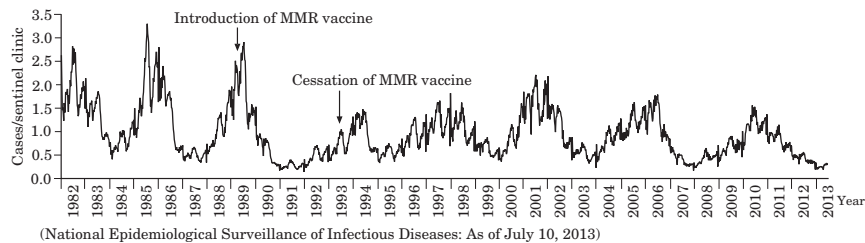


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<THE TOPIC OF THIS MONTH> Mumps (infectious parotitis) in Japan, as of July 2013

Figure 1. Weekly reports of mumps patients from week 1 of 1982 to week 27 of 2013, Japan



Infectious parotitis is characterized by the diffuse tender swelling of parotid glands and fever. It is called “Otafuku Flu” in Japan because the patient’s face resembles the face of the folkloric full-cheeked woman Otafuku, who may bring us good fortune. The causative agent mumps virus is a single stranded RNA virus of the negative polarity, and belongs to the family *Paramyxoviridae*, sub-family *Paramyxoviridae*, genus *Rubulavirus*. The 2012 WHO’s proposal classifies mumps virus into 12 genotypes from A to N (note: previous E and M are now classified as C and K, respectively, and E and M are absent) (see p. 224 of this issue).

Mumps virus is transmitted by droplet infection or direct contact with saliva. The basic reproduction number: R_0 (the average number of cases among the susceptible population, which one case can directly infect over the course of its infectious period) is 4-7 (R_0 is 12-18 for measles and 5-8 for rubella). The incubation period is usually 16-18 days. The communicability lasts from a few days before onset of the disease until disappearance of swelling of the parotid gland. School Health and Safety Act designates mumps infection as a category 2 school infectious disease and prohibits the school attendance for at least 5 days after the appearance of the swelling of parotid, submandibular and sublingual gland and until full recovery of general condition of the health. Asymptomatic infection cases occupying 30-35% of infections shed the virus and can become infection sources.

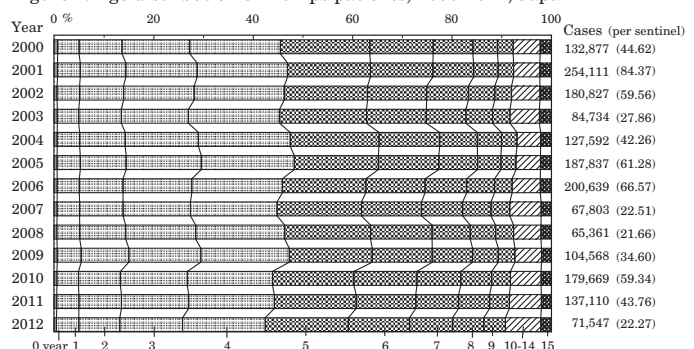
Cases notified under the National Epidemiological Surveillance of Infectious Diseases: Infectious parotitis is a category V infectious disease under the Infectious Diseases Control Law (<http://www.nih.go.jp/niid/images/iasr/34/402/de4021.pdf>). It is monitored at about 3,000 pediatric sentinel clinics, which reports the cases on weekly basis (Fig. 1).

Though the immunization started in 1981 on voluntary basis, the coverage remained low. As a consequence, the large scale epidemic occurred at 3-5 year intervals. In April 1989, measles-mumps-rubella (MMR) vaccine became a choice in the routine immunization. Accordingly the mumps vaccination coverage increased and mumps incidence was significantly reduced. However, the MMR vaccination was discontinued in April 1993 on account of many post-vaccination aseptic meningitis cases, which became an object of public concern (see p. 230 of this issue). Though mumps monovalent vaccine was used thereafter, large mumps epidemics recurred at 4-5 year intervals (2001-2002, 2005-2006 and 2010-2011).

