninsured groups. Those with insurance tended to have higher incomes from work and wealth for both the 65+ group and the 85+ group. In addition, uninsured older adults were more likely to live with a spouse and receive informal help.

Part III: Formal and Informal Care in Singapore

Overview of Singapore's Care Landscape
Singapore's life expectancy at birth increased from 81.9 years in 2011 to 83.7 years in 2019 (Singapore Department of Statistics, 2022a), much higher than the global life expectancy of 73.4 years in 2019 (World Health Organisation, 2023). Coupled with a low fertility rate that declined below replacement level in 1977 and has remained one of the lowest in the world, family sizes have rapidly decreased over time. While there have been many policies to promote Successful Ageing (as described above), families are now facing a more significant care burden due to smaller family sizes (Ministry of Finance Singapore, 2023). Many Singapore families simultaneously face

the demands of child and eldercare, with the government's statement that "Institutional care should remain as a last resort" (Ministry of Community Development and Sports Singapore, 2001). As such, the government has been coordinating partnerships between community and family, playing the central role in providing necessary infrastructure and funding mechanisms for care within the community (Yeoh & Huang, 2009).

At the individual level, older adults are personally responsible for keeping healthy and active through various programs such as the National Steps Challenge (Healthhub Singapore, 2022). The government has also provided many other programs on preventive health to encourage older adults to keep "alert, active, and integrated', by maintaining their physical and mental well-being (Ministry of Community Development and Sports Singapore, 2001). Frail older adults can also be cared for in their homes and tap into community services such as meal delivery, telephone hotline, befriender, and other supportive services (Mehta, 2002). Nevertheless, anecdotal reports have raised the issue of disabled and frail older adults feeling imprisoned in their own homes as they are unable to leave the house without help if they stay on non-lift landing units (The Straits Times Singapore, 2006), which has been improved with the Housing Development Board lift upgrading program and installation of ramps within the homes with EASE program. In addition, nursing homes are also often perceived as contrary to Asian values and culture (Choong, 2000). Thus, many middle-class and affluent families have turned to employing live-in domestic workers as surrogate caregivers to provide care for older adult(s) needing help with activities of daily living within the home (Yeoh & Huang, 2009).

Institutional Care

Table 8 provides an overview of the long-term care facilities in Singapore. In 2020, there were 8,100 places for center-based services such as day rehabilitation, dementia daycare, and day activity centers; 10,000 for home-based services such as home medical, home nursing, and personal home care; and 16,221 nursing home beds. In addition, 3,100 clients may receive home-based palliative care anytime in the year. Finally, there were 2,069 community hospital beds (equivalent to skilled nursing facilities) where clients receive inpatient rehabilitation in preparation for returning to the community.

The overall nursing home bed occupancy rate has generally remained stable over the past five years, at around 90%, higher than other developed countries like the U.S., with approximately 79.7%. However, our nursing home beds per 85+ population of 0.282 were similar to the U.S. of 0.265. In addition, eight new nursing homes were set up between 2016-2020, adding 3300 more nursing home beds (Lai, 2021).

The primary input to LTC is labor supply. Table 8 also shows that there were 16,550 staff in the ILTC sector in 2020. Figure 5 shows the distribution of the workers employed in nursing homes and home health agencies. Most employers at care facilities consist of support staff, with healthcare professionals comprising only about 28% of residential and center-based care employees and 41% of home-based care employees. Table 9 shows the training requirements for formal healthcare assistants, consisting of 160 training hours for the health attendant or healthcare assistant and 218 training hours for the senior healthcare assistant.

Table 10 shows an estimated monthly wage in the long-term care center, from nursing facilities to home healthcare services, including healthcare professionals and administrative and ancillary staff. For comparison, we present several earnings metrics in the broader economy at the bottom. For example, some staff nurses and allied health workers earned less than the median wage of degree holders aged 25 to 29 years. In contrast, some nursing aides, therapy aides, and healthcare

assistants earned less than the median wage of working adults who have only completed secondary school or post-secondary education aged 25 to 29 years.

Formal and Informal Home Care

Respondents of the Retirement and Health Study (RHS) were asked if they had received assistance with that particular ADL or IADL. Further questions included the relationship of the helpers, the number of hours each helper administer care to the recipient per week, and if the helper receives a cash allowance for the help administered. The relationship of caregivers to care recipients in Singapore mainly include paid migrant domestic workers, private nurses, or informal caregivers, who mainly consist of the respondent's spouse, children, or grandchildren.

Table 11 shows the proportion of older adults in Singapore receiving home care by age and the number of ADL or IADL limitations, where 19% of those 65+ received home help. The percentage of older adults who received care increased significantly with age and the number of ADLs limitations, with 62% of those 85+ receiving assistance. However, once we consider the disability level, the distribution across the number of limitations becomes more comparable by age: 94% of those 65+ with three or more ADL limitations received help. In comparison, 92% of those 85+ did.

Most long-term care in Singapore is provided by family, friends, and neighbors, where most caregivers are women, and most are between 45 and 59 years of age. Table 12 illustrates the weekly hours of care received, with a median of those aged 65+ at 20 hours, but the mean was 37 hours, and 10% of the population received care over 84 hours in the past month. The number of hours of care received was higher among the oldest old, where the median hours for those aged 85+ was 48, with an average of 57 hours. The top 10% of this age group received 112 or more hours of care.

Informal home care refers to care recipients receiving ADL or IADL assistance from family members or unpaid individuals. In contrast, formal home care refers to care recipients receiving ADL or IADL assistance from migrant domestic workers, private nurses, or others who are paid. Of the care recipients aged 65+, 65% received only informal home care, 17% received only formal home care, and 18% received both formal and informal care (Figure 6). Among the care recipients aged 85+, 47% received only informal home care, 21% received only formal home care, and 32% received both formal and informal care. The proportion of older adults using only informal care declined as the number of limitations increased (Figure 7). About 21% received only informal care among those with three or more ADL limitations. Formal care and the use of both formal and informal care rose with the number of ADL limitations. The results were consistent among the 85+.

Families in Singapore frequently hire foreign female migrant domestic workers to assist in caregiving. As of December 2020, there were 247,400 migrant domestic workers in Singapore (Ministry of Manpower Singapore, 2021a), or about one worker in every five households. In addition, approximately half of all families with disabled older members hire a migrant domestic worker to provide care. Furthermore, families can send their migrant domestic workers for short training courses on eldercare skills. Course fees are subsidized with a Caregivers' Training Grant.

It is difficult to parse out the amount of care that migrant domestic workers provide specifically to older adults since nearly all of them are full-time residents of the household in which they are employed. Their responsibilities relate to domestic chores, housekeeping, as well as caregiving. However, the TraCE study attempted to gather data on this and asked primary family caregivers about the number of hours of care that a migrant domestic worker provided older adults.

Table 13 illustrates the weekly hours of care for older adults receiving ADL care from informal caregivers and migrant domestic workers. Informal caregivers provided an average of 18.1 hours of ADL or IADL care per week. Not all 278 care recipients in the sample had a migrant domestic worker caring for them or had a migrant domestic worker even for non-caregiving purposes. Migrant domestic workers provided an average of 33.2 hours of ADL or IADL care per week to the 132 care recipients reported as receiving ADL or IADL care from a migrant domestic worker. We used a cap of 112 care hours per week, assuming at least 8 hours of rest per day for caregivers.

The annual cost of hiring a domestic helper in Singapore includes one-time costs such as maid agency costs and work permit costs, as well as monthly recurring costs such as salary, which ranges from $450 - $850, foreign worker levy, and daily living expenses (Koh). In addition, workers cared for older adults for an average of 14 hours daily (Association of Women for Action & Research and Humanitarian Organisation for Migration Economics, 2020).

Home care for older adults can be provided by formal (paid) caregivers, informal (unpaid) caregivers, or both. Most formal care providers are not-for-profit social service agencies (SSAs) that receive financial support from the government that offsets a portion of their operational expenses. In addition, Social Service Agencies typically raise additional funds through philanthropic donations to augment their budgets. The Agency for Integrated Care (AIC) (Agency for Integrated Care Singapore, 2021) manages all referrals to subsidized long-term care services. As Singapore is a small and densely populated city-state, access to services is typically supported by distance. Means-tested subsidies can reduce the out-of-pocket expenses for patients whose monthly per capita household income is S$2,800 and below. Households with higher monthly per capita household income typically face full, unsubsidized fees when using formal LTC (Ministry of Health Singapore, 2022a).

Singapore has long emphasized families as the primary source of support for older adults (Malhotra et al., 2018). As such, the government is exploring ways to support caregivers. For example, the recent Home Caregiving Grant (2019) provides care recipients from qualifying households in the community with at least permanent moderate disability a monthly cash grant of SGD$200 to defray caregiving costs. The grant will be increased to up to $400 in 2023. In addition, most caregivers are female, and 25% were never married.

About 75% of those helping someone aged 65+ were informal caregivers (120,000/160,000), but that fraction fell to 67% when focusing on care for those 85+ (20,000/30,000) (Table 14). In addition, more than half of these caregivers were 60 years and above, and 73% of the caregivers were female (Figure 8). Majority of the caregivers who provided ADL care (Figure 9a) and IADL care (Figure 9b) were female, whereas 66% of the caregivers were children of the care recipients (Figure 10) (Lim-Soh et al., 2023).

Cost of care

LTC is financed through out-of-pocket (OOP) payments, government subsidies, and disability payouts such as LTC insurance and grants. Individuals who pass the means-testing pay less OOP, as the government subsidies would cover a portion of the LTC expenses. The government centrally manages the means-testing and functional assessment processes that help determine eligibility for the various subsidy schemes. LTC insurance in Singapore has evolved from a voluntary financial instrument (ElderShield) to mandatory coverage (CareShield Life).

