

TECHNICAL REPORT

Overview of the implementation of COVID-19 vaccination strategies and deployment plans in the EU/EEA

8 September 2022

Key messages

This report provides an updated overview of the progress with national COVID-19 vaccination strategies and deployment in European Union/European Economic Area (EU/EEA) countries, including updates on:

- overall vaccine uptake and uptake by target group;
- vaccination strategies and policies.

Vaccine COVID-19 roll-out overview

- As of 21 August 2022 (week 33, 2022), over 916 million doses of COVID-19 vaccines had been administered in the EU/EEA, with around 330 million people having received a complete primary course, 243 million having received a first booster dose (30 countries reporting), and 20.7 million having received a second booster dose (25 countries reporting).
- Since the start of COVID-19 vaccine deployment in December 2020 and as of 21 August 2022, the cumulative uptake of the primary vaccination course against COVID-19 in the total EU/EEA population has reached 72.8% (range: 29.9–86.5%), 53.6% (range: 9.2–71.9%) for the first booster dose and 6.1% for the second booster dose (range: <0.1–16.3%).
- Among adults (aged 18 years and above) the cumulative vaccine uptake reached 83.5% (range: 35.7–94.6%) for the complete primary course and 64.7% (range: 11.2–86.2%) for the first booster dose. The progress differs across countries, with two countries still reporting less than 50% of the total population having completed the primary vaccination course (Bulgaria and Romania).
- The uptake of the first booster dose is still showing a very modest increase among adolescents aged 15–17 years and young adults aged 18–24 years (average absolute weekly increase of 0.1% in the last month).
- The cumulative uptake of the second booster dose among adults aged 18+ is 7.5% (range: <0.1–20.7%), 14.7% in those aged 60+ (range: <0.1–61.7%) and 21.4% in those aged 80+ (range: 0.1–81.2%). The cumulative uptake of the second booster dose among adults aged 18+ is 7.5% (range: <0.1–20.7%), 14.7% in those aged 60+ (range: <0.1–61.7%) and 21.4% in those aged 80+ (range: 0.1–81.2%). The uptake among those aged 60+ is still low in most countries (only seven countries exceeded 25% of those aged 60+ as of week 33, 2022: 61.7% in Sweden; 55.5% in the Netherlands; 51.2% in Ireland, 41.6% in Malta, 34.1% in Luxembourg, 27.8% in France and 26.7% in Iceland).

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Vaccination strategies and policies during roll-out

- All EU/EEA countries offer primary vaccination to those aged 12 years and above. A total of 29 countries are recommending primary vaccination to all children aged 5–11 years and one country is recommending it only for those aged 5–11 years with risk factors.
- All EU/EEA countries recommend an additional primary dose as an extension of the primary course for those with weakened immune systems. In several countries up to two booster doses are now recommended for immunocompromised individuals.
- All EU/EEA countries are recommending a first booster dose for different groups in the general population to improve protection in individuals whose immunity may wane overtime after completing the primary course. All EU/EEA countries are recommending first booster doses for all adults aged 18 years and over and fourteen are also recommending first boosters for adolescents between the ages of 12 and 18 years, as authorised by the European Medicines Agency.
- All EU/EEA countries are now recommending a second booster dose for certain population groups. Country recommendations for a second booster dose target different vulnerable populations, such as people above a certain age threshold (with various age cut-offs from 50+ to 80+ years), residents in long-term care facilities (LTCFs), healthcare workers or personnel working in LTCFs. In some countries individuals aged 18 years and over can also be vaccinated with the second booster dose upon request.
- Ten EU/EEA countries have published recommendations for their autumn/winter vaccination campaigns, aiming to maximise the benefits of COVID-19 vaccination for those most at risk and older adults who are vulnerable. At the time of this report, sixteen countries were still discussing their vaccination strategies for autumn/winter.
- Thirteen countries are also considering the possibility of incorporating the autumn/winter COVID-19 vaccination into the annual influenza vaccination campaign.

The roll-out of national vaccination campaigns is an ongoing process, and this report provides a snapshot of the progress to date.

Scope of this document

ECDC has previously published nine technical reports on vaccination strategies and vaccine deployment across EU/EEA countries, on 2 December 2020 [1], 1 February 2021 [2], 29 March 2021 [3], 6 May 2021 [4], 14 June 2021 [5], 23 September 2021 [6], 11 November 2021 [7], 31 January 2022 [8] and 21 April 2022 [9]. This tenth technical report provides an updated overview of the progress with national COVID-19 vaccination strategies in EU/EEA countries, including updates on vaccine uptake overall and by target group, as well as detailing the vaccination strategies and policies in place.

Target audience

Target audiences for this document are the European Commission, the Health Security Committee (HSC), the EU/EEA National Immunisation Technical Advisory Groups (NITAGs), national public health institutes and ministries of health in the EU/EEA, and public health experts and decision-makers at national and sub-national level responsible for implementing vaccine deployment plans.

Methods

The information provided in this report was collected from the sources set out below.

Integrated Situational Awareness and Analysis report

The European Commission sends questions on vaccines to EU/EEA countries for the Integrated Situational Awareness and Analysis (ISAA) report. The ISAA report is prepared under the Integrated Political Crisis Response Mechanism (IPCR) of the Council of the European Union [10,11].

- Since 9 December 2020, a weekly set of questions has been sent via the ISAA report to country representatives, as the validating authorities of the IPCR, to obtain regular information on various topics related to COVID-19. One section of these questions covers vaccination strategies and deployment. The representatives gather the responses to the questions from the various agencies and ministries in their countries.

- This report is based on responses from countries to the vaccine-related questions received between 29 March 2022 and 27 July 2022. Where relevant, data are included from responses provided before March 2022. The response rate from countries to each question is specified in the sections below.
- A draft version of this report was sent to the Health Security Committee Members for verification and validation, and to complement any missing information.

Data from The European Surveillance System

ECDC has implemented a monitoring system to collect information on vaccine roll-out (the number of doses distributed to EU/EEA countries and administered, by age group and other prioritised population) since mid-January 2021, in conjunction with the World Health Organization's Regional Office for Europe. EU/EEA countries have been reporting data on the COVID-19 vaccine roll-out through The European Surveillance System (TESSy), which can be viewed in the ECDC COVID-19 Vaccine Tracker [12] and in the weekly COVID-19 country overviews on ECDC's website [13]. The information on the COVID-19 vaccine roll-out presented in this report is based on the most recent data reported by EU/EEA countries to TESSy and displayed in the Vaccine Tracker as of 21 August 2022. The Vaccine Tracker may be consulted for additional details and country-specific [disclaimers on data](#).

Results

COVID-19 vaccine roll-out overview

As of 21 August 2022 (week 33, 2022), over 916 million vaccine doses had been administered in the EU/EEA, with around 330 million people in the EU/EEA having received a complete primary vaccination course, 243 million having received a first booster dose, and 20.7 million having already received a second booster dose [12].

Since the start of COVID-19 vaccine deployment in December 2020 and as of 21 August 2022, the cumulative uptake of the primary vaccination course against COVID-19 in the total EU/EEA population had reached 72.8% (range: 29.9–86.5%), 53.6% for the first booster dose¹ (range: 9.2–71.9%) (pooled data from 30 reporting countries), and 6.1% for the second booster dose² (range: <0.1–16.3%) (pooled data from 25 reporting countries).

Among adults (aged 18 years and over) in the EU/EEA, the cumulative vaccine uptake has reached 83.5% (range: 35.7–94.6%) for the complete primary course, with no sign of further increase for several months. Median uptake of completed primary vaccination has reached 75.0% in 18–24-year-olds; 78.6% in 25–49 year-olds, 83.9% in 50–59 year-olds (29 countries reporting) and 90.7% in 60+ year-olds (30 countries reporting). In eligible adolescents and children, the median uptake of primary vaccination is 23.9% in those under 18 years (29 countries reporting); 71.3% in 15–17 year-olds (19 countries reporting), 37.4% in 10–14 year-olds and 13.8% in 5–9 year-olds (18 countries reporting) (Figure 1).

The uptake of the first booster dose has reached 64.7% (range: 11.2–86.2%) and is increasing very slowly. The uptake of the first booster dose is still showing some increase among adolescents aged 15–17 years and young adults aged 18–24 years (average absolute weekly increase of 0.1% in the last month in both age groups), among adults 25–49 years and those aged 80 years and above (average absolute weekly increase of 0.1% and 0.2% in the last month respectively) (Figure 2).

Among individuals aged 60 years and above, the median uptake of the primary course, first booster dose and second booster has reached 90.7% (range: 38.3–100%), 83.8% (range: 13.6–100%) and 14.7% (range: <0.1–61.7%), respectively (pooled data from 25 reporting countries; Figure 3).

