

**Special Report On COVID-19
Vaccination Trends Among
Older Adults in Singapore**

***ROSA Research Brief Series
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Abstract

This report examines trends in vaccination among older adults in Singapore to better understand why segments of older adults continue to resist vaccination against COVID-19. We find that individuals who were most likely to still be waiting to vaccinate or to not want to be vaccinated as of June 2021

- are relatively older (aged 71-75),
- are of lower socioeconomic status (lower education levels and living in 1-3 room HDB flats),
- were the least likely to rely on Newspapers and Government Sources as sources of information for COVID-19 related news in November 2020,
- were least trusting of all sources of information, including Government as well as Local News sources, for COVID-19 information among all respondents in November 2020,
- have one or more chronic health conditions,
- are less socially integrated (more likely to live alone, have fewer household members on average, or have fewer 'close contacts' on average).

Respondents were most likely to be waiting to vaccinate or to not want to vaccinate because they were sceptical of either the efficacy or the safety of COVID-19 vaccines.

We hence suggest that initiatives to encourage older adults to vaccinate should be targeted at such individuals and should focus on assuring them of the safety and efficacy of vaccinations. Given the importance of social integration and social support for shaping health behaviour as our findings also suggest, as well as the fact that older adults who were less likely to be vaccinated were most trusting of family members for information on COVID-19, initiatives should include encouraging younger relatives of older adults to persuade their older family members to vaccinate, as they are more likely to be trusted by older family members for such advice. This could additionally involve encouraging younger individuals to accompany their older family members to get their vaccines as a form of support for older family members, which is likely to persuade more older adults to get vaccinated. Initiatives to encourage older adults who live alone or are less socially integrated to get vaccinated can include running programs with volunteers to accompany these older adults to get their vaccinations.

Introduction

With the recent rise of new COVID-19 variants that are significantly more transmissible, the Singapore government has placed greater emphasis on its vaccination regime in a bid to avoid widespread lockdowns that many other countries have resorted to in order to cope with these new variants. As such, the government put in place several strategies to bolster vaccination rates in the country, for instance through securing the supply of more vaccines, as well as placing priority on giving a larger proportion of Singaporeans the first dose of the vaccine, rather than having a smaller proportion that is fully vaccinated.

However, a significant minority of eligible older adults have yet to receive their vaccination and remain reluctant to do so, hindering the effort¹. While vaccinations for those aged 70 and above started on the 22nd of February 2021 in Singapore and in mid-March 2021 for those 60 and above², about 25% of older adults above the age of 60 remain unvaccinated as of 24th June 2021¹. This is compared to a vaccination rate of 80% for individuals aged 12-39, despite this cohort having begun vaccinations only from 11th June 2021. While the government has put in place additional initiatives to encourage older adults to vaccinate such as allowing them to walk-in to vaccination centres for their vaccines as compared to booking appointments in advance³, the rate of vaccination among older adults remains a concern.

This report hence examines the trends in vaccination among older adults aged 56-75 (as of 2021) in Singapore and seeks to better understand why segments of older adults continue to resist vaccination against COVID-19. Data is derived from the Singapore Life Panel[®] (SLP), a population representative monthly survey of Singaporeans aged 56-75 (inclusive) in 2021 that has been conducted since 2015. The SLP has an average response rate of about 7,200 respondents per month and is web-based, allowing respondents to participate even during periods of full or partial social lockdown.

The report focuses on four main issues; (1) the demographic profile of older adults less likely to have been vaccinated as of June 2021, (2) the reasons why said older adults were hesitant to vaccinate or against vaccination, (3) how the usage and trust in various sources of information may shape their willingness to vaccinate, and (4) how an individual's level of social integration may shape their willingness to vaccinate. The report then concludes by making several recommendations for policy to encourage vaccination among older adults.

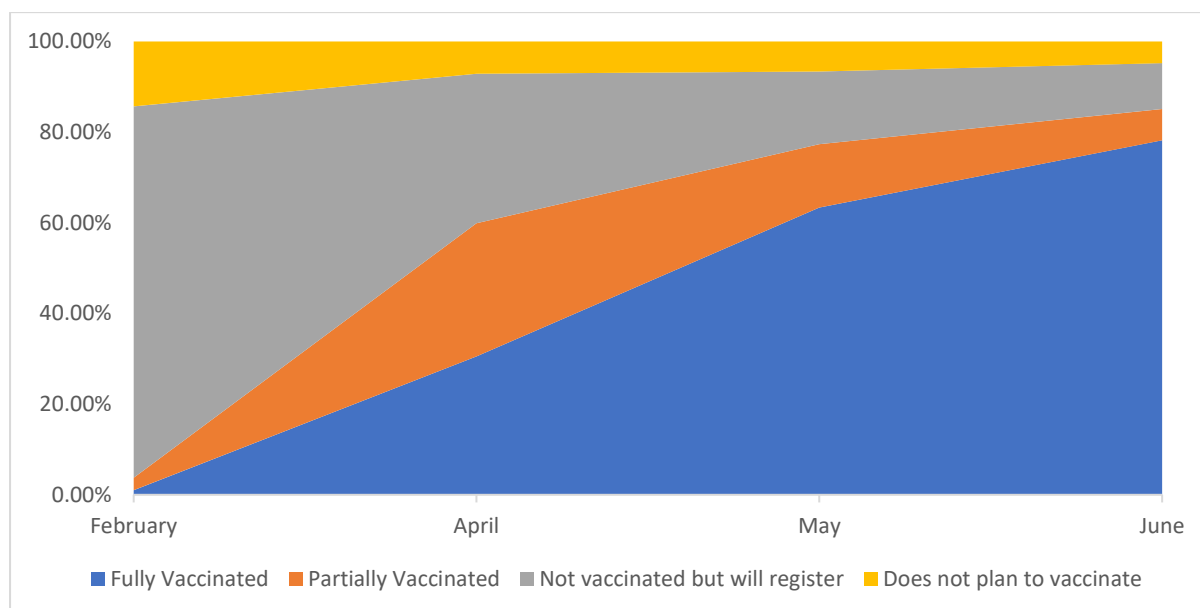
¹ <https://www.straitstimes.com/singapore/ministers-urge-more-seniors-to-get-vaccinated-ahead-of-further-reopening>

