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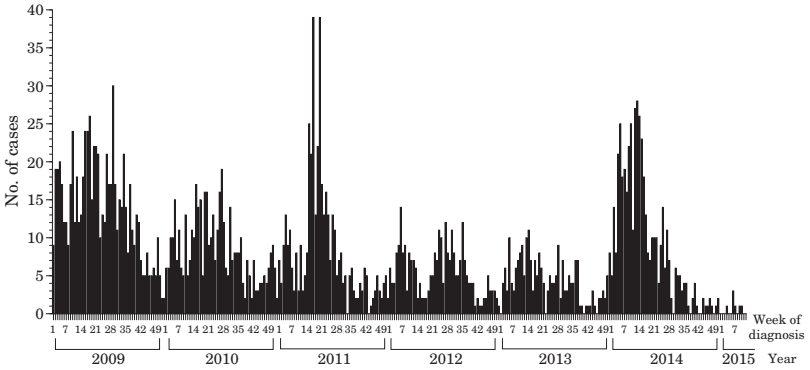
National Institute of Infectious Diseases and
Tuberculosis and Infectious Diseases
Control Division,
Ministry of Health, Labour and Welfare

<THE TOPIC OF THIS MONTH>
Measles in Japan, as of March 2015

Figure 1. Weekly number of reported measles cases, week 1 of 2009 to week 12 of 2015, Japan



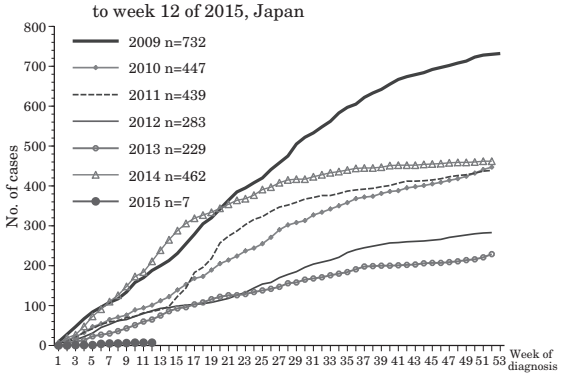
(National Epidemiological Surveillance of Infectious Diseases: as of March 25, 2015)

Measles is an acute infectious disease caused by the highly infectious measles virus. Main clinical manifestations are fever, rash and catarrh. Pneumonia and encephalitis are major complications that may lead to death. Subacute sclerosing panencephalitis (SSPE) is a rare complication of measles. The encephalitis develops several years after infection, and its prognosis is extremely poor. No effective cure is presently available (see p. 67 of this issue).

Japan has been making progress towards measles elimination using the guidelines of Ministry of Health, Labour and Welfare (MHLW), "Special infectious disease prevention guidelines for measles" (MHLW Notice 442 issued on 28 December 2007; MHLW Revised Notice 126 issued on 30 March 2013). The elimination target year was fiscal year (FY) 2015. In 2014, Japan's National Verification Committee for Measles Elimination announced that Japan was free of the endemic strain D5 for three years in the presence of a well performing surveillance system (see p. 65 of this issue). On 27 March 2015, the Regional Verification Commission for Measles Elimination in the Western Pacific Region verified that Brunei Darussalam, Cambodia and Japan have interrupted endemic transmission of measles and confirmed that Australia, Macao (China), Mongolia and the Republic of Korea have maintained interruption of endemic measles transmission since the last verification in 2014 (http://www.wpro.who.int/mediacentre/releases/2015/20150327/en/).

Measles incidence under the National Epidemiological Surveillance of Infectious Diseases: Since January 2008, the Infectious Diseases Control Law requests notification of all measles cases (IASR 34: 21-22, 2013). As shown in Fig. 1, the number of measles cases started increasing towards the end of 2013 and the trend continued well into 2014. The outbreak was initiated by measles imported from the Philippines and other Asian countries (see p. 57 of this issue). The outbreaks involved medical facilities (see p. 54 of this issue) and nursery schools (IASR, 35: 278-280, 2014). The outbreak waned around week 18 of 2014, thanks to response activities, including active surveillance (see pp. 54 & 55 of this issue), aimed at preventing further transmission (Fig. 2). As for the period from January to March, the year 2015 recorded the lowest number of cases in the past 7 years (Fig. 2).

