Varicella Virus Vaccine Live

AHFS Class: 80:12 — Vaccines (tofc-80)

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Alert:

On January 5, 2026, the US Department of Health and Human Services (HHS) announced the approval of a revised US childhood and adolescent immunization schedule (https://www.cdc.gov/vaccines/hcp/imz-schedules/child-adolescent-age.html (https://www.cdc.gov/vaccines/hcp/imz-schedules/child-adolescent-age.html)). Under the revised recommendations, CDC continues to organize the childhood immunization schedule in three distinct categories (Immunizations Recommended for All Children, Immunizations Recommended for Certain High-Risk Groups or Populations, and Immunizations Based on Shared Clinical Decision-Making) but changes individual vaccine placement within those categories. For additional information, see https://www.hhs.gov/press-room/cdc-acts-presidential-memorandum-update-childhood-immunization-schedule.html (https://www.hhs.gov/press-room/cdc-acts-presidential-memorandum-update-childhood-immunization-schedule.html) .

Introduction

Varicella virus vaccine is a live, attenuated virus vaccine that contains varicella zoster virus (VZV) of the Oka/Merck strain[1,]

Uses

▪ Prevention of Varicella (Chickenpox) Infection

Varicella virus vaccine live is used to stimulate active immunity to varicella (chickenpox).[1,] Varicella virus vaccine live is commercially available as a single-antigen vaccine (Varivax®) for use in adults and pediatric patients 12 months of age or older.[1,] A fixed combination vaccine is also available containing measles, mumps, rubella, and varicella virus live (MMRV; ProQuad®) for use in pediatric patients 12 months through 12 years of age.[125,]

Varicella is a highly contagious acute infectious disease caused by the varicella zoster virus (VZV); secondary infection rates in healthy, susceptible individuals exposed through household contact might reach 90%.[27,138,] In children, the first sign of primary infection of varicella is often a rash; adults may have fever and malaise 1–2 days prior to rash onset.[138,] In unvaccinated individuals, the rash is generalized, pruritic, and progresses rapidly (within 24 hours) from macules to papules to vesicular lesions before crusting.[138,] In healthy children, the clinical course of the infection is generally mild, with fever up to 102°F and other systemic symptoms such as malaise and headache, and usually resolves within 2–4 days after the onset of the rash.[138,] Adults may have more severe disease, including a higher incidence of complications.[138,] Complications of varicella include bacterial infection of skin lesions, pneumonia, CNS manifestations, thrombocytopenia, and, in rare cases, Reye syndrome, glomerulonephritis, arthritis, and hepatitis.[100,138,] Immunocompromised children, persons infected with human immunodeficiency virus (HIV), and otherwise healthy children on high-dose corticosteroids (>2 mg/kg per day of prednisone or equivalent) are at risk for severe and prolonged illness and complications.[100,138,] Varicella during pregnancy is associated with severe congenital and maternal morbidity and mortality, including congenital varicella, neonatal varicella, and herpes zoster infection during infancy or early childhood; about 10–20% of infected pregnant women develop pneumonia, a significant risk factor for maternal mortality.[27,100,146,]

Prior to licensure of the varicella virus vaccine live (i.e., prior to 1995), approximately 4 million cases of varicella occurred annually (15–16 cases per 1000 population) in the US, with peak incidence during winter and spring in temperate climates mainly among children <15 years of age.[27,100,138,] Since 1995, when the VZV vaccine live became commercially available, there have been substantial decreases in the incidence of varicella and varicella-associated hospitalizations in the US in all age groups.[138,] The number of hospitalizations and deaths from varicella has decreased more than 90% in the US since 1995.[138,] After the implementation of the second dose of varicella vaccine in 2007, data from 40 states in the US have shown an 85% decline in the incidence of varicella from 2005–2006 to 2013–2014.[138,]

Clinical Experience

Efficacy of varicella virus vaccine live (Varivax®) administered subcutaneously was established by a placebo-controlled, double-blind clinical trial, a comparison of varicella rates in vaccine recipients versus historical controls, and by assessment of protection from disease following household exposure to varicella.[1,3,43,80,146,147,148,150,151,] Clinical trials have also evaluated immunogenicity following vaccination of formulations of varicella virus vaccine live containing 1000–50,000 plaque-forming units (PFU) per dose in healthy adults and pediatric patients ranging from 12 months to 55 years of age.[1,42,43,101,152,]

Infants and Children 12 Months through 12 Years of Age.

In a randomized clinical trial, 2216 children 12 months to 12 years of age with a negative history of varicella were randomized 1:1 to receive either 1 dose of the varicella virus vaccine live or 2 doses of the varicella virus vaccine live, administered 3 months apart.[1,101,151,] Each dose of the vaccine was 0.5 mL and administered subcutaneously.[101,151,] Five lots of vaccine with potencies ranging from 2900–9000 PFUs per dose were used.[101,151,] At 6 weeks postvaccination, the seroconversion rate for patients who received the 1-dose regimen was 97.5%, and 99.9% for patients who received the 2-dose regimen.[101,] For 10 years after vaccination, subjects in this study were actively followed annually for varicella, any varicella-like illness, or herpes zoster and any exposures to varicella or herpes zoster.[1,] During the 10-year follow-up, there were 60 cases of breakthrough varicella in children who received 1 dose of the vaccine, and 17 cases of breakthrough varicella in children who received 2 doses

of the vaccine.[151] For the 10-year observation period, the estimated vaccine efficacy was 94.4% for the 1-dose vaccine regimen and 98.3% for the 2-dose vaccine regimen.[1,151] The varicella antibody persistence rates remained high from 1–9 years postvaccination, with cumulative rates of 99.0 and 99.8% for the 1-dose and 2-dose group, respectively.[151]

Adults and Adolescents 13 Years of Age and Older.