Based on data reported to TESSy by 25 EU/EEA countries, approximately 20.7 million second booster doses have been administered to adults aged 18+ years and 87% of them have been administered to those aged 60+ years. The cumulative uptake of the second booster dose among reporting countries is 7.5% in those aged 18+ years (range: <0.1–20.7%), 14.7% in those aged 60+ years (range: <0.1–61.7%) and 21.4% in those aged 80+ years (range: 0.1–81.2%) [14]. The uptake among those aged 60+ years is still low in most countries (only seven countries exceeded 25% of those aged 60+ years as of week 33, 2022: 61.7% in Sweden; 55.5% in the Netherlands; 51.2% in Ireland, 41.6% in Malta, 34.1% in Luxembourg, 27.8% in France and 26.7% in Iceland).

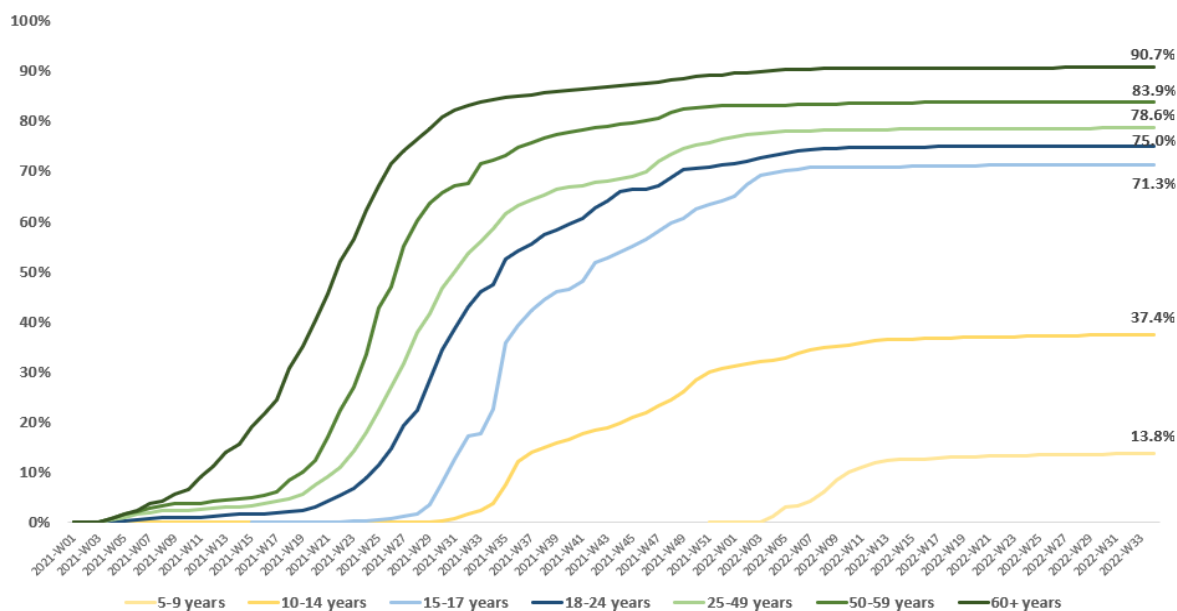
¹ For surveillance purposes, this refers to the first additional dose of COVID-19 vaccine administered after the standard primary course. Therefore the count and uptake estimates may include both first booster doses administered to immunocompetent individuals and additional primary course doses administered to immunocompromised individuals.

² For surveillance purposes, this refers to the second additional dose of COVID-19 vaccine administered after the standard primary course. Therefore the count and uptake estimates may include both second booster doses administered to immunocompetent individuals and second additional doses administered to immunocompromised individuals after a standard primary course.

Table 1 summarises the uptake of the primary course, first and second booster dose by the total population, for adults aged 18 years and above and persons aged 60 years and above as of 21 August 2022. More information on COVID-19 vaccine doses administered and vaccine uptake rates can be found in [ECDC's Vaccine Tracker](#).

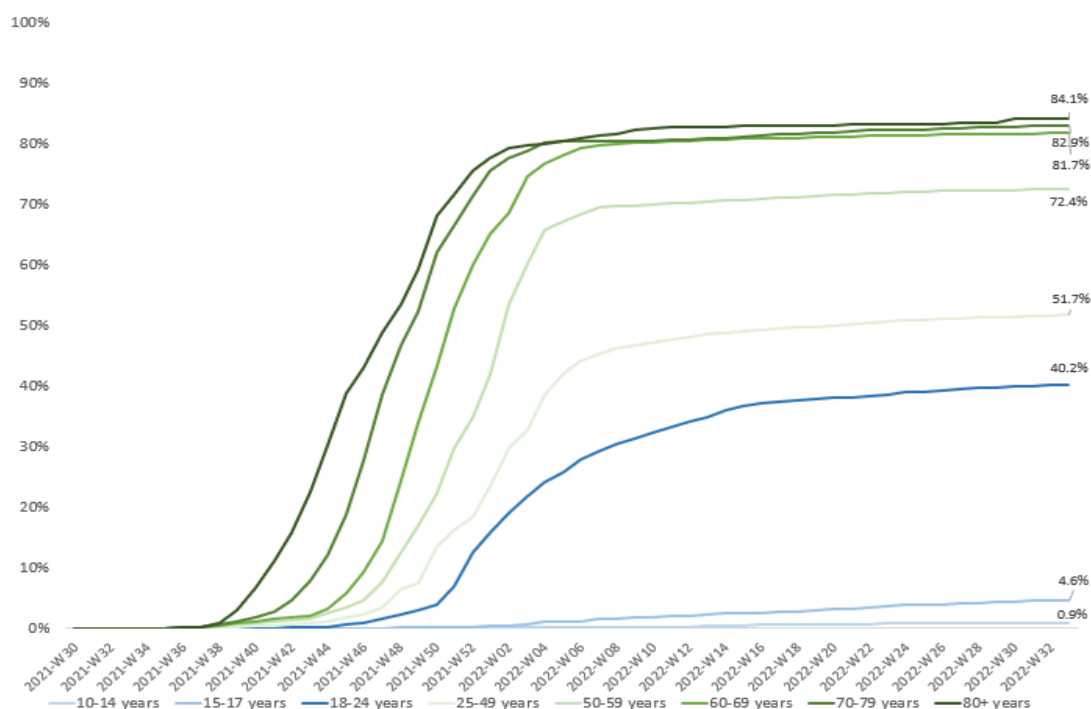
Overall, progress in vaccine uptake remains uneven across EU/EEA countries (Figure 4) and a few EU/EEA countries are lagging behind, with two (Bulgaria and Romania) still reporting less than 50% uptake of the primary vaccination course in the total population.

Figure 1. Median cumulative uptake of the primary course of COVID-19 vaccines by age group in the EU/EEA (as of 21 August 2022)



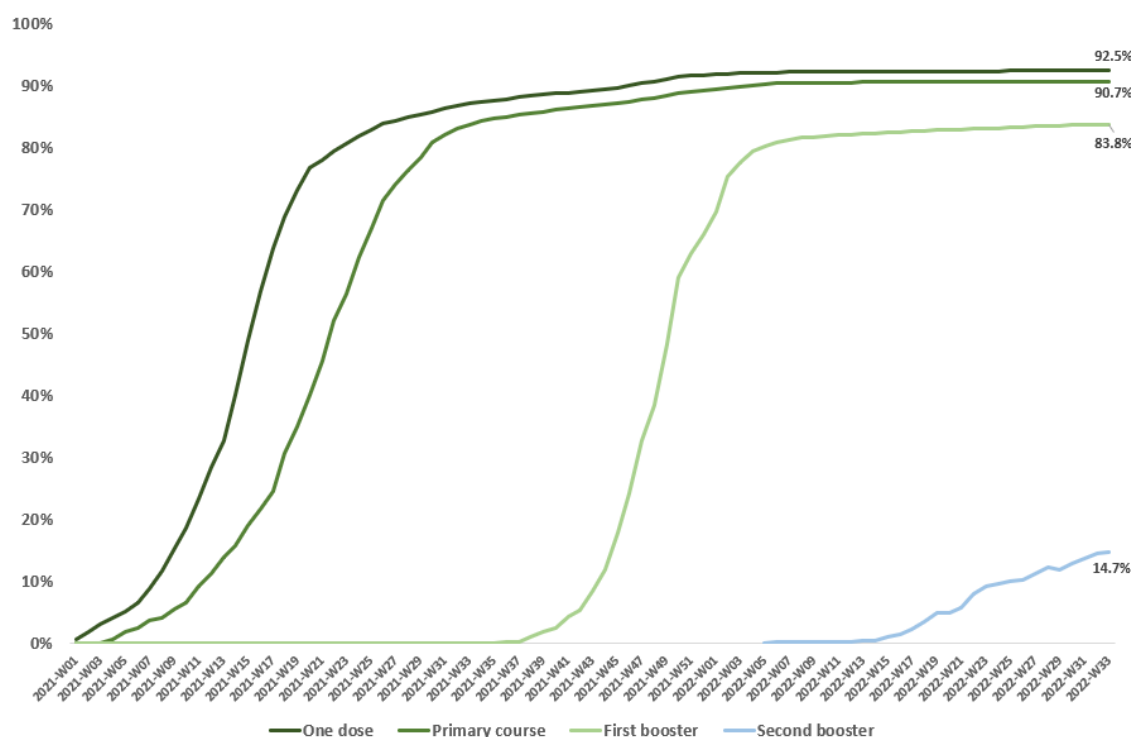
Source: TESSy data reported by 30 countries.

