SUPPLEMENTARY TABLE. Timeline of booster, second booster, and additional dose COVID-19 vaccine authorizations and recommendations — United States, August 2021–May 2022

Date	COVID-19 vaccine product(s)	Authorization or recommendation	Additional information
August 2021			
August 12, 2021	Moderna, Pfizer-BioNTech	FDA amends the EUA for Moderna and Pfizer-BioNTech COVID-19 vaccines to authorize an additional mRNA vaccine dose for certain immunocompromised persons. The additional dose is to be administered ≥28 days after the second dose in the primary series.	**FDA press release:** https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-authorizes-additional-vaccine-dose-certain-immunocompromised
August 13, 2021	Moderna, Pfizer-BioNTech	ACIP and CDC recommend that persons with moderate or severe immunocompromise receive an additional dose of mRNA vaccine to complete a primary series of Moderna or Pfizer-BioNTech vaccine. The recommendation applies to Moderna primary series recipients aged ≥18 years and Pfizer-BioNTech primary series recipients aged ≥12 years. The additional dose is to be administered ≥28 days after the second dose in the primary series.	**CDC media statement:** https://www.cdc.gov/media/releases/2021/s0813-additional-mRNA-mrna-dose.html
September 2021			
September 22, 2021	Pfizer-BioNTech	FDA amends the Pfizer-BioNTech EUA to authorize a single booster dose of Pfizer-BioNTech vaccine administered ≥6 months following primary series completion. The booster dose is authorized for selected populations: • Persons aged ≥65 years • Persons aged 18–64 years at high risk for severe COVID-19 • Persons aged 18–64 years whose frequent institutional or occupational exposure to SARS-CoV-2 puts them at high risk for serious complications of COVID-19 including severe COVID-19.	**FDA press release:** https://www.fda.gov/news-events/press-announcements/fda-authorizes-booster-dose-pfizer-biontech-covid-19-vaccine-certain-populations
September 23, 2021	Pfizer-BioNTech	ACIP recommends a booster dose of Pfizer-BioNTech for persons in selected populations, ≥6 months following completion of a primary series of Pfizer-BioNTech. ACIP recommends the following populations should receive a booster dose: • Persons aged ≥65 years • Persons aged ≥18 years who reside in long-term care settings • Persons aged 50–64 years with certain underlying medical conditions In addition, the following populations may receive a booster dose, based on assessment of individual benefits and risks: • Persons aged 18–49 years with underlying medical conditions	**ACIP MMWR:** https://www.cdc.gov/mmwr/volumes/70/wr/mm7044e2.htm
September 24, 2021	Pfizer-BioNTech	CDC accepts the September 23, 2021, ACIP recommendations and further recommends that persons aged 18–64 years at increased risk for SARS-CoV-2 exposure and transmission because of occupational or institutional setting may receive a Pfizer-BioNTech booster dose based on an assessment of individual benefits and risks. The booster dose is to be administered ≥6 months after completion of a Pfizer-BioNTech primary series.	**CDC media statement:** https://www.cdc.gov/media/releases/2021/p0924-booster-recommendations-.html
October 2021			
October 20, 2021	Janssen, Moderna, Pfizer-BioNTech	FDA amends the EUAs for Janssen, Moderna, and Pfizer-BioNTech. The Janssen EUA is amended to authorize a single booster dose to be administered ≥2 months after receipt of the Janssen primary series dose.	**FDA press release:** https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-takes-additional-actions-use-booster-dose-covid-19-vaccines

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		The Moderna EUA is amended to authorize a single booster dose of Moderna vaccine, to be administered ≥6 months after completion the primary series, for the following populations: • Persons aged ≥65 years • Persons aged 18–64 years at high risk for severe COVID-19 • Persons aged 18–64 years with frequent institutional or occupational exposure to SARS-CoV-2 The Pfizer-BioNTech EUA is amended to clarify that a single booster dose of Pfizer-BioNTech is authorized for persons aged 18–64 years with frequent institutional or occupational exposure to SARS-CoV-2. In addition, all three vaccines are authorized to be administered as a heterologous booster dose (i.e., administered to a person who received a primary series of different FDA-authorized or approved COVID-19 vaccine product).	
October 21, 2021	Janssen, Moderna, Pfizer-BioNTech	ACIP and CDC recommend a booster dose (can be heterologous) for persons in select populations who completed a primary series of Moderna or Janssen. For Moderna primary series recipients, ACIP recommends the following populations should receive a booster dose administered ≥6 months following the primary series completion dose: • Persons aged ≥65 years • Persons aged ≥18 years who reside in long-term care settings • Persons aged 50–64 years with certain underlying medical conditions In addition, the following populations may receive a booster dose: • Persons aged 18–49 years with underlying medical conditions • Persons aged 18–64 years at increased risk for SARS-CoV-2 exposure and transmission because of occupational or institutional setting For Janssen primary series recipients, a booster dose is recommended for all persons aged ≥18 years, to be administered ≥2 months after completion of the primary series.	**CDC media statement:** https://www.cdc.gov/media/releases/2021/p1021-covid-booster.html
November 2021			
November 19, 2021	Moderna, Pfizer-BioNTech	FDA amends EUAs for Moderna and Pfizer-BioNTech vaccines to authorize a single booster dose for all persons aged ≥18 years who completed a primary series with any FDA-authorized or approved COVID-19 vaccine. ACIP and CDC expand booster dose recommendations to include all adults aged ≥18 years who completed a primary series of vaccine.	**FDA press release:** https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-expands-eligibility-covid-19-vaccine-boosters **CDC media statement:** https://www.cdc.gov/media/releases/2021/s1119-booster-shots.html
November 29, 2021	Moderna, Pfizer-BioNTech	CDC strengthens booster dose recommendations. All adults aged ≥18 years who completed a primary series are recommended to receive a booster dose when eligible. For Moderna and Pfizer-BioNTech primary series recipients, the booster dose is to be administered ≥6 months after completion of the primary series; for Janssen primary series recipients, ≥2 months after completion of the primary series.	**CDC media statement:** https://www.cdc.gov/media/releases/2021/s1129-booster-recommendations.html
December 2021			
December 9, 2021	Pfizer-BioNTech	FDA amends EUA for Pfizer-BioNTech to authorize a single booster dose for persons aged 16–17 years who completed a primary series of Pfizer-BioNTech. CDC	**FDA press release:** https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-

