

# Long-Term Care Updates

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## An Update on Current Influenza, Pneumococcal, and Zoster Immunization Guidelines

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### Introduction

Influenza and pneumococcal disease are among the leading major causes of morbidity and mortality in the United States. Additionally, these two infections are the fifth leading cause of death in the elderly. Vaccination rates among patients residing in long-term care (LTC) facilities have increased over the last ten years, but rates among the general public have remained steady. Among Medicare beneficiaries, influenza and pneumococcal vaccines are underutilized despite being highly efficacious, affordable, and covered under Medicare Part B.<sup>1</sup> Nearly one-third of Americans experience a shingles infection within their lifetime, and in 2013, an estimated \$3 billion of direct and indirect costs were associated with shingles infections.<sup>2,3</sup> Each of these disease states—influenza, pneumococcal and herpes zoster—have an approved vaccine to prevent patient complications and decrease healthcare costs.

### Influenza

Influenza is one of the most common viral infections that can lead to morbidity and mortality, especially among older adults.<sup>4</sup> Since 2010, the Centers for Disease Control and Prevention (CDC) estimate that influenza has caused between 9 and 45 million illnesses, 140,000 to 810,000 hospitalizations, and between 12,000 and 61,000 deaths annually in the United States. There are four types of influenza viruses: A, B, C and D. Influenza A and B are the most common strains and are known to cause seasonal outbreaks of influenza in the United States during the winter months. Influenza A viruses are further divided into subtypes based on two proteins on the surface of the viral cell: hemagglutinin (subtype H) and neuraminidase (subtype N). Influenza B viruses are further classified into two lineages: B/Yamagata and B/Victoria. Both viruses can then be further classified into clades (also referred to as groups) and sub-clades (also referred to as sub-groups). Dividing the virus into clades and sub-clades allows influenza experts to track outbreaks and current strains circulating around the world.<sup>5</sup>

## *Influenza Vaccine*

Influenza vaccines are categorized by how many strains they protect against, how they are made, and the type of immune response they illicit. Trivalent influenza vaccines protect against three different influenza strains while quadrivalent vaccines protect against four. The strains included in the vaccine are predicted by an international committee and approved by the U.S. Food and Drug Administration (FDA) on an annual basis. High-dose and adjuvanted influenza vaccines are theorized to invoke a larger immune response. Recombinant and cell-based vaccines are made without the use of eggs and can be used in patients with an egg allergy.<sup>6</sup> In the U.S., the influenza season runs annually throughout the fall and winter. Since the influenza vaccine requires about two weeks to gain full effectiveness, the CDC recommends that everyone receive it before October. Early vaccination during July and August is not recommended due to decreased efficacy later in the season. Children as young as 6 months can receive the influenza vaccine, and it is recommended for everyone who does not have a contraindication, especially the elderly and those with complicated disease states.<sup>7</sup>

Two influenza vaccinations are approved specifically for individuals  $\geq 65$  years of age: high-dose influenza vaccine (Fluzone High-Dose) and adjuvanted influenza vaccine (Fluad).<sup>8</sup> The high-dose influenza vaccine contains four times the amount of antigen compared to the standard influenza vaccine, while the adjuvanted influenza vaccine contains an ingredient that elicits a more intense immune response.<sup>8,9</sup> Older adults can receive any influenza vaccine, but the high-dose and adjuvanted influenza vaccines provide boosted immunity for this population, creating better immune protection against influenza and advanced illness. Older adults who receive the high-dose or adjuvanted vaccine are less likely to suffer from complications that could lead to hospitalization and death. The high-dose influenza vaccine was previously a trivalent vaccine, but as of last year it is only available as a quadrivalent formulation. The adjuvanted influenza vaccine has been available as both a trivalent and quadrivalent vaccine. Adverse effects of these influenza vaccines include swelling or redness at the injection site, fatigue, fever, muscle aches, or headache.<sup>8,9</sup>

## Pneumococcal Disease

Pneumococcus is a gram-positive extracellular pathogen that leads to a high disease burden among people all over the world. *Streptococcus pneumoniae* is a pathogen within this group that causes more deaths than any other infectious disease. Those at highest risk for this disease include children under the age of five and the elderly.<sup>10</sup> Persons who reside in LTC facilities are at an especially high risk of developing pneumococcal disease due to their advanced age and underlying comorbidities. Case fatality rates among individuals in LTC facilities from pneumococcal disease are between 27% and 44%.<sup>1</sup> Pneumococcal disease infections can range from mild, including otitis media and sinusitis, to severe, including pneumonia and meningitis. Pneumococcal infections are spread from person to person via respiratory droplets which can then travel to the ears, sinuses or lungs, and can even penetrate the blood stream.<sup>10</sup>

Roughly 93 different serotypes of pneumococci have been identified. Certain serotypes are more likely to cause severe disease than others; some of the highest mortality rates have been associated with types 3, 6B and 19F. Pneumococcal serotypes that cause invasive disease differ based on geographic location.<sup>10</sup>

