



Guidance for issuing varicella-zoster immunoglobulin (VZIG)

Post exposure prophylaxis (PEP) is offered to individuals at high risk of severe chickenpox following an exposure. This includes immunosuppressed individuals, young babies in their first week of life and pregnant women.

In response to a significant shortage of varicella zoster immunoglobulin (VZIG) in 2018 and a review by a Public Health England (PHE) convened expert working group, updated interim guidelines on PEP for high risk contacts have been published in June 2019. VZIG is recommended for susceptible women exposed in the first 20 weeks of pregnancy and neonates. For women exposed from 20 weeks, antiviral agents or VZIG can be used. Antiviral agents are recommended for post-exposure prophylaxis for immunosuppressed individuals.

See the detailed guide "[Updated guidelines on post exposure prophylaxis \(PEP\) for varicella/shingles](#)" for the latest information.

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Date	Change made	Version number
October 2016	<p>Revised, reformatted and published as a PHE document. This version updates “Chapter 7 Chickenpox” in the HPA Immunoglobulin Handbook (October 2008). Changes to the guidance include:</p> <ul style="list-style-type: none">• Restructuring to provide clear guidance on the three main at risk populations (immunosuppressed patients, infants/neonates and pregnant women)• New guidance on susceptibility testing in the different groups and the requirement for quantitative testing• More information on assessment of immunosuppressed patients and classification into two groups in order to prevent unnecessary testing and delay in issuing VZIG• Inclusion of advice on inadvertent vaccination with shingles and varicella vaccine to immunosuppressed individuals or pregnant women	1.0
May 2017	<ul style="list-style-type: none">• Rewording of antiviral section page 8 for clarity• Clarification that prednisolone dose of 2mg/kg/day refers to paediatric dosage• Paediatric dosages of drugs considered immunosuppressive updated• Reclassification of patients on certain immunosuppressive medicines <p>Revision of Table 2 to indicate that testing is indicated for immunosuppressed individuals with ‘No record of chickenpox or shingles <u>AND</u> no record of 2 doses of varicella vaccine’</p> <ul style="list-style-type: none">• Clarification for different cut-offs for testing neonates and pregnant women• Updated guidance for patients on long term low dose aciclovir /valciclovir prophylaxis• Updated guidance on management of pregnant contacts with history of two recorded doses of varicella vaccine	2.0
August 2017	Change to wording on page 10 to clarify dose of methotrexate	3.0

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Human varicella-zoster immunoglobulin (VZIG)

Varicella-zoster immunoglobulin (VZIG) is prepared by Bio Products Limited (BPL) from the pooled plasma from non-UK blood donors and is dispensed in vials of 250mg (minimum 100 IU/ml). VZIG is issued by Public Health England Colindale (tel: 020 8200 4400) and local PHE and NHS laboratories following a risk assessment of the exposed individual.

Supplies of intravenous immunoglobulin (IVIg), if indicated, should be available from the local hospital pharmacy or from the manufacturers. IVIg is not issued by PHE.

Indications

VZIG prophylaxis is recommended for individuals who fulfil all of the following three criteria:

- Significant exposure to chickenpox (varicella) or shingles (zoster) during the infectious period
- At increased risk of severe chickenpox i.e. immunosuppressed individuals, neonates and pregnant women
- No antibodies to varicella-zoster virus (VZV). Urgent VZV antibody testing can be performed within 24 hours

Infectious period and routes of transmission

Chickenpox infection is primarily transmitted via respiratory droplets. The infectious period for chickenpox is generally considered as being from 48 hours before, to five days after, onset of rash. However, vulnerable individuals who have direct physical contact with vesicle fluid e.g. non-immune pregnant carers may be at risk of infection beyond this period and should therefore be considered for prophylaxis after contact up to the point when the lesions have crusted over.

Shingles infection is primarily transmitted by direct contact with vesicle fluid in immunocompetent individuals but can be transmitted via respiratory droplets from immunosuppressed patients. The infectious period for localised and disseminated shingles is considered as being from onset of rash until all of the lesions have crusted over.