The efficacy of varicella virus vaccine live in adults and adolescents has been determined by evaluation of protection in vaccine recipients following administration of 2 doses of the vaccine, either 4 or 8 weeks apart, and subsequent exposure to varicella in a household setting.[1] In vaccine recipients who were actively followed for up to 6 years, 76 had household exposure to varicella; no reports of breakthrough varicella occurred in 83% of these vaccinees, while 17% reported a mild form of varicella.[1] In additional clinical studies, 220 adults and adolescents received varicella virus vaccine live containing 3315–9000 PFU of attenuated virus per dose and were actively followed for up to 6 years following a 2-dose vaccination series.[1] After a time period >42 days after the second dose, 3 clinical varicella cases were reported.[1] Among the subset of vaccine recipients who were actively followed in these additional studies for up to 5 years, 16 patients were exposed to an unvaccinated individual with wild-type varicella in a household setting; there were no reports of breakthrough varicella among the exposed vaccinees.[1]

In a clinical trial, the immunogenicity of varicella virus vaccine live was assessed in over 700 adults and adolescents 13 years of age and older who were serologically susceptible to varicella.[1,80] The vaccine was administered as 2 doses subcutaneously, 4 or 8 weeks apart; 3 lots of vaccine with potencies ranging from 905–1230 PFUs per 0.5 mL dose were used.[1,80] For individuals who received the 2-dose regimen 4 weeks apart, seroconversion rates 4 weeks after dose 1 and 2 were 72 and 99%, respectively.[80] For individuals who received the 2-dose regimen 8 weeks apart, seroconversion rates 4 weeks after dose 1 and 2 were 78 and 99%, respectively.[80] In another clinical study that enrolled adults and adolescents, 2 doses of varicella virus vaccine live administered subcutaneously 8 weeks apart led to seroconversion rates of 94 and 99%, respectively, 6 weeks after the first and second dose of the vaccine.[1] In clinical studies that included adults and adolescents who received 2 doses of varicella virus vaccine live subcutaneously and were followed for up to 6 years, detectable VZV antibodies were present in 97.9% of vaccine recipients at 1 year, 97.1% at 2 years, 100% at 3 years, 97.0% at 4 years, 97.4% at 5 years, and 100% at 6 years postvaccination.[1]

Clinical Perspective

The US Centers for Disease Control and Prevention (CDC) Advisory Committee on Immunization Practices (ACIP) and other organizations (e.g., the American Academy of Pediatrics [AAP]), provide recommendations for the prevention of varicella.[149,153,154,155,156,157,199,200,310] Primary vaccination with a 2-dose series of varicella vaccine is recommended in all persons ≥12 months of age; the first dose should be administered at 12–15 months of age and the second dose at 4–6 years of age.[199,310] ACIP states that the use of the fixed-combination vaccine containing measles, mumps, and rubella virus vaccine live (MMR) and varicella virus vaccine live (MMRV; ProQuad®) is not recommended for pediatric patients 12–47 months of age or 13–18 years of age, and to administer the MMR and varicella vaccines separately for these age groups.[199] AAP expresses no preference for use of the MMRV fixed-combination vaccine or use of the MMR and varicella vaccines separately for toddlers receiving their first immunization of this kind; patients should be counseled about the rare possibility of their child developing a febrile seizure 1–2 weeks after immunization with MMRV for the first immunizing dose.[310] For the second dose given between 4–6 years of age, the use of the fixed-combination MMRV vaccine is generally preferred over the separate MMR and varicella vaccines to minimize the number of injections.[310]

Varicella vaccination is also recommended for older children, adolescents, and adults if they do not have evidence of immunity.[199,200,310] Acceptable evidence of immunity includes at least one of the following: 1) documentation of age-appropriate vaccination, 2) laboratory evidence of immunity, 3) laboratory confirmation of disease, 4) birth in the US before 1980 (should not be considered evidence for healthcare professionals, pregnant people, and immunocompromised people), 5) diagnosis or verification of a history of varicella disease by a healthcare provider, or 6) diagnosis or verification of a history of herpes zoster by a healthcare provider.[27,100,200] For children 7–12 years of age without evidence of immunity, ACIP and AAP recommend a 2-dose series with the varicella vaccine administered 3 months apart; if a dose is inadvertently administered after at least 4 weeks, it may be counted as valid.[199,310] For children ≥13 years of age, a 2-dose series with a routine interval of 4–8 weeks (minimum of 4 weeks) is recommended.[199,310] For adults without evidence of immunity, ACIP recommends a 2-dose series 4–8 weeks apart if the individual did not receive any prior dose of a varicella-containing vaccine; for adults who previously received 1 dose, a second dose at least 4 weeks after the first dose is recommended.[200]

In healthcare professionals with no evidence of immunity to varicella, 1 dose of the varicella vaccine is recommended if the individual has previously received 1 dose of a varicella-containing vaccine.[200] A 2-dose series 4–8 weeks apart is recommended in healthcare professionals if they previously did not receive any varicella-containing vaccine, regardless of whether they were born in the US before 1980.[200]

The varicella vaccine is contraindicated during pregnancy; however, 1 dose of the varicella vaccine should be administered after pregnancy (before discharge from the healthcare facility) in individuals who do not have evidence of immunity to varicella.[200] If a dose of a varicella-containing vaccine had been previously received by the individual, no additional doses are needed; if the individual did not previously receive any varicella-containing vaccine, regardless of whether born in the US before 1980, a second dose of varicella vaccine is recommended 4–8 weeks after the first dose.[200] The American College of Obstetricians and Gynecologists (ACOG) also recommends that pregnant women who do not have a history of varicella infection or of immunization and show no serologic evidence of immunity should receive a dose of varicella vaccine upon completion or termination of the pregnancy, and that a second dose should be administered 4–8 weeks after the first dose.[149] For nonpregnant patients who receive the varicella vaccine, ACOG recommends that conception be delayed for 3 months after the last dose due to the small chance of mild varicella infection after vaccination with the live, attenuated vaccine; however, standard vaccine surveillance systems have not detected any cases of congenital varicella after inadvertent administration during early pregnancy.[149]

Specific recommendations for varicella vaccination have also been made for specific high-risk groups and populations.[153,154,155,156,157,200] For adults and adolescents with HIV, primary varicella can cause substantial morbidity.[155,156] Varicella vaccination should be considered for **children with HIV infection who do not have evidence of immunity to varicella [off-label]**† when CD4+ T-lymphocyte (CD4) cell count percentage is ≥15% of total lymphocytes.[156] A 2-dose series should be given, starting as early as 12 months of age, with an interval of 3 months between the 2 doses.[156] Ideally, children should be taking effective antiretroviral therapy (ART) for ≥3 months prior to immunization.[156] Varicella vaccination (2-dose series, 3 months apart) may also be considered in **adults with HIV infection who do not have evidence of immunity to varicella [off-label]**† when CD4 percentages ≥15% and CD4 cell count ≥200 cells/mm^3.[200] Vaccination with varicella is contraindicated in individuals with HIV infection and severe immunosuppression (i.e., CD4 count <200 cells/mm^3).[155,200]

