

IMMUNISATION OF OLDER ADULTS IN THE ASIA PACIFIC: BARRIERS, FACILITATORS, AND STRATEGIES TO IMPROVE ACCESS TO VACCINES

TECHNICAL REPORT

PHASE II (HONG KONG AND JAPAN)

Prepared by Research For Impact
For the International Longevity Centre – Singapore (ILC-S),
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Publishers

About Tsao Foundation

Tsao Foundation is dedicated to transforming the ageing experience, so the extra decades of life in longevity is an opportunity for us to actualise our full potential for growth, well-being, and fulfilment in a society for all ages. Established in 1993 as a non-profit, operational foundation, Tsao Foundation is an Institution of Public Character (IPC) with the goal of being a catalyst for constructive change at practice, systems and policy levels through innovations and excellence. Ageing-in-place and active ageing have been our battle cry since inception. For almost three decades, Tsao Foundation has pioneered new approaches, services and programmes in ageing, longevity, and community-based eldercare, and the Foundation's work is taken forward through four synergistic initiatives: Hua Mei Centre for Successful Ageing, Community for Successful Ageing (ComSA), Hua Mei Training Academy and International Longevity Centre Singapore. For more information, please visit www.tsaofoundation.org.

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The International Longevity Centre Singapore (ILC Singapore) aims to promote the well-being of older people and contribute to national development through supporting policy, practice and capacity building by enabling a “connecting of the dots” between community, practitioners, academia, policy makers and the private sector through the creation of relevant stakeholder platforms as well as high impact research that strives to inform policy, facilitate cogent policy-action translation, and promote quality, effective practice in Singapore and internationally. ILC Singapore is member of the ILC Global Alliance, a multinational research and education consortium which aims to address longevity and population ageing in positive and productive ways, typically using a life course approach, highlighting older people's productivity and contributions to family and society as a whole.

As an initiative of the Tsao Foundation, ILC Singapore's mission is to drive constructive change in how society approaches and responds to ageing.

Website: <https://tsaofoundation.org/what-we-do/research-and-collaboration/about-ilc-singapore>

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Foreword

The Asia Pacific region is experiencing a rapid increase in its aging population, with the number of individuals aged 65 and older projected to more than double by 2050. (United Nations, 2017). This demographic shift poses significant public health challenges, as older adults are more susceptible to severe illnesses, including infectious diseases. To that end, life-course immunisation is particularly important in the Asia-Pacific, as many of the infectious diseases older adults are susceptible to are vaccine-preventable (Bianchi and Tafuri, 2022). In response, Tsao Foundation, through its International Longevity Centre Singapore, conducted a study to understand better the barriers to immunisation of older people in selected countries – Australia, Indonesia, the Philippines, Singapore, Hong Kong and Japan. The study was conducted in two phases, Phase I includes Australia, Indonesia, the Philippines, Singapore and Phase II includes Hong Kong and Japan.

This report is phase II, presenting the findings of the study, which includes a literature review and interviews with key stakeholders involved in older adult immunization from Hong Kong and Japan. The report outlines research methods and synthesizes the results, offering insights into strategies for policymakers and stakeholders to enhance immunization rates among older adults in the Asia Pacific region, leveraging vaccine-preventable measures to address this pressing health concern. By understanding and addressing these barriers, the foundation can make a meaningful contribution to public health, reduce healthcare costs, and improve the quality of life for older individuals not only in Singapore but in the region as well.

We want to thank our partners and colleagues from the following organizations, the Research for Impact Singapore (RFI) Singapore, Health and Global Policy Institute Japan (HGPI), for their valuable contributions in the conduct of the study and in preparing this report. We also want to acknowledge the funding support from MSD.

Ms Susana Concorde Harding
Senior Director, International Longevity Centre Singapore
Tsao Foundation
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Introduction

The Asia-Pacific region is experiencing rapid population ageing, with far-reaching social, economic, and political implications. It is projected that by 2050, one in four people in Asia and the Pacific will be over 60 years old, and the population of persons aged over 60 will triple, reaching close to 1.3 billion people (Asian Development Bank, n.d; UNESCAP, n.d.; UNFPA, n.d.). Vaccination prevents as well as reduces the severity of illnesses that are particularly relevant to an ageing population, including influenza, pneumonia, shingles, and COVID-19. Maintaining good health in old age is crucial for overall well-being and quality of life. One significant factor in achieving this goal is preventing infectious diseases. Vaccines offer a powerful tool to protect older adults from a range of illnesses. Older individuals are more susceptible to infections compared to younger adults. This increased vulnerability can lead to higher rates of morbidity and mortality. Additionally, many older adults may experience lingering health issues or worsening chronic conditions after recovering from an acute infection. Influenza, pneumococcal disease, and herpes zoster are examples of infections that pose particular risks to older populations. These illnesses can result in long-term consequences, such as frailty, reduced ability to perform daily tasks, and even loss

of independence. Vaccination is a vital strategy for preventing these infections and promoting healthy aging. By protecting older adults from diseases, vaccines can help them maintain a higher quality of life and enjoy their later years to the fullest (Addario A et al., 2023; Weinberger B., 2021).

This technical report is the second part of an ongoing research study that aimed to identify the factors influencing vaccination uptake among older adults in the Asia-Pacific. The first study examined Singapore, Australia, the Philippines and Indonesia. For this study, we sought to zoom into the country-level experiences of Hong Kong and Japan to gain a deeper understanding of the challenges faced by two Asia-Pacific countries facing similar challenges (Tsao Foundation Report 2023; [click here](#)).

Consistent with the previous study ([click here](#)), the work has two components: a scoping review of literature and semi-structured in-depth interviews with key stakeholders working on the immunisation of older adults across both countries. Based on these new findings, this report provides further insights and recommendations for policymakers and other key stakeholders to consider, based on the experience of immunisation among older adults in Hong Kong and Japan

Our overall study aims are as follows:

- To understand the key policy gaps as well as social, cultural, and economic barriers to immunisation, and the effect of these barriers in uptake of vaccination among the older people in Hong Kong and Japan
- Drawing on best practices highlighted in this phase of the research, to develop further recommendations to inform:
 - Strategies for optimising the delivery of immunisation to older adults through current vaccination programmes
 - Strategies to build engagement and support for vaccine programmes among key external stakeholders such as charities and patient advocacy groups
 - Strategies to improve older adults' vaccine confidence and better encourage them to seek out and receive vaccines

Background

Although vastly different in population size, Hong Kong and Japan's populations have similarly high life expectancies – Hong Kong's average life expectancy is 83 years for males and 88 years for females, while males and females in Japan have an average life expectancy of 81 years and 88 years, respectively (World Data, n.d.). Both economies also share rising rates of population ageing, driven by declining fertility rates and increasing life expectancies. Japan has the highest proportion of elderly citizens of any country in the world – as of 2022, people aged 65 years and older in Japan accounted for approximately 29.9% of the total Japanese population and by 2050, an estimated

one-third of the population in Japan is expected to be 65 and older (National Institute of Population and Social Security Research, n.d.). Meanwhile, Hong Kong's proportion of people aged 65 and over is expected to almost double from 17.9% to 31.9% between 2018 and 2038. Additionally, the number of individuals aged 75 or above is projected to increase from 7.9% to 18.3% of the total population during the same period (Wong and Yeung, 2019). By 2046, it is estimated that 36% of the population in Hong Kong will be aged 65 or above (Yiu and Ng, 2019).

Hong Kong's dual-track healthcare system encompasses both public and private sectors.

Table 1: Sample country characteristics

	Hong Kong	Japan
Population size (as of 2023)	7.50 million ¹	123.3 million ²
Percentage of population aged at least 65	10.2% (2023) ³	29.9% (2022) ⁴
Estimated percentage of population aged at least 65 by 2050	40.6% ⁵	35.7% ⁶
Life expectancy (2022)	84 years ⁷	81 years ⁸

¹ Census and Statistics Department, The Government of the Hong Kong Special Administrative Region. (n.d.). Vaccination uptake. Retrieved from https://www.censtatd.gov.hk/en/web_table.html?id=110-01001

² Worldometer. (n.d.). Japan Population. Retrieved from <https://www.worldometers.info/world-population/japan-population/>

³ Census and Statistics Department, The Government of the Hong Kong Special Administrative Region. (n.d.). Vaccination uptake. Retrieved from https://www.censtatd.gov.hk/en/web_table.html?id=110-01001

⁴ Statista. (n.d.). Share of population aged 65 and above in Japan. Retrieved from <https://www.statista.com/statistics/1149301/japan-share-of-population-aged-65-and-above/>

⁵ Rowse, M. (2023, August 27). How will Hong Kong care and house its growing number of elderly. *South China Morning Post*. Retrieved from <https://www.scmp.com/comment/opinion/article/3232298/how-will-hong-kong-care-and-house-its-growing-number-elderly>

⁶ National Institute of Population and Social Security Research. (n.d.). [Summary of the Japanese Population Projection]. Retrieved from https://www.ipss.go.jp/pp-newest/e/ppfj02/suikai_g_e.html

⁷ Centre for Health Protection, The Government of the Hong Kong Special Administrative Region. (2023). Life Expectancy at Birth (Male and Female), 1971 – 2022. Retrieved from <https://www.chp.gov.hk/en/statistics/data/10/27/111.html>

⁸ The Japan Times. (2023, July 28). Japan's average life expectancy continued to fall in 2022. Retrieved from <https://www.japantimes.co.jp/news/2023/07/28/japan/science-health/japans-average-life-expectancy-continued-to-fall-in-2022/>

The public sector is similar to the United Kingdom (UK)'s National Health Service and provides heavily subsidised and regulated care services at hospitals and clinics. The private system offers more choices and generally shorter wait times to the approximately 48% of the population who have private insurance coverage (Tikkanen et al., 2020). Meanwhile, the healthcare system in Japan offers universal health coverage, with the government providing a comprehensive social health insurance

scheme funded through employer and employee contributions as well as government subsidies. All Japanese residents are legally required to have health insurance coverage; those without employer-based insurance can participate in a national health insurance programme administered by local governments. Both are well-developed healthcare systems that face similar challenges, namely escalating medical costs, ageing populations, and healthcare staff shortages (Tikkanen et al., 2020).

Table 2: Adult immunisation policies

	Clear policy on adult vaccination?	What level of guidance and financing support exists?
Hong Kong	Yes, Government Vaccination Programme (GVP)	For the year 2023/24, the GVP offers free seasonal influenza vaccination and pneumococcal vaccination for eligible residents, including specific groups such as the elderly aged 65 years or above for the pneumococcal vaccination. The Vaccination Subsidy Scheme (VSS) in Hong Kong provides subsidized seasonal influenza and pneumococcal vaccinations to eligible residents. It is administered through private doctors, who are reimbursed by the government for providing vaccinations to eligible individuals. The VSS 2023/2024 launched on September 28, 2023, and the government's vaccination programs began on October 5. Eligible elderly individuals aged 65 or above can receive subsidized pneumococcal vaccinations throughout the year. The peak influenza period in Hong Kong is typically from January to March/April and July to August. For seasonal influenza vaccinations, eligible individuals include pregnant women, those aged 50 or above, children and adolescents between 6 months and 18 years old, secondary school students, individuals with intellectual disabilities, recipients of Disability Allowance, and residents aged 18 to under 50 who are recipients of Standard Rate of "100% Disabled" or "Requiring Constant Attendance" under the CSSA Scheme. The subsidy level for seasonal influenza vaccines is HK\$260 per dose, and doctors may charge extra fees.

Table 2: Adult immunisation policies – *cont'd*

	Clear policy on adult vaccination?	What level of guidance and financing support exists?
Hong Kong	Yes, Government Vaccination Programme (GVP)	For pneumococcal vaccinations, eligible individuals are Hong Kong residents aged 65 or above. Healthcare professionals will recommend the type of pneumococcal vaccine based on the patient's vaccination history and risk factors. High-risk conditions include previous pneumococcal disease, chronic diseases, immunocompromised states, and chronic neurological conditions. The subsidy level for pneumococcal vaccines varies depending on the type of vaccine, with a range of HK\$400 to HK\$800 per dose. Doctors may also charge extra fees.
Japan	Yes, vaccination policies and schedules are managed and implemented through various health initiatives and laws, structured around routine and voluntary vaccinations, as outlined by the Ministry of Health, Labour and Welfare (MHLW) and other health organisations.	The government categorises vaccines into routine (recommended) and voluntary, offering different levels of support for each. For routine vaccinations, the government actively recommends and may cover the costs, focusing on public health protection. For vaccinations, such as the influenza vaccine for the elderly, support may include subsidies or coverage through health insurance, aiming at individual health protection. Financing mechanisms vary, including direct coverage, subsidies, and health insurance, to ensure broad access to vaccinations. The Immunization Law categorizes vaccines into two types: routine and voluntary. Routine vaccines include: • Class A Diseases: Hib, pediatric pneumococcal, hepatitis B, rotavirus, DPT/IPV, BCG, MR, chicken pox, Japanese encephalitis, and HPV. Class A are provided free of charge to recipients. • Class B Diseases: Influenza vaccine (for the elderly), adult pneumococcal vaccine (for the elderly). Class B are partially funded through the NIP and it is not mandatory for municipalities to proactively encourage vaccination. Voluntary vaccines are voluntary and not obliged to make efforts. These include mumps, DPT, influenza for pediatric population, hepatitis A, and meningococcus.

