23 Varicella-Zoster

VARICELLA HOSPITALISATION NOTIFIABLE
OUTBREAK NOTIFIABLE

In some circumstances, advice in these guidelines may differ from that in the Summary of Product Characteristics of the vaccines. When this occurs, the recommendations in these guidelines, which are based on current expert advice from NIAC, should be followed.

Key changes

23.6 Herpes zoster vaccines

- 23.6.1 Shingrix
  - Recommendations (updated 21 October 2022)

23.7 Post exposure prophylaxis

- 23.7.2 Prophylaxis
- 23.7.3 Recommendations
  - 23.7.3.ii Pregnancy (updated 21 October 2022)

Key changes

23.1 Introduction

Varicella- zoster virus (VZV) is one of eight herpes viruses known to cause human infection and is distributed worldwide. Two distinct clinical syndromes are associated with VZV infection - varicella (chickenpox) and herpes zoster (shingles).

Primary infection results in varicella, an acute exanthematous disease. Varicella is usually a mild disease. However complications can occur, most often in infants, adults, pregnant women and the immunocompromised.

The virus becomes latent in the cells of the dorsal root or cranial nerve ganglia and may reactivate after a period, which may be several decades. Reactivation results in herpes zoster.

23.2 Epidemiology

VZV is very infectious; one case of primary varicella can infect 10-12 susceptible people (R^0 10-12).

In Ireland, the incidence of varicella is seasonal, reaching a peak between January and April. Transmission is by inhalation of respiratory droplets, by direct contact with vesicular fluid, or by contact with fomites. VZV can be transmitted from individuals with zoster to non-immune contacts resulting in varicella. Such transmission is infrequent and is dependent on direct or indirect contact, including inhalation, from non-intact vesicles.

The incubation period is from 10 to 21 days; the majority develop disease between 14 and 16 days. The incubation period may be prolonged up to 28 days in immunocompromised patients and in individuals who have received varicella-zoster immunoglobulin (VZIG).

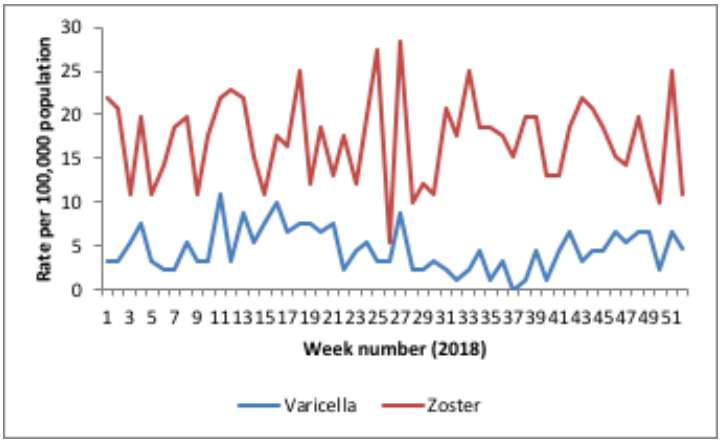
Cases of ***varicella*** are infectious from 2 days before the appearance of the rash until all of the lesions have crusted, typically a total of 7 days. This may be prolonged in immunocompromised individuals. In the family setting, the secondary attack rate ranges from 60-90% for susceptible persons.

The period of infectivity of ***zoster*** is typically 5 days, from the appearance of the lesions until all lesions have crusted. Viral load and/or viral shedding may be increased with increased risk of transmission if the lesions are exposed or disseminated, or from immunocompromised patients with localised zoster on any part of the body.

In Ireland, hospitalised cases of varicella became notifiable in 2011. In 2018, there were 99 varicella hospitalised cases notified and one reported death.

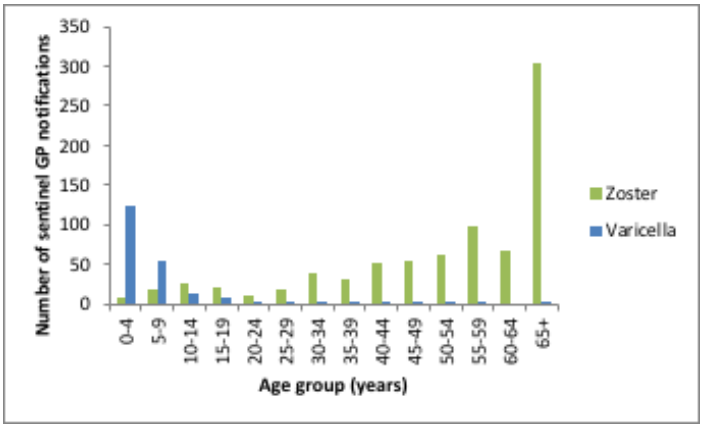
These data likely considerably underestimate the true burden of this disease. Varicella and zoster incidence in the community is estimated from data obtained from the sentinel surveillance system of the Irish College of General Practitioners (ICGP)/ Health Protection Surveillance Centre (HPSC) (Figure 23.1).