Singapore's morbidity patterns change from acute to chronic degenerative diseases and disabilities. Formal LTC service utilization in Singapore is lower than in western societies. Most families prefer to rely on migrant domestic workers to care for older family members. A migrant domestic worker can provide 24/7 care for an older adult and perform household chores. Recent research on Singaporeans' attitudes towards LTC shows that most concerns centered around financial accessibility, quality, and convenience (location of LTC services).

Data from 2017 shows that the government's operating expenditure for long-term care services was about $580 million (Table 15). About 60% of the expenditure was for residential long-term care. The remainder was for home and center-based care and other support schemes, such as active aging programs and the Seniors' Mobility and Enabling Fund. During this period, approximately 14,100 Singaporeans used nursing home services; 1,300 used inpatient hospice services; and 29,700 used home and center-based care services, where 90% were aged 60 and above. Private formal long-term care services are estimated to cost about $800 million (Table 15).

Before government subsidies, a nursing home care service could range from S$2,200 to S$4,200 monthly. Additional charges may include a one-time refundable deposit and administrative charges. Other expenses not covered by the essential cost may also be applied (Agency for Integrated Care Singapore, 2021). Government subsidies for residential LTC are available only to Singapore citizens and permanent residents and range between 10% and 75%, depending on income level. For individuals who can afford it, an unsubsidized private nursing home room costs S$4,000 to S$6,500 per month (Gusmano, 2017). The payout from LTC insurance starts at S$600 per month in 2020. As such, out-of-pocket payments are critical because Singapore's health and long-term care systems emphasize 'shared responsibility' and the need to minimize the moral hazard problem.'

In June 2019, dementia daycare centers in Singapore had a daily capacity of 3400 persons with dementia. As of August 2019, there were about 3100 (91.1%) active users (Ministry of Health Singapore, 2019). However, there could have been more users overall as non-subsided users were excluded. Pre-subsidy costs of dementia daycare centers range between S$1260 and S$1575 (Agency for Integrated Care Singapore, 2021).

To estimate the value of care provided by informal caregivers, we use two strategies. First, in a "potential wage" strategy, we value the time spent by informal caregivers using predicted wages, adjusting for the probability of working. The valuation is the predicted wages of informal caregivers * probability of working of informal caregivers * predicted hours of care for ADLs or IADLs received by older adults in Singapore from informal caregivers.

We used three sources of data for the analysis. The probability of working was first estimated using the Retirement and Health Survey, using a logistic regression model that regressed current work status on the age, sex, educational attainment (categorized as no formal education, primary only, secondary and above), and housing type (1-2 room government-built housing, 3-room government-built, 4-5 government-built and private housing) of respondents. Additionally, we ran an OLS regression model regressing the reported monthly wages of currently employed RHS respondents on the same set of characteristics. The coefficients of these models were used to estimate the predicted probability of work and the predicted wages for informal caregivers in the TraCE study (Table 16). The average product of the probability of work and predicted wages was equivalent to caregivers' average 'potential wage.' The monthly wages were converted to hourly rates by annualizing (x12) and then converted to weekly amounts (/52) and further into hourly wage rates (/44), assuming a 44-hour work-week. We also used the TraCE data to predict the hours of care older adults receive for ADLs and IADLs. In TraCE, primary informal caregivers were

asked to report on the number of hours of care for ADLs and IADLs that they or any other informal caregiver provided per week to the older adult, i.e., their care recipient. The relationship between informal caregivers that provided care to the older adult for ADLs and IADLs was primarily that of a child (60%), spouse (21%), or sibling (13%). We ran an OLS regression model regressing the total number of hours received by care recipients on care recipient characteristics: age, sex, living arrangement (categorized as whether living alone, with a spouse and a child, with a spouse and no child, with a child and no spouse, with others), educational attainment and housing type (categorized as described above), number of self-reported ADL and IADL limitations, and number of self-reported chronic physical ailments. To arrive at a valuation of informal care that is representative of Singapore, the coefficients of this model were used to estimate the predicted hours of care received by the nationally representative sample of older adults in THE SIGNS Study – (Table 16). We limited the prediction of hours of care to those older adults who reported that they found any ADLs or IADLs difficult and required human assistance. Our strategy was thus based on the assumption that if older adults required human assistance with ADLs or IADLs, it was provided by informal caregivers. We used sampling weights to arrive at a nationally representative estimate. The annual average cost of informal care per individual estimated through this 'potential wage' strategy was SGD 3683 (Table 17), leading to a national valuation of SGD 463 million.

In a "market-based" strategy, we value the time spent on caregiving as the potential wage valuation added to the predicted hours of care multiplied by the market wage of professionals who provide such care; that is, the hourly wage of the occupation listed in the Singapore Ministry of Manpower's data as "healthcare assistant and other personal care workers" multiplied by the probability of informal caregivers not working. We use S$9.30 as the hourly wage for this category of workers, based on the Ministry of Manpower's published median wage rates obtained originally as monthly gross values (i.e., inclusive of the mandatory contributory savings and pension plan for Singapore citizens and permanent residents). The annual average cost of informal care per individual per this 'market-based' strategy is SGD 6366, leading to a national valuation of SGD 800 million (Table 17).

We also estimated the value of the care provided to older persons for ADLs and IADLs by migrant domestic workers (MDWs). In the TraCE study, primary caregivers could also report if MDWs provided care to care recipients for ADLs and IADLs and, if so, how many hours of care they provided per week. Similar to the potential wage strategy, based on the OLS regression model of the number of MDW hours of care, we predicted the number of hours of care received from MDWs among the representative sample of older adults in THE SIGNS Study – I. We limited the estimation to older adults who reported requiring human assistance with ADLs or IADLs and had a cohabiting migrant domestic worker. The annual average cost of care provided by MDWs for ADLs and IADLs is SGD 3393, leading to a national valuation of SGD 156 million (Table 18).

The overall cost of care is cumulated in Table 19. In both valuation methods, most of the costs came from the private care sector, and the overall cost was approximately 0.5% of Singapore's total GDP.

Part IV: Conclusions

Increases in life expectancy and sustained low fertility rates have transformed many countries, including Singapore, into aging societies. While the number of older adults is increasing in Singapore, the 80+ (oldest-old) is the fastest-growing segment. These older individuals are more likely to need formal and informal care to help with ADLs and IADLs limitations. At the same time, the need for formal care is increasing as the population of informal caregivers has decreased

over time. This trend suggests that prices for formal care, such as wages, may increase to attract more care workers to this industry. The decrease in informal caregivers also suggests enhancing community-based health and social care services.

The government has recently introduced policies to improve availability and access to care in Singapore, including the rollout of mandatory long-term care insurance – CareShield Life; a means-tested monthly cash grant to defray the costs of caregiving expenses – Home Caregiving Grant, which will be further enhanced from 2023 onwards; and centers such as embedded Active Aging Centers and Active Aging Care Hubs that provide activities for older adults, including health and social care services. These measures are taken in the context of a healthcare system shifting its emphasis towards primary and community care. However, despite the various programs and policies, the cost of long-term care in Singapore is still not cheap, with a large portion of formal long-term care being financed by individuals (40% out of pocket) and government spending (42%) (Graham & Bilger, 2017), as shown in Figure 4. Moreover, subsidies for residential LTC services are only available to those with a monthly per capita household income of $2,800 and below (Ministry of Health Singapore, 2022a). While individuals bear much of this cost out-of-pocket, the actual cost remains underestimated as most older Singaporeans do not use formal care. Thus, in addition to formal long-term care services, families often rely on informal support such as migrant domestic workers, especially if they have few or no ADL and IADL limitations. However, some families still struggle with finding or providing appropriate care, whether formal or informal care. This difficulty will likely escalate in the coming years as family support structure changes and the population ages.

The government has recently drawn attention to preventative care to improve Singaporeans' health spans as they age. Healthier SG, a recent government initiative, is intended to significantly reform Singapore's healthcare system by increasing the focus on preventative care provided through a decentralized network of family physicians. Healthier SG was developed in response to Singapore's aging population and the increased prevalence of various chronic diseases (Ministry of Health Singapore, 2022b). The program includes providing free vaccination and screenings for chronic diseases such as high cholesterol and high blood pressure, increasing the number of programs that promote healthier lifestyles, and tasking general practitioners with drawing up preventative health and social care plans for individuals rather than focusing only on treatment and management of disease (Ministry of Health Singapore, 2022b).

In recent years, Singapore has taken a particularly proactive approach to develop community-based health and social care services in response to population aging. The government has also launched the three assisted living developments whereby older Singaporeans can purchase "senior-friendly flats" that are outfitted with non-slip flooring, grab bars, adjustable countertops, etc., and receive health and social care services in their homes. One of these developments, Kampung Admiralty, has an intergenerational element embedded in the design. Playgrounds, nurseries, and spaces for older persons are co-located to encourage intergenerational contact and communication. The emphasis here is testing the social and psychological value of intergenerational living on older adults' well-being. As these developments are in nascent stages, proper evaluations of the impact of these typologies of living arrangements on successful aging have yet to be completed. Singapore presents an excellent test bed for evaluating an Asian response from older adults and family perspectives to assisted living and multigenerational co-location of care and services.