The varicella vaccine is contraindicated in individuals with severe immunocompromising conditions, including those undergoing cancer treatment.[153,200] The American Society of Clinical Oncology (ASCO) published recommendations for vaccination of adults with cancer in 2024, including adults with solid tumors, hematologic malignancies, and those receiving hematopoietic stem-cell transplantation (HSCT), chimeric antigen receptor T-cell (CAR-T) and B-cell-depleting therapies; long-term survivors; and household contacts, as patients with cancer often experience a compromised immune system.[153] Live vaccines such as varicella can pose a risk of uncontrolled infection and should be avoided in individuals with weakened immune systems; individuals receiving chemotherapy, immunotherapy, and radiation therapy for solid tumors should be assumed to have a compromised immune system.[153] For patients with solid tumors, vaccination with varicella and MMR, another live vaccine, may be considered at least 4 weeks before the initiation of cancer treatment; varicella vaccination should be delayed for at least 3 months after the completion of cancer treatment.[153] For individuals who have undergone HSCT, a 2-dose series of varicella vaccine administered 1 month apart may be given to individuals who are varicella-seronegative without a history of primary varicella, no sooner than 2 years after transplant if there is absence of graft-versus-host-disease (GVHD), no systemic immunosuppressive use for at least 1 year, and no receipt of IV immunoglobulin (IVIG) for 8–11 months.[153] ASCO also extends this recommendation to recipients of CAR-T-cell therapy.[153] For household contacts of individuals undergoing cancer treatment, the live varicella vaccine can be safely administered and close contacts should remain up to date with recommended vaccines.[153] Precaution is advised for individuals undergoing cancer treatment to avoid close contact with persons with varicella vaccine-induced rash.[153]

The American Society of Transplantation (AST) Infectious Diseases Community of Practice published guidelines related to VZV in solid organ transplantation in 2019.[154] For solid-organ transplant candidates, the guideline recommends that candidates be screened by serology for prior VZV infection during the pre-transplant process.[154] Potential transplant candidates that are susceptible to VZV should be given the varicella virus vaccine live (Varivax®) at least 4 weeks prior to transplantation, if no contraindications are present.[154] Caregivers, household members, and family members who are VZV seronegative and do not have any contraindications should also receive varicella virus vaccine live as a strategy to reduce VZV transmission.[154] Post-transplant, the live varicella vaccine is generally contraindicated but can be given with caution for **varicella prevention in select kidney and liver transplant recipients who are seronegative and receiving long-term, low-level immunosuppression [off-label]**†.[154]

The American College of Gastroenterology (ACG) published guidelines for preventive care in adults with inflammatory bowel disease (IBD) in 2025, which include recommendations for vaccinations.[157] Often, individuals with IBD may require treatment with immune-modifying therapies, which may increase the risk of infections, including vaccine-preventable infections.[157] ACG recommends that adults with IBD should be evaluated for immunity against varicella before initiating immune-modifying therapy, either through a documented history of infection or completion of a 2-dose series of the varicella vaccine.[157] In previously vaccinated individuals, serologic testing is not recommended due to the high rates of false-negative.[157] If the individual is confirmed not to be immune to varicella, vaccination should be completed before initiating immune-modifying therapy when possible.[157] Household members of individuals receiving immune-modifying therapy can receive live vaccines, including the varicella vaccine, with certain precautions.[157] If a varicella vaccine recipient develops a rash after immunization, they should avoid contact with individuals with altered immunocompetence until the rash resolves.[157]

Postexposure Vaccination and Outbreak Control

Varicella virus vaccine live also has been used for **postexposure vaccination [off-label]**† in susceptible individuals who have had significant exposure to VZV and for outbreak control.[27,100] Types of significant exposure include household members residing with someone who has varicella, a playmate who has had face-to-face indoor play ≥5 minutes (some experts suggest >1 hour) with someone with varicella, and newborn infants.[27,100] In the hospital setting, substantial exposure to varicella consists of sharing the same hospital room with someone with the infection, having adjacent beds in a large ward to someone with the infection, face-to-face contact with a person (either staff member or patient) who is infectious, or a visit by someone who is deemed contagious.[27,100] Individuals who are exposed and do not have evidence of immunity to varicella may require administration of varicella-zoster immune globulin, antiviral therapy, and/or vaccination with the varicella vaccine.[27,100] Within 3 days and up to 5 days after exposure, for healthy persons 12 months of age and older, administration of the varicella virus vaccine live (Varivax®) is recommended if there are no contraindications.[100] Vaccination even after 3–5 days following exposure is still warranted.[100] If the exposure occurred during an outbreak, to help with outbreak control, a second dose of the varicella vaccine is recommended for preschool-aged children <4 years of age if at least 3 months have passed after the first dose.[100] For immunocompromised children, people who are pregnant, certain newborn infants, and certain hospitalized preterm infants, varicella-zoster immune globulin is recommended if it can be administered within 10 days of exposure; 10 days after exposure, oral valacyclovir or acyclovir is recommended.[100] Any individual who receives varicella-zoster immune globulin should receive age-appropriate varicella vaccine subsequently if there are no contraindications.[27,100] The vaccination should be delayed for 5 months after immune globulin administration.[27,100] If the patient has varicella despite administration of varicella-zoster immune globulin, vaccination is not needed.[27,100]

If a varicella outbreak occurs, persons who do not have adequate evidence of immunity to varicella should receive a 2-dose vaccine series.[27] In outbreaks among preschool-aged children, a 2-dose series is recommended, and children vaccinated with 1 dose should receive their second dose 3 months after the first.[27] Varicella outbreaks in certain settings, such as childcare facilities, schools, or institutions, can last as long as 4–5 months.[27] Individuals who receive either their first or second dose of varicella vaccine as part of the outbreak control program may be immediately readmitted to school.[27] Those who receive 1 dose as part of outbreak control measures should receive a second dose as age-appropriate.[27] Individuals who are unvaccinated and remain unvaccinated without other evidence of immunity to varicella should be excluded from institutions where the outbreak is occurring until at least 21 days after the onset of rash in the last case of varicella.[27] For school-aged individuals who are covered by the 2-dose school requirements, exclusion during an outbreak is recommended for vaccine recipients who received the first dose before the outbreak but not the second dose as part of the outbreak control program.[27] For individuals at increased risk of severe varicella who have contraindications to the varicella vaccine, varicella-zoster immune globulin should be administered within 96 hours of exposure.[27]

Dosage and Administration

▪ General

Dispensing and Administration Precautions

Appropriate medical treatment used to manage immediate allergic reactions must be available in the event an acute anaphylactic reaction occurs following administration of varicella virus live vaccine (Varivax®).[1,]

▪ Administration

Varicella virus vaccine live (Varivax®) is administered by subcutaneous or IM injection.[1,]

A fixed-combination vaccine preparation containing measles, mumps, rubella, and varicella vaccine (ProQuad®) is also commercially available for use when such vaccines are indicated in children 12 months through 12 years of age; consult the prescribing information for ProQuad® for additional details.[125,]