Figure 23.1 Varicella and zoster rates per 100,000 population by week 2018
Source: ICGP/HPSC sentinel surveillance



Fifty-seven per cent of notified varicella cases in 2018 occurred in children aged under five years. Sixty-seven per cent of notified zoster cases in 2018 were aged 45 years or older (Figure 23.2).

Figure 23.2. Varicella and zoster notifications from sentinel GP sites, 2018
Source: ICGP/HPSC sentinel surveillance



In the USA prior to the introduction of routine childhood varicella vaccination, adults had a 25 times greater risk and infants a 4 times greater risk of dying from varicella than did children 1-4 years old. Since the introduction of varicella vaccine in the U.S. in 1995 the number of hospitalisations and deaths from varicella has decreased markedly.

23.3 Effects of varicella

Varicella is typically a benign infection of childhood characterised by a generalised pruritic vesicular rash. A mild prodrome of fever and malaise may occur, more commonly in adults. The rash usually starts on the head and progresses to the trunk and extremities. The rash may involve mucous membranes (mouth, respiratory tract, vagina, conjunctiva and cornea). The rash progresses from macules to papules to vesicular lesions that crust over as they dry. Successive crops appear over several days. The number of lesions ranges from a few to hundreds.

In children, the clinical course is generally mild with malaise, pruritus and fever for 2-3 days. Complications are uncommon in childhood and include superinfection (usually with Group A streptococcus), skin scarring, encephalitis, pneumonia, glomerulonephritis, myocarditis, hepatitis and coagulopathy. The risk of complications is higher in infants under one year of age and in those aged 15 years and older, particularly pregnant women, smokers, and the immunocompromised.

Recovery from varicella usually results in lifelong immunity. Recurrent disease is rare but is more likely in immunocompromised individuals.

Diagnosis is primarily clinical and can be confirmed from a swab of vesicular fluid by culture or biopsy for electron microscopy. Serology is also available and can be used to demonstrate immunity.

23.3.1 Varicella infection during pregnancy

Varicella infection during pregnancy carries an increased risk of severe varicella pneumonia in the mother, especially late in the second and early in the third trimester. Risks to the foetus and neonate are related to the timing of maternal infection.

23.3.2 Congenital varicella syndrome

In a large prospective study of maternal varicella, the incidence of congenital varicella syndrome was < 1% in the first 12 weeks of pregnancy, approximately 2% between 13 and 20 weeks, with no cases after 20 weeks gestation.

Effects include limb hypoplasia, microcephaly, cataracts, growth retardation and skin scarring. Congenital varicella syndrome is associated with a mortality rate of 30% in the first few months of life.

Maternal varicella during pregnancy is also associated with the subsequent development of zoster during childhood. In a study published in 1994, ten children of 1,373 women with primary varicella during pregnancy developed childhood zoster.

Congenital varicella syndrome following maternal zoster is extremely rare.

23.3.3 Neonatal varicella

Varicella occurring in a mother within one week before and one week after delivery is associated with an increased risk of neonatal infection. The highest risk is associated with maternal infection from five days before to two days after delivery, with a mortality rate up to 30% in the infant. Postnatally acquired varicella that occur 10 days or more after birth is typically mild. However, because of their relative immunologic immaturity, newborns are at greater risk for acquiring severe disease than are older infants or children.

23.3.4 Varicella in immunocompromised persons

Those at increased risk of severe complications include immunocompromised individuals, especially those who have leukaemia or other disorders in which there is depressed cell mediated immunity, solid organ transplant recipients on immunosuppressive treatment, and those with rheumatological diseases treated with tumour necrosis factor (TNF) antagonists (Chapter 3).

23.4 Effects of herpes zoster

The individual lifetime risk of developing zoster is between 24% and 30%. Although zoster can occur at any age, incidence increases with age. Two-thirds of cases occur in those aged 50 years and older. The risk of developing the disease in those aged ≥85 years is 50%. Children are more likely to develop zoster if infection with varicella occurred during pregnancy or infancy.

Zoster is characterised by a vesicular rash localised in the sensory region of the affected ganglia, and is often preceded or accompanied by acute pain or itching. Headache, photophobia, myalgia and malaise may occur in the prodromal phase, which lasts 1-10 days (average two days).

The rash most commonly appears on the trunk, in one or two thoracic dermatomes (*localised zoster*), not typically crossing the midline. Less commonly, the rash can affect three or more dermatomes (*disseminated zoster*). This generally occurs in the immunocompromised. Disseminated zoster can be difficult to distinguish from varicella.

Zoster of the trigeminal nerve should be considered in a patient with a prior history of varicella presenting with blurred vision and a painless red eye. Urgent ophthalmological opinion should be sought.

New vesicles continue to form over three to five days and progressively dry and crust. The rash usually resolves in two to four weeks; permanent pigmentation changes and scarring may occur in the skin over affected dermatomes.

*Post herpetic neuralgia (*PHN) is defined as a persistent pain lasting 30 days or more after the acute infection or after all lesions have crusted (9-45% of all cases). The pain can be severe and incapacitating and can persist for months and occasionally for years. Older adults are most likely to have PHN and to have longer lasting and more severe pain (over 13% of those aged 60 years and older with zoster will develop PHN).

