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# Maintaining Polio-Free Certification in the World Health Organization Western Pacific Region for Over a Decade

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## Abstract

On 29 October 2000, the World Health Organization (WHO) Regional Commission for the Certification of Poliomyelitis Eradication in the Western Pacific certified the WHO Western Pacific Region as free of indigenous wild poliovirus. This status has been maintained to date: wild poliovirus importations into Singapore (in 2006) and Australia (in 2007) did not lead to secondary cases, and an outbreak in China (in 2011) was rapidly controlled. Circulation of vaccine derived polioviruses in Cambodia, China and the Philippines was quickly interrupted. A robust acute flaccid paralysis surveillance system, including a multitiered polio laboratory network, has been maintained, forming the platform for integrating measles, neonatal tetanus, and other vaccine-preventable disease surveillance and their respective control goals. While polio elimination remains one of the most important achievements in public health in the Western Pacific Region, extended delays in global eradication have, however, led to shifting and competing public health priorities among member states and partners and have made the region increasingly vulnerable.

### Keywords

polio; WHO Western Pacific Region; vaccination

On 29 October 2000, the World Health Organization (WHO) Regional Commission for the Certification of Poliomyelitis Eradication in the Western Pacific (RCC) concluded that the transmission of indigenous wild poliovirus (WPV) had been interrupted in all countries and



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areas of the WHO Western Pacific Region (WPR) and therefore certified it as free of polio. The WPR was the second of the 6 WHO regions to achieve this certification, after the Region of the Americas, which was certified in 1994 [1].

On the basis of surveillance data, the last foci of WPV infections in the WPR were in the Mekong River and Tonle Sap Lake areas of Cambodia and Vietnam. Polioviruses were identified in these areas until early 1997, despite reported high vaccination coverage in both countries. To interrupt WPV transmission in these areas, high-risk-response immunization campaigns were conducted in Cambodia, the Lao People's Democratic Republic (Lao PDR), and Vietnam during May–July 1997. These campaigns appeared to end ongoing transmission, as the last confirmed case of indigenous WPV infection in the region was reported from Cambodia in March 1997.

## IMMUNIZATION ACTIVITIES

After certification, strong emphasis was placed by member states on strengthening routine immunization performance. WHO Regional Committee Meeting resolutions on measles elimination and hepatitis B control emphasized the importance of timely hepatitis B birth dose and measles vaccinations in the routine immunization schedule, not only as an important strategy to achieve these specific vaccine-preventable disease control goals, but also for their contribution to maintaining polio-free status by providing opportunities to ensure that children are fully immunized [2].

Achieving uniformly high coverage with 3 doses of polio vaccine remains challenging, though, and in 2012, 5 countries (Guam, Nauru, the Lao PDR, the Northern Mariana Islands, and Papua New Guinea [PNG]) reported coverage of ≤80%. For one country (American Samoa), no information was available. The range of performances at subnational levels can also be large: 61%, 51%, and 41% of districts in PNG, the Lao PDR, and the Philippines, respectively, had <80% coverage for the third dose of diphtheria-tetanus-pertussis vaccine (DTP3), which is considered a surrogate for receipt of the third dose of polio vaccine [3]. Likewise, analysis of the immunization status of individuals with non–polio-associated acute flaccid paralysis (AFP), a proxy for the immunization status of the general population, suggests coverage problems in some countries (the Lao PDR, PNG, and the Philippines) [4].

Supplementary immunization activities (SIAs) decreased after certification because of the focus on strengthening routine immunization services, reduced funding, and shift to other public health priorities. The 2005 WPV importation and subsequent outbreak in Indonesia, which borders several WPR countries, highlighted the continued risk in the region. Increased concerns about subnational coverage gaps and repeated WPV importations into previously polio-free countries in other WHO regions lead to oral poliovirus vaccine (OPV) increasingly being added to SIAs for other vaccines (eg, measles vaccine and tetanus toxoid vaccine) and in other mass campaign activities, like Child Health Days (see further details in the Risk Assessment section, below).

