



# **HPA National Measles Guidelines**

## **Local & Regional Services**

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## **1. Introduction**

Measles is one of the most highly infectious diseases known. Measles can be particularly severe in susceptible infants, pregnant women, and immunocompromised individuals. The most effective way to control measles is by active immunisation of a high proportion of the population. Vaccination against measles was introduced in 1968 but coverage was sub-optimal up to the late 1980s. When MMR vaccine was introduced in October 1988, the UK first set a target for the elimination of measles, mumps and rubella. The European region of the World Health Organisation has adopted a target for the elimination of measles from the region by 2010.

## **2. Rationale for public health action**

In countries with a low incidence, clinicians are encouraged to rapidly inform the local public health agency of every suspected measles case as measles requires urgent public health action. If outbreaks are detected at an early stage, prompt vaccination campaigns may limit spread to those not already exposed. Vulnerable contacts (infants, pregnant women and immuno-compromised individuals) need to be identified for consideration of post-exposure prophylaxis. Susceptible healthcare workers may act as a source of transmission to vulnerable individuals and therefore need urgent assessment and possible exclusion from work. Healthy contacts, including unimmunised children and adults may benefit from post-exposure vaccination.

## **3. Surveillance of measles**

Measles remains a notifiable disease under the Health Protection Legislation (England) Guidance 2010. Awareness of measles should be raised among health professionals to facilitate early recognition and diagnosis (appendix 1). Notification of the local Health Protection Unit would fulfil their responsibility to notify the Local Authority Proper Officer. This should be by phone as soon as is reasonably practicable, and in writing within three days.

In line with WHO recommendations, countries with an elimination target are required to have intensive case-based surveillance to detect, investigate and confirm every suspected case. Since November 1994, enhanced surveillance including oral fluid testing of all notified and suspected cases has been provided through the Centre for Infections. CfI supplies each health protection unit with a set of oral fluid testing kits. When a case of suspected measles is reported and/or notified to the local health protection unit, an oral fluid kit is sent to the case, or the parent or general practitioner of the case. Samples should be taken as soon as possible after measles is suspected, and posted or couriered back to the Virus Reference Department, where it is tested for anti-measles IgM and/or measles RNA. Results are reported back to the patient's GP and the local HPU.

Staff at CfI follow up cases confirmed at the Virus Reference Laboratory and all confirmed cases reported from local diagnostic laboratories to obtain further epidemiological and clinical information and to confirm the precise vaccination details. Confirmatory testing, genotyping and further characterization is undertaken at the WHO Global Specialised Reference Laboratory based at Colindale. Measles virus sequences are entered on the WHO global Measles Nucleotide Sequence (MeaNS) database hosted at CfI.

CfI is responsible for reporting on a monthly basis case-based information on confirmed cases to the European surveillance network (EU-VACnet) and this information is forwarded to WHO European region.(see appendix 2 – surveillance definitions). VRD also report monthly data on the numbers of samples tested for measles to the WHO laboratory network.

## 4. Minimum details to be taken when a case is reported

When a case is reported or notified to an HPU, the following information is essential for the risk assessment of the case.

### *Callers details:*

- Name, address, designation and contact number

### *Demographic details*

- Name, DOB, sex, ethnicity, and NHS number
- Address, including postcode
- Current residence if not the home address
- Contact phone number and contact details of parent if case is a child
- Occupation (if relevant)
- Place of work/education (if relevant)
- **\*GP name and address and phone number**
- **\*Member of hard to reach population (eg. Steiner, travelling family)?**

### *Clinical/epidemiological assessment*

- Clinical information (including onset dates for prodrome, rash and diagnosis)
- **\*Immunisation history**
- **\*Contact with confirmed or suspected case?**
- **\*UK and non UK travel in previous 4 weeks?**
- **\*Context: e.g. high risk population (e.g. international students, Steiner, traveller family?)**

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

## 5. Risk assessment of the index case

The positive predictive value of a clinical diagnosis of measles is generally poor when cases are sporadic and outside of an outbreak situation. In the absence of laboratory results, the diagnosis of measles will depend upon a combination of epidemiological and clinical factors (see appendix 1, 2). Management will normally have to precede the results of laboratory testing (even where requested urgently) and false negative results can occur where samples are taken or stored incorrectly or tested for the wrong markers. For example, samples taken within 3 days of rash onset may be negative for IgM. Measles RNA detection in clinical samples is variable and will depend on nature of the sample, timing, and the method used. For accurate exclusion of measles an oral fluid sample should always be requested (see appendix 3).