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		recommends that persons aged 16–17 years receive a booster dose ≥6 months after completion of a Pfizer-BioNTech primary series.	expands-eligibility-pfizer-biontech-covid-19-booster-dose-16-and-17 **CDC media statement:** https://www.cdc.gov/media/releases/2021/s1208-16-17-booster.html
January 2022			
January 3, 2022	Pfizer-BioNTech	FDA amends the Pfizer-BioNTech EUA to authorize a single booster dose for persons aged 12–15 years, to be administered ≥5 months after completion of the Pfizer-BioNTech primary series. Additionally, the EUA is amended for all primary series recipients aged ≥12 years so that the time between completion of the Pfizer-BioNTech primary series and a booster dose is shortened from ≥6 months to ≥5 months. Lastly, a third primary series dose is authorized for certain immunocompromised children aged 5–11 years. This additional primary dose is authorized to be administered ≥28 days after the second dose of the Pfizer-BioNTech primary series.	**FDA press release:** https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-takes-multiple-actions-expand-use-pfizer-biontech-covid-19-vaccine
January 4, 2022	Pfizer-BioNTech	After FDA authorization, CDC updates recommendations to shorten the time between completion of the Pfizer-BioNTech primary series and a booster dose to ≥5 months. CDC also expands recommendations for an additional primary dose for persons with moderate or severe immunocompromise status to include children aged 5–11 years.	**CDC media statement:** https://www.cdc.gov/media/releases/2022/s0104-Pfizer-Booster.html
January 5, 2022	Pfizer-BioNTech	ACIP and CDC expand booster dose recommendations to adolescents aged 12–15 years. For this age group, a booster dose of Pfizer-BioNTech is recommended ≥5 months after completion of the Pfizer-BioNTech primary series.	**CDC media statement:** https://www.cdc.gov/media/releases/2022/s0105-Booster-Shot.html
January 7, 2022	Moderna	FDA amends the Moderna EUA to shorten the time between the completion of the Moderna primary series and a booster dose for persons aged ≥18 years. The booster dose is authorized to be administered ≥5 months after completion of the primary series (previously ≥6 months). CDC updates the recommendations for Moderna primary series recipients so that a mRNA booster dose is recommended ≥5 months after completion of the Moderna primary series.	**FDA press release:** https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-shortens-interval-booster-dose-moderna-covid-19-vaccine-five-months **CDC media statement:** https://www.cdc.gov/media/releases/2022/s0107-moderna-booster.html
February 2022			
February 11, 2022		CDC updates interim clinical guidelines for COVID-19 vaccination for persons with moderate or severe immunocompromise status. Recommendations are clarified to specify that immunocompromised persons who received the 3-dose mRNA primary series should also receive a booster dose administered ≥3 months after completion of the primary series. In addition, immunocompromised persons who received Janssen vaccine should receive an additional dose of an mRNA vaccine administered ≥4 weeks after receipt of the initial Janssen vaccine dose.	**ACIP presentation slides:** https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2022-02-04/08-COVID-Hall-508.pdf
March 2022			
March 29, 2022	Moderna, Pfizer-BioNTech	FDA updates Moderna and Pfizer-BioNTech EUAs to authorize a second booster dose of mRNA vaccine, to be administered ≥4 months after a first booster dose, for persons in selected populations: • Persons aged ≥50 years • Persons aged ≥12 years with certain types of immunocompromise (Pfizer-BioNTech) • Persons aged ≥18 years with certain types of immunocompromise (Moderna)	**FDA press release:** https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-authorizes-second-booster-dose-two-covid-19-vaccines-older-and **CDC media statement:**

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		After FDA authorization, CDC updates recommendations to allow persons aged ≥50 years and certain immunocompromised persons aged ≥12 years to receive a second booster dose, to be administered ≥4 months after the first booster dose.	https://www.cdc.gov/media/releases/2022/s0328-covid-19-boosters.html
May 2022			
May 17, 2022	Pfizer-BioNTech	FDA amends Pfizer-BioNTech EUA to authorize a single booster dose of Pfizer-BioNTech for children aged 5–11 years. The booster dose is to be administered ≥5 months after completion of the Pfizer-BioNTech primary series.	**FDA press release:** https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-expands-eligibility-pfizer-biontech-covid-19-vaccine-booster-dose
May 19, 2022	Moderna, Pfizer-BioNTech	ACIP and CDC recommend that children aged 5–11 years receive a booster dose of Pfizer-BioNTech ≥5 months after completion of the Pfizer-BioNTech primary series. In addition, ACIP and CDC strengthen the recommendations for a second booster dose for all persons aged ≥50 years and immunocompromised persons aged ≥12 years. The second booster dose is to be administered ≥4 months after the first booster dose.	**CDC media statement:** https://www.cdc.gov/media/releases/2022/s0519-covid-booster-acip.html

Abbreviations: ACIP = Advisory Committee on Immunization Practices; EUA = Emergency Use Authorization; FDA = Food and Drug Administration; Janssen = Janssen (Johnson & Johnson) COVID-19 vaccine; MMWR = Morbidity and Mortality Weekly Report.