

# Reducing Risks With Vaccinations: Recommendations for Adults and Children With Diabetes

Reviewed by ADCES Professional Practice Committee

## Recommendations for Adults

### Respiratory Syncytial Virus

Respiratory syncytial virus (RSV) is a virus that affects the lungs and can cause significant respiratory complications in older adults, particularly during the fall and winter. RSV in adults may present as mild cold symptoms, but older adults who are infected may develop pneumonia, which can lead to hospitalization or even death. The Centers for Disease Control and Prevention (CDC) recommends adults 75 years and older or 60 to 74 years with diabetes and related chronic medical conditions are eligible and encouraged to minimize their risk of severe illness from RSV by receiving the RSV vaccine.<sup>1-3</sup> Studies conducted with mice have shown that hyperglycemia weakens the immune system and causes the body to respond poorly when it tries to attack the virus. A weakened immune system leads to the virus being able to replicate easier and with greater concentration in the blood, which increases the chance of developing lower respiratory complications such as pneumonia. Research has shown that people with diabetes and unmanaged blood glucose are at a higher risk for hospitalization if they become infected with RSV.<sup>3</sup> This vaccine is currently a one-time vaccine, meaning there is no need to revaccinate for the RSV season. One dose of the RSV vaccine should protect a person for approximately 2 RSV seasons. As research on the vaccine continues to develop, additional doses will be determined based on the benefit to adults. The best time to receive the RSV vaccine is late summer into early fall to ensure protection before the virus spreads amongst the community.

**Recommendation:** The CDC recommends adults 75 years and older or 60 to 74 years with diabetes who are at an increased risk for severe RSV disease get the vaccine.<sup>3</sup>

*(Note: At the time of writing, it is anticipated the CDC's Advisory Committee on Immunization Practices will approve the RSV vaccine for adults aged 18 to 59 years who are at increased risk for RSV.)*

### Coronavirus Disease 2019 (COVID-19)

Severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2, or COVID-19) is a highly contagious respiratory disease. It is spread via mouth or nose droplets from an infected person. The severity of the COVID-19 virus is particularly pronounced for people with diabetes (PWD), who are at an increased risk for severe disease or even death if they become infected.<sup>4</sup> Infection with the COVID-19 virus in PWD is associated with higher mortality rates and detrimental consequences.<sup>5</sup> These consequences are due to comorbidities, including immunosuppression, vascular disorders, and hyperglycemia. Hyperglycemia contributes to the increase in cardiovascular death in PWD.<sup>6,7</sup> The risk of hospitalization in the intensive care unit is more than doubled for PWD, and the risk of death is more than tripled in PWD when compared with those without diabetes. Given these risks, the Centers for Disease Control and Prevention (CDC) strongly recommends everyone 6 months and older receive the most updated COVID-19 vaccine available.<sup>8-9</sup>

**Recommendation:** The CDC recommends everyone 6 months and older receive the COVID-19 vaccine.<sup>10</sup>

### Hepatitis A (Hep A)

The hepatitis A virus (HAV) is a highly contagious infection that affects the liver. Hepatitis A is a food-borne illness commonly transmitted via a fecal route and person-to-person contact via blood.<sup>11</sup> Because this virus affects the liver, its primary representation is jaundice. The introduction of the hepatitis A vaccine in 1995 has led to a 95% decrease in infection rates.<sup>12</sup> Studies have shown that people with diabetes (PWD) are more susceptible to infection with HAV.<sup>11</sup> The risk increases by 40% if PWD are unvaccinated.<sup>11</sup> The Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP) recommends unvaccinated adults at an

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increased risk for infection or severe disease be vaccinated against hepatitis A.<sup>13</sup> The hepatitis A vaccine is a vaccine series that is administered over 6 months.

