Long-Term Care Updates

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What's New in Vaccines

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Introduction

Vaccines remain an important tool for training the body to resist infection. The World Health Organization (WHO) estimated in 2019 that vaccinations prevent 2-3 million deaths each year and that an additional 1.5 million deaths could be prevented with expanded vaccine coverage worldwide.[1] Currently, vaccines can be used preventatively against more than 20 life-threatening diseases.[2] Innovation in the field of immunization is crucial to slowing the spread of illness and reducing mortality associated with vaccine-preventable diseases.

Respiratory Syncytial Virus

Respiratory syncytial virus (RSV) is a virus that typically causes mild, self-limiting upper respiratory symptoms; however, some patient populations are at risk for more severe presentation. Older adults and children under the age of 1 year can develop pneumonia or other respiratory complications that could potentially lead to hospitalization. The virus spreads through droplet contact, often due to sneezing, coughing, or touching contaminated surfaces. Precautions to avoid such contact are especially important during the peak season for viral transmission, occurring between during the fall and winter in the United States.[3] Table 1 on the next page provides a comparison of the products currently on the market for RSV vaccination.

Clinical Data Review

Wilson and colleagues at Moderna are evaluating the safety and efficacy of their new mRNA-based RSV vaccine (mRNA-1345, or "mResvia") in adults ≥ 60 years of age. This ongoing, randomized, double-blind, placebo-controlled trial enlisted 35,541 patients to either receive the new vaccine (n=17,793) or placebo (n=12,748). Primary efficacy endpoints included prevention of LRTD with two signs or symptoms, as well as with three signs or symptoms. A key secondary efficacy endpoint was prevention of RSV-associated acute respiratory disease. Follow-up occurred when approximately half of the anticipated cases of LRTD had occurred, and median time to follow-up was 112 days. Overall, researchers found that the efficacy of mResvia for prevention of RSV-associated LRTD was 83.7% (95.88% CI: 66.0, 92.2) with at least two signs or symptoms and 82.4% (96.36% CI: 34.8, 95.3) with at least three signs or symptoms. Efficacy for the secondary endpoint of RSV-associated acute respiratory disease was found to be 68.4% (95% CI 50.9, 79.7). Most adverse events were mild to moderate and self-limiting. In the treatment group, 58.7% of patients developed local adverse reactions, compared with 16.2% in the placebo group. Systemic reactions occurred in 47.7% of patients treated with mResvia versus 32.9% of those who received placebo.[7]

Table 1. Comparison of RSV Vaccines[4-6]

	Arexvy	Abrysvo	mResvia
Product	Respiratory Syncytial Virus Vaccine, Adjuvated Suspension for IM Injection	Respiratory Syncytial Virus Vaccine, Solution for IM Injection	Respiratory Syncytial Virus Vaccine, Suspension for IM Injection
Manufacturer	GlaxoSmithKline	Pfizer, Inc.	ModernaTX, Inc.
Pharmacologic category	Inactivated (Viral); Vaccine, Recombinant		mRNA Vaccine
Indication	Prevention of LRTD caused by RSV in people 60 years of age and older.	Prevention of LRTD caused by RSV in people 60 years of age and older. Immunization of pregnant individuals at 32 through 36 weeks gestational age for prevention of LRTD in infants from birth to 6 months of age.	Prevention of LRTD caused by RSV in people 60 years of age and older.
Dosage	0.5 mL IM as a single dose		
Preparation for administration	Prior to use, powder (lyophilized antigen vial) must be reconstituted with the liquid (adjuvant vial).	Reconstitute with provided syringe of sterile water diluent component.	Thaw pre-filled syringes to room temperature [15 to 25°C (59 to 77°C)] before administering.
Storage requirements after preparation	Administer immediately or store in the refrigerator between 2°C (35.6°F) and 8°C (46.4°F) or at room temperature [up to 25°C (77°F)] for up to 4 hours. Protect vials from light. Do not freeze.	Administer immediately or store at room temperature [15 to 30°C (59 to 86°F)] and use within 4 hours. Do not store in refrigerated conditions. Do not freeze.	Administer immediately or store at 8 to 25°C (46 to 77°F) for up to 24 hours after removal from refrigerated conditions. Do not refreeze or return to refrigerator. Do not shake.
Adverse reactions	Most commonly reported (≥ 10%) were injection site pain, fatigue, myalgia, headache, and arthralgia	Most commonly reported (≥ 10%) were fatigue, headache, injection site pain, muscle pain, fatigue (patients ≥ 60 years), and nausea (pregnant individuals)	Most commonly reported (≥ 10%) were injection site pain, fatigue, headache, myalgia, arthralgia, axillary swelling or tenderness, and chills
Availability	FDA approved May 2023; available now	FDA approved May 2023; available now	FDA approved May 2024; available now

