

COVID-19 VACCINE COVERAGE, BEHAVIORAL AND SOCIAL DRIVERS, COMMUNICATION ACTIVITIES IN VIETNAM: A NARRATIVE REVIEW



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1. BACKGROUND

Country profile

Vietnam has a population of approximately 99 million persons in 2022 with 9.3% aged 65 years and above [1]. Figure 1 shows the Vietnamese population structure by age and sex in 2022. Overall, the population aged 15-64 years approximately doubled the number of dependents including children 0-14 years old and people 65 years old and above [2].

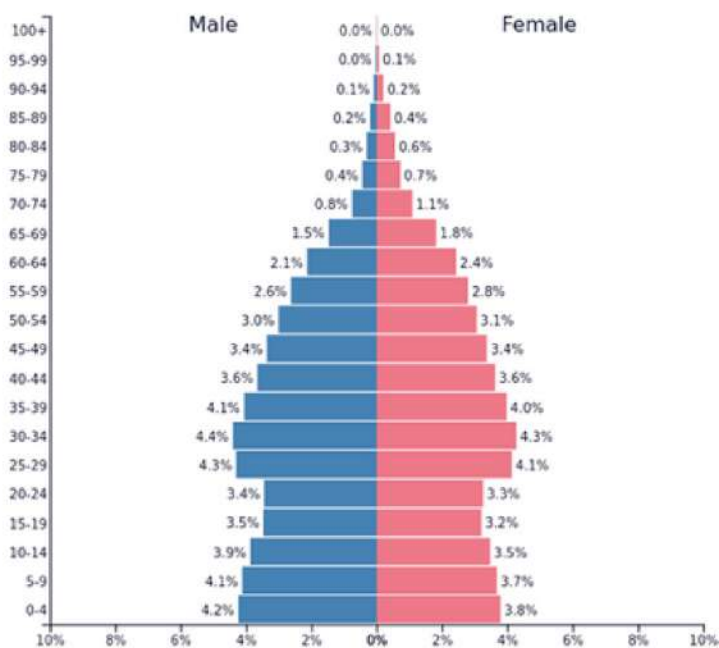


Figure 1. Vietnamese population structure by age and sex in 2021 [2]

There are 54 ethnic groups in Vietnam. The Kinh (Viet) accounts for nearly 90% of the whole population. Ethnic minorities are concentrated in the rural and mountainous areas across all three main geographic regions (the North, the Central, and the South).

Vietnam's human development index (HDI) value was 0.704 in 2019, putting the country in the high human development category and positioning it at 117 out of 189 countries and territories (Table 1) [3]. The HDI value has increased by almost 46% over the last 30 years, which is among the highest HDI growth rates worldwide. Other indicators relevant to health, education, and income show that Vietnam has achieved substantial improvement in the country's development compared to the last decades.

Table 1 - Vietnam Human Development Indicators in 2022 [3]

Domain	Indicator	Value
Health	Life expectancy at birth (years)	75.4
	Child malnutrition, stunting (moderate or severe) (% under age 5)	23.8
	Current health expenditure (% of GDP)	5.5
	Infants lacking immunization, DTP (% of one-year-olds)	4
	Infants lacking immunization, measles (% of one-year-olds)	5
	Mortality rate, infant (per 1,000 live births)	16.5
	Mortality rate, under-five (per 1,000 live births)	20.7
Education	Mean years of schooling (years)	8.3
	Government expenditure on education (% of GDP)	4.2
	Literacy rate, adult (% ages 15 and older)	95
Income	GDP per capita (2017 PPP \$)	8,041
	Gross domestic product (GDP), total (2017 PPP \$ billions)	775.7
Inequality	Human Development Index (HDI)	0.704
	Inequality-adjusted HDI (IHDI)	0.588
Employment	Employment to population ratio (% ages 15 and older)	75.9
	Labour force participation rate (% ages 15 and older)	77.4
	Old-age pension recipients (% of statutory pension age population)	39.9

The COVID-19 pandemic in Vietnam

With two cases reported on 23 January 2020, Vietnam was among the first countries to be affected by the COVID-19 pandemic. Between January 2020 and the present, Vietnam has experienced four outbreaks as summarized in Figure 2 [4-6].



Figure 2. COVID-19 pandemic timeline in Vietnam

Since the first COVID-19 case was recorded on 23 Jan 2020, Vietnam has gradually instituted a series of comprehensive non-pharmaceutical interventions (NPI) based on the evolving context/evidence, thus they did not come as a “shock” to the public, and the number of cases and deaths remained low during the first three waves. Such NPIs included border closures, school closures, suspension of mass-gatherings, mask-wearing, hand washing, and different levels of movement restrictions (i.e., all people are required to stay at home, no exception or all people are required to stay at home, except for some who need to make trips to buy essential goods such as food and medicine, for emergencies, and to go to work at factories and businesses that remain open), physical distancing, lockdowns (i.e., prohibiting residents from leaving their homes. Food was delivered to every household by the military), active surveillance and contact tracing, laboratory testing, a four-ring quarantine system (i.e., (1) quarantine and treatment for cases and their close contacts with a priority for housemates at healthcare facilities, (2) centralized quarantine (not in hospitals) for close contacts of cases, (3) home-quarantine for close contacts to those being quarantined in ring 2, (4) whole-community quarantine), and ongoing centralized quarantine for incoming travelers, introduced through government directives such as 05/CT-TTg, 06/CT-TTg, 10/CT-Ttg, 13/CT-Ttg, 15/CT-Ttg, 16/CT-Ttg, and 19/CT-Ttg.

[Photo credit: VnExpress/Dang Khoa]



As of 24 September 2020, Prime Minister sent an urgent telegram No. 1300/CD-TTg1 requesting ministries, sectors, and local authorities to continue implementing COVID-19 preventive and control measures in order to sustain the country's achievement in its outbreak response. However, meanwhile, the country was encouraged to open up to trade and commercial activities to accelerate economic recovery. This was described as moving toward a "safe coexistence" with COVID-19. Since then, the less strict level of NPIs was maintained and continuously reviewed to ensure the best fit with the fast-changing outbreak and travel/ trade opening-up policies based on the risk level of each local community. During the fourth wave of the COVID-19 pandemic in Vietnam, communes were guided to assess their pandemic risk level from level 1 to level 4 in accordance with the Government Resolution No. 128/ NQ-CP dated 11 October 2021 and the Ministry of Health (MOH) Decision No. 4800/QD-BYT dated 12 October 2021. Assessment criteria include:

- (1) New confirmed cases in the community/population/duration,
- (2) Vaccination coverage, and
- (3) Ensuring the receipt and treatment capacity of medical examination and treatment establishments at all levels. The most updated assessments can be found in [7].

The fourth wave of the COVID-19 pandemic (from 27 April 2021 to the present) relevant to Delta and Omicron variants has dramatically changed the situation. The wave was confirmed as the most widespread and complicated when the highest number of deaths was recorded compared to the previous waves. Confirmed cases were found not only in hospitals but also in communities and industrial zones. Thousands of community cases were detected each day, posing massive burdens on the healthcare system and stretching available resources for contact tracing.

Figure 3 presents the correlation between the case fatality rate and the number of COVID-19 doses administered from June 2021 to June 2022. Since the first COVID-19 case with the Omicron variant was recorded in Vietnam on 28 December 2021, the rollout of COVID-19 vaccines nationwide has contributed to a remarkable reduction in the case fatality rate. As of 24 July 2022, a total of 10,767,948 cases had been reported, of which 9,861,276 had recovered and been discharged from hospitals, and 43,092 COVID-related deaths.

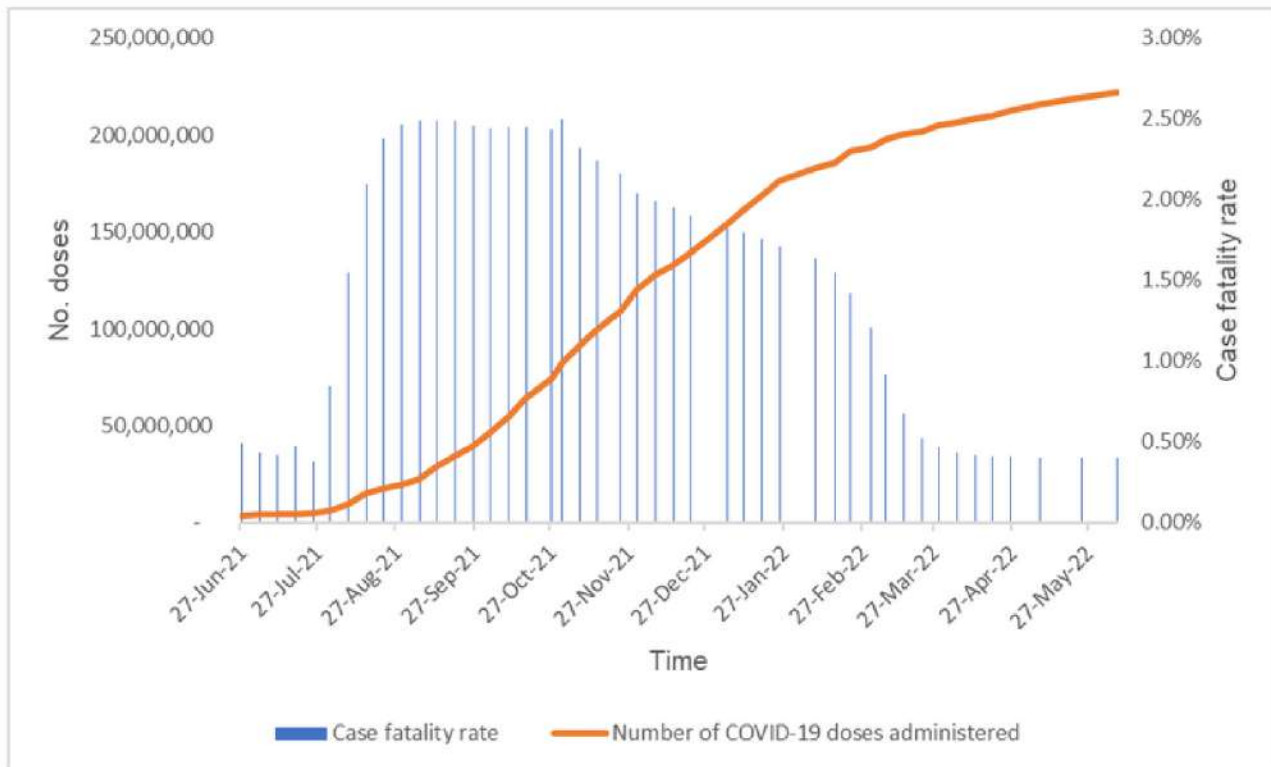


Figure 3. Numbers of COVID-19 doses administered and case fatality rates in Vietnam from June 2021 to June 2022

During each of these outbreaks, the Government’s initial “Zero COVID-19” approach was overwhelmed. By the April 2021 outbreak, stringent lockdowns were introduced, contributing to steep economic costs. For the almost whole year of 2021, Vietnam experienced continuous periods of lockdowns in two major economic centers, Ho Chi Minh City and Hanoi, and their surrounding areas — which was attributable to a decrease of over 6% in national GDP in the third quarter. The projected increase in GDP for 2021, as estimated by the World Bank, thus was not met, i.e. 2.6% increase only, about 4.2 percentage points lower than expected [8]. In April 2022, Vietnam lifted domestic restrictions on school closure, public services, domestic traveling, and tourism. Control measures for international travelers, including health declarations, COVID-19 testing requirements for international arrivals, and quarantine were also gradually suspended in early May, in line with the country’s strategy of opening up.

COVID-19 vaccines available in Vietnam

To date, nine foreign-made COVID-19 vaccines have been approved by the Vietnamese Government (Table 2). In accordance with the MOH Decision 3355/QĐ-BYT dated 8 July 2021, sixteen groups initially prioritized to receive COVID-19 vaccines were as follows:

1. Workers of public and private healthcare facilities and the healthcare sector;
2. Participants in COVID-19 prevention and control (members of steering committees for COVID-19 prevention and control at all levels, workers in quarantine areas, persons involved in contact tracing and epidemiological investigation, community COVID-19 teams, volunteers, reporters, etc.);
3. Military forces;
4. Police forces;
5. Vietnamese diplomatic officials and staff seconded overseas and families thereof, workers in diplomatic missions, consular posts, and international organizations operating in Vietnam;
6. Customs staff and officials involved in entry and exit operations;
7. Providers of essential services such as aviation, transport, tourism, power supply, and water supply;
8. Teachers, workers, and students of educational and training institutions; young doctors; workers in administrative units and agencies; lawyer organizations, notary organizations, bidding organizations, etc. frequently meeting many people;
9. Persons having chronic diseases and persons aged 65 and above;
10. Persons living in infected areas;
11. Poor people and social policy beneficiaries;
12. Persons seconded to work or study abroad by a competent authority or wishing to work or study abroad; foreign experts working in Vietnam;
13. Workers of enterprises (including enterprises in industrial parks and export processing zones, transport businesses, credit institutions, tourism businesses, etc.), providers of essential services such as lodgings, food and beverages, banking services, healthcare, pharmacies, medical equipment providers, etc., retail and wholesale establishments, markets and construction works and families thereof, and people living in tourism areas;
14. Religious dignitaries;
15. Freelance workers;
16. Other recipients decided by the Minister of Health or Chairperson of the provincial People's Committee and proposed by vaccine sponsors of the Ministry of Health.

Table 2. Types of foreign COVID-19 vaccines approved in Vietnam ordered chronologically by approval date

Vaccine	Country	Type	Approved in	Target population (age)	Initial schedule
AstraZeneca	England	Viral vector	Decision 983/QĐ-BYT, 01/02/2021	18+	2 doses, 8-12 weeks interval
Sputnik V	Russia	Viral vector	Decision 1654/QĐ-BYT, 23/03/2021	18+	2 doses, 3 weeks interval
Verocell (Sinopharm)	China	Inactivated	Decision 2763/QĐ-BYT, 03/06/2021	18+	2 doses, 2-4 weeks interval,
Comirnaty (Pfizer)	USA/ Germany	mRNA	Decision 2908/QĐ-BYT, 12/06/2021 Decision 457/QĐ-BYT, 01/03/2022	18+ 5+	2 doses, 2-8 weeks interval
Spikevax (Moderna)	Spain/ France	mRNA	Decision 3122/QĐ-BYT, 28/06/2021 Official Dispatch 2308/QLĐ-KĐ, 31/03/2022	18+ 6+	2 doses, 4-8 weeks interval
Janssen (Johnson & Johnson)	Belgium/ Holland	Viral vector	Decision 3448/QĐ-BYT, 15/07/2021	18+	1 dose
Hayat-vax	China	Inactivated	Decision 4361/QĐ-BYT, 10/09/2021	18+	2 doses, 2-4 weeks interval
Abdala	Cuba	RBD	Decision 4471/QĐ-BYT, 17/09/2021	19-65	3 doses, 2 weeks interval
Covaxin	India	Inactivated	Decision 5225/QĐ-BYT, 10/11/2021	18+	2 doses, 4 weeks interval

AstraZeneca vaccine was first approved on 1 February 2021. 811,200 vaccine doses arrived on 1 April 2021 via the global mechanism for equitable access to COVID-19 vaccines (COVAX), with support from the World Health Organization (WHO), United Nations Children's Fund (UNICEF), GAVI the Vaccine Alliance, and Coalition for Epidemic Preparedness Innovations (CEPI).

Nearly two months later, on 23 March 2021, **Sputnik V** vaccine was approved "for emergency use" to help achieve a total target of 150 million doses. On 2 June 2021, the Government signed an agreement with Russia to import 20 million doses of Sputnik V vaccine.

On 3 June 2021, **Verocell (Sinopharm)** vaccine was approved for emergency use, with 500,000 doses arriving in Hanoi on 20 June. This batch was intentionally used for Chinese citizens living in Vietnam, Vietnamese citizens who were planning to study or work in China in a short period, and for people located near China's borders.