**Recommendation:** The ACIP recommends the hepatitis A vaccine to unvaccinated adults who are at an increased risk for infection or an increased risk for severe disease from being infected. Depending on the vaccine received, the vaccine series may be 2 to 3 doses over 6 months.<sup>14</sup>

### Hepatitis B (Hep B)

Hepatitis B virus (HBV) is a viral infection that affects the liver. HBV is highly infectious and is typically spread via blood or other bodily fluids. Sharing medical equipment and devices such as glucose meters, needles, and insulin syringes increases a person's risk of becoming infected with HBV.<sup>15</sup>

There are 2 types of HBV:

- **Acute hepatitis B** is a short-term illness that occurs within 6 months of exposure and can cause mild symptoms or symptoms so severe they may require hospitalization.
- **Chronic hepatitis B** is a lifelong illness that, if left untreated, can lead to liver damage, cirrhosis, cancer, or even death.

Individuals infected with HBV may not initially experience symptoms, but some may experience symptoms starting 90 days after infection. Those with chronic hepatitis B may not experience symptoms until decades after exposure. HBV can remain alive outside the body for at least a week and still be able to enter a person's body and infect them with the virus. Type 2 diabetes can accelerate the progression of liver disease in those infected with HBV.

**Recommendation:** The Centers for Disease Control and Prevention recommends hepatitis B vaccine for everyone, especially those who travel regularly.<sup>16,17</sup> The hepatitis B vaccine is recommended for all infants and children, adults 19 to 59 years, and older adults 60 years and older with risk factors.<sup>18</sup>

### Pneumococcal

People with diabetes (PWD) have an increased risk for invasive pneumococcal disease, requiring hospitalization in the intensive care unit, and pneumococcal pneumonia. However, studies have shown an overall reduction of pneumonia in PWD who are vaccinated against the disease.<sup>19</sup> People with diabetes have increased mortality rates of up to 50% due to bacterial forms of pneumonia.<sup>20</sup> Adults 65 years and older are at an increased risk for pneumonia, and the risk increases with age. Receiving pneumococcal vaccines protects PWD from pneumococcal

infections, including invasive diseases.<sup>19,20</sup> The Centers for Disease Control and Prevention (CDC) recommends adults 65 years and older receive the pneumococcal vaccine. The CDC also recommends PWD 19 years and older or with specific chronic health conditions receive the vaccine.<sup>21,22</sup> There are 2 types of pneumococcal vaccines available in the United States: pneumococcal conjugate vaccine (PCV) and pneumococcal polysaccharide vaccine (PPSV).<sup>21</sup> There are 3 types of PCVs: PCV15, PCV20, and PCV21, and one type of PPSV: PPSV23.

**Recommendation:** The CDC recommends all adults aged 19 to 64 years with certain risk factors such as diabetes, who have not previously received the PCV, should receive it. For adults 65 years and older who have not received a PCV or have an unknown history, the CDC recommends the PCV. If an adult 65 years and older has only received PCV15, they are indicated to receive a dose of PPSV23 at least 1 year later if needed. However, additional vaccination with PPSV23 is *not* recommended for older adults who have received PCV20 or PCV21.<sup>22,23</sup>

**Recommendation:** The CDC recommends adults 65 years and older, regardless of previous vaccination history (eg, a PWD is high risk and received a pneumococcal vaccine at aged 45 years) receive the PPSV23 vaccine. This vaccine is typically one dose, but health care professionals may recommend an additional dose for high-risk groups. The PPSV23 vaccine is recommended for anyone 2 years and older with an increased risk for pneumococcal disease.<sup>24,25</sup>

### Zoster (Shingles, Herpes Zoster)

The Centers for Disease Control and Prevention (CDC) recommends the only way to protect yourself from getting shingles is to get vaccinated.<sup>26,27</sup> The risk of getting shingles increases with age. The lifetime risk of developing herpes zoster (shingles) is 25%, but that risk spikes sharply after 50 years of age. The shingles vaccine is a 2-dose series and is 90% effective in preventing shingles and postherpetic neuralgia in healthy adults 50 years and older.<sup>27</sup> Adults aged 19 years and older with weakened immune systems have an increased risk of complications. Chickenpox and shingles are the same virus. When you recover from chickenpox, the virus remains dormant in the body and can be reactivated years later, resulting in shingles. The second dose of the shingle vaccine series is given 2 to 6 months after the first. People who have had shingles received the Zostavax vaccine (no longer available in the United States) and/or received the varicella (chicken pox) vaccine should still get the shingles vaccine.<sup>28</sup>