² <https://www.channelnewsasia.com/news/singapore/covid-19-vaccination-seniors-60-69-brought-forward-14360132>

³ <https://www.straitstimes.com/singapore/health/walk-in-covid-19-vaccinations-start-for-seniors-aged-60-and-above>

Overall Vaccination Status from February 2021 to June 2021

Figure 1: Proportion of respondents based on vaccination status from February – June 2021 (Note: there is no datapoint in March 2021)



From our findings, we observe that the number of respondents who are either fully or partially vaccinated has risen significantly from February 2021 (3.77%) to June 2021 (85.10%). This is to be expected as vaccinations for the general public only began in March 2021. (See [Table A1](#) in the appendix for the full list of proportions)

However, since vaccinations for the general public began for those aged 60 and above in mid-March, and in late-March for those aged 50 and above (approximately 25% of the sample are aged 55-69), we see that the rate at which more older adults aged 55 and above are getting vaccinated is slowing. From April to May, the proportion of respondents who had at least one dose of the vaccine increased by 29.16%, whereas from May to June, the proportion increased by a smaller 10.06% (calculated as the month on month increase in proportion of respondents with at least one dose of COVID-19 vaccines).

Additionally, the number of respondents reporting that they do not plan to vaccinate has fallen from 14.31% of respondents in February 2021 to 4.76% in June 2021, indicating an increase in the acceptance of the need to vaccinate. This could potentially be attributed to the fact that on the 5th of June 2021, authorities declared it safe for individuals with certain allergies to get vaccinated⁴.

In June 2021, there were also a total of 10.14% of respondents waiting for their first vaccination – 3.92% of whom were either waiting for their appointments to take place, or were waiting for health conditions to improve before taking the vaccine, while 6.22% were waiting for reasons such as wanting to see if there are any negative side-effects of the vaccine or because the Government did

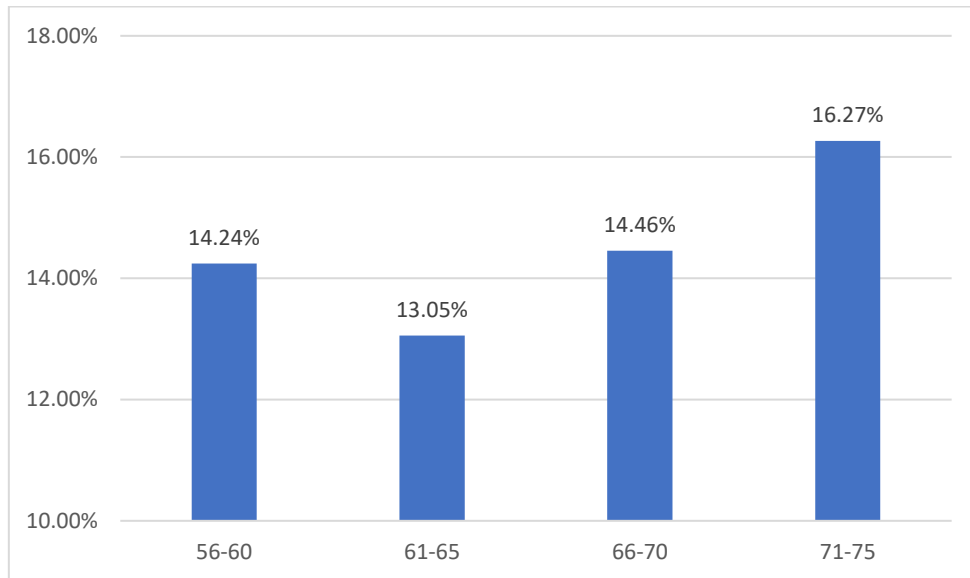
⁴ <https://www.straitstimes.com/singapore/health/moh-lifts-covid-19-mrna-vaccine-restrictions-on-those-with-allergies-to-food-or>

not allow them to choose the brand of vaccine⁵ (the full list of reasons can be found in [Table A3.1](#) in the appendix).