Part V: Other Information

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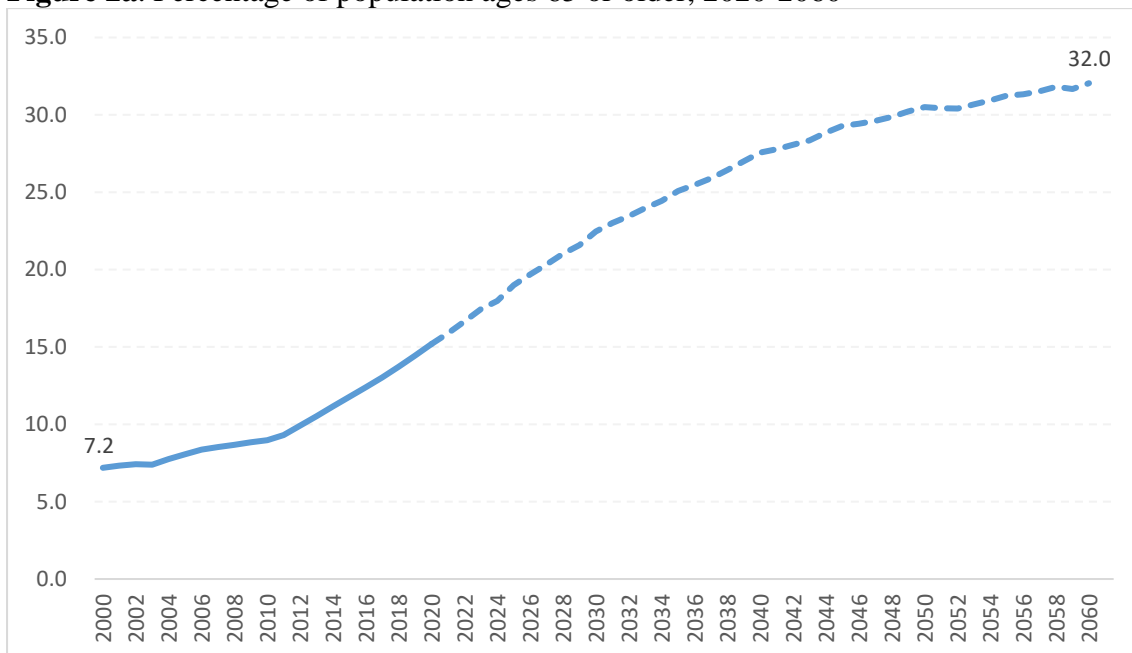
Introduction

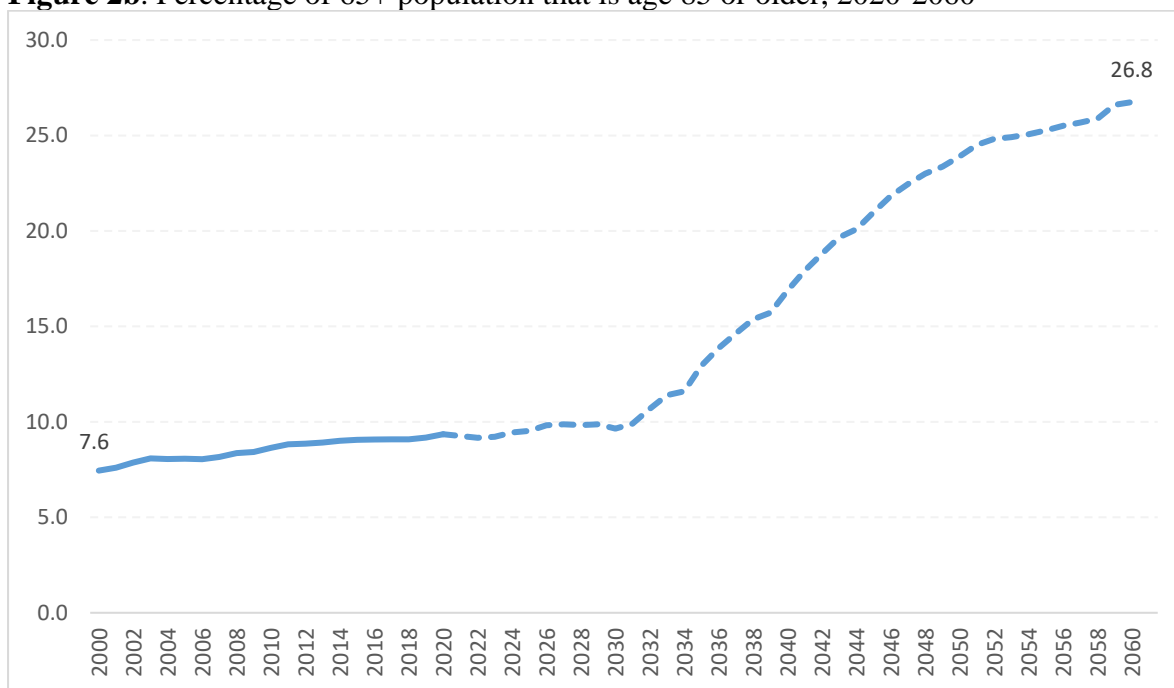**Figure 1**. Trends in Total Fertility Rate, 1960-2021
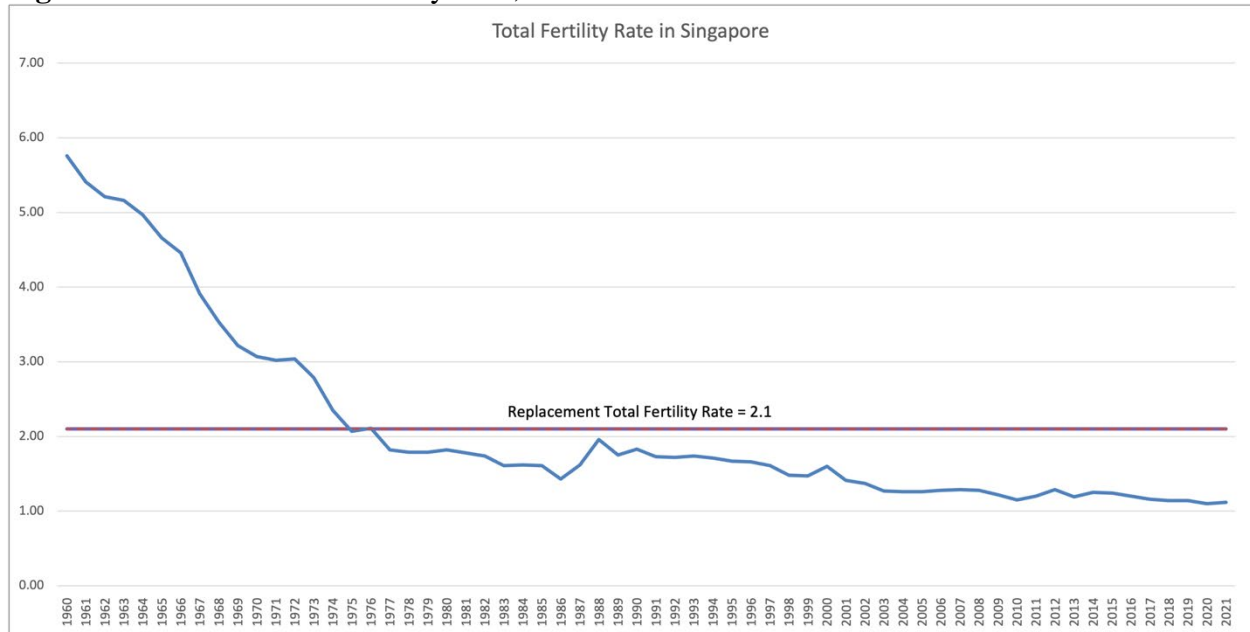
Source: Department of Statistics, Singapore

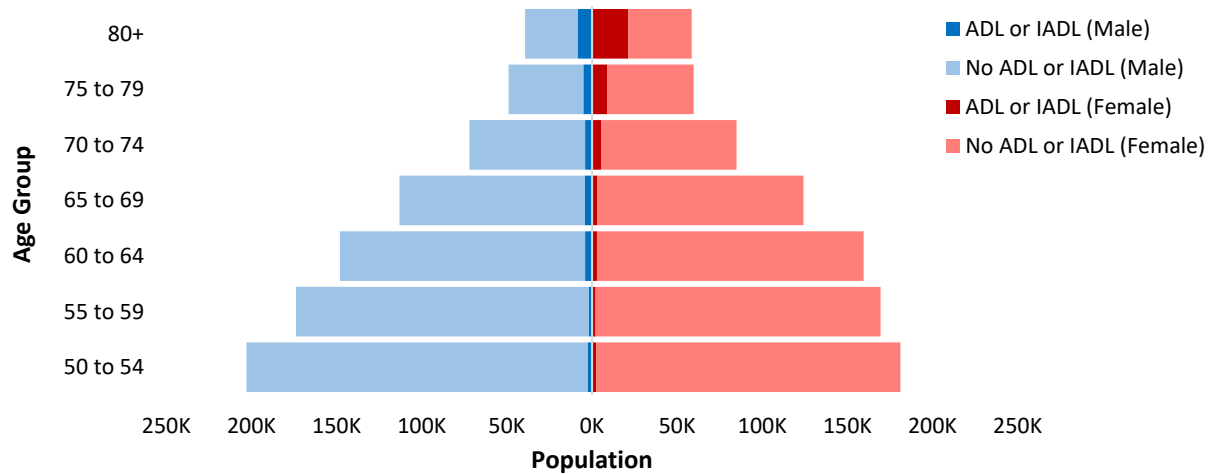**Figure 2a**. Percentage of population ages 65 or older, 2020-2060

Source: OECD Stat.

Figure 2b. Percentage of 65+ population that is age 85 or older, 2020-2060

Part I: Aging on Health and Financial Security

Figure 3. Population pyramid of Singapore with ADL or IADL limitations, 50+, 2018

Source: Singapore Retirement and Health Study (RHS, Wave 3 in 2018).
Note: The 6 ADLs assessed were taking a bath or shower, dressing up, eating, standing up from a bed or chair, sitting on a chair, walking (around the house), and using the sitting toilet. The 6 IADLs assessed were using the telephone, shopping, preparing food, traveling, managing medication, and managing finances. Respondent weights were used for all calculations.