Varicella virus vaccine live (Varivax®) is supplied as a single-dose vial of lyophilized vaccine that must be reconstituted with the accompanying sterile diluent (supplied in a vial or prefilled syringe) prior to administration.[1,] If the diluent is supplied in a vial, withdraw the entire volume of diluent from the vial and slowly inject into the lyophilized vaccine vial; gently agitate to dissolve completely.[1,] If the diluent is supplied as a prefilled syringe, reconstitute the vaccine by slowly injecting the entire contents of the prefilled syringe into the lyophilized vaccine vial; gently agitate to dissolve completely.[1,] A single dose of varicella virus vaccine live is approximately 0.5 mL.[1,] See the manufacturer's prescribing information for additional details on preparation of individual vaccine preparations.[1,] After reconstitution, withdraw and administer the entire volume immediately after reconstitution; discard if not used within 30 minutes after reconstitution..[1,]

Store the lyophilized vaccine component of varicella virus vaccine live between -50°C and -15°C prior to use.[1,] Before reconstitution, the lyophilized vaccine component may be stored at 2–8°C for up to 72 continuous hours; protect from light.[1,]

Varicella vaccine may be given simultaneously with other age appropriate vaccines.[306,] When multiple vaccines are administered during a single health-care visit, each vaccine should be given with a different syringe and at different injection sites.[307,] Injection sites should be separated by at least 1 inch, if possible.[307,] If multiple vaccines must be given into a single limb, the deltoid may be used in older children and adults, but the anterolateral thigh is preferred in infants and younger children.[307,]

IM Administration

To ensure delivery of vaccine into muscle, administer IM injections at a 90° angle to the skin using a needle length appropriate for the individual's age and body mass, thickness of adipose tissue and muscle at the injection site, and injection technique.[308,]

Subcutaneous Administration

Subcutaneous injections are usually administered in the upper-outer triceps in persons 12 months of age and older.[308,] To ensure appropriate delivery, administer subcutaneous injections at a 45° angle using a 5/8-inch, 23- to 25-gauge needle.[26,] Prior to injection, care should be taken to ensure that the needle is not in a blood vessel.[1,26,]

▪ Dosage

Single-antigen varicella virus vaccine live (Varivax®) is administered in 0.5-mL doses.[1,]

When the single-antigen varicella vaccine (Varivax®) is administered within 30 minutes following reconstitution as specified, each 0.5-mL dose contains at least 1350 plaque-forming units (PFU) of Oka/Merck varicella virus.[1,]

Adults

Primary Immunization Against Varicella Infection.

In adults without evidence of immunity to varicella (e.g., born in the US before 1980 [except for pregnant women and healthcare professionals]), documentation of 2 doses of varicella-containing vaccine at least 4 weeks apart, diagnosis or verification of history of varicella or herpes zoster by a healthcare professional, laboratory evidence of immunity or disease), a 2-dose series of varicella virus vaccine live 4–8 weeks apart is recommended.[200,] For catch-up vaccination in those who previously received 1 dose of a varicella-containing vaccine, a second dose at least 4 weeks after the first dose is recommended.[200,]

For healthcare professionals without evidence of immunity to varicella, 1 dose of the varicella virus lvaccine live is recommended if the individual has previously received 1 dose of a varicella-containing vaccine; a 2-dose series 4–8 weeks apart is recommended if the individual has not received any varicella-containing vaccine, regardless if born in the US before 1980.[200,]

Postexposure Vaccination Against Varicella Infection and Outbreak Control.

If varicella virus vaccine live is used for **postexposure prophylaxis [off-label]**† of varicella in susceptible adults, the vaccine should be given within 3–5 days after the exposure.[27,100,]

However, if VZIG or IGIV is used for postexposure prophylaxis of varicella in susceptible individuals, varicella virus vaccine live should not be administered for at least 5 months following the immune globulin.[27,100,] Varicella virus vaccine live is not necessary in patients who develop varicella following exposure.[27,100,]

During a varicella outbreak, persons who have received one dose of varicella vaccine should receive a second dose, provided the appropriate interval has elapsed since the first dose (i.e., at least 4 weeks for adults).[27,138,]

Pediatric Patients

Primary Immunization Against Varicella Infection.

Children 12 Months through 12 Years of Age: For routine primary immunization in healthy children 12 months through 12 years of age, a 2-dose regimen of varicella virus vaccine live is recommended.[1,199,310,] The first dose of the varicella virus live vaccine should be administered at 12–15 months of age and the second dose should be administered at 4–6 months of age.[1,199,310,] At least 3 months should elapse between doses; however, a dose inadvertently given after at least 4 weeks may be counted as valid.[1,199,310,] At least 1 month should elapse between a dose of measles-containing vaccine and a dose of varicella virus vaccine live if they are not given concurrently.[1,]

Alternatively, a 2-dose series with the fixed combination vaccine containing measles, mumps, rubella, and varicella vaccine live (MMRV) may be used in children 12 months through 12 years of age.[199,] ACIP states that use of MMRV is not recommended for individuals 12–47 months of age.[199,] (See Prevention of Varicella [Chickenpox] Infection under Uses.)

Catch-up vaccination is recommended for children 7 years of age and older who do not have evidence of immunity to varicella.[199,310,] For children 7–12 years of age, a 2-dose series of varicella virus vaccine live administered 3 months apart (a dose inadvertently administered after at least 4 weeks may be counted as valid) is recommended.[1,199,310,]

Adolescents 13–18 Years of Age: Catch-up vaccination is recommended for adolescents 13–18 years of age who do not have evidence of immunity.[199,310,] A 2-dose series of the varicella virus vaccine live is recommended, with a routine interval of 4–8 weeks (minimum interval of 4 weeks).[1,199,310,] ACIP states that use of the fixed combination MMRV vaccine is not recommended for individuals 13–18 years of age (See Prevention of Varicella [Chickenpox] Infection under Uses.).[199,]

Postexposure Vaccination Against Varicella Infection and Outbreak Control.