On 13 June 2021, **Comirnaty (Pfizer)** vaccine was officially approved for emergency use as well. Vietnam signed an agreement to purchase 31 million doses of Pfizer vaccine in 2021 for its ongoing national vaccination program. As of 28 Oct 2021, Vietnam received 13,722,930 doses.

Other vaccines, including **Spikevax (Moderna)**, **Janssen (Johnson & Johnson)**, **Hayatvax**, **Abdala**, and **Covaxin**, were subsequently approved in Vietnam for emergency use on 29 June, 15 July, 10 September, 17 September, and 10 November 2021, respectively.

The number of COVID-19 vaccines delivered to Vietnam has been increasing over time (Figure 4). As of 3 July 2022, Vietnam had received nearly 251.4 million doses of COVID-19 vaccines. Of these, 133.1 million doses (53.0%) were via bilateral procurement, 68.1 million doses (27.1%) were via the COVAX mechanism, and 50.1 million doses (19.9%) were via donations from other countries. Of these, a total of 233.5 million (92.8%) doses had been administered by 3 July 2022. Among nine types of COVID-19 vaccines approved, Pfizer accounted for 41% of total doses administered, followed by AstraZeneca (26%) and Sinopharm (21%) [9].

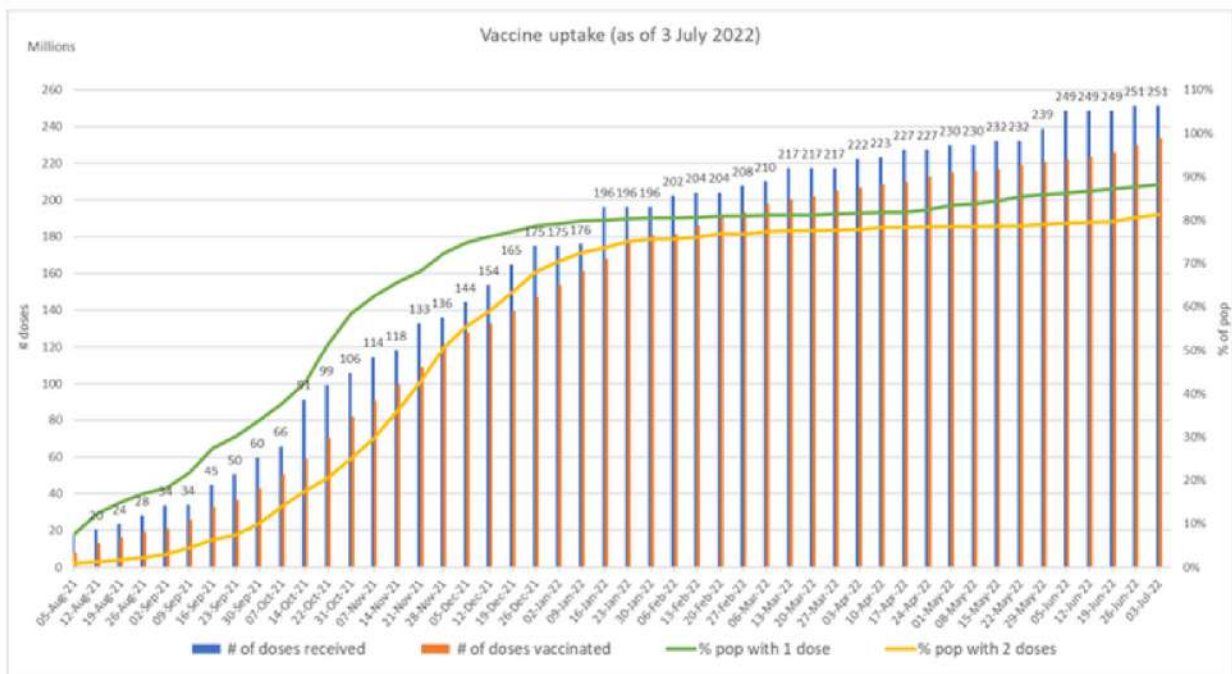


Figure 4 - Progress of vaccine usage and vaccination coverage per total population in Vietnam as 3 July 2022 [9]

According to Decision 457/QD-BYT issued on 01 March 2022, one dose of Comirnaty (Pfizer) vaccine for people aged from 12 years is 0.3ml of vaccine (after dilution) containing 30mcg of mRNA enveloped by lipid nanoparticles, while one dose for children from five to under 12 is 0.2ml of vaccine (after dilution) containing a third of the amount of mRNA for adults, or 10mcg. On 31 Mar 2022, Vietnam's health authorities announced that they have expanded the emergency use authorization for Moderna COVID-19 vaccine (Spikevax) to include children from 6 to under 12 years old with a dosage of 0.25ml, or half of the dosage for adults, according to Official Correspondence 2308/QLD-KD. The recommended interval between two doses for both vaccines is four weeks and the first and second doses must be of the same vaccine.

Regarding local COVID-19 vaccines, the clinical trial Phase 1, open-label, dose-escalation to evaluate the safety, tolerability, and initial assessment of immunogenicity of Nanocovax vaccine (manufactured by Nanogen Pharmaceutical Biotechnology) intramuscularly in 620 healthy Vietnamese adult volunteers and the clinical trial Phase 2, randomization, double-blind, multicenter, placebo-controlled to evaluate the safety, immunogenicity, and determined the optimal dose of the vaccine intramuscularly in healthy volunteers were registered in December 2020. Results of the first two phases were published in May 2022 [11], while the report on Phase 3 was submitted and reviewed by MOH but not yet published in a scientific journal.



The trials are ongoing and results have not been reported [12]. The second candidate for local COVID-19 vaccines is Covivac, approved by the MOH for clinical trials. The vaccine has been developed by the Institute of Vaccine and Medical Biologicals (IVAC) since May 2020. In Phase 1, the Covivac vaccine was tested on 120 volunteers, aged 18-59 years old, and in Phase 2, the vaccine was tested on 374 volunteers. Given the high coverage of the COVID-19 vaccine in Vietnam, Phase 3 of this trial, which needs about 4,000 volunteers, has been halted due to difficulty in recruiting eligible volunteers who have not received any type of COVID-19 vaccine [13].

The third COVID-19 vaccine which was put into human clinical trials in Vietnam was an mRNA vaccine called ARCT-154, following a technology transfer contract between the US company Arcturus Therapeutics, Inc. and VinBioCare Biotechnology JSC, a subsidiary of Vietnam's leading multisectoral conglomerate Vingroup [14]. The clinical trials were planned to be carried out in three phases with the participation of 21,000 volunteers, including 100 in Phase 1, 300 in Phase 2, and 20,600 in Phase 3.

Other COVID-19 vaccines under technology transfer contracts between Vietnam's government and partners from Russia and Japan are being processed at the laboratory stage [15]. As such, no locally made vaccines have been approved so far.

Rationale of this review

A National Communication plan for Immunisation was approved by the MOH in 2014. The Plan, which was formally in force until 2016, provided a foundation for relevant government departments to build specific communication plans to support immunisation and guide implementation at the local level. In March and July 2021, the MOH developed a communication plan regarding the purchase and use of COVID-19 vaccines and a communication campaign for COVID-19 vaccination, respectively, aiming to ensure providing accurate and prompt information on COVID-19 vaccines. The plan included guidance for communicating about the development, use, adverse events, and effectiveness of COVID-19 vaccines.



[Photo credit: VnExpress/Huu Khoa]

As of 3 July 2022, Vietnam has reached over 90% and 85% coverage of the first and second doses of COVID-19 vaccines, respectively, amongst the whole population [10]. The national coverage of the first dose of COVID-19 vaccines for children aged 5 – under 12 years was, however, low at 13.7% according to Official Correspondence 2357/BYT-DP dated 9 May 2022. The first booster dose (i.e., the third dose) had started to be provided to people aged 18 years and over and children aged 12-17 years since 17 December 2021 according to Official Dispatch No. 10722/BYT-DP and 11 June 2022 according to Official Dispatch No. 3181/BYT-DP, respectively.

A second booster dose (i.e., the fourth dose) has been administered for people aged over 50 years, moderately or severely immunosuppressed people over 18 years old, and people aged from 18 years at high risk for COVID-19 exposure including health care workers, frontline forces, and workers in industrial areas since May 2022 [16]. The first booster dose coverage remains suboptimal at 57.5% for the population aged 18 years and above, while the second booster dose (the fourth dose) coverage is almost unknown [16]. Tailored communication is required to increase the uptake of booster doses among children aged 12-17 years and high-risk populations as well as of primary doses among children aged 5-under 12 years. The focus of these plans therefore could include education with a particular focus on older adults, people with underlying medical conditions, and parents of primary school children.

Australia is supporting access to safe and effective COVID-19 vaccines in the Pacific and Southeast Asia through the Regional Vaccine Access and Health Security Initiative (VAHSI) and the Quad Vaccine Partnership. The Australian Expert Technical Assistance Program for Regional COVID-19 Vaccine Access: Policy, Planning, and Implementation (AETAP-PPI) has been established under the VAHSI to support Pacific and Southeast Asian countries' efforts to deliver safe, effective, and accessible COVID-19 immunisation programs, based on a health system strengthening approach and in line with best-practice standards. Thus, technical assistance under this program has been available to provide country-specific support for the Government of Vietnam's COVID-19 vaccine rollout.

The National Centre for Immunisation Research and Surveillance (NCIRS), as the lead of the AETAP-PPI program, draws upon Australian scientific and technical expertise from the Australian Regional Immunisation Alliance (ARIA) Network and provides access to technical experts remotely and/or through in-country technical assistance. NCIRS, with support from Woolcock Institute of Medical Research (Woolcock) and the Murdoch Children's Research Institute, Melbourne (MCRI), has collaborated with UNICEF Vietnam to support the MOH in developing a detailed COVID-19 vaccine communications strategy for community engagement. These organizations will also support the development of the training and capacity-building plan that will help health care workers increase the uptake of COVID-19 booster doses among the population aged 12 years and older and primary doses among children aged 5-under 12 years. The technical assistance is provided in two phases: (1) Design and develop a targeted COVID-19 vaccine communications plan for community engagement at the subnational level, and (2) Develop training tools and materials for building the capacity of health workers and other workers involved in COVID-19 community engagement.

The development of the plan (first phase) will be done in two stages. In the first stage, a desk review was conducted to synthesise existing data to understand the country's situation on the coverage and drivers of COVID-19 vaccine uptake. The communication plan will be developed in the second stage based on evidence from the desk review.



This report presents findings from the desk review, in accordance with three primary objectives as follows:

1. To summarise current data on COVID-19 vaccine coverage in Vietnam, including breakdowns by population age/location/vaccine type and dose, where possible.
2. To map recent evidence and literature on the behavioral and social drivers (BeSD) of COVID-19 vaccine uptake from community residents' perspective in Vietnam following the BeSD model (Figure 5).
3. To map the key features of recent COVID-19 vaccine communication activities, materials and/or policies for community engagement, including communication training (and evaluations of their effectiveness, where available).

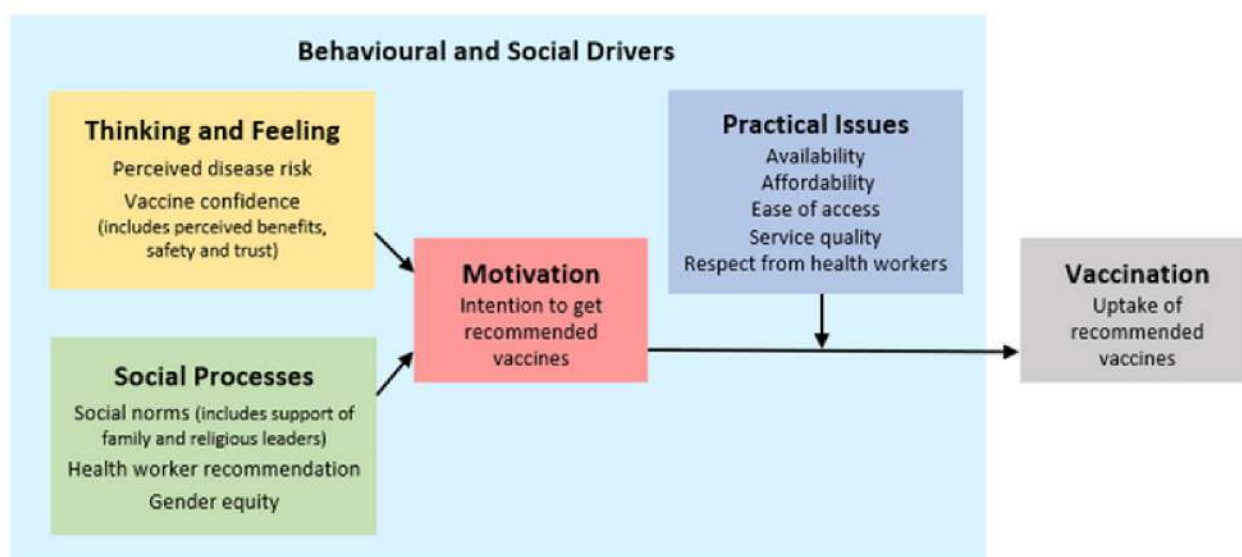


Figure 5. behavioral and social drivers of vaccination (BeSD) framework [14]

2. METHODS

Data sources

Different sources for three main components of vaccine coverage, uptake, and communication were used to collect data. Given the fact that the COVID-19 situation has dramatically changed during the fourth wave and COVID-19 vaccines were only available in Vietnam from April 2021, we limited the search to publications from May 2021 to 12 May 2022.

For national COVID-19 vaccine coverage:

- The national COVID-19 vaccine portal (<https://tiemchungcovid19.gov.vn/portal>) provides a daily update on primary doses coverage among people aged over 18 years.
- The official news channel of the MOH (<https://suckhoedoisong.vn/>) provides a daily update on the number of doses given to children aged 5-under 12 years and 12-17 years.
- Google-based search and experts/stakeholders communication provide data on vaccination coverage by age/location/vaccine type and the vaccine coverage among high-risk populations.

For BeSD of COVID-19 vaccine uptake and communication activities:

- Engine search including PubMed, pre-print journals (e.g. MedRxiv), LitCovid, WHO's COVID-19 database, and the COVID-19 LOVE platform.
- Grey literature including Vietnamese medical journals, governmental websites, Google-based search, and experts/stakeholders communication.
- Reference lists of selected studies from the engine search were screened.

Search terms

Medical Subject Headings (MeSH) and free terms of relevant concepts were combined:

- Vietnamese population including adults and children, older people, pregnant women, vaccine-hesitant populations, people with immunosuppression disorders, people with comorbidities, people with chronic diseases, marginalised groups, vulnerable groups, foreigners, and ethnic minorities.
- COVID-19 vaccine(s), immunisation

- Output topics of interest:
 - Acceptance, refusal, delay, consent
 - Thinking and feeling: perceived disease risk, vaccine confidence, perceived benefits, safety, trust, attitudes, beliefs, knowledge
 - Social processes: social norms, health worker recommendations, gender equity, rumors
 - Motivation: intention, readiness, willingness, hesitancy
 - Practical issues: availability, convenience, cost, service quality, barriers, difficulties
 - Communication for community engagement: social media, training, coaching, internet, online platforms, information source, misinformation, channel, and communication programs/activities/policies/materials.

Both English and Vietnamese terms were used to optimize search results. The PubMed search strategy can be found in Annex Table A1.

Data screening

After one researcher (N.T.M.) conducted a search and removed duplicate studies, the titles and abstracts of the remaining studies were screened by two researchers (N.T.M. and T.T.H.D.), both of whom then screened the full texts of possibly relevant studies in further detail. The whole process was performed independently based on the selection criteria as follows:

Inclusion criteria:

- Studies investigating the coverage/ uptake/ acceptance/ BeSD/ communication regarding vaccines against COVID-19 among Vietnamese people
- Full text accessible
- Written in Vietnamese or English languages
- Type of documents to be included:
 - Articles, reviews, and government documents
 - Unpublished works, including working papers, reports, presentations, and discussion notes
 - Communication materials available to support vaccine uptake (e.g. posters, information, and websites with information)

Exclusion criteria:

- COVID-19 but not mention COVID-19 vaccines
- Not about people living in Vietnam
- Studies whose data collection was completed before May 2021

Discrepancies in findings were discussed with a third researcher (N.T.A.) until a consensus was reached.

