

## Flu Vaccines for 2023-24

This chart reviews approved influenza vaccines for the 2023-2024 season. It includes approved ages for use, route of administration, dose, cost (US), and egg and thimerosal content. The FAQ that follows answers questions about efficacy, administration with other vaccines, use in patients who are immunocompromised or pregnant, and more.

--None of the available flu vaccines for 2023-24 contain latex.--

Brand Name Manufacturer <sup>a</sup>	Route <sup>a</sup>	Approved Ages for Use <sup>a</sup>	Availability <sup>a</sup> (US Cost/dose <sup>b</sup> )	Contains Thimerosal? <sup>a</sup>	Dose <sup>a</sup>	Comments <sup>a</sup>
<b>Quadrivalent inactivated (IIV4):</b> protects against two influenza A-like viruses and two influenza B-like viruses. <sup>4,24,27</sup>						
US: <i>Afluria Quadrivalent</i> Canada: <i>Afluria Tetra</i> Seqirus	IM	US: ≥6 months  Canada: ≥5 years	0.5 mL PFS (~\$20)  5 mL MDV (~\$19)	Yes (MDV only)	6 to 35 months: • 0.25 mL  ≥36 months: • 0.5 mL	<ul style="list-style-type: none"> <li>• May contain trace amounts of neomycin and polymyxin B.</li> <li>• <i>Afluria Quadrivalent</i> (US): <i>PharmaJet Stratis</i> needle-free injector approved for ages 18 to 64 years.</li> </ul>
<i>Fluad Quadrivalent (US only)</i>  Seqirus	IM	≥65 years	0.5 mL PFS (~\$67)	No	0.5 mL	<ul style="list-style-type: none"> <li>• One of the preferred options <b>in the US</b> for people ≥65 years old.<sup>22</sup></li> <li>• This <b>adjuvanted vaccine</b> may be abbreviated <b>aIIV4</b>.<sup>3</sup></li> <li>• May contain trace amounts of neomycin and kanamycin.</li> <li>• Adverse effects (e.g., injection site reactions, fatigue, myalgias, headache) seem similar to the previously available trivalent inactivated, adjuvanted vaccine.</li> </ul>
<i>Fluarix Quadrivalent (US only)</i>  GSK	IM	≥6 months	0.5 mL PFS (~\$19)	No	0.5 mL	None

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<b>Quadrivalent inactivated (IIV4), continued</b> (Protects against two influenza A-like viruses and two influenza B-like viruses. <sup>4,24,27</sup> )						
US: <i>Flucelvax Quadrivalent</i> Canada: <i>Flucelvax Quad</i> Seqirus	IM	≥6 months	0.5 mL PFS (~\$30)  5 mL MDV (~\$28)	Yes (MDV only)	0.5 mL	<ul style="list-style-type: none"> <li>• This <b>cell-cultured</b> vaccine may be abbreviated <b>ccIIV4</b> or <b>IIV4-cc</b>.<sup>3,24,29</sup></li> <li>• <b>Egg-free</b></li> </ul>
US: <i>FluLaval Quadrivalent</i> Canada: <i>FluLaval Tetra</i> GSK	IM	≥6 months	US • 0.5 mL PFS (~\$19) Canada • 5 mL MDV	US: • No  Canada: • Yes	0.5 mL	None
<i>Fluzone Quadrivalent</i>  Sanofi Pasteur	IM	≥6 months	• 5 mL MDV • 0.5 mL PFS • 0.5 mL SDV (US only) (~\$18 to \$19)	Yes (MDV only)	6 to 35 months: • 0.25 mL (US only) or 0.5 mL  ≥36 months: • 0.5 mL	None
<i>Fluzone Quadrivalent High-Dose</i>  Sanofi Pasteur	IM	≥65 years	0.7 mL PFS (~\$64)	No	0.7 mL	<ul style="list-style-type: none"> <li>• One of the preferred options in the US (the preferred option in Canada) for people ≥65 years old.<sup>22,24</sup></li> <li>• Contains 60 mcg of each virus strain compared to 15 mcg in standard-dose IM vaccines.<sup>3,24</sup></li> <li>• Higher risk of adverse effects (injection site reactions, myalgia, headache) than the previous high dose, inactivated, trivalent formulation (IIV3) (which had higher risk of adverse effects vs standard dose vaccine).</li> </ul>

