IMMUNOCOMPROMISED CHILDREN EXPOSED TO OR REQUIRING TREATMENT FOR VARICELLA ZOSTER- CLINICAL GUIDELINE FOR MANAGEMENT V3.0
1. **Aim/Purpose of this Guideline**

   1.1. The aim of this guideline is the management of immunocompromised children who have been exposed to Varicella zoster (VZ) and for the treatment of Varicella zoster in this group.

2. **The Guidance**

   2.1. *Varicella zoster is a potentially serious infection in an immunocompromised child.*

   - The mortality rate from varicella was about 7% in children being treated for cancer before the availability of Varicella zoster Immunoglobulin (VZIG) and antiviral agents.
   - At diagnosis it is important to ask if the child has had VZ infection. Newly diagnosed patients should have their Varicella zoster virus (VZV) antibody status checked prior to blood transfusions.
   - The result should be clearly recorded in the patient’s notes.
   - Patients who have antibodies from previous VZ infection or from transfusions of blood products may be protected against infection. However this immunity may be lost and so if a patient is exposed to VZ infection it is safest to assume that they are not protected and recheck their VZV antibody status.
   - A child who is either on treatment (standard chemotherapy or other immunosuppressive drugs) or within 6 months of completing treatment and has had significant VZV exposure (for definition see below) must be treated if they are VZ antibody negative. If they are known to be Varicella antibody positive then it is up to the individual clinician to treat the patient if they feel it is necessary.
   - After autologous or allogeneic HSCT the child should be considered at risk until at least 1 year post procedure (18 months for non-sibling, unrelated or mismatched donors) and/or at least 12 months off all immunosuppressive therapy.

2.2. **VZIG and indications for VZIG prophylaxis.**

   - VZIG has been shown to modify varicella infections.
   - VZIG may prevent infection altogether or result in milder disease.
   - The effect of VZIG is maximized by giving it within 72 hours of exposure. However UK guidelines allow administration up to 10 days after exposure.
VZIG prophylaxis is recommended for individuals who fulfill ALL the following criteria:

- Significant exposure to VZ or Herpes zoster (for definition see below).
- A clinical condition that increases the risk of severe VZ i.e. immunocompromised patients.
- No antibodies to VZ.

2.3. Definition of a significant exposure to VZ virus. Three aspects of exposure need to be considered.

1. Type of VZ infection in index case:
   - Chickenpox
   - Disseminated zoster
   - Immunocompetent individuals with exposed lesions eg ophthalmic zoster. The risk of acquiring infection from an immunocompetent individual with non-exposed zoster lesions (eg thoraco-lumbar) is remote.
   - Immunocompromised patients with localised zoster on any part of the body (in whom viral shedding may be greater)

2. Timing of the exposure in relation to onset of rash in index case:
   - Exposure to a case of chickenpox or disseminated zoster between 48 hours before the rash develops and crusting of all lesions.
   - Exposure to localised zoster from the day of onset of rash until crusting of lesions.

3. Closeness and duration of contact:

   Varicella zoster:
   - Continuous home contact e.g. affected sibling.
   - Contact in the same room for a significant period of time (15 minutes or more)
   - Face to face contact (e.g. while having a conversation)
   - In the case of large open wards, where air-borne transmission at a distance has occasionally been reported, the necessity of giving VZIG to all susceptible high-risk contacts should be considered, particularly in paediatric wards where the degree of contact may be difficult to define.

   Herpes zoster:
   - Direct contact with the exposed lesions.
   - Cohabitation with an affected person.

Significant exposure to Herpes zoster can be difficult to define. Generally the same guidance is used as for chickenpox. Herpes zoster is not infectious until the lesions are visible.
2.4. Determination of VZ antibody status:

- Even if immunosuppressed contacts have a history of chickenpox, their VZ immune status should be checked if possible. This should be done by sending a clotted blood sample to Microbiology (discuss and inform Microbiology prior to sending sample).

- VZ immunity testing for immunocompromised patients is NOT done in RCHT lab. All samples are sent to Bristol. In all cases Microbiology must be informed prior sending the sample.
  