Table 1. Share of older adults with 0-6 difficulties in ADL, 65+ and 85+, 2018

	65+	85+
0 ADLs & 0 IADLs	0.899	0.537
0 ADLs & 1+ IADLs	0.042	0.136
1 ADL	0.015	0.050
2 ADLs	0.007	0.050
3 ADLs	0.007	0.032
4 ADLs	0.006	0.036
5 ADLs	0.009	0.063
6 ADLs	0.015	0.096
1+ ADLs	0.059	0.327
1+ IADLs	0.086	0.424
Observations	*5,187*	*284*

Source: Singapore Retirement and Health Study (RHS, Wave 3 in 2018).
Note: The 6 ADLs assessed were taking a bath or shower, dressing up, eating, standing up from a bed or chair, sitting on a chair, walking (around the house), and using the sitting toilet. The 6 IADLs assessed were using the telephone, shopping, preparing food, traveling, managing medication, and managing finances. Respondent weights were used for all calculations.

Table 2. Distribution of Limitations with Specific ADLs/IADLs, 2018

	65+ All	65+ Conditional	85+ All	85+ Conditional
Panel 1- IADLs:				
IADL – Using the telephone	0.032	0.371	0.209	0.493
IADL – Manage Finances	0.059	0.684	0.350	0.825
IADL – Managing Medication	0.039	0.455	0.268	0.631
IADL – Shopping	0.030	0.345	0.166	0.390
IADL – Preparing food	0.030	0.343	0.161	0.379
IADL – Travelling	0.007	0.080	0.039	0.093
Observations	*5187*	*521*	*284*	*114*
Panel 2- ADLs:				
ADL – Using the sitting Toilet	0.032	0.539	0.21	0.642
ADL – Dressing Up	0.039	0.669	0.241	0.737
ADL – Taking a bath or shower	0.042	0.707	0.273	0.834
ADL – Walking (around the house)	0.042	0.713	0.223	0.683
ADL – Eating	0.022	0.374	0.156	0.477
ADL – Standing up from a bed or chair; sitting down on a chair	0.030	0.514	0.177	0.541
Observations	*5187*	*347*	*284*	*86*

Source: Singapore Retirement and Health Study (RHS, Wave 3 in 2018).
Note: Column 1 shows the share of the sample that reported having difficulty with each activity, while Column 2 shows the percentage of people with at least 1 IADL (panel 1) or at least 1 ADL (panel 2) who report having difficulty with each activity. Individuals that reported not doing these activities were also included as having difficulty with them. Respondent weights were used for all calculations.

Table 3. Well-Being for those 65+ and 85+ by ADL and IADL Limitations, 2018.

	65+	65+ with 3+ Limitations	85+	85+ with 3+ Limitations
Self-Report of Health – Good or Better	0.55	0.17	0.34	0.12
MMSE Score >= 24 (Normal cognition)	0.78	0.20	0.33	0.08
Self-Report Depression	0.03	0.08	0.06	0.08
Observations	*5,187*	*332*	*284*	*91*

Sources: Singapore Retirement and Health Study (RHS, Wave 3 in 2018)
Notes: The 6 ADLs assessed were taking a bath or shower, dressing up, eating, standing up from a bed or chair, sitting on a chair, walking (around the house), and using the sitting toilet. The 6 IADLs assessed were using the telephone, shopping, preparing food, traveling, managing medication, and managing finances. The limitations Index runs from 0-12 and was the number of both ADLs and IADLs that are either difficult or not done. Mini-Mental State Examination (MMSE) was a 30-point questionnaire used to measure cognitive impairment; a score of 24 or more indicated normal cognition, and scores below indicated cognitive impairment. Respondent weights were used for all calculations.

Table 4a. Distribution of monthly household income for those aged 18-64 and 65+

Percentile of Income	Income Percentiles, 18-64	Income Percentiles, 65+
5% Percentile	600	90
10% Percentile	1,100	200
25% Percentile	2,200	500
50% Percentile	4,000	900
75% Percentile	6,800	1,800
90% Percentile	10,100	4,000
95% Percentile	11,400	7,700
Mean	5,400	2,100

Source: Household Expenditure Survey 2017/2018, Department of Statistics Singapore.
Note: Household income from all sources in the HES refers to recurrent and regular income from work, and non-work sources, which include investment, rental, other sources such as pension and contributions from children, relatives, and friends, as well as regular government transfers received by individual members and transfers given at the household level.
Income data included employer CPF contributions.
Income values were normalized using the OECD equivalence scale, derived from the mean household size of 3.24 in 2018; thus, it was set at 2.4. Values were adjusted to 2019 dollars.
Exchange rate: USD 1 = SGD 1.39.

Table 4b. Distribution of wealth for elderly groups relative to the working-age population, 2018

Percentile of Wealth	Wealth Percentiles, 45-64	Wealth Percentiles, 65+	Wealth Percentiles, 85+
5% Percentile	63,600	11,700	4,000
10% Percentile	131,900	30,500	9,100
25% Percentile	229,100	152,500	23,900
50% Percentile	381,700	281,100	181,200
75% Percentile	702,800	514,000	335,500
90% Percentile	1,392,400	1,265,500	838,300
95% Percentile	2,283,500	2,311,800	2,536,500
Observations	*6,493*	*5,187*	*284*
Mean	686,500	583,400	474,000

Source: Authors' calculation based on Singapore Retirement and Health Study (RHS, Wave 3 in 2018).
Note: The variable used to measure wealth is the addition of the Respondent's net worth from property assets (Total apportioned housing asset + Value of commercial properties – Total apportioned housing loan – Commercial property loans) and the net worth from non-property assets in SGD (Total savings balance +Value of life insurance + Balance of Supplementary Retirement Scheme account + CPF net balances + Unused CPF LIFE premiums + Value of financial investments + Value of equity in business + Value of other assets – Credit card debts – Other liabilities). Respondent weights were used for all calculations. Values were adjusted to 2019 values.
Exchange rate: USD 1 = SGD 1.39.

Table 5. Income Distribution by Limitations for 65+ population, 2018

	0 ADLs & 0 IADLs	0 ADLs & 1+ IADLs	1 ADL	2 ADLs	3+ ADLs	Total
Panel 1: Income						
Share <50% of Median HH Income	0.328	0.382	0.413	0.481	0.435	0.336
Share 50-100% of Median HH Income	0.159	0.235	0.244	0.161	0.156	0.164
Share 100-150% of Median HH Income	0.158	0.152	0.116	0.180	0.167	0.158
Share 150-200% of Median HH Income	0.107	0.126	0.067	0.045	0.108	0.107
Share 200%+ of Median HH Income	0.248	0.106	0.161	0.134	0.134	0.236
Total	0.899	0.042	0.015	0.007	0.037	
Number of Observations	*4,579*	*261*	*88*	*37*	*222*	*5,187*
Panel 2: Wealth						
Share <50% of Median Wealth	0.210	0.483	0.391	0.289	0.336	0.230
Share 50-100% of Median Wealth	0.266	0.268	0.289	0.427	0.338	0.270
Share 100-150% of Median Wealth	0.188	0.147	0.141	0.164	0.110	0.182
Share 150-200% of Median Wealth	0.098	0.042	0.079	0.000	0.079	0.094
Share 200%+ of Median Wealth	0.238	0.061	0.100	0.120	0.137	0.224
Total	0.899	0.042	0.015	0.007	0.037	
Number of Observations	*4,579*	*261*	*88*	*37*	*222*	*5,187*

Source: Author's calculations was based on Singapore Retirement and Health Study (RHS, Wave 3 in 2018).
Notes: The 6 ADLs assessed were taking a bath or shower, dressing up, eating, standing up from a bed or chair, sitting on a chair, walking (around the house), and using the sitting toilet. The 6 IADLs assessed were using the telephone, shopping, preparing food, traveling, managing medication, and managing finances. Median household income was the sum of Respondent's and household members' gross monthly salaries (excluding bonuses and employer CPF contributions from all relevant current main jobs. It was calculated in the RHS Wave 3 and normalized using the OECD equivalence scale. It as set at approximately SGD 1,070. We did not have information on the wealth of other household members; therefore, household wealth cannot be tabulated, as such personal wealth used for this section, with the definition similar to that of Table 3a. Thus, median wealth was set at approximately SGD 280,000.
Respondent weights were used for all calculations, and values were adjusted to 2019 dollars.
(Exchange rate: USD 1 = SGD 1.39).