Figure 2. Median cumulative uptake of the first booster dose of COVID-19 vaccines by age group in the EU/EEA (as of 21 August 2022)



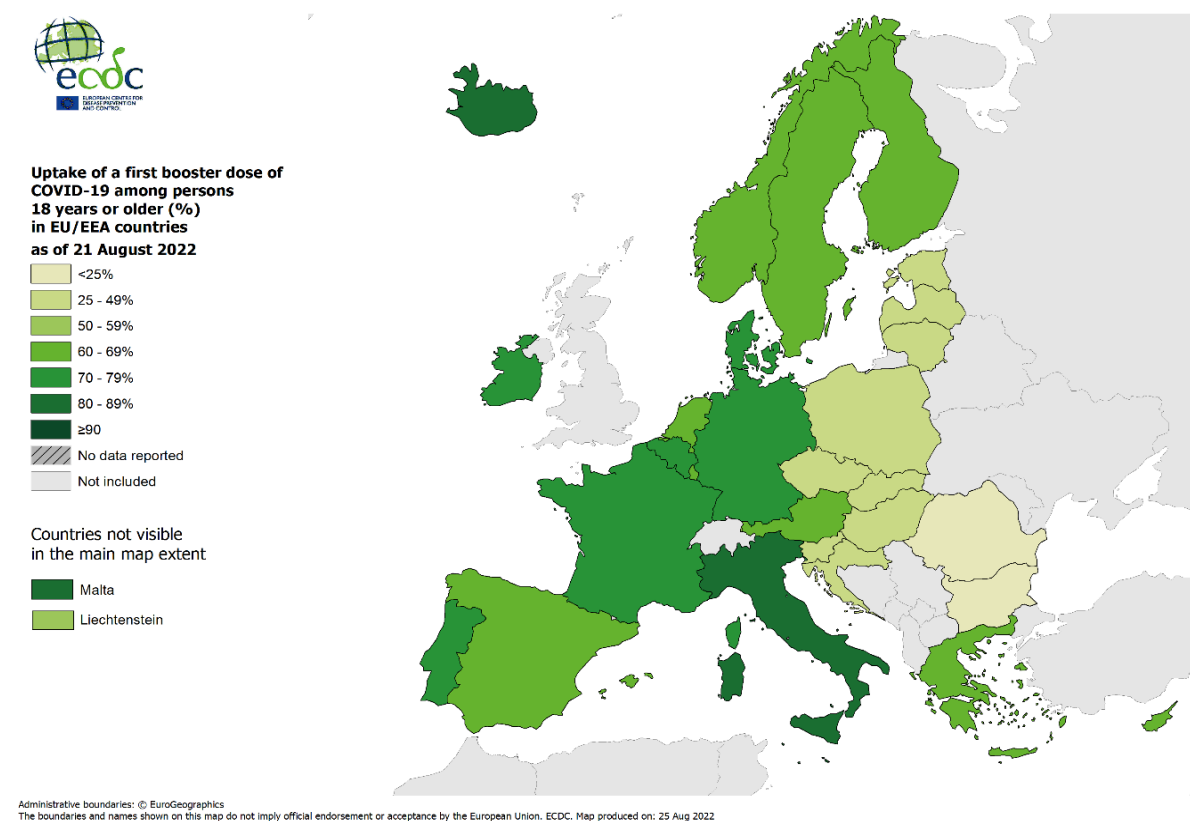
Source: TESSy data reported by 30 countries.

Figure 3. Median cumulative uptake of one dose, primary course, first and second booster of COVID-19 vaccines among those aged 60 years and above in the EU/EEA (as of 21 August 2022)



Source: Cumulative uptake of the primary vaccination course based on the dosing schedule authorised in the EU/EEA. Numbers of countries reporting to TESSy: 30 for uptake primary course and first booster, 25 for second booster.

Figure 4. Uptake of first booster dose of COVID-19 vaccines among adults aged 18 years and above in EU/EEA countries (as of 21 August 2022)



Source: TESSy data reported by 30 countries.

Table 1 shows a summary of the cumulative uptake of the primary course and additional dose in the total population, adults (18+ years) and older adults (60+ and 80+ years). More information on the COVID-19 vaccine roll-out in EU/EEA countries can be found on ECDC's Vaccine Tracker [12] and in the weekly COVID-19 country overviews [13].

Table 1. Summary table of COVID-19 vaccine uptake in EU/EEA countries (as of 21 August 2022)

Population group	Uptake of primary course (range)	Uptake of the first booster dose (range)	Uptake of the second booster dose (range)
Total population	72.8% (29.9–86.5%)	53.6% (9.2–71.9%)	6.1% (<0.1–16.3%)
Adults (18+)	83.5% (35.7–94.6%)	64.7% (11.2–86.2%)	7.5% (<0.1–20.7%)
Individuals aged 60+ years*	90.7% (38.3–100%)	83.8% (13.6–100%)	14.7% (<0.1–61.7%)
Individuals aged 80+ years*	94.1 (26.3–100%)	84.1 (8.0–100%)	21.4 (0.1–81.2%)

Note: cumulative uptake of the primary vaccination course based on the dosing schedule authorised in the EU/EEA. Numbers of countries reporting: 30 for uptake of primary course and first booster in total population and those aged 18+ years, 25 for second booster; 30 for uptake of primary course and first booster in those aged 60+ years, 25 for second booster; 29 for uptake of primary course and first booster in those aged 80+ years (missing Germany), 24 for second booster.

*Median uptake among reporting countries.

Vaccination strategies and policies during roll-out

Countries continue to adapt vaccination strategies and policies based primarily on the changing epidemiological situation at country and sub-national level, new information regarding the efficacy of the various COVID-19 vaccines, safety, effectiveness (including the duration of protection from the vaccines against different outcomes), and new evidence on the virus and its impact on human health.

The vaccination policies captured in this section include vaccination of adolescents and children aged 5–17 years; plans to expand primary vaccination to children <5 years; recommendations for an additional primary vaccine dose or booster doses and vaccination strategies for autumn/winter 2022.

Primary vaccination of adolescents and children aged 5–17 years

All 30 EU/EEA countries are recommending primary vaccination for all 12–17-year-olds. Following authorisation of a lower dose of Comirnaty for children aged five to 11 years [15] and Spikevax for 6–11 year-olds [16], 29 of the 30 countries are currently recommending primary vaccination for all children aged 5–11 years. One country is recommending primary vaccination for those children aged 5–11 years with risk factors.

Table 2. Countries recommending primary vaccination of children aged 5–11 years (n=30)

Vaccination of children aged 5-11 years	Countries
Yes, for all children.	Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland*, France, Germany**, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, the Netherlands, Norway***, Poland, Portugal, Romania, Slovakia, Slovenia, Spain.
Yes, but only for children with risk factors.	Sweden.

* Recommended for children aged 5–11 years with severe underlying disease or children with close family members having severe underlying disease, and offered to all other children aged 5–11 years of age.

** It is recommended that children aged 5–11 years with severe underlying disease should be given a two-dose primary series, children with no underlying disease should be given one dose.

*** It is recommended that children aged 5–11 years with severe underlying disease should be given a two-dose primary series, children with no underlying disease can be vaccinated with both one and two doses if they and their parents agree.

The majority of the responding countries are following the indication authorised by the European Medicines Agency (EMA) for this age group. In Croatia, Greece and Spain, children aged five to 11 years are recommended two doses of the Comirnaty paediatric formulation, with an interval of eight weeks and upwards between doses (to achieve a better immune response and safety profile). Norway report that two doses of vaccine with an 8–12-week interval are being recommended for children with severe underlying conditions, and the vaccine is being made available for healthy children in the same age group, if parents would like to vaccinate their children. In Portugal, children aged 5–11 years are recommended two doses of the Comirnaty paediatric formulation, with an interval of six-to-eight weeks in between. In France, children aged 5–11 years are recommended two doses of the Comirnaty paediatric formulation, with an interval of three weeks between two doses (flexibility 18–24 days). For children with a previous infection, only one dose is required.