Figure 2. Cumulative number of measles cases by week, week 1 of 2009 to week 12 of 2015, Japan



(National Epidemiological Surveillance of Infectious Diseases: as of March 25, 2015)

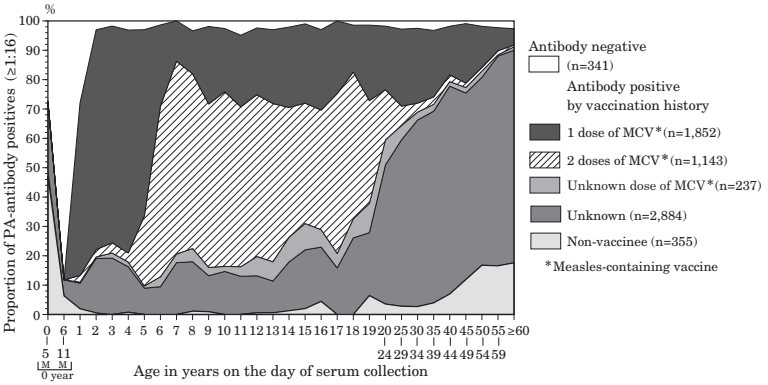
As for age distribution (Table 1 in p. 53), cases in their 10's have decreased drastically owing to successful catch-up immunization, which started in 2008 as a limited 5 year measure (target populations were 13 year old 1st grade junior high school and 18 year old 3rd grade senior high school students). The proportion of adult cases (≥20 years of age) was

(Continued on page 52′)

(THE TOPIC OF THIS MONTH-Continued)

33% in 2008, 36% in 2009, 37% in 2010, 48% in 2011, 58% in 2012, 70% in 2013 and 47% in 2014. In 2014, among 462 cases, there were 216 (47%) measles cases without any vaccination, 87 (19%) with 1 dose, 32 (7%) with 2 doses, and 127 (27%) with unknown vaccination status (Fig. 3 in p. 53). Infants (0-1 year of age) occupied 20% of the cases (93/462), 83% of whom were unimmunized, and among 142 of 6-24 year old cases that should have received 2 MCV doses, 70 were not vaccinated (49%).

Figure 5. Proportion seropositive against measles virus by age and vaccination status, fiscal year 2014 (April 2014 to March 2015), Japan
(National Epidemiological Surveillance of Vaccine-Preventable Diseases) (Particle agglutination assay)



Isolation and detection of measles virus: The measles virus genotype D5 that had been endemic in Japan has not been detected for 4 years and 10 months (i.e., not reported since May 2010) (Fig. 4 in p. 53). In 2014, a total of 366 measles strains were isolated or detected (Table 2 in p. 53). The largest number of cases were of genotype B3 (261 cases; of 63 derived from the Philippines), followed by D8 (57 cases), D9 (22 cases) and H1 (15 cases). Eleven cases had undetermined virus genotype(s). After detection of a single case, all outbreaks were subjected to active surveillance and laboratory investigation. In 2015, genotype H1 was detected from 1 case (returnee from China) and D8 genotype was detected from 2 cases (one with travel history to Indonesia) (Fig. 4 in p. 53, as of 31 March, 2015).

Laboratory diagnosis: Laboratory diagnosis is essentially required for all suspected measles cases by law (notification criteria: http://www.nih.go.jp/niid/images/iasr/35/410/de4101.pdf). Once measles infection is suspected clinically, the case shall be notified to the nearby health centres (HC), whenever possible, within 24 hours. The HC arranges shipping of the acute phase clinical specimens (a set of EDTA-treated blood specimen, throat swab and urine specimen obtained within 1 week after onset of rash) from medical institutions to prefectural and municipal public health institutes (PHIs) for virus isolation/detection/genotyping. The medical institution also sends the clinical specimens to a commercial laboratory for IgM testing (covered by national medical insurance). Once a definitive diagnosis is made by the clinical and laboratory findings, the notified "clinically-diagnosed measles" is reclassified as "laboratory-confirmed measles"; if the laboratory results are negative, the notification is retracted.