Definition of a significant exposure to varicella-zoster virus (VZV)

Three aspects of exposure to VZV during the infectious period are relevant when considering the need for post-exposure prophylaxis for a susceptible individual:

1. Type of VZV infection in index case:

VZIG should be issued only for those in contact with chickenpox, or those in contact with the following:

- disseminated shingles
- immunocompetent individuals with exposed shingles lesions (e.g. ophthalmic shingles) or
- immunosuppressed individuals with localised shingles on any part of the body in whom viral shedding may be greater

The risk of acquiring infection from contact with an immunocompetent individual with non-exposed shingles lesions (e.g. thoraco-lumbar) is remote and therefore is not an indication for VZIG.

2. The timing of the exposure:

VZIG should be offered to:

- **contacts where there is continuous exposure** to a case of **chickenpox** or shingles (e.g. household member, nursery or care worker). VZIG should be administered within 10 days of the onset of rash in the index case for pregnant women or preferably administered within 7 days of onset of rash for neonates or immunosuppressed contacts.
- **contacts where there has been more than one exposure** to a case of **chickenpox** or **shingles** (e.g. family friend who visited on more than one occasion during the infectious period). VZIG should ideally be administered within 10 days (preferably 7 days for neonates and immunosuppressed contacts) of the first contact. If first contact is reported beyond 10 days (7 days for immunosuppressed) of the first exposure, then repeat assessment based on the date of the second exposure for the need for VZIG.
- **contacts with a single exposure** to a case of **chickenpox** during the infectious period from 48 hours before onset of rash until the lesions have crusted over (in immunocompetent individuals, this is usually 5 days after rash appearance). VZIG should be administered within 10 days of contact (or preferably within 7 days of contact for neonates and immunosuppressed individuals).
- **contacts with a single exposure** to a case of **shingles** (see definitions in “Type of VZV infection in index case” above) during the infectious period from onset of rash until the lesions have crusted over (in immunocompetent individuals, this is usually 5 days after rash appearance). VZIG should be administered within 10 days of contact (or preferably within 7 days of contact for neonates and immunosuppressed individuals).

3. Closeness and duration of contact:

In addition to household contacts, the following require VZIG prophylaxis:

- contacts in the same small room (e.g. in a house or classroom or a 2 to 4 bed hospital bay) for a significant period of time (15 minutes or more)
- face to face contact, for example while having a conversation
- immunosuppressed contacts on large open wards, where air-borne transmission at a distance has occasionally been reported, particularly in paediatric wards where the degree of contact may be difficult to define

Assessment of susceptibility

The administration of VZIG is unlikely to confer any additional benefit for patients who already have varicella antibody (VZV IgG) and therefore VZIG is not recommended for individuals with adequate levels of VZV IgG. Assessment of susceptibility will depend on the history of previous infection or vaccination, and the underlying clinical condition.

Dosage of VZIG for prophylaxis

0 – 5 Years	250mg	By slow intramuscular injection
6 – 10 Years	500mg	
11 – 14 Years	750mg	
15 years and older	1000mg	

When a large-volume injection such as VZIG is to be given, it should be administered deep into a large muscle mass. If more than 3ml is to be given to young children and infants, or more than 5ml to older children and adults, the immunoglobulin should be divided into smaller amounts and given into different sites. The upper outer quadrant of the buttock can be used for varicella zoster immunoglobulin injection.

Individuals for whom intramuscular injections are contraindicated

Contacts with bleeding disorders who cannot be given an intramuscular injection should be given intravenous human normal immunoglobulin (IVIG) at a dose of 0.2g per kg body weight (i.e. 4ml/kg for a 5% solution) instead. This will produce serum VZV antibody levels equivalent to those achieved with VZIG.