Part II: Policy approaches for Successful Aging in Singapore

Figure 4. Percentage of LTC Financing by Source, 2017
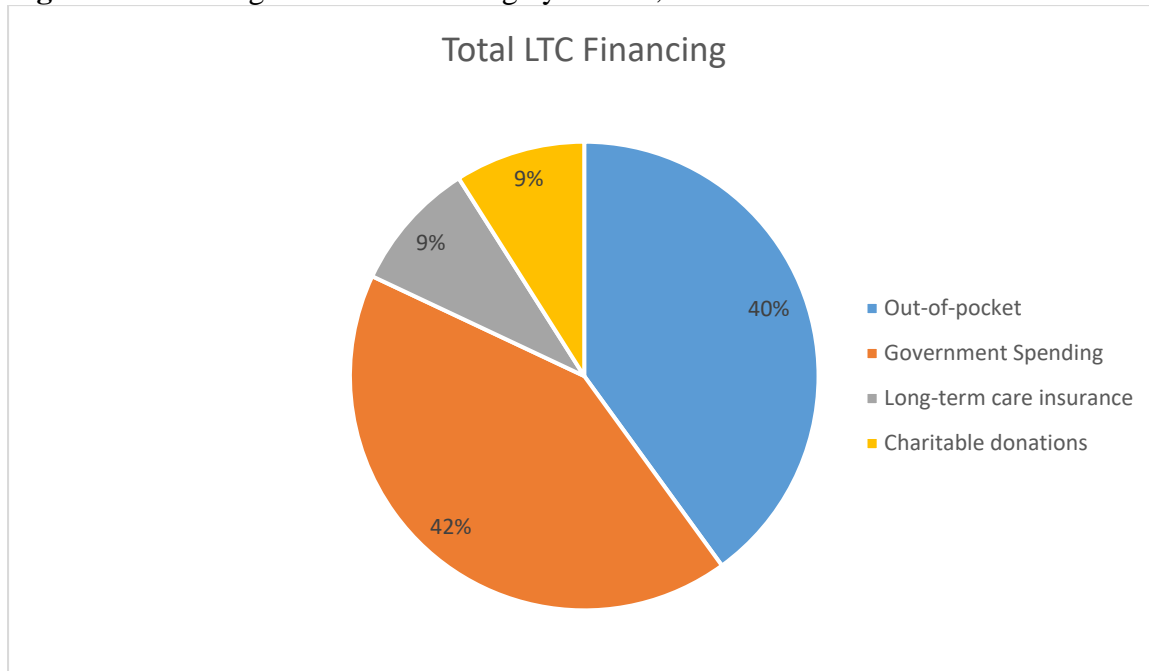
Source: Graham WCK, Bilger M. Financing Long-Term Services and Supports: Ideas From Singapore. Milbank Q. 2017 Jun;95(2):358-407. doi: 10.1111/1468-0009.12264. Erratum in: Milbank Q. 2017 Sep;95(3):682. PMID: 28589606; PMCID: PMC5461396.

Table 6. Population with LTC Insurance, 2018

	65 Plus	85 Plus
Population with LTC Insurance	353,000	31,000
Share of Population with Insurance	(0.645)	(0.632)
Observations	*3,401*	*184*

Source: Singapore Retirement and Health Study (RHS, Wave 3 in 2018).
Note: LTC Insurance coverage refers to older adults being covered by Eldershield, which is a public long-term insurance scheme targeted at severe disability.
Respondent weights were used for all population estimate calculations. Population size was taken from the Department of Statistics, Singapore.

Table 7. Characteristics by LTC Insurance, 2018

	65+ Insured	65+ Uninsured	85+ Insured	85+ Uninsured
Total Wealth - Mean	607,700	533,300	489,800	446,800
Total Wealth - Median	287,300	262,700	192,500	156,300
Total Household Income - Mean	4,200	3,800	3,300	4,400
Total Household Income - Median	2,500	2,100	1,400	1,200
Received Care	0.18	0.21	0.64	0.58
Live with Spouse or Partner	0.63	0.64	0.33	0.42
Formal Help with ADL/IADLs	0.06	0.07	0.33	0.34
Informal Help with ADL/IADLs	0.15	0.18	0.48	0.49
Observations	*3,401*	*1,786*	*184*	*100*

Source: Author's calculation based on Singapore Retirement and Health Study (RHS, Wave 3 in 2018).
Note: LTC Insurance coverage refers to older adults being covered by Eldershield, which is a public long-term insurance scheme targeted at severe disability. The variable used to measure wealth was the addition of the Respondent's net worth from property assets and the net worth from non-property assets in SGD, as elaborated in the notes in Table 3a. Household income was the sum of Respondent's and household members' gross monthly salaries (excluding bonuses and employer CPF contributions from all relevant current main jobs, which was similar to Table 5's definition of household income; however, for this table, the household income was not equivalized. Respondent weights were used for all calculations, and Values were adjusted to 2019 dollars.
Exchange rate: USD 1 = SGD 1.39.

Part III: Formal and Informal Care in Singapore

Table 8. Places in long-term care facilities, 2020

	2020
Nursing homes	77
Nursing homes beds	16,221
Nursing homes occupancy rate	90%
Population aged 65 and above	614,368
Population aged 85 and above	57,461
Nursing home beds per population aged 65 and above	0.026
Nursing home beds per population aged 85 and above	0.282
Places for Center-Based Services	8,100
Places for Home-Based Services	10,000
Places for Home-Based Palliative Care	3,100
Community Hospital Beds	2,069
Staff in ILTC Sector	16,550

Notes: Data for the number of nursing homes were from https://data.gov.sg/dataset/number-of-residential-long-term-care-facilities. Data for nursing home beds were from https://www.moh.gov.sg/resources-statistics/singapore-health-facts/beds-in-inpatient-facilities-and-places-in-non-residential-long-term-care-facilities. Data for nursing homes' occupancy rate were from https://www.straitstimes.com/singapore/politics/eight-nursing-homes-set-up-in-past-5-years-but-institutionalising-elderly-should. Data for other long-term care facilities were from https://www.moh.gov.sg/resources-statistics/singapore-health-facts/beds-in-inpatient-facilities-and-places-in-non-residential-long-term-care-facilities. Data for number of staff in ILTC sector were taken from https://www.moh.gov.sg/news-highlights/details/the-number-of-staff-in-the-intermediate-and-long-term-care-sector/. Staff in the ILTC sector includes 6,490 registered professionals - doctors, nurses,

dentists, physiotherapists, occupational therapists, speech-language therapists, diagnostic radiographers, radiation therapists, pharmacists and 10,060 support care staff, administrative, ancillary staff. ILTC Sector includes MOH-subvented community hospitals, nursing homes, centre-based services, hospices, home care services, dialysis services, and others (e.g. psychiatric rehabilitation homes and diabetic education & care services)

Figure 5. Percent distribution of employees at care facilities by job group, 2018.
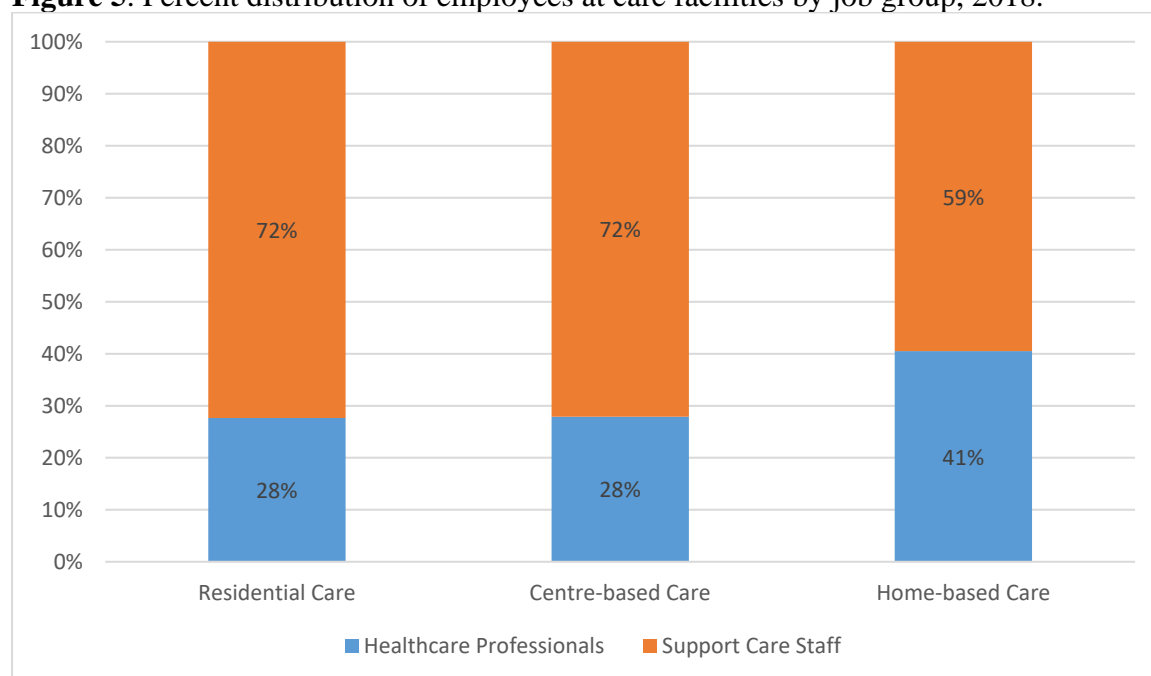
Source: Ministry of Health, Singapore
Note: Healthcare professionals refer to doctors, dentists, registered nurses, enrolled nurses, pharmacists, and Allied Health Professionals (AHPs), e.g., physiotherapists. Support care staff includes healthcare assistants, nursing, and therapy aides.
Residential Care refers to nursing homes and inpatient hospices. Center-based Care refers to senior care centers and day hospices. Home-based Care refers to personal home care, home medical, home nursing, home palliative, and home therapy services.
Manpower figures were based on Full-Time Equivalents (FTEs)

Table 9. Minimum Training Requirements for Formal Healthcare Assistants, 2022

Occupation Title	Course Level	Training Hours
Health Attendant	Level 1 (Certificate)	160
Healthcare Assistant	Level 2 (Higher Certificate)	160
Senior Healthcare Assistant	Level 3 (Advanced Certificate)	218

Notes: These were the Singapore Workforce Skills Qualifications (WSQ) programs in 2022 for direct nursing care conducted by SkillsFutureSG.