Diagnosis is primarily clinical. Diagnosis can be confirmed from a swab of vesicular fluid by culture or biopsy for electron microscopy. Serology is also available and can be used to demonstrate immunity.

23.5 Varicella vaccines

Two varicella vaccines are licensed-monocomponent Varivax, and varicella in combination with measles, mumps and rubella vaccines (MMRV, ProQuad). ProQuad is not marketed.

23.5.1 Varivax

Varicella vaccine (Varivax) is a live virus vaccine produced in human diploid cells.

Licensed indications

Active immunisation against varicella:

- in healthy individuals from 9 to 11 months of age under special circumstances;

- in healthy individuals from the age of 12 months;
- for post exposure prophylaxis if administered to healthy, susceptible individuals exposed to varicella within 72 hours of contact
- in individuals at high risk of severe varicella

Storage

As the vaccine is less stable than other live virus vaccines, storage temperature requirements are critical to ensure optimum vaccine effectiveness. The unreconstituted vaccine and its diluent should be stored in the original packaging in a refrigerator at +2° to +8°C and protected from light. Following reconstitution, the vaccine should be used immediately. Discard any unused reconstituted vaccine after 30 minutes.

Efficacy

Overall, two dose vaccine efficacy in younger children is between 86-98% and approximately 75% in adolescents and adults. Immunity appears to be long lasting in most individuals. Mild breakthrough infections may occur in a minority of recipients.

Dose, route and schedule

The dose is 0.5 mls IM into the anterolateral thigh or the deltoid.

Age 12 months to 12 years: two doses at least one month apart. Those with asymptomatic HIV infection with an age-specific CD4+ count of 25% or more should receive two doses 12 weeks apart.

Age 13 years and older: two doses 4-8 weeks apart

Recommendations

Varicella vaccination is not included as part of the routine childhood immunisation schedule. Vaccination may be considered for any non immune persons aged 12 months or older. Those who choose to have themselves or their child immunised should consult with their GP.

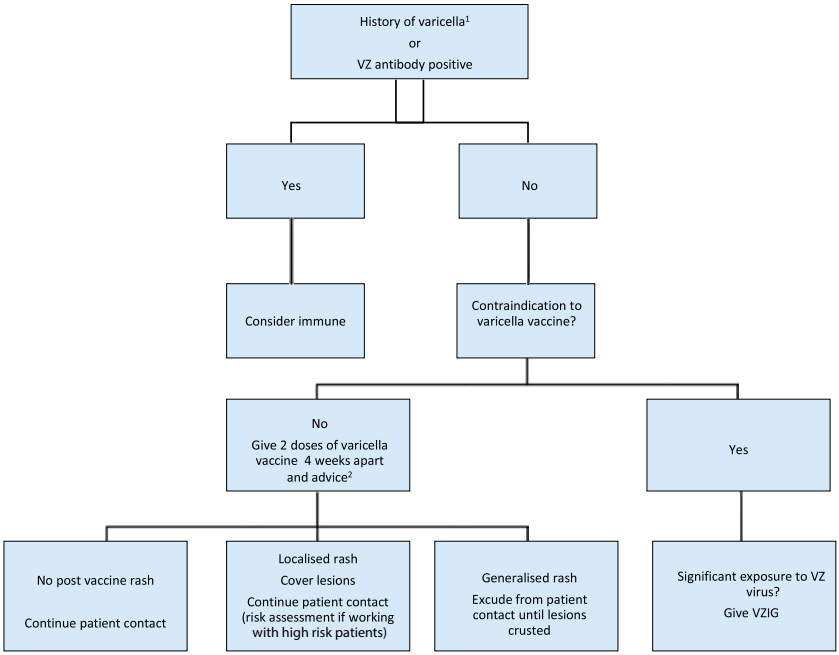
Two doses of varicella vaccine, at least four weeks apart, are recommended for **non-immune individuals** without a definite history of varicella, proof of immunity, or vaccination from 12 months of age in the following risk groups:

- Health care workers (HCWs) particularly those working with haematology, oncology, obstetric, paediatric or neonatal patients (see Figure 23.3)

  A history of varicella may be a less reliable predictor of immunity in individuals born and raised overseas, and therefore routine testing should be considered in this group of HCWs.

- Laboratory staff exposed to varicella virus in the course of their work.
- Some immunocompromised patients, e.g. those with lymphocytic leukaemia in remission, and transplant recipients following immune reconstitution (Chapter 3).
- Close household contacts of immunocompromised patients.
- Some HIV infected children (Chapter 3).
- Children in residential units with physical and intellectual disability. Those without a history of varicella should have their immunity checked.
- Non pregnant women of childbearing age. Those with negative serology should be vaccinated prior to or after pregnancy. Pregnancy should be avoided for one month following varicella vaccination.