**Table 3: Vaccination uptake/ acceptance rates among older adults in Hong Kong and Japan
(in percentage)**

	Hong Kong	Japan
Influenza	44.6% (2021) ⁹	50.2% (2021) ¹⁰
Pneumococcal	42.4% (2022) ¹¹	37.8% (2021) ¹²
Tetanus/Diphtheria/Pertussis (Tdap)	No data available	No data available
Varicella zoster (Shingles)	45.7% (2019) ¹³	No data available
COVID-19 (2 doses)	77.59% (2022) ¹⁴	77.5% (2023) ¹⁵

⁹ Chan, R. W., & Leung, W. M. (2023). Influenza vaccine uptake and associated factors in adult patients with type 2 diabetes in a general outpatient clinic in Hong Kong. *Australian Journal of General Practice*, 52(9), 643–649. <https://doi.org/10.31128/ajgp-11-22-6621>

¹⁰ *Vaccinations*. Japan Health Policy NOW. (n.d.). <https://japanhpn.org/en/vaccinations-2/#:~:text=Vaccination%20coverage%20among%20the%20elderly,is%20even%20lower%20at%2037.8%25>

¹¹ Centre for Health Protection, The Government of the Hong Kong Special Administrative Region. (n.d.). Retrieved from <https://www.chp.gov.hk/en/statistics/data/10/100044/6870.html>

¹² Japan Health Policy Now. (2021, June). *Vaccinations*. Retrieved from <https://japanhpn.org/en/vaccinations-2/#:~:text=Vaccination%20coverage%20among%20the%20elderly,is%20even%20lower%20at%2037.8%25>.

¹³ Cheng, L. (2019). A pilot study to assess the awareness of herpes zoster and the attitudes towards herpes zoster vaccination among Chinese patients attending a government general out-patient clinic in Hong Kong]. *The Hong Kong Practitioner*, 41(3), 60-65. https://www.hkcfp.org.hk/Upload/HK_Practitioner/2019/hkp2019vol41Sep/original_Article.html

¹⁴ Statista. (2022). Share of people fully or partly vaccinated against coronavirus COVID-19 in Hong Kong from March 2021 to April 2022. Retrieved from <https://www.statista.com/statistics/1298127/hong-kong-covid-19-vaccination-rate/>

¹⁵ Statista. (2023). Coronavirus disease (COVID-19) vaccination rate in Japan as of February 27, 2023. Retrieved from <https://www.statista.com/statistics/1239927/japan-covid-19-vaccination-rate/>

Methods

Scoping review

A systematic search of the literature on the immunisation of older adults in Hong Kong and Japan was carried out in November 2023. The search string developed and deployed used keywords and MESH terms centred on older people, vaccination, and known barriers and facilitators pertaining to immunisation among older people previously identified in the literature, including knowledge, access, information, cost, funding, affordability, and coverage. This search string was adapted from the string used in a previous study exploring the barriers and facilitators to immunisation of older adults in Indonesia, Australia, the Philippines, and Singapore. All literature retrieved from the search was retrieved and imported into Mendeley for management and article screening.

The study screening process was underpinned by the Cochrane Rapid Review Methods Group's recommendations for conducting rapid reviews (Garritty et al., 2021). Studies were included if they involved a human population over 60 years old (i.e., the definition of older adults as defined by the United Nations Department of Economic and Social Affairs), reported any barriers/facilitators/factors influencing immunisation, and/or reported on the effectiveness of promoting immunisation among older adults. The studies included employed quantitative, qualitative, or mixed methods and were limited to only Hong Kong and Japan. Only English-language, peer-reviewed studies that used original data and were published between 2018 and 2023 were included (Box 1).

A total of 1591 records were retrieved from database searches. After removal of duplicates and title and abstract screening, 111 studies were full-text reviewed. Of those, 52 met the inclusion criteria and data were extracted from these studies for synthesis. Twenty-three papers were from Hong Kong and 29 papers were from Japan.

Fifty-two articles were included in the final synthesis. Forty-seven papers reported on barriers and/or facilitators to immunisation of older adults while seven articles reported on effective interventions to promote vaccination uptake in this population. Twenty-eight studies addressed COVID-19 vaccine uptake and hesitancy, six looked at influenza vaccination, thirteen at pneumococcal vaccination, one at herpes zoster vaccination, and four at both influenza and pneumococcal vaccinations. Quality appraisal was guided by The Mixed Methods Appraisal Tool (Hong et al., 2018) and the quality of included studies was assessed to be moderate overall.

Data extraction focused on the barriers and facilitators to immunisation among older adults and effective interventions that promoted vaccination among older people. All barriers and facilitators from across study types were inductively extracted. For quantitative studies, factors that were significantly associated with vaccination uptake were extracted. For qualitative studies, factors that were identified from thematic/content analysis of data were extracted.

Stakeholder interviews

Semi-structured in-depth stakeholder interviews were conducted with key individuals who work in the space of immunisation of older adults in Hong Kong and Japan between November 2023 and May 2024. We conducted interviews with diverse stakeholders, including ageing and public health experts, clinicians, policymakers, academics, and community and social sector/patient advocacy organisations. These interviews were guided by an interview guide (Appendix B) to better understand the current state of the immunisation of older adults in Hong Kong and Japan, as well as best practices, successes, gaps, and potential ways forward to improve uptake.

Interviewees were purposively sampled based on their experience and knowledge of immunisation of older adult populations in their respective countries. To ensure that a holistic view of the barriers and facilitators to the immunisation of older adults in Hong Kong and Japan was obtained, interviewees were recruited from diverse backgrounds including medicine, nursing, community health and outreach, research, and health policymaking. Interviewee profiles can be viewed in Appendix C of this report.

Six Hong Kong stakeholder interviews were conducted in English, while seven Japan stakeholder interviews were conducted in Japanese by our research partner, the Health and Global Policy Institute (HGPI). Interviews took place using a secure videoconferencing platform or in person. All interviews took up to 60 minutes to complete and were audio recorded, transcribed, and translated into English where necessary. Interview data were anonymised and deidentified, then thematically analysed by the research team.

Box 1: Study inclusion and exclusion criteria

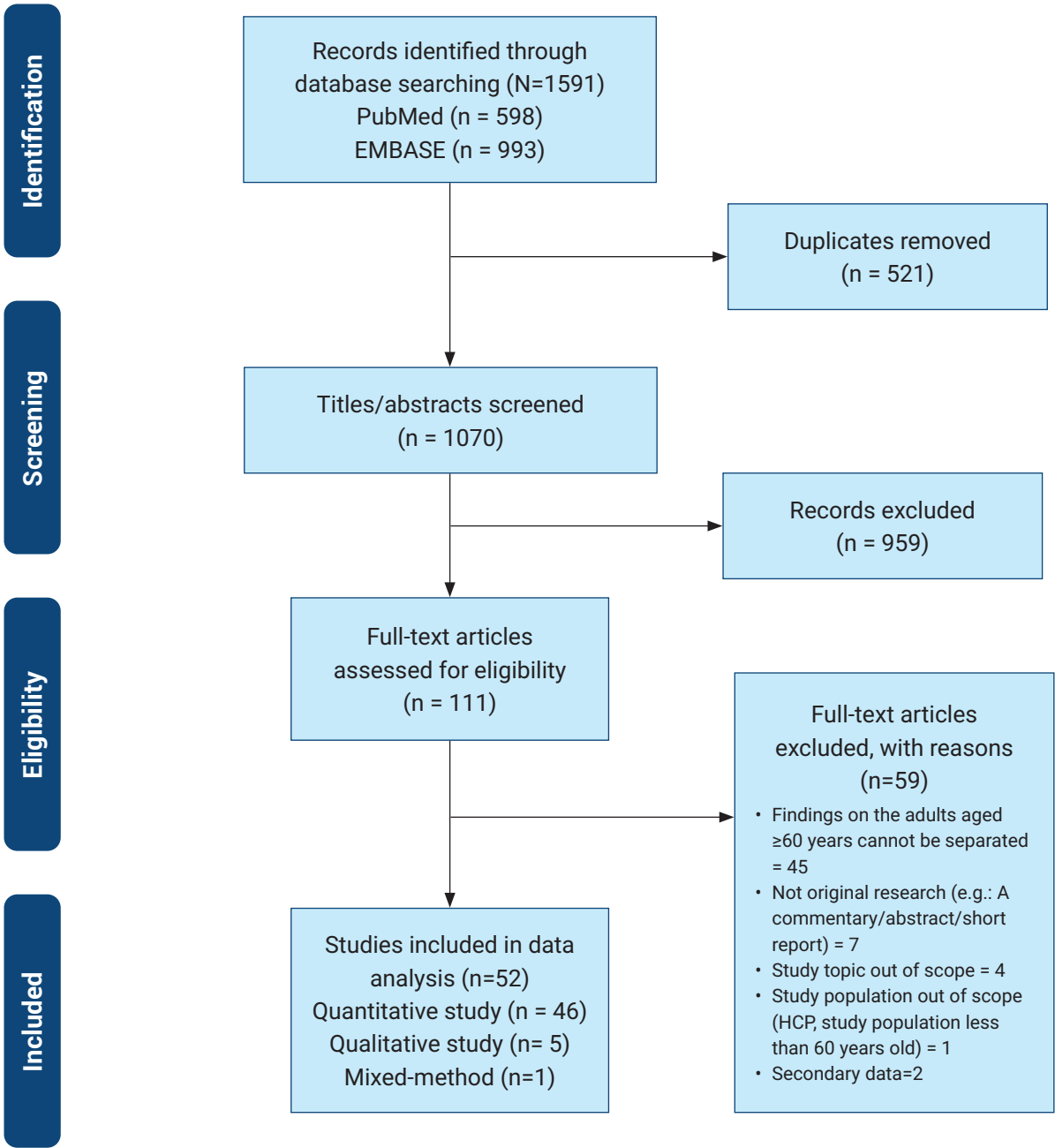
Inclusion criteria

- Human population over 60 years old
- Studies that reported any barriers, facilitators or factors influencing immunisation
- Studies that reported effectiveness of interventions in promoting immunisation among older adults. Interventions are defined as a) study that included a comparison of a group who had been exposed to an intervention with a group who had not been exposed or who had been less exposed, or, or b) a programme that was implemented to increase vaccination uptake and looked at overall pre- and post-vaccination rates.
- Quantitative, qualitative, and mixed-method designs
- English only
- Studies conducted in countries limited to Hong Kong and Japan
- Publication year from 2018 – 2023 (5 years)
- Studies that used original data
- Peer-reviewed articles

Exclusion criteria

- Study population less than 60 years old
- Populations out of scope (e.g., pregnant women and healthcare professionals)
- Vaccines out of scope (e.g., travel, occupational health vaccines)
- Outcomes out of scope (e.g., studies investigating vaccine immunogenicity, efficacy, effectiveness)
- Not about vaccines/vaccination
- Secondary outcomes
- Secondary research
- Not in English
- Study that was conducted in a multi-country setting but data on the targeted countries (Hong Kong, Japan) could not be separated
- Systematic, narrative or literature review or meta-analysis, protocols, commentaries, theses, dissertations, letters, editorials, abstracts, and conference proceedings, poster
- Duplicates

Figure 1: Flow diagram detailing the database searches, the number of abstracts screened, and the full texts retrieved for scoping review



Ethical approval for this component of the study was granted by the National Council of Social Services (NCSS) Singapore [Study Number NERC/017/2023]. In alignment with ethical research practices, all interviewees were required to sign an informed consent form that provided study information, sought

permission for the audio recording of interviews, and reassured participants of data confidentiality before commencing the interview.

Finally, the scoping review and key stakeholder interview findings were synthesised and reported thematically.

