13 Mumps

Key information

Mode of transmission	Airborne droplets or by direct contact with saliva or urine from an infected person.
Incubation period	About 16 to 18 days, ranging from 12 to 25 days.
Period of communicability	For contact tracing purposes, the recommended period of communicability is from 2 days before to 5 days after the onset of parotitis.
Funded vaccine	MMR vaccine (Priorix) is a live attenuated vaccine.
Dose, presentation, route	0.5 mL per dose after reconstitution. Pre-filled syringe and glass vial. The vaccine must be reconstituted prior to injection. Subcutaneous injection.
Funded vaccine indications and schedule	Children at ages 15 months and 4 years. Adults who are susceptible to one or more of measles, mumps and rubella. For (re-)vaccination following immunosuppression (if the individual is immunocompetent enough to safely receive the vaccine).
Vaccine efficacy/ effectiveness	64–66 percent effective against laboratory-confirmed mumps after 1 dose and 83–88 percent after 2 vaccine doses.
Egg allergy	Egg allergy, including anaphylaxis, is **not** a contraindication for MMR vaccine.
Adverse events to vaccine	MMR vaccine is generally well tolerated. The risk of adverse reactions to MMR vaccine is low, compared to the risk of complications from mumps disease.

Continued overleaf

Public health measures	Cases: exclude for 5 days from onset of parotitis. Susceptible contacts working in healthcare settings or living or working with immunocompromised people: • exclude from 12 days after the first exposure to 25 days after last exposure to the infectious case. • vaccinate with 2 documented doses of MMR. Susceptible contacts in other settings (tertiary education, school, early childhood services or work): • if zero MMR doses, consider exclusion from 12 days after the first exposure to 25 days after last exposure to the infectious case, if there is a high risk of mumps transmission. They can be readmitted immediately after receiving the 1st MMR dose. • if a history of 1 MMR dose, they do not need to be excluded but should be offered a 2nd MMR dose.

13.1 Virology

Mumps is a paramyxovirus, genus *Rubulavirus*, with a single-stranded RNA genome. It is rapidly inactivated by heat, formalin, ether, chloroform and light.

13.2 Clinical features

Mumps is transmitted by airborne droplets or direct contact with infected respiratory tract secretions or urine. Humans are the only known host of the virus.

People with mumps are most infectious from two days before to five days after the onset of parotitis.[1] For contact tracing purposes, the recommended period of communicability is also from two days before to five days after the onset of parotitis.[1] However, mumps virus has been isolated in saliva from seven days before to nine days after the onset of parotitis.[1] Asymptomatic cases also can be infectious.[1]

Classic mumps, an acute viral illness, is characterised by fever, headache, and swelling and tenderness of one or more parotid (salivary) glands. Patients may have no involvement of salivary glands but still experience involvement of other organs (eg, orchitis or meningitis). At least 30 percent of mumps infections in children are asymptomatic.

The complications of symptomatic mumps include aseptic meningitis in 15 percent (almost always without sequelae), orchitis (usually unilateral) in up to 20 percent of post-pubertal males, and oophoritis in 5 percent of post-pubertal females. Sterility occurs rarely. Profound unilateral nerve deafness occurs in 1 in 15,000 cases. Encephalitis has been reported to occur at a frequency of between 1 in 400 and 1 in 6,000, the latter being a more realistic estimate. Pancreatitis, neuritis, arthritis, mastitis, nephritis, thyroiditis and pericarditis may also occur.

The case fatality rate for mumps encephalitis is 1.4 percent, while the overall mumps case fatality rate is reported as 1.8 per 10,000 cases. Mumps in the first trimester of pregnancy may increase the rate of spontaneous abortion, but there is no evidence that it causes fetal abnormalities.

13.3 Epidemiology

13.3.1 Global burden of disease

Prior to the introduction of immunisation, approximately 85 percent of adults had evidence of past mumps infection. Most infections in those aged under 2 years were subclinical, while those affected in adulthood are more likely to experience severe disease. The peak incidence was in late winter and spring.

More recently, there have been numerous reports of increasing numbers of mumps cases in the US, UK and elsewhere, thought to be due to a waning of vaccine-induced immunity.[2] Many cases are reported in 18–30 year olds.[3] Outbreaks appear to occur mainly in those in crowded situations such as university students.[4]

13.3.2 New Zealand epidemiology

Mumps vaccine (as MMR) was introduced to the Schedule in 1990 for children aged 12 to 15 months, with a second dose introduced in 1992 for children aged 11 years. The current two-dose schedule at ages 15 months and 4 years was introduced in 2001 (see Appendix 1 for more information). The last mumps epidemic occurred in 1994.

In 2016, 20 cases of mumps were notified (16 were laboratory confirmed), compared to 13 notifications in 2015 (6 were laboratory confirmed). The 2016 mumps notification rate was 0.4 per 100,000 population, similar to the 2015 rate (0.3 per 100,000) (ESR, 14 March 2017).

