



Control of measles in the event of an outbreak

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Introduction

When there is an outbreak of measles, or a possible outbreak, there are several things that must be done:

- Ensure that all possible cases of measles are notified to the Health Protection Unit promptly (see “*Notification*” below);
- Encourage MMR for everybody who is not fully vaccinated (see “*MMR*” on page 3);
- Follow up and treat contacts where appropriate (see “*Contacts*” on page 3);
- Confirm (or refute) diagnosis by appropriate testing (see “*Testing to confirm or refute the diagnosis of measles*” on page 4);
- Ensure that spread is minimised (see “*Minimising spread of measles*” on page 4).

More detailed guidance is given in “*Appendix II: Management of contacts of cases of measles*” on page 6.

Notification

Please ensure that if measles is suspected, this office is notified as soon as possible. We will need to know:

- The suspected diagnosis;
- The name, address, and date of birth of the patient;
- The name and contact details of a parent or relative who can give us further details about the case (as below);
- The name and contact details of the person reporting the possible case.

We would expect the notifying clinician to give us all of the above details.

HPU contact details are given in “*Appendix I: Health Protection Unit contact details*” on page 5.

Ideally we would also like to know about contacts of the case:

- Who the case lives with (household contacts);
- The movements of the case and any vulnerable household contacts – who they’ve mixed with over the previous two weeks;
- Whether the case and any vulnerable household contacts attend school, nursery, or go to work, and where; and
- Whether any of the contacts are immune-suppressed, pregnant, or under the age of 1 year.

The HPU will usually seek these details from the patient or their relatives, although on occasions we may have to ask others for help with this.

MMR

The main defence against measles is, of course, MMR vaccination. It is possible that anti-MMR sentiments are waning, following a barrage of evidence that completely refutes the suggestions raised by Andrew Wakefield and JABS (see the links at <http://ganfyd.org/index.php?title=MMR> for more information on this). It is possible that there will be some media interest in this over the next few weeks, and there may be more people coming forward for MMR jabs. Our advice is that:

- Everybody born in or after 1970 should have two doses of measles vaccine (the only licensed vaccine currently is MMR). The first should be given after the age of 1 year; the second should be given after the age of 18 months; and there should be at least 4 weeks between doses.¹⁻³
- If there is an outbreak of measles, or a child is exposed to a case, additional doses of MMR may be recommended to give more rapid immunity. Infants over the age of 9 months may be given a dose; and children over the age of 1 but under the age of 18 months may be given a second dose. In these situations the vaccine cannot be relied on to induce long-term immunity, so **these additional doses do not count** towards the two doses described above.
- The MMR vaccine contains live viruses. Significant side effects are extremely rare, and are caused by the virus replicating in the body. If somebody already has immunity to the viruses in the vaccine (including passive immunity from immunoglobulin or maternal antibodies) the viruses will not be able to replicate, and so there is no risk of significant side effects. If they are not already immune, then they clearly need the vaccine. There is, therefore, no significant risk from re-vaccinating somebody who had been vaccinated previously, or who has had the wild disease. If in doubt as to whether somebody is fully vaccinated or immune to measles, mumps and rubella, they should be offered a further dose of MMR.

Every opportunity should be used to offer MMR to those who meet the above criteria. See the Green Book (http://ganfyd.org/index.php?title=Green_book) for more details.

Contacts

Measles vaccine given as soon as possible after exposure, and within 72 hours, may prevent or attenuate disease. Certain individuals (e.g. those who are immune-compromised, pregnant, or 6-8 months old) may benefit from immunoglobulin, which can be organised via the Health Protection Unit, who will advise on when this is required. Dr Carroll of Surrey and Sussex HPU has put together some guidance with a flowchart to summarise the guidance on the management of contacts – see Appendix II on page 6.

If there is a high index of suspicion of measles (see “*Note 2. Notification of measles and index of suspicion*” on page 7), and particularly early on in an outbreak, it may be worth testing contacts – the Health Protection Unit will advise.