Based on the minimum information provided (as above), and the knowledge of the local epidemiology, vaccination coverage and demography, each case needs to be assessed by an experienced member of the HPU team and classified as **likely** or **unlikely** for the purposes of management (appendix 4). This assessment of the case will normally require knowledge of the epidemiology of measles in the area where the case may have been exposed.<sup>1</sup>

The epidemiological information that will help to favour the diagnosis of true measles includes a history of contact with another case, age, travel and membership of an unvaccinated

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<sup>1</sup> If there is sustained local transmission then an individual risk assessment may not be possible and all cases reported from a reliable source should be regarded as likely to be measles

community. For contact with index cases outside of your area, Cfl can check the name to see whether or not it has been confirmed. Cases in teenagers and adults are more likely to be true measles, as consultation for mild rash illness is uncommon in these age groups. Cases with recent travel to endemic countries (particularly the Indian sub-continent) or to other places where there is a current outbreak (again, this can be checked with Cfl) should be considered likely measles. Similarly, membership or contact with an unvaccinated community (including Steiner schools, travelling families etc) increases the index of suspicion. Generally this epidemiological information is a better predictor of true measles than the clinical features. Cases in infants and toddlers are less likely to be true measles, as other diagnoses (such as HHV6) are more common. Cases in fully vaccinated individuals only occur rarely.

Cases that are **confirmed, epidemiologically linked** or assessed as **likely** to be measles by an experienced member of the HPU team will require active contact tracing as in section 6.0.

In cases assessed as **unlikely** to be measles, oral fluid testing should be arranged and no further public health action will be required unless the diagnosis of measles is confirmed.

### **Urgent laboratory testing:**

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** (e.g. index case is a member of a travelling community, or there is a local increase in confirmed cases etc) then public health action should proceed **without** waiting for confirmation of the diagnosis.

**All requests for urgent testing MUST be discussed with the Centre for Infections Immunisation & Diagnosis Unit -0208 327 6253 before sending the sample. The Immunisation & Diagnosis Unit at CFI offers a same-day/next working day diagnostic service, for oral fluid and other appropriate specimens.** The clinician or local laboratory should then send samples as discussed with Cfl, using Hayes DX or other rapid courier service.

Some local laboratories may offer additional urgent diagnostic testing for measles. Additional samples must still be sent to Cfl to ensure cases are investigated according to WHO guidelines, and for genotyping where appropriate.

## **6. Assessment of contacts and consideration of post exposure prophylaxis**

At any level of measles control it is vital to attempt to protect vulnerable contacts. Where disease transmission is widespread, it may not be possible to sustain the workload required for individual case assessment and contact tracing. At lower levels of transmission or if the workload is manageable the priority for contact tracing is to identify the following:

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

### **6.1 Vulnerable contacts**

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

- **Has there been a 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 individual 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 available at: [http://www.hpa.org.uk/web/HPAwebFile/HPAweb\\_C/1238565307587](http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1238565307587) . Arrangements should be made with the local laboratory for urgent IgG testing if required.

### **6.2 Health care workers**

Health care workers potentially exposed to a case of confirmed, epidemiologically linked or likely measles should be followed up if there has been face-to-face contact irrespective of the time exposed, or exposure for 15 minutes or longer in the same room. For health care workers in high risk settings, a lower level of exposure may be considered significant.

Health care workers with satisfactory evidence of protection can continue to work normally but should be advised to report to OH 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 5<sup>th</sup> day after exposure, unless they can be tested and shown to be IgG positive. The Association Of National Occupational Health Physicians (ANHOPs) recommends that susceptible healthcare workers (HCW) 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 onset of the rash; treat HCW as a case and confirmation and notification should be sought in the usual way.

### **6.3 Other healthy contacts**

**MMR vaccination may be effective post-exposure prophylaxis if given within 72 hours of exposure.** MMR can be given at any time and in the following situations:

- even if individual is incubating measles.
- even if individual is already immune.
- in immunocompetent persons of any age above 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). If first dose is given before 1 year, it should be discounted and immunisation continued with the normal schedule at 13 months and pre-school.

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 after one month. If the second dose is given within three months of the first and the child is under the age of 18 months, the child will still require the pre-school "booster" dose of MMR.

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

## **7. Case management**

### **7.1 All cases**

Any patients with a rash which is considered to be likely to be measles should be advised to avoid contact with any vulnerable (immunosuppressed, pregnant, infants) patients unless they are known or likely to be immune.

Advise any patient with a rash, which is considered likely to be measles especially if preceded by a fever, to telephone if possible, before turning up at a GP surgery or at A&E and/or advise the receptionist immediately on arrival.

Send oral fluid (saliva) kit for confirmation of diagnosis, even if already confirmed at a local laboratory. Specimen to be taken as soon as possible and up to 6 weeks after the onset of symptoms. Samples from cases testing positive at a local laboratory should be forwarded to CfI for confirmation and further characterisation.