Profile of those who had not received their vaccinations as of June 2021

Age

Figure 2: Proportion of respondents not vaccinated as of June 2021 by age group

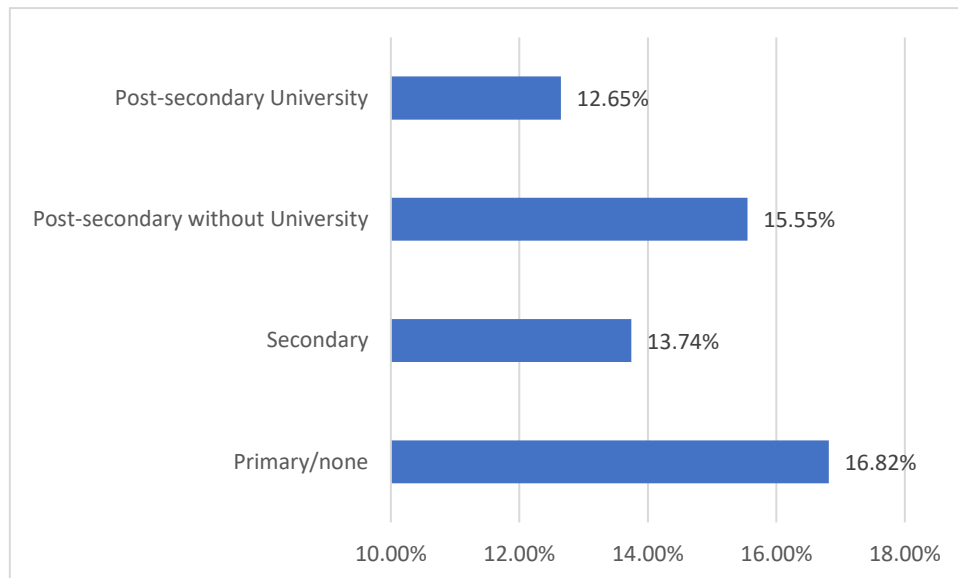


In June 2021, 16.26% of older adults aged 71-75 were not vaccinated either because they did not want to be vaccinated (6.52%) or because they were waiting to vaccinate (9.74%). This is highest proportion among the 4 age groups (see Figure 2; [Table A2](#) in the appendix provides the full list of proportions).

⁵ Readers should note that the Sinovac COVID-19 vaccine was allowed in Singapore under the 'Special Access Route' through several private clinics on the 2nd of June 2021

Education

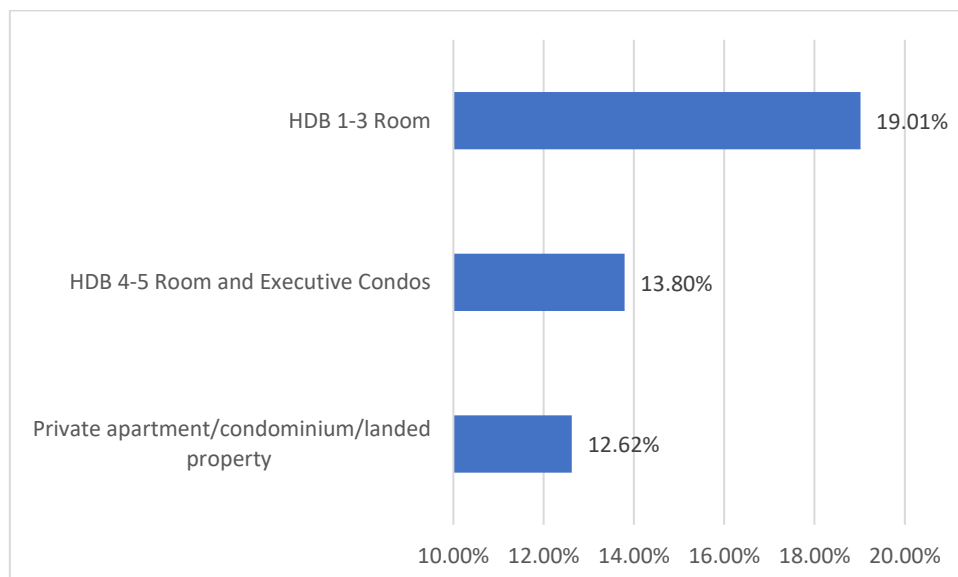
Figure 3: Proportion of respondents not vaccinated as of June 2021 by highest education achieved



In terms of education levels, individuals with a primary or who had no education were most likely to not have been vaccinated, with a total of 16.82% having not received any vaccination, of which 6.77% did not intend to vaccinate, and 10.05% were waiting to get their vaccines for various reasons (see Figure 3).

Housing Type

Figure 4: Proportion of respondents not vaccinated in June 2021 by housing type



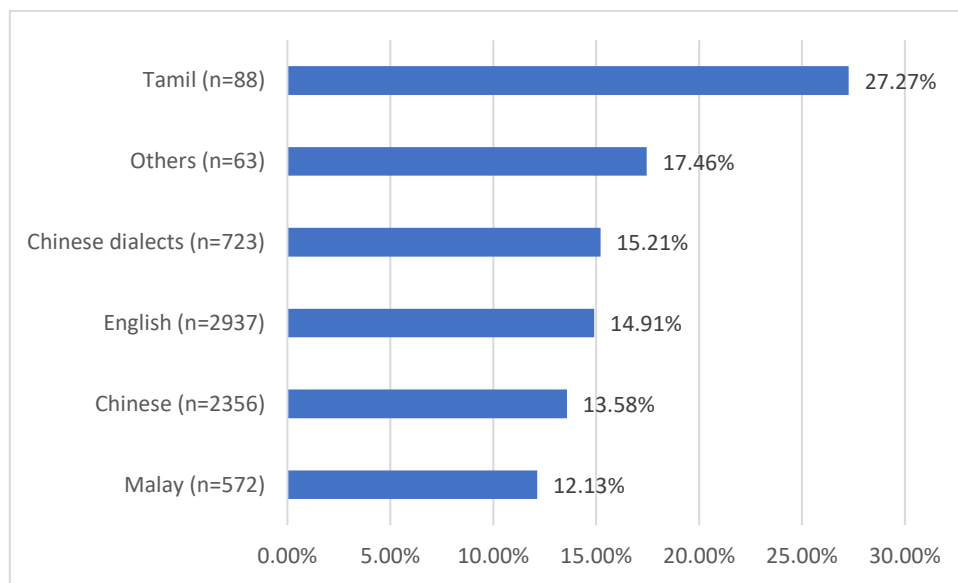
For housing type, individuals living in 1-3 room HDB flats were most likely to have not been vaccinated, with a total of 19.01% of such individuals yet to be vaccinated – of whom 7.01% did not intend to vaccinate, and 12.01% were waiting for various reasons. This is compared to a smaller 12.62% of respondents living in private properties who were yet to be vaccinated (see Figure 4). That being said, a majority of respondents who were either waiting to vaccinate (62.15%) or did not intend

to vaccinate (52.17%) lived in 4-5 room HDB flats, likely due to the fact that a larger proportion of respondents live in 4-5 room HDB flats in the sample (approximately 62%).