Use of antivirals for prophylaxis

For those seronegative contacts for whom VZIG is not indicated and/or for those for whom prophylaxis with a non-blood product is preferred, oral aciclovir at 10mg/kg four times a day from days 7 to 14 after exposure can be considered (Kumagai et al, 1999¹)

¹ Kumagai T, Kamada M et al. Varicella-Zoster Virus–Specific Cellular Immunity in Subjects Given Acyclovir after Household Chickenpox Exposure. The Journal of Infectious Diseases 1999;180:834–7

Treatment of chickenpox in immunosuppressed individuals, neonates and pregnant women

There is no evidence that VZIG is effective in the treatment of disease. Prompt treatment with appropriate drugs (i.e. aciclovir, valaciclovir, famciclovir) should be commenced at the first signs of illness in individuals with a clinical condition which increases the risk of severe varicella.

Inadvertent administration of chickenpox or shingles vaccine

- See page 15 for inadvertent vaccination of immunosuppressed individuals
- See page 23 for inadvertent vaccination of pregnant women

For further information on varicella, please refer to [the Green Book Varicella Chapter 34](#).

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Immunosuppressed individuals: risk assessment, prophylaxis and treatment

Risk assessment

All immunosuppressed individuals as defined in **Chapter 6** (Immunisation against infectious disease – the Green Book) are at risk of severe chickenpox and should be assessed for the need for prophylaxis (VZIG or aciclovir) following a significant exposure. However many adults and older children with immunosuppression will have immunity due to past infection. VZIG is not indicated in immunosuppressed contacts with VZV IgG antibody ≥ 150 mIU/ml as the amount of antibody provided by VZIG will not significantly increase VZV antibody levels.

Individuals receiving regular IVIG replacement therapy do not require VZIG if the most recent dose was administered ≤ 3 weeks before exposure.

Individuals on long term aciclovir / valaciclovir prophylaxis, e.g. post-haematopoietic stem cell transplant will require their dose of aciclovir to be temporarily increased e.g. to 10mg/kg four times a day from days 7 to 14 following exposure for aciclovir. For patients within 12 months of a stem cell transplant, VZIG should also be considered.

All other immunosuppressed individuals who are not already on IVIG replacement therapy will require an assessment at the time of exposure. These individuals can be categorized into two groups (see Table 17).

- **Group A** includes most individuals with immunosuppression. These individuals should be able to develop and maintain adequate antibody from prior infection or vaccination.
- **Group B** includes individuals who are unlikely to have developed or maintained adequate antibody levels from prior infection or vaccination. Individuals in Group B may have lost immunity since their previous antibody tests due to procedures such as haematopoietic stem cell transplant or other immunosuppressive treatments.

Immunocompromised patients who are less immunosuppressed and do not fulfil the criteria for either Group A or Group B do not require VZIG e.g. children on doses of prednisolone less than 2mg/kg/day, patients on doses of methotrexate 25 mg/ week or less. However, prophylactic acyclovir could be considered after discussion with the specialist clinician caring for the patient.

Table 1: Classification of immunosuppressed individuals to inform requirements for VZV IgG antibody testing following an exposure

GROUP A	GROUP B
<p>All patients with malignant disease, other than those in group B, until at least six months after completion of immunosuppressive chemotherapy or radiotherapy.</p>	<p>Patients on treatment for acute lymphoblastic leukaemia (ALL) within and until at least six months after completion of immunosuppressive chemotherapy.</p> <p>Patients with lymphoproliferative disorders who continue to be followed up including haematological malignancies such as indolent lymphoma, leukaemia and plasma cell lymphoma.</p>
	<p>Patients who are receiving (or have received in the past six months) immunosuppressive treatment for a solid organ transplant.</p>
	<p>Patients with severe primary immunodeficiency* (who would not be expected to have made a good initial response to vaccine or disease in childhood).</p> <p>*these patients are often on IVIG replacement therapy and will not require VZIG</p>
<p>Patients who have received a haematopoietic stem cell transplant in the past but do not fit the Group B definition.</p>	<p>Patients who have received a haematopoietic stem cell transplant (until at least 24 months post-transplant and at least 12 months off all immunosuppressive treatment or longer where the patient has developed graft-versus-host disease).</p>
<p>Patients receiving systemic high-dose steroids, or who have received high dose steroids in the past three months. This would include:</p> <ul style="list-style-type: none"> • Children who receive prednisolone, orally or rectally, at a daily dose (or its equivalent) of 2mg/kg/day for at least one week, or 1mg/kg/day for one month • Adults who receive short term high-dose corticosteroids (>40mg prednisolone per day or equivalent for more than 1 week) • Adults who receive short long term 	

