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<td><strong>Reference Number</strong></td>
<td>Med11/011</td>
</tr>
<tr>
<td><strong>Implementation Date</strong></td>
<td>November 2011</td>
</tr>
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<td><strong>Review Date</strong></td>
<td>November 2014</td>
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<tr>
<td><strong>Responsible Officer</strong></td>
<td>Head of Infection Prevention &amp; Control</td>
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**Introduction**

Measles is one of the most highly infectious diseases known. Measles can be severe in susceptible infants, pregnant women and immunocomprised individuals. The most effective way to control measles is by active immunisation, using the MMR vaccination.

**Disease Information and Key Points for Consideration**

<table>
<thead>
<tr>
<th>Infectious agent:</th>
<th>Measles virus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reservoir:</td>
<td>Humans</td>
</tr>
<tr>
<td>Transmission:</td>
<td>Airborne by droplet spread. Direct contact with nasal or throat secretions of infected persons.</td>
</tr>
<tr>
<td>Clinical Signs and Symptoms:</td>
<td>Measles normally present with a prodromal fever, conjunctivitis, coryza, cough and Koplik spots (small spots with white or bluish/white centres on an erythematous base on the buccal mucosa. A characteristic red, blotchy maculopapular rash which is not itchy appears on the third to seventh day. The rash begins on the face and behind the ears, and then becomes generalised lasting 4-7 days.</td>
</tr>
<tr>
<td>Complications:</td>
<td>Complications are frequent and can include pneumonia, otitis media and diarrhoea. Less frequently encephalitis may occur and rarely sub acute sclerosing panencephalitis (SSPE).</td>
</tr>
<tr>
<td>Diagnosis:</td>
<td>Confirmation is performed on oral fluid or serum samples (see page 4)</td>
</tr>
<tr>
<td>Period of Infectivity:</td>
<td>Patient is infectious from 4 days before to 4 days after the onset of the rash</td>
</tr>
<tr>
<td>Incubation Period:</td>
<td>7-18 days (average 10-12 days)</td>
</tr>
<tr>
<td>Prevention:</td>
<td>MMR vaccination</td>
</tr>
<tr>
<td>Precautions:</td>
<td>Non-immune staff should not provide care. Contact/airborne precautions should apply. HCCWs should wear FFP3 masks. Patient should be isolated, ideally in a NEGATIVE PRESSURE room.</td>
</tr>
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</table>
Minimum Details to be Taken When a Case is Reported

When a case is reported or notified to the Public Health Duty Room, the following information is essential for the risk assessment of the case.

<table>
<thead>
<tr>
<th>Caller’s details:</th>
</tr>
</thead>
<tbody>
<tr>
<td>○ Name, address, designation and contact number</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Demographic details:</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Name, DOB, sex, ethnicity, and NHS number</td>
</tr>
<tr>
<td>□ Address, including postcode</td>
</tr>
<tr>
<td>□ Current residence if not the home address</td>
</tr>
<tr>
<td>□ Contact phone number and contact details of parent if case is a child</td>
</tr>
<tr>
<td>□ Occupation (if relevant)</td>
</tr>
<tr>
<td>□ Place of work/ education (if relevant)</td>
</tr>
<tr>
<td>□ *GP name, address and phone number</td>
</tr>
<tr>
<td>□ *Member of hard to reach population (e.g. Steiner, travelling family)?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical/epidemiological assessment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Clinical information (including onset dates for prodrome, rash and diagnosis)</td>
</tr>
<tr>
<td>□ *Immunisation history</td>
</tr>
<tr>
<td>□ *Contact with confirmed or suspected case?</td>
</tr>
<tr>
<td>□ *UK and non UK travel in previous 4 weeks?</td>
</tr>
<tr>
<td>□ <em>Context, such as high risk population (e.g. international students, Steiner, traveller family?)</em></td>
</tr>
</tbody>
</table>

* Information required in addition to the routine information collected on all notifiable diseases

Notification

Measles remains a notifiable disease under the Public Health (Control of Disease) Act 1984.

The Public Health Duty Room should be informed immediately of any probable or confirmed case of measles (including out of hours).

Contact numbers are: 028 90 553994/ 028 90 553997
Out of Hours: Call the Public Health Agency Doctor through NI Ambulance Control on 028 90 404045.

Laboratory Confirmation of Measles

An urgent laboratory test is only required when the public health risk is high and the epidemiological features are not consistent with measles.

If there are epidemiological factors to suggest measles is likely then public health action should proceed without waiting for confirmation of the diagnosis.
Samples required from a clinically suspected measles case:

- Oral fluid test kit – Measles IgM can now reliably be detected in saliva if the specimen is collected between 1 and 6 weeks after the onset of symptoms. This sample can be tested for PCR if indicated.