Plan to expand primary vaccination to children aged <5 years

The majority of countries are currently discussing an expansion of primary vaccination to children aged <5 years if vaccines are authorised by EMA for this age group. Two countries are planning to expand vaccination to those aged <5 years, five countries are not planning to expand, and six countries have not yet discussed this issue.

Table 3. Plan to expand vaccination to children aged under five years (n=26)

Plan to expand vaccination to children aged <5 years	Countries
Yes, for all children.	Lithuania, Malta
No	Belgium, Bulgaria, Ireland, Denmark, Sweden
Under discussion	Austria, Czechia, Finland, France, Germany, Latvia, Luxembourg, Romania, Hungary, the Netherlands, Slovakia, Spain, Iceland, Portugal
Have not discussed yet	Croatia, Cyprus, Greece, Liechtenstein, Norway, Slovenia

Additional primary dose and booster dose recommendations

Booster doses are for people who responded adequately to the primary vaccination series, whereas additional primary doses are for those with weakened immune systems who did not respond adequately to primary vaccination. Booster doses are given to vaccinated people (i.e. those who have completed a primary series of COVID-19 vaccination) to restore protection after it would have waned. On the other hand, additional primary doses may be given to people with severely weakened immune systems as part of a primary vaccination series, since they may not achieve an adequate level of protection from the standard primary vaccination.

For individuals with weakened immune systems, all 30 countries recommend an additional primary dose as an extension of the primary vaccination course for those who are immunocompromised. Twenty-six countries are also recommending a booster dose for immunocompromised individuals following the extended primary three-dose vaccination series (four doses).

All 30 EU/EEA countries are recommending first booster doses for immunocompetent individuals:

- Sixteen countries are recommending a first booster dose for those aged 18 years and above (Belgium, Croatia, Denmark, Estonia, Finland, Greece, Latvia, Lithuania, Malta, the Netherlands, Norway, Portugal, Slovenia, Slovakia, Spain, Sweden).
- Twelve countries are recommending a first booster dose in those aged 12 years and above (Bulgaria, Cyprus, Czechia, France, Germany, Hungary, Ireland, Italy, Liechtenstein, Luxembourg, Poland, Romania).
- One country is recommending a first booster dose in those aged 16 years and above (Iceland).
- One country is recommending a first booster in those aged five years and above (Austria).

In Croatia, Greece, and Portugal, first booster dose is recommended for those aged 12 years and above with underlying risk factors and at increased risk of severe disease.

All 30 EU/EEA countries are recommending a second booster dose for immunocompetent individuals:

- Six countries recommend a second booster for those aged 65 years and above (Belgium, Bulgaria, Hungary, Latvia, Norway, Sweden).
- Nineteen countries recommend a second booster for those aged 60 years and above (Austria, Croatia, Cyprus, Czechia, Estonia, Finland, France, Germany, Greece, Iceland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Poland, Romania, Slovenia, Spain).
- Two countries recommend a second booster dose for those aged 80 years and above (Liechtenstein, Lithuania).
- Three countries recommend a second booster for those aged 50 years and above (Denmark, Ireland and Slovakia).

Further details on second booster doses were provided as follows: Belgium will offer the possibility of a second booster dose for those aged 50 to 64 years as a part of the autumn/winter strategy. Some countries recommend a second booster dose for those aged 18 years and above with underlying risk conditions (Belgium, Croatia, Czechia, Finland, France) and some for those aged 12 years and above with underlying risk conditions (Estonia, Portugal). Should they wish, people aged 18 years and above can also be vaccinated with the second booster dose in Bulgaria, Croatia, Greece (starting from 30 years of age), Hungary, Latvia (after consultation with family doctor), Romania, and Slovenia. The majority of countries recommend a second booster dose for residents of long-term care facilities (LTCFs) and healthcare workers or personnel working in LTCFs. In some countries other population groups are also included (those being cared for at home; those with chronic diseases or underlying conditions; those with Down syndrome and those vaccinated with Jcovden – previously COVID-19 vaccine Janssen). The time interval after the first booster dose differs among countries from three months (earliest) to six months (for healthcare workers).

Table 4. Details of recommendations for an additional dose and/or a booster dose (n=30)

Country	Recommendation and timing of additional doses and booster doses of COVID-19 vaccination for individuals with weakened immune systems (i.e. immunocompromised and immunosuppressed)	Recommendation for booster doses of COVID-19 vaccination and timing for the general population
Austria [17]	<p>Recommendation: Additional dose plus one booster dose (four doses) for individuals (extended primary three-dose vaccination series plus a booster dose 3+1 schedule).</p> <p>Timing: Additional dose is given at least 28 days after second dose. At least four weeks later, testing of neutralising antibodies is recommended to determine whether there is an immune response. If no neutralising antibodies can be detected after the additional third dose, an additional fourth dose is recommended at least four weeks after the third dose (off-label).</p>	<p>Recommendation: An additional third dose for individuals ≥ 5 years (2+1 vaccination schedule).</p> <p>Additional fourth doses for individuals aged ≥ 60 years; for those with underlying health conditions or those who are at risk of severe disease (from 12 years).</p> <p>Timing: Individuals aged five years and above: additional third dose given six months after the second dose; After one dose with COVID-19 vaccine Jcovden a second dose is recommended 28 days after the first dose (preferably with mRNA-vaccine), COVID-19 vaccine Jcovden can also be used again for the second dose, in this case an interval of at least two months between the first two doses is recommended and a third dose at the above-indicated intervals (six months) is also recommended for people vaccinated with COVID-19 vaccine Jcovden.</p> <p>For people aged ≥ 60 years and those irrespective of age (12 years or above) who have pre-existing conditions or whose circumstances may place them at increased risk of severe disease of COVID-19, and whose immunity may wane more quickly, an additional fourth dose is recommended after four months at the earliest, but in any case six months after completion of the primary series (three doses). On personal request, an additional fourth dose (off-label) can still be given at the earliest four months, or better six months after completion of the primary series (three doses) to immunocompetent individuals aged 12 to 59 years.</p>
Belgium [18]	<p>Recommendation: Additional dose for individuals aged 5-11 years (extended primary three-dose vaccination series). One booster dose (fourth dose) for individuals > 12 years (extended primary three-dose vaccination series plus a booster dose). Two booster doses (fifth dose) for individuals > 18 years (extended primary three-dose vaccination series plus two booster doses).</p> <p>Timing: Additional dose given at least 28 days after second dose followed by a booster dose (fourth dose) at least three months after the third dose.</p>	<p>Recommendation: One booster dose for individuals aged ≥ 18 years (primary two-dose vaccination series plus a booster dose). Second booster for individuals aged ≥ 65 years. From September, all staff in the entire healthcare sector, including primary care, residential care centres, hospitals, etc. can receive an autumn booster. After that, the age group from 50 to 64 years is actively invited, in decreasing age. People between 18 and 50 years old can request a second booster.</p> <p>Timing: Booster given at least four months after primary vaccination with mRNA-based vaccines; four months after primary vaccination with Vaxzevria; two months after single dose of COVID-19 vaccine Jcovden. An interval of at least three months, and ideally six months must be maintained between the two boosters.</p>
Bulgaria [19]	<p>Recommendation: Additional dose plus one booster dose for individuals (extended primary three-dose vaccination series, plus a booster).</p> <p>Timing: Additional dose given at least 28 days after second dose.</p>	<p>Recommendation: One booster dose for individuals age ≥ 12 years (primary two-dose vaccination series plus a booster dose). Second booster for individuals age ≥ 65 years, patients with chronic diseases, healthcare workers, LTCF residents, anyone else who wishes to be immunised upon personal request.</p> <p>Timing: Booster dose given at least three months after primary vaccination for those aged ≥ 18 years. For those aged 12-17 years at least six months after primary vaccination. Second booster dose can be administered at least four months after the first booster.</p>
Croatia [20]	<p>Recommendation: Additional dose plus two booster doses for individuals aged ≥ 5 years (extended primary three-dose vaccination series, plus two booster doses).</p> <p>Timing: Additional dose is given at least four weeks, preferably eight weeks after second dose, followed by a booster dose at least three months after the additional dose. Second booster dose is given at least four months after the first booster.</p>	<p>Recommendation: One booster dose for individuals aged ≥ 18 years (primary two-dose vaccination series plus a booster dose). Also recommended for children aged 12 years and above with underlying risk factors and at increased risk of severe disease. Second booster doses for individuals ≥ 60 years and adults < 60 at increased risk of severe disease due to underlying medical condition. Other people aged ≥ 18 years can also receive second booster if they wish.</p>