Findings

Individual drivers of vaccination decision-making

	Facilitators	Barriers
Perceived risk of disease	<u>Routine vaccinations</u> Perceived risk of infection or susceptibility to infection: • Pneumococcal disease (Wang et al., 2021a; Huang et al., 2021; Nakamura et al., 2020) Better knowledge of disease and vaccine: • Pneumococcal disease (Higuchi et al., 2018; Wang et al., 2021a) <u>COVID-19 vaccination</u> Perceived risk of infection or susceptibility to infection: • COVID-19 (Kajikawa et al., 2022; Hori et al., 2023; Okubo et al., 2021) Perceived health conditions that would increase their disease risk, i.e., co-infection with both COVID-19 and influenza: • Perceived infectivity of COVID-19 disease impacted intention to take up seasonal influenza vaccination (Liang et al., 2023) • Perceived risk of co-infection with COVID-19 and influenza (Liang et al., 2023) Perceived risk of passing infection to others (Okubo et al., 2021)	<u>Routine vaccinations</u> • Poor understanding of pneumococcal disease (Huang et al., 2022) <u>COVID-19 vaccination</u> • Perceived low susceptibility or risk of COVID-19 disease (Siu et al., 2021; Yu et al., 2023) • Perceived risk of disease from COVID-19 vaccination locations (Siu et al., 2021) • Downplaying COVID-19 pandemic risk (Yuan et al., 2023) • Personal history of COVID-19 infection (Okubo et al., 2021)
Perceived severity of disease	<u>Routine vaccinations</u> • High perceived severity of influenza disease (Liang et al., 2023) <u>COVID-19 vaccination</u> • High perceived risk of serious illness (Okubo et al., 2021)	<u>COVID-19 vaccination</u> • Fear of COVID-19 induced death (Okubo et al., 2021)

	Facilitators	Barriers
Knowledge of vaccination and vaccine programmes	<u>Routine vaccinations</u> • Previous experience of pneumococcal and influenza vaccination impacted intention to take up seasonal influenza vaccination (Liang et al., 2023) • Past influenza vaccination impacted uptake of pneumococcal vaccination (Kawakami et al., 2022) • Pneumococcal vaccination willingness associated with influenza vaccination in the previous season (Kajikawa et al., 2022) • Knowledge of vaccination schemes for pneumococcal disease, including eligibility criteria (Huang et al., 2022)	<u>Routine vaccinations</u> • Poor understanding of pneumococcal vaccine schemes (Huang et al., 2022) • Lack of understanding of pneumococcal vaccine (Higuchi et al., 2018) • Lack of perceived value of pneumococcal vaccination (Higuchi et al., 2018) <u>COVID-19 vaccination</u> • Being unsuitable for COVID-19 vaccination (Liang et al., 2023; Siu et al., 2021)
Perceived effectiveness of vaccine	<u>Routine vaccinations</u> Efficacy of protection: • From pneumococcal disease (Higuchi et al., 2018) • From influenza (Kajikawa et al., 2019) Perceived benefits of vaccine/vaccination: • Influenza vaccine (Liang et al., 2023) • Pneumococcal vaccine (Huang et al., 2021; Wang et al., 2021a) <u>COVID-19 vaccination</u> Efficacy of protection: • From COVID-19 (Wang et al., 2021b; Kajikawa et al., 2022; Wu et al., 2023) Perceived benefits of vaccine/vaccination: • COVID-19 booster (Chan et al., 2023) • Positive attitudes towards the COVID-19 booster (Wang et al., 2022a)	<u>COVID-19 vaccination</u> • Concerns about COVID-19 vaccine efficacy or necessity (Huang et al., 2022; Yuan et al., 2023) • Perceived poor long-term effectiveness of COVID-19 vaccine (Siu et al., 2022) • Perceived poorer response to COVID-19 vaccine due to old age and chronic conditions (Wang et al., 2022a) • Perceived negative impact of taking multiple vaccines (e.g., COVID-19 vaccine would negatively affect effectiveness of flu vaccine) (Liang et al., 2023)

	Facilitators	Barriers
Perceived risks of taking vaccine	<u>Routine vaccinations</u> • Low perceived susceptibility to adverse events related to influenza vaccination (Kajikawa et al., 2019) <u>COVID-19 vaccination</u> • Trust in safety and efficacy of COVID-19 vaccines (Machida et al., 2021; Siu et al., 2022)	<u>Routine vaccinations</u> • High susceptibility to adverse side effects of influenza vaccine (Kajikawa et al., 2022) <u>COVID-19 vaccination</u> • Concerns about COVID-19 vaccine side effects (Hori et al., 2023; Higuchi et al., 2018; Yuan et al., 2023)
Secondary health incentives/ disincentives		<u>Routine vaccinations</u> • Vaccines as harmful to the body (influenza and pneumococcal - Siu et al., 2021) <u>COVID-19 vaccination</u> • Negative attitudes towards COVID-19 vaccines (Wang et al., 2022b; Yu et al., 2023) • Vaccine fatigue (Chan et al., 2023) • Vaccines as toxic (Siu et al., 2022) • Vaccination as a viral injection (Siu et al., 2022) • Distrust and lack of confidence in COVID-19 vaccines (Siu et al., 2022; Yuan et al., 2023) • Fatalistic views on pandemic risk (Yuan et al., 2023) • Contentment with non-pharmaceutical COVID-19 risk reduction strategies (e.g., quarantine, lockdowns) (Yuan et al., 2023) • Negative views of western biomedicine (Yuan et al., 2023)
Indirect incentives/ disincentives	<u>COVID-19 vaccination</u> • Freedom of personal movement and access to venues, including visits to homes and hospitals without COVID-19 testing, travel without quarantine (Chu et al., 2022; Wang et al., 2022b) • Relaxing COVID-19 restrictions on visiting policies in hospitals and healthcare facilities (Wong et al., 2021b)	<u>COVID-19 vaccination</u> • Embarrassment of being infected with COVID-19 (Okubo et al., 2021) • Insufficient incentives to be vaccinated against COVID-19 (Yuan et al., 2023)

	Facilitators	Barriers
Decision-making and ability to access and appraise information	<u>Routine vaccinations</u> • Greater competence of finding and appraising information (influenza - Zhang et al., 2020) • Informed decision-making style (influenza - Sato et al., 2022) <u>COVID-19 vaccination</u> • Internet use (Takayama et al., 2023) • Less decisional conflict (i.e., personal uncertainty about which option to take when there are competing options) (Wang et al., 2022b)	<u>COVID-19 vaccination</u> • Limited competence accessing and appraising COVID-19 vaccine information (Zhang et al., 2020) • Not obtaining COVID-19 vaccine information from medical professionals or TV (Yoneoka et al., 2022) • Obtaining COVID-19 vaccine information from YouTube (Yoneoka et al., 2022) • Decision-making based on preexisting vaccine-related attitudes, perceptions, and biases (Yuan et al., 2023)
Information-seeking behaviour		<u>COVID-19 vaccination</u> High levels of information-seeking behaviour (Machida et al., 2021)
Social media use		<u>COVID-19 vaccination</u> Fewer types of social media use (Zhang et al., 2022)
Self-efficacy and activation	<u>Routine vaccinations</u> • Patients' questioning attitude (pneumococcal - Sato et al., 2022) • Higher confidence to receive pneumococcal vaccine (Wang et al., 2021a) • Consistent health-seeking behaviour and relationship (pneumococcal - Huang et al., 2021) • Higher self-efficacy (pneumococcal - Huang et al., 2021) <u>COVID-19 vaccination</u> • Perceived behavioural control with respect to COVID-19 booster (Wang et al., 2022b) • Higher self-efficacy (Chan et al., 2023)	

Perceived risk of disease and vaccine efficacy

The results of this scoping review are consistent with past findings that the perceived risk of infection or susceptibility significantly influences attitudes toward vaccination, as was seen for COVID-19 and routine vaccinations such as pneumococcal disease. For instance, individuals who perceive a higher risk of contracting pneumococcal disease are more likely to opt for vaccination, as increased perceived susceptibility is linked to higher vaccine uptake (Huang et al., 2021; Nakamura et al., 2020; Wang et al., 2021a). Similarly, in the context of COVID-19, those who perceive greater infection risks or higher susceptibility tend to support vaccination (Hori et al., 2023; Kajikawa et al., 2022; Okubo et al., 2021).

Better knowledge of the disease impact and of the benefits of vaccination leads to more informed immunisation decisions, particularly noted in pneumococcal disease research (Higuchi et al., 2018; Wang et al., 2021a). The perceived severity of diseases such as influenza can drive vaccination uptake, with individuals more likely to seek immunisation if they believe that the consequences of infection are severe (Liang et al., 2023).

Concerns about co-infections, such as contracting both COVID-19 and influenza, also affect vaccination intention, with studies showing that fear of co-infection can prompt individuals to pursue vaccinations for both diseases as a precaution (Liang et al., 2023). Finally, the perceived risk of transmitting infections to others often motivates vaccination, reflecting an altruistic approach to public health (Okubo et al., 2021).

While the scoping review clearly indicates the correlation between knowledge and uptake, in our interviews, both Japan and Hong Kong experts explained that this fundamental knowledge may be lacking at the population level: older adults still have limited awareness of the potential risks and impacts

of vaccine-preventable illnesses, particularly relative to other infectious diseases. As shared by a Hong Kong expert,

"I think older people, they don't [think that influenza is serious]. But the government keep promoting the idea that influenza mortality rates could be also very high. But yes, people know about it, but when you go high, it is not that high, because it is just so common to get influenza." -HK002

Ironically, vaccination programmes for older adults send important messages about risk and disease prevention but may also have backfire effects on take-up if interpreted as signalling low priority. For example, Japan experts noted that although influenza and pneumococcal vaccines are strongly recommended by the government, both infections are classified as Class B, or less life-threatening, diseases under Japan's Immunisation Act, which may shape individuals' perceptions of disease severity and subsequent vaccination behaviours.

In addition, across both Japan and Hong Kong, experts described the negative impacts of older adults having an "overconfident" or "lucky" mentality, believing that they would be safe or fortunate enough to not be infected with a vaccine-preventable disease. Reasons for this attitude included the perceptions that limited contact with others and wearing masks were protective from infection, high levels of self-perceived health, and fears of being infected enroute to seeking vaccination.

Finally, having a preventive health mindset is not sufficient to motivate vaccination specifically. Hong Kong experts mentioned while the elderly tended to prioritise their health, vaccination was not seen as especially critical to health. It is understood to be just one of many ways of caring for their health, alongside diet, exercise and other lifestyle modifications and behaviours:

"If we talk about building immunisation for older people, they would not only rely on vaccination. They will also modify their lifestyle to have better food and doing more exercise ... I think the concept of having immunisation is not that strong in older people, but they know that they have to make themselves strong to fight those infections." -HK005

Knowledge of vaccination and vaccine programmes

With respect to routine vaccination, individual experiences with prior vaccinations significantly influence intentions and behaviours toward subsequent immunisations. For example, individuals who have previously been vaccinated against pneumococcal disease are more likely to pursue seasonal influenza vaccinations, suggesting that positive experiences or perceived benefits from one type of vaccination can enhance compliance and receptivity towards others (Liang et al., 2023). Similarly, individuals who had received influenza vaccines in the past were more likely to accept pneumococcal vaccines, indicating a trend where positive vaccination experiences build trust and acceptance of other vaccines (Kawakami et al., 2022). The decision to accept a pneumococcal vaccine is frequently influenced by recent participation in influenza vaccination programmes, underscoring the importance of sustained vaccination efforts and the cumulative effect of routine vaccination habits on public health behaviours (Kajikawa et al., 2022).

Knowledge of vaccination schemes, such as an understanding of the eligibility criteria and other details of vaccination programmes, significantly improves the willingness of older adults to get vaccinated. Clear and accessible information about vaccination schemes enhances the likelihood of participation in these programmes, empowering individuals to make informed decisions about their

health and contributing to higher vaccination rates (Huang et al., 2022).

Our experts noted that limited awareness and understanding of vaccine types, programmes, and vaccination eligibility remain key concerns in both Japan and Hong Kong. Experts noted that vaccination protocols need to be explicit with clear pathways to access and financing in order for vaccine-seeking behaviour to change:

"The guidelines for classifying B Category diseases were introduced during the flu pandemic in 2001, but they do not specifically advocate for vaccinations, rendering them ineffective." -JPN003

"There are some complications because not everyone is free. You have to be over a certain age. A little bit complex ... If you're 50, you have to go to the GP. If you're 65, you can go anywhere. If you have a compromised immune system, there are some complications. Some of them are nervous that, "What if I'm wrong? I'm not eligible, and I don't have the money"." -HK001

Older adults' knowledge and awareness of vaccine types and programmes are influenced by their informational environment, including government promotion and encouragement of certain vaccinations. Understanding can vary across different vaccines – experts noted that older adults in Japan have higher awareness and understanding of influenza vaccination compared to pneumococcal vaccination because of consistent promotion efforts by the government, with corresponding differences in uptake rates (i.e., about 50% for the annual flu vaccine versus about 20% for the five-yearly pneumococcal vaccine).

The success of life-course immunization strategies in Hong Kong has been varied. While childhood

immunization rates are high, reaching around 95–96%, there are challenges in ensuring continued vaccination throughout adulthood. Adolescents and young adults often do not realize the need for updating vaccinations, particularly for diseases like measles, pertussis, and influenza. The lack of recognition for the importance of annual influenza vaccination contributes to low uptake in this age group. However, the involvement of active medical practitioners who recommend regular immunizations during patient visits has been identified as a key factor contributing to success. These practitioners monitor vaccination records, recommend updates, and provide explanations, helping to increase awareness and uptake of vaccines among older adults.

