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Comprehensive Vaccination Practices for Adult Healthcare: A Guide for nurses

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Abstract

Vaccination is a crucial aspect of health promotion and disease prevention, with a history dating back to the introduction of the smallpox vaccine in 1798. Despite the effectiveness of vaccines in reducing the incidence of preventable communicable diseases, vaccination rates remain suboptimal in the United States, partly due to the proliferation of misinformation about vaccine safety. This article provides nurses caring for adults with a concise overview of essential information necessary for effective patient care, including vaccine administration schedules, clinical considerations, patient-provider discussions, and addressing common myths surrounding vaccination. The article covers various vaccine-preventable diseases, such as hepatitis A and B, human papillomavirus (HPV), influenza, measles, mumps, rubella, meningococcal disease, pneumococcal disease, tetanus, diphtheria, pertussis, varicella, and herpes zoster. For each disease, the article discusses the epidemiology, risk factors, available vaccines, and important contraindications. The role of the immune system in vaccine-induced immunity is also explained, highlighting the importance of humoral and cell-mediated immunity. The article emphasizes the need for nurses to identify at-risk individuals, ensure appropriate immunization, and provide

accurate and evidence-based information to address patient concerns. By collaborating with patients to ensure access to reliable information and timely immunizations, nurses play a vital role in promoting health and reducing the risks associated with vaccine-preventable diseases.
Keywords: Vaccination, nurses, Adult Healthcare, Vaccination guidelines, Immunization practices, Nurse education, Vaccine administration.

Introduction

Vaccination has been a pivotal aspect of health promotion and disease prevention since the introduction of the smallpox vaccine in 1798 (Plotkin, 2014). Throughout the history of vaccination and in modern times, substantial attention has been focused on the role of vaccination in maintaining population health. This focus is due, in part, to the presence of a vocal anti-vaccine movement, the proliferation of misinformation about vaccine safety, and increasing cases of preventable communicable diseases in the United States (Dubé et al., 2015). Additionally, a global initiative to develop a vaccine for the prevention of severe acute respiratory syndrome coronavirus 2 has underscored the critical role vaccination plays in public health. It is essential for nurses to have a thorough understanding of vaccination practices. Collaborating with patients to ensure access to reliable information and timely immunizations is vital for promoting health and reducing risks.

This article aims to provide Nurses who care for adults with a concise overview of essential information necessary for effective patient care. While not exhaustive, this overview is intended as a refresher for clinicians managing adult and older adult patients. Key topics include vaccine administration schedules, clinical considerations for patient vaccination, patient-provider discussions on vaccination, and addressing myths surrounding vaccination.

To establish a foundation, it is important to introduce common terms related to vaccination. These include:

- **Live-attenuated vaccines**: These vaccines use a weakened form of the virus that causes disease. Examples include the varicella and measles-mumps-rubella vaccines.
- **Inactivated vaccines**: These vaccines contain viruses that are no longer capable of reproducing. Examples include the hepatitis A vaccine and injectable influenza vaccines.
- **Subunit, recombinant, polysaccharide, and conjugate vaccines**: These vaccines utilize specific components of disease-causing germs, such as proteins, capsids, or sugars, to confer immunity. Examples include hepatitis B and shingles vaccines.
- **Toxoid vaccines**: These vaccines use toxins produced by disease-causing organisms that have been treated to eliminate their toxic effects, thereby inducing immunity through antibody production. Examples include tetanus and diphtheria vaccines.

Understanding the role of the immune system in vaccine-induced immunity is crucial. Immunization primarily leverages the human body's adaptive immune system, which is advantageous in preventing infectious diseases because it can develop a memory of specific pathogens (Clem, 2011).

A critical component of this process is humoral immunity, wherein B cells generate antibodies, also known as immunoglobulins (Ig). These B cells are produced in the bone marrow and migrate to lymph nodes. When an antigen binds to a B cell, it differentiates into a plasma cell, capable of producing approximately 2,000 antibody molecules per second. In some cases, B cell activation requires the involvement of T-helper cells, which amplify the immune response when necessary. The ultimate objective of immunization is the creation of memory cells that ensure a robust and long-lasting immune response.