The findings imply that older adults' socioeconomic status, as represented by their education level or type of housing, may play a significant factor in determining whether respondents are likely to get vaccinated soon or at all. This is possibly due to the fact that individuals of a lower socioeconomic status may not have the time to get vaccinated or may be more fearful of potential negative side effects due to a lack of knowledge of the risks.

First language spoken

Figure 5: Proportion of respondents yet to be vaccinated as of June 2021 by first language

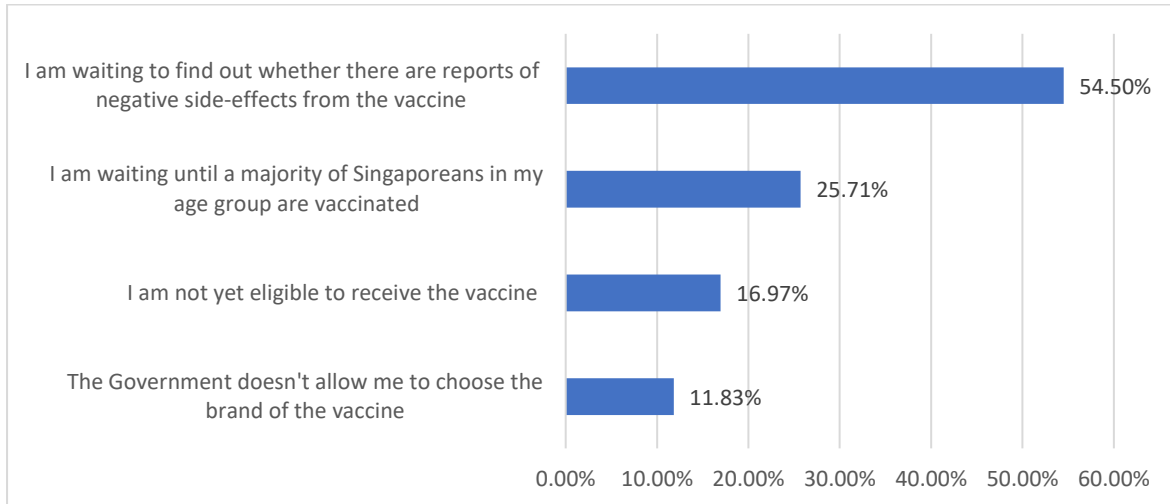


Finally, associations between the first language that individuals spoke and their vaccination status as of June 2021 were examined. Findings indicated that individuals who spoke Tamil as their first language were most likely to not have been vaccinated, with 27.27% of such respondents yet to be vaccinated - 19.32% and 7.95% of whom were waiting to vaccinate or did not plan to vaccinate respectively (see Figure 5). It should be noted, however, that the proportion of individuals with Tamil as their first language is relatively small (approximately 1.3% of the sample). In terms of languages that were spoken by at least 10% of respondents, respondents who spoke Chinese dialects as their

first language were least likely to have been vaccinated, with 15.21% of such respondents yet to be vaccinated.

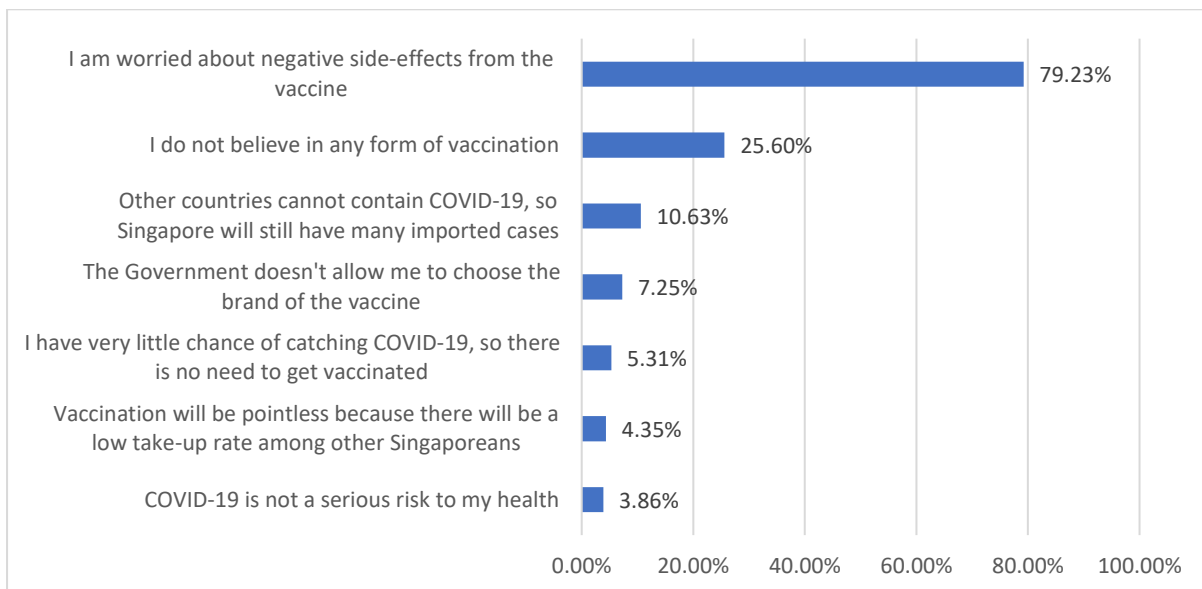
Reasons why older adults were yet to be vaccinated (see [Table A3](#) in the appendix for full list of proportions)