Some Hong Kong experts highlighted that acceptance and uptake of routine vaccinations improved after the COVID-19 pandemic, as regular COVID-19 vaccination encouraged vaccine acceptance, built vaccination habits, increased confidence, and assuaged fears of adverse vaccine side effects. As one expert explained:

"[The elderly] learn to regularly take vaccination throughout COVID. We really see some people come up and say, 'I have a free jab in COVID, so I get less severe symptoms, so I really know by now that vaccination is important, and I want to get a flu jab'. We really have some of that in the community. And also, the vaccination rate is growing. From the first time I started doing community vaccination, it's like 20-something or close to 30%, and now it's like 48%." -HK001

Perceived risks of taking vaccine

Public perceptions of susceptibility to adverse side effects, alongside trust in the efficacy and safety of vaccines, play crucial roles in the uptake of routine vaccinations. Studies in this scoping review indicate

that lower perceived risks, such as those associated with influenza vaccines, correlate with higher vaccination rates and the maintenance of regular vaccination schedules (Kajikawa et al., 2019). Similarly, robust trust in the safety and effectiveness of COVID-19 vaccines, bolstered by the dissemination of positive, evidence-based information, significantly influences decisions to participate in vaccination programmes (Machida et al., 2021; Siu et al., 2022). This collective trust underscores the importance of effectively communicating the benefits and safety of vaccines to enhance public participation in vaccination efforts.

Scepticism around vaccine efficacy and concerns around risks of harm, including severe adverse side effects, shape vaccine uptake among older adults. This can be especially difficult in the context of new vaccine technologies (e.g., mRNA), as vaccine efficacy and benefits may appear unclear, and mistrust can be exacerbated by vaccine-related misinformation or disinformation.

"The chances of you dying is low, but it's there, and then the question that asks again, so what is the chance of you getting a serious side effect of vaccination and they wouldn't know, of course. But then I said, quoting experiences from much, you know, millions and millions of doses being used. So, you talk about one in a million that you get a serious adverse event following vaccination unless you have a number of different allergies." -HK007

"The chances of you getting infected and so on is actually higher than the chance of getting sick by vaccination." -HK007

"The chances of a flu vaccine working nowadays, about 60 maybe 70% efficacy, that's actually higher than flipping a coin."

But because you have 60–70% coverage protection, you make a decision yourself, but then looking at all these steps and analysing risk, OK then you make a decision yourself.” -HK007

On the ground, experts reiterated that while some risks are real, the perception of risks is influenced by media coverage of vaccination and adverse events, with the spread of misinformation and disinformation through the media itself as well as social and family networks. One stakeholder in Hong Kong, for example, highlighted the implications of linking different vaccines to political camps and mistrust in vaccine development processes, quality, efficacy, and harm in Hong Kong during COVID:

“Misinformation during the COVID time is so serious that really affects people’s behaviour. ... some of the people actually consider the vaccines are developed not well, it’s not good enough, so that [it] may hurt your body. So, this kind of misinformation has been all everywhere, and it actually affects the older people to make decisions on vaccination as well.” -HK005

Policy actions and communications that demonstrate the limited harms of vaccination to older adults can positively impact vaccination behaviours. An illustrative example shared by a Hong Kong expert was that older adults in long-term care and their families were reassured and COVID-19 vaccine uptake increased following a lack of severe adverse events after the government implemented priority vaccination of those aged 65 and over.

“[Among long-term care residents who were not cognitively impaired/disabled], because I went to the nursing homes, I could see them,

at least in the first wave, there was a lot of anxiety. But after the government... pushing the older people to receive the vaccinations, and the large group of people, they see that after receiving the vaccinations, there’s no problem at all, no people died. And then people gained the confidence, and they’re more happy to receive that vaccination.” -HK002

Indirect incentives and disincentives

Indirect incentives and disincentives significantly influence decisions regarding COVID-19 vaccination. Primary incentives include freedom of personal movement and access to various venues. For example, being vaccinated against COVID-19 allows individuals to visit homes and hospitals without the need for COVID-19 testing and to travel without the requirement to quarantine (Chu et al., 2022; Wang et al., 2022b).

Additionally, vaccination can lead to relaxing COVID-19 restrictions on visiting policies in hospitals and healthcare facilities, further incentivising individuals to receive the vaccine (Wong et al., 2021b).

Decision making and ability to appraise information

Decision-making and the cognitive ability to access and appraise information play critical roles in vaccination behaviours. In the context of routine vaccinations like influenza, the competence to find and effectively appraise information significantly enhances informed decision-making. For instance, individuals who are better at accessing and evaluating information are more likely to make informed choices regarding influenza vaccinations (Zhang et al., 2020; Sato et al., 2022).

Similarly, for COVID-19 vaccination, factors such as internet use have been identified as significant in facilitating access to vaccination-related

information, thereby aiding decision-making processes. Clearer and more accessible information can reduce hesitation and encourage vaccine uptake, because older adults are more likely to opt for vaccination when they feel less uncertain about which option to select when faced with competing options (i.e., have a reduced level of decisional conflict) (Takayama et al., 2023; Wang et al., 2022b).

Self-efficacy and activation

Self-efficacy and activation are crucial factors in the decision-making process for both routine and COVID-19 vaccinations. For routine vaccinations, such as those for pneumococcal disease, several aspects significantly influence uptake. A questioning attitude among patients can lead to more informed choices regarding vaccinations (Sato et al., 2022). Furthermore, individuals with higher confidence are more likely to receive the pneumococcal vaccine, and those displaying consistent health-seeking behaviour and maintaining strong relationships with healthcare providers are often more engaged in proactive health measures (Wang et al., 2021a; Huang et al., 2021).

In the context of COVID-19, having the ability to make their own decisions regarding the booster doses significantly impacts individuals' readiness to receive additional shots, reflecting an understanding of and confidence in managing their health with respect to the virus (Wang et al., 2022b). Additionally, higher self-efficacy is associated with greater likelihood and readiness to receive COVID-19 vaccinations, underscoring the importance of confidence in one's ability to take health-related actions (Chan et al., 2023).

Certain common ageist stereotypes did not emerge in expert interview data. For instance, experts did not provide evidence that older adults' fears of injections or fatalistic beliefs were linked to low uptake.

"Public awareness is an important thing, that they will have that little bit of knowledge in themselves and then they will make the assessment themselves risk assessment themselves and they would make a correct choice of action." -HK007

Systemic drivers of vaccine acceptance and uptake

	Facilitators	Barriers
Accessibility	<u>COVID-19 vaccination</u> • Walk-in COVID-19 vaccination services without prior booking (Wang et al., 2022b)	<u>COVID-19 vaccination</u> • Technological access to COVID-19 vaccination (e.g., online booking of appointments/facilities) (Chu et al., 2022)
Family, significant others, and friends	<u>Routine vaccinations</u> • Peer recommendations to take pneumococcal vaccine (Nakamura et al., 2020) • Peers of similar age who had taken pneumococcal vaccine (Wang et al., 2021a) <u>COVID-19 vaccination</u> • Recommendations from others to take COVID-19 vaccination (Kajikawa et al., 2022) • Cues to action to take COVID-19 vaccine from significant others (Liang et al., 2023; Wang et al., 2021a) • Cues to action to take COVID-19 vaccine from family members (Chu et al., 2022) • Perceived support of significant others to take COVID-19 vaccine (Wang et al., 2022a)	<u>Routine vaccinations</u> • Family member/friend with negative history of seasonal influenza (Liang et al., 2023) <u>COVID-19 vaccination</u> • Exposure of friends and family to COVID-19 misinformation in the media (Chia et al., 2023) • Perception that peers would wait to take up COVID-19 vaccine (Liang et al., 2023) • Family members' low acceptance of COVID-19 vaccine (Wang et al., 2021b) • Peer pressure to wait before taking COVID-19 vaccine (Siu et al., 2022) • Low levels of COVID-19 vaccination decisional support from family (Yuan et al., 2023) • Perception that significant others would not support COVID-19 vaccination decision (Wang et al., 2022a) • Family's unsupportive attitudes towards COVID-19 vaccination (Yu et al., 2023) • Prioritising negative COVID-19 vaccine-related news from peers (Yuan et al., 2023)

	Facilitators	Barriers
Community and social care	<u>Routine vaccinations</u> • Social capital: civic participation, social cohesion, mutual exchange of social support (pneumococcal - Iwai-Saito et al., 2021) <u>COVID-19 vaccination</u> • Espousal of social norms (Hori et al., 2023; Kajikawa et al., 2022) • Civic and collective responsibility i.e. the willingness to protect others by one's own vaccination through herd immunity (Machida et al., 2021; Okubo et al., 2021, and Siu et al., 2021)	<u>COVID-19 vaccination</u> • Fragile social networks (Siu et al., 2022) • Passive disengagement due to lack of social support and connectivity (Yuan et al., 2023)
Healthcare system	<u>Routine vaccinations</u> • Vaccination recommendation by physician (pneumococcal - Higuchi et al., 2018; Huang et al., 2022; Kawakami et al.2020; Nakamura et al., 2020) • Involvement of physician (pneumococcal - Huang et al., 2022) • Positive patient experience (herpes zoster - Inaba et al., 2023; influenza and pneumococcal - Kaneko et al., 2020) • Having a family physician (Influenza and pneumococcal - Iwai-Saito et al., 2023; Sato et al., 2022) • Physician's listening attitude (influenza and pneumococcal - Sato et al., 2022) • Shared decision-making between patient and physician (influenza and pneumococcal - Sato et al., 2022) <u>COVID-19 vaccination</u> • Vaccination recommendation by physician (Kajikawa et al., 2019) • Cues to action to take COVID-19 vaccine from family doctor (Chu et al., 2022)	<u>Routine vaccinations</u> • Lack of pneumococcal vaccination recommendation by physicians (Higuchi et al., 2018) • Lack of influenza and pneumococcal vaccination promotion by healthcare providers (Siu et al., 2021) <u>COVID-19 vaccination</u> • Advice from healthcare professional not to take up COVID-19 vaccination (Yu et al., 2023) • Stigma towards healthcare workers during the COVID-19 pandemic (Siu et al., 2022) • Low levels of COVID-19 vaccination decisional support from physicians (Yuan et al., 2023)

	Facilitators	Barriers
Economic factors	<u>Routine vaccinations</u> • Reduced influenza vaccination copayments (Ando et al., 2023) • Offering free vaccine (influenza - Ando et al., 2023) <u>COVID-19 vaccination</u> • Offering free vaccine (COVID-19 - Siu et al., 2022)	<u>Routine vaccinations</u> • Increased out-of-pocket costs (pneumococcal - Murakami et al., 2019) • Increased per capita income (pneumococcal - Murakami et al., 2019) • Increased unemployment rate (pneumococcal - Murakami et al., 2019)
Government and authorities	<u>Routine vaccinations</u> • Recommendations from government (pneumococcal - Huang et al., 2021) • Involvement of government (pneumococcal - Huang et al., 2021) <u>COVID-19 vaccination</u> • Trust in government (Siu et al., 2022) • Recommendations from government (Wong et al., 2021b) • More civil servants and physicians per population (Tomioka et al., 2023) • Trust in COVID-19 promotional materials from government (Wang et al., 2022a) • Government incentives (Wang et al., 2022b)	<u>COVID-19 vaccination</u> • Lack of trust in government (Okubo et al., 2021 and Siu et al., 2022) • Dissatisfaction with policy response to COVID-19 vaccine adverse side effects (Yuan et al., 2023) • Low levels of COVID-19 vaccination decisional support from government (Yuan et al., 2023)
Vaccination choice architecture / environment	<u>Routine vaccinations</u> • Municipal subsidies and notifications for pneumococcal vaccination (Kawakami et al., 2020) • Municipal notifications for pneumococcal vaccination (Murakami et al., 2019, Watanabe et al., 2020) <u>COVID-19 vaccination</u> • Less uncertainty regarding COVID-19 vaccine booster choice (Wang et al., 2022a)	

	Facilitators	Barriers
Informational environment		<u>COVID-19 vaccination</u> • Shifts in information and knowledge over the course of the COVID-19 pandemic (Xiao et al., 2022) • Exposure to conflicting information about the suitability of elderly people to receive vaccination during COVID-19 pandemic (Yu et al., 2023) • Exposure to conflicting information that the elderly should not be vaccinated against COVID-19 (Yu et al., 2023)

Accessibility

Having vaccines that are free of charge and easily physically accessible to the elderly population is a key facilitator of vaccination uptake.