During the initial encounter with an antigen, antigen-specific IgM antibodies are produced over several days by plasma cells. IgM antibodies indicate the acute phase of an infection. Over the following months, IgG antibodies are generated, offering more effective neutralization of

antigens, enhancing phagocytosis through opsonization, and activating the complement system. Subsequent antigen exposures prompt IgG-mediated secondary immune responses that are both rapid and potent.

In addition to humoral immunity, cell-mediated immunity is a fundamental component of active immunity. This type of immunity primarily safeguards the body against intracellular pathogens, such as viruses. The key players in cell-mediated immunity are CD4 and CD8 T cells. Unlike humoral immunity, cell-mediated immunity does not involve antibody secretion. Instead, it relies on the presentation of intracellular pathogens via major histocompatibility complexes on the surface of cells, alongside self-antigens. T cells become activated when they recognize these complexes, initiating processes that suppress viral replication, facilitate primary T-cell responses, or activate B cells to mount a coordinated immune defense. As noted by Amanna and Slifka (Amanna & Slifka, 2011), many early vaccines successfully employed this mechanism to establish human immunity against specific pathogens.

Hepatitis A

Hepatitis A (HAV) is a viral infection that leads to liver inflammation and is transmitted via the fecal–oral route. It accounts for approximately one-third of all viral hepatitis cases in developed countries. In the United States, the incidence of HAV infections had decreased by over 95% from 1995 to 2011; however, since 2016, there has been a significant rise in cases. Notably, over 75% of adults with HAV remain asymptomatic during infection, emphasizing the need for healthcare providers to understand HAV vaccination guidelines and actively promote immunization.

The Centers for Disease Control and Prevention (CDC) identifies several groups at increased risk of HAV infection, including international travelers, men who have sex with men, individuals who use illicit drugs, persons at occupational risk for exposure, individuals expecting close contact with an international adoptee, and people experiencing homelessness. Additionally, incarcerated populations face an elevated risk of HAV infection.

The HAV vaccine (HepA) has been part of the standard childhood immunization schedule since 1994. Given its relatively recent inclusion, many adults may not have received this vaccine as part of routine care. For unvaccinated individuals who have not previously contracted HAV, the CDC recommends two doses of the Havrix vaccine administered 6 to 12 months apart or two doses of the Vaqta vaccine given 6 to 18 months apart. Both Havrix and Vaqta are inactivated, single-antigen vaccines. An alternative option is the bivalent HAV and hepatitis B vaccine (Twinrix), which is administered in a three-dose series at 0, 1, and 6 months. Twinrix contains a lower dose of the hepatitis A antigen compared to single-antigen vaccines and may be suitable for patients requiring protection against both hepatitis A and B. Providers should assess the local prevalence of HAV and encourage vaccination in endemic regions.

Important contraindications:

- Both Havrix and Vaqta are contraindicated for individuals with latex or neomycin allergies, as latex is part of the vaccine packaging and neomycin is used during the manufacturing process of the HepA vaccine.

Hepatitis B

Hepatitis B (HBV) is a viral infection that causes liver inflammation, similar to HAV; however, HBV can result in chronic, lifelong infection in some individuals. Alarmingly, HBV was identified as an underlying or contributing cause of death in over 1,600 cases in 2018, primarily due to its role as a significant risk factor for liver cirrhosis and hepatocellular carcinoma. Transmission of HBV commonly occurs from mother to child during childbirth or through contact with the blood or bodily fluids of an infected person. Currently, it is estimated that approximately 850,000 people in the United States are living with chronic HBV, with around

20,900 acute infections reported annually. Despite these statistics, only about 25% of adults over the age of 19 in the United States have been vaccinated against HBV.

Healthcare providers must address the low immunization rates and implement reminders during routine visits to encourage vaccination. Unvaccinated individuals at higher risk include people who use injection drugs, individuals with HBV-positive sexual partners, men who have sex with men, individuals living with someone infected with HBV, healthcare and public safety workers with potential blood exposure, and hemodialysis patients.

The CDC recommends HBV vaccination for all adults who desire protection and those identified as at-risk. Current options include two-dose and three-dose single-antigen recombinant vaccines. The two-dose series (Heplisav-B) should be administered at least four weeks apart, while the three-dose series (Engerix-B or Recombivax HB) is given at 0, 1, and 6 months. The three-dose bivalent HAV–HBV vaccine (Twinrix) is also available for patients requiring protection against both HAV and HBV.