lower dose corticosteroids (>20mg prednisolone per day or equivalent for more than 14 days)	
<p>Patients receiving high doses of non-biological oral immune modulating or other types of immunosuppressive drugs (alone or in combination with steroids) or who have received such therapy in the past three months. This would include</p> <ul style="list-style-type: none"> • Adults who receive methotrexate >25mg per week • Adults who receive azathioprine >3.0mg/kg/day or • Adults who receive 6-mercaptopurine >1.5mg/kg/day • Adults on cyclosporin, cyclophosphamide, leflunomide AND • Children (<16years) who receive any dose of the above drugs 	<p>Patients receiving other types of immunosuppressive drugs including biological therapies alone or in combination with steroids, until at least six months after terminating treatment. These include:</p> <ul style="list-style-type: none"> • monoclonal antibodies e.g. alemtuzumab, ofatumumab and rituximab • cytokine inhibitors e.g. etanercept
Patients with immunosuppression due to human immunodeficiency virus (HIV) infection with a CD4 count <200 cells/ μ l who do not have a diagnosis of AIDS	Patients with a diagnosis of acquired immunodeficiency syndrome (AIDS)

Determination of VZ immune status for Group A immunosuppressed individuals

Group A includes most individuals with immunosuppression. These individuals should be able to develop and maintain adequate antibody from prior infection or vaccination.

Individuals in Group A born in the UK, other European countries and North America who are aged 50 years and older are highly likely to have been exposed to varicella during childhood and /or during adulthood from their own children and therefore the majority of these individuals will be immune. For individuals aged 50 years and older born and raised in countries in Asia and Africa, the likelihood of past infection may be lower, although the majority of these individuals are also likely to be immune.

- Individuals in Group A with a history of chickenpox OR shingles OR two recorded doses of varicella vaccine OR a recorded dose of shingles vaccine OR a previous VZV IgG positive (≥ 150 mIU/ml) test should be considered to be immune and do not require testing.

- Individuals in Group A who do not meet these criteria should be tested at the time of exposure. **Those who previously tested VZV IgG negative or equivocal from a sample more than six months ago should be retested (see Table 2).** VZIG should only be given to those found to be VZV IgG negative by a qualitative assay or <150 mIU/ml by a quantitative assay.
- For Group A individuals less than 50 years of age, VZIG administration should not be delayed past 7 days (see paragraph on timing on page 7) after initial contact while an antibody test is done. In these circumstances VZIG should be given on the basis of a negative history of chickenpox. If a patient less than 50 years of age with a positive history of chickenpox is inadvertently tested and found to be negative by a qualitative assay or <150 mIU/ml by a quantitative assay, VZIG should be given.
- However, as most Group A individuals aged 50 years and above can be assumed to be immune, VZIG will not be issued without a negative VZV IgG. If testing is delayed beyond 7 days, VZIG can be given up to 14 days following exposure.

Determination of immune status for Group B immunosuppressed individuals

Group B includes individuals who are unlikely to have developed or maintained adequate antibody levels from prior infection or vaccination. Individuals in Group B may have lost immunity since their previous antibody tests due to procedures such as haematopoietic stem cell transplant or other immunosuppressive treatments and, apart from those within 12 months of haematopoietic stem cell transplant, should be retested at the time of exposure even if known to be VZV IgG positive previously (see Table 2).