From 1 September 2016 to 7 March 2017, 45 confirmed and probable cases of mumps have been notified to EpiSurv (provisional data). This is higher than observed for the same period in previous years: 2015/16 (6 cases), 2014/15 (10 cases) and 2013/2014 (10 cases).

13.4 Vaccines

13.4.1 Available vaccines

Mumps vaccine is one of the components of the live attenuated MMR and MMRV vaccines, considered in sections 11.4 and 21.4. Single antigen mumps vaccine is not available in New Zealand.

Funded vaccine

MMR vaccine funded as part of the Schedule is Priorix (GSK), which contains attenuated Schwarz strain measles, RA 27/3 rubella, and Jeryl Lynn mumps. See section 11.4.1 for more information.

Other vaccines

MMR II (MSD) was the funded vaccine prior to the 1 July 2017 Schedule change (see section 11.4.1).

13.4.2 Efficacy and effectiveness

A 2012 Cochrane review of the safety and effectiveness of MMR vaccine estimated that a single dose of MMR vaccine was 69–81 percent effective in preventing clinical mumps. Effectiveness of MMR in preventing laboratory-confirmed mumps cases in children and adolescents was estimated to be between 64 and 66 percent for one dose and between 83 and 88 percent for two vaccine doses.[5]

A two-dose vaccination schedule and high immunisation coverage has been very successful in controlling disease. However, outbreaks can still occur in highly immunised populations because two doses of vaccine are not 100 percent effective. Declining vaccine-induced mumps immunity may also contribute to outbreaks.[2] Data from Finland shows that 20 years after the second MMR dose, immunity to rubella was secure, 95 percent of people remained sero-positive for measles and immunity to mumps declined, with 74 percent being sero-positive.[6] The antibody avidity also decreased over time, by 8 percent for measles and 24 percent for mumps.[7]

A third dose of MMR vaccine has been used safely and effectively during mumps outbreaks in highly immunised populations.[8] Although the mumps vaccine is less effective than measles and rubella vaccines, cases that have been vaccinated are significantly less likely to experience complications from disease such as orchitis, meningitis and hospitalisation.[9]

13.4.3 Transport, storage and handling

Transport according to the *National Standards for Vaccine Storage and Transportation for Immunisation Providers 2017*.[10] Store at +2°C to +8°C. Do not freeze.

MMR vaccine must be reconstituted only with the diluents supplied by the manufacturer. Use MMR vaccine as soon as possible after reconstitution. If storage is necessary, reconstituted MMR vaccine can be stored at +2°C to +8°C for up to eight hours.

13.4.4 Dosage and administration

The dose of MMR is all of the reconstituted vaccine (approximately 0.5 mL) administered by subcutaneous injection (see section 2.2.3).

Co-administration with other vaccines

MMR vaccine can be given concurrently with other vaccines, as long as separate syringes are used and the injections are given at different sites. If not given concurrently, live vaccines should be given at least four weeks apart. (See also section 2.2.7 for information about multiple injections at the same visit.)

Interchangeability

The two brands of MMR vaccine (Priorix and MMR II) may be used interchangeably for completion of a course.[11]

13.5 Recommended immunisation schedule

Table 13.1: Recommended MMR vaccine schedule

	Schedule
Usual childhood schedule[a]	2 doses: at ages 15 months and 4 years
Catch-up[b] for children, adolescents and adults	2 doses: at least 4 weeks apart

a If MMR is given to children aged 6–12 months for outbreak control, 2 further MMR doses are still required at ages 15 months and 4 years.

b MMR vaccine is funded for those who are susceptible to 1 or more of the 3 diseases.

13.5.1 Usual childhood schedule

Two doses of mumps vaccine as MMR are recommended at age 15 months and age 4 years (Table 13.1).

The second dose can be given as soon as four weeks after the first dose.

Children who in an outbreak receive MMR vaccine when aged under 12 months require two further doses administered after age 12 months. The first scheduled MMR vaccine may be given to children from age 12 months whose parents/guardians request it, and no opportunity should be missed to achieve immunity.

13.5.2 Catch-up

MMR is recommended and funded for children, adolescents and adults who are known to be susceptible to one or more of the three diseases (two doses, four weeks apart). See sections 11.5.2 and 18.5.2.

13.5.3 Immunocompromise

Contacts of immunocompromised individuals

In general, MMR is contraindicated in immunocompromised individuals (see section 4.3). They can be partially protected from exposure to infection by ensuring that all contacts are fully immunised (funded), including hospital staff and family members. There is no risk of transmission of MMR vaccine viruses from a vaccinee to the immunocompromised individual (see section 11.7.2). See also 'Household contacts' in section 4.3.1 for general vaccination information for contacts of immunocompromised individuals.