Important contraindications:

- Caution is necessary for individuals with yeast or latex allergies, as these substances are used during the manufacturing and packaging processes.
- Heplisav-B is not recommended for pregnant women due to limited safety data in this population.

Human Papillomavirus

Human papillomavirus (HPV) is the most prevalent sexually transmitted infection in the United States, with an estimated 79 million Americans currently infected. HPV is linked to cancers of the genitals, anus, and oropharynx, with strains 16 and 18 responsible for nearly 70% of cervical cancer cases (Villa, 2011). In 2006, the U.S. Food and Drug Administration (FDA) approved the first vaccine for HPV, GARDASIL, which targeted four strains (16, 18, 6, and 11). This was followed in 2009 by CERVARIX, a bivalent vaccine protecting against strains 16 and 18 (Villa, 2011). In 2014, a 9-valent vaccine, Gardasil 9, was approved and remains the only licensed HPV vaccine in the United States. Gardasil 9 offers protection against high-risk, cancer-associated HPV strains and additional protection against low-risk, wart-causing strains. All approved HPV vaccines utilize virus-like particles formed from HPV surface components, without containing viral DNA.

Vaccination rates for HPV remain uneven between men and women. Among females aged 19 to 26 years, 48.5% reported receiving at least one dose of the HPV vaccine, compared to only 13.5% of males in the same age group. To address these low rates, nurses should recommend HPV vaccination for both males and females aged 15 to 45 years. The number of doses required depends on the individual's age at the start of vaccination. For those initiating the series before their 15th birthday, the CDC recommends two doses spaced at least six months apart. Individuals starting the series between 15 and 45 years of age require a three-dose series at 0, 2, and 6 months.

Nurses frequently encounter misconceptions about the HPV vaccine (Bednarczyk, 2019). Common myths include beliefs that the HPV vaccine can lead to infertility or cause an HPV infection. However, as noted by the CDC, the HPV vaccine is a recombinant vaccine, meaning it cannot cause an active HPV infection. Additionally, extensive research has demonstrated no association between the HPV vaccine and infertility (Schmuhl et al., 2020). For parents concerned that HPV vaccination might promote sexual promiscuity, studies have conclusively refuted this claim (Coles et al., 2015).

Important contraindications:

- Gardasil 9 is contraindicated for individuals allergic to yeast, as it is used in the vaccine manufacturing process.

Influenza

Influenza, commonly referred to as "the flu," is a contagious respiratory illness transmitted through droplets produced during coughing, sneezing, or talking. It can also spread through contact with contaminated surfaces or objects followed by touching the mouth or nose. Each year, influenza affects approximately 8% of the U.S. population (Tokars et al., 2018). Although older adults experience a lower incidence of influenza compared to younger populations, they face significantly higher rates of hospitalization and mortality (Wilhelm, 2018). Younger adults with specific health conditions, such as pregnancy, diabetes, or cardiovascular and pulmonary diseases, are also at increased risk for influenza-related complications. Despite these risks, only 45.3% of adults in the U.S. were vaccinated during the 2018–2019 flu season, according to CDC estimates.

The CDC recommends annual influenza vaccination for all individuals over six months of age, using any vaccine appropriate for the person's age and health status. The vaccine is most effective when administered early in the fall, prior to the onset of community-wide viral spread. Several formulations of the influenza vaccine are available. The most commonly used are the inactivated influenza vaccine, the quadrivalent recombinant influenza vaccine, and the quadrivalent live attenuated influenza vaccine. The inactivated and quadrivalent recombinant vaccines are administered intramuscularly, while the live attenuated vaccine is delivered intranasally. The inactivated vaccine is approved for individuals older than six months, whereas the quadrivalent recombinant vaccine is licensed for those 18 years and older. The quadrivalent live attenuated vaccine is suitable for individuals aged 2 to 49 years. For patients aged 65 and older, a high-dose inactivated trivalent vaccine is available. This high-dose vaccine contains four times the antigen content of standard-dose vaccines and has been shown to elicit a stronger immune response in older adults (DiazGranados et al., 2014).