With the absence of wild-type polio, the risk of vaccineassociated paralytic polio has become increasingly unacceptable to member states. Concerns have also arisen about

potential problems posed by prolonged vaccine-derived poliovirus (VDPV) excretion in immunocompromised persons with the continued use of OPV. Although only French and American territories were using or introducing inactivated poliovirus vaccine (IPV) at the time of polio-free certification (ie, 2000), currently 18 of 36 countries and territories in the WPR use IPV, albeit with great variance in schedules and presentations [5]. Of the 18 IPV-using countries, 15 have booster dose(s), including Malaysia, which uses OPV for the booster dose. Singapore shifted to a sequential schedule involving IPV in June 2013. WPR countries at the forefront of IPV production, such as China and Japan, use Sabin strains to produce IPV, which is associated with greater biosafety than traditional IPV production processes. This factor is especially important under future biocontainment requirements [6].

## SURVEILLANCE

Polio surveillance remains in place in the majority of WPR countries and is based on the reporting and investigation of AFP cases. In a well-functioning AFP system, public health staff at various levels conduct active searches for cases on a regular basis. In several countries and territories (eg, Australia, Hong Kong/China, New Zealand, and Singapore), all practitioners or key physicians, mainly hospital-based pediatricians and other clinicians, are responsible for notifying AFP cases involving children <15 years old to designated surveillance units, which coordinate complete case investigation [7].

The Republic of Korea has ongoing special AFP surveillance in the Seoul metropolitan area, supplemented by case reporting from sentinel hospitals and supplementary nationwide enterovirus surveillance. In Japan, virological surveillance for enteroviruses, including polioviruses, has been the key element of polio surveillance.

In the 20 Pacific island countries and areas (PIC), which, for certification purposes, are considered 1 epidemiological block, a hospital-based active surveillance network structure is in place. It includes 20 national coordinators, 58 hospitals throughout the 20 countries and areas, and >200 key pediatric clinicians [8].

While complete and timely investigation of AFP cases remains essential to detect polioviruses, several countries face challenges to reach required performance levels. These challenges include reduced resources, multiple responsibilities of surveillance staff, and low awareness among health workers for polio surveillance in the absence of ongoing disease.

In 2012, for the key indicators of AFP surveillance quality, 13 of 15 countries (86.7%) with nationwide AFP surveillance reached the minimum non–polio-associated AFP rate of 1 case per 100 000 children <15 years of age, while adequate stool specimen collection rates of ≥80% were achieved by 11 of 15 (73.3%). The PIC reporting as an epidemiological block did not meet either indicator [9]. Overall, main AFP surveillance indicators (non–polio-associated AFP rate and percentage of AFP cases with adequate stool samples) have remained at certification quality standards since 2000 and even improved in recent years (Figure 1). Country performances are continuously monitored by the WHO, and support is provided to address quality gaps.

To supplement AFP surveillance, environmental surveillance has been introduced in Australia (3 sentinel sites in New South Wales), China (2 sites in Xinjiang Ughur Autonomous Region), and Malaysia (3 sites in Klang Valley), focusing primarily on high-risk areas. To date, no WPVs have been isolated.

## POLIO LABORATORY NETWORK

The polio laboratory network in the WPR consists of 1 global specialized laboratory in Japan, 2 regional reference laboratories in Australia and China, and 9 national laboratories and 31 provincial laboratories in China. It played an important role in certifying polio elimination during 2000 and in maintaining the polio-free status by providing accurate and timely laboratory results. The performance of network laboratories is monitored through a laboratory accreditation program established by the WHO, which includes proficiency testing, on-site performance reviews, and monitoring of accuracy and timeliness of reporting. All network laboratories are accredited under WHO standards [10].

By 2010, the new standard WHO algorithm for poliovirus isolation and identification, under which virus isolation results are reported within 14 days of sample receipt and intratypic differentiation results are reported within 7 days of virus isolation, was fully implemented by all network laboratories in the WPR except those in China [11].

Following the 2011 polio outbreak, the Chinese Center for Disease Control and Prevention decided to introduce the new virus isolation algorithm in all 31 subnational provincial laboratories and real-time polymerase chain reaction (PCR) analysis for intratypic differentiation of polioviruses and VDPV in selected provincial laboratories and conducted respective trainings in 2012 [12].