Brand Name Manufacturer <sup>a</sup>	Route <sup>a</sup>	Approved Ages for Use <sup>a</sup>	Availability <sup>a</sup> (US Cost/dose <sup>b</sup> )	Contains Thimerosal? <sup>a</sup>	Dose <sup>a</sup>	Comments <sup>a</sup>
<b>Quadrivalent inactivated (IIV4), continued</b> (Protects against two influenza A-like viruses and two influenza B-like viruses. <sup>4,24,27</sup> )						
<i>Influvac Tetra</i> (Canada only)  BGP Pharma	IM or deep subcutaneous injection	≥6 months	0.5 mL PFS	No	0.5 mL	<ul style="list-style-type: none"> <li>• May contain trace amounts of gentamicin or neomycin and polymyxin B.</li> </ul>
<b>Quadrivalent recombinant (RIV4):</b> protects against two influenza A-like viruses and two influenza B-like viruses. <sup>4,24,27</sup>						
US: <i>Flublok Quadrivalent</i>  Canada: <i>Supemtek</i>  Sanofi Pasteur	IM	≥18 years	0.5 mL PFS (~\$64)	No	0.5 mL	<ul style="list-style-type: none"> <li>• One of the preferred options <b>in the US</b> for people ≥65 years old.<sup>22</sup></li> <li>• <b>Egg-free</b></li> <li>• Contains 45 mcg of each virus strain compared to 15 mcg in standard-dose IM vaccines.<sup>3</sup></li> </ul>
<b>Quadrivalent live-attenuated (LAIV4):</b> protects against two influenza A-like viruses and two influenza B-like viruses. <sup>4,24,27</sup>						
<i>FluMist Quadrivalent</i>  MedImmune (US) AstraZeneca (Canada)	Intranasal	2 to 49 years  (2 to 59 years [Canada])	0.2 mL prefilled intranasal sprayer (~\$24)	No	0.1 mL per nostril	<ul style="list-style-type: none"> <li>• For healthy, non-pregnant patients.<sup>24,27</sup></li> <li>• Has not been studied in patients with severe asthma or active wheezing.</li> <li>• The FAQ below, <i>Communicating About Flu Vaccination</i>, addresses who should NOT receive this flu vaccine.</li> <li>• May contain trace amounts of gentamicin.</li> </ul>
<b>Trivalent inactivated (IIV3) (Only available in Canada):</b> protects against two influenza A-like viruses and one influenza B-like viruses. <sup>24</sup>						
<i>Fluad and Fluad Pediatric</i> (Canada only)  Seqirus	IM	Pediatric: 6 to 23 months  Adult: ≥65 years	Pediatric: 0.25 mL PFS  Adult: 0.5 mL PFS	No	6 to 23 months: • 0.25 mL  ≥65 years: • 0.5 mL	<ul style="list-style-type: none"> <li>• This <b>adjuvanted vaccine</b> (with MF59) may be abbreviated <b>IIV3-Adj</b>.</li> <li>• May contain trace amounts of kanamycin and neomycin.</li> </ul>

- a. **FDA-approved product information** is from the following US product labeling unless otherwise specified: *Afluria Quadrivalent* (June 2023); *Fluad Quadrivalent* (June 2023); *Fluarix Quadrivalent* (June 2023); *Flucelvax Quadrivalent* (June 2023); *FluLaval Quadrivalent* (June 2023); *Fluzone Quadrivalent* (June 2023); *Fluzone Quadrivalent High-Dose* (June 2023); *Flublok Quadrivalent* (June 2023); *FluMist Quadrivalent* (August 2023). **Information for Health Canada-approved products** is from the Government of Canada (<https://www.canada.ca/en/public-health/services/publications/vaccines-immunization/national-advisory-committee-immunization-statement-seasonal-influenza-vaccine-2023-2024.html>) unless otherwise specified.<sup>24</sup>
- b. Pricing based on wholesale acquisition cost (WAC). Medication pricing by Elsevier, accessed July 2023.