Data extraction

Data extraction was undertaken under three themes:

- Coverage/ uptake of COVID-19 vaccines
- BeSD of COVID-19 vaccines including potential barriers to community engagement in Vietnam
- COVID-19 vaccine communication strategies following the Template for Intervention Description and Replication (TIDieR) checklist

Quality assessment

The quality of included studies was not assessed due to time constraints. However, a critical quality assessment might be considered using appropriate instruments, e.g. Newcastle Ottawa Scale, at a later stage (publication development).

3. RESULTS

Search results

The process of screening materials included in the final review is presented in Figure 6. Initially, we found 495 records from the engine search and 18 records from the grey literature search. After the screening procedure, a total of 22 documents were included in the desk review.

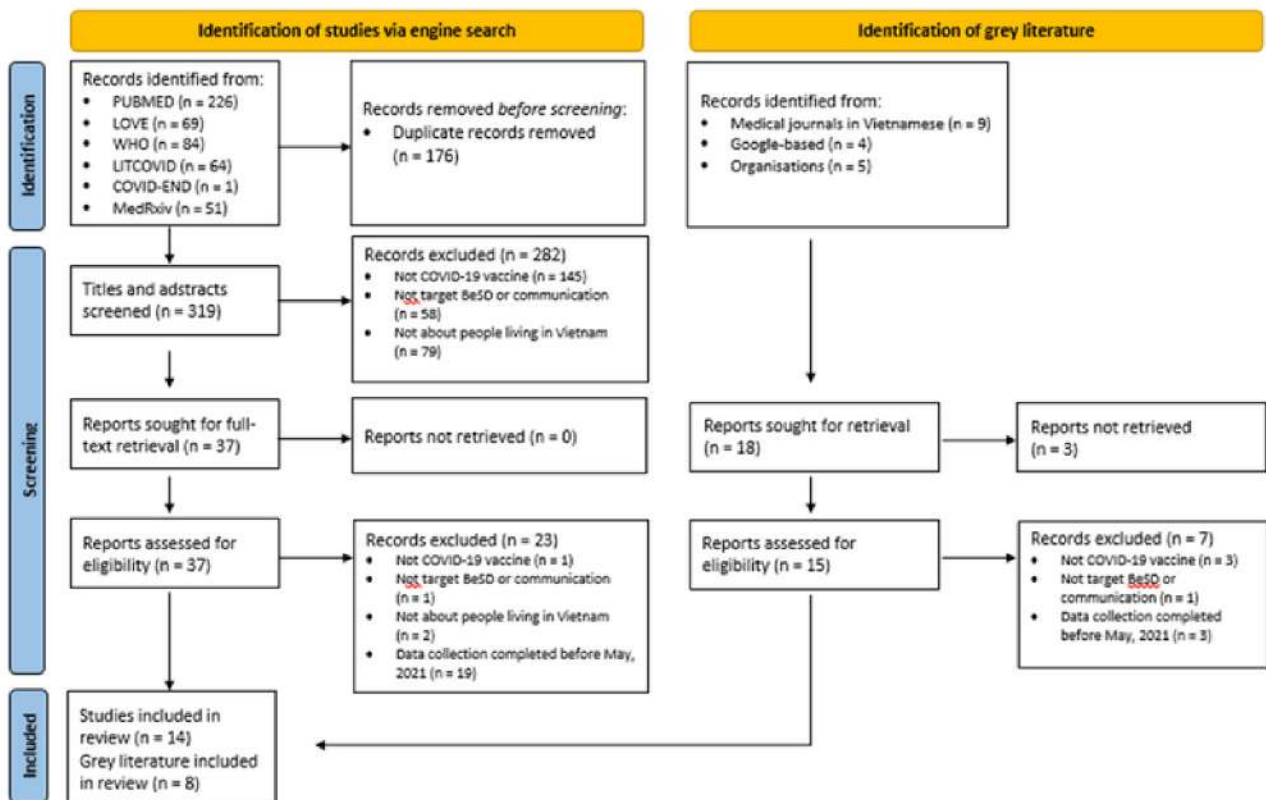


Figure 6 - Flow chart of the selection process for included studies and reports

Coverage of COVID-19 vaccines in the Vietnamese population

Table 3 summarises information on vaccine coverage for the first and second primary doses and the booster doses (first and second booster) from six primary sources related to COVID-19 vaccine coverage including situation reports published by WHO, National COVID-19 Vaccine Portal, VnExpress, news on MOH’s official website, National Expanded Programme on immunisation (EPI), and policy documents.

As of May 2022, Vietnam has had substantial success in providing COVID-19 vaccination to the general population. The Government set a goal of reaching approximately 70% vaccine coverage for the Vietnamese population by the end of 2021 or the start of 2022 as announced in the Government’s Resolution No. 21/NQ-CP dated 26 February 2021. In fact, the coverage of COVID-19 vaccination has been increasing over time and had reached slightly over 90% and 85% of the whole population for primary doses (first and second doses), respectively, by 3 July 2022, according to the WHO situation report no. 95 [18] (Table 3). According to Our World in Data [19], as of 26 July 2022, the primary doses coverage in Vietnam (89%) is higher than in many ASEAN countries, such as Malaysia (84%), Thailand (79%), and Indonesia (74%) and is even higher than several developed countries, such as Japan (83%) and the United States (78%) (Figure 7).

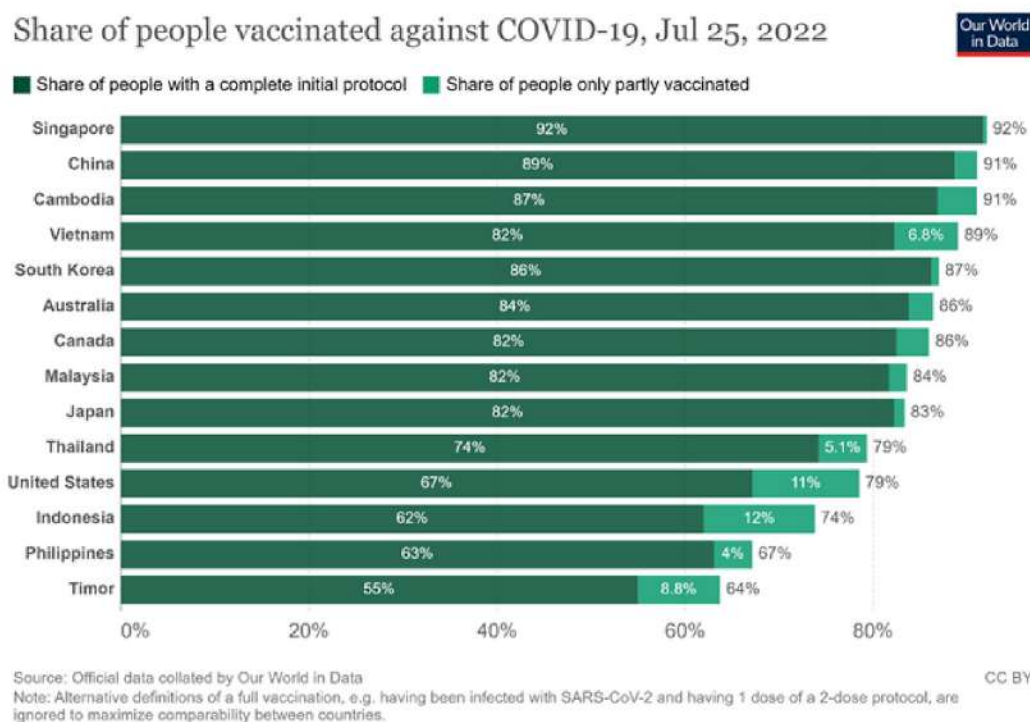


Figure 7 - Share of people vaccinated against COVID-19 by 25 July 2022

At the beginning of the fourth phase of the pandemic (24 April 2021 to present), owing to the limited supply of COVID-19 vaccines for Vietnam, the vaccines were prioritized for healthcare workers at healthcare facilities and frontline workers working on outbreak prevention and response (Resolution 21/NQ-CP issued on 26 February 2021). [20]At the time, the proportion of people aged 18 years and older willing to receive COVID-19 vaccines if they had enough supply was relatively high nationwide, ranging from 71.5% to 89.9%, according to different studies [21-23] (Table 4). This suggests a high community vaccination coverage when more COVID-19 vaccines become available. Indeed, the actual coverage of the primary doses among this population reached almost nationwide ($>90\%$ - 100%) after one year (May 2022) [16] (Table 3). This might be due to effective coordination strategies that allow smooth collaboration among relevant agencies, flexible vaccine distribution, and wide access to different sources of vaccines. Vietnam has successfully launched the largest free vaccination program in the country's history, aiming to inoculate its population from 5 years old [24]. During the vaccination process, monitoring and follow-up on materials and equipment for vaccination provision were implemented by national MOH delegations which assisted with the timely management of problems with vaccination. The MOH requested local health facilities to administer the vaccination to the priority groups while maintaining safety and equity in access to other groups [25].

[16]Despite high primary dose coverage, the coverage of the first booster among the population aged 18 years and over remains suboptimal (55.4% - 57.5%) [16, 18, 26]. The uptake of the second booster had not been fully reported as of July 2022 (Table 3). Uptake of these booster doses remains relatively slower than the national target, that is to complete the third dose for eligible people aged 18 years and above within the second quarter of 2022, as set in the Announcement No.114/TB-VPCP dated 15 April 2022.

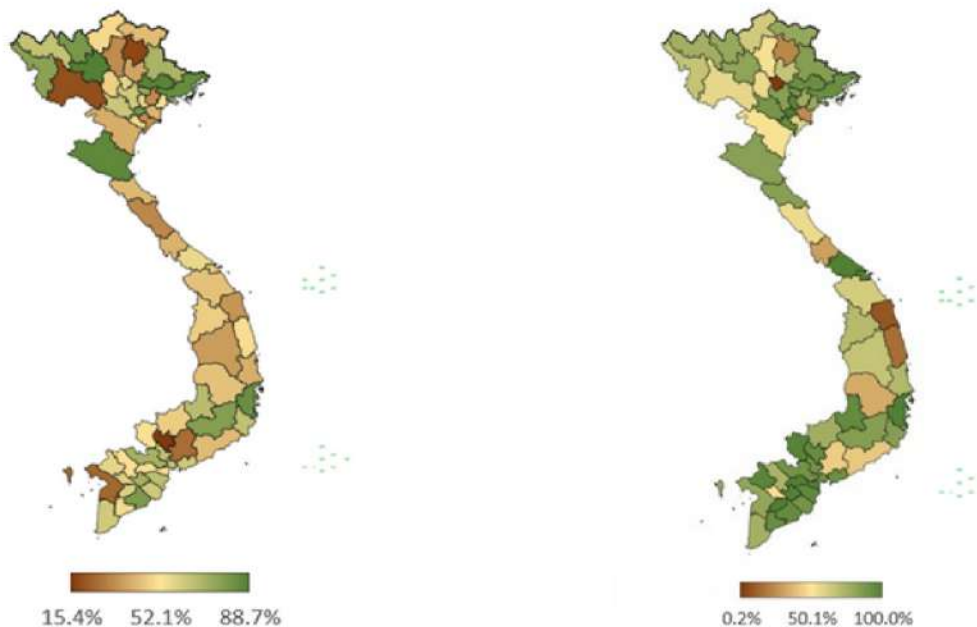
Vietnam started rolling out COVID-19 vaccines for children aged 12-17 years in November 2021 [27]. As of 26 July 2022, the percentage of children aged 12-17 years fully vaccinated with two primary doses ranged from 74.1% to 98.5%, depending on data source. The first booster dose (i.e. the third dose) has started to be provided to children aged 12-17 years since 11 June 2022 according to Official Dispatch No. 3181/BYT-DP. However, limited data on the booster coverage has been available since then.

Provision of the first dose for children aged 5-under 12 years has been approved in the MOH Official Correspondence 1535/BYT-DP dated 28 March 2022 and has been carefully scaled up in all provinces. Comirnaty (Pfizer) and Spikevax (Moderna) are the only vaccines that are allowed to be used in children aged 5-under 12 and 6-under 12 years, respectively. Announcement No.114/TB-VPCP dated 15 April 2022 set out the targets of completing the second dose for children aged 5-under 12 years in June 2022.

A survey on acceptance of the COVID-19 vaccine for children aged 5-under 12 years among 415,000 parents or guardians conducted by the Health Strategy and Policy Institute at the beginning of 2022 reported an acceptance rate of 60.6% in this age group [28] (Table 4). However, as of 26 July 2022, 13.7% of children aged 5-under 12 years received the first dose (Table 3). By the end of April 2022, the Minister of Health Nguyen Thanh Long announced on the Government News that the uptake of COVID-19 vaccines had slowed down, especially the booster dose for the population aged 12 years and over and primary doses for the population aged 5-under 12 years, albeit no shortage in the COVID-19 vaccine supply [29].

As of July 2022, the three remaining gaps in the COVID-19 vaccine coverage are as follows:

- The progress of reaching the booster coverage among the population aged 12 years and above is slower than expected.
- Uptake of primary doses among children aged 5-under 12 years is lower than targets and varies by region.
- There are some provinces reporting low uptake of primary series vaccines, as well as low rates of uptake of boosters and vaccines among children (Figure 8 and Annex Table A2). Whether these low proportions are derived from slow progress in updating data or the slow progress of administering the vaccines has been hard to confirm.



(A) The first booster dose coverage among people aged 18 years and over

(B) The primary dose coverage among children aged 12-17 years

Figure 8 - COVID-19 vaccine coverage as a proportion of the population, by province, as of 18 July 2022[26]

Detailed characteristics of six sources of data were compared in Annex Table A3. Several concerns regarding the quality of data related to reported COVID-19 vaccine coverage include:

- **Discrepancies between reported numbers:** For the same age group and the same dose, data collected from different sources are inconsistent. For example, according to VnExpress, as of 22 May 2022, 55.4% of the population aged 18 years and above got a booster dose, while the Official Dispatch No. 2357/BYT-DP reported a higher percentage of 57.5% on an earlier date of 4 May 2022.
- **Limitations in describing methods to calculate coverage:** The aforementioned inconsistency could be due to different denominators used to calculate the percentages. Indeed, only VnExpress reported that they used population data obtained from the 2019 Population and Housing Census Report to calculate the vaccine coverage, while all other sources do not mention how the denominator for their calculations was calculated.
- **Differences between vaccine regimens:** Medical terms used to name COVID-19 vaccination doses as described in Annex Table A3 are unsystematic. Among seven types of COVID-19 vaccines currently available in Vietnam, Abdala requires three primary doses, and other vaccines (AstraZeneca, Sinopharm, Pfizer, Moderna, Sputnik V, and Hayat-Vax) require two primary doses. For this reason, a third dose can be interpreted as either the third primary dose of Abdala, the booster dose of the other vaccines, or even the additional dose of the other vaccines for those who are less likely to mount a protective immune response after the initial vaccination.
- **Unclear inclusion criteria for reporting:** According to the latest Vietnam Coronavirus Disease 2019 (COVID-19) Situation Report #91 released by WHO on 8 May 2022, 15,242,897 immunosuppressed people and high-risk people received an additional dose. However, the report did not mention definitions as well as classification criteria of such groups.
- **Errors in reporting:** Total numbers of people who received at least one dose by province reported on the National COVID-19 Vaccine Portal ranged from 194.4% to 263.5%, which made no sense in terms of data nature, calculation, and interpretation.