Capacity has also been established to implement real-time PCR techniques for intratypic differentiation and VDPV screening developed by the Centers for Disease Control and Prevention (CDC; Atlanta, GA) [13].After the first introduction of real-time PCR for intratypic differentiation in the WPR, all 7 intratypic differentiation laboratories participated in WHO intratypic differentiation proficiency testing, which was prepared by the CDC. Whereas 5 laboratories introduced real-time PCR, 2 laboratories (in Hong Kong/China and New Zealand) used conventional PCR for intratypic differentiation until 2012. The second regional hands-on training on the use of real-time PCR for polio intratypic differentiation and VDPV screening was held in December 2012, with 2 intratypic differentiation laboratories in Hong Kong/China and New Zealand and 4 polio laboratories in the Philippines, Vietnam, and Korea participating in the training. For this training, a new dual-stage real-time PCR method was introduced [10].

By 2013, the number of laboratories performing intratypic differentiation had increased to 33 in the WPR: 11 national laboratories and 22 subnational laboratories in China. Expansion of intratypic differentiation laboratories will reduce the time needed for intratypic differentiation and the need to ship viral isolates to global specialized laboratory/regional reference laboratories for intratypic differentiation and sequencing. Findings of intratypic

differentiation of polioviruses will therefore be available earlier for appropriate program actions.

Network laboratories remain actively involved in strengthening supplementary enterovirus and environmental surveillance in the region. In particular, China has established a very extensive hand, foot, and mouth disease laboratory network based on existing polio and measles/rubella laboratories.

## CERTIFICATION PROCESS

Following the approval of the regional Plan of Action for the Certification of the Eradication of Poliomyelitis, which contains criteria for certification, disease- and laboratory-based surveillance activities, performance standards for AFP surveillance, additional surveillance activities required in high-risk areas and countries of nonendemicity, and special requirements for the certification of the PIC [14], at the first RCC meeting in 1996, national certification committees (NCCs), and the PIC Sub-regional Certification Committee (SRCC) were established. The RCC subsequently reviewed and approved national certification action plans and progress reports on their implementation in annual meetings during 1997–1999. Since the last indigenous case in 1997, the RCC stated that importation of WPV constitutes the greatest threat to the polio-free status of the WPR and reminded all countries of the need to include detailed importation response plans in the documentation presented for certification.

At its sixth meeting, held in Kyoto, Japan, in October 2000, the RCC reviewed in detail the documentation, additional information, and amendments from each country and the PIC. The RCC found all documentations to be of high quality and consistent with the absence of WPV transmission in the WPR. The RCC concluded that the transmission of indigenous WPV has been interrupted in all countries and areas of the WPR and certified the region as free of polio [15].

The RCC required the NCCs and SRCC to continue to function until global certification is achieved, so the RCC can fulfill its obligations to the Global Certification Commission. The RCC has continued its active oversight to help maintain the polio-free status of the WPR. Its key roles include reviewing annual progress reports from all countries, scrutinizing the quality of national surveillance and immunization activities, and communicating their findings and recommendations to the respective NCCs and ministries of health. The RCC also regularly reviews technical requirements from advisory groups, such as the WPR Expanded Programme on Immunization technical advisory group and the global Strategic Advisory Group of Experts, and their relevance for maintaining certification standard performance levels. The RCC continues to conduct site visits in countries to review and verify the progress of activities that serve to maintain the WPR’s polio-free status. All functions of the RCC are being supported by a WHO secretariat.

## RISK ASSESSMENT

While risk assessment has been an integral part of the RCC oversight since certification and is included in the annual NCC progress reports, the 2010 outbreaks of WPV infection

in the WHO European Region established an indicator-driven and visualized approach. Risk assessment remains qualitative in nature and considers components of population susceptibility, the ability to rapidly detect and monitor polio cases, and other factors that influence poliovirus exposure and transmission in the population. These components are estimated and monitored by using indicators from a variety of sources, with resulting risk statuses presented in maps. Further details are included in Table 1.

An initial exercise conducted by the WHO in 2010–2011 for all WPR countries to assess the potential risk of an imported WPV to cause a polio outbreak classified Cambodia, the Lao PDR, PNG, and the Philippines at high risk and China, Malaysia, and Vietnam at medium risk.