If varicella virus vaccine live is used for **postexposure prophylaxis [off-label]**† of varicella in susceptible children 12 months of age and older, the vaccine should be given within 3–5 days after the exposure.[27,100,]

However, if varicella zoster immune globulin (VZIG) or immune globulin IV (IGIV) is used for postexposure prophylaxis of varicella in susceptible individuals, varicella virus vaccine live should not be administered for at least 5 months following the immune globulin.[27,100,] Varicella virus vaccine live is not necessary in patients who develop varicella following exposure.[27,100,]

During a varicella outbreak, persons who have received one dose of varicella vaccine should receive a second dose, provided the appropriate interval has elapsed since the first dose (3 months for children 12 months through 12 years of age and at least 4 weeks for adolescents 13 years of age or older).[27,138,]

▪ Special Populations

Hepatic Impairment

The manufacturer makes no specific dosage recommendations for patients with hepatic impairment.[1,]

Renal Impairment

The manufacturer makes no specific dosage recommendations for patients with renal impairment.[1,]

Geriatric Patients

The manufacturer makes no specific dosage recommendations for geriatric patients.[1,]

Cautions

▪ Contraindications

- History of severe allergic reaction to any component of the varicella virus live vaccine (including neomycin and gelatin) or to a previous dose of varicella vaccine.[1,]
- Immunosuppression.[1,]
- Moderate or severe febrile illness (>38.5°C).[1,]
- Active untreated tuberculosis.[1,]
- Individuals who are pregnant or who are planning on becoming pregnant within the next 3 months.[1,]

▪ Warnings/Precautions

Hypersensitivity

Prior to administration, the recipient and/or parent or guardian should be questioned concerning reactions to previous doses of varicella virus vaccine or similar preparations.[27,] Epinephrine should be readily available for immediate treatment of an anaphylactic reaction if such a reaction should occur.[27,]

Because varicella virus vaccine live contains trace amounts of neomycin, the vaccine is contraindicated in individuals who have had an anaphylactic reaction to neomycin.[1,26,27,] Neomycin allergy usually is characterized by a delayed-type (cell-mediated) hypersensitivity reaction, such as contact dermatitis (e.g., characterized by ar erythematous, pruritic nodule or papule) occurring within 48–96 hours, rather than anaphylaxis.[26,27,] While a history of anaphylactic or severe allergic reaction to neomycin is a contraindication, a history of contact dermatitis is not considered a contraindication to receive the varicella vaccine.[27,]

The possibility of an allergic reaction to hydrolyzed gelatin, which is present in varicella virus vaccine live, should be considered.[26,27,]

Family History of Immunodeficiency

Individuals should be evaluated for immune competence prior to administration of varicella virus vaccine live if there is a family history of congenital or hereditary immunodeficiency.[1,] Immunization should be delayed until the individual's immune status has been evaluated and the individual has been found to be immunocompetent.[1]

Individuals with Altered Immunocompetence

Varicella virus vaccine live generally is contraindicated in individuals with primary immunodeficiencies (e.g., cellular immune deficiency, hypogammaglobulinemia, dysgammaglobulinemia), in individuals with suppressed immune responses resulting from acquired immunodeficiency syndrome (AIDS) or other clinical manifestations of human immunodeficiency virus (HIV) infection, blood dyscrasias, leukemia, lymphomas of any type, or any other malignant neoplasms affecting the bone marrow or lymphatic systems, and in individuals whom immunologic responses have been suppressed because of immunosuppressive therapy (e.g., antineoplastic agents).[1,27,70,100,137,153,154,155,156,157,200,] The vaccine also generally is contraindicated in individuals with a family history of congenital or hereditary immunodeficiency in a first-degree relative (e.g., parents and siblings), unless the immune competence of the potential vaccine recipient has been clinically substantiated or verified by a laboratory.[1,20,27,137,]

The US Public Health Service Advisory Committee on Immunization Practices (ACIP) has specific recommendations on the use of varicella vaccine in individuals with HIV infection; refer to the guidance for specific information.[1,]

Risk of Vaccine Virus Transmission

Recipients of varicella virus vaccine live may be capable of transmitting the vaccine viruses to close, susceptible contacts.[1,9,10,11,20,] It is recommended that vaccine recipients should attempt to avoid close association with susceptible high-risk individuals for up to 6 weeks following vaccination, whenever possible.[1,] High-risk individuals include immunocompromised individuals, pregnant women without a documented history of varicella or laboratory evidence of prior infection, neonates of such susceptible pregnant women, and all newborn infants born at <28 weeks gestation regardless of maternal varicella immunity.[1,93,] Vaccine recipients who develop a varicelliform rash should avoid contact with immunocompromised, susceptible individuals until the rash resolves.[27,]

Concomitant Illness

The decision whether to administer or delay administration of varicella virus vaccine live in an individual with a current or recent acute illness depends largely on the severity of symptoms and etiology of the illness.[26,27,] The manufacturer states that the vaccine is contraindicated in individuals with active febrile illness.[1,] ACIP states that minor acute illness, such as mild upper respiratory infection (with or without low-grade fever) or mild diarrhea, does not preclude vaccination.[26,27,] However, vaccination of individuals with severe acute illness should be deferred until they have recovered from the illness.[26,27,] The manufacturer states that varicella virus vaccine live is contraindicated in individuals with active untreated tuberculosis.[1,] ACIP states that, although no data exist regarding whether either varicella or varicella virus vaccine live exacerbates tuberculosis, vaccination is not recommended for individuals with untreated, active tuberculosis.[27,] However, tuberculin skin testing is not a prerequisite for administration of varicella virus vaccine live.[27,]

Use of Immune Globulins and Transfusions

Blood products, including immune globulins, should not be given concomitantly with varicella virus vaccine live.[1,] These products may contain antibodies that interfere with vaccine virus replication, which can decrease the expected immune response.[1,] ACIP has recommendations specifically for intervals between administration of antibody-containing virus and live virus vaccines.[1,]

Varicella vaccines should not be administered within 3–11 months (depending on dosage) after administration of blood (except washed red blood cells), plasma, or immune globulin.[27,] Individuals who received a varicella vaccine should not be administered an antibody-containing product for 2 weeks after vaccination unless the benefits of antibody-containing product administration outweigh the benefits of vaccination.[27,] In those cases, the individual should either be revaccinated or tested for immunity at appropriate intervals, depending on the dose of antibody-containing product received, and then revaccinated if seronegative.[27,]

Use of Salicylate Therapy

Due to the association of Reye syndrome with salicylate therapy and wild-type varicella infection, following vaccination with varicella virus live vaccine, avoid the use of salicylates (aspirin) or salicylate-containing products in children and adolescents 12 months through 17 years of age for at least 6 weeks.[1,]

Limitation of Vaccine Effectiveness

Varicella virus vaccine live (Varivax®) may not protect all individuals from varicella.[1,27,]

Specific Populations

Pregnancy.

Varicella virus vaccine live is contraindicated in pregnant women; infection during pregnancy with the wild-type varicella virus has been associated with adverse outcomes, including congenital varicella syndrome.[1,]

Lactation.

It is not known whether varicella virus vaccine live is secreted in human milk.[1,] Consider the developmental and health benefits of breast-feeding along with the mother's clinical need for the varicella virus vaccine live and any potential adverse effects on the breast-fed child from the vaccine or from susceptibility to varicella.[1,]

Pediatric Use.