Figure 6: Proportion of respondents citing reason for waiting to vaccinate in June 2021 (n=389)



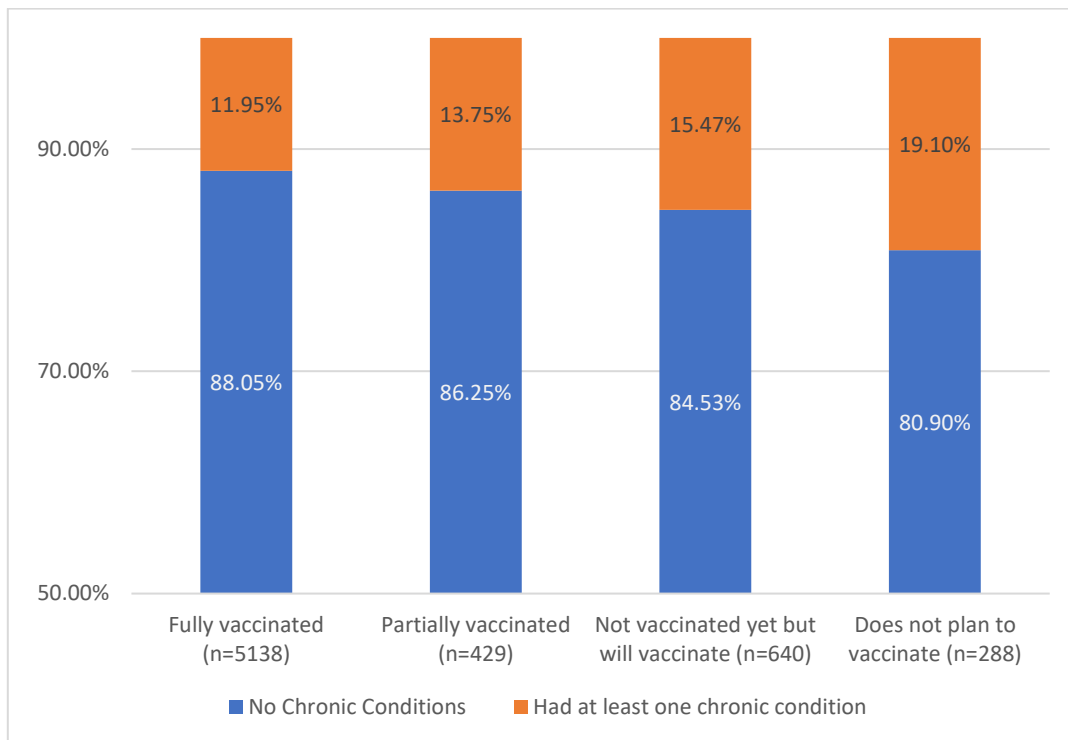
In June 2021, the two most cited reasons for waiting to get vaccinated among respondents were: that they were waiting to find out whether there are reports of negative side-effects from the vaccine (54.50% of respondents), followed by that they were waiting until a majority of Singaporeans in their age group were vaccinated (25.71% of respondents) (see Figure 6).

Figure 7: Proportion of respondents citing reason for not wanting to vaccinate in June 2021 (n=207)



In terms of reasons for not wanting to be vaccinated, in June 2021 the two most cited reasons were: that they were worried about negative side-effects from the vaccine (79.23% of respondents), followed by that they did not believe in any form of vaccination (25.60% of respondents) (see Figure 7).

Figure 8: Proportion of respondents with chronic condition(s) by vaccination status as of June 2021



These findings suggest that many older adults remain sceptical of the efficacy and safety of the vaccines. Thus, in order to encourage more older adults to get vaccinated, authorities should make efforts to assure older adults of the safety of the vaccines. This is perhaps especially so for older adults who are likely to have poorer levels of health, as 19.10% of respondents who do not plan to vaccinate had at least one chronic condition, compared to a smaller 11.95% of those who were fully vaccinated (see Figure 8).

Sources of information and vaccination status

Respondents who stated that they do not plan to vaccinate in June 2021 were the least likely to rely on Newspapers and Government Sources as sources of information for COVID-19 related news in November 2020. 37.91% and 32.13% of unvaccinated respondents indicated that they relied on Newspapers and Government Sources respectively, compared to 47.92% and 48.29% of vaccinated respondents respectively (see Table 1 for full list of proportions). It is also noteworthy that respondents who do not plan to vaccinate were the most likely to not be gathering any information about COVID-19 at all, with 4.33% of such respondents stating that they were not doing so, compared to just 0.55% of individuals who were fully vaccinated.

In terms of the average level of trust respondents had in different sources of information for information on COVID-19, we observe that respondents who stated that they did not want to vaccinate in June 2021 were least trusting of all sources of information (see Table 2 for full list of average trust scores). The findings also indicate that the differences in the levels of trust between groups of different vaccination status were greatest when looking at Local News on Television, Local Radio Channels, and Government sources, thus suggesting that the level of trust individuals hold in these sources of information might be an important factor in determining whether they were willing to vaccinate.