## *Pneumococcal Vaccines*

There are currently two vaccines recommended by the CDC for prevention of pneumococcal disease, the 13-valent pneumococcal conjugate vaccine (PCV13) and the 23-valent pneumococcal polysaccharide vaccine (PPSV23).<sup>11</sup>

The PPSV23 vaccine is used to immunize the elderly and other high-risk individuals against pneumococcus. Serotypes in the PPSV23 vaccine have been chosen based on the dominant strains causing disease in the United States.<sup>10</sup> Among the 23 strains it covers are 3, 6B, and 19F, which are known to cause invasive disease.<sup>12</sup> PPSV23 is currently recommended for all adults 65 years and older and those ages 2 to 64 with certain high-risk conditions, including chronic heart and lung disease, diabetes, and cigarette smoking. Patients who receive a dose of PPSV23 under the age of 65 should receive one final dose when they are 65 years of age or older (at least 5 years after the prior dose).<sup>11</sup>

At one time, the Advisory Committee on Immunization Practice (ACIP) and CDC recommended PCV13 for all adults  $\geq 65$  years of age; however, in 2019, ACIP voted to remove this recommendation based on the theory that PCV13 use in children is expected to continue to reduce disease burden as patients age into their older adult years. If a patient  $\geq 65$  years of age has never received a dose of PCV13, shared clinical decision making with the health care provider should be utilized to determine if one is appropriate. If a dose of PCV13 is given, a dose of PPSV23 should follow one-year later.<sup>13</sup> Common adverse reactions associated with the PCV13 and PPSV23 vaccinations include pain, redness and swelling at the injection site, fatigue, headache, chills, decreased appetite, and muscle and joint pain.<sup>12,13</sup>

## Zoster

Varicella-zoster-virus (VZV) is commonly known as the chicken pox and is a highly contagious virus that causes itchy, rash-like spots all over the body. VZV is commonly spread through direct contact to lesions or saliva, which can aerosolize and transport the virus through the air. Most people experience VZV infections during their childhood. VZV stays within the body after recovery and hides within sensory nerves. Reactivation of the VZV is known as herpes zoster virus, and the physical infections that can manifest are known as “shingles”. Shingles infections occur in 10% to 20% of patients who were previously infected with VZV. The likelihood of these infections increases with age, with most infections occurring after the age of 50 years. Infections under that age are possible, but less likely.<sup>14</sup>

When a zoster infection occurs, the virus uses the sensory nerves to crawl toward the skin. The resulting infection consists of a painful rash that occurs in a localized spot on one side of the body. The pain can range from mild to extreme and in some cases, the pain can last up to 4 weeks. Long-term complications can include vision loss if infection is in the area of the eye, permanent nerve damage, and post-herpetic neuralgia (a continuation of nerve pain at the site of the rash that continues for more than 90 days). Immunocompromised patients are at a higher risk of a zoster infection. Finally, because the zoster infection is due to the VZV virus, patients with a current shingles infection can spread VZV to children or other adults who have not been previously exposed, causing chicken pox infections in those individuals.<sup>14</sup>

## *Zoster Vaccine*

Zoster vaccine live (ZVL, Zostavax) was introduced onto the market in 2006 and was recommended for patients 60 years and older. It was found to be 51% effective against preventing shingles and 66% effective at preventing post-herpetic neuralgia.<sup>2</sup> However, in 2017 the recombinant zoster vaccine (RZV, Shingrix) was approved. RZV was shown to be more effective than ZVL, with 97% effectiveness against shingles and 91% effectiveness against post-herpetic neuralgia.<sup>15</sup> Soon after its release, RZV became the vaccine of choice and was recommended by the CDC over ZVL. The increased efficacy of RZV was a driving force for this change, but another factor in its favor was its availability as an inactivated vaccine. ZVL was a live vaccine and, therefore, not always recommended for patients who were immunocompromised.<sup>15</sup>

ZVL was discontinued in November of 2020, so currently the only available zoster vaccine is RZV.<sup>14</sup> The CDC recommends RZV for all adults aged 50 years and older who are not pregnant and who are immunocompetent. The CDC has not yet specifically endorsed the use of RZV in immunocompromised patients because data are still lacking; however, it is not contraindicated in this population and studies are underway to provide more guidance.<sup>16</sup> RZV is a two-dose series with the second dose given no sooner than 2 months after the first dose and no later than 6 months.<sup>17</sup> If a patient does not receive the second dose within the 4-month timeframe, the series does not need to be restarted and the second dose can be given as soon as possible.<sup>16</sup> Adverse effects include a sore arm, redness or swelling around the injection site, fatigue, fever, headache, shivering, and muscle aches—many of which are standard adverse reactions with any vaccine.<sup>17</sup>

## Conclusion

Vaccinations against influenza, pneumococcal, and shingles infections are all routine immunizations that are recommended in older adults. The purpose of these vaccines is to prevent serious complications that can be associated with each of these diseases. It is important for older adults to talk to their providers, making decisions that are appropriate given age-, lifestyle-, and health-specific factors.

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