Safety and efficacy of varicella virus vaccine live (Varivax®) in pediatric patients younger than 12 months of age have not been established.[1,]

Geriatric Use.

Clinical studies of varicella virus vaccine live did not include sufficient numbers of seronegative adults 65 years of age and older to determine whether geriatric adults respond differently than younger individuals.[1,]

▪ Common Adverse Effects

Common adverse effects reported in individuals 1–12 years of age receiving Varivax® included fever ≥38.9°C (oral) and injection site complaints.[1,]

Common adverse effects reported in individuals ≥13 years of age receiving Varivax® included fever ≥37.8°C (oral) and injection site complaints.[1,]

Common adverse effects reported in all individuals receiving Varivax® included varicella-like rash at the injection site and generalized varicella-like rash.[1,]

Drug Interactions

▪ Antiviral Agents

Because antiviral agents active against herpesviruses (e.g., acyclovir, famciclovir, valacyclovir) may reduce efficacy of varicella virus vaccine live, the US Public Health Service Advisory Committee on Immunization Practices (ACIP) and American Academy of Pediatrics (AAP) recommend that these antiviral agents be discontinued at least 24 hours before administration of vaccines containing varicella virus vaccine live, if possible.[100,199,200,]

▪ Blood Products

Blood products (e.g., whole blood, packed red blood cells [RBCs], plasma) may interfere with the immune response to certain live virus vaccines; therefore, these live vaccines should not be administered simultaneously with or for specified intervals before or after administration of these preparations.[1,] Although specific studies evaluating possible interference with the immune response to varicella virus vaccine live have not been performed, use of the vaccine generally should be deferred following administration of blood products.[1,26,27,]

Varicella vaccines should not be administered within 3–11 months (depending on dosage) after administration of blood (except washed red blood cells), or plasma.[27,] Individuals who received a varicella vaccine should not be administered an antibody-containing product for 2 weeks after vaccination unless the benefits of antibody-containing product administration outweigh the benefits of vaccination.[27,] In those cases, the individual should either be revaccinated or tested for immunity at appropriate intervals, depending on the dose of antibody-containing product received, and then revaccinated if seronegative.[27,]

▪ Immune Globulins

Antibodies contained in immune globulin preparations (e.g., immune globulin, cytomegalovirus immune globulin, hepatitis B immune globulin, rabies immune globulin [RIG], tetanus immune globulin [TIG], varicella zoster immune globulin [VZIG]) may interfere with the immune response to certain live virus vaccines and these vaccines should not be administered simultaneously with or for specified intervals before or after administration of these preparations.[1,26,27,] Although specific studies evaluating possible interference with the immune response to varicella virus vaccine live have not been performed, use of the vaccine generally should be deferred following administration of immune globulin.[1,26,27,100,]

Varicella vaccines should not be administered within 3–11 months (depending on dosage) after administration of immune globulin.[27,] Individuals who received a varicella vaccine should not be administered an antibody-containing product for 2 weeks after vaccination unless the benefits of antibody-containing product administration outweigh the benefits of vaccination.[27,] In those cases, the individual should either be revaccinated or tested for immunity at appropriate intervals, depending on the dose of antibody-containing product received, and then revaccinated if seronegative.[1,]

Specific studies are not available evaluating whether passively acquired antibodies from Rho(D) immune globulin interfere with the immune response to varicella virus vaccine live.[26,] Because of the importance of postpartum varicella vaccination in women who do not have evidence of varicella immunity, vaccination of such women should not be delayed because they received Rho(D) immune globulin or any blood product during the last trimester of pregnancy or at delivery.[26,]

▪ Immunosuppressive Agents

Individuals receiving immunosuppressive agents (e.g., corticotropin, corticosteroid, alkylating agents, antimetabolites, radiation therapy) may have a diminished immunologic response to live vaccines such as varicella virus vaccine live, and replication of the virus may be potentiated.[1,26,27,70,] Administration of varicella virus vaccine live generally should be deferred until immunosuppressive therapy is discontinued since these individuals are more susceptible to infections than healthy individuals and more extensive vaccine-associated rash or disseminated disease can occur.[27,137,] AAP states that for patients who are receiving high doses of systemic corticosteroids (2 mg/kg of body weight or ≥20 mg/day of prednisone or its equivalent) for 14 days or more, varicella vaccine should not be administered; the recommended interval between discontinuation of high-dose corticosteroid therapy and varicella vaccine immunization is at least 1 month.[100,] In general, use of inhaled or topical steroids is not a contraindication to varicella vaccine administration.[100,]

▪ Salicylates

The manufacturer recommends that individuals who receive varicella virus vaccine live avoid use of salicylates for 6 weeks following vaccination.[1,] This precaution is based on reports of Reye's syndrome in children and adolescents who received salicylates during natural varicella infection.[1,] However, an association between Reye's syndrome, administration of varicella virus vaccine live, and use of salicylates has not been established, and the syndrome has not been reported to date in recipients of the vaccine.[1,27,42,100,] The ACIP states that, since the risk for serious salicylate-associated complications is likely to be greater in children in whom natural varicella disease develops than in children who receive the vaccine containing attenuated virus, children who have rheumatoid arthritis or other conditions requiring therapeutic salicylate therapy probably should receive varicella virus vaccine live in conjunction with subsequent close monitoring.[27,]

▪ Tuberculin Skin Testing

Varicella virus vaccine live may result in a temporary depression of purified protein derivative (PPD) tuberculin skin sensitivity, which may lead to false-negative results.[1,] The manufacturer recommends that tuberculin skin testing with PPD may be performed before varicella vaccine is administered, on the same day, or at least 4 weeks following vaccination with varicella virus vaccine live.[1,]

▪ Vaccines

Varicella vaccine may be given simultaneously with other age-appropriate, including live, vaccines. Live virus vaccines not administered simultaneously (on the same day) should be separated by at least 1 month.[1] In children through 12 years of age, at least 3 months should elapse between administration of 2 doses of a live attenuated varicella virus-containing vaccine.[1] For adults and adolescents, 2 doses may be separated by 1 month.[1]

When multiple vaccines are administered during a single health-care visit, each vaccine should be given with a different syringe and at different injection sites.[307] Injection sites should be separated by at least 1 inch, if possible.[307] If multiple vaccines must be given into a single limb, the deltoid may be used in older children and adults, but the anterolateral thigh is preferred in infants and younger children.[307]