Important contraindications:

- The live attenuated influenza vaccine should not be administered to immunocompromised individuals, those with anatomic or functional asplenia, individuals with cochlear implants, patients with cerebrospinal fluid–oropharyngeal communication, caregivers or close contacts of immunocompromised individuals, pregnant individuals, or those treated with antiviral medication for influenza in the preceding 48 hours.
- For patients with severe egg allergies, influenza vaccination should be conducted in settings where allergic reactions can be promptly recognized and managed.
- Individuals with a history of Guillain–Barré syndrome within six weeks of receiving a prior influenza vaccine should not be vaccinated unless the benefits outweigh the risks.

Measles, Mumps, and Rubella

Measles is a highly contagious respiratory disease caused by the *Morbillivirus* genus, transmitted through respiratory droplets or aerosols (Naim, 2015). Though often considered a childhood illness, about 20% of unvaccinated individuals in the U.S. who contract measles require hospitalization. Measles was declared eliminated in the U.S. in 2000 due to a robust vaccination program. However, outbreaks continue to occur in communities with low vaccination rates and among travelers returning from regions where measles is prevalent.

Mumps, caused by a *Paramyxovirus*, is another viral illness spread via respiratory droplets. While mumps is also regarded as a childhood disease, outbreaks have been reported among adults in their 20s and 30s. Adults with mumps are more likely to experience severe symptoms and complications, such as deafness, orchitis in males, and oophoritis in females. Despite the availability of an effective vaccine, periodic outbreaks still occur.

Rubella, also known as German measles, is caused by a togavirus and spreads through inhalation of infected droplets. While rubella often results in mild symptoms, including arthritis

in 70% of females, approximately 25% to 50% of cases are asymptomatic. The primary concern with rubella is its teratogenic potential, particularly if contracted during the first trimester of pregnancy. Congenital rubella syndrome can lead to deafness, heart defects, intellectual disabilities, low birth weight, and damage to the liver and spleen. Additionally, the syndrome increases the risk of miscarriage or stillbirth. Although rubella was declared eliminated in the U.S. in 2014, sporadic cases continue to occur, mainly among unvaccinated individuals entering the country from abroad.

In 1998, an article published in *The Lancet* by Wakefield and colleagues falsely claimed a connection between the measles, mumps, and rubella (MMR) vaccine and autism. Although the article was retracted in 2010, the misinformation it perpetuated continues to influence public opinion (Flaherty, 2011). Numerous studies have consistently debunked the purported link between the MMR vaccine and autism (Di Pietrantonj et al., 2020). Given the misinformation fueled by this single fraudulent study, it is crucial for Nurses to provide accurate and evidence-based information when addressing concerns about the MMR vaccine.

In the United States, vaccines for measles, mumps, and rubella are combined into a single formulation known as MMR II. This vaccine is live-attenuated, requiring special caution for individuals with immunocompromising conditions as detailed elsewhere in this discussion. Additionally, another live vaccine combining MMR and varicella (ProQuad) is available; however, this formulation has not been approved for use in adults in the United States.

The CDC advises administering one dose of the MMR vaccine to adults without evidence of immunity. Evidence of immunity includes documentation of vaccination or laboratory confirmation of immunity. Specific health conditions and circumstances may necessitate additional doses. Healthcare personnel represent a special population for vaccination. Those born before 1957 without documented immunity should receive a 2-dose series administered 4 weeks apart for measles or mumps and a single dose for rubella. Those born in 1957 or later should follow the same protocol: 2 doses spaced 4 weeks apart for measles or mumps and at least one dose for rubella.

Important Contraindications:

- Contraindicated in individuals with HIV infection and a CD4 count below 200 cells/μL.
- Contraindicated for individuals with severe immunocompromising conditions.
- Not to be administered to individuals with active, untreated tuberculosis.
- Should not be given to individuals with a febrile illness where fever exceeds 101.3°F.
- Contraindicated for individuals who are pregnant or planning to become pregnant within one month.

Meningococcal Disease

Meningitis, an inflammation of the meninges, may result from infection by viruses or bacteria. Common bacterial pathogens include *Streptococcus pneumoniae*, group B *Streptococcus*, *Neisseria meningitidis*, *Haemophilus influenzae*, and *Listeria monocytogenes*. Among these, *N. meningitidis* is classified into 13 serogroups, with serogroups A, B, C, W135, and Y being most frequently associated with invasive disease. In the United States, serogroup Y predominates (McGill et al., 2016). Transmission occurs through respiratory secretions, such as during coughing, kissing, or prolonged close contact.