Country	Recommendation and timing of additional doses and booster doses of COVID-19 vaccination for individuals with weakened immune systems (i.e. immunocompromised and immunosuppressed)	Recommendation for booster doses of COVID-19 vaccination and timing for the general population
		<p>Timing: First booster dose given at least three months after primary vaccination; two months after single dose of COVID-19 vaccine Jcovden. Second booster dose given at least four months after the first booster dose.</p>
Cyprus [21]	<p>Recommendation: Additional dose plus one booster dose (four doses) for individuals irrespective of age (extended primary three-dose vaccination series plus a booster).</p> <p>Timing: Additional dose given at least four weeks after second dose, followed by a booster dose at least five months after the third dose.</p>	<p>Recommendation: One booster dose for individuals aged ≥12 years (two dose primary vaccination series with mRNA-based vaccines plus booster dose with Comirnaty). Two booster doses given to those aged >60 years, residents and staff at LTCFs, vulnerable groups (i.e. individuals with diabetes mellitus, severe obesity, immunodeficiency and immunosuppressed and those at increased risk of developing severe disease), healthcare professionals (two dose primary vaccination series plus two booster doses (second booster dose with mRNA-based vaccines).</p> <p>Timing: First booster dose given at least six months after primary vaccination, second booster dose at least five months after the first booster dose.</p>
Czechia [22]	<p>Recommendation: Additional dose for individuals (extended primary three-dose vaccination series).</p> <p>Timing: Additional dose given at least one month after second dose.</p>	<p>Recommendation: One booster dose for individuals aged ≥12 years (two dose primary vaccination series plus booster dose). Second booster dose is recommended for individuals aged ≥60 years, those aged 18 to 59 years who are vulnerable due to their health status and patients with chronic diseases.</p> <p>Timing: Booster dose given at least three months after primary vaccination for those aged >60 years, LTCF residents and staff, healthcare workers and people with chronic conditions. For the rest of the population five months after primary vaccination. Two months after single dose of COVID-19 vaccine Jcovden.</p>
Denmark [23]	<p>Recommendation: Additional dose plus two booster doses for individuals irrespective of age (extended primary three-dose vaccination series, plus two booster doses).</p> <p>Timing: Additional dose given at least one month after second dose and a maximum of eight months afterwards or at earliest convenience (different timings depending on the risk group) followed by a booster dose at least three months after the third dose.</p>	<p>Recommendation One booster dose for individuals aged ≥18 years (2 dose primary vaccination series plus booster dose). Second booster dose is recommended to individuals aged ≥50 years.</p> <p>Timing: Booster given at least 140 days after primary vaccination. Second booster dose will be given at least three months after the first booster.</p>
Estonia [24]	<p>Recommendation: Additional dose for individuals (extended primary three-dose vaccination series).</p> <p>Timing: Additional dose given at least one month after second dose.</p>	<p>Recommendation: One booster dose for individuals aged ≥18 years (two dose primary vaccination series plus booster dose).</p> <p>Two booster doses for individuals ≥60 years individuals and individuals 12+ with certain diagnosis; elderly care/nursing houses (residents and care providers who are in direct contact with patients); healthcare providers who are in direct contact with patients.</p> <p>Timing: First booster given at least three months after primary vaccination with mRNA-based vaccines; and Vaxzevria; two months after single dose vaccination with COVID-19 vaccine Jcovden. Recovered individuals – five months after recovery. Second booster dose will be given at least six months after the first booster vaccination or after having COVID-19.</p>
Finland [25]	<p>Recommendation Additional dose plus two booster doses for individuals aged >12 years (extended primary three-dose vaccination series plus two booster doses).</p> <p>Timing: Additional dose given at least two months after second dose followed by a booster dose at least 3-4 months after the third dose. Second booster given four to six months since the fourth dose.</p>	<p>Recommendation: One booster dose for individuals aged ≥18 years and those aged 12-17 years in risk groups (two dose primary vaccination series plus booster dose). Two booster doses for individuals aged ≥60 years, residents of LTCFs, and for those aged 18 to 59 years who belong to the risk groups.</p>

Country	Recommendation and timing of additional doses and booster doses of COVID-19 vaccination for individuals with weakened immune systems (i.e. immunocompromised and immunosuppressed)	Recommendation for booster doses of COVID-19 vaccination and timing for the general population
		<p>Timing:</p> <p>One booster dose for those over 60 years of age and at-risk groups aged over 18 years is recommended 3-4 months after primary course. For those aged between 18 and 60 years, a booster dose is recommended 4-6 months after primary course. In 12–17-year-olds the booster dose is recommended six months after primary course. For those vaccinated with vaccine Jcovden, a booster dose is recommended two months after the primary course.</p> <p>Second booster dose given at least three months after the first booster dose.</p>
France [26,27]	<p>Recommendation</p> <p>Additional dose plus two booster doses for individuals (extended primary three-dose vaccination series, plus two booster dose).</p> <p>Timing:</p> <p>Additional dose given at least one month after second dose, followed by a booster dose as least three months after the third dose. Second booster given three months after the fourth dose.</p>	<p>Recommendation:</p> <p>One booster dose for individuals aged ≥ 12 years (two dose primary vaccination series, plus booster dose).</p> <p>Two booster doses for individuals aged ≥ 60 years six months after the first booster or three months after infection, in the event of infection that occurred after the first booster.</p> <p>Two booster doses for individuals aged ≥ 80 years, residents of LTCFs three months after the first booster or infection.</p> <p>Two booster doses for individuals aged 18 to 60 years with underlying risk conditions, pregnant women, people having contact with vulnerable people, professionals working in the health and medico-social sectors.</p> <p>Timing:</p> <p>Booster dose given at least three months after primary vaccination and a second booster dose given three to six months after the first booster dose.</p>
Germany [28,29]	<p>Recommendation</p> <p>Additional dose plus two booster doses for individuals aged ≥ 5 years (extended primary three-dose vaccination series plus two booster doses).</p> <p>Immunocompromised individuals:</p> <p>Additional dose is given at least one month after the second dose followed by a booster dose given at least three months after the third dose. Second booster is given at least three months after the first booster.</p>	<p>Recommendation:</p> <p>One booster dose for individuals aged ≥ 12 years and 5- to 11-year-olds at increased risk of severe illness (two dose primary vaccination series, plus booster dose).</p> <p>Two booster doses for individuals aged ≥ 60 years, residents of LTCFs and people at risk of developing severe illness in support facilities, workers in medical and nursing facilities (especially those in direct contact with patients and residents) and people aged 5+ with underlying health conditions (two dose primary vaccination series, plus two booster doses).</p> <p>Timing:</p> <p>Booster dose given at least six months after primary vaccination. Second booster dose given at least six months after primary booster for immunocompetent individuals (including elderly) with indicator for a second booster. Second booster, given at the earliest four months after first booster dose, is possible.</p> <p>For those vaccinated with COVID-19 vaccine Jcovden, a second dose with an mRNA vaccine is recommended one month after primary course to optimise immunisation. A booster of mRNA should follow after at least six months.</p>
Greece [30]	<p>Recommendation</p> <p>Additional dose plus one booster dose for individuals aged ≥ 12 years (extended primary three-dose vaccination series, plus a booster dose).</p> <p>Timing:</p> <p>Additional dose given at least four weeks after second dose, followed by a booster dose at least three months after the third dose.</p>	<p>Recommendation:</p> <p>One booster dose for individuals aged ≥ 18 years (two dose primary vaccination series plus booster dose). One booster dose is recommended in persons aged 12-17 years who belong to high risk groups.</p> <p>Two booster doses for those aged ≥ 60 years. Individuals ≥ 30 years who wish to receive a second booster dose can do so.</p> <p>Timing:</p> <p>One booster dose given at least three months after primary vaccination. Two months after primary vaccination with COVID-19 vaccine Jcovden. Second booster dose at least four months after first booster dose.</p>
Hungary [31]	<p>Recommendation:</p> <p>Additional dose plus one booster dose for individuals (extended primary three-dose vaccination series, plus a booster dose).</p> <p>Timing:</p> <p>Additional dose given at least 28–56 days after second dose, followed by a booster dose at least four months after third dose.</p>	<p>Recommendation:</p> <p>One booster dose for individuals aged ≥ 12 years (two dose primary vaccination series plus booster dose).</p> <p>Two booster doses for individuals aged ≥ 65 years, and those with chronic disease - also available to anyone (aged over 18 years) who asks for it (two dose primary vaccination series plus two booster doses).</p>