Diphtheria and Tetanus Toxoids and Pertussis Vaccines

Varicella virus vaccine live may be administered concurrently with diphtheria and tetanus toxoids and acellular pertussis vaccines adsorbed (DTaP).[1] In a clinical study, children 12–42 months of age received an investigational varicella-containing vaccine (a formulation combining measles, mumps, rubella, and varicella in 1 syringe) concomitantly with booster doses of DTaP and oral poliovirus vaccine (OPV; no longer licensed in the US).[1] These children were compared with patients who received measles, mumps, rubella (MMR) vaccine concomitantly with booster doses of DTaP and OPV, followed by varicella virus vaccine live 6 weeks later.[1] At 6 weeks postvaccination, seroconversion rates were comparable between the 2 groups; however, anti-VZV levels were decreased in the group that received the investigational varicella-containing vaccine.[1]

Haemophilus b and Hepatitis B Vaccines

Varicella virus vaccine live may be administered concurrently with Haemophilus b conjugate (Hib) vaccines or hepatitis B vaccine (recombinant).[1,27,100] In a clinical study, children 12–18 months of age received an investigational varicella-containing vaccine (a formulation combining measles, mumps, rubella, and varicella in 1 syringe) administered concomitantly with a booster dose of Hib conjugate vaccine (PedvaxHIB®).[1] The comparator group received MMR concomitantly with a booster dose of Hib followed by varicella virus vaccine live 6 weeks later.[1] At 6 weeks postvaccination, seroconversion rates for measles, mumps, rubella, and varicella were comparable between the 2 groups; however, anti-VZV levels were decreased in the group that received the investigational varicella-containing vaccine.[1]

In another clinical study, children 12–15 months of age received a fixed combination vaccine containing Hib conjugate and hepatitis B (Comvax®; no longer licensed in the US), MMR, and varicella virus vaccine live concomitantly at separate injection sites.[1] The comparator group in this study received the fixed combination vaccine containing Hib conjugate and hepatitis B followed by MMR and varicella virus vaccine live 6 weeks later.[1] At 6 weeks postvaccination, immune responses were similar between groups with respect to all antigens administered.[1]

Measles, Mumps, and Rubella Virus Vaccine Live

Varicella virus vaccine live may be administered concurrently with MMR at a different site using a separate syringe.[1,5,7,26,27,87,100] Results of studies in healthy children 12–36 months of age indicate that seroconversion rates, antibody responses, and adverse effects reported with simultaneous administration of the vaccines are similar to those reported when the vaccines are administered 6 weeks apart.[1,76]

Description

Varicella virus vaccine live stimulates active immunity to varicella (chickenpox).[1,4,8,9,65,67] Varicella virus vaccine live is commercially available as a single-antigen vaccine (Varivax®), and in a fixed combination vaccine containing measles, mumps, rubella, and varicella virus live (MMRV; ProQuad®).[1,125]

Varicella vaccines commercially available for use in the US contain live, attenuated varicella zoster virus (VZV) of the Oka/Merck strain.[1,27,42,100] Each 0.5 mL dose of Varivax® contains at least 1350 plaque-forming units (PFU) of Oka/Merck varicella virus when reconstituted and stored at room temperature for a maximum of 30 minutes.[1] The VZV was initially obtained from a child with wild-type virus, then introduced into human embryonic lung cell cultures, adapted to and propagated in embryonic guinea pig cell cultures and then finally propagated in human diploid cell cultures (WI-38).[1] Further passage of the virus for the varicella virus vaccine live was performed in human diploid cell cultures (MRC-5) that were free of adventitious agents.[1]

Each 0.5 mL of Varivax® also contains sucrose (24 mg), hydrolyzed gelatin (12 mg), sodium chloride (3.1 mg), monosodium L-glutamate (0.5 mg), sodium phosphate dibasic (0.44 mg), potassium phosphate monobasic (0.08 mg), and potassium chloride (0.08 mg).[1] The varicella virus vaccine live product also contains residual components of MRC-5 cells, including DNA and protein, and trace quantities of sodium phosphate monobasic, EDTA, neomycin, and fetal bovine serum; the vaccine does not contain any preservatives.[1]

Varicella virus vaccine live can induce both humoral and cell-mediated responses in vaccine recipients.[1,4,8,9,65,67] However, the role and relative contribution of each type of response to long-term immunity against varicella has not been fully determined.[1,8,9,53,67] Efficacy of varicella virus vaccine live in preventing varicella infection varies depending on the age and immunocompetence of the vaccinee.[11,54,65] In some individuals, especially healthy adults and immunocompromised children, the vaccine provides partial immunity and modification of subsequent varicella infection rather than complete protection.[5,8,11,13,24,41,65]

Levels of specific antibodies that protect against varicella infection have not been defined and the acquisition of any detectable level of antibodies against VZV generally has been used to indicate seroconversion in individuals who receive varicella virus vaccine live.[1,52,27] There is some evidence that breakthrough varicella infections occur in substantially fewer children who have geometric mean antibody titers of 5 units or greater (measured by gp enzyme-linked immunosorbent assay [gpELISA]) following receipt of varicella virus vaccine live than in those who have gpELISA titers less than 5 units.[27]

The duration of immunity following vaccination against varicella has not yet been established; however, long-term efficacy studies demonstrated continued protection up to 10 years after immunization.[1] In vaccine recipients with exposure to wild-type varicella, a boost in antibody levels has been observed, which could account for apparent long-term protection after vaccination.[1]

Advice to Patients

The following information contains important points for the clinician to discuss with patients during counseling. For more comprehensive monographs suitable for distribution to the patient, please refer to the *AHFS Patient Medication Information* monographs available from MedlinePlus (https://vsearch.nlm.nih.gov/vivisimo/cgi-bin/query-meta?v:project=medlineplus) (in English and Spanish; written at a 6th- to 8th-grade reading level).

