University Hospital Southampton NHS
NHS Foundation Trust

Public Health England

Measles testing and measles post-exposure prophylaxis at University Hospitals Southampton NHS Foundation Trust (UHSFT)

This document is based on National UK guidelines (Public Health England and Department of Health)

Measles

- The incubation period is about 10 days (ranging between 7 and 18 days).
- The prodromal stage lasts for 2 to 4 days before the onset of rash and is characterised by the onset of fever, malaise, coryza, conjunctivitis and cough.
- The rash is erythematous and maculopapular, starting at the head and spreading to the trunk and limbs over three to four days. Koplik spots (small red spots with blueish-white centres) may appear on the mucous membranes of the mouth one to two days before the rash appears and may be seen for a further one to two days afterwards. Koplik spots are pathognomonic of measles.

  Rash may be absent in immune compromised patients who may present with unexplained pneumonia or encephalitis.
- The following combination of features is strongly suggestive of measles:
  - Rash for at least three days
  - Fever for at least one day, and
  - At least one of the following: cough, coryza or conjunctivitis.
- Measles is spread by airborne or droplet transmission.
- Period of infectiousness: from the beginning of the prodromal period (when the first symptoms appear) to four days after the appearance of the rash. It is one of the most highly communicable infectious diseases.

A. Measles testing at UHSFT:

Please report patient's clinical details on the request form, including date of onset of rash Please note that rash may be absent in immune compromised patients			
Test available on Equest Virology	Measles IgG *** (UHSFT)	Measles PCR* (Colindale)	Measles IgM* (Colindale)
Type of sample	Clotted blood	Oral fluid** (preferred sample), mouth swab in viral transport medium (VTM), Urine (less reliable, but suitable sample in case swab & VTM non available)	Clotted blood, Oral fluid**
Turnaround time	3 hours from sample receipt during working hours. For same day results send samples not later than 3:30 pm. Please phone Serology on ext. 6342 to discuss urgent testing.	24-48 hours from sample receipt in reference laboratory, Mondays to Fridays. Test not performed during weekends.	24-48 hours from sample receipt in reference laboratory during working hours. Test not performed during weekends.

*The Immunisation & Diagnosis Unit at Colindale, Public Health England, offers a same-day/next working day diagnostic service, for oral fluid and other appropriate specimens. All requests for urgent testing MUST be discussed with Colindale (telephone number 0208327 6253). The clinicians or local laboratory should send samples for urgent testing only after discussion with Colindale, using Hayes DX or other rapid courier service.
** Oral fluid (saliva) collection kits are available at UHS by phoning the Serology Laboratory on extension 6342.
*** Measles IgG Elisa: the cut off value for the assay is equivalent to 175 mIU/ml (well above the protective measles IgG level is > 120 mIU/ml).

B. Post exposure prophylaxis

- Human Normal Immunoglobulin (HNIG) indicated to prevent or attenuate an attack in
  - Immune compromised contacts
  - Pregnant women
  - Infants under the age of 6 months
- MMR vaccine indicated to prevent an attack in immune competent individuals (children over the age of 6 months and adult; there is no upper age limit).

<table>
<tr><th colspan="4">Measles post exposure prophylaxis</th></tr>
<tr><td colspan="4">Incubation period for onset of prodromal symptoms: 7-18 days (average: 10-12 days)
Period of infectiousness of measles: from 4 days prior to 4 days post onset of rash</td></tr>
<tr><td colspan="4">HNIG (available from UHSFT Pharmacy)</td></tr>
<tr><td colspan="4">Where a second exposure occurs more than three weeks after a first dose of HNIG, a further dose should be given</td></tr>
<tr><td>Immunocompromised patients (any age) not on IV HNIG replacement treatment

See also Appendix</td><td>Direct exposure for a very short time (minutes) OR not direct exposure such as entering a room within a short period after a measles case has left</td><td>Administration should not be delayed beyond 3 days of exposure. However, for this group, IV HNIG may still be considered beyond six days.</td><td>0.15 g/kg of IV HNIG