**Recommendation:** The CDC recommends the shingles vaccine for all adults 50 years and older and adults 19 years and older with weakened immune systems due to therapy or disease. Dosing frequency is based on age and necessity.<sup>28</sup>

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### Tdap (Tetanus, Diphtheria, Pertussis)

The Tdap vaccine is a crucial shield against diphtheria, pertussis, and tetanus.<sup>29</sup> Pertussis, commonly known as whooping cough, is a serious threat in the United States, because of frequent outbreaks. This highly contagious respiratory disease, caused by the challenge to manage and identify *Bordetella pertussis* bacteria, spreads through sneezing and coughing.<sup>30,31</sup> Coughing fits from whooping cough can persist for weeks to months, which makes prevention through vaccination the best defense.

Tetanus is caused by the bacteria *Clostridium tetani*, which is found in the environment and infects someone through broken skin. Once infected by the tetanus bacteria, symptoms occur an average of 8 days after and may likely present with the most common sign, lockjaw.<sup>32</sup> Having diabetes and being 70 years and older puts individuals at an increased risk for tetanus. Diphtheria is caused by the toxins produced by some strains of *C. diphtheriae*, which can kill healthy tissue, resulting in many health issues. The diphtheria virus is spread from droplets from sneezing or coughing. Infection with the bacteria can also occur by coming in contact with ulcers or open sores caused by *C. diphtheria*. Diphtheria can affect the upper respiratory tract and skin, but respiratory diphtheria is more serious.<sup>33</sup> Common symptoms such as a mild fever, sore throat, and swollen glands in the neck typically present 2 to 5 days after exposure. Respiratory diphtheria can lead to deadly complications such as kidney failure, nerve damage, and damage to heart muscles. It is not just about the first dose. The CDC recommends the Tdap vaccine for everyone, with a crucial booster dose for adults every 10 years.<sup>29</sup> This ongoing protection is essential to ensure everyone is shielded from the threats of diphtheria, pertussis, and tetanus.

### Influenza (Flu)

People with diabetes (PWD) are at an increased risk for a more severe course of influenza (Flu). Diabetes is linked to an increased risk of hospitalization, mortality, and morbidity.<sup>35</sup> Studies have found that PWD has 7.4 times higher rates of pneumonia and 5.7 times higher rates of sepsis during influenza season.<sup>36</sup> There is accumulating evidence that vaccination against the influenza virus is linked to reducing cardiovascular and clinical complications in PWD. The Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP) recommends all individuals 6 months and older receive routine annual flu vaccine, preferably by the end of October.<sup>37</sup> Not only does the flu vaccine reduce the risk of getting the flu, but many studies have shown that it can reduce the severity of the illness for those who have been vaccinated but still become ill. It is not recommended that PWD receive live attenuated influenza, which comes in nasal spray form.<sup>38</sup> Adults 65 years and older are advised to obtain a high dose of the influenza vaccine because of its improved benefit in that age group.<sup>39</sup>

**Recommendation:** The ACIP and CDC recommend everyone 6 months and older receive a routine annual flu vaccine, preferably by the end of October.<sup>37</sup>

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## Recommendations for Children

The Centers for Disease Control and Prevention's (CDC) *Recommended Child and Adolescent Immunization Schedule by Medical Indication, United States, 2024*, recommends adolescents and adults aged 18 years and younger with diabetes receive all age-appropriate vaccines with few additions. The pneumococcal vaccines are the only vaccines where a child with diabetes may require additional doses.<sup>1</sup>

### Respiratory Syncytial Virus (RSV)

- There is no evidence of diabetes-specific recommendations for children. Children whose mothers did not receive the RSV vaccine during pregnancy, and/or if the child has other medical indications, may require one or multiple doses of nirsevimab. Nirsevimab is the RSV vaccine approved for use in neonates and infants.<sup>1,2,3,4</sup> (Note: While nirsevimab is the preferred vaccine there are indications that palivizumab would be used for children under 24 months who are at high risk for RSV.)