  - During the working week if the sample is received in lab before 3 pm it can be sent to Bristol on the same day and result is usually expected on following day (afternoon). If the sample is received after 3 pm, then it will usually be sent by courier the following day. Bristol normally runs the test 6 days a week (Not on Sunday and there is no courier on Saturday from RCHT lab). A sample received after 3 pm on Friday can only be sent on Monday expecting a result on Tuesday.

- Every attempt should be made to find out the exact date and nature of contact to determine the eligibility for VZIG. This information should be shared with microbiology while requesting authorisation of VZIG.

- VZIG administration should not be delayed beyond 7 days after the initial contact while the results of the VZ antibody test are awaited (ideally given within 72 hours but can be administered up 7 days and may attenuate infection up to 10 days following exposure).
  
  - If the antibody result is delayed beyond 7 days then contacts should receive VZIG on the basis of a negative chickenpox history.
  
  - If there is a positive history of chickenpox wait for the antibody result.
  
  - Contacts with a positive history of chickenpox but no detectable antibody should receive VZIG.

- Immunosuppressed contacts with detectable antibody do not require VZIG as the amount of antibody provided by VZIG will not significantly increase VZ antibody titres in those who are already positive.

- Second attacks of chickenpox can occasionally occur in immunosuppressed patients who are VZ antibody positive. This is usually due to defects in cell-mediated immunity.

- Despite VZIG prophylaxis following a contact, about half of susceptible immunosuppressed contacts will develop clinical VZ.

- About 15% of patients given VZIG following a contact, who do not develop symptoms, will have a sub-clinical infection leading to seroconversion. Hence contacts that have been negative for VZ antibody and have received VZIG in the past should be retested for VZ antibody in the event of subsequent exposure.
As a few patients may seroconvert due to a sub-clinical infection after a contact despite VZIG, then it is prudent to retest VZ immunity 3 months from the contact or last negative VZ immunity test particularly when the patient is anticipated to remain immunosuppressed for significant period of time. This can help in decision making for the requirement of VZIG on further exposure.

**ACTION – Treat with either VZIG or Aciclovir (for those patients where VZIG is not indicated):**

**VARICELLA ZOSTER IMMUNOGLOBULIN (VZIG)**

<table>
<thead>
<tr>
<th>Age</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>By slow intramuscular injection – if &gt;5mls required it is advisable to administer in divided doses at different sites (Discuss with Microbiologist at RCHT prior to obtaining VZIG from pharmacy)</td>
<td></td>
</tr>
<tr>
<td>1 month - 5 years</td>
<td>250mg (1 vial)</td>
</tr>
<tr>
<td>6-10 years</td>
<td>500mg (2 vials)</td>
</tr>
<tr>
<td>11-14 years</td>
<td>750mg (3 vials)</td>
</tr>
<tr>
<td>15 years and older</td>
<td>1000mg (4 vials)</td>
</tr>
</tbody>
</table>

- VZIG is given by intramuscular injection in the upper outer quadrant of the buttock or the anterolateral thigh.
- Ideally VZIG should be given within 72 hours of the contact but it is recommended that VZIG prophylaxis should be given even if beyond 72 hours from contact as giving prophylaxis within 10 days of contact may attenuate infection.
- Patients re-exposed to chickenpox more than 3 weeks after receiving VZIG and who remain non-immune should have VZIG repeated.
- The incubation period for chickenpox may be prolonged to 28 days after VZIG.
- Even if VZIG prophylaxis is given, contacts can still develop chickenpox.
- VZIG is well tolerated. Anaphylactoid reactions occur rarely.

**OR**

**ACICLOVIR ORALLY (for those patients where VZIG is not indicated)**

Dose = 10mg/kg 4 times per day po

Prophylactic aciclovir should be commenced by 7 days after contact and be continued for at least 7 days.

(Bristol Children’s Hospital guideline suggests treating from day 7 to 21 after contact.)
- Aciclovir is a highly potent inhibitor of VZV
- Evidence suggests that prophylactic aciclovir is commenced 7 days after exposure and continued for at least 7 days
- Caution in renal impairment – adjust dose as per BNFC
- VZV resistance to aciclovir has been reported in immunocompromised patients, although this remains rare.