Figure 23.3 Guidance on varicella vaccination of HCWs



[1] If born in Ireland or Western Europe
[2] Avoid salicylates for 6 weeks
Avoid pregnancy for 1 month
Consult occupational health if post vaccine rash appears

Contraindications

- Anaphylaxis to any of the vaccine constituents.
- Immunocompromise from disease or treatment (Chapter 3).
- Active untreated tuberculosis.
- Pregnancy.
- Individuals with a family history of congenital or hereditary immunodeficiency, unless the immune competence of the potential recipient is demonstrated.
- Children who are being breastfed by mothers taking infliximab.

Precautions

- Acute severe febrile illness, defer until recovery.
- Recent (3-11 months) receipt of an antibody-containing product (Chapter 2, Table 2.5).
- Salicylate-containing medicines should be avoided for six weeks after vaccination in children under 16 years (potential risk of Reye syndrome).
- Receipt of some antivirals (e.g. acyclovir, famciclovir, or valacyclovir) 24 hours before vaccination.
- Pregnancy should be avoided for one month following vaccination.
- If not given at the same time as MMR vaccine, the vaccines should be separated by at least four weeks. The risk of breakthrough varicella is increased if varicella vaccine is administered less than four weeks following MMR vaccine.

The following are NOT contraindications

- Pregnancy of recipient's mother or other close or household contact.*
- Immunodeficient family member or household contact.*
- Treatment with low dose (less than 2 mg/kg/day) alternate-day, topical, replacement, or aerosolised steroid preparations. (Chapter 3).
- Asymptomatic or mildly symptomatic HIV infection (CD4 count ≥15%). (Chapter 3).
- Humoral immunodeficiency (e.g. agammaglobulinaemia).
- Breast-feeding.

*If a vaccinee has a presumed vaccine-related rash 7-25 days after vaccination, they should avoid direct contact with immunocompromised persons, non-immune pregnant women and their newborn in the first week of life, and non-immune infants in neonatal units, for the duration of the rash.

Adverse reactions

Local: common: pain, redness, tenderness, varicella-like rash (injection site, median two lesions)

General: very common: fever ≥ 38°C
common: fever ≥39°C, irritability, upper respiratory infection, measles/rubella-like rash, varicella-like rash (generalised, median five lesions).

Transmission of vaccine virus can occur but the risk is very low and primarily occurs in the presence of a post-vaccination rash ((see * on page 9).

23.6 Herpes zoster vaccines

Herpes zoster vaccines are licensed for those aged 50 years or older to reduce the risk of developing zoster and postherpetic neuralgia. It is not necessary to determine whether patients have a history of varicella or zoster prior to vaccination because waning antibodies in previously exposed patients (particularly older adults) may lead to negative results despite past infection.

There are two licensed herpes zoster vaccines:

23.6.1 Shingrix

Shingrix is a non-live, recombinant vaccine containing varicella zoster virus glycoprotein E antigen adjuvanted with $AS01_B$

Licensed indications

Prevention of herpes zoster and post-herpetic neuralgia in:

- those aged 50 years and older
- those aged 18 years and older at increased risk of herpes zoster

Storage

The vaccine should be stored at +2°C to +8°C and protected from light. After reconstitution the vaccine should be used promptly; if this is not possible, stored at +2°C to +8°C and discard if not used within six hours.

Dose, route and schedule

The dose is 0.5 ml IM or SC in the deltoid region. Two doses are required 2-6 months apart. The second dose can be given 1-2 months after the first dose to those who are immunocompromised.

The need for a booster has not been established.

Efficacy
Clinical trials, with follow up for a median of four years after two doses showed efficacy of 100% in those aged 50-69 years, 93% in those aged 70-79 years, and 71% in those aged 80 years and older.

Recommendations
Shingrix may be considered in those aged 50 years and older, due to the greater burden and severity of disease and PHN in this age group and in those aged 18 years and older at increased risk of herpes zoster.

As the vaccine is not part of the national immunisation programme, those who wish to receive it should consult with their GP or pharmacist.

The vaccine may be given to those who have had zoster. It is prudent to defer vaccination for 12 months after the zoster has resolved so that the vaccine can produce a more effective immune response.

The immune response to Shingrix is unaffected by prior vaccination with Zostavax.

Interchangeability
There are no safety, immunogenicity or efficacy data to support replacing a dose of Shingrix with a dose of Zostavax.

Contraindications
Anaphylaxis to any of the vaccine constituents.

Precautions
Acute severe febrile illness- defer until recovery.

Shingrix should be given with caution to those with thrombocytopenia or any coagulation disorder since bleeding may occur following IM administration to these subjects. The SC route may be used.

It is preferable to defer Shingrix during pregnancy.

There are limited data to support the use of Shingrix in individuals with a history of zoster.

Co-administration
Shingrix may be given at the same time as COVID-19 vaccines, inactivated seasonal influenza vaccine, pneumococcal polysaccharide vaccine (PPV23) or Tdap vaccine. The vaccines should be administered at different injection sites.

Adverse reactions

Local: very common: erythema, pain, swelling
common: pruritus

General: very common: abdominal pain, diarrhoea, fatigue, fever, headache, myalgia, nausea, vomiting
common: malaise.