Testing to confirm or refute the diagnosis of measles

All cases of suspected measles should have confirmatory testing.

Where the case is not part of a possible outbreak the usual procedure is for a saliva test to be performed in the convalescence phase – when antibodies are likely to be present. In the event of a possible outbreak more urgent testing may be required. See *“Note 6. Laboratory investigation of possible measles cases”* on page 9 for more details.

Minimising spread of measles

Measles is highly infectious.

Wherever possible, people with possible measles should be seen in their homes, and not taken to GP surgeries, walk-in centres, hospitals, or anywhere else where vulnerable people may be. “Baby clinics”, accident and emergency departments, and paediatric settings where there may be young and as-yet unimmunised children in particular should be kept free of possible cases of measles wherever possible.

Contacts may need to be treated with MMR or Human Normal Immunoglobulin as described in *“Contacts”* on page 3.

Appendix I: Health Protection Unit contact details

For incidents that arise in Surrey, or in the West Sussex local authority areas of Adur, Crawley, Horsham and Chancetonbury, and Mid Sussex, please contact the Surrey and Sussex Health Protection Unit at:

Surrey and Sussex Health Protection Unit
Cedar Court
Guildford Rd
Leatherhead
Surrey
KT22 9RX

Tel 01372 227331

Fax 01372 227373

<http://www.bigfoot.com/~scdcs>

Email SySxHPU-Sy-Admin@shpu.nhs.uk (this email address is checked frequently, and mail sent to it will be forwarded to the person best placed to deal with it).

For incidents elsewhere in West Sussex, please contact the Chichester office of the Health Protection Unit at:

Surrey and Sussex Health Protection Unit
c/o Western Sussex Primary Care Trust
9 College Lane
Chichester
West Sussex
PO19 6FX

Tel 01243 770772

Fax 01243 815536

Email SySxHPU-WSx-Admin@wsx-pct.nhs.uk (this email address is checked frequently, and mail sent to it will be forwarded to the person best placed to deal with it).

For incidents occurring in East Sussex, Brighton or Hove, please contact the Lewes office of the Health Protection Unit at:

Surrey and Sussex Health Protection Unit
36-38 Friars Walk
Lewes
East Sussex
BN7 2PB