**Whichever prophylaxis is used, the patient and family should contact the CLIC Unit/Paed obs immediately if any suspicious skin lesions develop so that early treatment with INTRAVENOUS ACICLOVIR can be commenced.**

**Varicella zoster.**

- Chickenpox can be fatal in immunosuppressed patients.
- A senior clinician must be informed if an immunocompromised child is admitted with Varicella infection.
- If necessary diagnosis can be confirmed by collecting vesicle fluid or lesion swab.
- Patients with chickenpox should be treated for a MINIMUM of 10 days and receive INTRAVENOUS ACICLOVIR until there are no new lesions followed by ORAL ACICLOVIR to complete a course depending on discretion of clinician. This should ensure treatment is continued for 2 days after crusting of lesions.
- Aciclovir doses are prescribed according to the BNFC. Ensure adequate hydration and monitor renal function.
3. Monitoring compliance and effectiveness

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>Compliance with guideline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>Audit lead, paediatric consultant , oncology team</td>
</tr>
<tr>
<td>Tool</td>
<td>Audit, annual review</td>
</tr>
<tr>
<td>Frequency</td>
<td>Annually or before if indicated</td>
</tr>
<tr>
<td>Reporting arrangements</td>
<td>Paediatric haematology/oncology team Directorate audit and guidelines meeting</td>
</tr>
<tr>
<td>Acting on recommendations and Lead(s)</td>
<td>Paediatric haematology/oncology team Directorate audit and guidelines meeting</td>
</tr>
<tr>
<td></td>
<td>Required actions will be identified and completed in 3-6 months</td>
</tr>
<tr>
<td>Change in practice and lessons to be shared</td>
<td>Required changes to practice will be identified and actioned within 3-6 months. A lead member of the team will be identified to take each change forward where appropriate. Lessons will be shared with all the relevant stakeholders</td>
</tr>
</tbody>
</table>

4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the 'Equality, Diversity & Human Rights Policy' or the Equality and Diversity website.

4.2. Equality Impact Assessment

The Initial Equality Impact Assessment Screening Form is at Appendix 2.
## Appendix 1. Governance Information

<table>
<thead>
<tr>
<th>Document Title</th>
<th>IMMUNOCOMPROMISED CHILDREN EXPOSED TO OR REQUIRING TREATMENT FOR VARICELLA ZOSTER-CLINICAL GUIDELINE FOR MANAGEMENT V3.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Issued/Approved:</td>
<td>9th Nov 2017</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>9th Nov 2017</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>9th Nov 2020</td>
</tr>
</tbody>
</table>
| Directorate / Department responsible (author/owner): | Dr. Katrina MacDonald  
Sabrina Tierney  
Dr Shama Goyal |
| Contact details: | 01872252891 |
| Brief summary of contents | Medical guideline for care of immunocompromised children exposed to varicella zoster. |
| Suggested Keywords: | Children  
Immunocompromised  
Varicella zoster  
Chicken pox |
| Target Audience | RCHT  
PCH | CFT | KCCG |
| Executive Director responsible for Policy: | Medical Director |
| Date revised: | 9th Nov 2017 |
| This document replaces (exact title of previous version): | IMMUNOCOMPROMISED CHILDREN EXPOSED TO OR REQUIRING TREATMENT FOR VARICELLA ZOSTER-CLINICAL GUIDELINE FOR MANAGEMENT V2.0 |
| Approval route (names of committees)/consultation: | Paediatric consultants  
Paediatric oncology and haematology team  
Child health audit and guidelines meeting  
Microbiology consultant  
Divisional Board Meeting |
<p>| Divisional Manager confirming approval processes | David Smith |
| Name and Post Title of additional signatories | Not Required |</p>
<table>
<thead>
<tr>
<th>Name and Signature of Divisional/Directorate Governance</th>
<th>{Original Copy Signed}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead confirming approval by specialty and divisional management meetings</td>
<td>Name: Caroline Amukusana</td>
</tr>
<tr>
<td>Signature of Executive Director giving approval</td>
<td>{Original Copy Signed}</td>
</tr>
<tr>
<td>Publication Location (refer to Policy on Policies – Approvals and Ratification):</td>
<td>Internet &amp; Intranet ✓ Intranet Only</td>
</tr>
<tr>
<td>Document Library Folder/Sub Folder</td>
<td>Clinical / Paediatrics</td>
</tr>
<tr>
<td>Links to key external standards</td>
<td>None</td>
</tr>
</tbody>
</table>
Roderick M, Finn A, Ramanan AV. *Chickenpox in the immunocompromised child*. Arch Dis Child July 2012 Vol 97 No 7
Immunisation of the Immunocompromised Child (Best Practice Statement from Royal College of Paediatrics and Child Health, February 2002), University Hospitals Bristol NHS Foundation Trust *Clinical Guideline- Immunisation of Children Completing Chemotherapy*
| Training Need Identified? | No |
### Version Control Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
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<tr>
<td>Dec 2011</td>
<td>V1.0</td>
<td>Initial Issue</td>
<td>Dr. N. Gilbertson paediatric consultant, Dr. K. Macdonald Associate specialist</td>
</tr>
<tr>
<td>May 2014</td>
<td>V2.0</td>
<td>Review and changes to content and reformat.</td>
<td>Dr. K. Macdonald Associate specialist, Sabrina Tierney paediatric pharmacist, Tabitha Fergus Deputy ward manager-format only.</td>
</tr>
<tr>
<td>Nov 2017</td>
<td>V3.0</td>
<td>No changes</td>
<td>Katrina Macdonald Associate specialist</td>
</tr>
</tbody>
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This document is to be retained for 10 years from the date of expiry.
This document is only valid on the day of printing