Subsequently, the following main risk-mitigation activities were implemented during 2010–2012. Cambodia conducted 2 rounds of OPV SIAs in high-risk communities in combination with measles SIAs. Children younger than 6 years were targeted from February to April 2011 (344 069 children) and in November 2011 (249 914 children). The Lao PDR conducted 3 rounds of nationwide OPV SIAs, in combination with Child Health Days, TT SIAs (in 2010), and measles SIAs (2011). In November 2011, 798 598 children 0–59 months old were targeted, and the reported coverage was 89%. PNG added OPV to its nationwide phased measles SIA in 2010–2011 and targeted 435 000 children aged 0–24 months; the reported coverage was 82%. PNG included OPV for children aged 0–36 months with its nationwide first quarter 2012 measles SIA and during its fourth quarter TT SIAs. The Philippines added OPV to TT SIAs in 10 high-risk areas, targeting 560 000 children aged <6 years.

As the national risk status may mask variance at the subnational level, especially in large countries, subnational risk assessments were subsequently conducted in 2011–2012, with support of the WHO. The main focus of this exercise was placed on priority countries, including Cambodia, China, the Lao PDR, Malaysia, PNG, the Philippines, and Vietnam.

As part of overall risk mitigation, the RCC now requires all countries to develop and submit updated importation preparedness plans. By November 2012, all countries had a current plan in place. The plans have great diversity based on the country situations, so a systematic review of all plans by the WHO, using a template and detailed feedback to all countries, is provided.

Subnational risk assessments will be updated annually, and work is in progress for assessments across WHO regions (eg, the WHO Regional Office for the Western Pacific [WPRO]/WHO South-East Asia Region and the WPRO/WHO European Region). Efforts have also been made to validate the risk assessment models used and the respective global working group, led by the CDC, and to report all risk assessment findings quarterly to the Independent Monitoring Board of the Global Polio Eradication Initiative.

As part of cross-regional risk mitigation, an international workshop on polio eradication was held in July 2011 in Urumqi, China, cohosted by the WHO and the Chinese Center for Disease Control and Prevention. In attendance were >40 international public health specialists, senior officials, and experts engaged in the field of polio eradication from China,

India, Kazakhstan, Kyrgyzstan, Mongolia, Myanmar, Nepal, Pakistan, Russian Federation, Tajikistan, Uzbekistan, Vietnam, WHO headquarters, the WHO European Region, the WHO South-East Asian Region, the WPRO, and partner agencies [16]. The continuing challenges, as underscored by the Central Asian outbreak and the threats in Mongolia and China, were at the forefront of discussions. Participants agreed on the importance of defining and developing mechanisms for timely sharing of information and data and strategies to immunize cross-border migrant populations. Cross-regional collaboration through professional exchanges of staff, training workshops, online collaboration, and resource sharing were also discussed.

## LABORATORY CONTAINMENT

While the importance of poliovirus laboratory containment based on the first edition of the WHO Global Action Plan was well recognized prior to certification, completion of phase 1 (national inventories of biomedical laboratories storing WPV infectious and potentially infectious materials) was not yet a prerequisite for certification, but substantial progress toward it had to be achieved.

Since then, all 37 countries and areas in the WPR have completed surveys of relevant biomedical laboratories and established national inventories, following the requirements laid out for phase 1 WPV laboratory containment in the WHO Global Action Plan, Second Edition. All countries documented, with WHO support, their activities and results in standardized quality assurance reports, which were presented to the RCC.

The process was challenging. Some countries, such as China and Japan, had to deal with huge numbers of laboratories under the jurisdiction of a large range of government agencies outside the ministry of health. Others (eg, Australia and the Philippines) had to identify best ways to appropriately involve the private and educational sectors. First-time identification of VDPV in 2000–2001 and subsequent classification as a potentially infectious material forced several countries to redo prior survey activities.

Following receipt of reports from China and Japan at the end of 2008, the RCC declared phase 1 WPV laboratory containment complete for the WPR. A total of 77 260 laboratories were included in the survey. The number of laboratories storing relevant materials was identified as 45 (2 in Australia, 27 in China, 15 in Japan, and 1 in the Republic of Korea) and had been substantially reduced from 107 previously. Details of the survey process have been previously published [17].