IM: intramuscular, LRTD: lower respiratory tract disease, FDA: Food and Drug Administration

Recommendations

The most notable change from the previous year is the addition of Moderna's new mRNA vaccine to prevent RSV in patients ≥ 60 years: mResvia. A useful attribute of this vaccine is the fact that it is available in pre-filled syringes and does not require reconstitution like the other two formulations on the market.[6] Furthermore, Pfizer's vaccine Abrysvo received an additional indication to be used in pregnant individuals between 32 and 36 weeks' gestation for the prevention of RSV in the infant. As seen in Table 1, Abrysvo is currently the only RSV vaccine with FDA approval for use in this population.[5] Following this approval, in September 2023 the Center for Disease Control (CDC) Advisory Committee on Immunization Practices (ACIP) officially recommended that pregnant patients in this population should receive one dose of the RSV vaccine using seasonal administration in September through January.[8]

Recent changes to RSV immunization guidelines provided by ACIP could impact who receives RSV vaccination. In late June 2024, ACIP amended their recommendations for vaccination to state that adults ≥ 75 years of age should receive this immunization, and that adults 60-74 years of age should receive an RSV vaccine if they are at increased risk for severe RSV disease. Previously, the language approved by ACIP was that adults ≥ 60 years of age should receive an RSV vaccination following shared decision-making. Both the former and current guidelines recommend receiving only a single lifetime dose of RSV vaccine.[9] Box 1 below lists factors that place a patient at increased risk for severe RSV disease for the purpose of determining vaccine eligibility in patients 60-74 years of age.

Box 1. Risk factors for severe RSV disease[10]

Risk Factor
● Chronic lung disease (chronic obstructive pulmonary disease, asthma, etc.) ● Cardiovascular disease [congestive heart failure, coronary artery disease, etc. (excluding isolated hypertension)] ● Moderate or severe immune compromise ● Diabetes mellitus with end organ damage ● Severe obesity (body mass index ≥ 40 kg/m^2) ● Neurologic or neuromuscular conditions ● Advanced chronic kidney disease ● Liver disorders ● Hematologic disorders ● Residence at a long-term care facility ● Frailty

Note: List is not all-inclusive. Shared-decision making should be used to determine if a patient has any additional factors that may put them at risk for severe respiratory infection.

Pneumococcal Disease

Streptococcus pneumoniae is a gram-positive bacterium found in the respiratory tract of 5-90% of healthy individuals. There are over 100 known serotypes of this organism, but not all cause the clinical presentation associated with pneumococcal disease. Up to 5-10% of adults without children and 20-60% of school-aged children may be carriers without actually contracting the disease. Transmission, as with RSV, occurs through contact with respiratory droplets. Symptoms are often upper respiratory in nature and can include sinusitis and otitis media, but if left untreated, the disease could progress to pneumonia, bacteremia, or meningitis. Vaccination is necessary for preventing these escalations.[11]

Currently, there are three pneumococcal vaccines available on the market, one polysaccharide vaccine (PPSV23) and two conjugate vaccines (PCV15 and PCV20).[12] However, in June of 2024 the FDA approved a new 21-valent conjugate vaccine from Merck, called Capvaxive.[13] Shortly after, on June 27, 2024, ACIP voted to officially add Capvaxive to their recommendations for the treatment of pneumococcal disease.[14]

Clinical Data Review

Several phase 3 trials have been conducted or are ongoing to evaluate the safety and efficacy of Capvaxive (termed V116) in different populations. Platt and colleagues at Merck conducted a randomized, double-blind, active comparator-controlled, phase 3 trial to evaluate the safety and efficacy of Capvaxive in adults ≥ 18 years of age who were naïve to pneumococcal vaccination. Patients were split into two cohorts; adults in cohort 1 were ≥ 50 years of age and randomized 1:1 to receive either Capvaxive or PCV20 (n=2,362), while adults in cohort 2 were 18-49 years and randomized 2:1 to receive either Capvaxive or PCV20 (n=301). Randomization in cohort 1 was further stratified by age. Key primary outcomes were non-inferiority of Capvaxive to PCV20 in cohort 1 for serotypes covered by both vaccines, superiority of Capvaxive to PCV20 in cohort 1 for its unique serotypes, and non-inferiority of Capvaxive to PCV20 in cohort 2, compared with cohort 1. Non-inferiority was determined based on serotype-specific opsonophagocytic activity (OPA) geometric mean titers (GMT) ratios for serotypes common to both vaccines. Superiority was determined by a four-fold or greater rise in OPA response at day 30. Researchers evaluated safety based on proportions of adverse effects. Capvaxive met non-inferiority criteria for all serotypes covered by both Capvaxive and PCV20 ($p<0.0001$ for all), and it also met superiority for 10 of the 11 serotypes specific to Capvaxive ($p<0.0001$). The most common adverse effects were injection site pain, fatigue, and headache. Proportions of these events were similar across groups, with the exception that injection site pain was 12.2% higher in the PCV20 group versus the Capvaxive group in cohort 1 (53.6% and 41.4%, respectively). There were no vaccine-related serious adverse events in any group.[15]