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Appendix 2. Initial Equality Impact Assessment Form

This assessment will need to be completed in stages to allow for adequate consultation with the relevant groups.

<table>
<thead>
<tr>
<th>Name of the strategy / policy / proposal / service function to be assessed</th>
<th>IMMUNOCOMPROMISED CHILDREN EXPOSED TO OR REQUIRING TREATMENT FOR VARICELLA ZOSTER - CLINICAL GUIDELINE FOR MANAGEMENT V3.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directorate and service area:</td>
<td>Is this a new or existing Policy?</td>
</tr>
<tr>
<td>Child health</td>
<td>existing</td>
</tr>
<tr>
<td>Name of individual completing assessment:</td>
<td>Telephone:</td>
</tr>
<tr>
<td>T. Fergus</td>
<td>01872252800</td>
</tr>
</tbody>
</table>

1. **Policy Aim***
   - Who is the strategy / policy / proposal / service function aimed at?
   - Clear guidance for medical staff caring for immunocompromised children exposed to or requiring treatment for Varicella zoster.

2. **Policy Objectives***
   - Clear guidance for medical staff caring for immunocompromised children exposed to or requiring treatment for Varicella zoster.

3. **Policy – intended Outcomes***
   - Standardised and evidence based practice.

4. *How will you measure the outcome?* audit

5. Who is intended to benefit from the policy?
   - Children and families

6a Who did you consult with?

   b). Please identify the groups who have been consulted about this procedure.

   - Workforce
   - Patients
   - Local groups
   - External organisations
   - Other

   x

   **Please record specific names of groups**

   - Clinical Guideline Group
   - Child Health Directorate

   What was the outcome of the consultation?
   - Guideline agreed
### 7. The Impact

Please complete the following table. If you are unsure/don’t know if there is a negative impact you need to repeat the consultation step.

<table>
<thead>
<tr>
<th>Equality Strands:</th>
<th>Yes</th>
<th>No</th>
<th>Unsure</th>
<th>Rationale for Assessment / Existing Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sex</strong> (male, female, trans-gender / gender reassignment)</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Race / Ethnic communities /groups</strong></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Disability</strong> - Learning disability, physical impairment, sensory impairment, mental health conditions and some long term health conditions.</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Religion / other beliefs</strong></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Marriage and Civil partnership</strong></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pregnancy and maternity</strong></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian</strong></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

You will need to continue to a full Equality Impact Assessment if the following have been highlighted:

- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation - this excludes any policies which have been identified as not requiring consultation. or
- Major this relates to service redesign or development

8. Please indicate if a full equality analysis is recommended.

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

9. If you are not recommending a Full Impact assessment please explain why.

No areas identified
Keep one copy and send a copy to the Human Rights, Equality and Inclusion Lead
c/o Royal Cornwall Hospitals NHS Trust, Human Resources Department, Knowledge Spa,
Truro, Cornwall, TR1 3HD

This EIA will not be uploaded to the Trust website without the signature of the
Human Rights, Equality & Inclusion Lead.

A summary of the results will be published on the Trust’s web site.

Signed Chris Warren

Date 09/11/17