According to an investigation supported by Health and Labour Sciences Research Grant (Chief Investigators: Taniguchi, K and Nagai, M), the current annual incidence of mumps infection in Japan is estimated to be between 1.356 million, which was reported in the peak year 2005 (95% confidence interval: 1.272-1.440 million) and 0.431 million, which was reported in the bottom year 2007 (95% confidence interval: 0.355-0.508 million).

Fig. 2 shows the age distribution of mumps patients reported from the pediatric sentinel clinics. The 4-year-old cases were the largest in number, followed by 5-year-old

Figure 2. Age distribution of mumps patients, 2000-2012*, Japan



(THE TOPIC OF THIS MONTH-Continued)

and 3-year-old cases; 0-1 year-old cases were few. The cases aged less than 6 years accounted for 60% and cases aged less than 10 years occupied 90% of the total. Since 2010, the proportion of cases less than 6 years of age has been decreasing and that of those above 10 years of age has been increasing.

Mumps virus isolation/detection: During January 2000 through June 2013, prefectural and municipal public health institutes (PHIs) have reported 2,462 cases, from which mumps virus was detected (as of July 18, 2013). Clinical diagnosis of them was infectious parotitis for 1,397 cases and aseptic meningitis for 764 cases (Fig. 3). Infectious parotitis cases were reports from pathogen sentinels (corresponding about 10% of pediatric sentinel clinics), and aseptic meningitis were reports from the sentinel hospitals (consisting of about 500 hospitals each with more than 300 beds).

The genotypes of the epidemic mumps virus strains change overtime in Japan. The epidemic strain in 1980's was genotype B and that in 1990's was the mixture of J and B. In 1999, it suddenly changed to the mixture of G and L and since 2000 genotype G has been predominant (see pp. 224 & 226 of this issue).

Prognosis of mumps and its complications: Prognosis of mumps is generally good, but occasionally it develops complications, such as, aseptic meningitis, sensorineural hearing loss, encephalitis, orchitis, ovaritis, pancreatitis, etc. (see p. 222 of this issue). About 1-2% of the diagnosed infectious parotitis patients develop meningitis that requires hospitalization (see pp. 222 & 230 of this issue). Hearing impairment is observed among 0.1-1% of the mumps patients, and estimatedly 700-2,300 cases of hearing impairment occur in Japan every year (see pp. 227 & 228 of this issue). Though severe bilateral sensorial hearing impairment is rare, unilateral hearing loss is frequent and such cases are often left unnoticed during the childhood. They need hearing aids and cochlear implants, and, if the disease onset is before the entry to the junior high school, speech instruction is needed (see p. 228 of this issue).

Efficacy and safety of mumps vaccine: Mumps vaccine is introduced into the routine immunization in 117 countries globally, among them 110 countries adopt two-shot schedule and 7 countries one-shot schedule. There are 76 countries that have not introduced the mumps vaccine in the routine immunization. Japan is among them and the sole developed country that is conducting mumps immunization on voluntary basis. WHO recommends the two-shot schedule rather than the one-shot schedule, because comparative studies have indicated that the two-shot schedule was more effective. However, a recent mumps outbreak in the United States among those who had received two shots necessitated the third shot to control the epidemic (see p. 232 of this issue).

More than ten mumps strains are currently used as vaccine seeds, i.e., Jeryl-Lynn (JL) strain and its derivative RIT-4385 strain with the genotype A, Leningrad-3 strain and Leningrad-Zagreb strain with the genotype N, Urabe AM9 strain with the genotype B, etc. In Japan Hoshino strain and Torii strain both with the genotype B are used as the vaccine seed virus (Urabe AM9 strain has been abandoned and Miyahara strain discontinued) (see pp. 221 & 224 of this issue).