- **Those within 12 months of haematopoietic stem cell transplant do not require testing and should be given VZIG.** For all others, VZIG should be given if VZV IgG is negative or equivocal (<150 mIU/ml).
- For all Group B patients requiring VZIG, administration should not be delayed past 7 days (see timing on page 7).

Risk assessment following second exposure

Individuals who have previously received VZIG or IVIG as VZV post-exposure prophylaxis require a new risk assessment if a second exposure occurs. If the second exposure occurs:

- within 3 weeks of administration of VZIG or IVIG, a further dose of VZIG is not required.
- between 3 and 6 weeks following administration of VZIG or IVIG, a further dose of VZIG should be administered without further testing.
- more than 6 weeks following administration of VZIG or IVIG, retesting of a new sample is required.

Table 2: Risk assessment for immunosuppressed individuals with a confirmed significant exposure to chickenpox or shingles

Age group	History	Testing and action within 7 days of exposure	
		Immunosuppressed Group A	Immunosuppressed Group B
All ages	<p>A history of chickenpox OR shingles</p> <p>OR two recorded doses of varicella vaccine</p> <p>OR a recorded dose of shingles vaccine</p> <p>OR a previous VZV IgG positive by either a qualitative assay or ≥ 150 mIU/ml on a quantitative assay.</p>	<p>Assume immune.</p> <p>Do not test.</p>	<p>Regardless of age and history and even if known to be VZV IgG positive previously, test again at time of exposure.</p> <p>Administer VZIG if VZV IgG negative or equivocal or <150 mIU/ml.</p>
50 years and older	<p>No history of chickenpox OR shingles</p> <p>AND no record of 2 doses of varicella vaccine OR shingles vaccine</p> <p>OR previous VZV IgG negative test.</p>	<p>Test and administer VZIG ONLY if VZV IgG negative (qualitative assay) or <150 mIU/ml (quantitative assay). All VZV IgG equivocal results need retesting with a quantitative assay before issuing VZIG</p> <p>If not possible to test within 14 days of exposure, do <u>NOT</u> issue VZIG.</p>	<p>If not possible to test within 7 days of exposure, administer VZIG.</p> <p>If within 12 months of a haematopoietic stem cell transplant, administer VZIG without testing, unless on regular IVIG</p>
Under 50 years	<p>No history of chickenpox OR shingles</p> <p>AND no record of 2 doses of varicella vaccine</p> <p>OR previous VZV IgG negative test.</p>	<p>Test and administer VZIG within 7 days if VZV IgG negative or equivocal or <150 mIU/ml</p> <p>If not possible to test within this time period, VZIG should be administered, preferably within 7 days but up to 14 days after exposure.</p>	

Timing of administration of VZIG to immunosuppressed individuals

Ideally testing should be conducted to allow VZIG to be administered to immunosuppressed individuals within 7 days of exposure. Where the exposure has been identified beyond 7 days, VZIG can be offered up to 14 days after exposure without the need for testing in Group B immunosuppressed individuals. Where the exposure has been identified beyond 7 days, VZIG can be offered up to 14 days after exposure to VZV IgG negative (qualitative assay) or <150 mIU/ml (quantitative assay) Group A immunosuppressed individuals. Aciclovir may be considered as the first line treatment for individuals identified beyond 7 days of exposure as is current practice in many specialist centres,

Beyond this time for patients in both groups A and B, a discussion with the specialist caring for the individual should take place and IVIG (0.2g per kg body weight) may be considered in susceptible individuals for up to 21 days to attenuate infection. (Supplies of IVIG should be available from the local hospital pharmacy and are not issued from PHE)

Treatment of chickenpox in immunosuppressed individuals

Early treatment with high-dose oral aciclovir or systemic aciclovir has been shown to shorten the duration and number of vesicles. Since chickenpox can occur despite VZIG prophylaxis, individuals given VZIG should be monitored and aciclovir considered at the first signs of illness.

Inadvertent administration of chickenpox or shingles vaccine to immunosuppressed individuals

Immunosuppressed individuals who are inadvertently vaccinated with chickenpox or shingles vaccine should be urgently assessed by a clinician to establish the degree of immunosuppression (see Table 1).