23.6.2 Zostavax

Zostavax is a live attenuated virus vaccine produced in human diploid cells.

Licensed indications

Prevention of herpes zoster ("zoster" or shingles) and herpes zoster-related post-herpetic neuralgia (PHN) in those aged 50 years and older.

Storage

The vaccine should be stored at +2°C to +8°C and protected from light. After reconstitution the vaccine should be used immediately. Discard any vaccine unused after 30 minutes.

Dose, route and schedule

The dose is 0.65ml IM or SC in the deltoid region**.**

The need for a booster has not been established.

Efficacy

Zostavax is effective in reducing herpes zoster and PHN incidence for over 8-10 years in vaccinated people as compared to an unvaccinated reference group.

Efficacy in those aged 50-59 years was 70% after three months, 50% after five years, and not available after 10 years. Efficacy after similar time periods changed in those aged 60-69 years from 64% to 51% to 40%; in those aged 70-79 years from 41% to 46% to 36% and in those aged 80 years and older from 41% at 5 years to 31% after 10 years.

Recommendations

Zostavax may be considered in those aged 50 years and older, due to the greater burden and severity of disease and PHN in this age group.

As the vaccine is not part of the national immunisation programme, those aged 50 years and older who wish to receive it should consult with their GP or pharmacist.

Immunocompromised
There are insufficient data to make definitive recommendations regarding vaccination in immunocompromised persons aged 50 years and older.

The approach to vaccination in immunocompromised patients depends upon when immunosuppression is planned and the underlying condition.

Those with planned immunosuppression should ideally be vaccinated four weeks or more before the initiation of immunosuppressive therapy.

Those receiving low-dose immunosuppressive therapy are likely to respond to vaccination but disseminated zoster with vaccine type virus may rarely occur.

Contraindications
- Anaphylaxis to any of the vaccine constituents.
- Immunocompromise from disease or treatment (Chapter 3).
- Active untreated tuberculosis.
- Pregnancy.

Precautions
- Acute severe febrile illness– defer until recovery.
- Pregnancy should be avoided for one month following vaccination.
- The vaccine may be given to those who have had zoster. It is prudent to defer vaccination for 12 months after the zoster has resolved so that the vaccine can produce a more effective immune response.
- Patients who have received immunosuppressants should be carefully evaluated for the reconstitution of the immune system prior to receiving Zostavax.
- Safety and efficacy have not been established in those infected with HIV with or without evidence of immunosuppression
- This vaccine should be given subcutaneously to individuals with severe thrombocytopenia or any significant coagulation disorder

Co-administration
Zostavax may be administered at the same time, or at any interval from, influenza or pneumococcal polysaccharide vaccine.

An interval of at least seven days should be observed between Zostavax and COVID-19 vaccine. This is because an inflammatory response to COVID-19 vaccine could interfere with the immune response to Zostavax.

Adverse reactions

Local: very common: erythema, pain, pruritus, swelling
common: induration, haematoma

General: common: fever, headache, arthralgia, myalgia, pain in extremity, rash.

Transmission of vaccine virus may occur rarely between vaccinees and susceptible contacts (for example, VZV-susceptible infant grandchildren).

If a vaccinee has a presumed and uncovered vaccine-related rash 7-25 days after vaccination, they should avoid direct contact with immunocompromised persons, non-immune pregnant women and their newborn in the first week of life and non-immune infants in neonatal units, until the rash is dry and crusted.

23.7 Post exposure prophylaxis

The aim of post exposure prophylaxis is to protect individuals at high risk of developing severe varicella disease and also those who may transmit infection to those at high risk (such as health care workers or household contacts).

Whether active (varicella vaccine), passive immunisation (varicella zoster immunoglobulin VZIG) or antiviral medication is offered to a susceptible person with a history of varicella or zoster exposure depend on the host, the type of exposure and the time since exposure.

23.7.1 Protection of contacts with vaccine

Immunisation of susceptible contacts with varicella vaccine may prevent infection or modify disease course. Non-immune people from 12 months of age who have had a significant exposure to varicella or herpes zoster should be given varicella vaccine. The vaccine should be given within five days after exposure, and preferably within three days (see Table 23.1).

23.7.2 Prophylaxis for contacts

Prophylaxis is recommended for individuals who fulfill **all** the following criteria:

- Had significant exposure to varicella or zoster. The risk of acquiring infection from an immunocompetent individual with non-exposed zoster lesion, e.g, thoracolumbar, is remote

and

- Have an increased risk of severe varicella (e.g. immunocompromised, pregnant, neonates in the first week of life born to non-immune women, infants in neonatal units)

and

- Are non-immune (no VZV antibodies)

Significant exposure is defined based on:

- type of VZV infection in the index case (Table 23.1)
- timing of exposure in relation to the onset of rash in the index case.
- proximity and duration of contact.