OR

0.6 ml/kg of subcutaneous HNIG</td></tr>
<tr><td>IgG negative infants below the age of 6 months</td><td rowspan="2">Face-to-face contact (irrespective of the time of exposure)
OR
Exposure for 15 minutes or longer in the same room</td><td rowspan="2">Most effective if given within 72 hours of exposure, but may still be effective if given within 6 days</td><td>Infants: 0.6 ml/kg of subcutaneous HNIG up to maximum of 1 vial **</td></tr>
<tr><td>IgG negative pregnant women who do not have history of vaccination@ &</td><td>Pregnant women: 2,250 mg of subcutaneous HNIG (3 vials) **</td></tr>
<tr><td colspan="4">MMR vaccine ***</td></tr>
<tr><td colspan="4">Within 3 days of contact (MMR can be given during incubation of measles and in individuals already immune)</td></tr>
<tr><td>Unvaccinated healthy children over 6 months of age and adults&

including HCWs and family contacts</td><td>Face-to-face contact (irrespective of the time of exposer)
OR
exposure for 15 minutes or longer in the same room</td><td colspan="2">Where exposure is ongoing (for example following a single case in a nursery or during a community outbreak), MMR offered beyond three days may provide protection from subsequent exposures.

Individuals who have received only one previous dose of MMR may be given a second dose provided there is an interval of at least one month from the first dose.

Children under 12 months of age should also receive 2 MMR vaccines above a year of age as per the normal schedule of childhood vaccinations.</td></tr>
</table>

@ HNIG may attenuate the infection in the mother and (although no direct evidence) an attenuated maternal infection is likely to have a reduced risk of foetal loss.

** To be administered by subcutaneous infusion or intra-muscular injection, ideally in divided doses at different sites.

*** MMR vaccine should not be administered to individuals who had anaphylactic reactions to previous doses of measles, rubella or mumps containing vaccines, who are allergic to neomycin and gelatin and to pregnant women.

& For healthy individuals, satisfactory evidence of protection includes:
documentation of having received two or more doses of measles containing vaccine and/or positive measles antibody test, past history of measles. Over 90% of UK adults are measles IgG positive (99% of healthy individuals born before 1970 are measles IgG positive following natural infection while about 90% of those born between 1970 and 1989 are measles IgG positive following natural infection or vaccination).

Infection control considerations

As neither immunoglobulin nor vaccination is 100% effective in preventing measles, appropriate infection control procedures should be followed in health care settings. Exposed patients in hospital should be isolated from 6 days following exposure until 19 days post exposure.

Appendix

Classification of immune suppressed individuals

Group A	Group B
Individuals able to develop and maintain adequate antibody level from any prior successful vaccination or infection. Can therefore be managed on the basis of reliable history or previous measles IgG test results. For those with unknown status at the time of exposure, management on the basis of history and rapid antibody testing is recommended	Individuals who are unlikely to have developed or to maintain adequate antibody levels from past exposure or vaccination. Unless already on replacement immunoglobulin therapy, these patients would require urgent testing within three days of exposure, regardless of a past history or a previous positive measles antibody result.
✚ Patients with malignant disease, other than those in group B, for six months after completion of immune suppressive chemotherapy or radiotherapy ✚ Solid organ transplant recipients on immune suppressive treatment ✚ Patients on systemic high-dose steroids, until three months after discontinuation of treatment. This includes: CHILDREN: oral or rectal 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: at least 40mg of prednisolone per day for more than one week ✚ HIV positive patients who do not have AIDS ✚ Patients on other types of immunosuppressive drugs (e.g. azathioprine, cyclosporin, methotrexate, cyclophosphamide, leflunomide, anti-TNF alpha and the newer cytokine inhibitors) alone or in combination with steroids, for six months after their discontinuation.	✚ Acute Lymphoblastic Leukaemia (ALL) patients on chemotherapy and until at least six months after its completion ✚ Bone marrow transplant recipients until 12 months after discontinuation of all immunosuppressive treatment, or longer, in case of graft-versus-host disease (GvHD). ✚ Patients with severe primary immunodeficiency (who would not be expected to have made a good initial response to vaccine or disease in childhood) ✚ HIV positive patients with AIDS

Notes

- All immune suppressed patients, not on IVIG replacement therapy, should be assessed at the time of exposure.
- Persons on IV immunoglobulin replacement therapy: IV IG replacement dose, received in the 3 weeks preceding measles exposure, are normally sufficient to prevent infection.
- For people with severe defects of cell mediated immunity, however, passive immunoglobulin may be indicated even in the presence of measurable antibody
- Measles immune status of family contacts of immune compromised patients should be considered: see satisfactory evidence of protection on page 1 of this document.

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