Table 10. Pay for full-time care workers at nursing facilities and in-home health care, 2022

Industry	Occupation Title	Estimated Monthly Wage (SGD)
Nursing Homes	Staff Nurse	2500-4400
	Enrolled Nurse	1700-3200
	Nursing Aide/Therapy Aide	1600-2300
	Nursing Manager	4600-6300
	Locum In-House Doctor	3700-7400
	Physiotherapist/Occupational Therapist	2800-4600
	Housekeeper	1500-1800
	Medical Social Worker	2300-2800
Home Care Services	Staff Nurse	2800-4200
	Enrolled Nurse	2300-3200
	Healthcare Assistant	1500-2200
All Industries	All Workers (Median)	3400
	Below Secondary (Median)	2100
	Secondary (Median)	2300
	Post Secondary (Non-Tertiary) (Median)	2400
	Diploma and Professional Qualification (Median)	2800
	Degree (Median)	4000

Notes: Data for the estimated monthly wages were taken from job openings in My Careers Future Singapore from various nursing homes and home care service providers listed on the Agency of Integrated Care careers page in June 2022. Data for the median wage was the Median Gross Monthly Income from Work (Excluding Employer CPF) of Full-Time Employed Residents Aged 25 to 29 by Highest Qualification Attained taken from the Labour Force in Singapore 2021. Values were adjusted to 2019 dollars.

Table 11. Any Home Care by Age and ADL, 2018

	65 +	85 +
Full Sample	0.191	0.618
0 ADLs, 1+ IADLs	0.724	0.759
1 ADL	0.745	0.917
2 ADLs	0.982	1.000
3+ ADLs	0.935	0.915
Observations	*5,187*	*284*

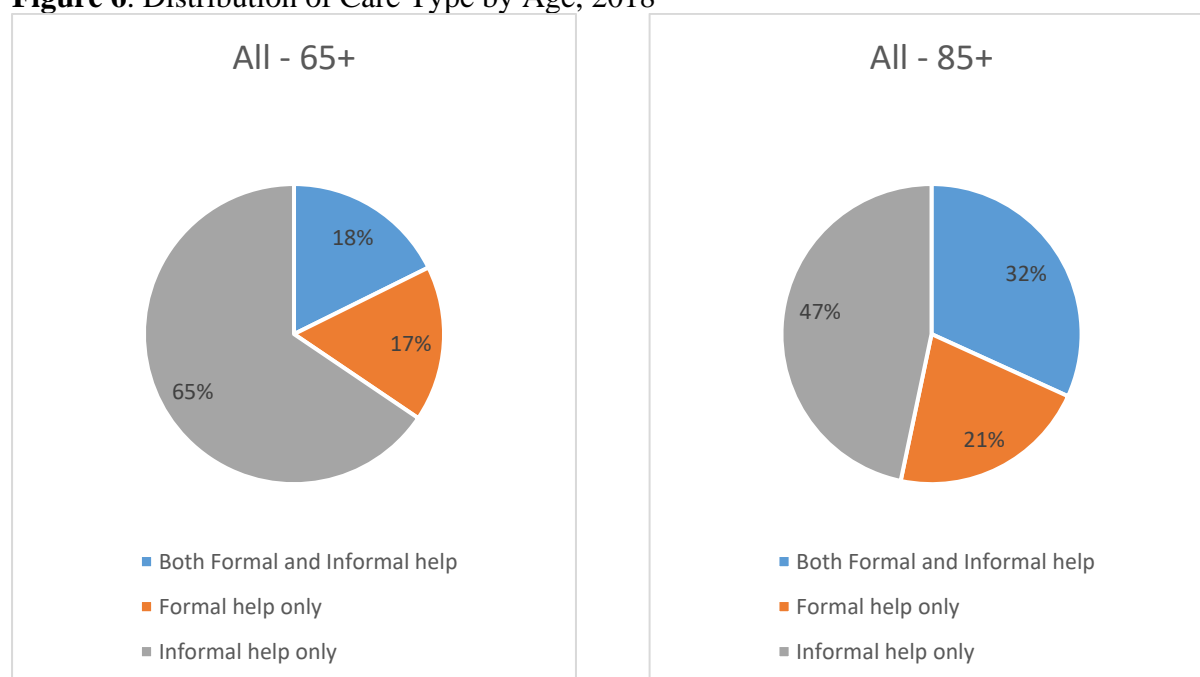*Source: Singapore Retirement and Health Study (RHS, Wave 3 in 2018).*
Note: The 6 ADLs assessed were taking a bath or shower, dressing up, eating, standing up from a bed or chair, sitting on a chair, walking (around the house), and using the sitting toilet. The 6 IADLs assessed were using the telephone, shopping, preparing food, traveling, managing medication, and managing finances. "Care received" refers to respondents who received home help with ADL or IADL difficulties. Respondent weights were used for all calculations.

Table 12. Distribution of weekly hours of home care received in a month by type, 2018

Percentiles	65+	85+
5th Percentile	1	2
10th Percentile	2	3
25th Percentile	5	15
50th Percentile	20	48
75th Percentile	56	84
90th Percentile	84	112
95th Percentile	112	168
Mean	37	57
7 Hours per week or Less	0.33	0.19
40 Hours per week or More	0.35	0.55
Observations	*962*	*146*

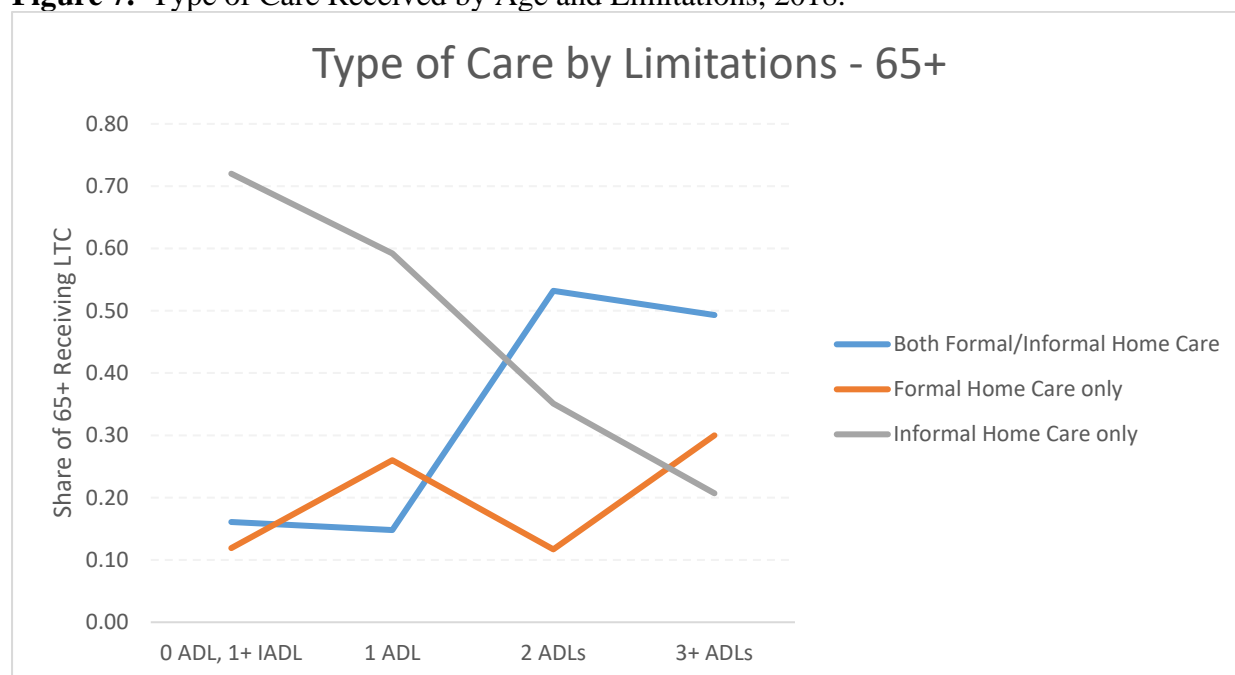*Source: Singapore Retirement and Health Study (RHS, Wave 3 in 2018).*
Home care consisted of formal help, informal help, and help from others. Respondent weights were used for all calculations.

Figure 6. Distribution of Care Type by Age, 2018

Source: Singapore Retirement and Health Study (RHS, Wave 3 in 2018).
Note: Informal help refers to receiving home help from family members or others who were unpaid.
Formal help refers to receiving help from migrant domestic workers, private nurses, or others who were paid. Respondent weights were used for all calculations.

Figure 7. Type of Care Received by Age and Limitations, 2018.

Source: Singapore Retirement and Health Study (RHS, Wave 3 in 2018).
Note: The 6 ADLs assessed were taking a bath or shower, dressing up, eating, standing up from a bed or chair, sitting on a chair, walking (around the house), and using the sitting toilet. The 6 IADLs assessed were using the telephone, shopping, preparing food, traveling, managing medication, and managing finances. Informal help refers to receiving home help from family members or others who were unpaid. Formal help refers to receiving home help from migrant domestic workers, private nurses, or others who were paid. Respondent weights were used for all calculations.

Table 13. Distribution of Hours of ADL or IADL Care Received by Older Adults, by Type of Caregiver, 2019

	Weekly hours of ADL or IADL Care received by Care Recipients 75+	
	From informal caregivers	From migrant domestic workers
Average (SD)	18.1 (22.6)	33.2 (27.5)
Observations	*278*	*132*

*Source: The TraCE study conducted in 2019.*
Notes: The maximum possible number of weekly hours of Care received from each caregiver was capped at 112 hours, assuming at least 8 hours of rest per day per caregiver.

**Table 14**. Informal Care Provision – Population Estimates, 2018

	Recipient of Help 65+	Recipient of Help 85+
All Helpers – ADLs & IADLs	160,000	30,000
Relative to the 65+/85+ Population	0.293	0.634
Relative to the 20 to 64 Population	0.062	0.012
Formal Helpers – ADLs & IADLs	40,000	10,000
Relative to the 65+/85+ Population	0.074	0.296
Relative to the 20 to 64 Population	0.016	0.006
Informal Helpers – ADLs & IADLs	120,000	20,000
Relative to the 65+/85+ Population	0.219	0.338
Relative to the 20 to 64 Population	0.046	0.006
Observations	*5,187*	*284*

Source: Singapore Retirement and Health Study (RHS, Wave 3 in 2018). Respondent weights were used for all population estimate calculations. Population size was taken from the Department of Statistics, Singapore.