- Saliva samples are usually positive for measles specific IgM on the day the rash appears. If negative, a second sample 2-6 weeks after onset is recommended to document an IgM response and/or IgG seroconversion.

- Serology – Single raised IgM or a rise in IgG from specimen(s) collected 1-3 weeks after the onset of symptoms.

- The sensitivity of serum IgM assay may be slightly higher in the early phase than saliva, but serum is significantly less useful for PCR than saliva or other clinical samples.

- Culture – The diagnosis can also be confirmed by culture (in blood, nasopharyngeal swab, conjunctiva secretions and urine). Throat swab and urine can be tested for measles by PCR.

**Note:**
- Saliva sample taken after the onset of rash is the first line investigation for rapid confirmation of measles.
- Salivary swab kits will be sent from the CCDC to the hospital concerned once notification is received.

### Assessment of Contacts and Considerations for Post Exposure Prophylaxis

It is vital to attempt to protect vulnerable contacts. Where transmission is widespread individual case assessment and contact tracing may not be possible to sustain. At lower levels of transmission the priority for contact tracing is to identify the following:

1. Immunocompromised contacts
2. Vulnerable immunocompetent contacts (pregnant women, infants)
3. Healthcare workers
4. Healthy contacts

**Vulnerable Contacts**

For all vulnerable contacts potentially exposed to a case of confirmed, epidemiologically linked or likely measles the following criteria should be addressed.

- Has there been significant exposure?

Individuals are infectious from 1 day before the beginning of the prodromal symptoms (usually about 4 days before rash onset) until 4 full days after the rash appears. Measles is one of the
most contagious diseases known; less than 15 minutes exposure to a case can lead to disease in a susceptible (non-immune) person.

**Thresholds for measles exposure times**

*Immunocompromised people exposed:* if any immunocompromised person is exposed (e.g. patients with leukaemia, high dose immunosuppressants) there is a very low threshold for follow-up: even a very short exposure (minutes) should trigger investigation. In a highly immunosuppressed child who is unlikely to be immune it may even be worth considering prophylaxis where the possibility of exposure has occurred by entering a room within a short period after a case has been present.

*Immunocompetent (pregnant or infants) people exposed:* if healthy immunocompetent persons or health care workers are exposed to measles they should be followed up if there has been face-to-face contact of any length or where exposure for 15 minutes or longer in the same room has occurred.

- Is the exposed likely to be susceptible?

Infants, pregnant women and immunosuppressed individuals should be assessed for susceptibility according to the [HPA Post Exposure Prophylaxis for Measles guidelines](http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1238565307587)

Arrangements should be made with the local virology laboratory, Royal Victoria Hospital, Belfast if urgent IgG testing is required.

Contact: 028 90 632662, or out of hours Virology on call via RVH switchboard.

**Healthcare Workers**

Healthcare workers with patient contact should be screened to assess their level of immunity/protection in relation to measles. Screening of healthcare workers is available through the Western Trust’s Occupational Health Department

Healthcare workers potentially exposed to a case of confirmed or suspected measles should be followed up if there had been face to face contact irrespective of the time exposed, or exposure for 15 mins or longer in the same room. For healthcare workers in high risk settings, a lower level of exposure may be considered significant.

Healthcare workers with satisfactory evidence of protection can continue to work normally but should be advised to report to Occupational Health if they develop a fever or symptoms of measles in the next 18 days. Satisfactory evidence of protection includes documentation of having received two or more doses of measles containing vaccine and/or a positive measles antibody test.

Healthcare workers who do not have satisfactory evidence of protection should be excluded from work from the 5th day after exposure, unless they have been tested and shown to be IgG
positive. Susceptible HCWs exposed to measles should receive one dose of MMR and be excluded from work from day 5 after exposure. The HCW can return to work 21 days after the final exposure, or earlier if symptom free and found to be measles IgG positive at least 14 days after MMR was given.

HCWs who become ill with symptoms or rash should be excluded from all work until 4 full days after the onset of the rash. Treat HCW as a case and confirmation and notification should be sought in the usual way.

In the event of measles not having been suspected at the time of admission and unprotected staff and patients being exposed to a case they should be dealt with according to the algorithm at Appendix 2.

Other Healthy Contacts

MMR vaccination is effective post-exposure prophylaxis if given within 72 hours of exposure.

MMR can be given at any time and in the following situations

- The individual is incubating measles
- The individual is already immune
- In immunocompetent persons of any age above the age of 6 months. There is no upper age limit

MMR should be offered to any household/social contact likely to be susceptible (children and young adults who have not had 2 doses of MMR).