Table 1: Sources of information relied on for COVID-19 news by vaccination status

Source of Information ^a	Vaccination Status as of June 2021			
	Fully Vaccinated	Partially Vaccinated	Not vaccinated yet but will vaccinate ^c	Does not plan to vaccinate
	% of respondents who answered (n=4933) ^b	% of respondents who answered (n=415) ^b	% of respondents who answered (n=378) ^b	% of respondents who answered (n=277) ^b
TV/Radio	74.66%	74.22%	76.98%	69.68%
Newspapers (digital or print)	47.92%	41.20%	40.74%	37.91%
Social media (such as Facebook, Twitter, Instagram)	35.60%	38.80%	38.10%	35.38%
My own internet research	11.09%	13.98%	17.99%	13.36%
Personal conversations with friends and family	22.24%	22.41%	25.40%	25.63%
Government Sources	48.29%	41.69%	45.24%	32.13%
I am not gathering information about COVID-19	0.55%	0.72%	1.32%	4.33%

^a Respondents were asked which sources of information they relied on for news on COVID-19. The question was fielded in November 2020, and respondents' answers to the vaccination question in June 2021 were matched to their answers in November 2020.

^b Respondents were given the option to select all sources of information that they relied on. Thus, the percentages presented in the table is based on the number of respondents selecting that option, out of the total number of respondents who answered the question and will not sum to 100%.

^c Respondents who had not vaccinated but were planning to vaccinate for health reasons or due to the fact that their vaccination appointment had not yet arrived were excluded, as their responses may skew the proportions since the population of interest in this case is people who are afraid of getting the vaccination.

Table 2: Mean trust in source of information for COVID-19 news according to vaccination status in June 2021, and p-value indicating significance of association between vaccination status and trust for each source

Source of Information ^a	Vaccination Status as of June 2021				
	Fully vaccinated	Partially vaccinated	Not vaccinated yet but will vaccinate ^b	Does not plan to vaccinate	P-value computed using Spearman's rho, testing for correlations between trust in sources, and vaccination status
Government	5.11	4.89	5.01	4.563177	P < .01*
Local news on television	5.12	4.93	5.01	4.61	P < .01*
Foreign news on television	4.25	4.13	4.25	3.99	0.6000
Local radio channels	5.01	4.84	4.9	4.48	P < .01*
Foreign radio channels	4.05	3.94	4.032	3.75	0.4597
Social media	3.64	3.65	3.66	3.58	0.9078

Family	4.83	4.76	4.82	4.65	0.4988
Friends	4.45	4.4	4.46	4.28	0.9184

^a Respondents were asked to rate from 1 Strongly Mistrust – 6 Strongly Trust how much they trusted each source of information for information on COVID-19. Values presented are the mean scores for each group. The question was fielded in November 2020, and respondents' answers to the vaccination question in June 2021 were matched to their answers in November 2020.

^b Respondents who had not vaccinated but were planning to vaccinate for health reasons or due to the fact that their vaccination appointment had not yet arrived were excluded, as their responses may skew the proportions since the population of interest in this case is people who are afraid of getting the vaccination.

*Statistically significant correlation

Social integration and vaccination status

Respondents who did not intend to vaccinate were more likely to be less socially integrated. On average, they had a smaller household size (mean size of 3.06 household members) and a fewer number of close contacts (mean number of close contacts of 8.63) as compared to individuals who were fully vaccinated (mean household size of 3.31 members and mean number of close contacts of 12.38) (see Table 3). In addition, individuals who do not plan to vaccinate are also more likely to be living alone, with 14.58% of those not intending to vaccinate living alone, as compared to 7.05% of respondents who were fully vaccinated that live alone (see Figure 9).

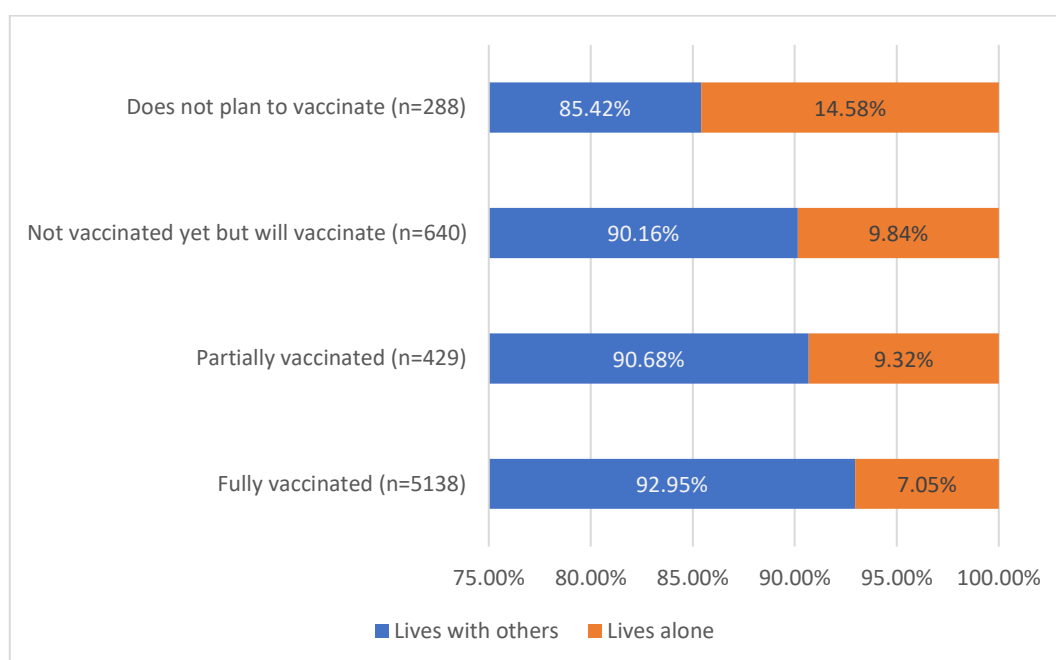
Table 3: Mean household size and number of close contacts by vaccination status as of June 2021