Figure 8. Demographic composition of primary informal caregivers, 2019
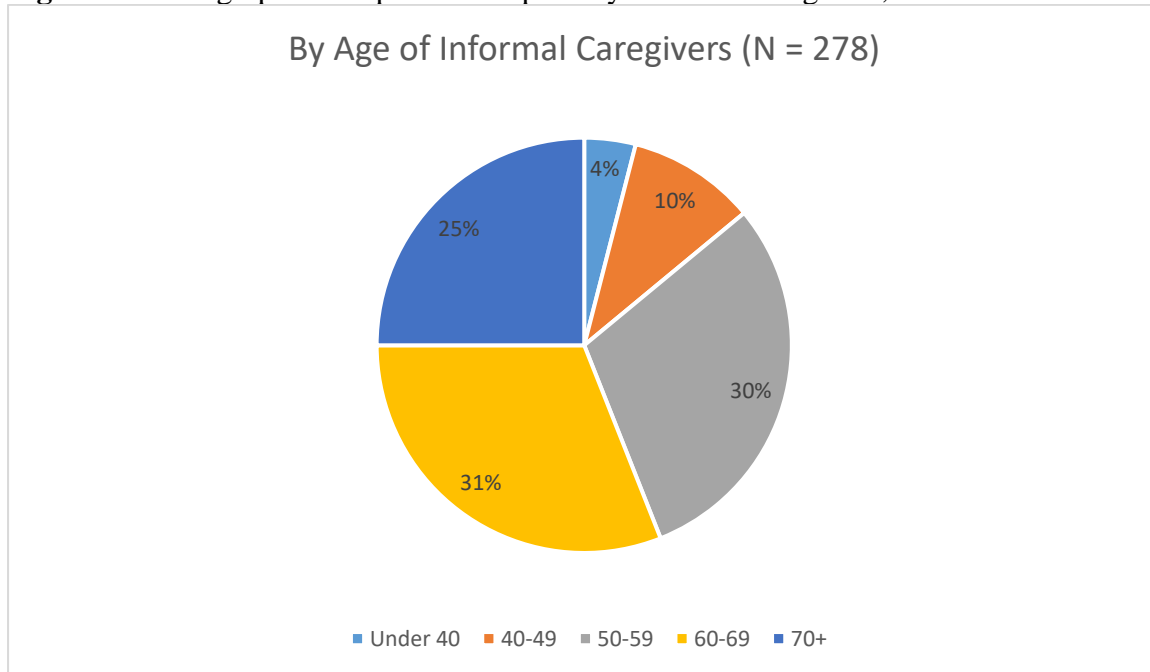
By Age of Informal Caregivers (N = 278)

4%
10%
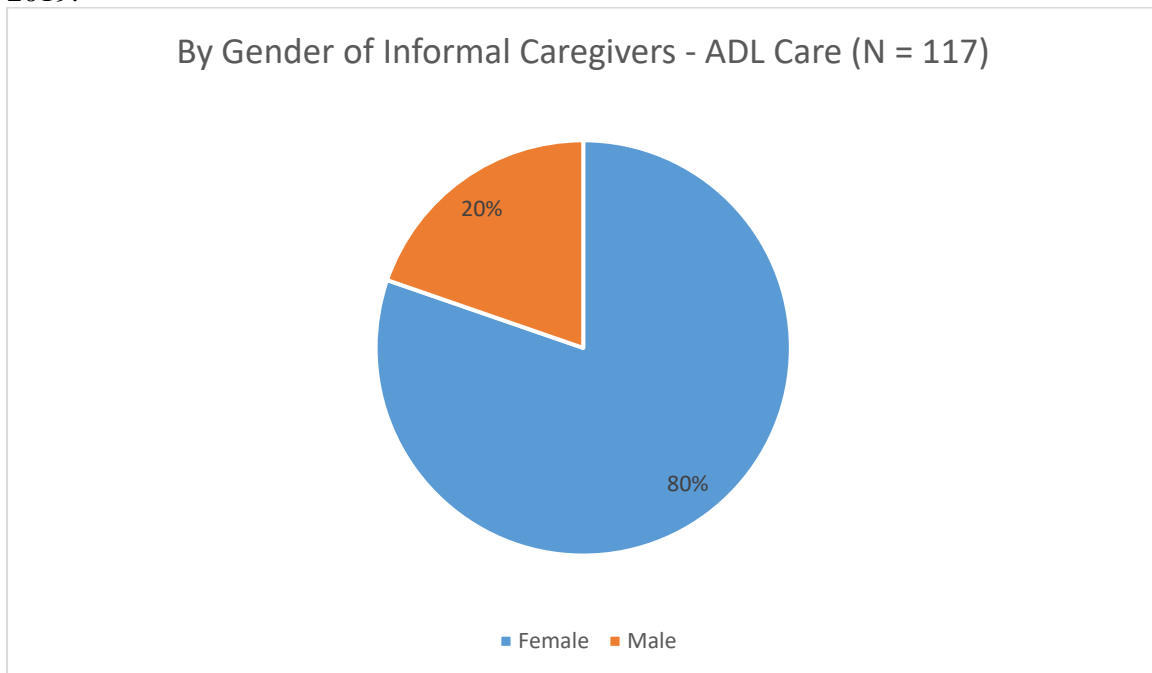25%
30%
31%

■ Under 40 ■ 40-49 ■ 50-59 ■ 60-69 ■ 70+

Source: Lim-Soh J, Azman NDB, Quach H-L, Goh VSM, Malhotra R. 2023. A Profile of Family Caregivers of Older Adults in Singapore. Research Brief Series No. 16. Singapore: Centre for Ageing Research and Education.

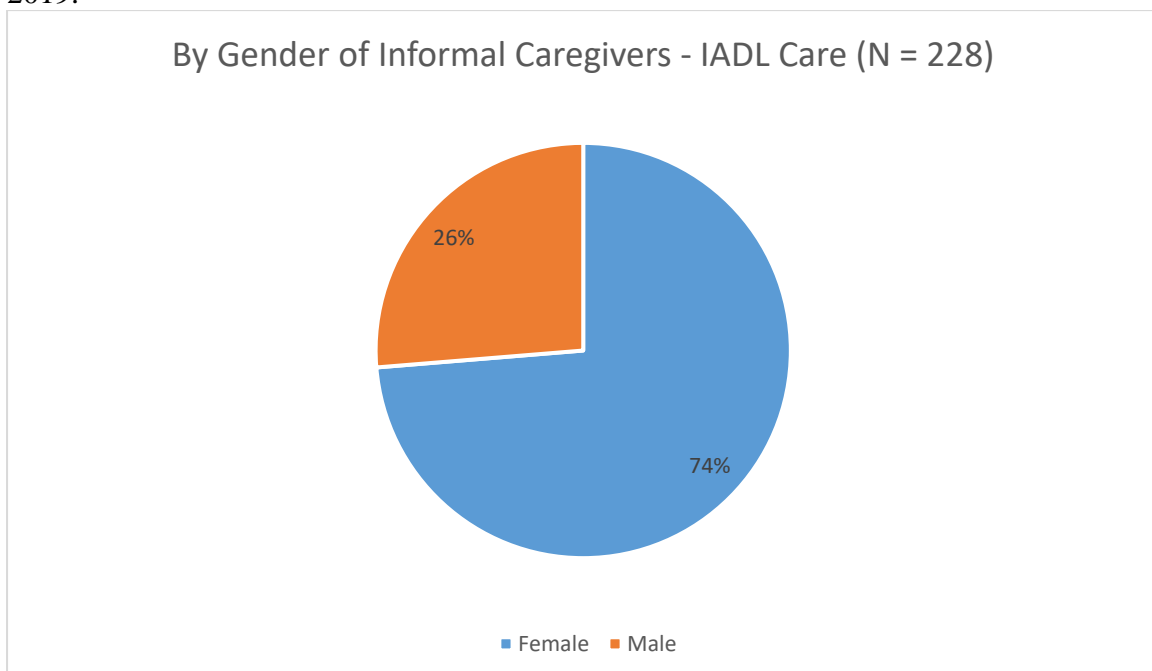By Gender of Informal Caregivers (N = 278)