Tel 01273 403591

Fax 01273 403600

Email SySxHPU-ESx-Admin@esbh.nhs.uk

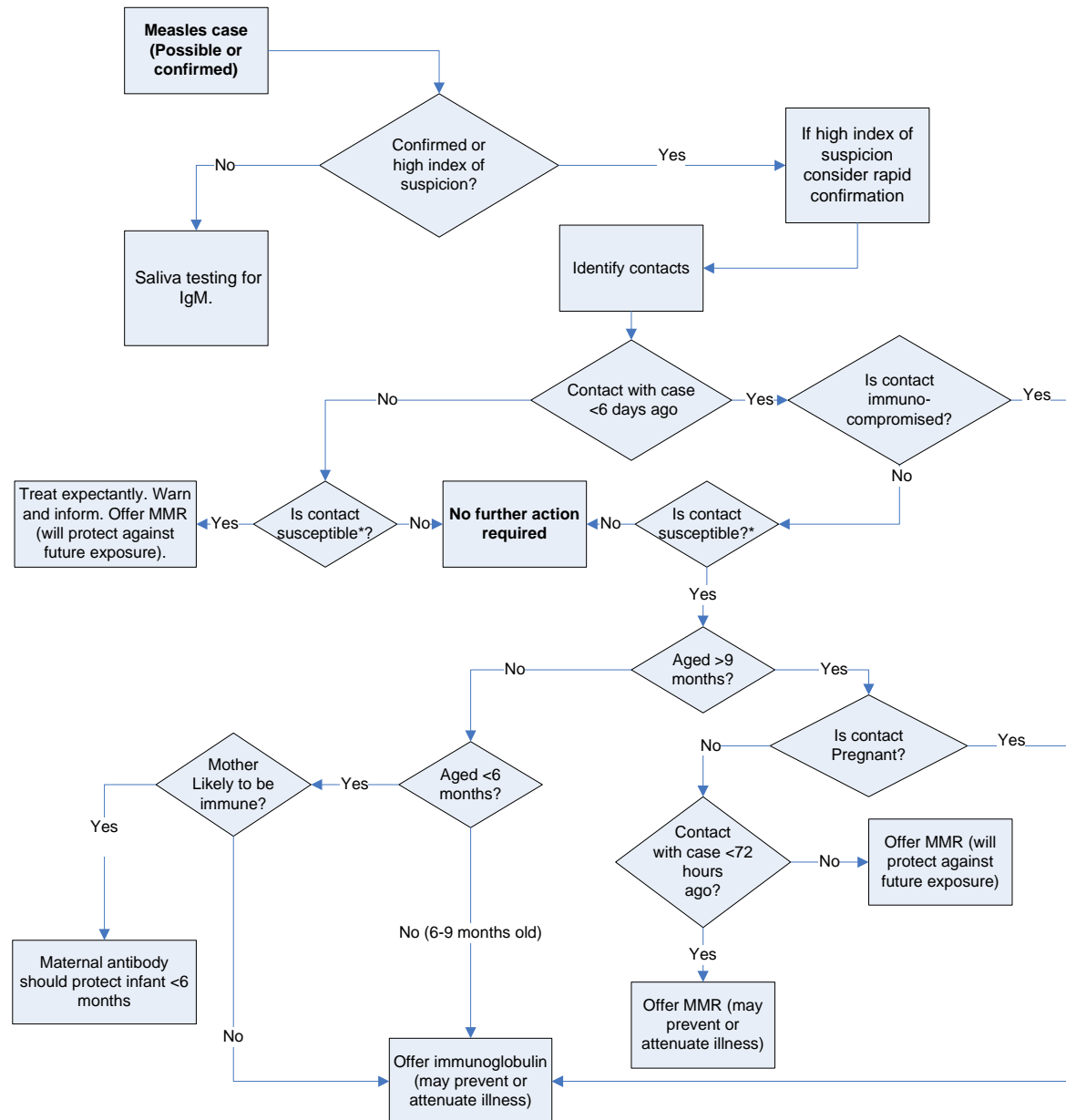
If the incident does not occur in Surrey or Sussex, please see the Health Protection Agency website (<http://www.hpa.org.uk>) to identify the appropriate Health Protection Unit (HPUs usually have the same boundaries as Strategic Health Authorities).

Appendix II: Management of contacts of cases of measles

Algorithm for management of contacts of measles cases

Figure 1: Algorithm for management of contacts of measles cases

This algorithm should be read together with the notes which follow, starting on page 7.



* A contact is "susceptible" if not already immune to measles – see notes on page 7 for further clarification.

Notes to accompany algorithm-“managing contacts of a single case of measles”**Note 1. Susceptibility to measles**

A susceptible person is someone who cannot provide acceptable presumptive evidence of immunity to measles.

A person can be considered to have acceptable presumptive evidence of immunity to measles if they meet one of the following criteria:

- infants under six months of age (except if the infected contact is the infant’s mother, or if the mother has not been fully vaccinated and has not had measles); or
- children aged one to four years who have documented evidence of having received one dose of a measles-containing vaccine, in the absence of an outbreak (during an outbreak or if exposed to a measles case it might be worth bringing forward their second dose of MMR – see also “MMR” on page 3); or
- persons over four years of age who have documented evidence of receiving two doses of a measles containing vaccine; or
- persons born before 1970 ; or
- persons with documented evidence of immunity; or
- persons with documented evidence of **confirmed** measles.