In the first case, reducing financial barriers, such as copayments for influenza vaccinations, has been shown to increase vaccine acceptance and compliance (Ando et al., 2023). Additionally, offering vaccines free of charge encourages broader participation in vaccination programmes, as evidenced by the increased uptake of free influenza vaccines (Ando et al., 2023). Similarly, for COVID-19 vaccinations, providing the vaccine at no cost has been identified as a crucial factor in enhancing uptake. The availability of free COVID-19 vaccines has led to an increase in vaccination rates, which is vital for achieving widespread immunisation coverage during public health emergencies (Siu et al., 2022).

In this case, physical access becomes the constraint. In fact, a significant systemic facilitator in enhancing vaccine uptake is the availability of walk-in COVID-19 vaccination services without the need for prior booking. Such services can substantially improve accessibility, reducing barriers related to scheduling and long waiting times (Wang et al., 2022b). This approach allows individuals more flexibility and

ease in accessing vaccination, which is crucial for increasing overall coverage rates, particularly among those who may face challenges with transportation, scheduling conflicts, or technology limitations for online booking. While Hong Kong experts did not identify any groups facing physical access barriers to vaccination, Japan experts identified several, namely the elderly living in care facilities, those receiving home medical care, and rural populations.

For other vaccines, however, financial access barriers remain a significant factor. In Hong Kong, certain socioeconomically vulnerable groups, such as lower-income individuals in government-subsidised long-term care settings, may not be able to afford the out-of-pocket costs of certain vaccines, e.g., shingles. In Japan, these barriers may also vary by geography – for some municipalities (e.g., in Hokkaido), there are no out-of-pocket costs for certain vaccines recommended to older adults.

“One success story may be that some places offer subsidies to cover the cost of vaccinations. Without subsidies, the shingles vaccine, for example, would cost tens of thousands of yen out-of-pocket for two doses, which is a heavy burden.” -JPN005

However, not all vaccines for older adults are similarly subsidised across the country and other routine vaccines often involve out-of-pocket payment. For example, there are differences in municipal subsidy rates for pneumococcal vaccines, resulting in different rates of uptake across municipalities. In comparison, local allocation taxes fully cover the costs of paediatric vaccinations.

Family, significant others, and friends

Our scoping review shows that family, significant others, and friends play a critical role in influencing vaccination decisions. Recommendations from peers significantly enhance the uptake of routine vaccinations, such as the pneumococcal vaccine, and similar patterns are observed with peers influencing others when they have also received the vaccine (Nakamura et al., 2020; Wang et al., 2021a).

In the context of COVID-19, the impact of social networks is even more pronounced. Strong motivation to receive the vaccine arises from recommendations made by others (Kajikawa et al., 2022). Cues to action from significant others are crucial in prompting individuals to get vaccinated, with specific emphasis on the influence of family members. Additionally, the perceived emotional support from these close contacts significantly enhances individuals' willingness to accept vaccination (Liang et al., 2023; Wang et al., 2021a; Chu et al., 2022; Wang et al., 2022a).

Our expert interviews reinforced this understanding and further highlighted the influence of social networks for the elderly in both Hong Kong and Japan. In Hong Kong, the family was crucial to encouraging or discouraging vaccination, and in some cases, permitting vaccination. Several Hong Kong experts raised that during the COVID-19 pandemic, despite elderly individuals' own openness to vaccination, some were forbidden from receiving COVID-19 vaccinations by their families due to their families' concerns regarding safety and side effects. An expert explained that this strong familial influence is

tied to Chinese culture and values, where key health decisions are primarily made within a "confined" and "close" family space with limited influence from the wider social network:

"Chinese are more follow the close group, the family... than the outside group people. So, going to the elderly centres would not be necessarily linked that they will follow their peers. ... All these key decisions will be confined within our family. ... And if this is a close friend, that might have influence on me. But if it is just a hearsay friend, ... I don't think they will actually influence me in terms of making that kind of decision. ... because we are a layered society. So, we have our close layer, that family, the close friends. And then the... we call it weak ties. ... in terms of ... health, physical decisions, weak ties doesn't cut [it]." -HK004

In Japan, conversely, while one expert described adult children objecting to the vaccination of their parents residing in elderly care facilities, the theme of direct family ties did not emerge as strongly as it did in Hong Kong. Instead, experts referred to the influence of friends and peers on vaccination behaviours:

"Even if the effectiveness of vaccination has been objectively proven, if the people around you do not vaccinate, you may feel uncomfortable about it yourself." -JPN004

Community and social care dynamics

Community and social care dynamics also impact vaccination decisions significantly. Social capital, which includes elements like civic participation, social cohesion, and mutual exchange of social support, has been found to positively impact the uptake of routine vaccinations such as the pneumococcal vaccine (Iwai-Saito et al., 2021).

In the context of COVID-19, the adoption of social norms plays a crucial role. Individuals are more likely to get vaccinated when they perceive that doing so aligns with the social norms upheld by their community (Hori et al., 2023; Kajikawa et al., 2022). Furthermore, a sense of civic and collective responsibility, particularly the willingness to protect others through herd immunity, significantly motivates individuals to participate in vaccination programs, underlining the community-oriented rationale behind health behaviours (Machida et al., 2021; Okubo et al., 2021; Siu et al., 2021).

These factors are broadly reflected in the importance of community and social care in facilitating and supporting immunisation efforts, as related by our interviewees. In Japan, participation in community activities was seen to positively impact older adults' vaccination uptake. As described by a Japanese expert:

"Social connections are linked to immunisation coverage. Those who participated in social activities - hobbies, volunteering in the community - had a 20% higher vaccination rate for pneumococcal vaccination ... it is thought to have some effect on decision-making." -JPN004

The case of Hong Kong further illustrates the role of organisational players in social and community care to actively facilitate immunisation beyond healthcare settings. These organisations tended to take a community-focused, holistic approach to caring for older adults which integrated their social and health needs within the communities in which they live, including improving vaccine literacy and uptake. The strengths of this approach are comfort and familiarity, trusting relationships with social and community care workers, physical accessibility of facilities and services, and the ability to combine health and social activities that are attractive to older adults and that cater to their needs.

"Actually, the vaccination programme in Hong Kong on paper is quite effective, because you get it in every GP, and it's virtually free. So why are they coming to the [community] centre if there is a GP downstairs who can do exactly the same and free of charge? ... because they feel relaxed coming to the centre. Although they may need to even take a bus ride of 30 minutes to the centre, but they still come. I think the unique selling point is the relationship, and they feel relaxed." -HK001

Healthcare system

Both Japan and Hong Kong have policies related to adult immunisation. Their well-developed healthcare systems, where older adults seek care and interact with healthcare professionals, present opportunities to engage with, educate, and vaccinate older adults. Our scoping review found that the healthcare system in each country has a profound influence on vaccination uptake, particularly with respect to routine vaccinations. At the same time, both these countries offer insights into ground-level challenges related to implementation.

The literature for Hong Kong and Japan emphasises the role of physicians. A physician's recommendation plays a pivotal role in encouraging patients to receive pneumococcal vaccines (Higuchi et al., 2018; Huang et al., 2022; Kawakami et al., 2020; Nakamura et al., 2020). Further involvement of physicians in discussing and administering the pneumococcal vaccine has shown to significantly boost vaccination rates (Huang et al., 2022). Additionally, positive patient experiences with healthcare providers during vaccination, such as those for herpes zoster and pneumococcal vaccines, are crucial for encouraging repeat and additional vaccinations (Inaba et al., 2023; Kaneko et al., 2020). Physicians who exhibit a listening attitude and engage in shared decision-making processes are more likely to influence patient decisions positively towards vaccination (Sato et al.,

2022). In the longer-term, it is important to have such physician relationships be consistent and trusted – having a family physician enhances regular influenza and pneumococcal vaccination compliance (Iwai-Saito et al., 2023; Sato et al., 2022). This was further illustrated in the context of COVID-19, where recommendations from physicians are a key driver for COVID-19 vaccination uptake (Kajikawa et al., 2019). Additionally, specific cues to action from a family doctor significantly prompted patients to opt for vaccination, underscoring the importance of personalised healthcare communication (Chu et al., 2022).

Our interviews with Hong Kong experts reaffirmed these findings and raised related challenges. They noted generally high levels of public trust in the healthcare system; they described physicians as being highly respected and trusted as well as having an especially influential role in shaping older adults' health behaviours. As articulated by an expert:

"That is the tradition in Hong Kong. Our physicians are actually regarded as God. ... it is not only about vaccines, it is about everything – about diagnosis, treatment, prognosis, operation, decision, all these things. ... And only the Western [trained] doctors, not the Chinese ones." -HK004

However, this role for physicians was also described as a constraint. Particularly in the public sector, physicians have limited bandwidth or scope to educate patients and promote routine immunisation. Patient-physician relationships remain largely transactional and focused on treatment or diagnosis. In addition, experts noted that some physicians and other healthcare professionals remain sceptical of vaccines, and that routine and COVID-19 vaccination uptake is by no means universal even among healthcare professionals themselves.

Meanwhile, Japanese experts described broader challenges that manifest across different levels

of the healthcare system even in the presence of national policies. While older adults are included in the Immunisation Act, the classification of vaccine-preventable diseases as Class B implies a lower prioritisation with respect to prevention of these diseases at the population level, leading to a lack of incentives for healthcare institutions and professionals to recommend and deliver adult vaccinations. At the organisational level, healthcare institutions were described as inadequately promoting vaccination among older adults and not fully understanding the importance of vaccines in preventing severe illness. At the level of healthcare professionals, experts noted that a lack of explicit and comprehensive clinical guidelines on vaccines for the elderly left physicians to rely on their own knowledge and discretion, which could also be limited, leading to poor outcomes for patients even in high-risk settings:

"The weaker the immune system is, such as during cancer treatment, the more severely prevention is needed. However, in a survey of influenza vaccination status in oncology in Japan,... 39% said that vaccination was not promoted during chemotherapy treatment. Thus, doctors other than infectious disease specialists do not always have a correct understanding of vaccines." -JPN005

Government and authorities

In Hong Kong, the government plays a prominent role in vaccination messaging, but trust in government may be impacted by an evolving political landscape. Conversely, in the much larger country of Japan, local governments are more directly involved in vaccine distribution and communication. In both economies, however, the government and authorities play a pivotal role in influencing public responses to routine and COVID-19 vaccinations alike.

The literature documents how recommendations and active involvement by government authorities

significantly enhance the uptake of pneumococcal vaccines, underscoring the impact of governmental guidance on public health behaviours (Huang et al., 2021). Municipal subsidies and notifications for routine pneumococcal vaccination have been found to positively influence vaccination rates, demonstrating the impact of local government support and proactive outreach efforts (Kawakami et al., 2020; Murakami et al., 2019; Watanabe et al., 2020).

In the context of COVID-19 vaccination, trust in government emerges as a crucial factor. Public confidence in governmental actions and recommendations plays a vital role in encouraging vaccine uptake (Siu et al., 2022; Wong et al., 2021b). Additionally, a higher ratio of civil servants and physicians per population is associated with better vaccination coverage, suggesting that robust public health infrastructure supports higher compliance rates (Tomioka et al., 2023). Trust in COVID-19 promotional materials issued by the government also positively affects public attitudes towards vaccination (Wang et al., 2022a). Furthermore, government incentives designed to encourage vaccination have proven effective in increasing participation in vaccination programmes (Wang et al., 2022b).

The role of government was especially apparent in Hong Kong experts' accounts of the government's actions during the COVID-19 pandemic, when they authoritatively led risk communications and promotion of vaccines for the elderly while enabling

access by setting up vaccination clinics in the community. However, the government concurrently faced a complex crisis of trust due to an uncertain political climate, which negatively impacted pandemic policy and decision-making, trust in vaccines in general, and COVID-19 vaccination uptake.

"We have three layers of distrust. Do you trust the government? Do you trust [this specific vaccine]? Do you trust vaccines [in general]? -HK001

In comparison, accounts from Japan highlighted some limitations of government even in an environment of high trust. One Japanese expert described the proactive role of local rather than national governments during the COVID-19 pandemic and noted the high prevalence of voluntary action:

"While local governments are not mandated to actively promote further uptake [of vaccines], approximately 80% of local governments in Japan notify eligible individuals." -JPN003

Some went well beyond sending vaccination notifications to eligible individuals in their spearheading of vaccination efforts for older adults (e.g., bussing people to and from vaccination centres and reducing the cost of routine vaccinations).

