

10 Mumps

10.1 Introduction

Mumps has been recognised as an acute disease since antiquity. In the fifth century BC Hippocrates described mumps as an illness accompanied by swelling of the ear and painful enlargement of the testes, either unilaterally or bilaterally. The infectious nature of the disease was recognised in the 19th century. By the early 20th century it was noted that mumps was particularly likely to occur in institutions and the armed forces. Large outbreaks occurred among the United States (US) armed forces in France during the First World War. In 1934 Johnson and Goodpasture demonstrated that a virus in human saliva could transmit the disease. The first safe and immunogenic attenuated mumps virus vaccine became available in 1967.

10.2 The illness

Classical mumps, an acute viral illness, is characterised by fever, headache, and swelling and tenderness of one or more salivary glands. At least 30 percent of mumps infections in children are asymptomatic. Patients may have no involvement of salivary glands, but still experience involvement of other organs (eg, orchitis or meningitis). 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 6000, the latter being a more realistic estimate. 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. Pancreatitis, neuritis, arthritis, mastitis, nephritis, thyroiditis and pericarditis may also occur. Mumps in the first trimester of pregnancy may increase the rate of spontaneous abortion, but there is no evidence that it causes fetal abnormalities.

The incubation period (until the appearance of the clinical illness) for mumps is usually 16 to 18 days but may range from 12 to 25 days. The period of communicability ranges from one week before to nine days after the onset of parotitis. Exposed non-immune individuals should be considered infectious from 12 to 25 days after exposure.

10.3 Epidemiology

Humans are the only known host of the mumps virus. Prior to the introduction of immunisation, approximately 85 percent of adults had evidence of past mumps infection. Most infections in those less than two years of age are subclinical, while those affected in adulthood are more likely to experience severe disease. The peak incidence is in late winter and spring.

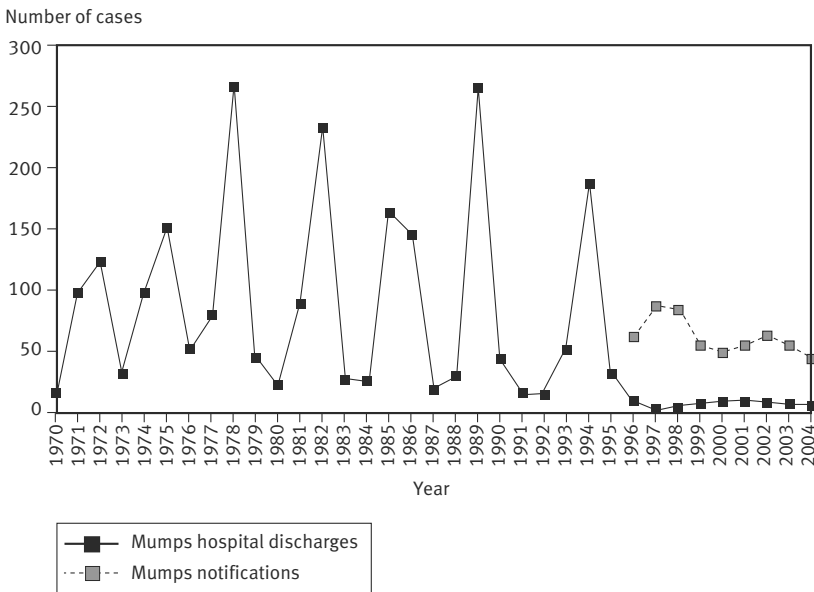
In the under 15 age group mumps is the most commonly identified cause of viral meningitis in an unimmunised population. For example, prior to immunisation, mumps resulted in about 1200 hospital admissions per year in England and Wales. Before the introduction of immunisation in the US, mumps was the leading identified cause of viral encephalitis, responsible for up to 30 percent of cases. Since being licensed in 1967 the mumps vaccine has been in widespread use. The disease is now responsible for only 0.5 percent of cases of viral encephalitis and the overall incidence of reported mumps and its complications has reduced dramatically.

In the United Kingdom (UK) in 2004, the number of cases of mumps rose to more than 16,000, from 4204 cases in 2003. Most cases were in older teenagers and young adults born before 1987, and the mumps epidemic occurred because they had either not received a dose of measles, mumps and rubella vaccine (MMR) containing the mumps antigen, or had only received one dose of MMR. A two-dose schedule of MMR was not introduced in the UK until 1996, and MMR was first introduced as one dose in 1988.¹

New Zealand epidemiology

Between 1970 and 1991 there were 2002 hospital admissions for mumps,² with an increase in the number of cases every three to four years. The mumps epidemic expected in 1993 was delayed to 1994, presumably by the introduction of MMR immunisation in 1990, and there has not been an epidemic since then (see Figure 10.1).