Table 3 - Evidence of COVID-19 vaccine coverage by age groups, vaccine doses, and data sources in July 2022

Age group	Dose	Aim [*]	Total population			18 years old and above			12-17 years old			5-under 12 years old		
			1 st	2 nd	1 st booster	1 st	2 nd	1 st booster	Aim ^{**}	1 st	2 nd	Aim ^{**}	1 st	2 nd
WHO [18]		By the end of 2021 or the start of 2022, approx. 70% of Vietnam's population vaccinated	>90.0%	85.0%	40.3%	88.1% ¹	81.3% ¹	56.3%	100%	98.5%	Complete the second dose for children aged 5-under 12 years within the second quarter of 2022	6.0million	2.3 million	
COVID-19 vaccine portal [30]			-	-	-	122.61%	121.8%	-	-	-		-	-	
VnExpress [26]			88%	80.7%	64.8%	-	111.31%	55.4%	89.0%	74.1%		-	-	
News [31]			87.2 million	80.5 million	46.9 million	71.3 million	68.8 million	46.9 million	9.0 million	8.6 million		6.9 million	3.1 million	
EPI			87 million	80.4 million	47.9 million	71.3 million	68.8 million	46.6 million	9.0 million	8.6 million		6.7 million	2.9 million	
Policy document [16]			-	-	-	100.0%	100.0%	57.5%	100.0%	96.4%		13.7%	-	

¹People from 12 years and above

^{*}Government's Resolution No. 21/NQ-CP dated 26/2/2021 on purchase and use of COVID-19 vaccines;

^{**}Announced in the Announcement No.114/TB-VPCP dated 15 April 2022 from conclusions of Prime Minister Pham Minh Chinh at the 14th online meeting of Vietnam National Steering Committee on COVID-19 Prevention and Control.

Summary Box 1. Vaccine coverage in Vietnam

Adult population aged 18 years and above

- High coverage of two primary doses as of July 2022 (the first dose: 100%; the second dose: 100%).
- Suboptimal coverage of the first booster dose: 57.5%.
- Provinces having the lowest coverage of the first booster dose included Binh Duong (15.4%), Bac Kan (18.3%), Son La (19.9%), and Dong Nai (26.5%).
- Limited data is available on the coverage of the second booster dose.

Children population aged between 12 and 17 years

- High coverage of two primary doses as of July 2022 (the first dose: 100%; the second dose: 98.5%).
- Provinces having the lowest coverage of the second primary dose included Vinh Phuc (0.2%), Quang Ngai (8.4%), Binh Dinh (15.4%), and Bac Kan (23.0%).
- Data quality on vaccination should be cross-checked for Lao Cai and Tuyen Quang provinces.
- Limited data is available on the coverage of booster doses.

Children population aged from 5 to under 12 years

- Low coverage of the first primary dose as of July 2022 (13.7%).
- Limited data is available on the coverage of the second primary dose.

Table 4 - Studies and reports on COVID-19 vaccine acceptance in Vietnam ordered chronologically by time of data collection

#	First author (year)	Study design	Sample size (people)	Sampling technique	Duration	Setting	Data collection tool	Participant age range	Acceptance rate	Refusal rate	Main findings
1	Marzo et al. (2022) [21]	Cross-sectional	651	Snowballing	February to May 2021	20 countries including Vietnam	Online questionnaire	≥18 years old	89.9%	NA	<ul style="list-style-type: none"> The findings revealed the prevalence of drivers of vaccination decision-making (convenience [48.2%], health providers' advice [69.3%], and costs [16.0%]).
2	Ngo et al. (2021) [22]	Cross-sectional	2,706	Convenience	12 to 20 May, 2021	Nationwide	Online questionnaire	18-39 years old	71.5%	NA	<ul style="list-style-type: none"> Positively associated factors of vaccine acceptance: people living in countryside / mountainous areas, male, unmarried, students, and healthcare workers; history of chronic diseases. Negatively associated factors: graduate and post-graduate, unaware of infected status.
3	Ha et al. (2021) [23]	Cross-sectional	3,954	Convenience	12 to 30 May, 2021	Nationwide	Online questionnaire	≥18 years old	71.7%	2.9%	<ul style="list-style-type: none"> Factors positively associated with vaccine acceptance: male, health care staff, having concerns about vaccination cost and the expiry dates, having belief in the vaccine effectiveness, and willingness to pay for vaccination. Factors negatively associated with vaccine acceptance: postgraduate-level education, living in urban areas, history of chronic disease, history of an allergic reaction, aware of serious complications of vaccination, having belief in the US- or Europe-originated vaccines rather than another country of origin, and people who considered the safety of the vaccine.
4	Le et al. (2022) [32]	Cross-sectional	911	Convenience	1 April to 30 June, 2021	Dong Thap	Online questionnaire	Health professions students	58.0%	1.5%	<ul style="list-style-type: none"> Factors positively associated with vaccine acceptance: perceived susceptibility of infection, cues to action, and perceived severity of adverse events. Factors negatively associated with vaccine acceptance: the perceived shortage of information on adverse effects provided by manufacturers and worries of death due to adverse events.
5	Nguyen et al. (2022) [33]	Cross-sectional	1,020	Convenience	28 August to 7 September, 2021	Nationwide	Self-administered questionnaire	≥18 years old	86.4%	NA	<ul style="list-style-type: none"> Factors positively associated with acceptance of local vaccines: younger age (18-29 years old vs. 30-39 years old), rural dwellers, female, self-employed workers. Factors negatively associated with acceptance of local vaccines: history of chronic diseases, history of allergic reactions, or unsure of their allergies.
6	Health Strategy and Policy Institute (2021) [28]	Cross-sectional	415,000	Convenience	2022	Nationwide	Self-administered questionnaire	≥18 years old	60.6% would accept vaccination for children aged 5-under 12 years	1.9%	<ul style="list-style-type: none"> 7.6% would accept vaccination for children aged 5-under 12 years if required, 29.1% would consider.

Ngo et al. (2021) [22] and Ha et al. (2021) [23] reported socio-demographic features of people who were less likely to accept COVID-19 vaccines including living in urban areas, having chronic diseases or a history of allergic reactions, and graduate and post-graduate-level of education. Those were aware of serious adverse events following immunisation, unaware of infected status, preferred US- or Europe-originated vaccines, as well as concerned about vaccine safety (Figure 9).

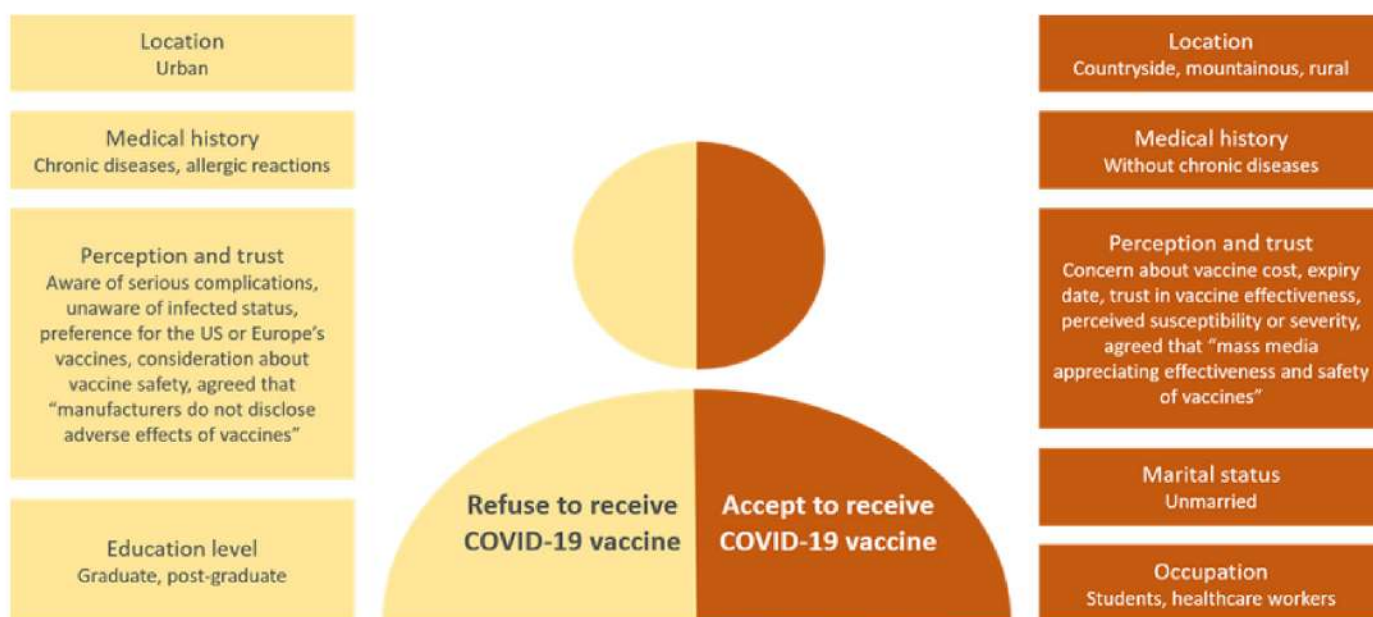


Figure 9 - Factors positively associated with COVID-19 vaccine acceptance and refusal

Behavioral and social drivers of COVID-19 vaccines

A. Thinking and feeling

There were twelve studies and reports investigating Vietnamese people's perceptions of COVID-19 vaccines, as shown in Table 5. These studies were conducted from the middle of Phase 3 (28 January – 25 March 2021) of the pandemic in Vietnam to February 2022. They were mainly large-scaled cross-sectional studies, administered using online survey tools and self-reported questionnaires in a short period of time (minimum 4 days and maximum 4 months). The two primary concerns people reported about COVID-19 vaccination were the perceived safety/side effects and effectiveness of the vaccines (Figure 10).



Table 5 - Studies and reports on thinking and feeling about COVID-19 vaccines in Vietnam ordered chronologically by time of data collection

#	First author (year)	Study design	Sample size (people)	Sampling technique	Duration	Setting	Data collection tool	Participant age range	Main findings
1	Marzo et al. (2021) [21]	Cross-sectional	651	Snowball	February to May 2021	20 countries including Vietnam	Online questionnaire	≥18 years old	Vietnam: 88.3% thought that COVID-19 vaccines were effective Sociodemographic factors associated with belief in vaccine effectiveness: younger age, male, urban residence, higher education, and higher income (multivariable regression analysis across 20 countries)
2	Pham et al. (2021) [34]	Cross-sectional	462	Convenience	March to May 2021	2 rural health centers in the South	Self-administered questionnaire	≥18 years old	On a Likert scale from 1 to 5 corresponding with strongly disagree to strongly agree, the study found high mean scores (>3.0 out of 5.0) for the perceived susceptibility and severity, perceived benefits, cues to action, attitude, subject norms, perceived behavioral control, and self-efficacy. By contrast, the perceived barriers measured by 3 items related to adverse effects following immunizations, unnecessary vaccination, and vaccine's cost reported a low mean score, indicating low perceived barriers among respondents.
3	UNICEF (2021) [35]	Cross-sectional	38,506	Convenience	7 to 16 May 2021	Nationwide	Online questionnaire	Not reported	98.0% felt confident in getting vaccine to protect themselves. 99.0% felt confident that vaccine can protect their community. 44.0% rated serious reactions of COVID vaccines at moderate and very concerned levels. 70.0% trusted health staff/vaccination service providers at high level who would give them COVID-19 vaccines
4	Ha et al. (2021) [23]	Cross-sectional	3,954	Convenience	12 to 30 May 2021	Nationwide	Online questionnaire	≥18 years old	Most expressed positive opinions about the COVID-19 vaccines. 69.7% agreed that COVID-19 vaccines are safe and effective. 77.3% agreed that vaccines could protect people from the COVID-19. 89.2% agreed that the more people being vaccinated the sooner the pandemic would end. Most concerning issues about COVID-19 vaccination were safety (92.5%), effectiveness (75.6%), and side effects (68.5%).
5	Duong et al. (2022) [36]	Cross-sectional	1,708	Snowball	16 April to 16 July 2021	Nationwide	Online and paper-based questionnaires	≥18 years old	46.7% had acceptable knowledge level (i.e., total score of 7 Likert questions above the mean score of all participants. The questions were developed based on available literature about COVID-19 vaccines and information from the manufacturers, World Health Organization (WHO), and Vietnam Ministry of Health) Older people and people having vaccinated had higher knowledge level Factors positively associated with lower knowledge levels included: gamminar income of <\$15 per day, less than a high school education, non-clinical professionals, and non-health lecturers.
6	Duong et al. (2021) [37]	Cross-sectional	1,579	Snowball	16 April to 16 July 2021	Nationwide	Online and paper-based questionnaires	≥18 years old	37.6% thought that vaccines were safe, while 57% were unsure. 94.5% would wait and see how people respond to the vaccines before getting vaccinated. 88.6% preferred to receive vaccines at public hospitals. 86.9% and 76.4% concerned about vaccine effectiveness and side effects, respectively. 61.8% concerned about vaccine cost.
7	Nguyen et al. (2022) [38]	Cross-sectional	329	Convenience	June to July 2021	Hanoi and HCM city	Online questionnaire	≥18 years old	44.7% concerned about vaccination safety; 27.7% concerned about vaccination effectiveness.
8	Dang et al. (2022) [39]	Cross-sectional	308	Convenience	28 August to 30 October 2021	Nationwide	Online questionnaire	≥18 years old, vaccinated	95.3% concerned about adverse reactions 96.7% wanted to be selective about vaccines. 100.0% agreed that COVID-19 vaccine benefits outweigh risks. Reported adverse reactions occurred: mild fever, headache, fatigue, and muscle pain. No serious events requiring hospitalization were recorded.
9	Vo et al. (2022) [40]	Cross-sectional	407	Convenience	1 to 18 December 2021	Nationwide	Online questionnaire	≥18 years old	Perceptions about a country where the vaccine was manufactured, value and quality of the vaccine affected trust in the vaccine. Factors associated with positive trust were: 30 years old or older, have steady occupations, know about India, have used Indian products in the past, and have strong brand trust in India's COVID-19 vaccinations.
10	UNICEF (2022) [41]	Cross-sectional	Not reported	Convenience	December 2021	Nationwide	Online questionnaire	Not reported	82% trusted vaccine effectiveness. 74% worried about side effects of vaccination.
11	Institute of public opinion (2022) [42]	Cross-sectional	387,037	Stratified randomization	11 to 15 February 2022	Nationwide	Self-administered questionnaire	Not reported	General community: 97.0% interested in COVID-19 vaccines for children aged 5-under 12 years. 78.0% considered vaccines to be necessary. Parents having children aged 5-under 12 years: 15.0% considered not necessary and suggested more studies and assessments on referring experiences and recommendations of other countries and organizations. 9.0% did not have enough information to answer.
12	UNICEF (2022) [43]	Cross-sectional	14,807	Convenience	21 January to 4 February 2022	Nationwide	Online questionnaire	Not reported	85.3% trusted the safety of vaccine. 86.0% trusted the efficacy of vaccine. 78.7% thought that a booster dose should be given.

Safety was reported to be the first priority for almost all recipients offered vaccination. Among twelve studies and reports, seven highlighted people's perceptions of the safety of COVID-19 vaccines. The sample size of these surveys ranged from 308 [39] to 38,506 respondents [35]. The proportions of people who believed that COVID-19 vaccines are safe ranged from 37.6% [37] to 85.3% [43]. There is an increasing trend in the percentage of people who believed in the safety of COVID-19 vaccines witnessed over time. For example, only 37.6% of adult respondents in a survey in April – July 2021 reported trust in the safety of COVID-19 vaccines [37], this proportion increased up to 85.3% in January – February 2022 [43]. However, there was a relatively high proportion of people reporting concerns relevant to the safety of COVID-16 vaccines (92.5% reported in Ha et al. (2021) [23], 44.7% reported in Nguyen et al. (2022) [38]) and to the threats of serious adverse effects (95.5% reported in Dang et al. (2022) [39], 74% reported in UNICEF (2022) [41], 68.5% reported concerns in Ha et al. (2021) [23], and 44% in UNICEF (2021) [35]).

Apart from concerns associated with adverse events of vaccination, a rapid survey on COVID-19 vaccination in Vietnam conducted by UNICEF in 2022 reported other reasons why 14.7% of its respondents believed that the COVID-19 vaccine is unsafe. These reasons included perceptions of a harmful long-term impact on health (65.7%), that they were unsafe for children (63.2%), and that insufficient information on the safety of COVID-19 vaccines was given by healthcare providers (61.1%) [43].