**Abbreviations:** IM = intramuscular; MDV = multidose vial; PFS = pre-filled syringe; SDV = single-dose vial.

## Communicating About Flu Vaccination

Use this FAQ to answer common questions about flu vaccines.

Question	Answer/Pertinent Information
Who should receive a flu vaccine?	<ul style="list-style-type: none"><li>• Flu vaccination is recommended for <b>everyone ≥6 months</b> without contraindications, using any age-appropriate vaccine.<sup>24,27</sup><ul style="list-style-type: none"><li>○ Canadian guidelines recommend focusing vaccination efforts on:<sup>24</sup><ul style="list-style-type: none"><li>▪ people at high risk of severe disease, flu-related complications or hospitalization.</li><li>▪ people capable of transmitting flu to those at high risk.</li><li>▪ people who provide essential community services.</li><li>▪ people in direct contact with poultry infected with avian flu during culling operations.</li></ul></li></ul></li><li>• In light of COVID-19, it’s more important than ever for patients to get a flu vaccine. The flu vaccine won’t protect against COVID-19 but getting the flu vaccine can help conserve healthcare resources, by reducing the risk of flu illnesses, hospitalizations, and death.<sup>21,27</sup></li><li>• For patients who cannot remember if they received this season’s flu vaccine, avoid missed opportunities to vaccinate by giving the flu vaccine even if this means giving a second dose to some patients.<sup>11</sup></li></ul>
Which flu vaccine is preferred?	<ul style="list-style-type: none"><li>• Avoid delaying vaccination in order to use a specific “preferred” flu vaccine.<sup>16,24</sup></li><li>• <b>In the US:</b><sup>22</sup><ul style="list-style-type: none"><li>○ A higher-dose or adjuvanted flu vaccine is preferred (if available) over standard-dose vaccines for people ≥65 years old.</li><li>○ There is not a preferred vaccine when selecting among licensed, age-appropriate vaccines for patients between 6 months and 64 years old.</li></ul></li><li>• <b>In Canada:</b><sup>24</sup><ul style="list-style-type: none"><li>○ quadrivalent flu vaccines are preferred over trivalent flu vaccines in children.</li><li>○ a high-dose flu vaccine is preferred over a standard-dose flu vaccine in patients 65 years and older.</li></ul></li></ul>

