STATENS SERUM INSTITUT

Nordic Pandemic Project

Vaccine strategies

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Contents

Summary

This report provides an overview of the COVID-19 vaccination strategies across the Nordic countries and their territories (Denmark, Finland, Norway, Sweden, Iceland, and the Faroe Islands) from the onset of the pandemic through 2025. While countries shared overarching goals, their operational approaches varied based on national circumstances, public health priorities, and evolving evidence.

All countries launched phased vaccination programs, beginning with high-risk groups such as the elderly, people with underlying health conditions, and frontline healthcare workers. Over time, strategies evolved: as vaccine supply increased, countries expanded eligibility, adapted to new variants, and adjusted to shifting epidemiological realities.

Notable differences included the prioritization of target groups, such as whether or not to include healthy children and adolescents, and the timing and use of specific vaccines, particularly regarding Vaxzevria and Jcovden, which were restricted or excluded to varying degrees.

By 2022, all countries transitioned from mass emergency vaccination to seasonal programs focused on high-risk populations. Uptake among older adults remained high, while third and fourth dose coverage declined, reflecting both lower urgency and narrower eligibility.

Key lessons include the value of flexibility within a shared strategic framework, the importance of rapid data sharing, and the benefit of close regional cooperation. These findings form a strong foundation for future pandemic preparedness and vaccine planning.

Introduction

This report provides an overview of COVID-19 strategies in the Nordic countries and its territories from the onset of the pandemic. The report explores national objectives, target groups, and vaccine use. The report highlights both common approaches and country-specific adaptions for vaccine strategies.

Working group

Participants from the following countries formed the working group for this report:

- Denmark
- Finland (including Åland islands)
- Iceland
- Norway
- Sweden
- The Faroe Islands

Greenland was unable to participate due to limited resources.

1. Country-specific overview

1.1. Denmark

The primary aim of Denmark's vaccination strategy was to minimize death and severe illness, gain control of the epidemic situation, and safeguard critical societal functions. These objectives were anchoring for all the phases of the vaccination roll-out, from the initial vaccination initiatives during the pandemic to the establishment of the seasonal programs.

The Danish health authorities used an approach prioritizing those at most risk for death or severe illness following COVID-19. The overall vaccination strategy was developed in close collaboration between the Danish Health Authority, Statens Serums Institut, The Ministry of Health, and The Prime Minister's Office (this body was only involved during the pandemic years).

The vaccination program was launched on December 27th, 2020. The aims in a prioritized order were (these were later adjusted according to the epidemic situation):

- Minimization of death and severe illness caused by COVID-19
- Reduction of transmission in society and ensuring control of the epidemic
- Protection of critical societal functions

The program followed a phased approach, beginning with those at most risk of severe illness or death, and frontline workers. The second phase included the rest of the population where priority was based on age and certain health conditions.

At this early stage in the program vaccination couldn't be rolled out to the entire population at once due to limited vaccine supply. Therefore, vaccination was considered a supplement to other epidemic control measures.

In 2021 the overall aims stayed the same as in 2020 and was also increasingly adjusted so age became the determining factor for when people were offered vaccination and therefore, the roll-out progressed from the oldest towards the youngest segments of the adult population. This was based on the fact that age is a key factor for severe illness, and because the strategy had to be adapted to mass vaccination of the broader population. Another factor was due to the fact that vaccines were not being received in sufficiently large quantities to vaccinate in the initial planned duration, and the health authorities aimed to vaccinate as many people as possible in a short time.

The health authorities initiated a booster vaccination program beginning in October. People with severely weakened immune systems, nursing home residents, and persons aged 85 years or older were first priority to vaccinations. Hereafter, the priority was persons

aged 65-84 years, health- and care personnel, persons under 65 years with increased risk of severe illness.

In 2022 Denmark officially concluded its pandemic vaccination program in February 2022 due to high population immunity. Onwards, vaccination against COVID-19 was integrated in the seasonal vaccination programs along with vaccination against influenza. The seasonal program maintained a focus on protecting those at most risk for severe illness or death related to COVID-19. Vaccination was offered to older adults (from age 50 in 2022, and from age 65 in 2023 and onwards), individuals with certain chronic illnesses, and pregnant individuals. in 2023, children aged 2-6 were also offered influenza vaccination, but not COVID-19 vaccination. Healthcare workers were offered vaccination in the 2022/2023 program but not going forward. However, they were able to get the vaccine from employer paid programs outside of the official government funded program.

1.2. Finland

Finland's vaccination approach focused on minimizing the burden of COVID-19 disease, preventing deaths caused by COVID-19, and assuring the functionality of the healthcare sector.
Vaccination was rolled out in phases, initially targeting health and social care workers and those at most risk of severe illness due to COVID-19, such as the elderly. They later on expanded by age in descending order.