Country	Recommendation and timing of additional doses and booster doses of COVID-19 vaccination for individuals with weakened immune systems (i.e. immunocompromised and immunosuppressed)	Recommendation for booster doses of COVID-19 vaccination and timing for the general population
		Timing: One booster dose given at least four months after primary vaccination followed by a second booster dose at least four months after first booster dose.
Iceland [32]	Recommendation: Additional doses for individuals aged 5-11 years (extended primary three-dose vaccination series). Timing: Additional dose given at least three months after second dose.	Recommendation: One booster dose for individuals ≥ 16 years (two dose primary vaccination series plus booster dose). Two booster doses for individuals aged ≥ 60 years, and those with risk factors, chronic diseases, LTCF residents. Timing: Booster dose given at least five months after second dose.
Ireland [33]	Recommendation: Additional doses for individuals aged 5-11 years (extended primary three-dose vaccination series). Additional dose, plus one booster dose for individuals aged ≥ 12 years (extended primary three-dose vaccination series, plus one booster dose). Timing: Additional dose given at least two months after second dose for those aged ≥ 12 years and 28 days after second dose for those aged 5-11 years. Booster dose given to those aged ≥ 12 years at least three months after the third dose.	Recommendation: One Booster dose doses for individuals aged ≥ 12 years (two dose primary vaccination series plus booster dose). Two booster doses for those aged ≥ 50 years, aged 12-49 years with underlying conditions and healthcare workers (two dose primary vaccination series plus two booster doses). Timing: One booster dose is given to those aged >16 years at least three months after the primary vaccination and for 12–15-year-olds the booster dose is given at least six months after the primary vaccination dose. Second booster dose given at least four months after first booster dose.
Italy [34,35]	Recommendation: Additional dose plus two booster doses for individuals (extended primary three-dose vaccination series plus a booster dose). Timing: Additional dose given at least 28 days after second dose, followed by a booster dose fourth months after third dose. A second booster: 120 days from the first booster dose.	Recommendation: One booster dose for individuals aged ≥ 12 years (two dose primary vaccination series plus booster dose). Two booster doses for individuals aged >60 years, LTCF residents, highly vulnerable people, depending on concomitant/pre-existing pathologies, aged 60 years and over. Timing: One booster dose given at least four months after primary vaccination. A second booster: 120 days from the first booster dose.
Latvia [36,37]	Recommendation: Additional dose, plus one booster dose for individuals (extended primary three-dose vaccination series plus one booster dose). Timing: Additional dose given at least one month after second dose.	Recommendation: One booster dose for individuals aged ≥ 18 years (two dose primary vaccination series, plus booster dose). A second booster dose for those aged ≥ 65 years, people with chronic diseases. Anyone can receive second booster after consultation with family doctor. Timing: Booster dose given at least three months after primary vaccination with mRNA vaccines. Two months after single dose of COVID-19 vaccine Jcovden. Three months after primary vaccination with Vaxzevria.
Liechtenstein [38]	Recommendation: Additional dose for individuals ≥ 12 years (extended primary three-dose vaccination series). Additional dose for children 5-11 years with negative SARS-CoV-2 post-vaccination antibody titer in the serology four weeks after second dose (extended primary three-dose vaccination series). First and second booster dose (dose 4 and 5) for individuals ≥ 12 years. Timing: Additional dose given at least 28 days after second dose. Booster doses are given at the earliest four months after last administered dose.	Recommendation: One booster dose for individuals ≥ 12 years (two dose primary vaccination series plus booster dose). Second booster for individuals aged ≥ 80 years. Timing: First booster dose given the earliest four months after primary vaccination. Second booster for individuals aged ≥ 80 years given at the earliest four months after first booster dose.
Lithuania [39]	Recommendation: Additional dose plus one booster dose for individuals (extended primary three-dose vaccination series plus one booster dose). Second booster for individuals with chronic immunodeficiency or severe immune dysfunction. Timing: Additional dose given at least 28 days after second dose. Second booster is given six months after the first booster.	Recommendation: One booster dose for individuals aged ≥ 18 years (two dose primary vaccination series plus booster dose). A second booster dose for individuals aged ≥ 80 years and those at higher risk. Second booster for individuals aged ≥ 60 years if their health condition increases the likelihood of serious illness. Timing: Booster dose given at least 90 days after primary vaccination; 60 days after single dose of COVID-19 vaccine Jcovden. Second booster is given six months after the first booster.

Country	Recommendation and timing of additional doses and booster doses of COVID-19 vaccination for individuals with weakened immune systems (i.e. immunocompromised and immunosuppressed)	Recommendation for booster doses of COVID-19 vaccination and timing for the general population
Luxembourg [40]	<p>Recommendation: Additional dose plus one booster dose for individuals aged ≥18 years (extended primary three-dose vaccination series plus a booster dose).</p> <p>Additional dose (extended primary three-dose vaccination series) on a case-by-case basis for those who are severely immunocompromised aged 5-11 years. Additional dose given eight weeks after the second dose.</p> <p>Timing: Additional dose given at least 12 weeks after second dose, followed by a booster dose at least three months after the third dose.</p>	<p>Recommendation: One booster dose for individuals aged ≥12 years (two dose primary vaccination series plus booster dose). Two booster doses for individuals aged ≥60 years, patients with chronic diseases, LTCF residents.</p> <p>Timing: Booster dose given at least three months after primary vaccination with mRNA-based vaccines; four months after primary vaccination with Vaxzevria; one month after single dose of COVID-19 vaccine Jcovden followed by an optional third dose at least three months after the second dose. Second booster dose at least four months after the first booster dose.</p>
Malta [41]	<p>Recommendation: Additional dose plus one booster dose for individuals (extended primary three-dose vaccination series, plus a booster dose).</p> <p>Timing: Additional dose given at least 28 days after second dose.</p>	<p>Recommendation: One booster dose for individuals ≥18 years (two dose primary vaccination series, plus booster dose). Second booster dose for individuals ≥60 years, LTCF residents.</p> <p>Timing: Booster dose given at least three months after primary vaccination.</p>
The Netherlands [42,43]	<p>Recommendation: Additional dose plus a booster dose for individuals ≥ 12 years (extended primary three-dose vaccination series plus a booster dose). Additional dose plus two booster doses for individuals ≥ 18 years (extended primary three-dose vaccination series plus two booster doses).</p> <p>Timing: An additional/third dose at least four weeks after second dose followed by a booster dose at least three months after third dose followed by a second booster dose at least three months after the fourth dose.</p>	<p>Recommendation: One booster dose for individuals 18-59 years (two dose primary vaccination series plus booster dose). Two booster doses for individuals aged ≥60 years, residents in LTCFs, adults with Down syndrome (two dose primary vaccination series plus two booster doses).</p> <p>Timing: One booster dose at least three months after primary vaccination, followed by a second booster dose at least three months after the first booster dose.</p>
Norway [44]	<p>Recommendation: Additional dose plus a booster dose for individuals (extended primary three-dose vaccination series, plus a booster dose). Second booster dose (dose 5): offered to some people with severely weakened immune systems after individual assessment by treating physician.</p> <p>Timing: Additional dose given at least four weeks after second dose, followed by a booster dose at least three months after the third dose.</p>	<p>Recommendation: One booster dose for individuals aged ≥18 years (two dose primary vaccination series plus booster dose). People aged 65 years and above and nursing home residents can receive a new second booster dose, if the interval since last dose is longer than four months.</p> <p>Timing: Booster dose given at least 20 weeks after primary vaccination with mRNA-based vaccines; COVID-19 vaccine Jcovden dose is followed by mRNA vaccine after at least 8-12 weeks, followed by a booster with mRNA vaccine at least 20 weeks after second dose. Second booster dose (dose 4): four months after the last booster dose (dose 3).</p>
Poland [45]	<p>Recommendation: Additional dose plus a booster dose for individuals (extended primary three-dose vaccination series plus a booster dose). From 1 June 2022, those vaccinated prior to hematopoietic cell transplantation (HCT) or CAR-T therapy are subject to a repeat schedule of vaccination against COVID-19 after ≥3 months (12 weeks) from the indicated procedures or treatments. The re-vaccination schedule against COVID-19 may be applied for those from 5 years of age. Persons ≥12 years of age who receive a booster dose after 28 days may receive a booster dose (fourth) with an interval of at least five months after the booster dose.</p> <p>Timing: Additional dose given at least four weeks after second dose, followed by a booster dose at least three months after third dose.</p>	<p>Recommendation: One booster dose for individuals aged ≥12 years (two dose primary vaccination series, plus booster dose). Two booster doses for people aged 60 years and above (the full primary vaccination schedule and the first booster dose with COVID-19 mRNA).</p> <p>Timing: Booster dose given at least five months after primary vaccination; two months after single dose of COVID-19 vaccine Jcovden. Second booster: 150 days after first mRNA booster</p>
Portugal [46,47]	<p>Recommendation: Additional dose for individuals ≥ 5 years (extended primary three-dose vaccination series). For 18 years and above, additional dose plus booster (extended primary three-dose vaccination series plus booster).</p> <p>Timing: Additional dose of mRNA vaccine given at least three months after second dose (minimum 28 days).</p>	<p>Recommendation: One booster dose for individuals aged ≥18 years and for individuals aged ≥12 years with specific comorbidities (two dose primary vaccination series, plus booster dose). Two booster doses for people aged 60 years and above, residents of nursing homes, people aged 18 years and above with comorbidities that are at risk from COVID-19, healthcare and nursing home professionals.</p>