27%
73%

■ Female ■ Male
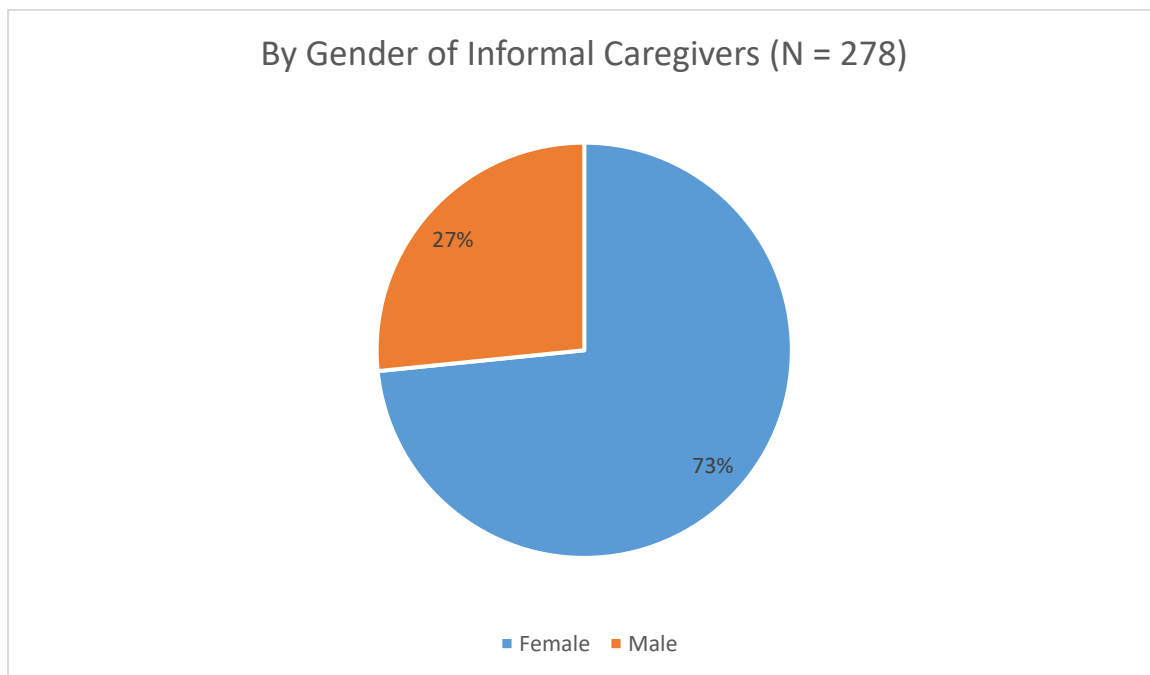
Source: Lim-Soh J, Azman NDB, Quach H-L, Goh VSM, Malhotra R. 2023. A Profile of Family Caregivers of Older Adults in Singapore. Research Brief Series No. 16. Singapore: Centre for Ageing Research and Education.

Figure 9a. Primary informal caregivers providing ADL Care to the care recipients by gender, 2019.

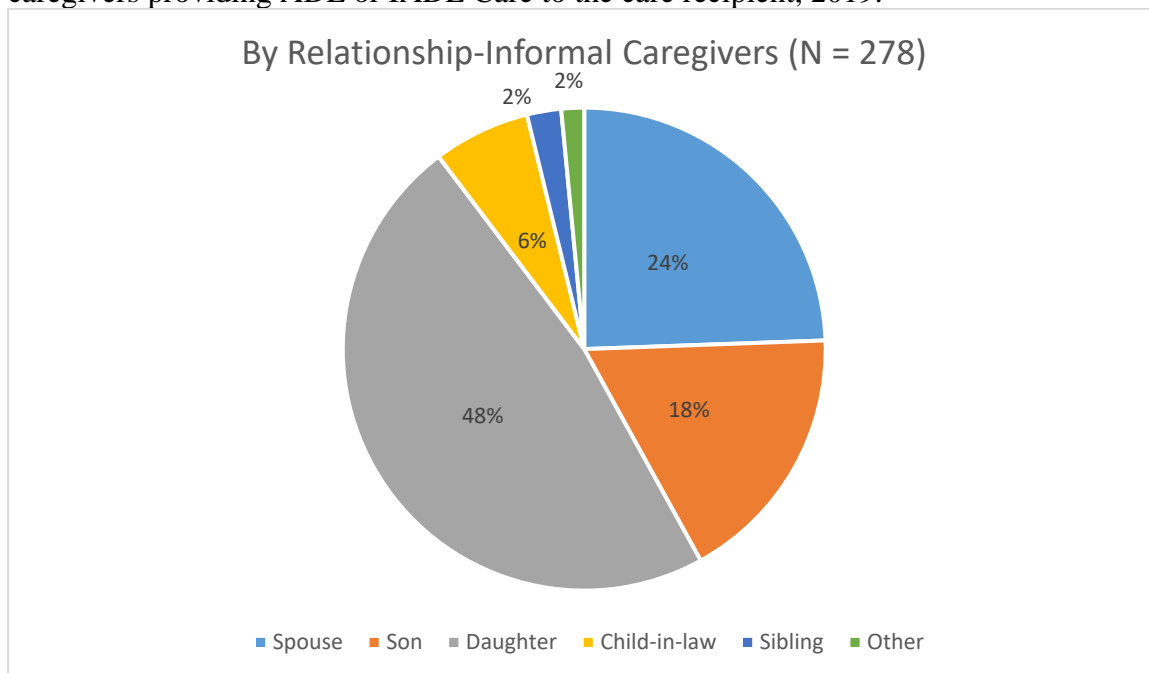By Gender of Informal Caregivers - ADL Care (N = 117)

20%

80%

■ Female ■ Male

Source: Lim-Soh J, Azman NDB, Quach H-L, Goh VSM, Malhotra R. 2023. A Profile of Family Caregivers of Older Adults in Singapore. Research Brief Series No. 16. Singapore: Centre for Ageing Research and Education.

Figure 9b. Primary informal caregivers providing IADL Care to the care recipients by gender, 2019.

By Gender of Informal Caregivers - IADL Care (N = 228)

26%

74%

■ Female ■ Male

Source: Lim-Soh J, Azman NDB, Quach H-L, Goh VSM, Malhotra R. 2023. A Profile of Family Caregivers of Older Adults in Singapore. Research Brief Series No. 16. Singapore: Centre for Ageing Research and Education.

Figure 10. Primary informal caregiver's relationship with the care recipient, for primary caregivers providing ADL or IADL Care to the care recipient, 2019.

By Relationship-Informal Caregivers (N = 278)

Legend: Spouse, Son, Daughter, Child-in-law, Sibling, Other

Values shown: 24%, 18%, 48%, 6%, 2%, 2%

Source: Lim-Soh J, Azman NDB, Quach H-L, Goh VSM, Malhotra R. 2023. A Profile of Family Caregivers of Older Adults in Singapore. Research Brief Series No. 16. Singapore: Centre for Ageing Research and Education.

Table 15. Formal care costs, annual, 2017

Types	Number of users	Total spending (millions $)
Residential long-term Care		
Public	15,400	348
Private		481
Home and center-based services		
Public	29,700	232
Private		320

Sources: Public formal care costs were taken from Ministry of Health, Singapore. Private formal care costs were the author's calculations based on Graham WCK, Bilger M. Financing Long-Term Services and Supports: Ideas From Singapore. Milbank Q. 2017 Jun;95(2):358-407. doi: 10.1111/1468-0009.12264. Erratum in: Milbank Q. 2017 Sep;95(3):682. PMID: 28589606; PMCID: PMC5461396.

Table 16. Probability of Work and Care Received, 2018.

1.E(Work) in TRaCE	0.51
2. E(Work)*E(Monthly Wage from Work) in TRaCE	1126
3. E(Hours of informal care received per week) in SIGNS	10.82
4. Total Hours Informal Help (millions) in SIGNS	70.8

Source: Author's calculations based on Singapore Retirement and Health Study (RHS, Wave 3 in 2018), The TraCE study (2019) and THE SIGNS Study - I (2016-2017).
Note: Proportion of people who work in RHS was 58.7%. Once the wage prediction model from RHS was applied to TRACE (which is a slightly younger population), the predicted wage was on average SGD 1800 per month. However, as TRACE was a much older population, the unconditional wages were SGD 1126 per month on average. Monetary values were adjusted to 2019 dollars.

Table 17. Annual costs of informal care receipt for all older adults needing human assistance with 1+ ADL or IADLs in Singapore, 2016-2020

	Population	Potential wage strategy (I)		Market-based strategy (II)	
		Average cost of care per individual	Total cost of care	Average cost of care per individual	Total cost of care
Number of older adults aged 60+ needing human assistance with 1+ ADL or IADL	125801	3683	463M	6366	800M

Note: The number of older adults needing human assistance with 1+ ADL or IADL was derived from the percentage of older adults aged 60+ in THE SIGNS Study - I (2016-2017) who reported difficulty with 1+ ADL or IADL and that they needed human assistance with any of them. These proportions were assumed to be constant until 2021 and applied to the resident population aged 60+ in 2021 (Singapore Residents By Single Year Of Age And Sex, At End June, Annual, published by Singapore Department of Statistics, 2021). The valuations assumed that human assistance was provided by informal caregivers. The vast majority of informal caregivers reported (94%) were spouses, children (including a child-in-law), and siblings.

Table 18. Annual costs of receipt of care from migrant domestic workers among older adults needing human assistance with 1+ ADL or IADLs and who have a cohabiting migrant domestic worker in Singapore, 2016-2020

	Population	Average cost of care per individual	Total cost of care
Number of older adults aged 60+ needing human assistance with 1+ ADL or IADL	46081	3393.0	156.3M

Note: Nationally-representative estimates from THE SIGNS Study - I (2016-2017) indicated that approximately 36.63% of older adults who need human assistance with 1+ ADL or IADL had a cohabiting migrant domestic worker. This proportion was applied to the estimated resident population aged 60+ in 2021 (Singapore Residents By Single Year Of Age And Sex, At End June, Annual, published by Singapore Department of Statistics, 2021) with 1+ ADL or IADL limitations in the panel above.

Table 19. Total Costs by Type of Care and Source in Singapore, 2016-2020

Care Type	Source	Cost I (in millions)	% of GDP	Cost II (in millions)	% of GDP
Residential long-term Care	Public	348	0.07	348	0.07
Residential long-term Care	Private	481	0.10	481	0.10
Residential long-term Care	All	829	0.17	829	0.17
Home and center-based services	Public	232	0.05	232	0.05
Home and center-based services	Private	320	0.07	320	0.07
Home and center-based services	All	552	0.12	552	0.12
Informal Care	Private	463	0.10	800	0.17
Informal Care from MDW	Private	156	0.03	156	0.03
Total	Public	580	0.12	580	0.12
Total	Private	1412	0.30	1757	0.37
Total	All	2000	0.42	2337	0.49

Note: GDP 2017 was used as a comparison, as Tables 15,17 and 18 consisted of 2017 data. Source of GDP was from Department of Statistics, Singapore. Costs were recorded in SGD Millions.