Recommendations

Currently, the CDC's website for pneumococcal vaccination lists only recommendations for PCV15, PCV20, and PPSV23, with the caveat that a new PCV21 vaccine has been approved for use by the CDC and that the written recommendations will soon be updated to reflect that. Based on the nomenclature voted on and agreed upon at the June 27 ACIP meeting, projected changes to these recommendations are highlighted in red in Table 2 below.[14]

Table 2. CDC guidelines for pneumococcal vaccination[14,16,17]

Vaccination	PCV15 or PCV20	PPSV23	PCV21 (Capvaxive)
Patient Population	●Children ≤ 5 years ●Age 5-64 years with risk conditions* and no previous PCV ●Age ≥ 65 years and no previous PCV ●PCV20 only: patients who previously received PCV13 and have not yet received all recommended PPSV23 doses	●Ages 2-18 years with risk conditions* who received PCV15 ●Age ≥ 19 who received PCV15 ●Previously received PCV13 ●Patients who previously received PCV13 and have not yet received all recommended PPSV23 doses	●Ages 19-64 years with risk conditions* and no previous PCV ●Age ≥ 65 years and no previous PCV ●Age ≥ 19 years who previously received PCV13 and have not yet received all recommended PPSV23 doses

*Risk factors include: alcoholism, chronic heart/liver/lung disease, chronic renal failure, cigarette smoking, cochlear implant, congenital or acquired asplenia, cerebrospinal fluid leak, diabetes mellitus, generalized malignancy, human immunodeficiency virus (HIV), Hodgkin disease, immunodeficiency/immunosuppression, leukemia, lymphoma, multiple myeloma, nephrotic syndrome, solid organ transplant, sickle cell disease, and other hemoglobinopathies.

Capvaxive is administered as a single 0.5mL intramuscular injection via prefilled syringe. As such, there are no requirements for preparation or reconstitution aside from the need to attach a needle to the Luer Lock syringe tip. It should be stored in the refrigerator between 2 and 8°C (36 to 46°F) until use and protected from light. Do not freeze Capvaxive.[13]

COVID-19

COVID-19 is an infectious viral disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and is spread via respiratory droplets. COVID-19 has a varied clinical presentation, ranging from mild cold and flu-like symptoms to more serious complications such as shortness of breath, pneumonia, heart problems, acute kidney injury, or organ failure. Individuals at risk for serious complications or hospitalizations include geriatric patients and those with underlying medical conditions (i.e., diabetes, cardiovascular disease, respiratory disease, cancer).[18] Vaccinations have been integral in reducing severity of symptoms and saving lives. According to Watson et al., an estimated 14.4 million deaths from COVID-19 were prevented in 185 countries and territories from December 8, 2020, to December 8, 2021.[19] The current vaccines authorized and available by the FDA are bivalent mRNA vaccines (Moderna, Pfizer-BioNTech) and protein subunit vaccine (Novavax, Adjuvanted).[20]

Recommendations

One important change to ACIP recommendations from the previous year is that the Novavax vaccine—which received emergency use authorization from the FDA in July 2022 and October 2023—is now accepted by the CDC for use in patients ≥ 12 years of age. The original series for immunocompetent unvaccinated patients typically consists of two 0.5mL intramuscular doses, followed by any indicated or updated boosters as necessary.[20,21] On April 25, 2024, ACIP also approved an additional dose of 2023-2024 vaccine formulations for patients ≥ 65 years, to be given at least 4 months after the previous dose.[22] It should be noted, however, that current schedules recommend vaccinating with the most recent approved formulations on the market, which according to the CDC, should be the 2024-2025 version for this fall and winter season. Finally, on June 27, 2024, ACIP updated its recommendations to include scheduling for the Pfizer-BioNTech and Moderna bivalent vaccinations in patients as young as 6 months.[23] The most current vaccination schedule per ACIP is reflected in Table 3 on the next page; however, clinicians should refer to the most current guidance published by the CDC as recommendations for COVID rapidly change.