Table 23.1. Criteria for defining significant exposure to VZV

Type of VZV infection in index case	Timing of exposure in relation to onset of rash in index case	Proximity and duration of contact (any of the following)
Varicella or disseminated zoster	From 48 hours before onset of rash until crusting of lesions	Contact in same room (e.g. in a house, classroom or a 2-4 bed hospital bay) for an hour or more. Face to face contact, within one metre e.g., while having a conversation (usually less than five minutes). Susceptible high risk contacts in large open wards, particularly in paediatric wards where degree of contact may be difficult to define.
Localised zoster in an immunocompromised patient (as viral shedding may be greater)	Day of onset of rash until crusting of lesions.	

23.7.3 Recommendations

i. Neonates and infants (Figure 23.4)

VZIG is recommended for:

- Neonates who are exposed to varicella in mother from seven days before to seven days after delivery. Approximately half of these infants may develop varicella despite immunoprophylaxis, but the disease is usually

modified. IV acyclovir treatment may occasionally be required.

These neonates must receive VZIG as early as possible in the incubation period, because neonatal mortality without VZIG is up to 30%.

- VZ antibody-negative infants
  - exposed to varicella or zoster (other than in the mother) in the first 7 days of life.
  - of any age, exposed to varicella or zoster while requiring intensive or prolonged special care.

The following infants may not have maternal antibodies despite a positive maternal history of varicella and should be tested to determine their VZ antibody status in the event of a contact:

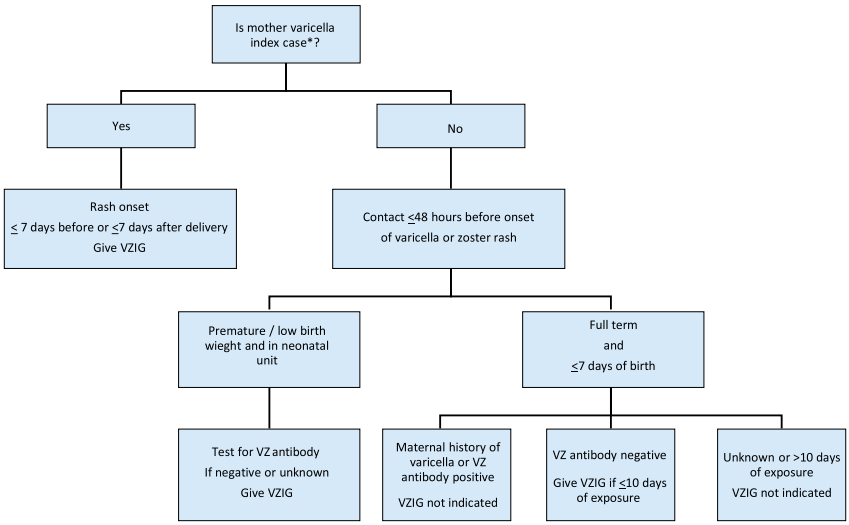
- born at less than 28 weeks gestation
- weigh less than 1000g at birth
- infants 60 days of age or more still requiring intensive or prolonged special care nursing
- had repeated packed red cell infusions

Other infants whose mothers have a positive history of varicella and/or VZV antibodies will usually have maternal antibodies and do not require VZIG.

VZIG is **not** indicated for full-term infants exposed to VZV (either varicella or zoster) more than seven days after delivery or if exposure was more than 48 hours before onset of of varicella or zoster rash in the index case.

People receiving monthly high-dose IV HNIG are likely to be protected and may not need VZIG if they received the last dose of HNIG within three weeks before exposure.

Figure 23.4 Use of VZIG in neonates exposed to VZV



ii. Pregnancy (Figure 23.5)

Non-immune women significantly exposed to varicella at any stage of pregnancy should be offered post exposure prophylaxis (PEP). This can take the form of either antivirals (oral aciclovir) or VZIG.

The decision on which prophylaxis to give should be made in line with local hospital guidelines and following discussion with the mother regarding the risks and benefits of each option.

Management of varicella infection in pregnancy should be discussed urgently with an obstetrician/microbiologist/ID consultant and consideration given to the use of an antiviral drug.

There is sufficient evidence to state that immunoprophylaxis with oral aciclovir is as effective as VZIG. In general, aciclovir should be considered the first-line option for prophylaxis and VZIG should only be offered if the woman is unable to take oral antivirals, for example, due to malabsorption or renal toxicity. The preference for aciclovir is because of ease of administration, limited VZIG supply and the theoretical potential for donor-related illness from VZIG.

There is little evidence that immunoprophylaxis will prevent congenital varicella syndrome following significant exposure of a non-immune mother in the first 20 weeks of pregnancy.

The date of exposure is defined as: the date of contact in a single exposure event, the date of first contact if exposure is on multiple occasions, or the date of rash onset in the index case if they are a household contact.

Antiviral post exposure prophylaxis
Oral aciclovir 800mg four times daily (i.e., six hourly) from day 7 to 14 post exposure is the recommended antiviral.

Oral valaciclovir 1,000mg three times daily may be used as an alternative, but the increased cost and comparative paucity of trial data should be taken into consideration.