The overall vaccination strategy was developed between The Finnish Ministry of Social Affairs and Health, The Advisory Board of Infectious Diseases, The Finnish Institute for Health and Welfare, and The Parliament. Åland followed the Finnish vaccination strategy as per the national Communicable Diseases Act.

Vaccination was launched in late December 2020, and the aims included the following:

- Minimization of burden of COVID-19 disease
- Preventing deaths caused by COVID-19 and losses of years of life
- Assuring the functionality of the healthcare sector

While waiting for regulatory approval of the vaccines, The Finnish Institute of Health and Welfare carried out risk and burden of disease analyses and modelled different scenarios to help forming the prioritization order of the different target groups.

In 2021 the overall aims stayed the same – minimize death and loss of life years, prevent severe illness caused by COVID-19, and assure the functionality of health care. From December 2021 the aim of reducing transmission in society and thereby contributing to

the control of the epidemic was also added per the request of the Minister of Social Affairs and Health.

After those at most risk was vaccinated first, the strategy was increasingly adjusted so that age became the determining factor for vaccination. This was based on the fact that age is a key factor for severe illness and mortality, and because the strategy had to be adapted to mass vaccination of the broader population. Another factor was that vaccines were not being received in sufficiently large quantities to vaccinate in the initial planned duration, and the health authorities aimed to vaccinate as many people at risk as possible in a short time.

Based on modelling work of transmission and subsequent burden of disease, there was also an attempt to concentrate vaccinations geographically into hotspots, i.e. where the detection rates of SARS-CoV-2 were highest during the prior two weeks of surveillance. However, the Government of Finland didn't fully support this initiative, and so it was only partially put into practice.

Booster vaccinations were initiated in October 2021, starting with people with severe weakened immune systems, nursing home residents, and people aged 85 years or older. Hereafter, priority was given to people aged 65-84 years, health- and care personnel, and persons under 65 years with certain underlying medical risk conditions. In early December 2021 with the surge of the Omicron variant, the Finnish Institute for Health and Welfare recommended revaccination of all citizens over 18 years.

From 2022 on, vaccination against COVID-19 was included in the seasonal programs, which maintains a focus on protecting people with underlying medical risk factors from severe illness, hospitalization, and death. From there on, spring/summer vaccination was only for those in certain high-risk groups based on individual clinician´s judgement.

1.3. Faroe Islands

The vaccination strategy in the Faroe Islands aimed at three main goals – reducing mortality and severe illness caused by COVID-19 as much as possible, reduce spread of infection and ensure control of the epidemic, and ensure socially sensitive functions.

The overall vaccination strategy was developed by a national vaccination group, The Commission of Epidemics, The Chief Medical office, The Faroese Ministry of Health, and The Pharmacy Sector.

Vaccination began in later December 2020 and was rolled out in phases beginning with healthcare and elderly care sector employees first. Hereafter those at most risk followed and then expanded by age.

After the pandemic years, the strategy shifted to annual seasonal campaigns focused on the elderly, people with certain chronic conditions, pregnant individuals, immunocompromised individuals and their close contacts, and healthcare and nursing staff who have close contact with people at increased risk of severe illness following COVID-19.
The seasonal programs maintain a focus on preventing severe illness, hospitalizations, ands deaths due to COVID-19.

1.4. Iceland

The overall vaccination strategy in Iceland were developed by The Ministry of Health, Ministry-appointed working groups, and the Directorate of Health.

Vaccination began in late December 2020 with the primary goal of reducing severity of illness and reduce spread of illness in key population groups such as risk groups and frontline workers. In 2021, as the vaccine supply increased, the objective broadened to include achieving herd immunity in order to allow roll-back of other infection control measures. The overall goal also shifted towards reducing severity of illness and risk of complications for all eligible age groups and maintain protection against disease for risk groups.

The strategy was adapted to respond to emerging variants and shifting priorities. Booster vaccination began in October 2021, with priority given to risk groups and older adults. Third doses were later offered to the general adult population approximately six months after their second dose.

In 2022, the focus shifted to maintaining protection among vulnerable groups. Primary and booster vaccinations continued for adults and children over five with risk factors, while broad public campaigns were scaled back. Iceland paused booster vaccination during the summer months to ensure and synchronize interval of over four months between doses for vulnerable groups.

From 2023 and onwards, the program became highly targeted and shifted towards a seasonal program. Vaccines were offered to people aged 60 years or above, individuals with underlying health conditions, and healthcare/social care workers – if organized by their employer. Boosters were limited to once per year, except in cases of very high medical risk, based on clinical discretion.

1.5. Norway

The primary aim of Norway's vaccination strategy was to reduce mortality and severe disease caused by COVID-19, protect essential services and critical infrastructure, protect businesses and economy, and reopen society. These goals anchored the strategy

throughout all phases, from the pandemic's onset to the current seasonal vaccination programs.