Country	Recommendation and timing of additional doses and booster doses of COVID-19 vaccination for individuals with weakened immune systems (i.e. immunocompromised and immunosuppressed)	Recommendation for booster doses of COVID-19 vaccination and timing for the general population
		<p>People aged 80 years and above and residents of nursing homes who already received a second booster (spring booster), will receive another booster for the autumn-winter 2022-2023.</p> <p>Timing: Booster dose of mRNA vaccine given four-to-six months (minimum three months) after the last dose or infection. Three months after primary vaccination with COVID-19 vaccine Jcovden.</p>
Romania [48,49]	<p>Recommendation: Additional dose for individuals (extended primary three-dose vaccination series).</p> <p>Timing: Additional dose given 28-120 days after second dose.</p>	<p>Recommendation: One booster dose for individuals aged ≥ 12 years (two dose primary vaccination series plus booster dose) especially for people at high risk of exposure, vulnerable people and on request for those who have completed the full vaccination course more than four months previously.</p> <p>Two booster doses for people over 18 years of age upon request, according to the National Committee on Vaccination against COVID-19. People aged over 18 years who have been vaccinated with three doses of mRNA vaccine or heterologous regimen that includes Vaxzevria and mRNA vaccines, may on request receive a fourth dose of Comimaty at least four months after the third dose. For those vaccinated with Jcovden and an additional dose of mRNA vaccine, the second booster is currently not recommended.</p> <p>Two booster doses for people over age of 18 who have been vaccinated against COVID-19 with three doses of mRNA vaccine. Recommended for people over 60 years of age.</p> <p>Timing: Booster dose given at least four months after primary vaccination. Fourth dose: at least four months after the third dose.</p>
Slovakia [50]	<p>Recommendation: Additional dose plus two booster doses for individuals ≥ 12 years (extended primary three-dose vaccination series plus a booster dose) .</p> <p>Timing: Additional dose given at least four weeks after second dose. Fifth dose is given at least four months after the fourth dose.</p>	<p>Recommendation: One booster dose for individuals aged ≥ 18 years (two dose primary vaccination series plus booster dose). Second booster dose to individuals aged ≥ 50 years given with an interval of at least four months after the first booster.</p> <p>Timing: Booster dose given at least three months, ideally four-to-six months after primary vaccination.</p>
Slovenia [51]	<p>Recommendation: Additional dose, plus one booster dose for individuals (extended primary three-dose vaccination series, plus a booster dose)</p> <p>Timing: Additional dose given at least four weeks after second dose, followed by a fourth dose, at least three months after the third dose.</p>	<p>Recommendation: One booster dose for individuals aged ≥ 18 years and 12-17 years with chronic diseases. Healthy individuals 12-17 years can choose to receive a booster (two-dose primary vaccination series, plus booster dose). Second booster for individuals aged ≥ 60 years, for LTCF residents, Individuals ≥ 18 years can have a second booster dose if they wish. Second booster dose (third dose) for individuals aged ≥ 80 years, for individuals aged ≥ 60 years, for people at increased risk of severe COVID-19 (particularly vulnerable chronic patients). Other people aged 18 years and above can also be vaccinated with the second booster dose if they wish.</p> <p>Timing: Booster dose given at least three months after primary vaccination with mRNA vaccines or mixed schedule; at least two months after primary vaccination with Vaxzevria or COVID-19 vaccine Jcovden. Second booster is given at least three months after the first booster.</p>
Spain [52,53]	<p>Recommendation: Additional dose plus one booster dose for individuals (extended primary three-dose vaccination series, plus a booster dose).</p> <p>Timing: Additional dose given at least 28 days after second dose, followed by a booster dose at least five months after the third dose.</p>	<p>Recommendation: One booster dose for individuals ≥ 18 years prioritised from oldest to youngest age groups (two dose primary vaccination series, plus booster dose). A second booster dose is recommended for autumn-winter to individuals aged ≥ 60 years, people in nursing homes and those with risk conditions, health and socio-health personnel who work</p>

Country	Recommendation and timing of additional doses and booster doses of COVID-19 vaccination for individuals with weakened immune systems (i.e. immunocompromised and immunosuppressed)	Recommendation for booster doses of COVID-19 vaccination and timing for the general population
		<p>in primary care, hospitals centres, residences for the elderly or caring for the disabled.</p> <p>Timing: Booster dose given at least five months after primary vaccination with mRNA vaccines.</p>
Sweden [54]	<p>Recommendation: Additional dose plus two booster doses for individuals ≥18 years (extended primary three-dose vaccination series, plus two booster doses).</p> <p>Timing: Additional dose given at least two months after second dose, followed by a first booster dose at least three months after third dose, and a second booster dose at least three months after the first booster dose.</p>	<p>Recommendation One booster dose for individuals aged ≥18 years (two dose primary vaccination series plus booster dose). Two booster doses for individuals aged ≥65 years, LTCF residents, people who have home care (hemtjänst) or home healthcare (hemsjukvård), people aged ≥18 years with Down syndrome (two dose primary vaccination series plus two booster doses).</p> <p>Timing: First booster dose given at least three months after primary vaccination and the second booster dose given four months after the first booster dose.</p>

Sources: ISAA survey responses and validation from countries. Rapid desk review of official sources.

Vaccination strategies for autumn/winter 2022

Several EU/EEA countries are currently discussing their future COVID-19 vaccination strategies and the need for additional booster doses before the autumn/winter period when another wave may arrive. The planning of future vaccination strategies and campaigns for the autumn is based on each country's epidemiological situation, the effectiveness of previously administered vaccinations, the potential availability of new, updated and more effective vaccines, and the identification of risk groups. Ten EU/EEA countries have published recommendations for their autumn/winter vaccination campaigns (Table 5). Sixteen countries are still currently discussing their vaccination strategies for autumn/winter (Austria, Croatia, Cyprus, Finland, Germany, Hungary, Iceland, Ireland, Latvia, Lithuania, Luxemburg, Poland, Malta, the Netherlands, Romania, Slovakia).

Some countries provided further details about the inclusion of children in future vaccination strategies for autumn/winter. Eight countries plan to only include children with specific comorbidities in autumn/winter vaccination campaigns (Estonia, Hungary, Ireland, Italy, Lichtenstein, Lithuania, the Netherlands, Norway). Portugal is recommending an autumn-winter 2022–2023 booster in people with specific comorbidities aged 12 years and above. Austria, Poland, Portugal, Romania, Spain, and Sweden are discussing the possibility of including children in the vaccination strategy for the autumn/winter campaign, whereas in Belgium, Czechia, Denmark, Finland, Iceland, Latvia, Luxemburg, Malta and Slovenia children are not being considered for impending vaccination campaigns.

Thirteen countries are also discussing the possibility of incorporating the autumn/winter COVID-19 vaccination in the annual influenza vaccination campaign (Austria, Croatia, Czechia, France, Germany, Hungary, Iceland, Ireland, Lithuania, Malta, the Netherlands, Romania, Spain).