Influenza

Influenza (flu) is a contagious virus that causes acute respiratory infection of the nose, throat, and lungs. Most individuals experience mild symptoms and will recover quickly without medical intervention; however, influenza can cause severe illness resulting in hospitalization or death, especially among the very young, the elderly, and those with serious health conditions.[24]

Recommendations

On June 27, 2024, ACIP released the CDC's updated recommendations for flu vaccination this 2024-2025 season. They reaffirmed their previous recommendation that everyone ≥ 6 months of age should receive a single dose of the updated vaccine unless contraindicated. They acknowledge that the best time to receive the vaccine would be during September and October, and they do not recommend flu vaccination in late July or August unless it would be impossible for an individual to receive the vaccine later.[23] Formulations for most age groups this year are trivalent, but according to the CDC, it is "preferred" that patients ≥ 65 years receive either the quadrivalent high-dose inactivated influenza vaccine (HD-IIV4), quadrivalent recombinant influenza vaccine (RIV4), or quadrivalent adjuvanted inactivated influenza vaccine (aIIV4).[20] Vaccine formulations for the 2024-2025 season will be active against H1N1, H3N2, and a B/Victoria lineage virus. Notably, the influenza A virus H3N2 will be an updated version as compared to last year's formulation.[23]

Table 3. Recommendations for COVID-19 vaccinations[20,22]

	Pfizer	Moderna	Novavax
Age 6 months to 4 years			
Not previously vaccinated	Three doses.	Two doses. Three doses if immunocompromised.	Not mentioned in guidelines
Previously vaccinated with 1 dose of any Moderna	Not mentioned in guidelines	One additional dose. Two additional doses if immunocompromised.	Not mentioned in guidelines
Previously vaccinated with 2 or more doses of any Moderna	Not mentioned in guidelines	One additional dose.	Not mentioned in guidelines
Previously vaccinated with 1 dose of any Pfizer	Two additional doses.	Not mentioned in guidelines	Not mentioned in guidelines
Previously vaccinated with 2 or more doses of any Pfizer	One additional dose.	Not mentioned in guidelines	Not mentioned in guidelines
Age 5-11 years			
Not previously vaccinated	One dose. Three doses if immunocompromised.	One dose. Three doses if immunocompromised.	Not mentioned in guidelines
Previously vaccinated with 1 or more doses of Moderna or Pfizer	One additional dose. *Complete series with whichever brand was previously received before administering booster if immunocompromised.	One additional dose. *Complete series with whichever brand was previously received before administering booster if immunocompromised.	Not mentioned in guidelines
Age 12-18 years			
Not previously vaccinated	One dose. Three doses if immunocompromised.	One dose. Three doses if immunocompromised.	Two doses.
Previously vaccinated with any COVID-19 vaccine(s)	One additional dose. *Complete series with whichever brand was previously received before administering booster if immunocompromised.	One additional dose. *Complete series with whichever brand was previously received before administering booster if immunocompromised.	One additional dose. *Complete series with whichever brand was previously received before administering booster if immunocompromised.
Age **≥19 years**			
Not previously vaccinated	One dose. Three doses if immunocompromised.	One dose. Three doses if immunocompromised.	Two doses.
Previously vaccinated with any COVID-19 vaccine(s)	One additional dose. *Complete series with whichever brand was previously received before administering booster if immunocompromised.	One additional dose. *Complete series with whichever brand was previously received before administering booster if immunocompromised.	One additional dose. *Complete series with whichever brand was previously received before administering booster if immunocompromised.

NOTE: Pfizer vaccination is available as a 0.3mL IM injection. Moderna and Novavax vaccinations are available as 0.5mL IM injections. All doses should be the most current formulations on the market, which are the 2023-2024 formulations as of July 31, 2024.[20]

Conclusion

Due to evolving diseases and medical advancements, vaccine schedules and recommendations are updated frequently to reflect the most recent and current information. This allows for effective and safe care to reach communities and individuals for protection and prevention from severe disease, hospitalization, or death.[25] It is recommended to routinely check ACIP for updated guidelines because changes can occur throughout the year. Healthcare providers are a valuable resource to patients regarding vaccine information and administration; leaving a lasting impact on the communities served.

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