

Varicella Disease

Varicella and Zoster Vaccines

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Varicella Zoster Virus

- ❑ Herpes virus (DNA)
- ❑ Primary infection results in varicella (chickenpox)
- ❑ Recurrent infection results in herpes zoster (shingles)
- ❑ Short survival in environment

Varicella Pathogenesis

- ❑ **Respiratory transmission of virus**
- ❑ **Replication in nasopharynx and regional lymph nodes**
- ❑ **Primary viremia 4 to 6 days after infection**
- ❑ **Multiple tissues, including sensory ganglia, infected during viremia**

Varicella Clinical Features

- ❑ Incubation period 14 to 16 days (range 10 to 21 days)**
- ❑ Mild prodrome for 1 to 2 days (adults)**
- ❑ Rash generally appears first on the head; most concentrated on the trunk**
- ❑ Successive crops over several days with lesions present in several stages of development**

Varicella Complications

❑ Complications include:

- Bacterial infection of lesions
- Hemorrhagic varicella
- CNS manifestations
- Pneumonia (primary viral or secondary bacterial)
- Congenital varicella
- Perinatal varicella

❑ Prevaccine era:

- Hospitalization ~3 per 1,000 cases or 11,000/year
- Death ~ 1 per 60,000 cases or 100/year



Varicella with secondary bacterial infection

Groups at Increased Risk of Complications of Varicella

- ❑ Persons older than 15 years**
- ❑ Infants younger than 1 year**
- ❑ Immunocompromised persons**
- ❑ Newborns of women with rash onset within 5 days before to 48 hours after delivery**

Varicella Epidemiology

Reservoir	Human
Transmission	Person to person – respiratory tract secretions Direct contact with lesions
Temporal Pattern	Peak in late winter and spring (U.S.)
Communicability	1 to 2 days before until lesions have formed crusts May be longer in immunocompromised

Herpes Zoster (Shingles)

- ❑ **Reactivation of varicella zoster virus**
- ❑ **Associated with:**
 - Aging
 - Immunosuppression
 - Intrauterine exposure
 - Varicella disease younger than 18 months of age

Complications of Herpes Zoster

- ❑ Dissemination with generalized skin eruptions and involvement of the central nervous system, lungs, liver, and pancreas
- ❑ Postherpetic neuralgia (PHN)
- ❑ Ophthalmic zoster



Herpes Zoster

- ❑ **500,000 to 1 million episodes occur annually in the United States**
- ❑ **Lifetime risk of zoster estimated to be 32%**
- ❑ **50% of persons living until age 85 will develop zoster**

Varicella-containing Vaccines

Product	FDA Age Indications	ACIP Abbreviation
Varivax	12 months and older	VAR
ProQuad	12 months through 12 years	MMRV
Zostavax	50 years and older	HZV

Varicella Vaccine Immunogenicity and Efficacy

❑ Detectable antibody:

- 97% of children 12 months through 12 years following 1 dose
- 99% of persons 13 years and older after 2 doses

❑ 1 dose of varicella vaccine is:

- 70%-90% effective against any varicella disease
- 95%-100% effective against severe varicella disease.

Herpes Zoster Vaccine Efficacy

- ❑ **Vaccine recipients 60 to 80 years of age had 51% fewer episodes of zoster**
 - Efficacy declines with increasing age
 - Significantly reduces the risk of postherpetic neuralgia
 - Reduces the risk of zoster 69.8% in persons 50 through 59 years of age

Varicella Vaccine Recommendations: Children

- ❑ **Routine recommendations:**
 - Dose 1 at 12-15 months of age
 - Dose 2 at 4-6 years of age
- ❑ **Minimum interval between doses is 3 months for children younger than 13 years of age**

Varicella Vaccine Recommendations: Adolescents and Adults

- ❑ All persons 13 years of age and older without evidence of varicella immunity**
 - 2 doses separated by at least 4 weeks
- ❑ Do not repeat first dose because of extended interval between doses**
- ❑ Second dose recommended for persons of any age who have only received 1 dose**

Varicella and HCP

- ❑ **Recommended for all susceptible health care personnel**
- ❑ **Prevaccination serologic screening probably cost-effective**
- ❑ **Postvaccination testing not necessary or recommended**
- ❑ **Give 2 doses, 4 weeks apart to susceptible persons**

Acceptable Evidence of Varicella Immunity

- ❑ **Written documentation of age-appropriate vaccination**
- ❑ **Laboratory evidence of immunity or laboratory confirmation of varicella disease**
- ❑ **U.S.-born before 1980***
- ❑ **Health care provider diagnosis or verification of varicella disease**
- ❑ **History of herpes zoster based on health care provider diagnosis**