Table 5. Recommendations for an autumn COVID-19 vaccination programme (n=10)

Country	Recommendations for an autumn/winter COVID-19 vaccination programme
Belgium	The Belgian Superior Health Council has published recommendations that all risk groups should be vaccinated with an additional booster by the end of September 2022 at the latest and that the campaign should be 'as compact as possible' to maximise the benefits of vaccinating against COVID-19 (the interval should be at least three months, but preferably six months for the administration of an additional booster dose). For the autumn/winter season 2022-2023, a proactive mass vaccination campaign will target adults aged 65 years and above, any patient with immune suppression due to disease or treatment, any patient with at least one comorbidity, all pregnant women, all 'persons active in the care sector' in and outside care institutions, and people living in the same household as those at high risk of severe disease. After that, the age group from 50 to 64 years will be invited. People aged between 18 and 50 years can volunteer [55].
Czechia	The experts of the working group at the Ministry of Health in Czechia have published recommendations on the organisation of a vaccination booster campaign for autumn 2022 for the population groups most at risk of severe forms of the disease (immunocompromised, people aged 60+ years and/or with comorbidities). The vaccination campaign against COVID-19 will be combined with the influenza vaccination campaign [56].
Denmark	The Danish Health Authority has provided preliminary recommendations for an autumn vaccination campaign starting from 15 September for residents in LTCFs and other vulnerable elderly people. From 1 October, all individuals aged over 50 years and those who are severely immunocompromised (regardless of age) will be offered vaccination which will be given at least three months after the last vaccination [57].
France	The French Haute Autorité de Santé (HAS) has published recommendations to anticipate the organisation of a vaccination booster campaign for autumn 2022 for the population groups most at risk of severe forms of the disease (immunocompromised, people aged 65+ years and/or with comorbidities), including consideration of vaccination for healthcare professionals. The vaccination campaign against COVID-19 will be combined with the one for influenza. In addition, as soon as updated vaccines obtain marketing authorisation, HAS will assess them, specify their inclusion in the vaccine strategy and indicate, where applicable, the preferred type of vaccine to be used for each population according to their characteristics. The start of the campaign and the eligible public will be specified in the coming weeks by the scientific authorities, based on epidemiological indicators [58].
Ireland	Ireland's National Immunisation Advisory Committee (NIAC) has also made a number of recommendations regarding the autumn/winter period. It has advised that healthcare workers are offered a second mRNA booster and a third mRNA booster is recommended for persons aged 65 years and above, and those aged 12-64 years who are immunocompromised. The NIAC will continue to examine emerging evidence regarding booster vaccines for others in the population where there is evidence of waning immunity and reduced effectiveness and will make further recommendations if required (country correspondence).

Country	Recommendations for an autumn/winter COVID-19 vaccination programme
Lithuania	As suggested by the experts of the working group at the Ministry of Health in Lithuania, those aged 60 years and above, and those suffering from chronic disease, irrespective of age, can be vaccinated with the second booster (if their health condition increases the likelihood of serious illness) starting from 1 August 2022. The second booster dose can only be given six months after the last vaccination against COVID-19. For all others aged 60 years and above, a second booster dose of the COVID-19 vaccine is recommended in the autumn, along with the influenza and pneumococcal vaccine. Detailed recommendations on this will be published as the autumn approaches [59].
The Netherlands	The Minister of Health has decided to start a booster campaign mid-September with the bivalent vaccines Moderna and Pfizer for everybody aged 60 years and above, immunocompromised patients, healthcare workers and those with other relevant comorbidities. This is the same group that receives the annual influenza vaccination, including pregnant women. After vaccination of this risk group (in October), the bivalent booster will become available for anybody aged 12 years and above who requests it [60].
Portugal	The Portuguese Directorate-General of Health has published recommendations for the autumn-winter 2022-2023 COVID-19 vaccination strategy. A new dose/booster of COVID-19 vaccine will be given to nursing home residents; people aged 60 years and above; people aged 12 years and above with comorbidities who are at risk of COVID-19; healthcare and nursing home professionals. The inclusion of other priority groups is under discussion. Portugal will use the adapted COVID-19 boosters (Original strain/Omicron) approved by EMA [61].
Spain	The Government of Spain has published a new recommendation for a booster dose for the autumn/winter. A new booster dose is recommended for the adult population aged 60 years and above, people admitted to nursing homes and those with risk conditions. The booster dose should be given at least five months from the last dose with mRNA vaccine. To health and socio-health personnel who work in primary care, hospital centres or residences for the elderly and care for disabled, the booster dose will be administered at least five months after the last dose of mRNA vaccine or the last infection [62].
Sweden	The Swedish Public Health Agency has provided new recommendations for the autumn COVID-19 vaccination campaign starting from 1 September 2022 for adults aged 65 years and above and people in risk groups from the age of 18 years (including pregnant women, people with weakened immune systems, people with heart and lung disease). For adults aged 18-64 years, the recommendation remains for one booster dose, however anyone in this age group can have a second booster upon request [63].

Conclusions

As of 21 August 2022, since the start of the COVID-19 vaccine deployment in December 2020, the uptake of the primary vaccination course against COVID-19 in the total EU/EEA population has reached 72.8% (range: 29.9–86.5%), the uptake of the first booster dose has reached 53.6% (range: 9.2–71.9%) (30 countries reporting), and the uptake of the second booster dose has reached 6.1% (range: <0.1–16.3%) (25 countries reporting).

Among adults (aged 18 years and above) the cumulative vaccine uptake reached 83.5% (range: 35.7–94.6%) for the complete primary course and 64.7% (range: 11.2–86.2%) for the first booster dose (30 countries reporting) and is now increasing very slowly (average 0.1% weekly increase in the last month). Nevertheless, vaccination uptake continues to differ among EU/EEA countries, with two countries still reporting less than 50% of the total population having completed a primary vaccination course. Approximately 20.7 million second booster doses have been administered to adults aged 18+ years and 87% of them have been administered to those aged 60+ years (25 countries reporting). The cumulative uptake of the second booster dose among reporting countries is 7.5% in those aged 18+ years (range: <0.1–20.7%), 14.7% in those aged 60+ years (range: <0.1–61.7%) and 21.4% in those aged 80+ years (range: 0.1–81.2%).

All 30 EU/EEA countries are recommending primary vaccination for those aged 12 years and above and 29 countries have also started vaccinating all children over five years of age, while one country is recommending vaccination for children with risk factors. All EU/EEA countries are recommending additional primary doses for immunocompromised individuals, with some countries recommending a first booster dose (four doses) and some even a second booster dose (fifth dose). All countries have also introduced booster doses for the general population, with around half of the countries recommending booster doses for adults aged over 18 years and the other half currently recommending boosters for younger age groups under 18 years. All 30 EU/EEA countries are recommending a second booster dose for the general population. The majority of countries recommend a second booster for those aged 65 years and above or 60 years and above, while a few countries recommend it for those aged 80 years and above or 50 years and above. Most of the countries recommend a second booster dose for LTCF residents and healthcare workers or personnel working in LTCFs. In some countries, people aged 18 years and above can also be vaccinated with the second booster dose if they wish.

Several EU/EEA countries are currently discussing their future COVID-19 vaccination strategies and the need for additional booster doses before the autumn/winter period when another wave may arrive, with the main priority groups for vaccination including those most at risk of severe disease, such as elderly people and those with underlying risk factors. Some countries are also discussing the possibility of incorporating the autumn/winter COVID-19 vaccination in the annual influenza vaccination campaign. Although full primary vaccination uptake in the total EU/EEA population has substantially increased, there are still differences in vaccination uptake among countries and at sub-national level, where pockets (geographical areas or population groups) of low uptake persist. This also includes countries that have achieved high levels of vaccination coverage overall.

At this stage of the pandemic, the objective of COVID-19 vaccination campaigns is still to reduce COVID-19 hospitalisation, severe disease, and death, and to protect healthcare systems. Vaccination of all eligible individuals who are currently unvaccinated is a priority, as is the protection of all eligible vaccinated individuals at risk of severe COVID-19 or at high risk of exposure to the virus due to their activities or living conditions by means of a booster dose. In addition, all other eligible vaccinated individuals should also consider receiving additional booster doses (at least three months after the completion of the primary vaccination course), in accordance with national recommendations, to reduce their individual risk of infection and disease.

It will be especially important to continuously monitor vaccine uptake and associated social determinants to understand where and in which population groups and communities the immunity gaps persist. A successful COVID-19 vaccination programme can only be built on an understanding of, and a proper response to individuals' and communities' beliefs, concerns and expectations regarding the vaccine and the disease. The '5Cs' model – Confidence, Constraints, Complacency, Calculation, and Collective responsibility – is one framework that can be used for understanding these concerns and designing strategies to facilitate COVID-19 vaccination acceptance and uptake [64]. Countries are putting in place several measures and strategies to increase vaccination in the population, especially among population groups with low uptake.

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Limitations of the information collected in this report

The information presented in this report is not exhaustive. Some countries did not respond to the vaccine questions collected via the ISAA report and there were different response rates to the questions from week to week. Countries will continue to adapt strategies and plans as the vaccination roll-out continues, and this report provides an overview of progress at the current time.

Disclaimer

All data published in this report are correct to the best of our knowledge at the time of publication.

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