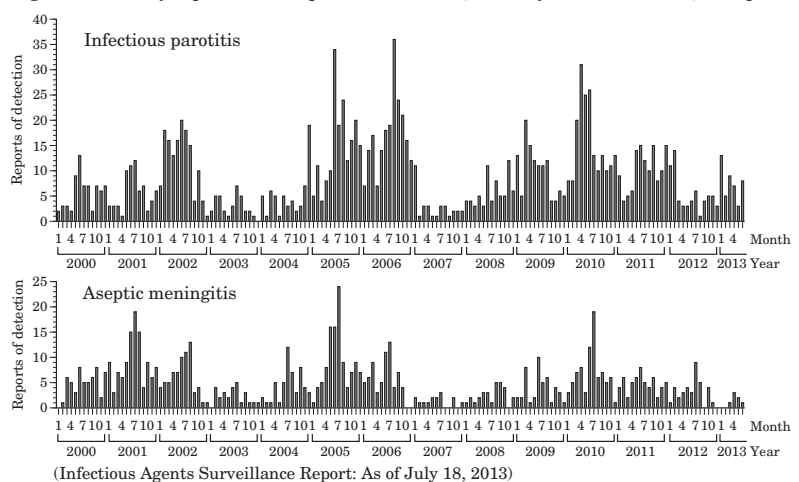
It has been suggested that vaccine effectiveness and safety were variable among vaccine strains. Vaccine effectiveness has been found comparable among Urabe AM9, Torii, Hoshino and Miyahara strains. Data obtained in the Western countries have suggested that Urabe AM9 strain has higher effectiveness than JL strain (Fact sheets on mumps: <http://www.mhlw.go.jp/stf/shingi/2r985200000bx23-att/2r985200000bybc.pdf>). As for vaccine-associated adverse effects, incidence of aseptic meningitis was reportedly lower for the JL strain than for Urabe AM9, Leningrad-3, Hoshino and Torii strains. As the subclinical infection is more frequent among younger children and complication rate increases with advancement of the age in natural infections, the first dose should be given during one year of age so as to reduce the frequency of the adverse effects (see p. 221 of this issue).

Current and future challenges: The infectious parotitis has been considered as an infection with a slight ailment. Aseptic meningitis occurs in 1-2 % of the patients and total 700-2,300 sensorial hearing impairment cases occur in Japan due to the mumps infection, however. The present situation should not be left as it is.

The second recommendation from Immunization Committee of the Infectious Diseases Branch of the Ministry of Health Labour and Welfare (MHLW) Council, which was issued in May 2012, proposed further strengthening of the prevention of infectious parotitis, together with that of varicella, hepatitis B and adult pneumococcal infection. The additional resolution to the revision of the Preventive Vaccination Law declared that decision as to the incorporation of the mumps vaccine into the routine immunization should be made before the end of FY2013.

Effective control of mumps virus infection needs surveillance of child and adult patients including their vaccination history, nationwide pathogen surveillance, investigation of antibody positive rates of the Japanese population, investigation of vaccine coverage, and surveillance of vaccine-associated adverse effects. Further strengthening of collaboration between MHLW, National Institute of Infectious Diseases, PHIs, health centers and medical institutions is in need.

Figure 3. Monthly reports of mumps virus detection, January 2000-June 2013, in Japan



(Infectious Agents Surveillance Report: As of July 18, 2013)

The statistics in this report are based on 1) the data concerning patients and laboratory findings obtained by the National Epidemiological Surveillance of Infectious Diseases undertaken in compliance with the Law Concerning the Prevention of Infectious Diseases and Medical Care for Patients of Infectious Diseases, and 2) other data covering various aspects of infectious diseases. The prefectural and municipal health centers and public health institutes (PHIs), the Department of Food Safety, the Ministry of Health, Labour and Welfare, and quarantine stations, have provided the above data.