The vaccination strategy was conducted in collaboration between The Norwegian Institute of Public Health, The Norwegian Ministry of Health, and The Prime Minister's office.

The vaccination program began in late December 2020 and was carried out in phases. The initial priority groups included residents in care homes, elderly, and people with certain underlying diseases. Hereafter, age was a determining criterion.

As vaccination rolled out the aim of the program gained even deeper emphasis on preventing severe disease or death. In 2022, the program shifted focus towards a program focussing on those at most risk. In early summer a booster dose was recommended for individuals aged 75 years or older and care home residents. In the autumn 2022, all individuals aged 65-74 years old and individuals aged 12-64 years old with underlying conditions, including pregnant individuals, were recommended a booster. Vaccination against COVID-19 was only available through the national program.
From 2023, vaccination was offered in the autumn to elderly individuals aged 65 years or older, high-risk groups, pregnant individuals, and children with severe health conditions. The overall aim remained to reduce severe disease and hospitalizations in those most vulnerable to COVID-19.

1.6. Sweden

The overall vaccination strategy in Sweden was developed by The Public Health Agency of Sweden in cooperation with The Medical Products Agency, The National Board of Health and Welfare, and The National Vaccine Coordinator (temporary appointment during the pandemic years). Regular meetings were held with the regional authorities for sharing information and planning aspects.

The initial aims were to minimize death and severe illness caused by COVID-19, and reduction of transmission in health care and elderly care.

The vaccination program was rolled out in four phases. The first phase included elderly individuals living in long term care facilities or at-home care settings including family members, and care personnel. The second phase included individuals aged 70 years or older and immunocompromised persons above 18 years. Phase three included other adults in risk groups. The last phase included the rest of the population where priority was based on age beginning with the oldest.

In 2021, the strategy shifted focus to only focus on minimization of death and severe illness caused by COVID-19, and did not prioritize the protection of critical societal

functions. Further, there was a focus to get as many people vaccinated in a short time, especially with one dose, before beginning second doses. This was to prevent severe disease for as many as possible in the first stages of the vaccination program. There was a specific aim for all adults in Sweden to have been offered at least one dose before July 2021. However, this had to be postponed to late September due to lower amount of vaccine deliveries than expected and early identification of adverse drug reactions that led to restricted use in specific groups of the population.

Revaccination began in late summer of 2021 for those at highest risk – immunocompromised, nursing home residents, and elderly. In 2022, Sweden moved towards a revaccination model, focusing on the elderly (from 65 years and above), individuals with underlying conditions, and those in nursing homes or home-based care.

From 2023 onwards, vaccination was formalized as a seasonal program. Those aged 80 years or older and nursing home residents/home-based care received two doses per year – one in spring and one in autumn. Adults aged 65-79 years and risk groups from 18-64 were offered a booster dose in the autumn.

2. Cross country insights

2.1. Strategic objectives

At the outset of the COVID-19 vaccination rollout, the Nordic countries and territories shared a set of common and broad strategic objectives. These included the prevention of severe illness and death through the direct protective effect for the vaccinated individual, as well as the secondary vaccination effect of reduced transmission to provide indirect protection, especially in certain selected societal functions such as the health and care sector. Many countries and territories also included the protection of critical societal functions. While the exact wording and order of priorities differed, the underlying goals were in general aligned.

In 2020, all countries emphasized the need to minimize severe illness and deaths caused by COVID-19. Denmark, the Faroe Islands, Finland, and Norway explicitly included the protection of critical societal functions in their early aims, alongside contribution to population-level epidemic control[1] through broad reduction in transmission. Norway also incorporated broader economic and societal reopening goals. In contrast, Sweden initially included transmission reduction in health and elderly care but quickly shifted to focus solely on minimizing severe illness and deaths. Sweden chose not to prioritize the protection of essential societal functions, a notable divergence from the other Nordic countries and territories.

The strategic frameworks in all countries and territories were all continuously revisited and adjusted in response to the evolving pandemic situation, vaccine supply, and emerging evidence. In the early phases of the pandemic there was a broad consensus that vaccination was regarded as a supplement to other epidemic control measures rather than a standalone solution. This was mainly due to the limited size of the first deliveries of the vaccines, and, therefore, vaccination couldn't be rolled out to the entire population at once. In Denmark, Finland, Norway and Sweden, it was clearly articulated by the health authorities that the limited vaccine supply at the outset of the roll-out demanded a gradual and prioritized rollout targeted the most vulnerable and most exposed segments of the population in the beginning. However, the emphasis on vaccination as a supplement to other epidemic control measures, such as test-isolate-contact tracing-quarantine strategies and physical distancing, was more strongly articulated in some countries than others. In particular, the extent to which non-pharmaceutical interventions were maintained or relied upon alongside vaccination varied, reflecting differing national expectations on

[1] In this report *epidemic control* is defined as significant population-level reduction of transmission and thereby incidence. WHO defines epidemic control a bit more broadly, as "Reduction of disease incidence, prevalence, morbidity and/or mortality to a locally acceptable level", see for example WHO 2021: Ending the neglect to attain the Sustainable Development Goals: A road map for neglected tropical diseases https://www.who.int/publications/i/item/9789240010352.

the impact of vaccinations and immunity gained by exposure to the virus on epidemic control.