Question	Answer/Pertinent Information
When are two doses of a flu vaccine needed?	<ul style="list-style-type: none"> <li>• To provide optimal protection, <b>children 6 months through eight years</b> should receive two doses of flu vaccine (separated by at least four weeks) if they have not received at least two doses of flu vaccine (separated by at least four weeks) prior to July 1 of the current year (US) or if they have not previously received the seasonal flu vaccine (Canada).<sup>24,28</sup> <ul style="list-style-type: none"> <li>○ US guidance specifies that for children who should receive two doses, if the child turns nine years old between doses one and two of the vaccine, two doses are still recommended.<sup>28</sup></li> </ul> </li> </ul>
When should flu vaccines be given?	<ul style="list-style-type: none"> <li>• <b>In the US</b>, encourage patients to try to complete vaccination by the end of October. Generally, avoid starting vaccinations before September, due to the possibility of reduced effectiveness later in the flu season.<sup>27</sup> <ul style="list-style-type: none"> <li>○ Consider earlier vaccination in children, especially if they require two doses, and pregnant patients in their third trimester.<sup>27</sup></li> </ul> </li> <li>• <b>In Canada</b>, start vaccinations as soon as possible based on availability.<sup>24</sup></li> <li>• Don't miss an opportunity to vaccinate due to fears the vaccine's effectiveness will not last throughout the entire flu season. <ul style="list-style-type: none"> <li>○ Though delayed vaccination may lead to increased immunity later in the season, it could also lead to missed opportunities to vaccinate, and is not recommended.<sup>24,27</sup> Some evidence suggests that vaccination early in the season may lead to "waning" or "wearing off" before the end of the flu season.<sup>15</sup> However, this has not been consistently seen from year to year, nor among different patient populations. <ul style="list-style-type: none"> <li>▪ Booster doses are NOT recommended later in the season for patients who receive their vaccine early in the season.<sup>11,24</sup></li> </ul> </li> <li>○ The timing of flu outbreaks is unpredictable.<sup>11</sup></li> </ul> </li> <li>• Continue to vaccinate as long as flu viruses are circulating.<sup>11,24</sup></li> </ul>
Can flu vaccines be given with other vaccines?	<ul style="list-style-type: none"> <li>• Live-attenuated and inactivated flu vaccines can be given with other vaccines, using separate administration sites.<sup>5,24</sup> <ul style="list-style-type: none"> <li>○ If two live vaccines (including <i>FluMist</i>) are NOT given on the same day, they should be administered at least four weeks apart.<sup>5</sup> (Canada: <i>FluMist</i> can be given together with or at any time before or after any other live-attenuated or inactivated vaccine.<sup>24</sup>)</li> <li>○ Any flu vaccines (including <i>FluMist</i>) can be coadministered with COVID-19 vaccines, as long as different injection sites are used, preferably different limbs (due to the potential for increased local reactions [e.g., injection site pain, redness]).<sup>24,33</sup></li> </ul> </li> <li>• Data are limited for coadministration of two adjuvanted vaccines (e.g., <i>Fluad Quadrivalent</i>, <i>Heplisav-B</i>, <i>Shingrix</i>).<sup>24,34</sup> There are theoretical concerns about more side effects. If a patient is receiving another adjuvanted vaccine, don't delay flu vaccination if an adjuvanted flu vaccine (i.e., <i>Fluad Quadrivalent</i>) is the only flu vaccine available.<sup>16,35</sup></li> </ul>
Can the flu vaccine be given to	<ul style="list-style-type: none"> <li>• <b>Continue to give the flu vaccine to patients with mild (and moderate in Canada) acute illnesses</b> to avoid missed opportunities to vaccinate.<sup>12,24</sup> Most acute illness with or without fever (e.g., diarrhea, upper respiratory infection) is not a contraindication to receiving the vaccine.<sup>12,24</sup></li> </ul>

Question	Answer/Pertinent Information
someone who is acutely ill?	<ul style="list-style-type: none"> <li>• Severe (and moderate in the US) acute illness is a precaution for administering any vaccine.<sup>12</sup> Vaccination side effects (e.g., fever, malaise) may make it difficult to assess management of acute illness.<sup>12</sup> Assess the risks and benefits of delaying vaccination in patients with moderate to severe illness.<sup>12</sup> In Canada, it is recommended to usually delay vaccination until serious acute illness symptoms have improved.<sup>24</sup></li> <li>• Generally, delay flu vaccination in anyone with symptomatic COVID-19 infection, until they are no longer moderately or severely ill and have completed their COVID-19 isolation period.<sup>30,31</sup></li> </ul>
Can immuno-compromised patients receive the flu vaccine?	<ul style="list-style-type: none"> <li>• <b>Immunocompromised patients</b> may receive any licensed, recommended, age-appropriate <b>injectable</b> flu vaccine.<sup>14,24</sup> <ul style="list-style-type: none"> <li>○ However, some experts recommend a high-dose or adjuvanted flu vaccine for immunocompromised patients. These vaccines may lead to an improved antibody response compared to standard-dose vaccines. However, there is no evidence yet that this antibody response correlates with better protection against flu.<sup>37-39</sup></li> <li>○ See our FAQ, <i>Vaccinating Immunocompromised Patients</i>, for more detailed information about use of <i>FluMist</i> in immunocompromised patients.</li> </ul> </li> </ul>
Can pregnant or lactating patients receive the flu vaccine?	<ul style="list-style-type: none"> <li>• Vaccinate <b>pregnant women</b> (any trimester) with any licensed, recommended, age-appropriate <b>injectable</b> flu vaccine, regardless of thimerosal content.<sup>6,11</sup> <ul style="list-style-type: none"> <li>○ Risk of flu and potential complications in pregnant woman and/or the fetus exceeds possible risks associated with flu vaccination.<sup>7,8,11,24</sup></li> </ul> </li> <li>• Flu vaccination is safe while breastfeeding.<sup>9</sup> Vaccinate post-partum women who did not receive a flu vaccine while pregnant, especially if breastfeeding an infant &lt;6 months old, as these infants are too young to receive a flu vaccine.<sup>6,10</sup> <ul style="list-style-type: none"> <li>○ <i>FluMist</i> is an option for breastfeeding patients younger than 50 years old (younger than 59 years [Canada]), if there are no other contraindications.<sup>17,24</sup></li> </ul> </li> </ul>
Can patients with an egg allergy receive a flu vaccine?	<ul style="list-style-type: none"> <li>• Patients with a history of severe egg allergy (symptoms more severe than hives [e.g., angioedema, respiratory distress, requiring epinephrine]) do not have higher reaction rates to egg-containing vaccines compared to non-egg allergic patients.<sup>16</sup></li> <li>• Patients with an egg allergy may receive any age-appropriate flu vaccine, including <i>FluMist</i>, without prior flu vaccine skin test and with the full dose, irrespective of a past severe reaction to egg, and in any setting where vaccines are routinely administered.<sup>16,24</sup></li> <li>• Refer to the chart above comparing available flu vaccines for egg-free vaccine options.</li> </ul>
Should unvaccinated people who had the flu this	<ul style="list-style-type: none"> <li>• Yes. Vaccinate unvaccinated people who have already had the flu during this season. The vaccine might protect against other circulating flu viruses.</li> </ul>