(Re-)vaccination following immunosuppression

MMR vaccine is funded for (re-)vaccination following immunosuppression. However, it is important to be sure that the individual is immunocompetent enough to safely receive the vaccine.

HIV infection

Discuss vaccination of individuals with HIV infection with their specialist (see 'HIV infection' in section 4.3.3).

MMR vaccine is recommended for all HIV-positive children, whether symptomatic or asymptomatic, if the CD4+ lymphocyte percentage is 15 percent or greater. Asymptomatic children who are not severely immunocompromised are recommended to receive MMR vaccine from age 12 months to provide early protection against the three diseases. Susceptible HIV-positive children and adults aged 14 years and older may receive MMR vaccine if the CD4+ lymphocyte count is 200 cells/mm^3 or greater. Administration of MMR with CD4+ counts below these recommended levels has been associated with vaccine-related pneumonitis (from the measles component).[12]

13.5.4 Pregnancy and breastfeeding

MMR vaccine is contraindicated during pregnancy. Pregnancy should be avoided for four weeks after MMR vaccination.[12, 13]

MMR vaccine can be given to breastfeeding women.

13.6 Contraindications and precautions

See also section 2.1.3 for pre-vaccination screening guidelines and section 2.1.4 for general vaccine contraindications.

13.6.1 Contraindications

See section 11.6.1 for specific MMR vaccine contraindications.

Anaphylaxis to a previous dose of MMR or any of the vaccine components (including neomycin) is a contraindication to a further dose of MMR.

MMR vaccine should not be given to women who are pregnant, and pregnancy should be avoided for four weeks after immunisation.[12, 13]

13.6.2 Precautions

Egg allergy, including anaphylaxis, is **not** a contraindication to MMR vaccine. See section 11.6.3 for more information, and section 11.6.2 for further precautions.

13.7 Expected responses and AEFIs

See sections 11.7 and 18.7.

13.8 Public health measures

It is a legal requirement that all cases of mumps be notified immediately on suspicion to the local medical officer of health.

13.8.1 Diagnosis

Except if there is an epidemiological link with a confirmed case, all suspected mumps cases should have diagnostic testing (eg, by buccal swab and PCR) as there are other causes of parotitis other than the mumps virus. See the latest version of the 'Mumps' chapter of the *Communicable Disease Control Manual 2012*[1] for the specimens

required for laboratory confirmation of mumps, or discuss these with the local laboratory.

13.8.2 Susceptible contacts

A susceptible contact is anyone born after 1981 who has not had mumps infection or has not been fully vaccinated for their age.

All susceptible contacts should be offered MMR vaccine. (All vaccinations given should be recorded on the NIR.) There is no increased risk of adverse events after immunisation during the incubation period of mumps or if the recipient is already immune. Immunoglobulin is ineffective after exposure to mumps.

The mumps vaccine given after exposure has not been shown to be effective in preventing infection, but immunisation will provide protection against future exposure and may prevent a third wave of cases from the susceptible contacts.

13.8.3 Exclusion

Cases

Exclude cases from tertiary education, school, sports, early childhood services or health care employment or other work and from close contact with other susceptible people for 5 days from onset of parotitis.[1]

Susceptible contacts

Discuss exclusion of susceptible contacts with the local medical officer of health. Previously immunised (pre-exposure) contacts need not be excluded. Generally, unimmunised contacts who have no previous history of mumps infection should be advised not to attend early childhood services or school because of:

- the risk of catching the disease themselves
- the risk of passing on the disease, when asymptomatic or in the prodromal phase, to other susceptible children.

Health care settings or working or living with immunocompromised people

Advise exclusion of susceptible contacts in health care settings and for those working or living with immunocompromised people from 12 days after the first exposure to 25 days after last exposure to the infectious case.[1] Documented full immunisation with two MMR doses should be required in these situations.[1]

Other settings

Consider advising exclusion of susceptible contacts with zero MMR doses from tertiary education, school, early childhood services or work from 12 days after the first exposure to 25 days after last exposure to the infectious case, if there is a high risk of mumps transmission. [1] Exclusion is more important in secondary and tertiary education settings as these settings are more conducive to outbreaks.[1]

All excluded contacts in settings other than healthcare or with immunocompromised people can be readmitted immediately after they have received the first MMR dose.[1] Those who have a history of one dose of MMR vaccination should be offered their second vaccine dose and be allowed to remain in tertiary education, school, early childhood services or work (except for health care workers or those working or living with immunocompromised people).[1] However, if the contact subsequently develops mumps symptoms they would need to be excluded.

For more details on control measures, refer to the latest version of the 'Mumps' chapter of the *Communicable Disease Control Manual 2012*.[1]

13.9 Variations from the vaccine data sheet

See section 11.9 for variations from the MMR (Priorix) data sheet.

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