All countries implemented phased programs. In the first phase, priority was given to those with an increased risk of severe illness or death – the elderly, nursing home residents, individuals with certain underlying health conditions. Furthermore, prioritization was initially given to protect the frontline healthcare workers in order to secure the critical work functions and reduce the risk of transmission to patients. Strategic approaches were largely consistent across the Nordic countries and territories at this stage. Most countries based their decisions on a combination of international guidance from WHO and ECDC, scientific reports and preprinted publications as well as their national data. Iceland and Finland notably made use of modelling and sero-epidemiological studies in their targeting strategies. Several countries, including Finland, Denmark, and Norway, integrated real-time national surveillance data such as disease burden and vaccine effectiveness studies to continuously adapt their strategic objectives.

As the pandemic evolved and vaccine supply increased in 2021, some countries began to adapt their objectives with a growing focus on epidemic control. Iceland, for instance, expanded its goals to include achieving herd immunity and supporting the lifting of broader infection control measures. Finland also gradually incorporated epidemic control as a formal aim later in 2021. All countries, to varying extent, implemented vaccination certificate requirements with the aim to reduce transmission domestically and across borders. However, by the time this was rolled out there was already growing evidence on the limited impact of vaccination on transmission of the new Omicron variants that had emerged.

Another distinction was in operational priorities. Some countries, such as Denmark had a clear aim to get certain risk groups fully vaccinated in a short time before moving to broader groups, while others, such as Sweden and Finland, focused on having as many people as possible vaccinated with a single dose before starting with the second dose in other risk groups. Finland used modelling and in-house analysed immunogenicity data to help adjust the time interval between the two doses of the primary series; this formed the evidence base of the off-label recommendation.
The different aims of the vaccination programs also caused differences in target groups recommended for vaccination. Denmark, Finland, Iceland, and the Faroe Islands extended vaccination to children aged 5–11, to limit community transmission and enhancing population-level immunity but also with the aim to protect the children from severe disease (MIS-C). In contrast, Sweden, Iceland, and Norway only recommended vaccination for children with specific medical vulnerabilities, arguing that the direct benefit to healthy children was limited and that societal gains did not justify a universal rollout to the age group. Youth 12-17 years were offered at least two doses in all Nordic countries in 2021.

By February 2022, all Nordic countries and territories shifted from emergency mass vaccination to a more targeted seasonal approach. This shift reflected changes in epidemiological risk and public health priorities, as well as growing evidence on the waning effects

of available vaccines on transmission, especially after the emergence of the Omicron variant. A key shift in the strategic objectives was the transition back from community-level epidemic control to individual-level protection of the vulnerable groups. The primary objective of seasonal programs became the prevention of severe illness, hospitalizations, and death among high-risk individuals, rather than population wide epidemic control. The prioritization criteria were guided by individual risk factors, including age, underlying medical conditions, and residency in care facilities. For instance, Sweden began recommending two annual booster doses (one in spring and one in autumn) for individuals aged 80 years or older, as well as for nursing home residents.

Moving forward, COVID-19 vaccination strategies are for now embedded in seasonal public health planning, with a clear focus on protecting the most vulnerable risk groups. As the vaccine supply obtained under the EU Joint Purchase Agreement is exhausted, each Nordic country need to consider under which circumstances and with what price COVID-19 will become part of their national immunization programmes.

2.2. Target groups

Across the Nordic countries and territories, the initial prioritization strategies were broadly similar in 2020 and early 2021. There was a broad consensus that vaccination should first be prioritized to those at highest risk of severe illness and those among who reduction of transmission was most critical.

The identification and prioritization of target groups followed a broadly similar trajectory through the Nordic countries and territories. The target groups evolved in alignment with the pandemic situation, vaccine availability and supply, and emerging scientific evidence.

The initial target groups were those at highest risk for severe illness or death related to COVID-19. The definition of “high-risk” individuals varied somewhat, with most countries developing specific disease-based eligibility criteria using national health data. Subsequently the approach shifted towards a broader scope to gain immunity in broader population groups, while in the later phase of the pandemic the approach was again to focus on those with the highest risk for severe illness.

Despite this overall alignment, countries differed in how granularly they defined subgroups. For example, Norway had detailed age-stratified priority lists, while Finland, Denmark, Sweden, Iceland also incorporated specific medical risk groups using national data on disease burden and seroprevalence. The Faroe Islands adopted a pragmatic tiered approach starting with front-line healthcare workers, followed by elderly individuals and persons with chronic illness.