Licensed meningococcal vaccines in the U.S. target the five common serogroups mentioned above. Additionally, pneumococcal and *Haemophilus influenzae* type B vaccines protect against other bacterial causes of meningitis.

Although cases of meningococcal disease have declined in the United States, adolescents and young adults aged 16 to 23 years experience the highest rates of infection. The CDC reports that up to 15% of individuals infected with meningococcal disease succumb to the illness, while 20% of survivors face long-term disabilities, including deafness, neurological damage, and

limb loss. Nurses should identify at-risk individuals and ensure appropriate immunization to mitigate adverse outcomes.

Risk factors for adult meningococcal disease include living in group settings, such as college dormitories, immunocompromising conditions or medications, travel to sub-Saharan Africa, and occupational exposure to meningitis-causing bacteria. Identifying these risk factors is essential for determining the need for vaccination.

For adolescents, the CDC recommends a meningococcal conjugate (MenACWY) vaccine at ages 11–12, followed by a booster dose at age 16. Nurses caring for adolescents should confirm that patients have completed the series by their 16th birthday.

Two licensed MenACWY vaccines are available in the U.S.: meningococcal polysaccharide diphtheria vaccine (Menactra) and meningococcal oligosaccharide diphtheria vaccine (Menveo). Both vaccines are approved for individuals aged 2 to 55 years. Neither vaccine protects against meningococcal group B (MenB).

There are two MenB vaccines licensed in the United States: MenB-FHbp (Trumenba) and MenB-4C (Bexsero). Both are approved for individuals aged 10–25 years. Adolescents aged 16–23 without additional risk factors should engage in shared decision-making with their nurse regarding MenB vaccination. For those electing to vaccinate, the CDC recommends either a 2-dose series of MenB-4C spaced 1 month apart or a 2-dose series of MenB-FHbp at 0 and 6 months. If the second dose of MenB-FHbp is administered less than 6 months after the first, a third dose should be given 4 months later. Importantly, MenB-4C and MenB-FHbp are not interchangeable; the same product must be used to complete the series.

Certain groups require special consideration for MenB vaccination. Adults with functional or anatomic asplenia, sickle cell disease, persistent complement component deficiencies, or those taking complement inhibitors should receive either a 2-dose series of MenB-4C spaced 1 month apart or a 3-dose series of MenB-FHbp administered at 0, 1–2, and 6 months. If the second MenB-FHbp dose is given at least 6 months after the first, the third dose is unnecessary. Similarly, microbiologists handling *N. meningitidis* are advised to follow the same vaccination schedule.

Important Contraindications:

- MenACWY is contraindicated in individuals with severe allergies to vaccine components, including diphtheria toxoid.
- MenACWY administration should be delayed in patients with moderate or severe acute illness.
- MenB vaccination should be postponed until after pregnancy unless the benefits clearly outweigh the risks.

Pneumococcal

Pneumonia, an infection of the lower respiratory tract, is caused by various organisms, including *Streptococcus pneumoniae*, *Mycoplasma pneumoniae*, *Haemophilus influenzae*, *Chlamydophila pneumoniae*, and several respiratory viruses. Older adults are particularly susceptible to community-acquired pneumonia in the United States due to the presence of comorbid conditions and diminished immune function. Despite the significant mortality associated with pneumonia, the CDC estimates that only 60–70% of adults over 65 years old and 18–24% of younger adults at risk are vaccinated. Common risk factors include individuals aged 65 years or older, those with chronic medical conditions, cigarette smokers, people with alcohol addiction, and those living with HIV infection.

In 2019, the Advisory Committee on Immunization Practices revised its recommendations for routine vaccination in adults aged 65 years and older (Matanock et al., 2019). Previously, all adults in this age group were advised to receive a two-dose series of pneumococcal vaccines: the 13-valent pneumococcal conjugate vaccine (PCV13, marketed as Prevnar 13) followed by

the 23-valent pneumococcal polysaccharide vaccine (PPSV23, marketed as Pneumovax 23). Currently, routine use of PCV13 in older adults is no longer recommended; instead, this population should receive a single dose of PPSV23. Shared clinical decision-making between patients and clinicians is encouraged to determine if PCV13 is appropriate for individual cases (Matanock et al., 2019). The CDC advises administering PCV13 first if both vaccines are used, followed by PPSV23 at least one year later.