- Individuals in Group A with a history of chickenpox OR shingles OR two recorded doses of varicella vaccine OR a previous VZV IgG positive (≥ 150 mIU/ml) test should be assumed to be immune.
- Individuals in Group A with no history of chickenpox OR shingles AND no recorded doses of varicella vaccine OR a previous VZV IgG negative test should be tested. Prophylactic aciclovir should be considered if the individual is found to be VZV IgG negative or equivocal (<150 mIU/ml) or if it is not possible to test within 7 days of vaccination.
- Individuals in Group B should be tested regardless of history and even if known to be VZV IgG positive previously. VZIG should be issued if the individual is found to be VZV IgG negative or equivocal (<150 mIU/ml). If it is not possible to test within 7 days of

vaccination, VZIG should be issued. VZIG and /or aciclovir may be administered beyond 7 days of vaccination and this should be discussed with the patient's specialist.

Individuals developing a rash following inadvertent vaccination should be urgently clinically assessed. For further information see [Vaccination against shingles: information for healthcare professionals](#) and [Varicella chapter of the Green Book](#).

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Infants/neonates: risk assessment, prophylaxis and treatment

Risk assessment

Although infants (< 1 year old) may be at increased risk of severe chickenpox infection, the risks of life threatening complications are particularly important in neonates in the first week of life. The risk assessment needs to take a number of factors into account including the presence of maternal antibodies, prematurity, timing of exposure, and whether the infant is still hospitalised.

VZIG is not usually required for neonates born more than 7 days after the onset of maternal chickenpox, or in those whose mothers develop shingles before or after delivery as these neonates will have maternal antibody.

VZIG is not indicated for neonates (< 7 days old) whose mothers have been exposed during pregnancy and have been found to be VZV IgG negative unless the mother develops chickenpox. In these circumstances, VZIG for the mother should be considered (see section on pregnant women). VZIG is only indicated for the neonate if they are directly exposed postnatally.

VZIG is recommended for:

- a. **Group 1** - neonates whose mothers develop chickenpox (but not shingles) in the period 7 days before to 7 days after delivery. VZIG can be given without VZV IgG antibody testing of the neonate or mother.
- b. **Group 2**
 - VZV antibody-negative infants under 1 year who have remained in hospital since birth who are born before 28 weeks gestation OR weighed less than 1000g at birth
 - OR
 - VZV antibody negative infants who have severe congenital or other underlying condition that require prolonged intensive or special care during the first year of life*
- c. **Group 3** - VZV susceptible neonates exposed to chickenpox or shingles (other than in the mother) in the first 7 days of life.

*In these infants, the use of oral or iv acyclovir should be considered as an alternative to an intramuscular VZIG injection, following discussion with the specialist caring for the infant.

Determination of immune status for neonates/infants

For infants in **Group 2**, maternal antibody may not be present despite a positive maternal history of chickenpox due to immaturity of the immune system at birth, or because birth occurred before maternal antibody transfer is likely to have occurred, or due to waning maternal antibodies. In addition, for those infants in Group 2 who have had repeated blood sampling with replacement by packed red cell infusion, maternal history cannot be relied upon. It is therefore recommended that such infants are tested to determine their VZV antibody status in the event of a contact.

For infants in **Group 3**, VZV antibody testing is not required for mothers or their infants, if the mother has a positive history of chickenpox OR shingles OR has two documented doses of varicella vaccine. For infants in **Group 3** whose mothers have a negative or uncertain history, testing of the mother (preferred) or infant is recommended. A higher cut off (150mIU/ml) is used to determine need for VZIG for neonates (when testing either mother or infant's bloods) compared to pregnant women to try to prevent infection as opposed to attenuating disease complications. VZIG is recommended for VZV antibody-negative neonates/infants, as defined as:-:

- infants whose mothers are VZV antibody-negative by a qualitative assay or <150 mIU/ml by a quantitative assay
- infants who are themselves tested and found to be VZV antibody-negative by a qualitative assay or <150 mIU/ml by a quantitative assay

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Table 3: Risk assessment for neonates or infants with a confirmed significant exposure to chickenpox or shingles

Group	Criteria	Testing	Action
1	Neonates whose mothers develop chickenpox (but not shingles) in the period 7 days before to 7 days after delivery	Not required for mother or infant	Administer VZIG within 7 days of delivery OR within 7 days of onset of disease in the mother, whichever is later
2	<p>Infants (<1yr) who have remained in hospital since birth with any one of the following:</p> <ul style="list-style-type: none"> -born before 28 weeks gestational age OR - weighed less than 1000g at birth OR -infants who have severe congenital or other underlying condition that require prolonged intensive or special care during the first year of life 	Test for VZV antibody status in the infant only	Administer VZIG within 7 days if found to be VZV antibody-negative by a qualitative assay or <150 mIU/ml by a quantitative assay
3	Neonates exposed to chickenpox or shingles (other than in the mother) in the first 7 days of life.	Test either mother (preferred) or neonate for VZV antibody status for infants whose mothers have a negative or uncertain history	Administer VZIG within 7 days if found to be VZV antibody-negative by a qualitative assay or <150 mIU/ml by a quantitative assay

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Plans for hospital discharge

There is no reason to prevent a new baby going home if other members of the household have chickenpox and the mother has had chickenpox or is shown to have VZV antibody. If the mother is susceptible, contact with household members with chickenpox should ideally be delayed until the new baby has reached 7 days of age. For further information see p15 of [Guidance on Viral Rash in Pregnancy](#).

Infants in Group 2 who have previously received VZIG as VZV post-exposure prophylaxis require a new risk assessment if a second exposure occurs whilst they are still in hospital.

Treatment of neonates with varicella

If severe chickenpox develops despite VZIG, high dose intravenous aciclovir treatment of 20mg/kg every eight hours for at least seven days should be started as soon as possible. Prophylactic intravenous aciclovir should also be considered in addition to VZIG for infants whose mothers develop chickenpox four days before to two days after delivery as they are at the highest risk of fatal outcome despite VZIG prophylaxis.

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Pregnant women: risk assessment, prophylaxis and treatment

Risk assessment

Pregnant women and their unborn babies may be at increased risk from chickenpox infection although the actual risk of any complications is low. The risk of maternal complications including pneumonia is increased in late pregnancy and the immediate postpartum period. Other rare complications for pregnant women include encephalitis and hepatitis.

Unborn babies may be at risk of complication from infection during pregnancy. Infection up to 28 weeks of pregnancy can, in rare cases, cause congenital varicella syndrome. Infection between 20 and 37 weeks can lead to shingles in infancy or early childhood due to reactivation of the virus. Infection after 36 weeks may lead to chickenpox in neonates. For further information see p6 and 7 of [Guidance on Viral Rash in Pregnancy](#)

Pregnant contacts with a positive history of chickenpox OR shingles OR two recorded doses of varicella vaccine do not require testing or VZIG (see Table 4). Antibody responses following vaccination may not be detectable and therefore results of VZV IgG testing in patients known to be vaccinated cannot be used to determine susceptibility. The history of vaccination should be used instead to determine need for VZIG. Those with a negative or uncertain vaccination history should be tested for VZV IgG. Those with a negative or equivocal result from a qualitative assay require confirmatory testing with a quantitative assay. For immunocompetent pregnant women, a lower cut-off of 100mIU/ml should be used (not 150mIU/ml as for immunosuppressed and neonates). This is because VZIG is unlikely to confer significant benefit to pregnant women who have low levels of antibody (between 100 to 150mIU/ml - equivocal range).