Disparities in vaccine acceptance and uptake by population subgroups

	Positive	Negative
Age	<u>Routine vaccinations</u> • Older age (influenza - Kajikawa et al., 2019) • Age 55 to 74 (pneumococcal - Sakamoto et al., 2018) <u>COVID-19 vaccination</u> • Older age (Liang et al., 2023; Kajikawa et al., 2022; Wong et al., 2021a) • Age 60 and up (Wu et al., 2023) • Age 70 and up (Yoda et al., 2022) • Age ≥60 years (Yu et al., 2022)	<u>Routine vaccinations</u> • 65 and above (influenza - Sun et al., 2020) <u>COVID-19 vaccination</u> • Older age (Nomura et al., 2021; Wang et al., 2022b; Zhang et al., 2022)
Gender	<u>Routine vaccinations</u> • Women (influenza - Zhang et al., 2020) <u>COVID-19 vaccination</u> • Men (Kajikawa et al., 2022) • Women (Liang et al., 2023)	<u>COVID-19 vaccination</u> • Women (Chan et al., 2023, Okubo et al., 2021)
Marital status		<u>COVID-19 vaccination</u> • Being married (Okubo et al., 2021)
Educational level		<u>COVID-19 vaccination</u> • Low education levels (Okubo et al., 2021)
Occupation		<u>COVID-19 vaccination</u> • Occupation outside of healthcare or essential services (Okubo et al., 2021)
Health status		<u>COVID-19 vaccination</u> • Lower levels of self-rated health (Zhang et al., 2022) • Depressive symptoms (Yu et al., 2023) • Severe psychological distress (Okubo et al., 2021)

	Positive	Negative
Health literacy		<u>COVID-19 vaccination</u> Low health literacy (Yuan et al., 2023)
Chronic conditions	<u>Routine vaccinations</u> Chronic respiratory disease (pneumococcal - Watanabe et al., 2020) <u>COVID-19 vaccination</u> Chronic conditions in general (Wong et al., 2021a)	<u>COVID-19 vaccination</u> Presence of chronic comorbid conditions (Okubo et al., 2021) Three or more chronic conditions (Zhang et al., 2022)
Social isolation		<u>COVID-19 vaccination</u> Social isolation (Yamada et al., 2023) Living alone (Okubo et al., 2021 and Zhang et al., 2022)
Caregivers		<u>Routine vaccinations</u> Caregiving burden (influenza - Iwai-Saito et al., 2023)
Income level		<u>COVID-19 vaccination</u> Low-income status (Okubo et al., 2021)
Social security assistance status	<u>COVID-19 vaccination</u> Receiving old age/disability allowance (Wong et al., 2021a)	<u>COVID-19 vaccination</u> Receiving Comprehensive Social Security Assistance (Wang et al., 2022b)
Alcohol use		<u>COVID-19 vaccination</u> Current alcohol use (Okubo et al., 2021)

Disparities across subpopulations

Our previous study highlighted the considerable heterogeneity among older adults, emphasising both inter-country and intra-country variations across very different societies in Singapore, Australia, Indonesia, and the Philippines.

In the more limited comparison of Japan and Hong Kong, the scale and scope of disparity is less pronounced, but some important differences still emerge.

We find mixed evidence by age and gender: our scoping review identifies cases in which older age groups demonstrate higher vaccine uptake and vice versa, both in the case of COVID-19 and routine vaccination; similarly with gender. There are a limited number of individual studies that document positive take-up being associated with being single, having high income/education/socioeconomic status, and being employed within healthcare-related fields; however, the small number means that these findings cannot be widely generalised.

Most notably, this scoping review does suggest an interesting finding consistent with our prior study: individuals with some comorbidities or other health-related vulnerabilities and poorer health are more inclined to accept vaccinations, but acceptance is lower for the most serious cases. This is consistent with the experience of our stakeholders. In the context of routine vaccination, Japanese experts identified poorer health status, namely having pre-existing health conditions and lower levels of independent functioning, as barriers to vaccination uptake among older adults. In Hong Kong, experts identified two key groups where vaccination uptake among older adults was especially challenging due to more extreme health concerns: long-term care residents with immunocompromised health states and individuals with complex health and social care needs.

Barriers and gaps to immunization for older people in Hong Kong are influenced by sociocultural, economic, and policy challenges. Socioculturally, low-income groups and those living in cramped conditions struggle to access healthcare, and traditional beliefs and misinformation can hinder vaccine acceptance. Economically, the cost of vaccines and healthcare is prohibitive for many, and limited government support exacerbates the issue. Policy-wise, the lack of recognition for lifelong immunization results in inadequate support and funding, with significant gaps in policy coverage for adult immunization compared to pediatric immunization.

Barriers vary across different subpopulations, with socioeconomic disparities affecting access to healthcare and vaccination programs. Vulnerable groups, including low-income individuals, the elderly in cramped quarters, and those with limited health literacy, face greater challenges in vaccine acceptance and uptake. Cultural beliefs and language barriers further complicate immunization efforts, necessitating targeted interventions by policymakers.

Improving immunization uptake among older adults requires addressing their lack of awareness about the importance of vaccines, limited access to accurate information, and digital literacy challenges. The influence of social media and the need for trust in healthcare providers also significantly impact vaccine acceptance among this demographic.

Experts also specifically highlighted some key sociodemographic groups where evidence was sparser, including caregivers and older adults who are socially isolated or living alone. Although only one study noted that caregivers are less likely to take on vaccination, this finding was independently emphasised by an expert from Hong Kong, who noted that uptake was 60% lower among older adults providing informal care to parents and spouses than those who did not.

Learning from effective intervention experiences

This section combines insights from the studies in our scoping review, which identified a small number of evaluations of effective interventions, as well as shared examples of best practices and successful interventions based on the experiences of our country experts. The experts also shared examples of approaches that were less successful and explained why.

A range of **education** approaches to address gaps in health and vaccine literacy were suggested by experts from both Japan and Hong Kong. These included opportunistic education sessions at healthcare facilities, community gathering spaces, workplaces, and grassroots events; education via community-based peer support initiatives (e.g., health ambassadors); identifying and working with advocates to better communicate the benefits of vaccination; and harnessing the educative potential of government and doctors as trusted authority figures in the vaccination space.

Education was not limited to older adults – experts emphasised the importance of also educating healthcare professionals who deliver vaccination services to the elderly, for instance by providing vaccination training and certification to healthcare professionals, and families, who influence older adults' vaccination decision-making.

"Some health promotion or health education should also go to the caregivers and family members, not just the older people. Because Hong Kong, I think very much like other Chinese populations, the decision-making model in their head, they mostly just follow their family members. If my son said I need to have the injections, I'll have the injections. If

he says, no, you can't, don't convince me. Still, quite a lot of older people have this mentality. So, if you want to protect or promote the uptake rates or something like that, you also need to educate the family members as well, not just the older people." -HK002

Incentivisation uses financial strategies to encourage vaccination uptake. In addition to the previous examples of reducing or removing co-payments altogether for COVID-19 vaccination, examples of successful incentivisation interventions found in the literature (both of which were for pneumococcal vaccination) included a voucher scheme to incentivise use of private primary healthcare in Hong Kong (Cheung et al., 2020) and age-based subsidies built into a routine adult vaccination programme in Japan (Shono et al., 2018). Japanese interviewees also suggested that incentivisation should target not only the elderly, but also local healthcare providers to carry out more primary prevention, including vaccination for the elderly.

Engagement uses nudges and behavioural cues to improve uptake. Our scoping review identified two successful examples of engagement, both of which were for pneumococcal vaccination in Japan, where municipalities sent vaccination notifications to eligible members of the population (Murakami et al., 2019, Watanabe et al., 2020).

Appealing to older adults' sense of empowerment and providing agency is also important. In the context of COVID-19 vaccination, enabling a degree of choice and providing information around COVID-19 vaccine booster options led to increased confidence and uptake of the vaccine, highlighting the importance of clear communication and streamlined decision-making processes in vaccination programmes (Wang et al., 2022a).

Stakeholders shared that successful engagement interventions included using plain language to communicate the benefits of vaccination more clearly and developing a standardised curriculum to guide older adults on vaccine decision-making. Experts also noted that older adults may respond less to individual incentives than to social incentives. Using altruism to frame messaging is used meaningfully to engage the elderly in addition to emphasising personal interest:

"... if [the elderly are] really concerned about others, instead of gain and loss framing, we have to do other framing. ... That means the altruism framing. Maybe, "you do this because you care about your family" and things like that, and then people would consider doing."
-HK004

Experts also highlighted that adopting the appropriate messenger is critical to engagement, and that the identity of said messenger can vary by context. In the case of the COVID-19 vaccine in Hong Kong, the primacy of physicians in the healthcare system was explicitly recognised and harnessed by the government during the COVID-19 pandemic, where doctors appeared in the mass media to promote and encourage vaccination. On the ground, however, the community setting is fertile ground to implement innovative and potentially effective interventions to tackle vaccine literacy and combat misinformation in the older adult population. In one example that was shared, a peer support intervention delivered by trained middle-aged and older volunteer health ambassadors was used to improve older adults' knowledge and uptake of the pneumococcal vaccine.

"We train up health ambassadors who are volunteers, and they are older people or middle-aged people, to approach the

older people, ... to get them [to] know about the knowledge about the pneumococcal vaccine. ... They are reaching out to their friends or community-dwelling older people in the community centres. ... They can talk about what they know about pneumococcal vaccination and then encourage them to receive the vaccination from the public clinic.

... We feel that the health ambassadors are the important ones to educate the public. ... They can remove the myths so that they can clarify the issues with more time. But, you know, the [healthcare] professionals do not explain too much. They are too busy to do that. So, it turns out that the health ambassadors are able to explain, in greater details about the misunderstanding of the vaccination." -HK005

Environmental restructuring seeks to change infrastructure and/or other environmental aspects to reduce physical or social barriers to access and augment vaccination uptake. Two examples of successful environmental restructuring interventions emerged from our scoping review: outreach vaccination services and in-person same-day vaccination centre vaccination quota distribution during the COVID-19 pandemic in Hong Kong (Chu et al., 2022), and the diversification of influenza vaccination locations to include town halls across multiple districts in Japan (Itamochi et al., 2020).

As described by our experts, the example of municipal governments in Japan during the COVID-19 pandemic suggests that providing end-to-end support along the vaccination pathway can be transformative, i.e., starting from notifying older adults, to removing costs, to providing physical transport to and from the vaccination centre. However, one caution is that such an intensive approach may not be sustainable, nor does it necessarily lead to sustained change. Experts also noted that despite these efforts, such initiatives

generally did not then culminate in improved routine vaccination rates among the elderly.

Finally, our experts expressed a strong sense of pragmatism in recognising that some older adults remain extremely vaccine-hesitant despite all concerted, consistent efforts at health promotion and service provision. As explained by one:

"There are always the hardliners. Even after all these things I do, you get a free body check, you talk to a doctor, you come to the closest centre, you familiarise, I personally call them and... Even after everything, there are always the hardliners."
-HK001

Function	Intervention	Source
Incentivisation	Voucher scheme for private primary healthcare use	Cheung et al. (2020)
Incentivisation	Age-based subsidies in routine adult vaccination programs	Shono et al. (2018)
Engagement	Vaccination notifications to eligible populations	Murakami et al. (2019); Watanabe et al. (2020)
Engagement	Empowering older adults with choice and clear information	Wang et al. (2022a)
Environmental Restructuring	Outreach vaccination services and same-day vaccination quotas	Chu et al. (2022)
Environmental Restructuring	Diversification of vaccination locations to include town halls	Itamochi et al. (2020)

Discussion

This study sought to identify the barriers and facilitators influencing the uptake of immunisation among older adults in the Asia-Pacific region, with focus on the -experiences of Hong Kong and Japan. We also sought to identify and illustrate best practices from both countries to inform recommended strategies for optimising vaccine delivery, building engagement and support for vaccination programmes, and improving vaccine confidence and uptake among older adults. Similar methodology used in phase 1 was adapted in phase 2 to conduct this qualitative research as the objective and the research question remains same across.

Based on our combined findings from a scoping review and in-depth key stakeholder interviews with experts from both Hong Kong and Japan, we found that while both economies have adult vaccination programmes that are relatively developed compared to their global counterparts, common challenges to outreach and engagement for older adults remain.

Barriers and facilitators to immunization among older adults fell into two main categories: individual drivers of vaccination decision-making and systemic drivers of vaccine acceptance and uptake.

Individual drivers were complex, spanning perceptions of disease risk and severity, awareness

of vaccines and vaccination programs, perceptions of vaccine efficacy and risks of harm, and incentives. Both Phase 1 and Phase 2 of the study identified similar individual drivers influencing vaccine uptake. Individuals who perceived a higher risk of disease, understood the benefits of vaccination, and trusted in vaccine efficacy were more likely to get vaccinated. However, concerns about side effects and misinformation also played a significant role in vaccine hesitancy.

Systemic drivers included access to vaccination, the influence of family and social networks, the healthcare, community, and social care systems of Hong Kong and Japan, and the role of and trust in government. Both phases highlighted the importance of accessible vaccination services, recommendations from healthcare professionals, and supportive government policies in increasing vaccine uptake. Barriers such as technological challenges, high out-of-pocket costs, and exposure to conflicting information were also identified as hindering vaccination efforts.