### Hepatitis B (Hep B)

- No diabetes-specific recommendation for children.<sup>1</sup>
- Children should receive their 3-dose series before 18 months.<sup>2</sup>

### Rotavirus

- No diabetes-specific recommendations for children.<sup>1</sup>
- Oral vaccines should be administered before the child is 8 months. The 2-dose series is administered at 2 and 4 months.<sup>2</sup>
- The 3-dose series is administered at 2, 4, and 6 months.<sup>5</sup>

### DTaP and Tdap

- No diabetes-specific recommendations for children.<sup>1</sup>
- Children should receive the 5-dose series by 6 months and 2 boosters by aged 18 months and 6 years.<sup>2</sup>

### Haemophilus Influenzae Type b (Hib)

- No diabetes-specific recommendations for children.<sup>1</sup>
- Children should get their 3-dose series by aged 6 months, and a booster by 15 months.<sup>2</sup>

### Pneumococcal

- Children with diabetes may require additional doses of the pneumococcal vaccine, depending on if they received the 4-dose PCV series before aged 15 months, or when they received other pneumococcal vaccines. If the child is aged 2 to 5 years and received the 3 PCV doses, they would require one additional dose at least 8 weeks after the last dose. If the child received less than the 3 PCV doses, they would require 2 additional doses administered 8 weeks apart, 8 weeks after the last dose. And, if the child received all their PCV doses, they would require a dose of PCV20 or PPSV23 8 weeks after their last PCV dose.<sup>1,2</sup>
- If the child is aged 6 to 18 years old and has never received any PCV dose, they would need one dose of PCV15 or PCV20. After their first PCV15 dose, the child may be administered a dose of PPSV23 8 weeks later. If the child received PCV before aged 6 years old, they would need to be administered one dose of PCV20 or PPSV23 if not previously received PCV20. If they receive PCV13 by aged 6 years, they require one dose PCV20 or PPSV23 8 weeks later. If they received a dose of PCV13 and a dose of PPSV23 by aged 6 years, they do not require additional doses.<sup>6</sup>

### Inactivated Polio Vaccine (IPV)

- No diabetes-specific recommendations for children.<sup>1</sup>
- Children should receive the 4-dose series beginning at aged 2 months and completed by aged 4 years, with at least 6 months in between doses.<sup>2</sup>

## Coronavirus Disease 2019 (COVID-19)

- No diabetes-specific recommendations for children.<sup>1</sup>
- Children can be vaccinated against COVID-19 starting at aged 6 months. They can receive a 2-dose series or 3-dose series.<sup>2</sup>

## Inactivated Influenza Vaccines (IIV4)

- No diabetes-specific recommendations for children.<sup>1</sup>
- Recommended for everyone after aged 6 months.<sup>2</sup>

## Live Attenuated Influenza Vaccine (LAIV4)

- No diabetes-specific recommendations for children; dependent on child's immune system.<sup>1,2</sup>

## Measles, Mumps, Rubella (MMR)

- No diabetes-specific recommendations for children.<sup>1</sup>
- Children should receive their 2-dose series after aged 12 to 15 months and 4 to 6 years.<sup>2</sup>

## Varicella (VAR)

- No diabetes-specific recommendations for children.<sup>1,2</sup>

## Hepatitis A (Hep A):1-2

- No diabetes-specific recommendations for children.<sup>1</sup>
- The 2-dose series should be administered to children aged 1 to 2 years.<sup>2</sup>

## Human Papillomavirus (HPV)

- No diabetes-specific recommendations for children.<sup>1</sup>
- After aged 9 years, children should be vaccinated with a 2- or 3-dose series before aged 18 years.<sup>2</sup>

## Meningitis ACWY (MenACWY)

- No diabetes-specific recommendations for children.<sup>1,2</sup>

## Meningitis (MenB)

- No diabetes-specific recommendations for children.<sup>1</sup>
- No guidance on the Centers for Disease Control and Prevention immunization schedule.<sup>2</sup>

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