Within the general community, 97% of people were concerned about administering COVID-19 vaccines for children aged 5-under 12 years, and 78% considered vaccination essential. Among parents having children aged 5-under 12 years, 15% considered it not really necessary and suggested that more studies and assessments were needed on the basis of referring experiences and recommendations of other countries and organizations [42].

Vaccine effectiveness was another factor that shaped people's acceptance of COVID-19 vaccines. Seven studies and reports revealed people's perceptions of the effectiveness of COVID-19 vaccines on samples ranging from 329 [38] to 38,506 respondents [35]. The proportion of people believing that COVID-19 vaccines were effective ranged from 82% [41] to 98% [35]. These proportions were apparently higher than those who believed that vaccines were safe. Correspondingly, fewer people were concerned about the effectiveness of vaccines, as reported in Nguyen et al. (2022) [38] (27.7%). The level of belief in the effectiveness remained stable over time. Several socio-demographic characteristics were identified as positively associated factors of trust in vaccine effectiveness: younger age, male, urban residence, higher education, and higher income [21].

A UNICEF survey also reported reasons why people doubted the effectiveness of COVID-19 vaccines [43]. Among 13.4% of respondents who believed that COVID-19 vaccines are not effective, 90.7% revealed the reasons for their mistrust was that even people fully vaccinated against COVID-19 still became sick. Furthermore, 45.1% of people said that there was insufficient information about the effectiveness of COVID-19 vaccines.

As a side note, trust in the brand of the vaccine was also a determinant of COVID-19 vaccine uptake. Indeed, 96.7% of respondents in Dang et al. (2022) [39] wanted to be selective about vaccines. Vo et al. (2022) [40] assessed the impact of the nation of origin on trust in the brand of the vaccine using Vietnam as a case study for India's COVID-19 vaccine and found that perceived country of origin had a significant effect on brand trust, and the perceived value and perceived quality of product of the country of origin also positively impacted the perceived efficacy of the vaccine.

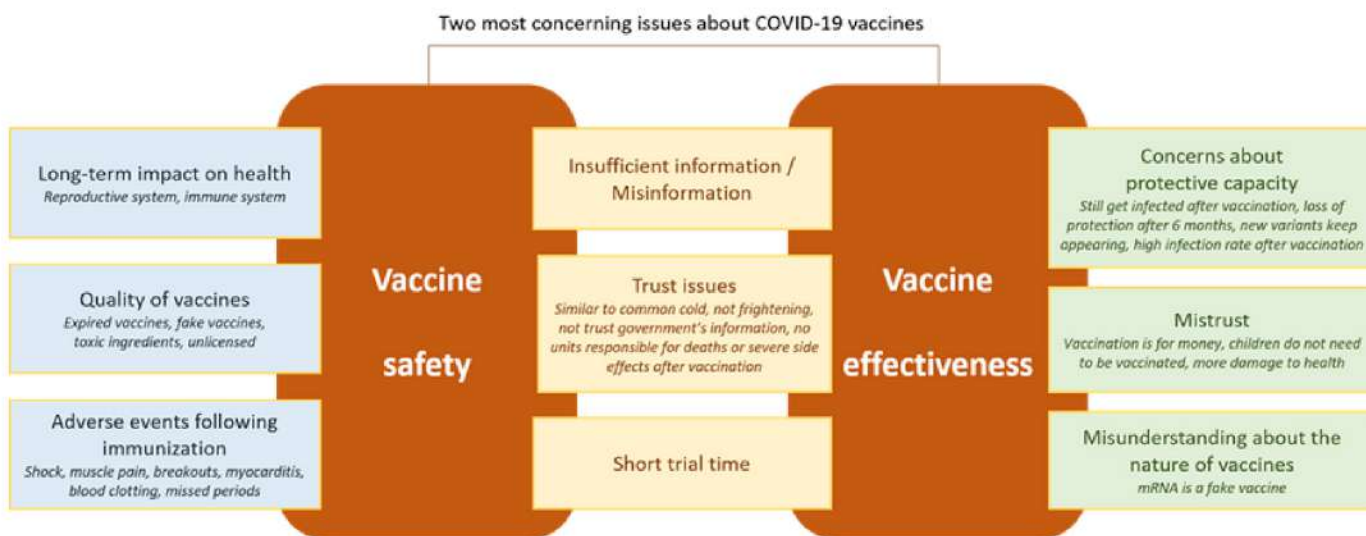


Figure 10 - Concerns around COVID-19 vaccine safety and effectiveness



[Photo credit: VnExpress]

B. Social processes

Among seven studies and reports conducted during the first six months of Phase 4 (from 27 April 2022 to the present), investigating how social processes affect Vietnamese people's decision on COVID-19 vaccination, there are six cross-sectional surveys with sample sizes ranging from 308 to 38,506 [23, 33-35, 37, 39] and one qualitative study [44] (Table 6).

There was a wide variety of information sources which surveyed participants used to access COVID-19 vaccine-related information including relatives, social media, government, MOH, health care workers, television, family members, friends, religious leaders, colleagues, television, online newspapers, and training (Table 6). Duong et al. (2021) [37], UNICEF (2021) [35], Ha et al. [23], and Nguyen et al. (2022) [33] consistently found that the most reliable source of information about the COVID-19 vaccine is Government/MOH, followed by health care staff including physicians/doctors, pharmacists, and nurses.

Most respondents (77.0%) could decide to take the vaccine themselves [35]. UNICEF (2021) [35] and Duong et al. (2021) [37] reported that spouse/partner, senior family members, and religious leaders could impact the decision-making process to a certain degree, while the qualitative study indicated that participants' intention to get vaccinated was not influenced by family members, friends, or colleagues [44]. The latter highlighted that published vaccine-related information about adverse events following immunisation (e.g., blood clots, anaphylaxis, shock, and death) had a strong impact on participants' vaccine acceptance regardless of their vaccination history [44]. The lack of information about COVID-19 vaccine safety and effectiveness made participants including health professionals hesitant to encourage people to get vaccinated [44].

Table 6 - Studies and reports on effect of social processes upon COVID-19 vaccination uptake in Vietnam ordered chronologically by time of data collection

#	First author (year)	Study design	Sample size (people)	Sampling technique	Duration	Setting	Data collection tool	Participant age range	Main findings
1	Pham et al. (2021) [34]	Cross-sectional	462	Convenience	March to May 2021	2 rural health centers in South Vietnam	Self-administered questionnaire	≥18 years old	COVID-19 information was received, predominately, via relatives (87.7%) and social media (86.4%) The two most reliable sources of information are the MOH (55.7%) and doctors at health facilities (17.9%). 77.0% of respondents could decide to get the vaccine themselves. 18.0% said that their decision can be affected by spouse or partner. 63.0% were sure that their family and friends would support them in the decision of getting vaccine. 54.0% thought most adults would get a COVID-19 vaccine. If it is recommended to them.
2	UNICEF (2021) [35]	Cross-sectional	38,506	Convenience	7 to 16 May 2021	Nationwide	Online	Not reported	The 2 most trusted information sources of the COVID-19 vaccines were health care staff (68.8%) and television (47.1%).
3	Ha et al. (2021) [23]	Cross-sectional	3,954	Convenience	12 to 30 May 2021	Nationwide	Online survey	≥18 years old	Participants' intention to get vaccinated was not influenced by family members or friends. Published vaccine-related negative information had a strong impact on participants' vaccine acceptance. Those who had been vaccinated felt scared and anxious before getting vaccinated due to the negative information.
4	Duong et al. (2022) [44]	Qualitative	20	Purposive	May 2021	Nationwide	Focus group discussions	≥18 years old	Lack of these information about COVID-19 vaccine safety and effectiveness made participants including health professionals hesitant to encourage people to get vaccinated. The highest rates of trust were attributable to government (89.1%) and physicians (85.9%). <50% of participants would accept the vaccines if pharmacists (45.5%), nurses (44.7%), employers (42.4%), senior family members (28.1%), and religious leaders (18.4%) would recommended it.
5	Duong et al. (2021) [37]	Cross-sectional	1,579	Snowballing	16 April to 16 July 2021	Nationwide	Online and paper-based questionnaires	≥18 years old	The most frequently accessed sources of information were online newspapers/Internet (82.0%), television (72.7%), colleagues (44.0%), and health care workers (43.8%). The most trusted sources were health care workers (70.0%), television (55.7%), and online newspapers/Internet (44.7%).
6	Nguyen et al. (2022) [33]	Cross-sectional	1,020	Convenience	28 August to 7 September, 2021	Nationwide	Self-administered questionnaire	≥18 years old	91.9% found information about COVID-19 vaccines
7	Dang et al. (2022) [39]	Cross-sectional	308	Convenience	28 August to 30 October 2021	Nationwide	Online questionnaire	≥18 years old, vaccinated	Primary sources of information included social networks, online newspapers (93.8%), friends and relatives (3.9%), training (1.9%), and others (0.3%)



[Photo credit: VnExpress]

[Photo credit: VnExpress/Giang Huy]

C. Motivation

Eight cross-sectional studies and reports investigating motivation to receive COVID-19 vaccines among Vietnamese people were conducted for one year from February 2021 to February 2022 (Table 7). Except for Pham et al. (2021) [34] and Le et al. (2022) [32] which were conducted at the provincial level, others were conducted nationwide with sample sizes ranging from 308 to 387,037 participants. Only the survey by the Institute of Public Opinion employed stratified random sampling [42], while the others used non-random sampling methods due to the issues of strict lockdown and social distancing measures amidst the fourth wave (from April 2021 to the present).

At the beginning of the fourth wave when a limited amount of COVID-19 vaccines arrived in Vietnam, the proportion of people aged 18 years and over willing to receive COVID-19 vaccines ranged from 80.5% [34] to 89.9% [21]. This was followed by an upward trend, reaching 93.5% between August and October 2021 [39] and then 93.8% for the booster dose in November 2021 [45]. Three studies mentioned a general term of “COVID-19 vaccines” rather than asking specifically about primary or booster doses [21, 34, 39], while the study focused solely on booster doses [45]. By the end of 2021, Hoang et al. (2022) measured the readiness of the public toward COVID-19 vaccination via seven components of the 7Cs model (i.e., confidence, complacency, constraints, calculation, collective responsibility, and compliance) and reported an overall score of 103.25 ± 15.13 (out of 147), suggesting a medium score of readiness [46]. By contrast, there was a decreasing trend in vaccination hesitancy rate among Vietnamese adults throughout the period. The rate reduced more than half, from 86.0% between February and May 2021 [21] to 40.4% between April and June 2021 [32], then hit the bottom at 6.3% for the booster dose in November 2021 [45].

Regarding COVID-19 vaccination for children, the proportion of parents having children aged 12-17 years willing to give COVID-19 to their children, which was 89.2% [45], was slightly higher than that of parents having children aged 5-under 12 years, at 81.0% [42]. The hesitancy rates were 10.9% and 12.0% in these two groups of parents, respectively [42, 45].

Table 7 - Studies and reports on willingness to accept COVID-19 vaccines ordered chronologically by time of data collection

#	First author (year)	Study design	Sample size (people)	Sampling technique	Duration	Setting	Data collection tool	Participant age range	Willingness / readiness	Main findings
1	Marzo et al. (2021) [21]	Cross-sectional	651	Snowballing	February to May 2021	20 countries including Vietnam	Online questionnaire	≥18 years old	89.90%	Vietnam: 86.0% hesitated to get COVID-19 vaccines Sociodemographic factors associated with vaccine hesitancy: male, higher education, employed, unmarried, and lower income (multivariable regression analysis across 20 countries) Factors positively associated with vaccine intention: higher level of perceived susceptibility and severity, cues to action, subjective norms, and self-efficacy. Factors negatively associated with vaccine intention: retailers/sellers (versus workers), having high gross household income (versus having low gross household income), higher level of perceived barriers.
2	Pham et al. (2021) [34]	Cross-sectional	462	Convenience	March to May 2021	2 rural health centers in South Vietnam	Self-administered questionnaire	≥18 years old	80.50%	The overall vaccine hesitancy rate was 40.4% (95% CI: 37.2% - 43.7%). Factors associated with vaccine hesitancy included perceived barriers, perceived severity, vaccination history, cues to action, and student's major.
3	Le et al. (2022) [32]	Cross-sectional	911	Convenience	1 April to 30 June, 2021	Dong Thap	Online questionnaire	Health profession students	Not reported	
4	Dang et al. (2022) [39]	Cross-sectional	308	Convenience	28 August to 30 October	Nationwide	Online questionnaire	≥18 years old, vaccinated	93.50%	93.5% were willing to vaccinate Factors negatively associated with vaccine readiness: awareness of the instances of death or serious adverse effects, the concern about the manufacturer or place of origin, waiting for a better vaccine, confused by different information of the vaccines, don't believe in the advice of the government regarding the safety and effectiveness of COVID-19-vaccines, how COVID19 affects one's health, and the effectiveness of vaccines in reducing the severity and complications of COVID-19.
5	Hoang et al. (2022) [46]	Cross-sectional	1,026	Convenience and snowballing	September to December 2021	Nationwide	Online questionnaire	≥18 years old, did not finish 2 doses	Medium score of readiness (average score of 7Cs was 103.25 ± 15.13)	6.3% hesitated to accept a booster dose. 10.9% hesitated to give the COVID-19 vaccine to children. Participants who had university degree and higher significantly had higher willingness to receive the booster doses than participants who had primary education. Participants who got the first and second doses of the COVID-19 vaccine had higher willingness to get a booster doses or to accept vaccination for their children vs. who had not vaccinated.
6	Chu et al. (2022) [45]	Cross-sectional	900	Convenience	17 to 24 November 2021	Nationwide	Online questionnaire	≥18 years old	Booster dose: 93.8% Vaccination for children aged 12–17 years: 89.2% Mean score of consumption intention to choose India's COVID-19 vaccine was 3.17 out of 5.0	Perceptions about value and quality of COVID-19 vaccines positively affected the willingness to accept the vaccines.
7	Vo et al. (2022) [40]	Cross-sectional	407	Convenience	1 to 18 December 2021	Nationwide	Online questionnaire	≥18 years old		
8	Institute of Public Opinion (2022) [42]	Cross-sectional	387,037	Stratified random sampling	11 to 15 February 2022	Nationwide	Self-administered questionnaire	Vietnamese	81.0%	12.0% hesitated to give COVID-19 vaccine to their children aged 5-under 12 years, 3.0% was not willing, 4.0% did not answer.

Figure 11 summarizes factors positively associated with willingness or hesitancy to accept COVID-19 vaccines. Perception and attitude about the safety and effectiveness of COVID-19 vaccines, vaccination history, and access to COVID-19 vaccines were important driving factors in people's willingness to accept vaccination. Those who had a higher level of perceived barriers including "vaccines have little efficacy and serious adverse effects" and "adverse effect causes death" were more likely to avoid getting COVID-19 vaccines [32]. People who had a lower level of belief in the advice of the government on the vaccine safety and effectiveness were less likely to accept the vaccines [46], while those who believed in the effectiveness and safety of COVID-19 vaccines as promoted in the mass media were more likely to accept the vaccines [32]. Additionally, a vaccination history regardless of flu or COVID-19 vaccine, perceived susceptibility, and severity, as well as easy access to COVID-19 vaccination were positively associated with COVID-19 vaccine willingness [32, 34, 45]. While findings from the qualitative study conducted by Duong et al. (2022) [44] showed that participants' intention to get vaccinated was not influenced by family members, friends, or colleagues, Pham et al. (2021) [34] indicated that participants would be more likely to accept vaccination if they got approval from their family members, relatives, and friends.

Vo et al. (2022) [40] and Hoang et al. (2022) [46] consistently indicated that perceptions about the manufacturer, country of origin, and quality of vaccine were significantly associated with vaccine consumption intention and willingness. While the former found that perceptions about the value and quality of COVID-19 vaccines positively affected the willingness to accept the vaccines [40], the latter found that concerns about the manufacturer or country where the vaccine was manufactured were negatively associated with vaccine readiness.