One of the most prominent differences was seen in the difference concerning vaccination of children and adolescents. While Denmark, Finland, and the Faroe Islands recommended vaccination of children in part of 2021 and 2022, vaccination of this target group

wasn’t only for the benefit of the individual but also considered a mean to gain epidemic control. For example, when Denmark and The Faroe Island recommended vaccination of children in late 2021 there was a high rate of infection among younger children. Thus, vaccination was recommended in order to increase immunity in the population and help reduce the spread of infection in the population. The protection of severe illness among the children was also an aim, as in Finland, since it was believed that vaccination could possibly prevent a rare but serious condition among children infected with COVID-19 (MIS-C). Sweden, Norway and Iceland did not recommend vaccination of this target group. In these countries, children were generally not recommended vaccination unless the child had a significant medical condition. This divergence reflects differing assessments of the balance between individual benefit, societal impact, and potential risks in this target group.

During the early stages of the pandemic, healthcare and other frontline personnel was universally prioritized. However, as vaccination objectives shifted from epidemic control to individual protection, their inclusion in the programs diminished. By 2023, Denmark, Finland, and Norway had all removed healthcare workers as a general target group. In Iceland vaccination of the target group is still possible through employer funded programs.

Recommendations for pregnant individuals also evolved over time. Pregnant individuals were not initially included in the early vaccination phases across the Nordic countries due to limited safety data and a cautious approach. However, as evidence grew showing increased risk of severe COVID-19 during pregnancy, most countries updated their guidance mid-2021 to recommend vaccination, typically from the second or third trimester. This shift reflected a dynamic reassessment of risk and benefit, informed by both international and national data.

After the pandemic many of the Nordic countries and its territories are evaluating the vaccination program for pregnant individuals. For example, Denmark is elaborating whether to keep offering the vaccination to this group, while Finland and Sweden are removing pregnant individuals entirely for the upcoming 2025/2026 season.

In the later phases of the pandemic, eligibility became increasingly defined by a risk-based approach. Some groups were intentionally removed from eligibility in several countries. For example, adults under 65 without risk factors, adolescents, and children were no longer recommended vaccination by 2023 in Norway, Sweden, Finland and Denmark, reflecting a common reassessment of limited marginal benefit. Common core target groups post pandemic across the Nordic countries and territories reads elderly, nursing home residents or people living with home-based care, people with chronic illness or immunocompromising conditions, and pregnant individuals (in the second or third trimester).

2.3. Vaccines

Vaccine selection followed a broadly similar pattern across the Nordic countries and territories in the early stages of the pandemic, particularly in 2020 and early 2021. This was facilitated by the Joint Procurement Agreement (JPA) coordinated by the EU Commission, which enabled all EU member states, as well as associated countries like Iceland and Norway, to collectively negotiate and purchase COVID-19 vaccines.
All countries began their programs using the Comirnaty vaccine from Pfizer/BioNTech, and shortly thereafter most countries expanded with the Spikevax vaccine from Moderna. These two vaccines remained the core components of national programs throughout the pandemic period. Comirnaty was the only vaccine to be distributed on the Faroe Islands.

Denmark, Finland, Iceland, Norway, and Sweden all included the Vaxzevria vaccine from AstraZeneca, and Denmark, Finland, and Iceland also included the Jcovden vaccine from Janssen Pharmaceuticals, later in the spring of 2021. Norway procured the Jcovden vaccine but never officially included it in the program. However, both vaccines were paused and removed from the vaccination programs following reports on serious adverse effects from most countries and its territories. For example, in Iceland, Jcovden was used until the doses expired with no restrictions in target groups. Vaxzevria was also not removed, as the vaccine was still available but used very little once the mRNA vaccines were abundant in June 2021. The vaccine expired in the fall of 2021, and the use was thereafter stopped.

Denmark paused the use of Vaxzevria in early March 2021, and Finland, Norway and Sweden followed a couple of days later. This was due to the fact that rare but serious adverse effects had been observed after vaccination with this vaccine. It was suspected that Vaxzevria probably was the cause of rare, serious symptoms of blood clots combined with low platelet count and bleeding, so called vaccine-induced immune thrombotic thrombocytopenia (VITT). The Nordic countries were the first to report this adverse event and helped inform the European Medicines Agency (EMA). The final evaluation of a link between the vaccine and the syndrome was concluded by an expert group set up by the EMA with data for the decision based on a study conducted by the Nordic countries[2].
Still, the vaccine remained authorised for use. The health authorities in Denmark, Finland, and Norway maintained, aligned with the EMA, that the preventive potential of Vaxzevria outweighed the potential risk of severe adverse effects. However, the vaccines were removed from the programs as a precautionary measure for a short interval. This decision was also due to the fact that the current epidemic control in society was at an acceptable level. In Sweden and Finland, the recommendation regarding Vaxzevria differentiated to only use it in individuals over the age of 65 years from late April 2021 as the