Certain conditions necessitate pneumococcal vaccination before age 65. Adults aged 19–64 with chronic heart, lung, or liver disease; diabetes; alcoholism; or who smoke cigarettes should receive one dose of PPSV23. Individuals with immunocompromising conditions or anatomic or functional asplenia should be vaccinated with one dose of PCV13, followed by PPSV23 at least eight weeks later. A second dose of PPSV23 is recommended five years after the first, with a final PPSV23 dose at age 65 or older, provided at least five years have elapsed since the previous dose. Patients with cerebrospinal fluid leaks or cochlear implants should receive one dose of PCV13, followed by PPSV23 at least eight weeks later, with a final PPSV23 dose at age 65, again separated by at least five years.

Important Contraindications:

- PPSV23 should not be administered to patients with a history of severe allergic reactions to any diphtheria toxoid-containing vaccine, as this is a component of PPSV23.

Tetanus, Diphtheria, and Pertussis

Tetanus is a potentially fatal bacterial infection caused by *Clostridium tetani*. Symptoms include muscle rigidity, spasms, and the classic manifestation of lockjaw. Since the introduction of vaccines in the 1940s, tetanus cases have dramatically decreased in the United States, with only 18 cases reported in 2009, most of which occurred in unvaccinated individuals or those without recent booster doses.

Diphtheria is caused by toxigenic strains of *Corynebacterium diphtheriae*. This disease can affect various mucous membranes, including the respiratory tract and skin, and is typically associated with sore throat, nasal discharge, hoarseness, fever, and malaise. Severe cases may involve airway obstruction, myocarditis, heart failure, neuritis, or death. Although rare in the United States, with only five cases reported since 2000, diphtheria remains prevalent in other parts of the world. Providers treating adult populations, especially immigrants, should assess vaccination status and encourage immunization when indicated.

Pertussis, or whooping cough, is a respiratory infection caused by *Bordetella pertussis* and spread through respiratory droplets. Like tetanus and diphtheria, pertussis is a toxin-mediated disease. It progresses through stages, with the paroxysmal stage occurring within 1–6 weeks. This stage is characterized by rapid bursts of coughing followed by a high-pitched inspiratory "whoop". Although adult deaths from pertussis are rare, complications such as urinary incontinence, pneumonia, rib fractures, and sleep disruption can occur.

Vaccines against tetanus (1924), diphtheria (1920s), and pertussis (1914) were developed in the early 20th century as toxoid vaccines. Today, combined vaccines for tetanus, diphtheria, and pertussis (Tdap) are available under the trade names Boostrix and Adacel. Adacel is approved for individuals aged 10–64, while Boostrix is approved for those aged 10 and older. Additionally, two combined tetanus and diphtheria toxoid (Td) vaccines, including a generic formulation and Tenivac, are available for individuals aged seven years and older.

The CDC recommends routine Tdap vaccination for individuals without a prior history of primary immunization. The series includes one dose of Tdap, followed by a dose of Td or Tdap four weeks later, and a third dose of Td or Tdap 6–12 months after the second dose. If Tdap was not received at age 11, one dose should be administered, with subsequent Tdap or Td boosters every ten years. A tetanus-toxoid-containing vaccine is also recommended for wound management if more than five years have elapsed since the last Td or Tdap dose (Liang et al.,

2018). Additionally, pregnant individuals should receive a single Tdap dose during each pregnancy, preferably between 27 and 36 weeks of gestation.

Important Contraindications:

- Moderate to severe acute illness.
- Tdap is contraindicated for individuals with a history of encephalopathy without an identifiable cause occurring within seven days of a pertussis-containing vaccine.
- Precaution should be exercised for patients with a history of Guillain-Barré syndrome within six weeks of receiving a tetanus-toxoid-containing vaccine or those with progressive neurological disorders.

Varicella

The varicella-zoster virus (VZV), commonly referred to as chickenpox, is a highly contagious infection that typically occurs during childhood. Although only approximately 2% of VZV cases occur in individuals older than 20 years, this age group accounts for nearly half of all VZV-related deaths. One of the most severe complications of VZV infection is pneumonia, which can be life-threatening. The varicella vaccine (VAR) was introduced in 1995 as a single-dose vaccination. In 2006, a second dose was added to the vaccination schedule to enhance protection (Bialek et al., 2013). Despite a significant reduction in VZV incidence following vaccination, a small proportion of adults may remain unvaccinated or lack a known history of varicella disease or immunization. Nurses should routinely assess patients' exposure history and vaccination status.