Our overall study findings showed the importance of addressing disparities in vaccination knowledge and access across certain vulnerable subpopulations, particularly those facing health-related challenges (e.g., comorbid conditions, lower health literacy) and social isolation. Our findings also highlighted the importance of doing so by strengthening both the health care system and the community. Based on the scoping review and stakeholder interviews, successful interventions spanned across the use of financial incentives to encourage uptake, the engagement of older adults using behavioural nudges and cues, and environmental restructuring to reduce physical and/or social barriers to vaccination access.

Both phases of the study revealed that a combination of addressing individual perceptions and enhancing systemic support is essential for improving vaccination rates among older adults in the Asia Pacific region. By understanding these factors,

policymakers and healthcare providers can develop more effective strategies to promote vaccine uptake and improve health outcomes.

Limitations

While this study aimed to provide richer insights into vaccination for older adults in Japan and Hong Kong by drawing on both a literature review and expert interviews, it is important to acknowledge certain limitations.

The findings of this study are intended to provide a deeper dive into conditions in Hong Kong and Japan, and they are not universally applicable due to variations in cultural, healthcare, and policy contexts. Due to time and resource constraint, the scoping review did not include articles in the Japanese or Chinese languages, such as government and other policy documents that are potentially available only in Japanese or Chinese. This restricted the breadth of literature reviewed and potentially overlooked valuable localised insights published in these languages. Recruitment was carried out with the support of study partners, and the lack of medical doctors in the pool of interviewees in Hong Kong limited the depth of understanding regarding perspectives on healthcare provision in the region. In the case of Japan, the reliance on second-hand interviews and translation for data collection may have introduced biases, as direct engagement between the analysts and primary sources was not feasible.

Conclusion

This study sought to identify the barriers and facilitators influencing the uptake of immunisation among older adults in the Asia Pacific region, with a focus on the economy-level experiences of Hong Kong and Japan. We also aimed to identify and illustrate best practices from across the region to inform recommended strategies for optimising delivery of vaccines, building engagement and support for vaccination programmes, and improve

vaccine confidence and uptake among older adults. The findings from a scoping review and in-depth stakeholder interviews with experts from across the region found the fundamental differences between adult vaccination programmes, in Hong Kong and Japan.

The decision-making process for vaccination is multifaceted, involving individual, community and systemic factors. Perceived risks, knowledge, and trust in vaccine efficacy are crucial drivers. Individuals who perceive a higher risk of disease, understand the benefits of vaccination, and trust in the efficacy and safety of vaccines are more likely to get vaccinated. Addressing barriers such as misinformation, lack of awareness, and concerns about side effects can significantly enhance vaccination rates.

Systemic facilitators such as accessible vaccination services, recommendations from healthcare professionals, and supportive government policies play a pivotal role in increasing vaccine uptake. Conversely, barriers like technological challenges, high out-of-pocket costs, and exposure to conflicting information can hinder vaccination efforts.

Disparities in vaccine acceptance and uptake are evident across different population subgroups, influenced by age, gender, educational level, health status, and socioeconomic factors. Addressing these disparities requires targeted interventions, such as tailored educational strategies, financial incentives, and community engagement.

Effective interventions, such as financial incentives, behavioural nudges, and environmental restructuring, have shown promise in increasing vaccination rates. Educating caregivers and family members, leveraging trusted advocates, and providing comprehensive support from notification to vaccination can further enhance vaccine uptake among older adults.

We conclude with recommendations for action, a combination of addressing individual perceptions and enhancing systemic support is essential for

improving vaccination rates. Consistent promotion, clear information, and positive experiences with prior vaccinations build trust and improve vaccine uptake, ultimately contributing to better health outcomes for older adults in Hong Kong and Japan

Recommendations

This report closes with recommendations for action to improve vaccination uptake among older adults in the Asia-Pacific, grounded in learnings from the experiences in Hong Kong and Japan:

System-Level: Optimizing Vaccination Delivery

1. Policy Review and Revision:

- o **Continuous Improvement:** Regularly review and revise vaccination policies to ensure they remain comprehensive and effective. This includes reassessing the classification of vaccine-preventable diseases to align with their actual importance and impact.
- o **Subsidization Framework:** Enhance the vaccine subsidization framework to reduce financial barriers and improve access to vaccines for older adults.
- o **Comprehensive Guidelines:** Develop and implement detailed guidelines for adult vaccination, addressing the specific needs and challenges of older adults.

2. Learning from Other Countries:

- o **Adapt Successful Practices:** Study and adapt successful vaccination policies and programs from countries like Singapore, and Australia, which are acceptable to the community and feasible to implement.
- o **Evidence Building:** Invest in research to build a robust body of evidence, focusing on frail older adults and less-known vaccines such as herpes zoster. Leverage data from COVID-19 vaccination efforts to understand and address barriers to vaccination in non-pandemic conditions.

3. Promotion Strategies:

- o **Health Communication:** Integrate best practices in health communication to raise awareness and encourage behaviour change related to age-appropriate immunization.
- o **Combat Misinformation:** Actively identify and address misinformation through fact-checking measures and effective communication strategies. Utilize artificial intelligence to monitor and correct false information on social media.

4. Healthcare Provider Engagement:

- o **Training and Certification:** Provide vaccination training and certification for healthcare professionals such as pharmacist, nurses and allied health professionals to ensure they are well-equipped to recommend and administer vaccines to older adults.
- o **Personalized Recommendations:** Encourage healthcare providers to engage in open and informative discussions with older adults, offering personalized recommendations and addressing individual concerns.

5. Technological Integration:

- o **Digital Tools:** Harness the potential of digital tools to provide up-to-date, easily accessible information about vaccines. Utilize technology to support more engaging and scalable education, reaching those with limited access to traditional healthcare resources.

Community-Level: Engaging and Supporting Key Stakeholders

1. Community-Based Approaches:

- o **Grassroots Initiatives:** Collaborate with community organizations to address potential barriers to vaccination and promote social connectedness. Implement peer support initiatives and health ambassador programs to foster trust and encourage vaccination.

- o **Tailored Campaigns:** Develop and implement education and awareness campaigns tailored specifically for older adults. Utilize community health groups, printed materials, and online resources to ensure accessible and comprehensive information about vaccines.

2. Cultural and Contextual Sensitivity:

- o **Regional Nuances:** Tailor vaccination efforts to the cultural beliefs and societal norms of each region. In Hong Kong, leverage the reverence for doctors, while in Japan, emphasize societal roles and norms.
- o **Primary and Community Care:** Strengthen primary and community care systems, increasing the number of older adults with a consistent family doctor and engaging disadvantaged elderly subpopulations through social sector initiatives.

2. Behavioural Nudges:

- o **Notifications and Reminders:** Use behavioural cues, such as nudges and notifications, to remind and encourage older adults to get vaccinated. Frame messages around the benefits of vaccination for both individual and community health.

Individual-Level: Improving Vaccine Confidence and Uptake

1. Education and Awareness:

- o **Empowerment through Information:** Empower older adults by providing them with necessary information and resources to make informed decisions about vaccination. Highlight the importance and benefits of vaccination, addressing common concerns and misconceptions.
- o **Accessible Information:** Ensure information about vaccines is accessible across various platforms, including digital tools, to support those with limited access to traditional healthcare resources.

2. Self-Efficacy and Activation:

- o **Building Confidence:** Foster self-efficacy and confidence in health management among older adults, encouraging proactive participation in their healthcare decisions.
- o **Positive Experiences:** Leverage positive healthcare experiences and past vaccination success stories to build trust and improve vaccine confidence.

3. Tailored Interventions:

- o **High-Risk Groups:** Develop specific immunization programs for high-risk groups, including individuals with chronic illnesses, healthcare workers, travellers, pregnant women, hepatitis B carriers, and the elderly.
- o **Data-Driven Approaches:** Enhance data collection and surveillance systems to monitor vaccine-preventable diseases and vaccination coverage rates, facilitating informed decision-making and targeted interventions.

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Economy Summary: Hong Kong

Overall policy:

In Hong Kong, the government has implemented several initiatives to ensure widespread vaccination among adults, especially older adults. The Elderly Vaccination Subsidy Scheme (EVSS) is a key component, providing subsidies for vaccinations against influenza and pneumococcal disease. This subsidy is aimed at reducing the financial barrier for the elderly to receive these important vaccinations.

Furthermore, Hong Kong has periodically expanded its vaccination programmes in response to public health needs, such as during the COVID-19 pandemic. The government has provided COVID-19 vaccines free of charge to all residents as part of its strategy to achieve a high vaccination rate. Public campaigns and the involvement of both public and private healthcare sectors are crucial elements in Hong Kong's approach to promote vaccination uptake.

The government also works to address vaccine hesitancy through public education campaigns that provide reliable information about the benefits and safety of vaccines. This effort is crucial in maintaining high vaccination rates and protecting public health.

Key individual and systemic determinants:

- Perceived benefits and risks
- Self-efficacy
- Health literacy
- Influence of significant others
- Past experiences with vaccinations
- Governmental policies and incentives
- Accessibility and convenience
- Healthcare provider engagement
- Public education and misinformation management
- Social and community support

Challenges identified:

- Vaccine fatigue
- Misinformation and media influence
- Technological barriers
- Perceived health suitability
- Trust in healthcare system and vaccine safety concerns
- Potentially negative influence of family and social networks
- Physical access and travel time

Key policy and priorities – engaging community and ensuring - accessibility

Enhance Public Education Campaigns

- Target local audiences: Use Chinese/Cantonese materials and campaigns.
- Leverage community networks: Partner with organizations, groups, and associations.
- Focus on vulnerable populations: Reach marginalized groups and those with limited health literacy.

Improve Access to Vaccination Services

- Expand public vaccination centers: Increase availability in densely populated areas.
- Offer mobile vaccination clinics: Reach remote or underserved communities.
- Provide extended hours: Accommodate individuals with busy schedules.

Strengthen Healthcare Provider Engagement

- Provide cultural sensitivity training: Improve communication with diverse populations.
- Facilitate patient-centered communication: Prioritize patient needs and concerns.

Foster Community-Based Initiatives

- Employ community health workers: Build trust within specific communities.
- Utilize social media campaigns: Reach younger generations.
- Organize community events: Promote vaccination and positive attitudes.

Review and Revise Vaccination Policies

- Assess policy effectiveness: Evaluate existing policies for addressing specific needs.
- Address policy gaps: Identify and address inconsistencies.
- Align policies with international standards: Ensure adherence to best practices.

Enhance Data Collection and Monitoring

- Track vaccination coverage: Monitor coverage among different demographic groups.
- Identify disparities: Address disparities in vaccination rates.
- Inform policy decisions: Use data to guide targeted interventions.

Empower Families and Caregivers

- Provide education and resources: Equip families with accurate information.
- Facilitate communication: Encourage open and supportive communication.
- Support vaccination decisions: Offer emotional support and encouragement.
- Advocate for vaccination: Encourage families to advocate for policies prioritizing older adults.

Economy Summary: Japan

Overall policy:

The Immunization Law categorizes vaccines into two types: routine and voluntary. Routine vaccines include:

- **Class A Diseases:** Hib, pediatric pneumococcal, hepatitis B, rotavirus, DPT/IPV, BCG, MR, chicken pox, Japanese encephalitis, and HPV. Class A are provided free of charge to recipients.
- **Class B Diseases:** Influenza vaccine (for the elderly), adult pneumococcal vaccine (for the elderly). Class B are partially funded through the NIP, and it is not mandatory for municipalities to proactively encourage vaccination.

The Adult Preventive Vaccination Subsidy System subsidises vaccines against influenza, pneumococcal disease, and more recently, COVID-19 for elderly citizens, aiming to reduce their financial burden and boost vaccination rates among vulnerable groups.

Local authorities in Japan play a crucial role in administering these subsidies, often adding local funds to national ones to further reduce costs for the elderly. Influenza vaccine coverage, for example, is promoted through national and municipal funds, which vary regionally but consistently strive to make vaccinations more accessible and affordable.

During the COVID-19 pandemic, Japan prioritised healthcare workers and the elderly in its vaccine rollout to manage uptake effectively and lower mortality rates. The government also runs public awareness campaigns and works with family physicians to promote vaccination, reflecting a comprehensive strategy that integrates policy, healthcare provision, and community engagement to improve immunisation coverage nationwide.

Key individual and systemic determinants:

- Past vaccination experience or knowledge of vaccines
- Perceived vaccine effectiveness
- Influence of family and healthcare providers
- Personal health beliefs and practices
- Social capital
- Educational attainment and household income
- Trust in the healthcare system
- Policy and subsidy programmes
- Priority settings in vaccine rollout
- Public awareness campaigns

Challenges identified:

- Perceptions caused by adult vaccines not being classified as Class A in the Immunization Law
- Understanding and acceptance of new or complex vaccines

- Out-of-pocket costs
- Physical access and travel time
- Healthcare professionals' limited prioritisation of vaccines for the elderly
- Potentially negative influence of family and social networks
- Trust in healthcare system and vaccine safety concerns
- Complexity of scheduling and administering vaccines

Key policy and priorities – engaging community and ensuring affordability:

Unified Vaccination for All Ages

Japan should remove the current classification of Class A and Class B diseases and implement a unified vaccination system that covers all ages and equally prioritizes prevention of all vaccine preventable diseases included in the National Immunization Program. This approach will ensure equitable access to immunization, promote public health, and reduce the burden of infectious diseases.