*Birth year immunity criterion does not apply to health care personnel or pregnant women

ACIP Recommendations: Zoster Vaccine

- ❑ Administer 1 dose of zoster vaccine to adults 60 years and older**
 - Need for booster dose or doses not known at this time.
- ❑ A history of herpes zoster should not influence the decision to vaccinate**

Zoster Vaccine

- ❑ **Persons 60 years of age and older can be assumed to be immune to varicella regardless of their recollection of chickenpox**
- ❑ **It is not necessary to inquire regarding history of chickenpox before administering zoster vaccine**

Zoster Vaccine and Serology

- ❑ **Do not perform serologic testing to verify varicella immunity prior to administering zoster**
 - If tested and seronegative, the person should receive 2 doses of single-antigen varicella vaccine (Varivax) separated by at least 4 weeks
 - Zoster vaccine is not indicated for persons who have immunity because they received varicella vaccine

Varicella-containing Vaccine Contraindications

- ❑ Severe allergic reaction to a vaccine component or following a prior dose
- ❑ Pregnancy or planned pregnancy within 4 weeks*
- ❑ Immunosuppression

**ACIP off-label recommendation*

Varicella-containing Vaccines Immunocompromised Persons

- ❑ **Single-antigen varicella vaccine may be administered to persons with isolated humoral immunodeficiency**
- ❑ **Consider varicella vaccination for:**
 - HIV-infected children with CD4 count of 15% or higher
 - HIV-infected older children and adults with CD4 count of 200 or higher

Varicella-containing Vaccines Precautions

- ❑ **Moderate or severe acute illness**
- ❑ **Recent blood product (varicella and MMRV)**
 - Varicella or MMRV vaccine should not be administered for 3–11 months after receipt of antibody-containing blood products

Varicella-containing Vaccines Precautions

- ❑ MMRV only: Personal or family (i.e., sibling or parent) history of seizures of any etiology**
- ❑ These children generally should be vaccinated with separate MMR and varicella vaccines**

Zoster Vaccine Contraindications

- ❑ Severe allergic reaction to a vaccine component or following a prior dose
- ❑ Pregnancy or planned pregnancy within 4 weeks*
- ❑ Immunosuppression

**ACIP off-label recommendation*

MMWR 2008;57(RR-5)

Zoster Vaccine Contraindications

Immunosuppression

- ❑ **Leukemia, lymphoma, or other malignant neoplasm affecting the bone marrow or lymphatic system**
 - Persons whose leukemia or lymphoma is in remission and who have not received chemotherapy or radiation for at least 3 months can be vaccinated*

**ACIP off-label recommendation*

MMWR 2008;57(RR-5)

Zoster Vaccine Contraindications

Immunosuppression

- ❑ **AIDS or other clinical manifestation of HIV infection**
 - Includes persons with CD4+ T-lymphocyte values less than 200 per mm³, or less than 15% of total lymphocytes

Zoster Vaccine Contraindications

Immunosuppression

- ❑ **High-dose corticosteroid therapy**
 - 20 milligrams or more per day of prednisone or equivalent lasting 2 or more weeks
 - Vaccination should be deferred for at least 1 month after discontinuation of therapy

Zoster Vaccine Contraindications

Immunosuppression

- ❑ **Hematopoietic cell transplant recipients**
 - Experience is limited
 - Assess the immune status of the recipient on a case-by-case basis
 - If a decision is made to vaccinate, the vaccine should be administered at least 24 months after transplantation

Zoster Vaccine Contraindications Immunosuppression

- ❑ **Preferred: Administer zoster vaccine before treatment with recombinant human immune mediators and immune modulators**
 - If not, assess the immune status of the recipient on a case-by-case basis
- ❑ **Defer vaccination for at least 1 month after discontinuation of treatment**

Zoster Vaccine Precautions

- ❑ **Moderate or severe acute illness**
- ❑ **Current treatment with an antiviral drug active against herpes viruses**
 - Discontinue at least 24 hours before administration of zoster vaccine
 - Should not be taken for at least 14 days after vaccination
- ❑ **Recent receipt of a blood product is NOT a precaution**

Adverse Reactions

- ❑ **Local reactions (pain, erythema)**
 - Varicella:
 - 19% (children)
 - 24% (adolescents and adults)
 - Zoster: 34%
- ❑ **Rash: varicella recipients (3%-4%)**
 - May be maculopapular rather than vesicular
 - Average 5 lesions
- ❑ **Systemic reactions not common**