Currently, the only licensed single-antigen VAR in the United States is marketed under the trade name Virivax, and it is approved for adult use. The CDC advises that individuals without evidence of immunity and no prior varicella vaccination should receive a two-dose series of VAR, administered 4 to 8 weeks apart, if born before 1980. For individuals who have evidence of only one prior VAR dose, a second dose should be administered at least 4 weeks after the first. Health care workers are advised to follow these recommendations and should be vaccinated regardless of being born before 1980 if they lack evidence of immunity.

Nurses may also consider VAR for individuals with HIV who have a CD4 count of 200 cells/μL or greater, following a modified schedule of two doses spaced 3 months apart.

Important Contraindications:

- VAR should not be administered during pregnancy.
- VAR is contraindicated in individuals with severe immunocompromising conditions.
- VAR is contraindicated in patients with HIV infection and a CD4 count less than 200 cells/μL.
- VAR should not be administered to patients with febrile illness or active infection, including untreated tuberculosis.
- VAR is contraindicated for individuals with allergies to neomycin or gelatin, as these are vaccine components.
- Salicylates should not be used in individuals aged 12–17 years for 6 weeks after VAR administration.
- Vaccination should be deferred for at least 5 months following blood or plasma transfusions or immune globulin administration.

Herpes Zoster

Herpes zoster (HZ), also known as shingles, is caused by the reactivation of the varicella-zoster virus, which remains dormant in the dorsal root ganglia for years or decades following primary VZV infection. HZ manifests as a painful or pruritic rash, commonly on the trunk but occasionally involving the face or presenting without a rash. HZ is prevalent in the United States, with approximately 1 million cases annually. The CDC estimates that one in three

individuals will develop HZ during their lifetime. The incidence of HZ increases with age, with approximately one case per 100 individuals aged 60 years or older.

HZ can lead to serious complications, including postherpetic neuralgia, a debilitating neuropathic pain resulting from sensory nerve damage. About 10% of individuals aged 60–69 years and 20% of those aged 80 years or older experience this complication. Additionally, immunosuppressed individuals have a higher likelihood of hospitalization and, though rare, an increased risk of mortality due to HZ. Other complications include vision loss and cranial or peripheral nerve palsies.

Currently, two vaccines for HZ are licensed in the United States. The first, zoster live vaccine (ZVL, marketed as Zostavax), was licensed in 2006 but has not been available for sale in the United States since July 1, 2020. In 2018, the Advisory Committee on Immunization Practices recommended a newer recombinant, adjuvanted zoster vaccine (RZV, marketed as Shingrix) in a two-dose series beginning at age 50 (Dooling et al., 2018).

The CDC recommends that individuals aged 50 or older receive a two-dose series of RZV, administered 2 to 6 months apart, with a minimum interval of 4 weeks between doses. This recommendation applies even to those who have previously received ZVL, although RZV should not be administered within 2 months of ZVL vaccination.

The Advisory Committee on Immunization Practices reported that RZV is approximately 97% effective in preventing HZ and 91% effective in preventing postherpetic neuralgia. Given its demonstrated efficacy, Nurses should strongly encourage patients aged 50 and older to receive RZV, regardless of prior ZVL vaccination history.

Important Contraindications:

- There is insufficient safety data regarding the use of RZV in pregnant and lactating women.
- RZV should not be administered during an active HZ infection.

Conclusion

Vaccination remains a cornerstone of public health, offering critical protection against a wide array of communicable diseases. Despite the availability of effective vaccines, barriers such as misinformation, underutilization, and disparities in access persist. For nurses, a robust understanding of vaccine indications, administration schedules, and contraindications is essential to address these challenges and ensure patients receive comprehensive preventive care.

Adult immunization strategies should be tailored to individual risk factors, including age, comorbid conditions, lifestyle, and occupational exposures. Furthermore, clear communication and patient education are key to dispelling myths and fostering vaccine acceptance. By prioritizing vaccination and integrating it into routine care, nurses can play a pivotal role in reducing disease burden, improving public health outcomes, and combating preventable diseases in adult populations.

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