Figure 10.1: Mumps hospitalisations, 1970–2004 and notifications, 1996–2004



History of the New Zealand Immunisation Schedule

Mumps vaccine (as MMR) was introduced to the National Immunisation Schedule in 1990 for children between 12 and 15 months of age. In 1992 a second dose of MMR was added, given at 11 years of age in year 7 (form 1). The timing of the first dose was changed in 1996 to 15 months of age to be given at the same time as the booster dose of diphtheria, tetanus, whole cell pertussis and *Haemophilus influenzae* type b vaccine (DTwPH). (This is discussed fully in section 9.3.) In 2001 the schedule for MMR vaccine was changed, maintaining the first dose at 15 months and changing the second dose to four years of age in order to prevent further epidemics of measles. There was an MMR school catch-up programme throughout the country in 2001 for all children between five and 10 years of age who would not receive MMR in school year 7 because of the schedule change.

10.4 Vaccines

Mumps vaccine is one of the components of the MMR vaccine (M-M-R[®] II, MSD), which is considered in section 9.4. M-M-R[®] II contains the Jeryl Lynn strain of mumps. The more reactive Urabe strain was used in New Zealand for a short time from 1991 until it was withdrawn in 1992. There is no single antigen mumps vaccine available in New Zealand. (See section 9.4 for information on other vaccines.)

Efficacy

The protective efficacy of the Jeryl Lynn strain of mumps vaccine is about 95–96 percent.³ In the US the introduction of a second dose has been associated with a further reduction in mumps cases. In Finland, a two-dose strategy and good immunisation coverage have led to the elimination of mumps.⁴

Dosage

The correct dose is all of the reconstituted vaccine (about 0.5 mL) given by subcutaneous injection in the deltoid area to all age groups. (See section 2.3 for needle sites and sizes.)

10.5 Recommended immunisation schedule

Two doses of mumps vaccine (as MMR) are recommended for children at 15 months and four years of age, before school entry. Approximately 5 percent of children fail to be protected by the first dose; of these, nearly all will be protected by the second. The second dose can be given as soon as four weeks after the first dose.

10.6 Expected responses and adverse events following immunisation (AEFI)

See section 9.6 for adverse events after MMR.

Any severe or unexpected reactions should be reported to CARM, PO Box 913, Dunedin, using the prepaid postcard HP3442 (see section 2.4) or via online

reporting at <http://carm.otago.ac.nz>. If the patient or parent/caregiver does not consent to being identified, the report should be made without personal identification.

10.7 Contraindications

See sections 1.9 and 9.7. Anaphylaxis to a previous dose of MMR is a contraindication to a second dose of MMR.

Although the mumps vaccine is grown in chick embryo cell culture, mumps and MMR vaccines may be safely given to those with anaphylactic allergy to egg. However, allergy to gelatin may be associated with anaphylactic reaction to MMR. See section 9.7 for further information about egg allergy and immunisation of children with a history of anaphylaxis.

10.8 Control measures

All cases of mumps should be notified to the local medical officer of health.

When an outbreak of mumps occurs, all susceptible people (ie, those who have no previous history of mumps and have not received the mumps or MMR vaccine) should be offered the MMR vaccine. The mumps vaccine given after exposure has not been shown to be effective in preventing infection, but immunisation will provide protection against future exposure. 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.

Parents/caregivers should be advised that cases should be excluded from early childhood services or school until nine days after the appearance of parotitis, at which time they cease to be infectious. Immunised contacts need not be excluded from early childhood services or school.

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.

The recommended period during which absence from early childhood services or school is advised for unimmunised contacts is from the date of exposure to a case until 26 days after the appearance of parotitis in the last case in school or early childhood service. The reason for the 26-day exclusion period is that cases may occur up to 25 days after exposure. To quote from the *Red Book*:⁵

When determining means to control outbreaks, exclusion of susceptible students from affected schools and schools judged by health authorities to be at risk of transmission should be considered. Such exclusion should be an effective means of terminating school outbreaks and rapidly increasing rates of immunisation. Excluded students can be readmitted to school immediately after immunisation.

For more details on control measures, refer to *Control of Communicable Diseases Manual*.⁶

References

- 1 Savage E, Ramsay M, White J, et al. 2005. Mumps outbreaks across England and Wales in 2004: observational study. *BMJ* 330: 1120–1.
- 2 Reid S, Wilson N, Baker M. 1993. The epidemiology and control of mumps in New Zealand. *Communicable Dis NZ* 93: 21–5.
- 3 Plotkin SA. 2004. Mumps vaccine. In: SA Plotkin, WA Orenstein (eds). *Vaccines* (4th edition). Philadelphia: WB Saunders Company.
- 4 Peltola H, Heinonen OP, Valle M, et al. 1994. The elimination of indigenous measles, mumps, and rubella from Finland by a 12-year, two-dose vaccination program. *N Eng J Med* 331: 1397–402.
- 5 American Academy of Pediatrics. 2003. In: LK Pickering (ed) *Red Book: Report of the Committee on Infectious Diseases* (26th edition). Elk Grove Village, IL: American Academy of Pediatrics, p.442.
- 6 Heymann DL (ed). 2004. *Control of Communicable Diseases Manual* (18th edition). Washington: American Public Health Association.