Regarding sociodemographic factors associated with COVID-19 vaccine hesitancy, there are conflicting findings. While Marzo et al. (2022) [21] found that higher education and lower income were positively associated with vaccine hesitancy, Pham et al. (2021) [34] and Chu et al. (2022) [45] found that respondents with higher education (university degree and higher) and lower gross household income had higher intention to get vaccinated against COVID-19.



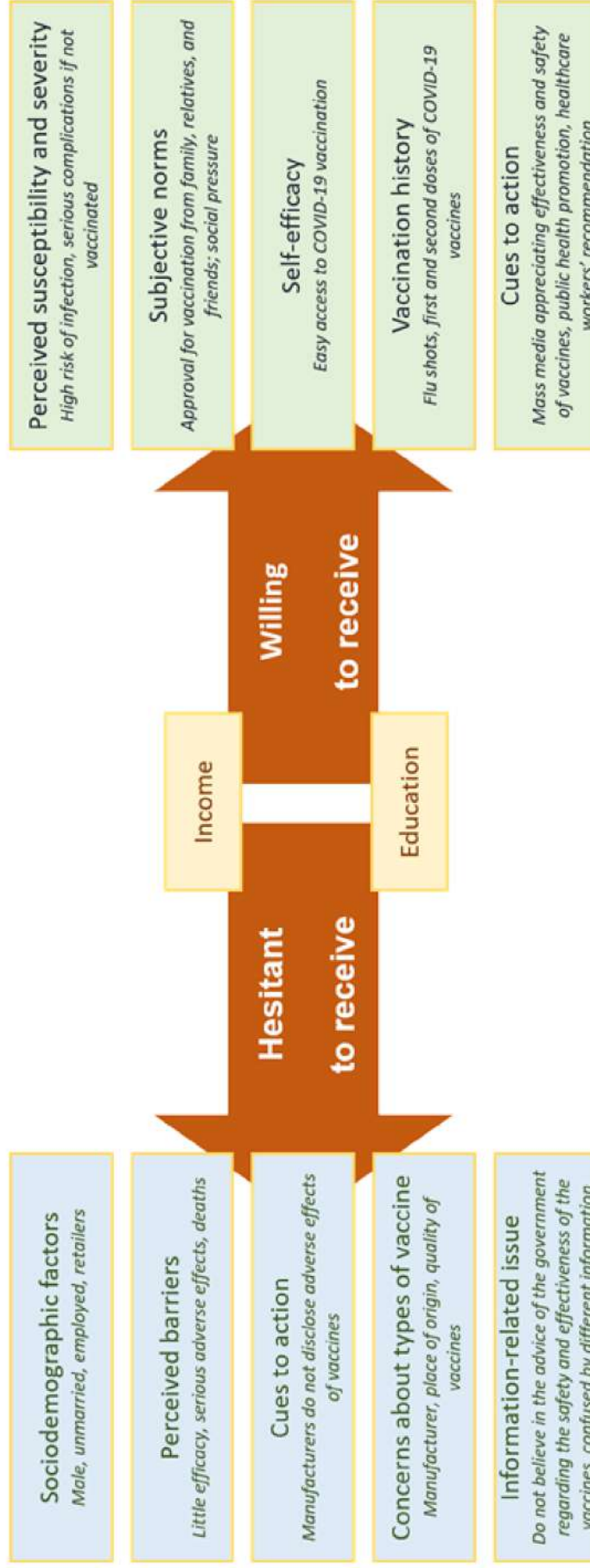


Figure 11 - Factors positively associated with willingness or hesitancy towards COVID-19 vaccination

D. Practical issues

Table 8 summarises the main characteristics of four studies and reports investigating practical factors associated with COVID-19 vaccination rollout among Vietnamese adults from April to July 2021. Duong et al. (2022) [44] performed two 1-hour focus group discussions of 10 participants with diverse backgrounds and constructed a conceptual framework consisting of three explanatory themes, i.e., external factors, risk-benefit self-assessment, and internal factors, to collect information on attitudes towards COVID-19 vaccine acceptance (Figure 12). Waiting time at vaccination centers did not affect acceptance, while travel costs associated with vaccination might hinder the community's willingness to get vaccinated. A quantitative study conducted during the same period found that less than one-fifth of participants whose intention to get vaccination was hesitated by extended waiting time at vaccination centers (17.6%), travel costs to vaccination centers (17.4%), and distance to vaccination centers (13.2%) [37].

Although vaccine cost was not of main concern to people, if the vaccine is at low efficacy, a high cost would affect their vaccination decision [44]. Increasing unemployment rate due to COVID-19 restrictions and income disparities between rural and urban areas, vaccine cost was strongly believed to be one of the determinants of acceptance of disadvantaged people, including ethnic minorities and those individuals living in rural mountainous areas [44]. A cross-sectional study [32] found that 40.4% of health professions students in Dong Thap province would have difficulties in accessing COVID-19 vaccination with charges. Another cross-sectional study [37] indicated that vaccine cost could influence the intention to vaccination receipt of 61.8% of participants.

The type of vaccination center where COVID-19 vaccines are administered was greatly attributable to the decision on acceptance of potential vaccine recipients. People considered the prestige and ranking in managing the side effects of such health facilities [44]. A quantitative study by Duong et al. (2021) [37] indicated that 88.6% of participants preferred receiving vaccines at public hospitals, particularly tertiary public hospitals which were acknowledged for being a standard vaccination center. Private hospitals were the second popular choice as they are less crowded than public hospitals which seemed to be associated with a low risk of acquiring COVID-19. Private health clinics were not preferred because it was considered unsafe [44].

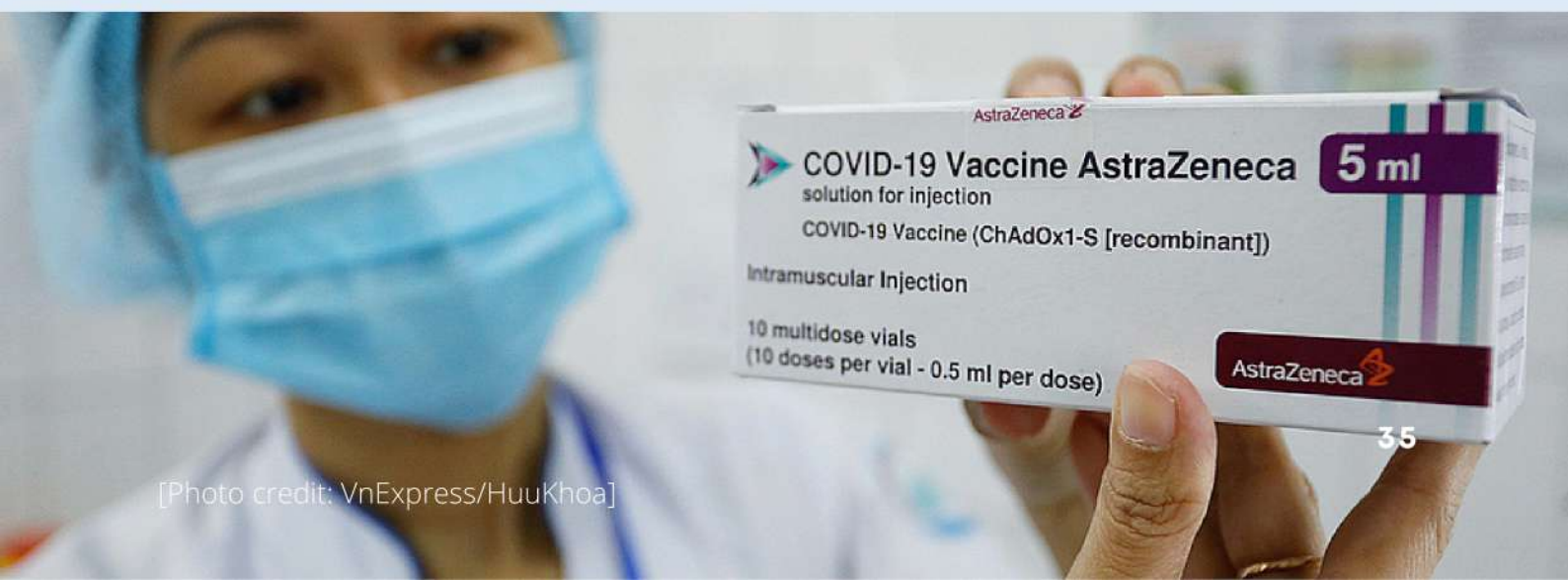


Table 8 - Studies and reports on practical factors associated with COVID-19 vaccination acceptance from community's perspectives ordered chronologically by time of data collection

#	First author (year)	Study design	Sample size (people)	Sampling technique	Duration	Setting	Data collection tool	Participant age range	Main findings
1	Duong et al. (2022) [44]	Qualitative	20	Purposive	May 2021	Nation-wide	Focus group discussions	≥18 years old	Three explanatory themes for attitudes towards COVID-19 vaccine acceptance included: Internal factors: trust in government's non-pharmaceutical responses to the outbreak, vaccine knowledge, previous experience with non-COVID-19 vaccines. External factors of vaccine acceptance: waiting time at a vaccination center, travel cost and travelling distance, vaccine cost, vaccination history, type of vaccination centers, influence of other people, vaccine information. Risk-benefit self-assessment regarding COVID-19 vaccination
2	Le et al. (2022) [32]	Cross-sectional	911	Convenience	Apr 1 to Jun 30, 2021	Dong Thap	Online questionnaire	Health professions students	40.4% would have difficulties in accessing to COVID-19 vaccination if the vaccines were not free.
3	Duong et al. (2021) [37]	Cross-sectional	1,579	Snowballing	16 April to 16 July 2021	Nation-wide	Online and paper-based questionnaires	≥18 years old	88.6% preferred receiving COVID-19 vaccines at public hospitals Less than one-fifth of participants whose intention to get vaccinated were influenced by distance from home to vaccination centers (13.2%), waiting time in vaccination centers (17.6%), and cost associated with traveling from home to vaccination centers (17.4%). Vaccine cost influenced an intention to get vaccinated of 61.8% of participants.
4	Hoang et al. (2022) [47]	Cross-sectional	540	Mixed methods	NA	NA	Secondary data, semi-structure questionnaire, online questionnaire	NA	Migrant workers were not specifically identified as priority group. Particular groups such as industrial zone workers, freelancers, transporters, etc. might get better access to vaccine. Barriers to vaccine access: job, household registration status, house status, renting contract, possess of ID card, disabilities status, health conditions, age (<18 years old; >65 years old), residency Perceived right of access to all ("Vaccines should be free for all")

Hoang et al. (2022) [47] indicated that there was inequity in access to COVID-19 vaccines, particularly in the migrant worker group as they were not specifically identified as a priority group. Barriers to vaccine access in this group included the nature of the job, household registration status, the status of renting contract, possession of ID card, having disabilities (deaf, mobility, or intellectual), having certain medical conditions (hypertension, underlying diseases, and history of allergy), age younger than 18 years old or older than 65 years old, and residency location. Those barriers to access might imply inequality in maintaining employment, delay in vaccination for higher-risk groups such as elderly people and people with comorbidities, and higher mortality rate. The authors concluded that access to available vaccination was not only decided by public health principles or medical criteria. While these criteria provided guidance, personal connections, either through online platforms or local authorities, played a role in getting access through residential channels to vaccination. Economic criteria also played a major role, as was clear in the prioritization of workers, often relatively young, in large companies in the formal sector. Most employment in Vietnam is however in small companies and those in the informal sector. Although the government made great efforts to make vaccines available and accessible, minority and disadvantaged groups could be excluded or faced more challenges in accessing vaccines due to a lack of specific information/policies to guide common practices at the grassroots level [47].

An overview report about COVID-19 vaccination in Vietnam released by the Ministry of Health at the beginning of June 2022 pointed out a systemic challenge of COVID-19 vaccine storage [48]. Rural and mountainous areas have been facing a lack of approximately 2,197 refrigerators from 2 to 8 degrees Celcius. There has also been limited capacity in storing vaccines at a lower temperature, particularly from -25 to -15 degrees at all levels in the Expanded Program on immunisation. Additionally, the process to buy the COVID-19 Pfizer vaccine for children aged from 5 to 11 years is slower than planned due to a delayed administrative process [49].

E. Summary

Figure 12 summarises the factors driving COVID-19 vaccination decision. Regarding sociodemographic factors, three surveys collecting data around May 2021 found associations of occupation, household income, gender, living area, marital status, and education level with COVID-19 vaccination decision [22, 23, 34]. [46] Ngo et al. (2021) [22] and Ha et al. (2021) [23] found that students and healthcare workers were more likely to accept COVID-19 vaccination, while Pham et al. (2021) found lower rates of vaccine intention among people who were sellers and had high gross household income [34]. Males, unmarried people, and people living in the countryside or mountainous areas were found to be more likely to accept vaccination, while people with postgraduate-level education and people living in urban areas were found to be less likely to do so [22, 23]. By contrast, a subsequent study by Hoang et al. (2022) [46] indicated that participants' sociodemographics were not associated with the readiness score to receive a COVID-19 vaccine and another study by Chu et al. (2022) [45] conducted in November 2021 only found the association between the highest education level and Vietnamese people's acceptance rate. As Pham et al. (2021) [34], Ngo et al. (2021) [22], Ha et al. (2021) [23], Hoang et al. (2022) [46], and Chu et al. (2022) [45] were all cross-sectional studies using non-random sampling methods, it is difficult to guarantee the representativeness of the results, determine the associations, and explain the conflicts. Given such a rapid pace of changes in terms of COVID-19 situation, vaccination, and policies, identifying target audiences for a COVID-19 vaccination strategic program based on current gaps in vaccine coverage is highly recommended.

There were conflicting findings about whether a history of chronic diseases drove acceptance or refusal of COVID-19 vaccination. While Ngo et al. (2021) [22] found a positive association, Ha et al. (2021) [23] found the contrast, although two studies were both conducted around May 2021. Ha et al. (2021) [23] and Nguyen et al. (2022) [33] consistently indicated that people with a history of allergic reactions were more likely to refuse vaccination. Therefore, COVID-19 vaccination communication activities targetting people with chronic diseases and previous allergic reactions should focus on the protective capacity of the vaccine against serious adverse events following COVID-19 infection among these populations as well as vaccine safety.

Perception was consistently proved as a key factor driving COVID-19 vaccination decision over the studied period from February 2021 to May 2022. A higher level of perceived susceptibility and severity of COVID-19 infection was associated with a higher likeliness to accept COVID-19 vaccination [32, 34]. Another positive factor indicated in Vo et al. (2022) [40] was perceptions about value and quality of COVID-19 vaccines. By contrast, people with a higher level of perceived barriers to access vaccination, perceived serious adverse events or deaths following vaccination, and a perceived shortage of information on adverse effects provided by manufacturers was more likely to refuse COVID-19 vaccination [23, 32, 34, 46]. More importantly, a lower likelihood to accept COVID-19 vaccination was also recorded among people who were confused by different information about the vaccines and did not believe in the advice of the government. This guides future communication activities to deliver consistent, scientific, adequate, accurate, and latest information to the public as well as strictly monitor and handle communication crises related to adverse events following vaccination. Such activities should also highlight a vital role of COVID-19 vaccines in reducing susceptibility and severity of COVID-19 infection, especially for high-risk populations.

It is worth noting that people who either were concerned about the manufacturers and places of origin or preferred the US- or Europe-originated vaccines were more likely to delay their vaccination schedule to wait for a better vaccine [23, 46]. This might partially result in the fact that vaccination rates in some areas were low even when COVID-19 vaccine was available in Vietnam. The message stated by WHO, which is “the best vaccine is the one you can get the soonest”, should be widely communicated to the public and targeted to the delayed population.



