ISSN 0915-5813

IASR

Vol. 37 No. 2 February 2016
Infectious Agents Surveillance Report
http://www.nih.go.jp/niid/en/iasr-e.html

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

<THE TOPIC OF THIS MONTH>
Poliomyelitis as of 2016

Poliomyelitis, also known as infantile paralysis, is caused by poliovirus that infects the central nervous system. Typically, the infection irreversibly damages motor neurons causing acute flaccid paralysis (AFP). As no specific therapeutic is available, vaccination is the basic strategy for preventing polio disease occurrence and epidemic. Acute poliomyelitis is a notifiable Category II infectious disease under the Law Concerning the Prevention of Infectious Diseases and Medical Care for Patients of Infections (the Infectious Diseases Control Law); physicians who have diagnosed symptomatic or asymptomatic cases (excluding vaccine strain carriers) must notify the case immediately (see http://www.nih.go.jp/niid/images/iasr/37/432/de4321.pdf for clinical characteristics and notification criteria). Vaccine-associated paralytic polio (VAPP) and those caused by secondary transmission of vaccine strain(s) derived from vaccinees are also notifiable. As AFP can be caused by causes other than polio, confirmation of poliovirus by isolation from stool specimens, identification and genetic analysis of the isolates are indispensable for polio surveillance.

Current situation of the global polio eradication program

Since WHO launched the global polio eradication initiative in 1988, the total number of reported polio cases and areas considered endemic steadily decreased. Globally, wild poliovirus (WPV) type 2 has not been isolated since the last detection in India in 1999 and the Global Commission for the Certification of the Eradication of Poliomyelitis declared eradication of WPV type 2 in September 2015. WPV type 3 has not been reported for ≥3 years since the last detection in Nigeria in 2012. The remaining WPV circulating in the world is poliovirus type 1; while still circulating in Pakistan and Afghanistan (Figure, see p. 19 of this issue), it is likely no longer circulating in the African continent after the last detection in Nigeria in July 2014, a country where polio had been endemic for a long time (see p. 29 of this issue). In 2015, 72 wild polio cases were reported globally, a considerable decline from 359 cases in 2014 (Table in p. 18). As the remaining polio-endemic countries are afflicted by numerous social problems, however, polio eradication in the near future will not be easy.

The Western Pacific Region (WPR) of WHO declared eradication of indigenous WPV in 2000. Since then, it has not experienced an epidemic of WPV except the WPV type 1 epidemic in Xinjiang province in China, which was imported from Pakistan. More recently, however, vaccine-derived poliovirus (VDPV) epidemics have been reported from various parts of the world, and in the WPR, a type 1 VDPV epidemic was reported from Laos in 2015 (see pp. 20 & 24 of this issue).

VDPV has thus become an impediment to the completion of global polio eradication (see p. 24 of this issue). In addition to VDPV, VAPP has also been a public health concern; approximately 40% of the 250-500 VAPP cases reported annually from countries

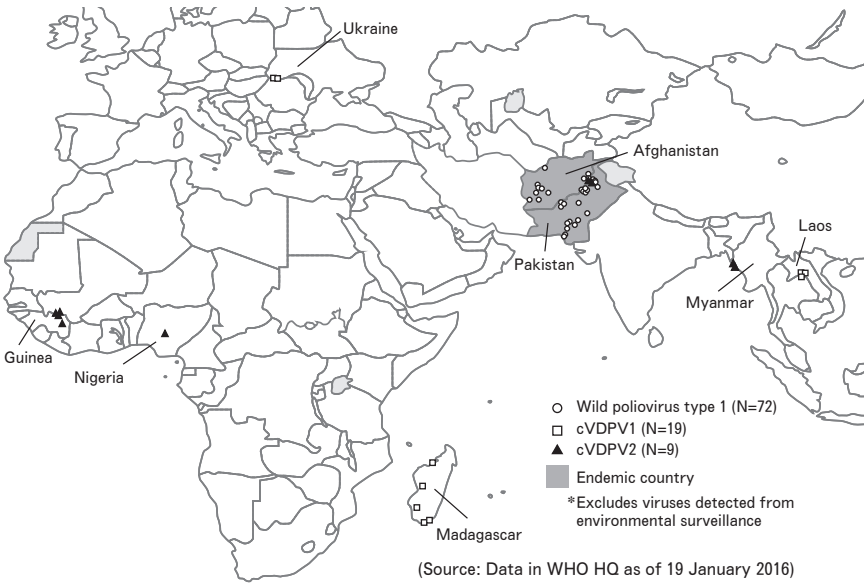

Fig. Wild poliovirus & cVDPV cases*, 2015

(Continued on page 18′)

(THE TOPIC OF THIS MONTH-Continued)

that use oral polio vaccine (OPV) have been caused by type 2 OPV (http://www.who.int/immunization/diseases/poliomyelitis/inactivated_polio_vaccine/learn/en/index2.html). Accordingly, WHO requested all countries to stop using trivalent OPV (tOPV) within the period of 17 April - 1 May of 2016, and it further requested for countries that will continue to use OPV that they should be prepared to replace tOPV with type 1 and type 3 bivalent OPV (bOPV). After replacement of tOPV with bOPV, however, risk of poliomyelitis due to type 2 VDPV may increase. In order to minimize such a consequence, at least one dose of the trivalent inactivated polio vaccine (IPV) should be incorporated into routine vaccination, which necessitates manufacturing a larger supply of IPV (see pp. 19, 20 & 30 of this issue).