When measles is circulating in the community or there is contact with a confirmed case, the first dose of MMR should be given as soon as possible, followed by the second dose given after 1 month. If the second dose is given within three months of the first dose and the child is under the age of 18 months, the child will still require the pre-school dose of MMR.

Individuals who develop symptoms of measles within 10 days of receiving post-exposure prophylaxis vaccination should be assumed to have ‘true measles’, unless the index case has been discarded.

Even where it is too late to provide effective post exposure prophylaxis with MMR, the vaccine can provide protection against future exposure from all three infections. Therefore, contact with suspected measles, mumps or rubella provides a good opportunity to offer MMR vaccine to previously unvaccinated individuals. If the individual is already incubating measles, mumps or rubella, MMR vaccination will not exacerbate the symptoms.

In this situation, MMR may be given from 6 months of age. Where the vaccine has been given before 12 months, immunisation with 2 further doses should be given at the normal ages. Where children who have received the first dose of MMR require immediate protection against measles, the interval between the first and second doses may be reduced to one month. If the child is under 18 months of age when the second dose is given, then the routine pre-school dose should be given in order to ensure full protection. To be arranged by the patient’s GP.
Infants, pregnant women and immunosuppressed individuals should be assessed according to the HPA Post Exposure Prophylaxis for Measles guidelines available at: http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1238565307587.

Human Normal Immunoglobulin (HNIG) and Accessing HNIG

Children and adults with compromised immune systems, regardless of their vaccination history, who come into contact with measles, should be considered for treatment with HNIG as soon as possible after exposure – at least within 5 days.

Pregnant women who are exposed to measles may be considered for HNIG. A very high proportion of such women will be immune and therefore whenever possible a sample for measles IgG should be taken.

The Northern Ireland Blood Transfusion Service supplies HNIG.

Additional Information Regarding the MMR Vaccine

Pregnancy

- If MMR vaccine is given to adult women, pregnancy should be avoided for one month.
- Women who are already pregnant must not receive MMR. It is therefore important to enquire about their status prior to immunisation.

Immunosuppression

- Individuals with HIV infection should be immunised (measles in HIV-infected persons can be severe and often fatal), excluding severely immunocompromised (low CD4+ T-lymphocyte counts).
- High dose steroids:
  - Children - those who receive prednisolone, at a daily dose (or its equivalent) of 2mg/ kg/ day for at least one week, or 1mg/ kg/ day for one month.
  - Adults - an equivalent dose is harder to define but immunosuppression should be considered in those who receive 40mg prednisolone per day for more than one week.
  - Note: administration of live vaccine should be avoided for at least three months after levels have been reached that are not associated with immunosuppression. In such cases, please consult the consultant in charge of the patient and local or national immunisation experts.

Egg Allergy

- If there is a history of confirmed anaphylactic reaction to egg-containing food, paediatric advice should be sought with a view to immunisation under controlled conditions, such as admission to hospital as a day case.
Management of a Case in Hospital

In the event a case is identified in a hospital setting (wards/ A&E), the patient needs to be isolated in a single room with contact precautions in place.

Inform the Infection Prevention and Control Team and/ or Consultant Microbiologist. An additional risk assessment for contacts will be required to be undertaken. This will include consideration of healthcare staff, ambulance staff and vulnerable patients.

Isolation

Respiratory isolation precautions are required. All cases of confirmed or probable measles should ideally be admitted to a negative pressure isolation room.

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Adults – Ward 31</th>
<th>Children – Royal Victoria Hospital for Sick Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altnagelvin Hospital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erne Hospital</td>
<td>Adults – A&amp;E Department and consider transferring to Altnagelvin Hospital</td>
<td>Children – As above</td>
</tr>
</tbody>
</table>

Personal Protective Equipment

Staff caring for a case of measles should wear personal protective equipment (PPE) required for respiratory isolation. This would include the wearing of FFP3 masks for which they have been fit tested. Gloves and aprons are essential for cough inducing procedures and for handling sputum and other body fluids.

Correct application of approved hand hygiene techniques before and after every patient and body fluid contact is essential. Particular attention must be taken during and following the removal of PPE.

A&E Departments

When measles is confirmed as circulating in the community, signage must be placed in waiting areas advising any patient with a rash, especially if preceded by a fever, to wait in a designated area. Receptionists and triage staff must be made aware that ALL patients with a fever and rash should be fast tracked to a dedicated respiratory isolation area (i.e. the SARS room), to minimise the risk of transmission to others.

While it is important that medical staff have an opportunity to see measles rash, colleagues should not be asked into the isolation area unless they can confirm immunity.