Adverse Reactions MMRV and MMR + VAR

- ❑ Fever is more common in the 5-12 days after vaccination following MMRV (22%) than following MMR+VAR (15%)**
- ❑ Data from CDC Vaccine Safety Datalink sites indicate the rate of febrile seizures following MMRV (9 per 10,000 vaccinated) was approximately 2 times higher than among those receiving MMR+VAR at the same visit (4 per 10,000 vaccinated)**
- ❑ Merck postlicensure surveillance has identified a similar trend**

MMRV Vaccine

- ❑ **For the first dose of measles, mumps, rubella, and varicella vaccines at age 12 through 47 months, either MMR vaccine and varicella vaccine or MMRV vaccine may be used**
- ❑ **Providers who are considering administering MMRV vaccine should discuss the benefits and risks of both vaccination options with the parents or caregivers**

MMRV Vaccine

- ❑ **Unless the parent or caregiver expresses a preference for MMRV vaccine, CDC recommends that separate MMR vaccine and varicella vaccine should be administered for the first dose for children 12–47 months of age**

MMRV Vaccine

□ Administer MMRV:

- For the second dose of measles, mumps, rubella, and varicella vaccines at age 15 months through 12 years
- For the first dose at age 48 months or older

Varicella-containing Vaccines

Storage and Handling

❑ **Lyophilized vaccine:**

- Store frozen between -58°F and +5°F (-50°C and -15°C).
- Vaccine may be stored in the refrigerator between 36°F and 46°F, (2°C and 8°C) for up to 72 continuous hours after removal from freezer. Discard unused vaccine after 72 hours.
- Protect vaccine from light.

❑ **Diluent:**

- Store diluent at room temperature or refrigerate

❑ **Reconstitute:**

- Use ONLY the diluent supplied by the manufacturer

Varicella-containing Vaccines Administration

- ❑ **Administer varicella-containing vaccines via subcutaneous injection**
 - Needle size: 5/8-inch, 23- to 25-gauge
 - Site: Fatty tissue over upper outer triceps of the arm
- ❑ **Follow proper injection practices**
 - Use aseptic technique
 - Use a new needle and syringe for each injection

ADDITIONAL SLIDES

Varicella Laboratory Diagnosis

- ❑ Isolation of varicella virus from clinical specimen**
- ❑ Rapid varicella virus identification using real-time PCR (preferred, if available) or DFA**
- ❑ Significant rise in varicella IgG by any standard serologic assay**

Varicella Zoster Immune Globulin

- ❑ **Used for post exposure prophylaxis for persons in whom varicella vaccine is contraindicated (pregnant women, immunosuppressed, etc.)**
- ❑ **Only VariZIG is currently available**
- ❑ **Updated recommendations for use published in July 2013[†]**

[†]MMWR July 19, 2013 / 62(28);574-6

Herpes Zoster Vaccine

❑ Herpes Zoster Vaccine (Zostavax)

- FDA approved for persons 50 years of age and older
- Contains live varicella vaccine virus in much larger amount (14x) than standard varicella vaccine (Varivax)

❑ Administer by subcutaneous injection

❑ ACIP abbreviation: HZV

Varicella Vaccine

Post Exposure Prophylaxis

- ❑ **Varicella vaccine is recommended for use in susceptible persons after exposure to varicella**
 - 70%-100% effective if given within 72 hours of exposure
 - Not effective if administered more than 5 days after exposure but will produce immunity if not infected

Varicella Breakthrough Infection

- ❑ Breakthrough infection is significantly milder, with fewer lesions (but transmissible).
- ❑ No consistent evidence that risk of breakthrough infection increases with time since vaccination.
- ❑ Risk of breakthrough varicella 2.5 times higher if varicella vaccine administered less than 30 days following MMR.
- ❑ No increased risk if varicella vaccine given simultaneously or more than 30 days after MMR.

Zoster Following Vaccination

- ❑ **Most cases in children**
- ❑ **Not all cases caused by vaccine virus**
- ❑ **Risk from vaccine virus less than from wild-type virus**
- ❑ **Usually a mild illness without complications such as postherpetic neuralgia**

Herpes Zoster Vaccine

- ❑ **FDA approved for persons 50 years and older.**
- ❑ **ACIP does not recommend vaccination of persons younger than 60 years because of supply and lower risk of zoster in this age group.**

Herpes Zoster Vaccine Adverse Reactions

- ❑ **Local reactions - 34% (pain, erythema).**
- ❑ **No increased risk of fever.**
- ❑ **No serious adverse reactions identified.**