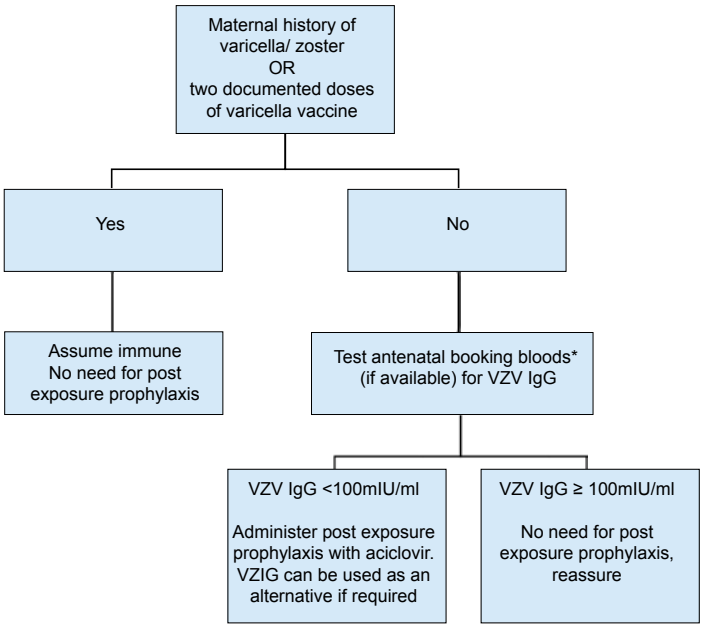
If the woman presents later than day 7 post exposure, a 7 day course of antivirals can be started up to day 14 after exposure. Given the relatively short half-life of aciclovir, if a subsequent exposure occurs, an additional course of 7 days of antiviral may be administered following repeat VZV IgG testing and a risk assessment.

Though aciclovir is not licensed in pregnancy, there is robust safety data to recommend its use in the setting of VZV disease and exposure. A detailed review of the safety data is presented in the HSE Medication Guidelines for Obstetrics and Gynaecology First Edition, Volume 2, Antimicrobial Safety in Pregnancy and Lactation (2017)

VZIG post exposure prophylaxis
VZIG should be administered as soon as possible and ideally within 72 hours of contact. It can be administered up to 10 days post exposure.

If a subsequent exposure to varicella occurs three weeks or more after the first dose of VZIG, an additional dose may be administered following repeat VZV IgG testing and a risk assessment.

Figure 23.5 Post exposure prophylaxis for pregnant women exposed to VZV



*A repeat serum sample should be taken for VZV in cases of repeated exposure to varicella in the same pregnancy if the booking bloods or most recent serology demonstrate non immunity

iii. Immunocompromised contacts (Figure 23.6)

Immunocompromised contacts who are VZV non immune and who have significant exposure to varicella or zoster may require VZIG. This includes adults and children with no history of varicella and/or a negative immune status, receiving immunosuppressive therapy including steroids, cytostatic agents, radiotherapy, recent stem cell transplantation, or who have congenital or acquired immunodeficiency disorders and are not receiving replacement therapy with immunoglobulin (Chapter 3).

immunocompromised contacts should be tested for VZV antibody *regardless of history of varicella*. If seronegative, VZIG is indicated. Testing will rarely be required outside normal working hours. VZIG administration should ideally not be delayed more than seven days after initial contact. If an immunosuppressed contact is antibody-positive, VZIG is not indicated.

Those with immunoglobulin deficiencies who are receiving replacement therapy with immunoglobulin do not require VZIG.

VZV IgG seronegative HIV positive contacts with CD4 cell count <15% should be considered for both VZIG and antiviral prophylaxis with aciclovir (800 mg four times daily) or valaciclovir (1 g three times daily) starting from day seven after exposure and continuing for seven days.

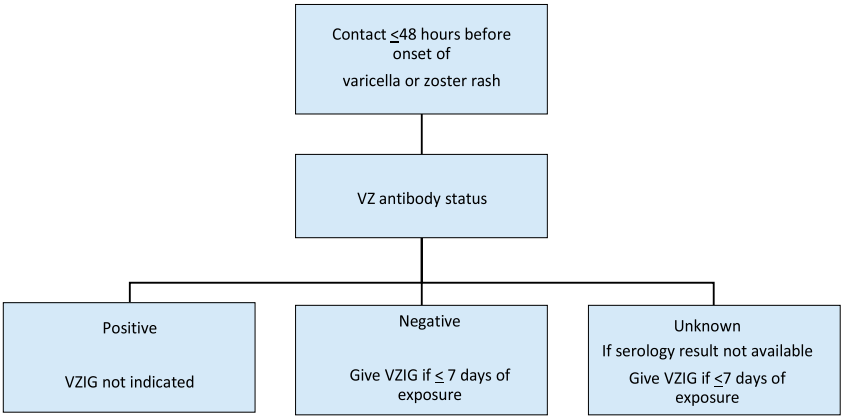
Varicella vaccine should be considered for VZV IgG seronegative HIV-positive contacts with CD4 cell count ≥15% between three and five days after exposure. A second dose should be given three months later.