Question	Answer/Pertinent Information
season still get the flu vaccine?	
How effective are flu vaccines?	<ul style="list-style-type: none"> <li>• Flu vaccination is typically about 40% to 60% effective (e.g., reduces flu illness, reduces laboratory confirmed flu).<sup>18,19,27</sup> Generally, flu vaccines are more effective against influenza B and influenza A(H1N1) strains compared to influenza A(H3N2) strains.<sup>18</sup> <ul style="list-style-type: none"> <li>○ Influenza vaccination reduces the risk of severe flu and death, even when the vaccine is not perfectly matched with that particular years' circulating flu strains.<sup>13,32</sup></li> <li>○ Avoid trying to compare these rates to those achieved with COVID-19 vaccines. These vaccines and the definitions for effectiveness are different; comparing them is like comparing apples to oranges.<sup>20</sup> <ul style="list-style-type: none"> <li>▪ Flu vaccines and COVID-19 vaccines target different viruses (i.e., influenza, coronavirus).<sup>20</sup></li> <li>▪ The flu vaccine targets <b>multiple</b> flu viruses. COVID-19 vaccines target <b>one or two</b> coronaviruses.<sup>20</sup></li> </ul> </li> </ul> </li> <li>• Higher dose or adjuvanted flu vaccines seem more effective than standard-dose flu vaccines for seniors, especially at reducing flu-related hospitalizations.<sup>36</sup></li> <li>• The previously available trivalent of the <i>Fluzone High Dose</i> provided modestly greater protection against lab-confirmed flu vs standard-dose trivalent vaccine in patients ≥65 years of age (n=31,989; NNT=200), [Evidence Level A-1].<sup>3,25</sup> There is no comparative data for the quadrivalent vaccines.</li> <li>• Recombinant quadrivalent flu vaccines (i.e., <i>Flublok Quadrivalent</i> [US], <i>Supemtek</i> [Canada]) may be slightly more effective in preventing laboratory confirmed flu than quadrivalent inactivated flu vaccines in patients ≥50 years of age (N=8,604; NNT=100), [Evidence Level A-1].<sup>2,26</sup></li> <li>• <i>Fluad</i> (Canada only) may provide modestly greater protection against laboratory-confirmed flu vs non-adjuvanted trivalent vaccine in patients ≥65 years of age (n=227; unable to calculate NNT), [Evidence Level B-2].<sup>23</sup></li> </ul>
<p>Who should NOT receive the LIVE-attenuated flu vaccine (<i>FluMist</i>)?</p> <p><i>Continued...</i> Who should NOT receive <i>FluMist</i>, continued</p>	<ul style="list-style-type: none"> <li>• Avoid use of the live-attenuated flu vaccine (<i>FluMist</i>) in the following patients: <ul style="list-style-type: none"> <li>○ children younger than 2 years (or, in the US: older than 50 years).<sup>17,24</sup></li> <li>○ anyone who is pregnant.<sup>17,24</sup></li> <li>○ adults or children with contraindications to live vaccines (e.g., certain chronic diseases, immunosuppression, severely immunosuppressed close contacts).<sup>17,27</sup></li> <li>○ adults or children who recently took an antiviral (<b>see row below</b> “Can the LIVE-attenuated flu vaccine (<i>FluMist</i>) be given to someone who received an antiviral?”).<sup>17,24</sup></li> <li>○ adults or children with asplenia, a non-functional spleen, cochlear implants, or active cerebrospinal fluid leaks (US).<sup>17</sup></li> <li>○ children between the ages of 2 and 4 years with asthma or a history of wheezing in the last 12 months (US).<sup>17</sup></li> <li>○ severe asthma or medically-attended wheezing within the previous seven days (Canada).<sup>24</sup></li> <li>○ children and adolescents on chronic aspirin or salicylate therapy.<sup>1,17,24</sup> If aspirin therapy is needed, separate aspirin and the live-attenuated flu vaccine by at least four weeks.<sup>24</sup></li> </ul> </li> </ul>