While only 38% of notified cases in 2008 were laboratory-confirmed cases, the proportion was ≥90% in 2014. In 2014, 78% of the reported cases were confirmed by PCR and genotyped in PHIs. The information collected through these activities supported the conclusion of the ≥12 months interruption of endemic measles transmission in Japan (see p. 59 of this issue). In March 2015, the section on measles in the laboratory manual for pathogen detection was revised; the current version, 3rd edition, is now available.

The National Epidemiological Surveillance of Vaccine-Preventable Diseases: In 2014, 23 PHIs in Japan conducted particle agglutination (PA) assay from serum obtained from 6,785 persons, such as healthy blood donors and those receiving health-checks (see p. 60 of this issue). Overall, PA antibody positivity (defined as ≥ 1:16 titers) has been ≥95% in the past 4 years since FY2011. The positivity was 73% among 0-5 month old infants (mainly attributable to maternal antibody) and 12% in 6-11 month old infants. After reaching 12 months of age, the antibody level increases through routine immunization. All age groups 2 years and above have maintained ≥95% positivity (Fig. 5).

Vaccination rate: Since FY2006, routine immunization in Japan has adopted measles-rubella combined vaccine, administered as two doses, the first to children aged one year (1st vaccination) and the second to children one year before school entry (2nd vaccination). In addition, from FY2008 to FY2012, supplementary vaccination was conducted for children whose age corresponded to those of the first grade of junior high school (3rd vaccination) and to those whose age corresponded to those of the third grade of high school (4th vaccination) to ensure two doses in these age groups as well.

The 1st vaccination covered ≥95% of the target population for 4 consecutive years from FY2010 to FY2013 (see p. 62 of this issue). The 2nd vaccination was 93% in FY2013, 2% short of the 95% target. The vaccination rates of the 1st and 2nd vaccinations in FY2013 were lower than those in FY2012. To stop the declining trends, it has been advised to promote the first immunization (1st vaccination) immediately after attaining 1 year of age and the second immunization (2nd vaccination) during April to June, early in the fiscal year, in the year preceding school entry.

Further measures to be taken: In compliance with the "Special infectious disease prevention guidelines for measles", coverage of the 1st and 2nd vaccination should be maintained at or above 95% so as to maintain population immunity sufficiently high enough to prevent measles transmission, even in case of importation. As many countries are measles endemic (see p. 68 & 70 of this issue), vaccination is recommended for those going to measles-endemic countries. Active surveillance should be conducted even if only a single case is detected and preventive measures should be taken immediately so as to interrupt endemic transmission. The notification format for clinicians was revised to include the patient's name and address, which is indispensable for rapid investigation and response (to be enforced on 21 May 2015).

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 Infections, 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.

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（特集つづき）

表1．麻疹患者の年齢分布，2008～2014年

Table 1. Age distribution of measles cases, 2008-2014, Japan

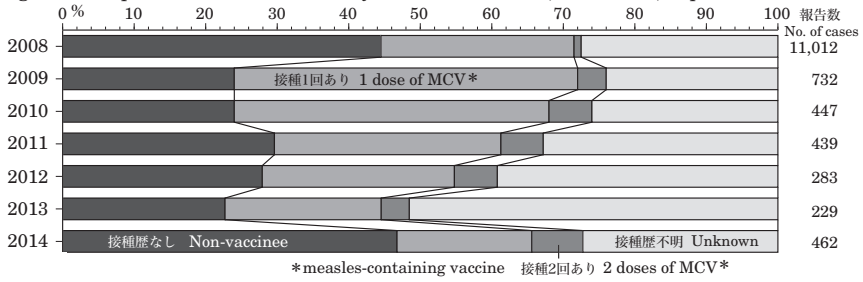
年 Year		年齢群（歳）Age group (year) <1	1	2	3	4	5-9	10-14	15-19	20-29	30-39	40-49	≥50	合計 Total
2008	n	612	630	169	136	134	930	1,839	2,905	2,446	914	208	89	11,012
	(%)	(6)	(6)	(2)	(1)	(1)	(8)	(17)	(26)	(22)	(8)	(2)	(1)	(100)
2009	n	74	133	43	20	25	49	56	70	86	100	44	32	732
	(%)	(10)	(18)	(6)	(3)	(3)	(7)	(8)	(10)	(12)	(14)	(6)	(4)	(100)
2010	n	29	104	22	20	8	28	36	33	55	62	24	26	447
	(%)	(6)	(23)	(5)	(4)	(2)	(6)	(8)	(7)	(12)	(14)	(5)	(6)	(100)
2011	n	25	51	11	17	15	40	35	35	78	80	39	13	439
	(%)	(6)	(12)	(3)	(4)	(3)	(9)	(8)	(8)	(18)	(18)	(9)	(3)	(100)
2012	n	15	29	7	4	4	23	15	23	65	60	27	11	283
	(%)	(5)	(10)	(2)	(1)	(1)	(8)	(5)	(8)	(23)	(21)	(10)	(4)	(100)
2013	n	11	26	4	4	5	4	4	12	51	59	31	18	229
	(%)	(5)	(11)	(2)	(2)	(2)	(2)	(2)	(5)	(22)	(26)	(14)	(8)	(100)
2014	n	46	47	10	10	14	47	33	35	108	80	22	10	462
	(%)	(10)	(10)	(2)	(2)	(3)	(10)	(7)	(8)	(23)	(17)	(5)	(2)	(100)