The PHA will undertake an assessment of other contacts in the community.
Cases in Primary Care

Whenever possible, signs should be placed in GP surgery waiting areas advising any patients with any rash to report to reception.

Ensure receptionists are informed that ideally, all patients with a fever and any rash are potentially infectious and should attend at the end of surgery.

Should patients with a fever and any rash attend the surgery when other patients are in the waiting room, they should be directed to a side room.

If a GP refers a case to A&E/hospital, they should inform the receiving department that measles is suspected before the patient arrives at the hospital, so that appropriate isolation can be initiated on arrival.

When probable case of measles has been notified to the PHA, staff should advise in relation to infection control measures and should take a decision on the investigation. In the event that the index case was in contact with other patients, the PHA staff should assess the possible risk of exposure to these patients.

Travelling Communities

Liaise with Health Visitors for travelling families to ensure they are aware and to immunise both contacts and the travelling community in general. Ensure schools attended by travelling family children with measles are informed (see below).

Schools

Inform schools attended by children with measles. Parents should be informed and asked to check the immunisation status of their children. Where the children have not had 2 doses of MMR they should be advised to attend their GP to give 2 doses. Remind practices that a 1-month gap between doses of MMR is acceptable in this situation.

Patient’s Own Home

Standard precautions apply. Seek advice from the Infection Prevention and Control Team if there is someone else in the home who is immunosuppressed in any way (see below for guidance).

Management of an Outbreak

In the event of a community or hospital outbreak, an outbreak meeting should be convened. Membership of the meeting can be seen in Appendix 1.

Where an outbreak is suspected, contact the CCDC immediately, followed by the Infection Prevention and Control Team.

Expert advice can be sought from the Immunisation and Diagnosis Unit, Virus Reference
If there is a need to undertake an immunisation programme it is important to contact the PHA at an early stage to ensure that there is a secure vaccine supply. If a large amount of vaccine may be required please contact PHA vaccine supply on 028 90 553994 before any decision is made to proceed with a large campaign.

As no laboratory tests are 100% sensitive and specific, particularly in the early stage, management of people at high risk (e.g. immunosuppressed individuals) will need to proceed even if the preliminary results are negative.

Further information on measles, immunisation and management of cases can be found in the Green Book (Immunisation Against Infectious Disease) 2006, which is available at:

APPENDIX 1

Membership of Team for Outbreak Meetings

Community (to be convened by the PHA)

In the event of a community or hospital outbreak, an outbreak control team should be convened.

An outbreak team for measles is likely to include:

- Consultant for Communicable Disease Control
- Education representative from Education Board
- Immunisation Co-ordinator
- School Nurse/ Team Leader
- GPs (if identifiable practices within the community)
- Communications Lead (PHA, Hospital Trust)
- Acute Hospital representatives (Consultant Microbiologist, Infection Prevention and Control Nurse, Paediatric Consultant, Medical Director)

Trust Hospital and Non Acute Facilities

Hospital outbreaks/ clusters will require close liaison:

- Medical Director
- Consultant Microbiologist
- Infection Prevention and Control Team
- Clinical Directors/ Service Managers
- Occupational Health
- PHA representative
Public Health Management of Suspected Cases of Measles

**Suspected Case of Measles**
- Obtain basic details and notify (see page 5)
- Conduct risk assessment

**Unlikely to be Measles**
- Surveillance follow up
  - Post oral fluid test kit
  - Consider other diagnoses and control measures

**Negative**
- No further action required
  - Discard as case
  - (Do not de-notify)

**Positive**
- Identify vulnerable contacts (see page 6)
  - Immunocompromised with any contact
  - Pregnant women, or infants with significant exposure
    - (face to face or >15 minutes in same room)
  - Organise HNIG or vaccination of contacts as appropriate
    - Manage case (see page 9)

**Confirmed or Epidemiologically linked or Assessed as Likely based on epidemiological features**
- Identify vulnerable contacts (see page 6)
  - Immunocompromised with any contact
  - Pregnant women, or infants with significant exposure
    - (face to face or >15 minutes in same room)

**No**
- Send oral fluid test kit
  - Manage case

**Yes**
- Assess susceptibility and/or IgG testing of vulnerable contacts
  - Organise HNIG or vaccination of contacts as appropriate
  - Send oral fluid test kit
  - Manage case (see page 9)

*For further details see [HPA Post Exposure Prophylaxis for Measles](https://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1238565307587) guidelines available at:*
Signed for and on behalf of the Western Health & Social Care Trust:

Dr Anne Kilgallen  
Medical Director

Dr Martin Kelly  
Chair of the Infection Prevention & Control Committee

[Signature]

Date: 31/8/11

Date: 18/07/11