Note 2. Notification of measles and index of suspicion

Index of suspicion should not be based on clinical findings, since these are unreliable. Epidemiological criteria should be used, for example:

- previous cases confirmed locally, likely linkage;
- particularly low MMR coverage locally – HPU will advise (possibly following discussion with Centre for Infections);
- from a community likely to have a low uptake of MMR, e.g. travellers, asylum seekers, and other new entrants to the UK;
- travel to high prevalence countries, such as India or Africa;
- no history of vaccination in suspected case (most confirmed cases recently have been in traveller families);
- **Assume that cases of measles are infectious from 5 days before to 4 days after the appearance of the rash. Identify contacts exposed during this period.**

Note 3. Use of Immunoglobulin (HNIG) and MMR vaccine

- HNIG is not usually indicated in infants under six months of age. They are likely to have maternal antibody if their mother has measles immunity, even if bottle fed. If the mother is uncertain whether she has had measles infection or two doses of measles vaccine, consider HNIG.
- HNIG should also be considered in immunosuppressed, or pregnant contacts who are susceptible if exposure occurred < 6 days ago.
- Also consider HNIG for Infants 6-8 months of age if exposure occurred < 6 days ago – particularly if they have had a recent serious illness OR they are household contacts of a confirmed or epidemiologically linked case or in relation to a confirmed outbreak of measles
- Children aged >12 months can be offered MMR vaccine within 72 hrs of exposure. MMR may also be given to infants 9-12 months if they are household contacts of a confirmed or epidemiologically linked case or in relation to a confirmed outbreak of measles.
- Infants receiving MMR before 12 months of age should receive two doses of MMR vaccine as per the national immunisation schedule (ie ignore the MMR given under 12 months of age – see “MMR” on page 3).
- If children are <18 months and immediate protection is required ie household contacts or a confirmed outbreak of measles an additional dose can be offered – see “MMR” on page 3..
- Manage susceptible contacts with exposure >5 days ago expectantly. They may be incubating the illness. Information should be provided to them. MMR can be given but it will not influence the outcome in the contact BUT it will protect against future exposures, as well as protecting against mumps and rubella.

Note 4. Immunocompromised contacts

This group includes contacts with

- HIV infection with evidence of immunosuppression
- lymphoma
- leukaemia
- cancer chemotherapy within the last six months
- patients on maintenance dose oral corticosteroids (equivalent to 15mg prednisolone per day)
- recurrent courses of prednisolone (at least 30mg over two weeks four times in the past year)

Note People who are immunocompromised should not be given MMR vaccine. However HIV-positive individuals should be given MMR vaccine according to national recommendations unless they have evidence of severe immunosuppression – see the Green Book (http://ganfyd.org/index.php?title=Green_book) for more details.

Note 5. Pregnant contacts who are susceptible

- MMR is a live vaccine and should generally not be given in pregnancy.
- HNIG should be considered for pregnant women born after 1970, particularly if they have been in contact with a confirmed case, or if their contact is associated with a local outbreak.
- HNIG may attenuate the infection in the mother but there is no evidence that it prevents foetal loss.
- Where time allows, please try to assess antibody status (may be possible to expedite by using blood already taken for antenatal screening)