	Fully vaccinated	Partially vaccinated	Not vaccinated yet but will vaccinate	Does not plan to vaccinate	P-value computed using Spearman's rho, testing for correlations between variables, and vaccination status
Mean household size	3.31	3.28	3.17	3.06	P < .01*
Mean number of close contacts ^a	12.38	10.49	11.19	8.63	P < .01*

^a Close contacts refer to individuals the respondent felt they could talk to about important things in their lives among their neighbours, co-workers, family, and friends

*Statistically significant correlation

Figure 9: Proportion of respondents living alone or with others by vaccination status in June 2021



Previous research on pro-health behaviour showed that individuals who had stronger levels of social support were more likely to want to sustain their health status to that they could continue to be effective and functioning members of their support groups (Straughan and Seow 2000)⁶. Social contacts also serve as purveyors of health information, and individuals were found to be more likely to trust and heed information from their close contacts.

Within the present context, we posit that individuals who are less socially integrated may have less social support and be less socially embedded. As a result, they are less concerned about the implications of their health behaviour (in this case getting a vaccine) or are less aware of the benefits and risks of the vaccine due to their lack of information from their social contacts. The provision of other forms of instrumental support by close contacts, for instance having family members or friends to help older adults register for the vaccine, take care of them if they suffer from side-effects, and even accompany them for their vaccination appointments, may also be an important factor in encouraging older adults to vaccinate.

Recommendations

Based on the findings, this report thus recommends that older individuals (aged 71 – 75 years) who are of a lower socioeconomic status, especially those living in 1-3 room HDB flats, should be the target of government initiatives to encourage vaccinations among the old. Such initiatives should focus on assuring individuals that the vaccines are effective and, more importantly, do not pose a significant risk to their health and well-being particularly for those who may be of poorer health but are still able to be vaccinated.

Unfortunately, the level of trust that respondents who were hesitant or unwilling to be vaccinated hold in official or formal sources of information from the Government and Local News sources is significantly lower as compared to other groups. That being said, in terms of the level of

⁶ Straughan, P. T., & Seow, A. (2000). Attitudes as barriers in breast screening: a prospective study among Singapore women. *Social science & medicine*, 51(11), 1695-1703.

trust in sources for information on COVID-19, the highest average level of trust for individuals who were unwilling to vaccinate was placed in family members. This is congruent with findings from Straughan and Seow (2000) who also found that individuals were more likely to heed health advice from trusted personal contacts. Thus, authorities should opt to attempt to encourage older adults who are unwilling to vaccinate by reaching out to the younger relatives of such older adults who would be more likely to be able to encourage their older relatives to get vaccinated. This is especially so given the importance of social support in encouraging positive health behaviour and the fact that those who did not wish to vaccinate were more likely to be less socially integrated.

Specific policies to encourage older adult vaccination could therefore involve encouraging younger individuals to accompany their older family members to get their vaccines. Companies and authorities may consider allowing their employees to take time off work so as to bring their older family members to get their vaccines. Initiatives to encourage older adults who live alone or are less socially integrated to get vaccinated can also include running programs with volunteers to accompany these older adults to get their vaccinations. In the absence of family (in particular, for older adults who are living alone), community social support will have to step in to partner older adults as we strive to bring more onboard our vaccination program.

Appendix

Table A1: Vaccination statuses of respondents in February, April, May, June 2021

Vaccination Status	% of respondents			
	Feb-21 (n=7402)	Apr-21 (n=7032)	May-21 (n=7422)	Jun-21 (n=7228)
Fully Vaccinated	1.03%	30.50%	63.38%	78.21%
Partially Vaccinated	2.74%	29.37%	13.95%	6.89%
Not vaccinated yet but will vaccinate	81.92%	33.02%	16.02%	10.14%
Does not plan to vaccinate	14.31%	7.11%	6.66%	4.76%