[2] Pottegård A, Lund LC, Karlstad Ø, Dahl J, Andersen M, Hallas J, Lidegaard Ø, Tapia G, Gulseth HL, Ruiz PL, Watle SV, Mikkelsen AP, Pedersen L, Sørensen HT, Thomsen RW, Hviid A. Arterial events, venous thromboembolism, thrombocytopenia, and bleeding after vaccination with Oxford-AstraZeneca ChAdOx1-S in Denmark and Norway: population based cohort study. BMJ. 2021 May 5;373:n1114. doi: 10.1136/bmj.n1114. PMID: 33952445; PMCID: PMC8097496.

risk/benefit analysis was favourable for the use of the vaccine to avoid serious COVID-19 among this age group. No new deliveries of the vaccine were received in Sweden, and the vaccine was used until July 2021, and then removed from the program. In Denmark the vaccine was officially removed in April 2021, later Finland and Norway followed and also removed the vaccine from their official programs by May 2021. In Denmark, the vaccine was included in an optional COVID-19 vaccination scheme outside of the official program, allowing citizens to be vaccinated more quickly than the official program could guarantee if they wished. In Iceland Vaxzevria was not formally removed from the program until it had expired. However, it was only used at request of the vaccinee from June 2021 on.

The Jcovden vaccine (also known as Johnson & Johnson) from Janssen Pharmaceuticals played a limited role in the Nordic vaccination programs. Initially it was welcomed for its single-dose regimen, but it was soon paused from most programs due to safety concerns due to possible adverse effects, specifically VITT syndrome. The EMA later confirmed a possible link between Jcovden and VITT. While, like with the Vaxzevria vaccine, the EMA maintained that the vaccine's benefits outweighed the risks, several Nordic countries and territories removed the vaccine from the programs as precautionary approach. Denmark and Finland removed the vaccine in March 2021, citing both precaution and the satisfactory coverage already obtained with other vaccines. In Denmark the vaccine was later able for use in an "off program" outside of the official program for individuals who actively wanted quicker vaccination than the official program could offer. Norway never included Jcovden in their official program but made it available off-program through general practitioners, but the uptake remained minimal. Sweden also never deployed Jcovden, removing it from consideration due to the same safety concerns as Vaxzevria. In Iceland, the vaccine remained technically available for individuals with contraindications to mRNA vaccines, though it was only used rarely and not promoted centrally.

Spikevax was part of all Nordic vaccination programs. However, several countries introduced age- and sex-based restrictions due to emerging safety concerns. These restrictions primarily stemmed from observations of an increased risk of myocarditis and pericarditis, particularly among younger males after the second dose of the vaccine. Sweden and Norway recommended against using Spikevax in individuals under 18 years of age. Norway, Finland, and Sweden subsequently advised not to use Spikevax in males under 30 years of age, citing myocarditis risk[3].

From 2022 onwards, all countries transitioned to using variant-updated mRNA vaccines in their seasonal booster campaigns. Here all countries adopted updated Comirnaty vaccines. However, only a few (Iceland, Finland, and Sweden) introduced alternative vaccines like Nuvaxovid from Novavax, typically as a backup for individuals unable to receive mRNA vaccines or for immunocompromised individuals with low response to mRNA vaccines.

[3] Husby A, Gulseth HL, Hovi P, Hansen JV, Pihlström N, Gunnes N, Härkänen T, Dahl J, Karlstad Ø, Heliö T, Køber L, Ljung R, Hviid A. Clinical outcomes of myocarditis after SARS-CoV-2 mRNA vaccination in four Nordic countries: population based cohort study. BMJ Med. 2023 Feb 1;2(1):e000373. doi: 10.1136/bmjmed-2022-000373. PMID: 36936260; PMCID: PMC9978676.