Most patients with measles can be managed at home with fluid and control of fever. Complications include pneumonia, ear infections, and encephalitis and may require medical assessment.

Previously unimmunised or partially immunised cases need to be fully immunised with MMR vaccine on their recovery to protect against the other infections. This should be given when the patient is fully recovered, ideally around four weeks after onset (to ensure an optimal response). MMR may be given sooner particularly if it may be difficult to ensure compliance at a later date. The GP should be advised accordingly.

### **7.2 Cases in primary care**

Whenever possible, signs should be placed in GP surgery waiting areas advising patients with any rash illness to report to reception. Ensure receptionists know that, in ideal circumstances, **all** patients with any fever and rash are potentially infectious and should attend **at the end of surgery** to minimise the risk of transmission to others.

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

Should a GP refer cases to A&E/hospital they should inform the staff that measles is suspected so that the case can be appropriately isolated on arrival.

When a likely case of measles is notified, the HPU staff should advise about infection control measures and should take a decision on the investigation. If the patient has not been managed appropriately, for example where the case was in the waiting room at the same time as other patients, then HPU staff should assess the possible risk of exposure for these patients (section 6).

### 7.3 Cases in an acute hospital setting

If a likely case is identified within a hospital setting (Wards or A&E), the patients need to be admitted into standard isolation and not just placed behind a curtain.

An additional risk assessment for contacts will need to be undertaken by hospital infection control team as above. They will need to consider health care staff and ambulance staff and any vulnerable patients. The HPU should undertake a risk assessment of other contacts in the community.

Inform the Infection Control Team or on-call microbiologist if a likely case was seen at a hospital but was not appropriately isolated.

### 7.4 Nursery, school or college

Confirmed and likely cases should be excluded from nursery, school, college or work for 4 full days after onset of rash.

For cases that are **confirmed, epidemiologically linked** or assessed as **likely** to be measles by an experienced member of the HPU team a discussion should take place with health care or appropriate senior staff at the institution (e.g. the school nurse and/or welfare officer, head teacher, health and safety officer or student health advisor). An appropriate letter/fact sheet may be forwarded (emailed or faxed) to the school/nursery for dissemination to parents. The immunisation coordinator and/or DPH for the PCT should also be informed.

Cases that are not considered likely to be measles, may be suffering from other infections with public health implications (e.g. scarlet fever). Therefore, general advice about staying away from school during acute illness may be required.

## 8. Outbreaks

In event of a community or hospital outbreak an outbreak control team should be convened. An appropriate outbreak control team is likely to include, if appropriate:

- Health Protection specialist from the local HPU
- Education representative from Local Authority
- District/PCT Immunisation Co-ordinator
- School nurse/Team Leader
- GPs (if identifiable practices within community)
- PCT DPH or appropriate representatives
- Communications leads (HPA, PCT, LA to liaise as necessary)
- Acute Trust representative (microbiologist, infection control nurse/DIPC/paediatric consultant/medical director)

Hospital outbreaks/clusters will require close liaison with the Director of Infection Prevention & Control; microbiologist (if different); Infection Control Team; Clinical Directors or Service Managers; Occupational Health Manager; DPH or a PCT representative (as Walk-In-Centres may be the responsibility of the PCT).



Expert advice can be sought from the Immunisation and Diagnosis Unit, Virus Reference Department or the Immunisation Department, HPA Centre for Infections (0208 200 6868/4400).

If there is a need to undertake an immunisation programme it is important to contact DH at an early stage to ensure that there is a secure vaccine supply. If a large amount of vaccine may be required please contact DH vaccine supply 0207 972 1200 before any decision is made to proceed with a large campaign.

## Appendix 1

### **Disease information:**

- 1) **Infectious agent** – Measles virus, a member of the genus 'morbillivirus' of the family Paramyxoviridae.
- 2) **Reservoir:** humans
- 3) **Transmission** – Airborne by droplet spread, direct contact with nasal or throat secretions of infected persons, and, less commonly, by articles freshly soiled with nose and throat secretions. Measles is one of the most highly communicable infectious diseases. Spending more than 15 minutes in direct contact with someone infected with measles is sufficient to transmit virus.
- 4) **Clinical Signs & Symptoms** – Measles normally presents with 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, then becomes generalised lasting for 4-7 days.
- 5) **Complications** - Even in healthy individuals, measles can be debilitating, resulting in morbidity and time off school and work. Complications from measles are frequent and include pneumonia, otitis media and diarrhoea; less frequently encephalitis may occur and rarely subacute sclerosing panencephalitis (SSPE).
- 6) **Diagnosis** - Confirmation of the diagnosis of measles is performed on oral fluid or serum samples. In acute cases measles RNA can also be detected in clinical specimens.
- 7) **Period of infectivity** – Patient is infectious from 4 days before to 4 days after the onset of rash.
- 8) **Incubation period:** 7-18 days (average 10-12 days).
- 9) **Prevention:** MMR vaccination