Table A2: Vaccination status according to demographic in June 2021⁷

Demographic Variable	Vaccination Status							
	Fully Vaccinated		Partially Vaccinated		Not vaccinated yet but will vaccinate		Does not plan to vaccinate	
	Col %	Row %	Col %	Row %	Col %	Row %	Col %	Row %
<i>Age</i>	<i>n=5138</i>		<i>n=427</i>		<i>n=640</i>		<i>n=288</i>	
56-60 (n=1622)	23.69%	75.03%	40.75%	10.73%	26.56%	10.48%	21.18%	3.76%
61-65 (n=2076)	33.07%	81.84%	24.82%	5.11%	29.06%	8.96%	29.51%	4.09%
66-70 (n=1584)	24.70%	80.11%	20.14%	5.43%	25.94%	10.48%	21.88%	3.98%
71-75 (n=1211)	18.55%	78.70%	14.29%	5.04%	18.44%	9.74%	27.43%	6.52%
<i>Education</i>	<i>n=5125</i>		<i>n=428</i>		<i>n=638</i>		<i>n=287</i>	
Primary/none (n=1396)	20.84%	76.50%	24.07%	7.38%	22.10%	10.10%	29.27%	6.02%
Secondary (n=2681)	41.56%	79.45%	43.22%	6.90%	39.18%	9.32%	40.42%	4.33%
Post-secondary without University (n=1361)	20.90%	78.69%	19.86%	6.25%	23.20%	10.87%	19.86%	4.19%
Post-secondary University (n=1040)	16.70%	82.31%	12.85%	5.29%	15.52%	9.52%	10.45%	2.88%
<i>House type</i>	<i>n=4540</i>		<i>n=364</i>		<i>n=561</i>		<i>n=259</i>	
HDB 1-3 Room (n=1195)	17.92%	73.97%	19.90%	6.95%	23.33%	11.97%	30.80%	7.11%
HDB 4-5 Room and Executive Condos (n=3912)	63.07%	79.55%	65.95%	7.03%	62.15%	9.74%	52.17%	3.68%
Private apartment/condominium/landed property (n=1133)	19.01%	82.79%	14.15%	5.21%	14.52%	7.86%	17.03%	4.15%
<i>Race</i>	<i>n=5132</i>		<i>n=427</i>		<i>n=639</i>		<i>n=288</i>	
Chinese (n=5724)	88.46%	79.32%	85.25%	6.36%	87.79%	9.80%	89.93%	4.52%
Malay (n=332)	5.16%	79.82%	7.49%	9.64%	3.29%	6.33%	4.86%	4.22%
Indian (n=313)	4.52%	74.12%	6.09%	8.31%	6.42%	13.10%	4.86%	4.47%
Other (n=117)	1.85%	81.20%	1.17%	4.27%	2.50%	13.68%	0.35%	0.85%
<i>First Language</i>	<i>n=5052</i>		<i>n=451</i>		<i>n=640</i>		<i>n=296</i>	
English (n=2937)	45.84%	78.86%	40.58%	6.23%	48.91%	10.66%	42.23%	4.26%

⁷ Discrepancies in the number of respondents (n) per group according to vaccination status in each demographic are due to missing data. This is mainly because respondents do not participate in every wave, and certain variables are only fielded in some waves. This applies to distributions in all tables in this report using different variables.

Chinese (n=2356)	37.03%	79.41%	36.59%	7.00%	32.97%	8.96%	36.82%	4.63%
Chinese dialects (n=723)	10.83%	75.66%	14.63%	9.13%	10.94%	9.68%	13.51%	5.53%
Malay (n=572)	4.18%	77.57%	6.21%	10.29%	3.28%	7.72%	4.05%	4.41%
Tamil (n=88)	1.17%	67.05%	1.11%	5.68%	2.66%	19.32%	2.36%	7.95%
Others (n=63)	0.95%	76.19%	0.89%	6.35%	1.25%	12.70%	1.01%	4.76%

Table A3: Reasons why respondents were waiting to vaccinate or do not plan to vaccinate

A3.1 Reasons why respondents were not vaccinated yet but were intending to ^a	Feb-21	Jun-21
	% of respondents who answered (n=5109) ^b	% of respondents who answered (n=389) ^b
I am not yet eligible to receive the vaccine	66.00%	16.97%
I am waiting until a majority of Singaporeans in my age group are vaccinated	31.10%	25.71%
I am waiting to find out whether there are reports of negative side-effects from the vaccine	13.13%	54.50%
The Government doesn't allow me to choose the brand of the vaccine	2.98%	11.83%
A3.2 Reasons why respondents did not want to vaccinate	Feb-21	Jun-21
	% of respondents who answered (n=834) ^b	% of respondents who answered (n=207) ^b
I am worried about negative side-effects from the vaccine	82.85%	79.23%
Vaccination will be pointless because there will be a low take-up rate among other Singaporeans	5.88%	4.35%
Other countries cannot contain COVID-19, so Singapore will still have many imported cases	8.99%	10.63%
I have very little chance of catching COVID-19, so there is no need to get vaccinated	7.31%	5.31%
COVID-19 is not a serious risk to my health	4.56%	3.86%
The Government doesn't allow me to choose the brand of the vaccine	8.51%	7.25%
I do not believe in any form of vaccination	20.74%	25.60%
^a Several of the respondents listed in Table A2 above who said they were waiting to vaccinate commented that they had either already arranged for their vaccination appointment but it had not yet taken place, or that they were waiting to vaccinate due to existing health problems. These responses are not reflected in this table, as their responses may skew the proportions since the population of interest in this case is people who are afraid of getting the vaccination.		
^b Respondents were given the option to select all sources of information that they relied on. Thus, the percentages presented in the table is based on the number of respondents selecting that option, out of the total number of respondents who answered the question and will not sum to 100%.		

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About the Centre for Research on Successful Ageing (ROSA)

ROSA is a multidisciplinary research centre based in SMU. It was established with an MOE Tier 3 social sciences research grant, as well as the generous support of The Ngee Ann Kongsi. Research at ROSA seeks to define and measure a holistic construct of well-being and to identify the factors that impact Singaporeans' well-being as they progress through the later phases of life. Through close collaboration with government and other partner agencies, ROSA also aims to translate research insights into policy innovations that advance the well-being of older adults holistically and promote successful ageing in Singapore. ROSA brings together a diverse team of leading international and local researchers in ageing and age-related issues from various disciplines. Through empirical evidence derived from a longitudinal methodological approach, the multidisciplinary and multi-institutional research team advances propositions that promote successful ageing in Singapore.

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