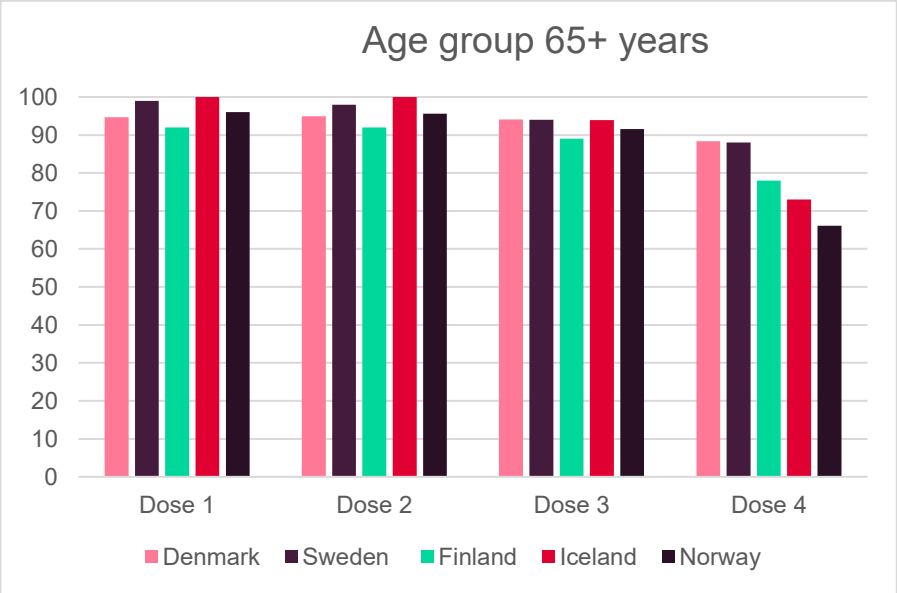
An overview of the vaccines used in the Nordic countries and its territories are shown in the table below.

Vaccine	Denmark	Sweden	Norway	Finland	Iceland	Faroe Islands
Comirnaty (Pfizer) (mRNA)	☑	☑	☑	☑	☑	☑
Spikevax (Moderna) (mRNA)	☑	☑ Paused for under 30 years	☑ Restricted for under 30 years	☑ Restricted for under 30 years	☑ Some pauses	✕ Never used
Vaxzevria (AZ) (Viral vector)	✕ Withdrawn April 2021 ⚠ (optional scheme)	✕ Withdrawn July 2021	✕ Withdrawn May 2021	✕ Withdrawn April 2021	✕ Phased out mid-2021	✕ Never used
Jcovden (J&J) (Viral vector)	✕ Withdrawn summer 2021 ⚠ (optional scheme)	✕ Never used	✕ Minimal uptake ⚠ (optional scheme)	✕ Withdrawn May 2021	☑ Used for selected groups	✕ Never used
Nuvaxovid (Novavax) (Protein based)	✕ Never used	⚠ (available, minimal use)	⚠ (available, minimal use)	⚠ (available, minimal use)	✕ (arrived, not used)	✕ Never used
Bivalent mRNA vaccines (BA.1, BA.4/5, XBB, JN.1)	☑	☑	☑	☑	☑	☑

2.4. Coverage

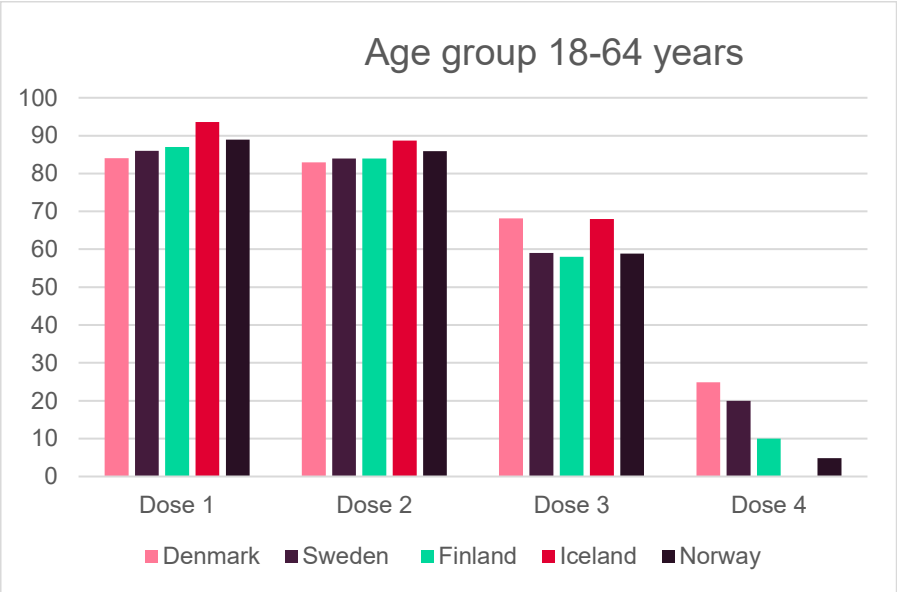
Coverage is only shown for some countries and territories, as not all countries and territories were able to provide data.

Age 65+ years



Among individuals aged 65 years and above, vaccine uptake was consistently high across all Nordic countries and territories, with coverage for the first three doses above 90%. Uptake for later booster doses was slightly lower overall, and more variation emerged between countries.

