

Title:	<b>Varicella Zoster Guideline: Neonatal risk, exposure and management</b> (Cheshire & Merseyside Guideline)
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<p>The North West Neonatal Network (NWNODN) consists of 3 locality neonatal networks, Cheshire and Merseyside (CM) Lancashire and South Cumbria (LSC) and Greater Manchester (GM). This document has been agreed by C&amp;M Clinical Effective Group (CEG) and can be adapted for local use. <b>Please acknowledge source if this document is adapted for local use.</b></p>	

## Varicella Zoster - neonatal risk, exposure and management

### Definition

This guideline details the management of babies and healthcare professionals, on the neonatal unit, in the event of a suspected exposure to Varicella Zoster virus (VZV).

### Background

The varicella zoster virus (VZV) is responsible for both primary infection (chickenpox) and reactivation (shingles). This is a common childhood infection. 90-93% of adults are VZV antibody positive with acquired immunity post infection that is usually life-long. It is a mild and self-limiting infection but can have complications with pneumonia, secondary bacterial infections and encephalitis. Neonates, immunocompromised patients and pregnant women are at risk of severe disease.

Congenital varicella syndrome is caused by primary maternal infection during pregnancy (within the first 20 weeks gestation) leading to neonatal transfer and infection. This results in congenital abnormalities within the foetus (limb deformity, cataracts, chorioretinitis, scarring, microcephaly, tissue calcification, growth retardation and hydrocephalus). The incidence for congenital varicella syndrome is <1% within the first 12 weeks, and then 2% between 13-20 weeks gestation. Diagnosis can be made antenatally through imaging.

Neonatal chickenpox is caused by exposure to varicella infection within seven days prior to and following birth. If maternal infection occurs earlier (7-20 days prior to birth), although chickenpox can still occur, it tends to be less severe due to the transfer of transplacentally transferred VZV antibodies as the antibodies partially protect the foetus. Elective delivery should be avoided if able to until 5-7 days after the onset of maternal rash to allow for the transfer of antibodies from mother to child. Neonatal ophthalmic examination will need to be arranged as an outpatient postnatally.

Transmission of VZV occurs through

- Personal contact with an infected individual
- Airborne spread of the virus through respiratory secretions
- Contact with inanimate objects contaminated with respiratory secretions or vesicular fluid

The incubation period is 10-21 days following exposure to an individual with chickenpox or shingles. Once viral transmission has occurred, individuals are deemed infectious from 2 days prior to vesicle eruption until all the vesicles have scabbed over and dried up with no new vesicle development (usually about 7 days later).

The identification of risk for an individual exposed to shingles is different.

- If the individual exposed has previously had primary infection with chickenpox, the risk is minimal.
- If the individual exposed has not had primary infection with chickenpox then they are susceptible to infection.

- If the area of skin is covered by clothing, the risk is deemed to be minimal.
- If the affected area is not covered by clothing and is exposed, the affected individual is deemed high risk and therefore exposure is deemed significant

Occupational Health would keep a record of VZV status for healthcare professionals – previous primary infection or vaccination if negative antibodies on testing

### Action

1. Liaise with Infection Prevention and Control team (IPCT) and Consultant Virologist or Microbiologist if there is an index case of chickenpox or shingles or exposure to chickenpox or shingles (Individuals are infectious up to 2 days before vesicle eruption until all the vesicles have scabbed over and dried up with no new vesicle development)
2. An incident meeting should include Consultant Neonatologist, Senior Neonatal Nursing Staff, Consultant Virologist or Microbiologist, representatives from the IPCT, Occupational Health, and Trust communication team.
3. Aim to confirm the diagnosis of VZV infection in the index case (either clinically or by requesting a virology swab of the vesicular fluid for VZV PCR)
4. Assess the immune status of all individuals (including babies who have been discharged, parents, healthcare professionals, visitors) who have had contact with the index case within the infectious period.
  - a. Previous chickenpox or shingles – immune
  - b. Evidence of IgG antibodies to VZV – immune

Ascertain if there is current or past history of immunosuppression in individuals considered to be immune as antibody levels may not be maintained.

5. Determine if VZV exposures for all susceptible individuals can transmit the infection (a significant exposure). Significant exposure is defined as:
  - Face to face contact with a case of chickenpox (e.g. while having a conversation)
  - Contact in the same room or bay for 15 minutes or more
6. Identify high risk susceptible individuals if a significant exposure has occurred and decide if prophylaxis with varicella zoster immunoglobulin (VZIG) (or oral or i.v. aciclovir) is needed. VZIG use should be discussed with the Neonatal Consultant, Consultant Virologist or Microbiologist and then the Consultant Virologist at the VZIG issuing laboratory
  - a. Neonates whose mothers develop chickenpox (but not shingles) within 7 days before birth to 7 days after birth
    - i. administer VZIG within 7 days of delivery OR within 7 days of onset of Chickenpox vesicles in the mother, whichever is later

- ii. 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.
  - b. Neonates exposed to chickenpox or shingles (other than in the mother) in the first 7 days of life
    - i. determine immune status of neonate: test either mother (preferred) or neonate for VZV antibody status for infants whose mothers have a negative or uncertain history of chickenpox or shingles
    - ii. administer VZIG within 7 days if found to be VZV IgG antibody-negative by a qualitative assay or <150 mIU/ml by a quantitative assay
  - c. Infants under 1 year who have remained in hospital since birth who were born before 28 weeks of gestation or had a birth weight of less than 1kg exposed to chickenpox or shingles (regardless of maternal history of chickenpox)
    - i. test for VZV IgG antibody status in the infant only
    - ii. administer VZIG within 7 days if found to be VZV IgG antibody-negative by a qualitative assay or <150 mIU/ml by a quantitative assay
  - d. Infants who have severe congenital or other underlying condition that requires prolonged intensive or special care during the first year of life exposed to chickenpox or shingles
    - i. test for VZV IgG antibody status in the infant only
    - ii. administer VZIG within 7 days if found to be VZV IgG antibody-negative by a qualitative assay or <150 mIU/ml by a quantitative assay.