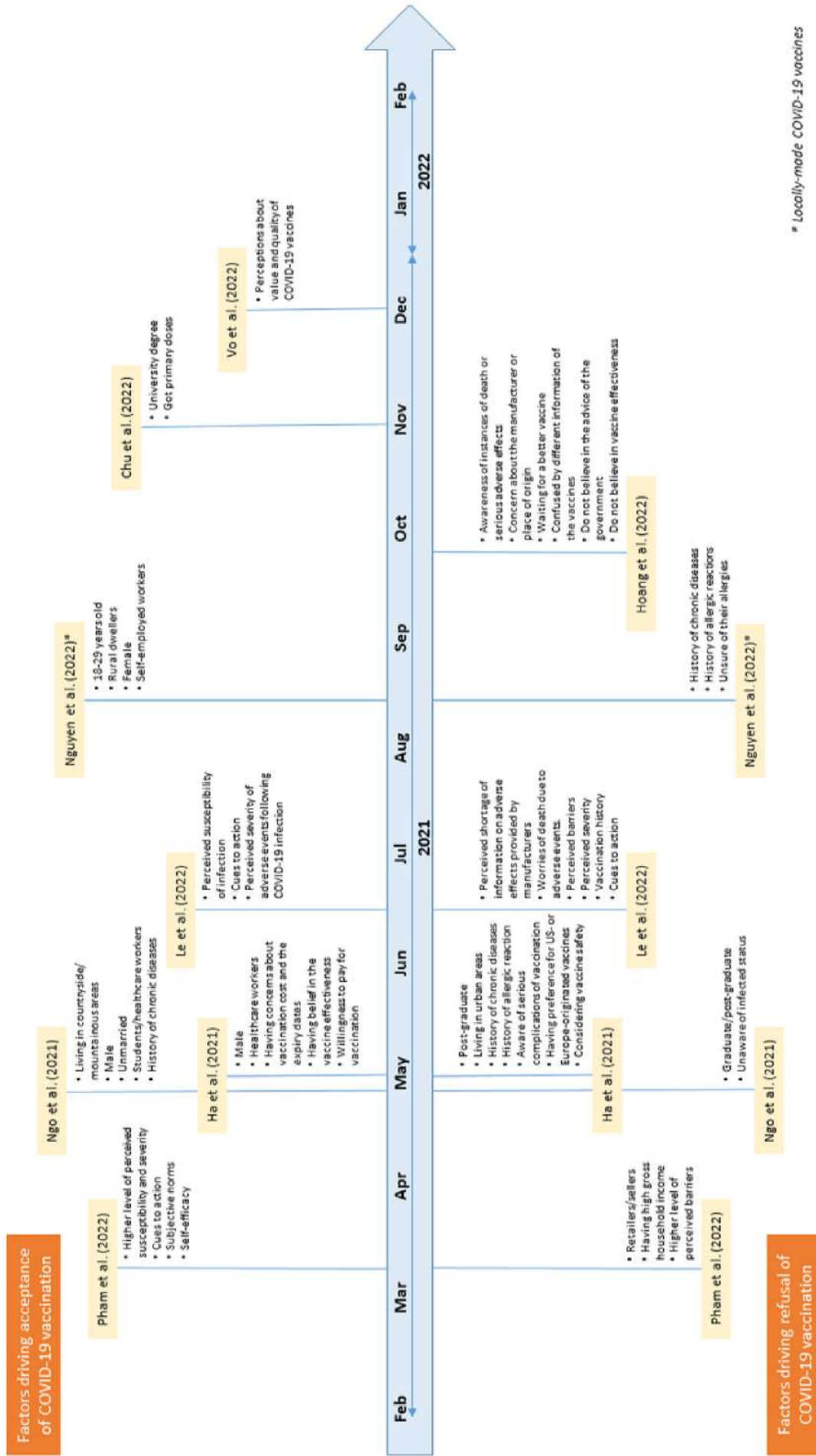
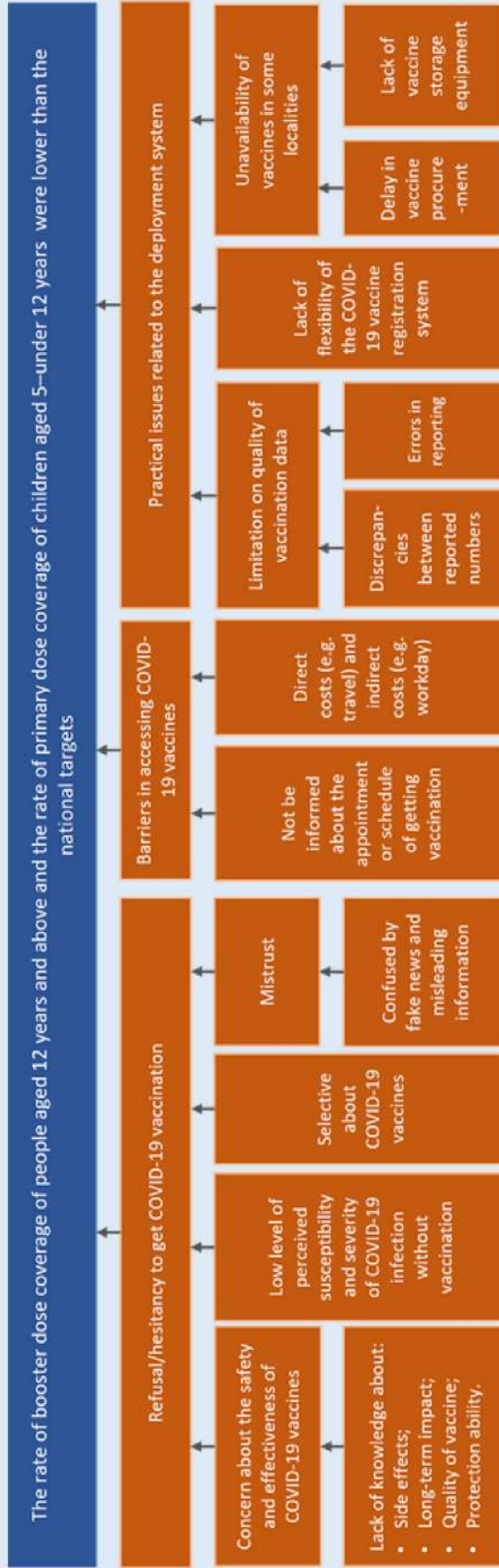


Figure 12 - Factors driving COVID-19 vaccination decision

Summary Box 2. Explanatory factors for gaps in COVID-19 vaccine coverage in Vietnam



COVID-19 vaccine communication strategies

In the implementation of the Government's Resolution No. 21/NQ-CP dated 26 February 2021 on the purchase and use of COVID-19 vaccines, Vietnam's MOH developed two national communication plans No. 271/KH-BYT dated 10 March 2021 and No. 1063/KH-BYT dated 16 July 2021, which aims to promptly provide accurate information about COVID-19 vaccines for people and communities, authorities at all levels, health agencies and forces participating in pandemic control activities.

Overall, the Department of Communication and Emulation, Commendation (DCEC), MOH is the focal point responsible for all communication activities regarding COVID-19 vaccines. It collaborates with the General Department of Preventive Medicine, The Expanded Program on immunisation, Drug Administration, Department of Planning and Finance, Medical Services Administration, MOH Office, the National Center for Health Communication and Education, Ministry of Information and Communications, Ministry of Public Security, WHO, and UNICEF to launch specific activities.

As official reports on an evaluation of communication activities in the Plan No. 271/KH-BYT and the Plan No. 1063/KH-BYT have not been available, information reported in this section was summarised from the Vietnam Coronavirus Disease 2019 (COVID-19) Situation Reports released by WHO on a weekly basis from March 2021 to May 2022 (Table 9). The data were extracted from the reports in terms of types of communication activities, periods, and main achievements. There has not been an updated plan guiding communication activities for COVID-19 vaccines from May 2022 published.

Communication activities can be classified into digital communication for the public (i.e., television news, SMS and Zalo messages to citizens, online newspapers, hotline, websites, and social networks such as Facebook), capacity-building training (i.e., media training for journalists and training about COVID-19 vaccines and risk communication for health care workers), and monitoring and handling of communication crises. Communication materials on COVID-19 vaccination were posted on an online folder managed by DCEC that is accessible to all [50].

Communication activities via digital channels have been undertaken since the issuance of the Plan 271 in March 2021. Respondents of cross-sectional surveys conducted from March to October 2021 reported that they received information about COVID-19 vaccines predominantly from social networks and online newspapers [82.0%-93.8%] [33, 34, 39], followed by television (72.7%) [33] (Table 6).



However, the most reliable sources of information were set descendingly as Government/MOH, health care workers especially doctors, television, and online newspapers/Internet [23, 33, 35, 37] (Table 6). As information from the Government/MOH is often delivered to the public either directly via healthcare workers or indirectly via digital channels, healthcare workers, especially doctors who provide COVID-19 vaccine consultation, are primarily key communicators.

A number of capacity-building training were provided for journalists and health care workers throughout the period. A forum discussing the roles of the media in the COVID-19 response was taken place in September 2021, followed by a training workshop for journalists in-charge of reporting information about vaccine safety in December 2021. For health care workers, there were both online and in-person training courses about COVID-19 vaccination, vaccine safety, adverse events following immunisation, and risk communication from March to November 2021. Additionally, all health care workers and people working in COVID-19 response could freely access the OpenWHO portal, an online training platform providing courses about how to respond to the ongoing COVID-19 emergency and other health threats in Vietnamese. Given an important role of healthcare workers in communicating COVID-19 vaccine-related information to the public, a comprehensive survey on their needs for capacity-building training is highly recommended to guide communication strategies in the future.

Although information about COVID-19 vaccines was continuously monitored (Table 9), there have been communication crises including fake news, rumors, and misleading information about COVID-19 vaccines, which negatively affect the vaccination decision of the public. A survey conducted by UNICEF (2021) indicated that 17% of the respondents heard/read made-ups and/or unreliable information (information without evidence and information from untrusted or unofficial sources) about COVID-19 vaccines [35]. Of these, 44% had shared/discussed such information either online via social media, or in person.

A social media listening report from the Vaccination Demand Observatory, a project by UNICEF, the Public Good Projects, and the Yale Institute for Global Health, provides an evaluation of misinformation about COVID-19 vaccines in Vietnam on social media throughout the first half of 2022 as low, medium, and high risk according to criteria described in Table 10.

Table 10 - Risk evaluation matrix

Indicator	Low risk	Medium risk	High risk
Risk to vaccine hesitancy & demand	Low risk to vaccine demand	Potential to trigger hesitancy to vaccinate	Potential to lead to vaccine refusals
Reach and scope of misinformation	Limited potential reach or scope	Moderate potential reach or scope	Wide or cross-country reach or scope
Likelihood of issues spread or escalation	Unlikely to spread in community or online	Spreading in community and/or online	Spreading rapidly in community and online
Response capacity	Strong messaging and capacity in place	Limited existing messages & resources to manage crisis	Limited existing messages and capacity exceeded
General public trust	Remaining trust in government, health services, vaccines	Reduced trust in government, health services, vaccines	Outward displays of mistrust government, health services, vaccines
Response	Monitor closely, consider prebunking	Debunk, raise trusted voices	Debunk, raise trusted voices

Source: Vaccine misinformation management field guide, the Vaccination Demand Observatory [51]

A total of 41 pieces of misinformation has been spread via social media from January to June 2022 (Figure 13). Of these, 19, 16, and 6 pieces were assessed as high, medium, and low risk respectively. Except for 2 pieces of high risk for children & teens and fertility & pregnancy, 17 remaining pieces were about vaccine safety in general and adverse reactions, long-term effects, and side effects in specific. It is worth noting that more than half of pieces of high risk (10 pieces) belonged to “children & teens” topic, which may partially explain for high hesitancy and refusal of COVID-19 vaccination, and thus low coverage among children aged 5-under 12 and 12-17 years. These findings emphasise an important role of continuous monitoring and timely responding to misinformation to increase COVID-19 vaccine coverage in Vietnam.

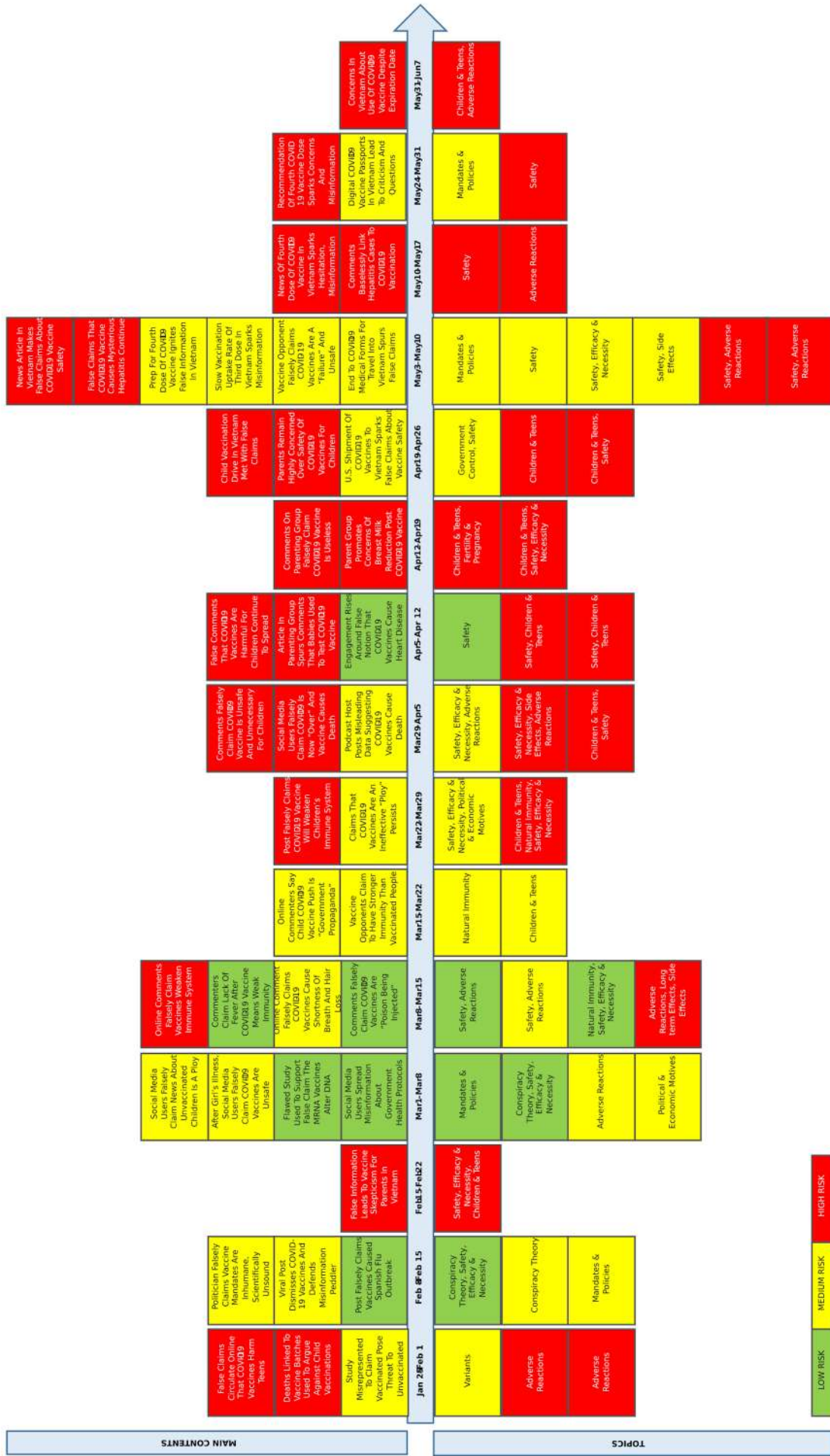


Figure 13 - Misinformation about COVID-19 vaccines in Vietnam on social media from January to June 2022

4. CONCLUSIONS, RECOMMENDATIONS, AND FUTURE ACTIONS

Main findings

COVID-19 vaccine coverage

- Vietnam was among the top countries with high primary COVID-19 vaccine coverage among the population aged 12 years and over.
- The coverage of the first booster among the population aged 18 years and over is relatively slower than the national target.
- The uptake of the first booster dose among the population aged 12-17 years and the second booster dose among the population aged from 18 years had not been fully reported as of July 2022.
- The progress of reaching the primary coverage among children aged 5-under 12 years is slower than expected.
- There are some provinces reporting low uptake of primary series vaccines, as well as low rates of uptake of boosters and vaccines among children.
- Several concerns regarding quality of data related to COVID-19 vaccination including discrepancies between reported numbers, limitations in describing methods to calculate coverage, differences between vaccine regimens, unclear inclusion criteria for reporting, and errors in reporting should be addressed.