## Appendix 2

### Surveillance case definitions and classification

The positive predictive value of a clinical diagnosis of measles is generally poor when cases are sporadic and outside of an outbreak situation. For the purposes of surveillance, cases should be classified as SUSPECTED, CONFIRMED or DISCARDED/NEGATIVE. As part of national surveillance, an attempt to confirm the diagnosis should be performed for all suspected cases, even where local testing has already been undertaken. This is to ensure that national surveillance information is complete and that genotyping can be attempted on all confirmed cases where required.

#### Suspected case of measles:

- Any person in whom a clinician suspects measles infection, **or**
- Any person with fever **and** maculopapular rash (i.e. non-vesicular) **and** one of the following: cough or coryza (runny nose) or conjunctivitis (red eyes).

#### Confirmed case of measles:

- Measles IgM positive in blood or oral fluid in the absence of a history of recent vaccination
- Confirmed wild measles RNA positive on any clinical specimen

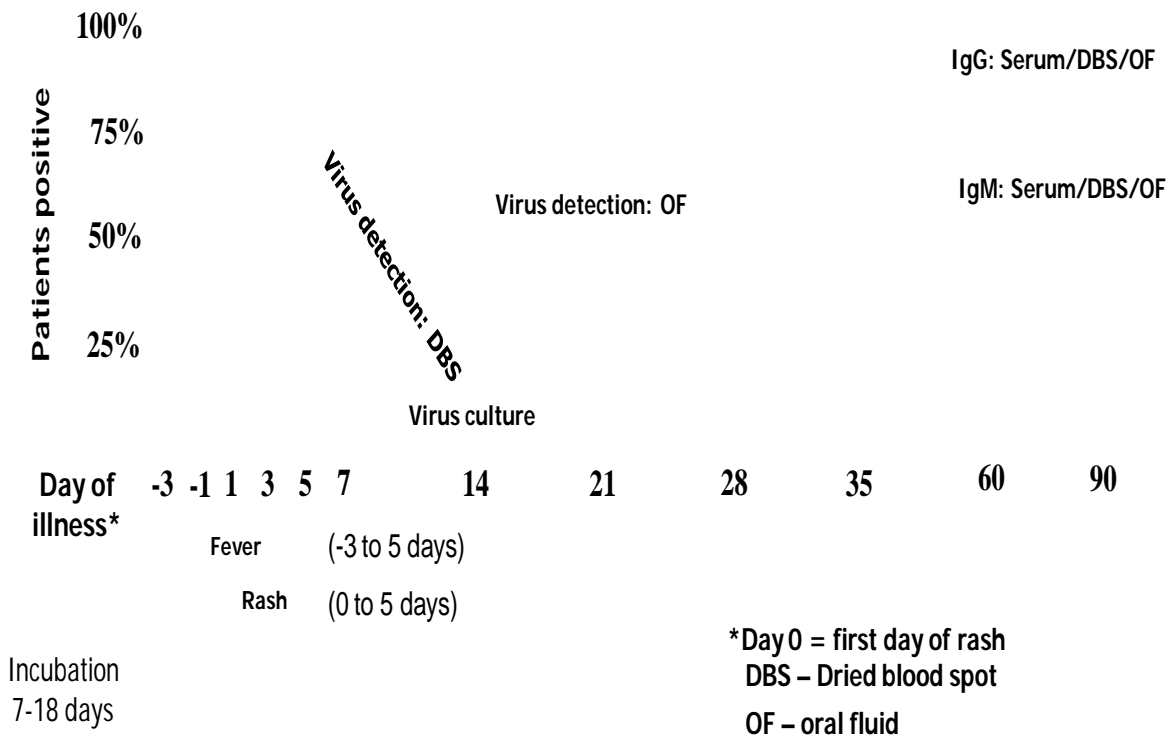
#### Epidemiologically linked case of measles:

- A person with signs and symptoms consistent with measles who was in contact with a laboratory confirmed case 7-18 days before the onset of symptoms

#### Discarded case

A case of measles is considered excluded if it is shown to be measles IgM negative in an adequate and appropriately timed specimen of oral fluid or blood. Measles IgM positive samples in children within six weeks of receiving a measles containing vaccine are considered discarded except where there are strong epidemiological features or a wild measles genotype is detected suggesting wild-type infection.

### Appendix 3: Sensitivity of measles laboratory investigations (Taken from WHO)



Appendix 4