Table 4: Risk assessment for pregnant women with a confirmed significant exposure to chickenpox or shingles

History	Testing	Action within 10 days of exposure
A history of chickenpox or shingles OR two recorded doses of varicella vaccine.	Do not test.	Assume immune. Do not issue VZIG.
Uncertain or no history of chickenpox or shingles AND Unknown or negative varicella vaccine history	Test antenatal booking bloods* (if available) for VZV IgG.	<p>If VZV IgG positive – reassure, patient is immune, do not issue VZIG.</p> <p>If VZV IgG negative or equivocal on a qualitative assay, retest with a confirmatory quantitative assay. If quantitative assay is ≥ 100 mIU/ml – reassure, VZIG is not indicated.</p> <p>If the result from quantitative testing will not be available within ten days of exposure, AND the individual is VZV IgG negative (qualitative testing) then VZIG should be given.</p> <p>If the result from quantitative testing will not be available within ten days of exposure, AND the individual is VZV IgG equivocal (qualitative testing) then VZIG is not recommended</p>

* For women with an uncertain history of chickenpox, antenatal booking bloods should be tested unless there is a recorded chickenpox exposure in this pregnancy, in which case a fresh sample should be taken for testing if the booking sample is negative.

VZIG is recommended for

- VZV IgG negative (<100 mIU/ml) pregnant contacts exposed at any stage of pregnancy, providing it can be given within 10 days of exposure (for household contacts count from day of onset of rash). Where a woman is exposed in late pregnancy, even if they have since delivered, VZIG should be administered within 10 days of exposure.

VZIG is of similar efficacy whether administered early or late within the ten day period following exposure. There is therefore generally sufficient time to confirm the woman's antibody status prior to issuing VZIG.

Further information about chickenpox in pregnancy is provided by the Royal College of Obstetrics and Gynaecology at [Royal College of Obstetrics and Gynaecology Chickenpox in Pregnancy \(Green-top Guideline No.13\)](#)

Pregnant contacts who have previously received VZIG or IVIG as VZV post-exposure prophylaxis require a new risk assessment if a second exposure occurs. If the second exposure occurs:

- within 3 weeks of administration of VZIG or IVIG, a further dose of VZIG is not required.
- between 3 and 6 weeks following administration of VZIG or IVIG, a further dose of VZIG should be administered without further testing.
- more than 6 weeks following administration of VZIG or IVIG, retesting of a new sample is required.

Treatment of pregnant women with chickenpox

Oral antiviral treatment for seven days (aciclovir 5 x 800mg per day) should be offered if women present within 24 hours of the onset of the rash and they have reached 20 weeks gestation. Aciclovir can be considered before 20 weeks of gestation and should be discussed with the woman's obstetrician. Further information about management of chickenpox in pregnancy is provided by the [Royal College of Obstetrics and Gynaecology Chickenpox in Pregnancy \(Green-top Guideline No.13\)](#)

Inadvertent administration of chickenpox or shingles vaccine to pregnant women

Both chickenpox vaccine (Varilrix® and Varivax®) and shingles vaccine (Zostavax®) contain the same live attenuated strain (Oka) of varicella zoster virus. However, the shingles vaccine has significantly higher antigen content than the chickenpox vaccine and therefore a risk assessment is required if a pregnant woman is inadvertently vaccinated.

There is limited data on women who have been inadvertently vaccinated with shingles vaccine during pregnancy. Therefore, as a precautionary measure, health professionals should undertake a risk assessment, including assessment of immune status similar to that for a natural exposure. Further information on the management of these women is available at [Chickenpox and shingles vaccines: advice for pregnant women](#).

Women who have inadvertently received the chickenpox vaccine can be reassured that no conditions consistent with congenital varicella syndrome have been reported. However, PHE continues to monitor reports of women who have inadvertently received the chickenpox vaccine up to 3 months before pregnancy or at any time during pregnancy and whose pregnancy outcomes are known. Women who have been immunised with chickenpox vaccine in pregnancy should be reported to [PHE Vaccine in Pregnancy Surveillance](#).

Pregnant women who are inadvertently vaccinated with either chickenpox or shingles vaccine should be advised to seek prompt medical advice if they develop a vesicular rash post vaccination.

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