（感染症発生動向調査：2015年3月9日現在）

(National Epidemiological Surveillance of Infectious Diseases: as of March 9, 2015)

図3．麻疹患者の予防接種歴別割合，2008～2014年

Figure 3. Proportion of measles cases by vaccination status, 2008-2014, Japan

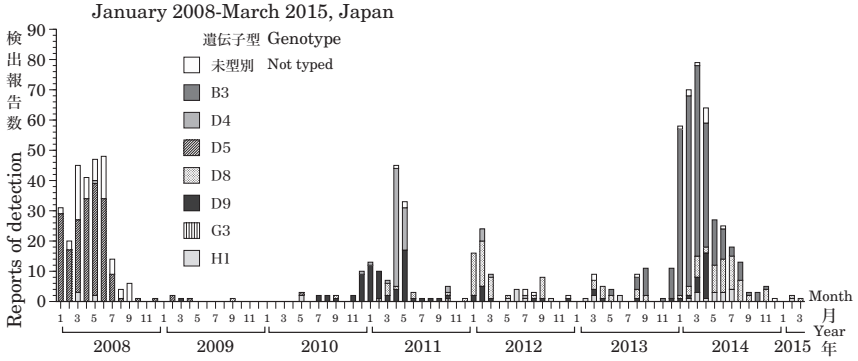


（感染症発生動向調査：2015年3月9日現在報告数）

(National Epidemiological Surveillance of Infectious Diseases: as of March 9, 2015)

図4．月別麻疹ウイルス分離・検出報告数，2008年1月～2015年3月 (病原微生物検出情報：2015年3月31日現在報告数)

Figure 4. Monthly number of reported measles cases with virus isolation/detection by genotype, January 2008-March 2015, Japan



(Infectious Agents Surveillance Report: as of March 31, 2015 from prefectural and municipal public health institutes)

表2．麻疹ウイルス検出例の渡航歴と渡航先，2014年

Table 2. Measles virus isolation/detection by travel history and destination abroad, 2014

遺伝子型 Genotype	例数 No. of cases	渡航歴 無／不明 No/unknown travel history	渡航歴 有 Travel history abroad	渡航先* Destination abroad*: インドネシア Indonesia	中国* China*	フィリピン Philippines	ベトナム* Viet Nam*	マレーシア* Malaysia*	カザフスタン* Kazakhstan*	米国 United States of America	ハワイ Hawaii	ソロモン諸島 Solomon Islands	ニュージーランド* New Zealand*
合計 Total	366	274	92	7	5	65	11	1	2	1	1	1	1
B3	261	195	66	-	-	63	-	-	-	1	1	1	-
D8	57	43	14	4	2	-	7	1	2	-	-	-	1
D9	22	18	4	3	-	1	-	-	-	-	-	-	-
H1	15	8	7	-	3	-	4	-	-	-	-	-	-
Not typed	11	10	1	-	-	1	-	-	-	-	-	-	-

*2つ以上の国へ渡航した例を含む （病原微生物検出情報：2015年3月23日現在報告数）

*Including cases who visited two or more countries (e.g. China/New Zealand)

[Infectious Agents Surveillance Report: as of March 23, 2015 from prefectural and municipal public health institutes (PHIs)]