#### 7. NOTES:

- VZIG is not required for infants with significant VZV exposure after seven days of life if they have already been discharged home.
  - VZIG is not required for neonates exposed to VZV outside of the designated time period (seven days before and after birth) or born to mothers whose chickenpox started more than 7 days prior to birth or those born to mothers with shingles do not require VZIG.
  - VZIG ameliorates chickenpox severity should it occur. It is postulated that VZIG may prevent infection in approximately 50% of neonates, and that close observation should continue for the next 4 weeks (VZIG extends the incubation period by one week). In the case that the neonate is discharged home within this time, clear instruction to seek urgent medical attention if concerned must be given to the parents and documented
8. 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.
  9. Neonates that have been exposed on the neonatal unit
    - a. nurse in incubators
    - b. barrier nurse
    - c. ensure they are cared by healthcare workers who are VZV immune and care for as few infants in that room as possible

10. 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.
11. Breastfeeding - Mothers with chickenpox may breastfeed as long as the neonate is covered by VZIG or Aciclovir. If there are lesions near the nipple, it is advised that milk be expressed from that breast and given via syringe/bottle/tube.
12. Any blood sampling which is required for testing should be fully discussed with parents and the Consultant Virologist or Microbiologist. This is to ensure that the appropriate tests are done, with consent, and that robust plans can be made for the timely transport and testing of these urgent samples.
13. High risk babies, if found to be immune to VZV (recent VZV IgG antibody test >150 on the quantitative assay), may move to a room in which the non-immune exposed babies are being nursed.
14. Step up of care for VZV exposed babies will be clinically indicated.
15. A decision should be made about restricting visiting on the neonatal unit during the incubation period following the exposure. Communication team should be involved in providing information and signage for parents and visitors.
16. In the event of a secondary case of chickenpox occurring on the neonatal unit due to an exposure, the on call neonatal and virology or microbiology consultant should be notified and a new incident meeting should be called.
17. Healthcare professionals should refer to Occupational Health if they are unsure of their VZV status.
18. Women (healthcare professionals, visitors) should urgently contact their midwives if they are pregnant, have been exposed to VZV and are unsure about their VZV status.
19. Inform Public Health England (PHE) local representative of the VZV issue on the neonatal unit.

## References

1. [Guidance for issuing varicella-zoster immunoglobulin \(VZIG\) August 2017](#)
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6. Sauerbrei, A. (2010) Review of varicella-zoster virus infections in pregnant women and neonates. Health, 2, 143-152.
7. NICE CKS Chickenpox guideline revised Oct 16.

## Abbreviations

VZV – varicella zoster virus

VZIG – varicella zoster immunoglobulin

IPCT – infection prevention and control team

## Appendix

### **Has the neonate been born to a mother who has developed chickenpox between 7 days prior to and after delivery?**

Need IV VZIG and potentially IV acyclovir, discuss with neonatal and microbiology consultant

### **Has the neonate been born to a mother who has developed shingles near the time of or after delivery?**

No treatment is needed as the mother has had previous primary VZ infection and will have passed on immunity to baby.

### **Has the neonate been born to a mother who has not previously had chickenpox but in the time of delivery and postnatal care a sibling or family member at the family household has developed chickenpox?**

If so, it would be advised that that neonate does not return to the family home in the first 7 days of life as they will be highly susceptible to infection.

### **Has a case of chickenpox developed in someone who has visited the SCBU in the 2-3 week incubation period?**

Precautions and analysis of exposure must occur with the input of infection control. Significant exposure: face to face contact or over 15 minutes in the same room.

If no significant exposure has occurred - no further steps are needed.

If significant exposure has occurred -

- If the neonate was born less than 28 weeks' gestation or had a birthweight of <1kg or have had numerous blood transfusions - high risk. Such cases must be discussed with the on call neonatal and microbiology consultant to determine management.
- If the neonate has been exposed but mother states she has had chickenpox previously, neonatal and/or maternal VSV antibody status' can be tested. If positive, transmission is less likely and if negative, transmission is more likely and they would need IV VZIG +/- IV acyclovir.

Neonates exposed to VZV outside of the designated time period (seven days before and after birth), born to mothers who started with primary VZV infection over 7 days prior to birth and those born to mothers with shingles do not require VZIG.

### **Can mothers with active chickenpox breastfeed?**

Guidance advises that mothers with chickenpox may breastfeed as long as the neonate is covered by VZIG and/or aciclovir. If there are lesions near the nipple, it is advised that milk be expressed and given via syringe/bottle/tube.

### **What if a staff member develops chickenpox or shingles?**

If a staff member develops chickenpox, this is a significant event and a timeline of exposure needs to be developed. If they develop shingles, the risk is minimal if the affected area is covered by clothing. If not covered by clothing, they would be deemed high risk as with active chickenpox exposure.