Age 18-64 years

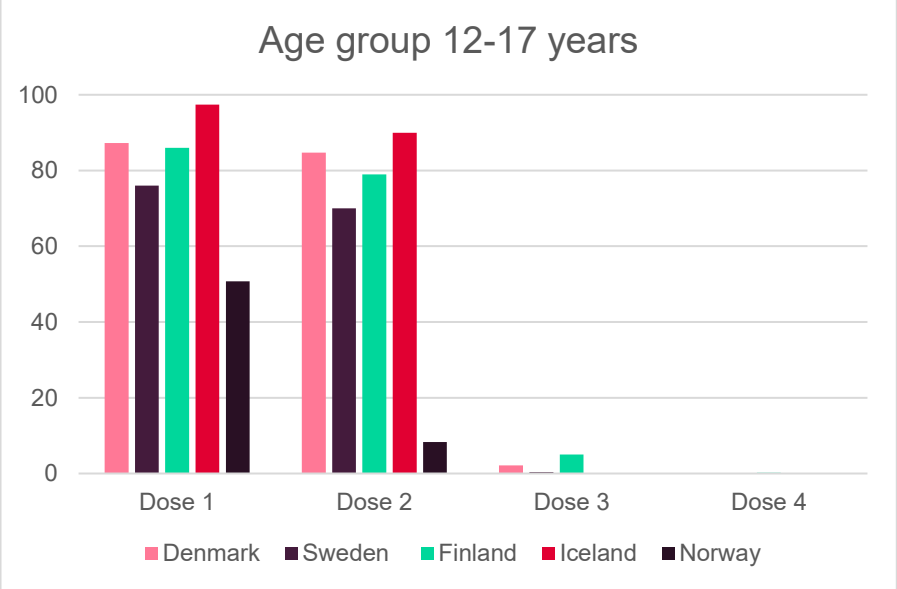


Across the Nordic countries and territories, uptake of the first two COVID-19 vaccine doses among adults aged 18-64 years was generally high. Most countries reported coverage rates between 84% and 93% for the first dose, and 82% to 88% for the second dose, indicating widespread acceptance and successful rollout during the initial phases of the vaccination campaigns.

For the third dose, however, uptake declined more noticeably. This pattern likely reflects both a shift in perceived urgency in the population and changes in eligibility, as later doses increasingly targeted individuals with elevated health risks.

A fourth dose was offered in five out of the six countries (all except Iceland), but only to selected target groups as part of seasonal programs. As such, coverage rate for dose four are shown as much lower, ranging from 5% to 24%, and should be interpreted within the context of more limited eligibility criteria.

Age 12-17 years



Vaccine uptake among adolescents aged 12–17 varied across the Nordic countries and territories. For the first dose, uptake ranged from 50% to 97%. For the second dose, the coverage range was 70% to 90%, indicating relatively high completion rates in countries that implemented broad adolescent vaccination programs.

3. Lessons learned

The COVID-19 vaccination programmes across the Nordic countries and its territories were grounded on many shared strategic objectives. While these overarching aims provided a common direction, there were context-specific adaptations. The Nordic countries and territories pursued somewhat different strategies based on their national priorities, population characteristics, health system capacities, and interpretation of evolving evidence.

Key differences included the prioritization of target groups, the timing of rollout phases, and the selection and restriction of vaccine types. The EU Joint procurement Process (JPA) process was a great assistance for the individual Nordic countries and territories and helped in getting the vaccines swiftly, i.e. that not each individual country had to negotiate contracts with the manufacturers.

A central lesson learned is the importance of strategic agility within a shared framework, enabling countries to adjust approaches as supply, epidemiology, and scientific understanding evolve. At the same time, the case in the Nordic countries and its territories has shown the benefits of close regional cooperation through the pandemic with setting up informal weekly Nordic vaccine meetings centering around vaccine recommendations, including transparent sharing of data, national strategies, and real-time learnings. This contributed to faster decisions-making, mutual validation, and greater resilience. The Nordic collaboration has been used at WHO networks as a demonstration case on how like-minded countries can help one another by information sharing and discussion.

Looking ahead, future pandemic vaccination strategies that can be built on the foundation includes:

- Developing clear, adaptable vaccination strategies that can evolve from broad protection goals to risk-based targeting.
- Ensuring mechanisms for rapid data sharing and coordinated response planning across borders.
- Recognizing the need to align vaccination strategies with non-pharmaceutical interventions.
- Strengthening public communication and trust-building, especially when scientific guidance changes. I.e. in Finland, The Finnish Institute for Health and Welfares working paper context were used as a tool to communicate to a wider audience. This meant that all the evidence that was gathered and used for the decision making were published in this form to increase transparency and understanding.
- Having access to and being able to use almost real-time data to monitor and model scenarios.

The variations underscore the value of flexibility and national adaptability within a similar strategic framework. At the same time, the experiences across the region highlight the

importance of cross-country learning and coordination. Setting up of the informal weekly meetings with central agency-colleagues across the Nordic countries and territories didn't exist before the pandemic and was a tremendously useful allowing for sharing of strategies, data, and lessons in real time not only supported evidence-based decision-making during the pandemic providing a strong foundation for future public health preparedness and joint response planning.