Advise the patient to read the FDA-approved patient labeling.[1,]

Prior to administration of each vaccine dose, provide a copy of the appropriate Centers for Disease Control and Prevention (CDC) Vaccine Information Statement (VIS) to the patient or patient's parent or guardian (VISs are available at https://www.cdc.gov/vaccines/hcp/vis/index.html (https://www.cdc.gov/vaccines/hcp/vis/index.html)).[1,140,]

Advise the patient and/or the patient's parent or guardian of the risks and benefits of vaccination with varicella virus vaccine live.[1,]

Question the patient, parent, or guardian about reactions to previous vaccines.[1,]

Advise the patient, parent, or guardian that vaccination with varicella virus vaccine live may not offer 100% protection from varicella.[1,]

Instruct patients, parents, or guardians to report any adverse reactions or any symptoms of concern to their healthcare provider.[1,]

Advise the patient and/or the patient's parent or guardian of the importance of contacting the clinician if any adverse reactions (including allergic reactions) occur with the varicella vaccine.[1,] Clinicians or individuals can report any adverse reactions that occur following vaccination to the Vaccine Adverse Event Reporting System (VAERS) at 800-822-7967 or https://vaers.hhs.gov/index (https://vaers.hhs.gov/index) .[1,]

Advise patients to inform their clinician of existing or contemplated concomitant therapy, including prescription and OTC drugs, and any concomitant illnesses.[1,]

Advise patients to inform their clinician if they are or plan to become pregnant or plan to breast-feed.[1,] Inform female patients to avoid pregnancy for 3 months following vaccination.[1,]

Advise patients of other important precautionary information.[1,]

Additional Information

The American Society of Health-System Pharmacists, Inc. represents that the information provided in the accompanying monograph was formulated with a reasonable standard of care, and in conformity with professional standards in the field. Readers are advised that decisions regarding use of drugs are complex medical decisions requiring the independent, informed decision of an appropriate health care professional, and that the information contained in the monograph is provided for informational purposes only. The manufacturer's labeling should be consulted for more detailed information. The American Society of Health-System Pharmacists, Inc. does not endorse or recommend the use of any drug. The information contained in the monograph is not a substitute for medical care.

Photos

Disclaimer (https://pillbox.nlm.nih.gov/about.html)

Preparations

Excipients in commercially available drug preparations may have clinically important effects in some individuals; consult specific product labeling for details.

Varicella Virus Vaccine Live (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=NonProprietaryName&ApptName=Varicella+Virus+Vaccine+Live&collapse=1)

Parenteral

For injection, for intramuscular or subcutaneous use

1350 plaque-forming units (PFU) per 0.5 mL of varicella virus vaccine live (Oka/Merck strain)

Varivax®, Merck (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=LabelerName&ApptName=Merck&collapse=1)

Measles, Mumps, Rubella and Varicella Virus Vaccine Live (MMRV) (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=NonProprietaryName&ApptName=Measles%2C+Mumps%2C+Rubella+and+Varicella+Virus+Vaccine+Live+%28MMRV%29&collapse=1)

Parenteral

For injection, for intramuscular or subcutaneous use

Measles Virus Vaccine Live (More Attenuated Enders' Line) ≥3 $\log_{10}$ tissue culture infective dose 50% ($TCID_{50}$), Mumps Virus Vaccine Live (Jeryl Lynn [B level] Strain) ≥4.3 $\log_{10}$ $TCID_{50}$, Rubella Virus Vaccine Live (Wistar RA 27/3 Strain) ≥3 $\log_{10}$ $TCID_{50}$, and Varicella Virus Vaccine Live (Oka/Merck Strain) ≥3.99 $\log_{10}$ plaque-forming units (PFU) per 0.5 mL

ProQuad®, Merck (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=LabelerName&ApptName=Merck&collapse=1)

Related Resources

AHFS Patient Medication Information (https://vsearch.nlm.nih.gov/vivisimo/cgi-bin/query-meta?v:project=medlineplus&query=Varicella%20Virus%20Vaccine%20Live) and other related patient health topics (MedlinePlus)
ASHP Drug Shortages Resource Center (https://www.ashp.org/Drug-Shortages)
CCRIS (https://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+ccris:%%22Varicella%20Virus%20Vaccine%20Live%%22) (Chemical Carcinogenesis Research Information System)
ChemID*plus* (https://chem.nlm.nih.gov/chemidplus/name/Varicella%20Virus%20Vaccine%20Live)
Biochemical Data Summary (http://www.drugbank.ca/unearth/q?utf8=%%E2%%9C%%93&query=Varicella%20Virus%20Vaccine%20Live&searcher=drugs&approved=1&vet_approved=1&nutraceutical=1&illicit=1&withdrawn
(US and Canada)
Clinical Trials (https://www.clinicaltrials.gov/ct/search?submit=Search&term=Varicella%20Virus%20Vaccine%20Live)
DailyMed (https://dailymed.nlm.nih.gov/dailymed/search.cfm?query=Varicella%20Virus%20Vaccine%20Live) (drug labels)
DART (https://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+dart:%%22Varicella%20Virus%20Vaccine%20Live%%22) (Developmental and Reproductive Toxicology Database)
Drugs@FDA (https://www.accessdata.fda.gov/scripts/cder/drugsatfda/index.cfm?fuseaction=Search.SearchAction&SearchType=BasicSearch&SearchTerm=Varicella%20Virus%20Vaccine%20Live) (approval information)
European Medicines Agency (https://www.ema.europa.eu/en/search/search?search_api_views_fulltext=Varicella%20Virus%20Vaccine%20Live)
FDA National Drug Code Directory (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=NonProprietaryName&ApptName=Varicella%20Virus%20Vaccine%20Live&collapse=1)
FDA Recalls, Market Withdrawals, and Safety Alerts (https://www.fda.gov/Safety/Recalls/default.htm)
HSDB (https://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+hsdb:%%22Varicella%20Virus%20Vaccine%20Live%%22) (Hazardous Substances Data Bank)
Inxight Drugs (https://drugs.ncats.io/substances?q=%%22Varicella%20Virus%20Vaccine%20Live%%22) (National Center for Advancing Translational Sciences)
LactMed (drug effects on breastfeeding) (https://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+lactmed:@or+%%28@na+%%22Varicella%20Virus%20Vaccine%20Live%%22+%%29)
New Drug Approvals (https://ahfs.ashp.org/drug-assignments.aspx)
Orange Book (https://www.accessdata.fda.gov/scripts/cder/ob/default.cfm?panel=0&drugname=Varicella%20Virus%20Vaccine%20Live) (therapeutic equivalence)
PharmGKB (https://www.pharmgkb.org/search?connections&gaSearch=Varicella%20Virus%20Vaccine%20Live&query=Varicella%20Virus%20Vaccine%20Live&type=chemical) (Pharmacogenomic data from PharmGKB)
Pillbox (*beta*) (https://pillbox.nlm.nih.gov/pillimage/search_results.php?submit=Search&splid=&getingredient=Varicella%20Virus%20Vaccine%20Live) (drug identification and images)
PubMed (https://www.ncbi.nlm.nih.gov/pubmed?DB=pubmed&term=Varicella%20Virus%20Vaccine%20Live%%5BAll+Fields%%5D) (scientific journals)
Safety-related Labeling Changes (https://www.accessdata.fda.gov/scripts/cder/safetylabelingchanges) (FDA/CDER)
ToxLine (https://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+toxline:%%22Varicella%20Virus%20Vaccine%20Live%%22) (Toxicology Literature Online)

† Use is not currently included in the labeling approved by the US Food and Drug Administration.

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