Note 6. Laboratory investigation of possible measles cases

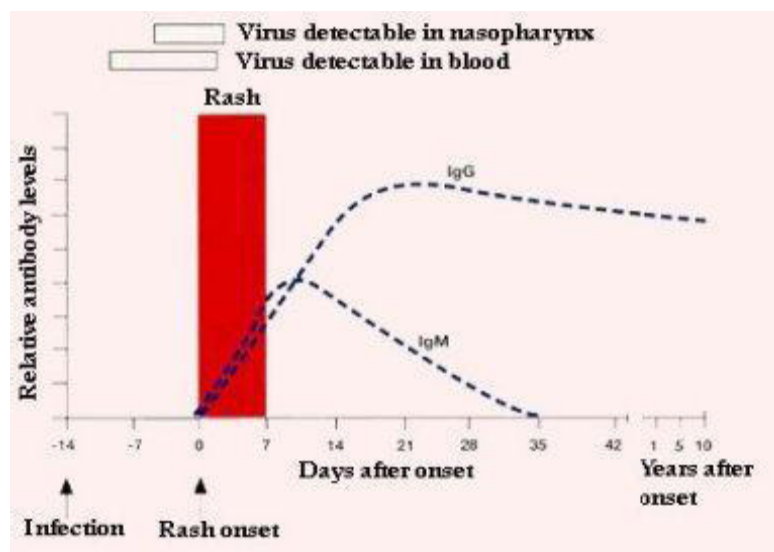
- If rapid confirmation is needed eg when the index of suspicion is high the Health Protection Unit will ring Cfl or ERNVL¹ – depending on the timing of the samples arriving a result may be possible within a couple of working days. Hayes DX system (VRD 6530006) is the code for fast measles PCR for Cfl.
- The samples that should be taken include:
 - Saliva sample – this can be tested for IgM at ERNVL and for PCR if indicated
 - Serum sample – this can be tested for IgM at ERNVL and some local laboratories, this sample is not ideal for PCR
 - Throat swab – this can be tested for measles by PCR at ERNVL and for viral culture and immuno-fluorescence at some local laboratories
 - Urine - this can be tested for measles by PCR at ERNVL
- Saliva samples are usually positive for measles specific IgM on the day of rash onset, but an IgG negative result may also be compatible with true infection during the first week of symptoms. In the latter case, a second sample, 2-6 weeks after onset, is recommended to document an IgM response and/or IgG seroconversion.
- Saliva is measles RNA positive in about 70% of samples taken in the first two weeks but will only be performed as a first line investigation in special circumstances or if a test run is already scheduled.
- Serum has only limited advantages over saliva in that the sensitivity of the IgM assay may be slightly higher in the early phase. Serum is significantly less useful for PCR than saliva or other clinical samples (including EDTA blood).
- The predictive value of immuno-fluorescence is unclear and even if it is used to guide immediate management, confirmation by serum or salivary IgM should be performed at a later stage. For patients in hospital, follow-up saliva samples can always be sent after discharge to confirm the diagnosis.
- Please note as no tests are 100% sensitive and specific, particularly in the early stage, management of people at high risk (eg. immunosuppressed individuals) may need to proceed even if the preliminary results are negative.
- Opportunistic vaccination of immuno-competent individuals over the age of 12 months can be performed whatever the cause of the rash in the index child.

In Surrey, the laboratory in Epsom (an HPA collaborating centre) can also do measles IgG and IgM serology (but cannot do this on saliva samples, and cannot do PCR for measles).

Note 7. Antibody responses to measles

- Following a natural measles infection in the primary antibody response, both IgM and IgG antibodies are produced and can be detected in the serum within a few days of the onset of the measles rash.
- IgM antibody levels peak after about 7– 10 days and then decline rapidly; they are rarely detectable after 6 weeks.
- IgG antibodies peak within about 4 weeks and are detectable long after infection.
- Serum IgA and secretory IgA antibodies are also produced. Re-exposure to the measles virus induces a strong secondary immune response in which levels of IgG antibodies are boosted and clinical disease on re-infection is prevented.
- Once the immune system has been primed, immunity is probably lifelong – see Figure 2 on page 10.

¹ The appropriate contact in the lab is the Immunisation Diagnostics Unit of ERNVL (020 8327 6202) – Stuart Beard or one of the other staff should answer. If you have trouble getting through to the lab please contact Mary Ramsay (020 8327 7085), Emma Savage (020 8327 6045) or Joanne White (020 8327 7446).

Figure 2 - antibody levels following measles infection

Events in acute measles infection (Adapted from Markowitz LE, Katz SL. In Plotkin SA, Mortimer EA, eds. *Vaccines*, WB Saunders, Philadelphia, 1994; 229-276)

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