Recommendations and future actions

- Setting out national targets for COVID-19 vaccination in the next stage should be evidence-based.
- COVID-19 booster vaccination should be recommended for people aged from 50 years, people who are moderately or severely immunocompromised, and people aged from 18 years at high risk for COVID-19 exposure.
- Interventions to increase uptake of COVID-19 vaccine should focus on areas with low coverage.



4. CONCLUSIONS, RECOMMENDATIONS, AND FUTURE ACTIONS

Main findings

BeSD of COVID-19 vaccine uptake

- It is difficult to determine the associations between sociodemographic factors and COVID-19 vaccination decision-making.
- People with a history of chronic diseases or allergic reactions were more likely to refuse vaccination.
- Perception was consistently proved as a key factor driving COVID-19 vaccination decision.
- The two primary concerns people reported about COVID-19 vaccination were the safety and effectiveness of the vaccines.
- A higher level of perceived susceptibility and severity of COVID-19 infection was associated with a higher likeliness to accept COVID-19 vaccination.
- A lower likelihood to accept COVID-19 vaccination was recorded among people who were confused by different information about the vaccines and did not believe in the advice of the government.
- People who either were concerned about the manufacturers and places of origin or preferred the US- or Europe-originated vaccines were more likely to delay their vaccination schedule to wait for a better vaccine.

Recommendations and future actions

- Interventions to increase COVID-19 vaccine coverage in Vietnam can be grouped into:
 - Communication interventions to raise awareness and build the trust of the public;
 - Systemic interventions to ensure quality of COVID-19 vaccination data and reduce access barriers to COVID-19 vaccination of the public.
- Targeted communication rather than mass communication is highly recommended in the next stage. In particular,

Who? Those who were more likely to refuse to receive COVID-19 vaccine (i.e, people with a history of chronic diseases or allergic reactions, people living in areas with low coverage, people with a higher level of perceived barriers to access vaccination, perceived serious adverse events or deaths following vaccination, and perceived shortage of information on adverse effects provided by manufacturers, people who are confused by different information of the vaccines and do not believe in the advice of the government, people concerned about either the manufacturers and places of origin or preferred the US- or Europe-originated vaccines).

4. CONCLUSIONS, RECOMMENDATIONS, AND FUTURE ACTIONS

Main findings

- The public received information about COVID-19 vaccines predominantly from social networks and online newspapers, followed by television. However, the most reliable sources of information were set descendingly as Government/MOH, health care workers especially doctors, television, and online newspapers/Internet
- Practical factors related to COVID-19 vaccination included systemic challenges causing COVID-19 vaccine shortage, waiting time at vaccination center, travel cost and distance to vaccination center, vaccine cost, and type of vaccination center.

Recommendations and future actions

What?

- Communication messages should focus on the two most concerning issues regarding COVID-19 as well as susceptibility and severity of COVID-19 infection if not being vaccinated.
- The message stated by WHO, which is “the best vaccine is the one you can get the soonest”, should be widely communicated to the public and targeted to the delayed population.
- Communication activities should deliver consistent, scientific, adequate, accurate, and latest information related to COVID-19 vaccines.
- Monitoring and handling communication crises, which negatively affect the vaccination decision of the public, should also be focused on.

How?

- For tailored communication, improving knowledge and communication skills about COVID-19 vaccination for healthcare workers, especially doctors, who directly provide consultation about vaccination is a key determinant to boosting acceptance of COVID-19 vaccination among the public.
- For broad communication, delivering accurate information about COVID-19 vaccines via social networks, online newspapers, and television should be fostered.



[Photo credit: VnExpress]

4. CONCLUSIONS, RECOMMENDATIONS, AND FUTURE ACTIONS

Main findings

COVID-19 vaccine communication activities

- Diverse communication activities including digital communication, capacity-building training, and monitoring and handling of communication crises were undertaken from March 2021 to April 2022
- An evaluation report of the communication activities has not been available as of July 2022.
- There has not been an updated plan guiding communication activities for COVID-19 vaccines from May 2022 published.

Recommendations and future actions

- The future strategic communications plan for the COVID-19 vaccine should set out practical steps in implementing communication and community engagement activities to attain national targets for COVID-19 vaccine coverage.
- The communication strategy should ensure campaigns, communications, and interactions are customised to the right population group, particularly those at the highest risk of COVID-19 while using the most effective and appropriate mixture of channels and techniques.
- An evaluation framework should be included in the strategy to guide the assessment of the system performance and the impact on the national vaccine coverage



Table A2. COVID-19 vaccine coverage among population aged from 18 years and population aged 12-17 years by region and province as of 26 July 2022, according to VnExpress [26]

Region	City/province	Population aged 18 years and above						People aged 12-17 years					
		#3	#4	#4/#3	Percentage of people fully vaccinated	People with 3 doses	#5/#3	Percentage of people with 3 doses	Population	Vaccinated with 1 dose	Percentage of people aged 12-17 years with 1 dose	Fully vaccinated	Percentage of people fully vaccinated
Northeast	Bac Giang	1.3M	1.5M	107.69%	1.1M	84.62%	1.46K	148.5K	101.71%	135.2K	92.60%		
	Bac Kan	220.2K	240.6K	102.95%	40.4K	18.35%	26.6K	20.4K	76.69%	6.1K	22.93%		
	Cao Bang	369K	404K	102.09%	159.3K	43.17%	46.4K	44.5K	95.91%	37.3K	80.39%		
	Ha Giang	490K	588K	98.92%	241.7K	49.33%	105.7K	84.7K	80.13%	66.9K	63.29%		
	Lang Son	588.2K	611.6K	102.28%	390.8K	70.01%	72.8K	66.4K	91.21%	62.1K	85.30%		
	Phu Tho	1M	1.2M	110.00%	489.1K	48.91%	150.5K	124.3K	82.59%	82.6K	54.88%		
	Quang Ninh	1M	1.2M	110.00%	855K	85.50%	119K	119.4K	100.34%	110.3K	92.69%		
	Thai Nguyen	918.1K	1M	108.44%	353.3K	38.48%	100.1K	105.8K	105.69%	66.6K	66.53%		
	Tuyen Quang	535.7K	587.8K	105.84%	176.8K	33.00%	71.9K	1.9K	2.64%	37.7K	52.43%		
	Dien Bien	339.2K	443.8K	116.04%	260.5K	76.80%	75K	62K	82.67%	49.9K	66.53%		
	Hoa Binh	570.1K	659.7K	107.31%	358.7K	62.92%	80.3K	75.4K	93.90%	71.5K	89.04%		
	Lai Chau	282.6K	336.9K	105.59%	183.1K	64.79%	58.3K	50.6K	86.79%	44.7K	76.67%		
	Lao Cai	445.2K	581.8K	119.14%	357.5K	80.30%	87.1K	36.3K	41.68%	69.7K	80.02%		
	Son La	786.1K	896.3K	102.76%	156.5K	19.91%	149.6K	93K	62.17%	85.6K	57.22%		
Red River Delta	Yen Bai	510.3K	639K	115.74%	452.8K	88.73%	88.5K	77K	87.01%	72.4K	81.81%		
	Bac Ninh	985.3K	1.3M	121.79%	722.7K	73.35%	128.1K	115.2K	89.93%	107.2K	83.68%		
	Ha Nam	612.2K	677.8K	106.68%	493.8K	80.66%	66.5K	70.9K	106.62%	69.1K	103.91%		
	Hanoi	6.2M	6.4M	101.61%	3.8M	61.29%	778.1K	692.7K	89.02%	653K	83.92%		
	Hai Duong	1.3M	1.5M	115.38%	448.8K	34.52%	164.2K	156.6K	95.37%	126.6K	77.10%		
	Hai Phong	1.6M	1.7M	100.00%	852.5K	53.28%	184.6K	152K	82.34%	148.2K	80.28%		
	Hung Yen	935.5K	913.7K	94.15%	547K	57.94%	106.3K	105.3K	99.06%	103.6K	97.46%		
	Nam Dinh	1.2M	1.3M	100.00%	396.4K	33.03%	122.6K	149.7K	122.10%	73.7K	60.11%		
	Ninh Binh	695.4K	783K	106.96%	341.2K	49.07%	81.8K	82.2K	100.49%	76.9K	94.01%		
	Thai Binh	1.4M	1.4M	92.86%	574.6K	41.04%	185K	149.1K	80.59%	45.3K	24.49%		
	Vinh Phuc	789.9K	885.8K	108.32%	453.1K	57.36%	126.8K	56.3K	44.40%	267	0.21%		
	Ha Tinh	795.4K	949.7K	110.74%	338.2K	42.52%	122.1K	112.7K	92.30%	102.8K	84.19%		
	Nghie An	2M	2.4M	110.00%	1.7M	85.00%	316.5K	281.1K	88.82%	266.7K	84.27%		
	Quang Binh	612K	616K	100.00%	197.5K	85.50%	119K	119.4K	100.34%	110.3K	92.69%		
Quang Tri	463.4K	510.8K	104.47%	191.3K	41.28%	69.7K	59.1K	84.79%	26.5K	38.02%			
Thanh Hoa	2.4M	2.4M	87.50%	962K	40.08%	417.3K	280.9K	67.31%	216.3K	51.83%			
Thuat Thien Hue	779.9K	908.9K	111.75%	439K	56.29%	93.1K	102.1K	109.67%	95K	102.04%			
South Central Coast	Binh Dinh	1.1M	1.2M	109.09%	560.4K	50.95%	153.9K	139.1K	90.38%	23.7K	15.40%		
	Binh Thuan	865.5K	1M	115.54%	371.9K	42.97%	114.4K	70.4K	61.54%	47.8K	41.78%		
	Da Nang	885.1K	945.8K	104.70%	410.6K	46.39%	100K	100.5K	100.50%	98.4K	98.40%		
	Khanh Hoa	901.7K	1.1M	121.99%	755K	83.73%	114K	116K	101.75%	114.6K	100.53%		
	Ninh Thuan	373.6K	508.1K	123.50%	243.7K	65.23%	62.8K	59.4K	94.59%	53.5K	85.19%		
	Phu Yen	649.7K	704.9K	102.59%	264.2K	40.66%	86.6K	84.2K	97.23%	62.2K	71.82%		
	Quang Nam	1.3M	1.2M	92.31%	556.2K	42.78%	127.8K	119.2K	93.27%	79.7K	62.36%		
	Quang Ngai	883.5K	968.8K	104.28%	309.1K	34.99%	134.2K	108K	80.48%	11.3K	8.42%		

Region	City/province	Population aged 18 years and above				People aged 12-17 years					
		Population	Fully vaccinated	Percentage of people fully vaccinated	People with 3 doses	Percentage of people with 3 doses	Population	Vaccinated with 1 dose	Percentage of people aged 12-17 years with 1 dose	Fully vaccinated	Percentage of people fully vaccinated
#1	#2	#3	#4	#4/#3	#5	#5/#3	#6	#7	#7/#6	#8	#8/#6
Central Highlands	Dak Lak	1.3M	1.4M	107.69%	562.2K	43.25%	215.2K	196.4K	91.26%	72.3K	33.60%
	Dak Nong	404.9K	497.5K	115.11%	270.8K	66.88%	68.9K	68K	98.69%	65.1K	94.48%
	Gia Lai	950.2K	1.1M	105.24%	346.8K	36.50%	165.7K	159.3K	96.14%	110.2K	66.51%
	Kon Tum	338.7K	393K	107.09%	158.4K	46.77%	65.9K	58.2K	88.32%	46.7K	70.86%
	Lam Dong	901.2K	1.2M	122.06%	702.6K	77.96%	132K	134.4K	101.82%	112.1K	84.92%
Southeast	Ba Ria-Vung Tau	891.2K	1M	110.79%	555.7K	62.35%	117.8K	110K	93.38%	108.1K	91.77%
	Binh Duong	2.1M	2.4M	114.29%	317.2K	15.10%	150.9K	187K	123.92%	141.9K	94.04%
	Binh Phuoc	758.6K	861.3K	106.54%	347.7K	45.83%	131.1K	109.6K	83.60%	100.9K	76.96%
	Dong Nai	2.4M	3.1M	125.00%	631.9K	26.33%	295.7K	177.3K	59.96%	128.5K	43.46%
	HCMC	7.2M	7.9M	105.56%	4.7M	65.28%	742.4K	679.4K	91.51%	673.9K	90.77%
Mekong River Delta	Tay Ninh	954.7K	1M	104.62%	510.9K	53.51%	88.2K	88.9K	100.79%	86.7K	98.30%
	An Giang	1.5M	1.7M	100.00%	835.9K	55.73%	188.3K	200.5K	106.48%	182.5K	96.92%
	Ben Tre	980.7K	1.2M	112.16%	652.6K	66.54%	104.4K	106.8K	102.30%	99.9K	95.69%
	Bac Lieu	572.6K	698.9K	113.10%	315.3K	55.06%	90.8K	88.3K	97.25%	84.9K	93.50%
	Ca Mau	857.6K	1M	112.01%	530.2K	61.82%	142.5K	111.6K	78.32%	108.7K	76.28%
	Can Tho	941.8K	1.5M	148.65%	555.1K	58.94%	100.5K	105.4K	104.88%	49K	48.76%
	Dong Thap	1.2M	1.5M	108.33%	600.8K	50.07%	155.5K	144.6K	92.99%	115K	73.95%
	Hau Giang	536.2K	644.7K	109.53%	320.2K	59.72%	70.4K	74K	105.11%	71.1K	100.99%
	Kien Giang	1.2M	1.4M	108.33%	312.3K	26.03%	189.1K	142.2K	75.20%	153.5K	81.17%
	Long An	1.4M	1.7M	114.29%	962.6K	68.76%	167.7K	169.7K	101.19%	151.5K	90.34%
	Soc Trang	861.4K	1.1M	113.40%	684.4K	79.45%	110.6K	116.9K	105.70%	104.5K	94.48%
	Tien Giang	1.5M	1.5M	93.33%	754.1K	50.27%	143.6K	156.2K	108.77%	147.5K	102.72%
	Tra Vinh	734.8K	756.8K	92.58%	457.6K	62.28%	87.4K	85.4K	97.71%	78.6K	89.93%
	Vinh Long	769K	927.2K	111.63%	546.4K	71.05%	87.3K	91.2K	104.47%	86.4K	98.97%

K = thousand; M = million; Cells containing percentages from 30% to 50% are highlighted in yellow; Cells containing percentages from 0% to 30% are highlighted in blue.

Table A3. Main characteristics of information sources reporting data related to COVID-19 vaccine coverage

Source	Breakdowns			Type of data reported			Update frequency	Data limitations
		Raw number of dose	Percentage over total population	Percentage over a specific subpopulation	Total vaccines administered/ allocated			
WHO ^[18]	Total population	x				Weekly	Method to calculate the percentages is unavailable Separate data for 12-17 years old group are unavailable Only provide raw numbers of doses given to children aged 5-under 12 years	
	By age	x	x					
	By dose	x						
	By dose	x	x					
COVID-19 vaccine portal ^[30]	Total population	x				Daily	Data about which year population aged over 18 years was extracted is not available	
	By age	x		x	x			
	By dose	x		x				
	By province	x		x	x			
	Total population	x	x					
	By age	x		x				
VnExpress ^[26]	Total population	x				Daily	Too low coverage in several provinces such as 0.21% of population aged 12-17 years fully vaccinated in Vinh Phuc may cause suspicions	
	By age	x		x				
	By dose	x	x					
	By province	x		x				
	Total population	x						
	By age	x		x				
News ^[31]	Total population	x				Unfixed	Only provide raw numbers of doses given to populations by age and by dose	
	By age	x						
	By dose	x						
EPI	Total population	x				Daily	Only provide raw numbers of doses given to populations by age and by dose	
	By age	x						
	By dose	x						
Policy document ^[16]	Total population	x				Unfixed	Only provide raw number of doses given to total population Method to calculate the percentages is unavailable	
	By age			x				
	By dose			x				

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