Introduction of IPV and polio surveillance in Japan

In September 2012, Japan replaced tOPV with tIPV for routine immunization, and two months later, ahead of other countries, it introduced DPT-IPV into routine immunization, which included Sabin-derived tIPV and diphtheria-pertussis-tetanus antigens. Though vaccine coverage and seropositivity were low in 2011-2012 when OPV was still used (for infants 1 year old and younger, vaccine coverage was 76%, and seropositivity for type 1, type 2, and type 3 were 80%, 78% and 48%, respectively), high levels of vaccine coverage (≥95% among children under 5 years of age) and high seropositivity (≥95% among children under 5 years of age for both type 1 and type 2 antigens) were obtained after switching to IPV-DPT, which has been maintained since then (see p. 26 of this issue).

Table. Number of confirmed wild poliovirus cases, 2011-2016

Country / territory	2011	2012	2013	2014	2015	2016*
Afghanistan	80	37	14	28	19	0
Pakistan	198	58	93	306	53	0
Somalia	0	0	194	5	0	0
Nigeria	62	122	53	6	0	0
Cameroon	0	0	4	5	0	0
Equatorial Guinea	0	0	0	5	0	0
Iraq	0	0	0	2	0	0
Israel	0	0	0	0	0	0
Syrian Arab Republic	0	0	35	1	0	0
Ethiopia	0	0	9	1	0	0
West Bank and Gaza	0	0	0	0	0	0
Kenya	1	0	14	0	0	0
Egypt	0	0	0	0	0	0
Niger	5	1	0	0	0	0
Chad	132	5	0	0	0	0
Democratic Republic of the Congo	93	0	0	0	0	0
Central African Republic	4	0	0	0	0	0
China	21	0	0	0	0	0
Guinea	3	0	0	0	0	0
Côte d'Ivoire	36	0	0	0	0	0
Angola	5	0	0	0	0	0
Mali	7	0	0	0	0	0
Congo	1	0	0	0	0	0
Gabon	1	0	0	0	0	0
India	1	0	0	0	0	0
Total	650	223	416	359	72	0
Total wild virus type 1 cases	583	202	416	359	72	0
Total wild virus type 3 cases	67	21	0	0	0	0
No. of cases in endemic countries/territories	341	217	160	340	72	0
No. of cases in non-endemic countries/territories	309	6	256	19	0	0
No. of countries with polio cases	16	5	8	9	2	0
No. of polio-endemic countries	4	3	3	3	3**	2

(Source: Data in WHO HQ, as of 19 January 2016*)

: polio-endemic countries

**Nigeria was excluded from the list of polio endemic countries on 27 September 2015.

Reporting under the Infectious Disease Control Law and surveillance activities under the National Epidemiological Surveillance of Vaccine-Preventable Diseases (NESVPD) ensured absence of importation and/or circulation of WPV and VDPV. To complement disease surveillance, infectious agent surveillance under the NESVPD has been examining stool specimens from healthy children for the presence of poliovirus. This system was replaced by the more sensitive environmental surveillance system in 2014, and in October 2014, Sabin type 3 poliovirus strain was isolated from concentrated sewage water (see p. 27 of this issue).

Laboratory diagnosis of poliovirus

Laboratory diagnosis consists of isolation of poliovirus in cultured cells. According to WHO's standard recommendations, intratypic differentiation should be conducted by real time RT-PCR. All isolates identified as non-Sabin-like by intratypic differentiation should be sequenced for the whole VP1 region to differentiate between WPV, VDPV and vaccine types. Isolates with nucleotide substitutions in ≥1% of the VP1 gene for types 1 and 3 and ≥0.6% of the VP1 gene for type 2 are classified as VDPV, which should be reported immediately to WHO (see p. 24 of this issue).

Biorisk management of poliovirus

WHO, in its Global Action Plan, 3rd edition (GAPIII), requests Member States to limit the use of poliovirus to the diagnosis, research and vaccine production conducted in certified facilities, where poliovirus is handled according to the Biorisk Management Standards delineated in GAPIII. In addition, GAPIII requests that the Sabin type 2 OPV strains be destroyed or handled under biosafety conditions designated for wild type poliovirus within three months after the global introduction of bOPV (see p. 22 of this issue).

Accordingly, the Ministry of Health, Labour and Welfare (MHLW) issued a national announcement requesting the destruction of unnecessary poliovirus and requested institutions that will continuously retain poliovirus materials to notify the Tuberculosis and Infectious Diseases Control Division of MHLW (Ken-kan-hatsu 1211 No.1) (see p. 22 of this issue).

Issues to be considered

WHO deems the global polio eradication program as the number one priority among public health programs, and is striving to interrupt the spread of WPV type 1 in endemic countries. As an endgame strategy, WHO is planning to replace tOPV with bOPV globally within the first half of year 2016.

As high vaccine coverage has been maintained after introduction of IPV, the occurrence of polio and the risk of transmission is believed be low in Japan. However, as IPV does not confer mucosal immunity sufficient enough for preventing the intestinal replication of the virus, importation of WPV or VDPV should be vigilantly monitored. As the Sabin type 2 strain will be controlled from the second half of 2016, MHLW is taking the necessary measures regarding further use or destruction of the poliovirus specimens in biomedical research facilities and other institutions.

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.

Infectious Disease Surveillance Center, National Institute of Infectious Diseases
Toyama 1-23-1, Shinjuku-ku, Tokyo 162-8640, JAPAN Tel (+81-3)5285-1111