Strengthen Community-Based Initiatives:

- **Leverage Social Networks:** Utilize existing social networks and community organizations to promote vaccination among older adults.
- **Improve Health Literacy:** To ensure that older adults understand the benefits of vaccination
- **Neighborhood-Based Programs:** Implement vaccination programs at the neighborhood level to improve accessibility and reduce barriers.

Enhance Healthcare Provider Engagement:

- **Cultural Competency Training:** Provide healthcare providers with training on communication skills to effectively interact with older adults.
- **Team-Based Approach:** Encourage a team-based approach involving physicians, nurses, and pharmacists to provide comprehensive vaccination counseling.
- **Patient-Centered Communication:** Promote patient-centered communication that focuses on understanding individual needs and concerns for both pre and post vaccination.

Improve Access to Vaccination Services:

- **Mobile Vaccination Clinics:** Utilize mobile vaccination clinics to reach older adults who may have difficulty traveling to healthcare facilities.
- **Extended Clinic Hours:** Offer extended clinic hours or weekend appointments to accommodate the schedules of working adults who may care for elderly parents.
- **Home-Based Vaccination:** Explore the feasibility of home-based vaccination services for those who are unable to visit clinics.

Leverage Technology:

- **Digital Health Tools:** Utilize digital health tools to provide information, reminders, and appointment scheduling services.
- **Telehealth Consultations:** Offer telehealth consultations to address vaccine-related questions and concerns without requiring in-person visits.
- **Data-Driven Decision Making:** Use data analytics to identify areas with low vaccination rates and tailor interventions accordingly.

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Appendices

Appendix A: Scoping review search string

PubMed

Search date: 23 November 2023

Search #	Search Details	Results
1	"aged"[MeSH Terms] OR "over 50 years old"[Title/Abstract] OR "older adult"[Title/Abstract] OR "elder*"[Title/Abstract] OR "geriatric"[Title/Abstract] OR "senior"[Title/Abstract] OR "life-course"[Title/Abstract] OR "old adult"[Title/Abstract] OR "elder people"[Title/Abstract] OR "older people"[Title/Abstract] OR "old people"[Title/Abstract] OR "old age"[Title/Abstract] OR "aged"[Title/Abstract] OR "ageing"[Title/Abstract] OR "aging"[Title/Abstract] OR "50 and over"[Title/Abstract] OR "late life"[Title/Abstract]	4,277,444
2	"vaccination"[MeSH Terms] OR "immuniz*"[Title/Abstract] OR "immunis*"[Title/Abstract] OR "vaccin*"[Title/Abstract] OR "inoculation"[Title/Abstract] OR "shot*"[Title/Abstract]	627,335
3	"Hong Kong"[MeSH Terms] OR "Japan"[MeSH Terms] OR "hong kong*"[Title/Abstract] OR "japan*"[Title/Abstract]	342,025
4	((("activat*"[Title/Abstract] OR "access*"[Title/Abstract] OR "barrier*"[Title/Abstract] OR "driver*"[Title/Abstract] OR "facilitat*"[Title/Abstract] OR "influence"[Title/Abstract] OR "factor"[Title/Abstract] OR "impact"[Title/Abstract] OR "block*"[Title/Abstract] OR "obstacle*"[Title/Abstract] OR "hinder*"[All Fields]) AND "title abstract"[All Fields]) OR "constrain*"[Title/Abstract] OR "uptake"[Title/Abstract] OR "adoption"[Title/Abstract])	685,802
5	"vaccination hesitancy"[MeSH Terms] OR "health knowledge, attitudes, practice"[MeSH Terms] OR "hesitan*"[Title/Abstract] OR "belief*"[Title/Abstract] OR "behavi*"[Title/Abstract] OR "confidence"[Title/Abstract] OR "social-norm"[Title/Abstract] OR "accept*"[Title/Abstract] OR "social determ*"[Title/Abstract] OR "antivaccin*"[Title/Abstract] OR "anti vaccin*"[Title/Abstract] OR "refus*"[Title/Abstract] OR "reluctan*"[Title/Abstract] OR "challeng*"[Title/Abstract] OR "fear"[Title/Abstract] OR "risk"[Title/Abstract] OR "perceived"[Title/Abstract] OR "perception"[Title/Abstract] OR "complacency"[Title/Abstract] OR "attitudes"[Title/Abstract]	6,488,845
6	"knowledge"[Title/Abstract] OR "internet access"[Title/Abstract] OR "information"[Title/Abstract] OR "digital"[Title/Abstract]	2,541,973

Search #	Search Details	Results
7	((“Primary Health Care”[MeSH Terms] OR “Homes for the Aged”[MeSH Terms] OR “availability”[Title/Abstract] OR “site”[Title/Abstract] OR “center”[Title/Abstract] OR “centre”[Title/Abstract] OR “accessib*”[Title/Abstract] OR “supply”[Title/Abstract] OR “deliver*”[Title/Abstract] OR “primary care”[Title/Abstract] OR “clinic”[Title/Abstract] OR “community”[Title/Abstract] OR “care”[Title/Abstract] OR “homes”[Title/Abstract]) AND “Retirement homes”[Title/Abstract]) OR “access”[Title/Abstract]	441,717
8	“advocacy”[Title/Abstract] OR “recommend*”[Title/Abstract]	892,377
9	(“funding”[Title/Abstract] OR “cost”[Title/Abstract] OR “financial”[Title/Abstract] OR “infrastructure”[Title/Abstract] OR “policy”[Title/Abstract] OR “politic*”[Title/Abstract]) AND “affordability”[Title/Abstract] OR “coverage”[Title/Abstract] OR “intervention”[Title/Abstract] OR “strategy”[Title/Abstract]	1,667,880
10	#1 AND #2 AND #3	1,828
11	#4 OR #5 OR #6 OR #7 OR #8 OR #9	10,045,342
12	#10 AND #11	1,139
13	#10 AND #11 with a 5-year filter (2018 to 2023)	598

EMBASE

Search date: 23 November 2023

Search #	Search Details	Results
1	‘aged’/exp OR ‘over 50 years old’:ti,ab OR ‘older adult’:ti,ab OR ‘elder*’:ti,ab OR ‘geriatric’:ti,ab OR ‘senior’:ti,ab OR ‘life-course’:ti,ab OR ‘old adult’:ti,ab OR ‘elder people’:ti,ab OR ‘older people’:ti,ab OR ‘old people’:ti,ab OR ‘old age’:ti,ab OR ‘aged’:ti,ab OR ‘ageing’:ti,ab OR ‘aging’:ti,ab OR ‘50 and over’:ti,ab OR ‘late life’:ti,ab	4,900,477
2	‘immunization’/exp OR ‘vaccination’/exp OR ‘immuniz*’:ti,ab OR ‘immunis*’:ti,ab OR ‘vaccin*’:ti,ab OR ‘inoculation’:ti,ab OR ‘shot*’:ti,ab	812,919
3	‘hong kong’/exp OR ‘japan’/exp OR ‘hong kong*’:ti,ab OR ‘japan*’:ti,ab	529,099

Search #	Search Details	Results
4	#1 AND #2 AND #3	2,414
5	'activat*':ti,ab OR 'access*':ti,ab OR 'barrier*':ti,ab OR 'driver*':ti,ab OR 'facilitat*':ti,ab OR 'influence':ti,ab OR 'factor':ti,ab OR 'impact':ti,ab OR 'block':ti,ab OR 'obstacle*':ti,ab OR 'hinder':ti,ab OR 'constrain*':ti,ab OR 'uptake':ti,ab OR 'adoption':ti,ab	9,944,726
6	'vaccine hesitancy'/exp OR 'hesitan*':ti,ab OR 'belief*':ti,ab OR 'behavi*':ti,ab OR 'confidence':ti,ab OR 'social-norm':ti,ab OR 'accept*':ti,ab OR 'social determ*':ti,ab OR 'antivaccin*':ti,ab OR 'anti-vaccin*':ti,ab OR 'refus*':ti,ab OR 'reluctan*':ti,ab OR 'challeng*':ti,ab OR 'fear':ti,ab OR 'risk':ti,ab OR 'perceived':ti,ab OR 'perception':ti,ab OR 'complacency':ti,ab OR 'attitudes':ti,ab	8,384,579
7	'knowledge'/exp OR 'knowledge':ti,ab OR 'internet access':ti,ab OR 'information':ti,ab OR 'digital':ti,ab	3,305,553
8	'community'/exp OR 'senior centre'/exp OR 'primary medical care'/exp OR 'availability':ti,ab OR 'site':ti,ab OR 'center':ti,ab OR 'centre':ti,ab OR 'accessib*':ti,ab OR 'supply':ti,ab OR 'deliver*':ti,ab OR 'primary care':ti,ab OR 'clinic':ti,ab OR 'community':ti,ab OR 'care':ti,ab OR 'homes':ti,ab OR 'retirement homes':ti,ab OR 'access':ti,ab	7,229,724
9	'advocacy':ti,ab OR 'recommend*':ti,ab	1,263,792
10	'intervention study'/exp OR 'policy'/exp OR 'funding':ti,ab OR 'cost':ti,ab OR 'financial':ti,ab OR 'infrastructure':ti,ab OR 'policy':ti,ab OR 'politic*':ti,ab OR 'affordability':ti,ab OR 'coverage':ti,ab OR 'intervention':ti,ab OR 'strategy':ti,ab	3,555,659
11	#5 OR #6 OR #7 OR #8 OR #9 OR #10	21,025,329
12	#4 AND #11	1,835
13	#4 AND #11 AND [english]/lim AND [2018-2023]/py	993

Appendix B: Interview guide

Introduction

1. To start, could you tell us a little bit about yourself and your professional background?
 - a. If you do not wish to, you do not have to share your name or organisation.
 - b. However, it would be helpful if you shared with us your current responsibilities and how long you have been working in this role.

Current situation

2. In your opinion, what is the current state of older adults' immunisation in your country?
 - a. Ensure that the following vaccines are covered: COVID-19, shingles, pneumococcal vaccines, influenza, Tdap.
 - b. Check for differentiation between COVID-19 and other types of adult vaccines.
 - c. Prompt: Uptake, adherence, current policies, availability of vaccines
 - d. Why do you say this? Please elaborate.

Comparisons to paediatric vaccination

3. In your experience, are there any differences between uptake rates/gaps in paediatric and adult vaccination programmes?

Successes and advantages

4. Can you comment on the success of the life-course immunisation strategies in your national context?
5. What do you think are the key factors that contribute to their success?

Barriers and gaps

6. What do you think are some of the barriers to life-course immunisation, especially among adults, in your country?
 - a. Sociocultural barriers
 - b. Economic barriers
 - c. Policy barriers

7. How and to what extent do these barriers to immunisation for older people vary across different subpopulations in your country?
 - a. Check: Marginalised, hard-to-reach and zero-dose populations
8. In your opinion, what are some of the key gaps that need to be filled to improve the uptake of older adult immunisation?
9. What are your recommendations to fill these gaps?

Best practices

10. In your experience, can you share some best practices in the Asia-Pacific region that demonstrate the success and value of life-course immunisation, especially among older adults?
 - a. Strategies for optimising the delivery of immunisation to older adults under current vaccination programmes
 - b. Strategies to build engagement and support for vaccine programmes from key external stakeholders such as charities and patient advocacy groups
 - c. Strategies to improve older adults' vaccine confidence and better encourage them to seek out and take vaccines
 - d. Strategies to ensure basic vaccine supply, including supply chain

Concluding question

11. We've come to the end of the interview. Is there anything further that you would like to share on the topic of adult immunisation that we have not yet covered?

Appendix C: Demographics of interview participants

Interviewee	Economy	Gender	Sector	Healthcare Professional (HCP)/Non-HCP	Interview Date
1	Hong Kong	M	Community	Non-HCP	28 Nov 2023
2		M	Research	HCP	29 Nov 2023
4		F	Research	Non-HCP	26 March 2024
5		F	Research	HCP	19 April 2024
6		F	Community	HCP	19 April 2024
7		M	Medical + Research	HCP	10 May 2024
1	Japan	M	Medical + Research	HCP	4 April 2024
2		M	Research	HCP	27 March 2024
3		M	Research	HCP	25 March 2024
4		M	Research	Non-HCP	13 March 2024
5		M	Medical + Research	HCP	6 March 2024
6		F	Medical + Research	HCP	26 March 2024
7		M	Research	HCP	27 March 2024

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UEN 199302114W

298 Tiong Bahru Road
#15-01/06 Central Plaza
Singapore 168730
Tel: 6593 9515
Fax: 6593 9522

www.tsaofoundation.org