Those born outside Ireland and Western Europe are less likely to be immune so may require serological testing to check immunity.

Immunocompetent contacts with a definite history of varicella are immune so neither serology nor immunoprophylaxis are necessary. The majority of adults and a substantial proportion of children without a definite history of varicella are VZV antibody positive. Those without a definite history, who are being considered for VZIG, should be tested for VZV antibody.

VZV antibody detected in patients who have received blood or blood products in the previous three months may have been passively acquired. Re-testing in the event of subsequent exposure is required, as the patient may have become antibody negative.

Figure 23.6 Guidance for use of VZIG in immunocompromised persons exposed to VZV



23.8 VZIG preparations, dose and administration

VZIG should be given as soon as possible after exposure, ideally within 72 hours; It may be given up to 10 days

23.8.1 Human Varicella-Zoster Immunoglobulin 100 IU/ml solution for injection.

Each vial contains 250mg human varicella-zoster immunoglobulin (VZIG).

Licensed indications

Prophylaxis against varicella zoster virus (VZV) infection in the following at risk patients exposed to varicella (chickenpox) or herpes zoster

- pregnant women with negative VZV immune status especially up to early in the third trimester (see Section 23.7.3.ii)
- neonates whose mothers develop varicella infection within seven days before and seven days after delivery
- neonates whose mothers have no history of varicella and/or a negative immune status
- premature infants less than 28 weeks gestation or newborns with low birth weight
- children and adults with no history of varicella and/or a negative immune status, with immunocompromise due to disease or treatment, and are not receiving replacement therapy with immunoglobulin.

Dose, route and schedule

0 - 5 years	250 mg (1 vial)
6 - 10 years	500 mg (2 vials)
11 - 14 years	750 mg (3 vials)
15 years and older	1000 mg (4 vials)

If a second exposure to chickenpox occurs three weeks or more after the first dose of VZIG, a second dose is required.

Method of administration

VZIG should be given IM in the deltoid muscle or anterolateral thigh. If a large volume, over 1-2 ml for infants or children, or over 3-5 ml for adults is required, it should be given in divided doses at different sites.

If IM administration is contraindicated (severe bleeding disorders), the injection can be administered SC. However, there are no clinical efficacy data to support SC administration.

Contraindications
Anaphylaxis to IgG, IgA or any of the vial contents.

Precautions
Immunoglobulin administration may interfere with the immune response to live virus vaccines, such as MMR for up to five months and varicella for up to three months. These vaccines should be deferred.

Adverse reactions

Local:	swelling, soreness, redness are common
General:	chills, headache, dizziness, malaise, fever, nausea, vomiting, allergic reactions, arthralgia, hypotension, moderate low back pain and anaphylaxis may occur occasionally. Their frequency is not known.

For special warnings and precautions, and a full list of undesirable effects see the SmPC.

Human Varicella-Zoster Immunoglobulin is available from Allphar Services Ltd.; Tel: 01 4688451 or email: info@promedicare.ie

23.8.2. Varitect
25IU/ml solution for intravenous infusion. Vial sizes are 5, 20 and 50mls.

Licensed indications:
Prophylaxis of varicella after exposure for:

- Children with negative history of varicella who are receiving immunosuppressive, cytostatic or radiotherapy or suffer from hereditary immunodeficiencies;
- Immunocompromised adults who, after careful evaluation are believed susceptible and have had significant exposure;
- Newborns of mothers who develop chicken pox within 5 days before and 2 days after delivery;
- Premature infants whose mothers have negative histories of varicella, as long as they require hospital care;
- Premature infants of less than 28 weeks of gestation or with a birth weight of 1000 g or less, regardless of maternal varicella history;
- Adjuvant therapy of severe or complicated varicella-zoster in immunocompromised patients or newborns at risk of dissemination.

Dose and administration
Prevention of varicella: 1ml (25IU)/kg IV

Treatment of zoster: 1-2ml (25-50IU)/kg IV
Varitect should be infused at an initial rate of 0.1ml/kg/hour for 10 minutes. If well tolerated, the rate of infusion may be increased gradually to a maximum of 1ml/kg/hour for the remainder of the infusion.

Those with immunoglobulin deficiencies who are receiving replacement therapy with immunoglobulin do not require VZIG if exposed to VZV.

Adverse reactions: Headache, nausea, vomiting, arthralgia, fever and allergic reactions are uncommon or rare.

The efficacy of live virus vaccines may be impaired for up to 3 months.

For special warnings and precautions, and a full list of undesirable effects see the SmPC.

Varitect is supplied by Aquilant Pharmaceuticals, contactable at 01 452 0388 or contactus@aquilantpharmaceuticals.ie

23.9 Management of HCW exposure to varicella or zoster

Non-immune HCWs who have had significant exposure to VZV (see Table 23.1) should be excluded from contact with high-risk patients from 8-21 days after exposure.

HCWs with localised zoster on a part of the body that can be covered with a bandage and/or clothing may be allowed to continue working, except with high-risk patients; in that case an individual risk assessment should be carried out.

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