Question	Answer/Pertinent Information
	<ul style="list-style-type: none"><li>○ healthcare workers (Canada) or patients who care for someone severely immunocompromised (i.e., who requires a protected environment).<sup>17,24</sup> US guidance recommends avoiding contact with severely immunocompromised patients for 7 days after receiving the live-attenuated flu vaccine.<sup>17</sup></li></ul>
Can the LIVE-attenuated flu vaccine ( <i>FluMist</i> ) be given to someone who received an antiviral?	<ul style="list-style-type: none"><li>● Most advise avoiding <i>FluMist</i> within 48 hours of an antiviral.<sup>24</sup> However, based on antiviral half-lives, it is possible antivirals could interfere with <i>FluMist</i> effectiveness if <i>FluMist</i> is given within the following timeframes AFTER an antiviral:<sup>17</sup><ul style="list-style-type: none"><li>○ 48 hours (oseltamivir and zanamivir)</li><li>○ five days (peramivir [approved but not marketed in Canada])</li><li>○ 17 days (baloxavir [approved but not marketed in Canada])</li></ul></li><li>● Antivirals may interfere with <i>FluMist</i> effectiveness. Recommend revaccination with an age-appropriate inactivated flu vaccine or recombinant flu vaccine (US only) if a patient receives a flu antiviral medication within two weeks of vaccination with <i>FluMist</i> (or revaccinating with <i>FluMist</i> 48 hours after completing antiviral therapy [Canada only]).<sup>11,24</sup></li></ul>

Users of this resource are cautioned to use their own professional judgment and consult any other necessary or appropriate sources prior to making clinical judgments based on the content of this document. Our editors have researched the information with input from experts, government agencies, and national organizations. Information and internet links in this article were current as of the date of publication.

## Levels of Evidence

In accordance with our goal of providing Evidence-Based information, we are citing the **LEVEL OF EVIDENCE** for the clinical recommendations we publish.

Level	Definition	Study Quality
<b>A</b>	Good-quality patient-oriented evidence.*	<ol style="list-style-type: none"> <li>High-quality randomized controlled trial (RCT)</li> <li>Systematic review (SR)/Meta-analysis of RCTs with consistent findings</li> <li>All-or-none study</li> </ol>
<b>B</b>	Inconsistent or limited-quality patient-oriented evidence.*	<ol style="list-style-type: none"> <li>Lower-quality RCT</li> <li>SR/Meta-analysis with low-quality clinical trials or of studies with inconsistent findings</li> <li>Cohort study</li> <li>Case control study</li> </ol>
<b>C</b>	Consensus; usual practice; expert opinion; disease-oriented evidence (e.g., physiologic or surrogate endpoints); case series for studies of diagnosis, treatment, prevention, or screening.	

\***Outcomes that matter to patients** (e.g., morbidity, mortality, symptom improvement, quality of life).

[Adapted from Ebell MH, Siwek J, Weiss BD, et al. Strength of recommendation taxonomy (SORT): a patient-centered approach to grading evidence in the medical literature. *Am Fam Physician*. 2004 Feb 1;69(3):548-56.

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