To protect investments made for this comprehensive exercise, the RCC requested all countries to maintain a national containment focal point to keep their national databases and inventory current and prepare the country for phase 2 requirements. Phase 2 (national long-term poliovirus policy and regulations) establishes national goals and policies for the posteradication/post–OPV cessation era, informs scientific communities and vaccine producers about such policies, and establishes national regulatory structures that will take effect on global declaration of the commencement of phase 3 [6].

## RESPONSES TO EMERGING THREATS TO POLIO-FREE STATUS

### Outbreaks Due to Circulating VDPV (cVDPV)

Since certification, the WPR has experienced 4 polio outbreaks due to cVDPV: in 2001 in the Philippines, in 2004 and 2011/2012 in China, and in 2005/2006 in Cambodia (Table 2). In addition, VDPVs were detected in 1 AFP case and several positive healthy contacts in the Lao PDR in 2004–2005 and in China in 2006. All VDPV emergences were terminated following 2–3 rounds of OPV SIAs.

## WILD POLIOVIRUS IMPORTATIONS

### Singapore

On 19 May 2006, the NPL reported isolation of type 1 WPV from a 2-year-old child from Dutse, Jigawa State, northern Nigeria, with paralysis onset on 21 April 2006. She subsequently sought medical treatment in Singapore and was hospitalized at a private hospital from 26–28 April. Virology experts from global specialized laboratories in Japan and the United States concluded from sequencing results that the closest match (99.0%) to the virus was an isolate from Katsina State in northern Nigeria, with the next closest match (98.9%) to an isolate from Gombe State.

The risk of onward spread of the poliovirus was considered low primarily because of Singapore's strong routine immunization system and excellent sanitation infrastructure. All 8 children who were in contact with the AFP case were traced to check their immunization status and had stool samples collected, all of which were negative for WPV.

Singapore's Ministry of Health sent an alert to all pediatricians, neurologists, and internal medicine specialists in private practice and in public-sector institutions to inform them of WPV isolation from a Nigerian child with AFP onset outside Singapore. Physicians were reminded of the need to adhere to Singapore's AFP notification and investigation requirements, with special emphasis that all cases of AFP in children <15 years of age must be immediately reported and have 2 adequate stool samples taken.

### Australia

On 13 July 2007, the regional reference laboratory in Melbourne reported isolation of a type 1 WPV from a stool sample of a 22-year-old Pakistani man with AFP who had returned to Australia on 1 July to continue his studies. Genetic sequencing of the poliovirus isolate confirmed that it was most closely related to virus in North West Frontier Province in Pakistan [18].

The risk of onward spread of the poliovirus was again considered low because of Australia's strong routine immunization system and excellent sanitation infrastructure. The government of Australia still undertook a number of additional steps in response to this importation, including enhancing disease surveillance and distributing an alert to public health institutions across the country. No further WPV was found.

This was the first polio event reported under the new International Health Regulations (IHR 2005), which came into force on 15 June 2007.

### China

After having had its last indigenous polio case in 1994 and a previous introduction in 1999, China experienced a type 1 WPV importation from Pakistan into western China in 2011, causing a polio outbreak of 21 cases in both children and adults in the Xinjiang Uyghur Autonomous Region. Since the outbreak notification on 26 August 2011, China conducted 5 rounds of large-scale SIAs and significantly enhanced surveillance. The last reported polio case had onset on 9 October 2011. An international review conducted during 4–12 June 2012 concluded that the surveillance system was sensitive enough to rapidly detect AFP cases and considered it highly unlikely that there was continued undetected WPV circulation. The government of China allocated about $55 million to the response effort, with resources provided by all levels of government, and mobilized >500 000 volunteers, health workers, and government officials.

The contents of the comprehensive China NCC report allowed the RCC in November 2012 to declare China as retaining its polio-free status. The RCC recommended that the outbreak investigation and response actions undertaken in China in 2011 serve as a global model for any other outbreak following importation.

With its conclusion about China’s polio-free status and on the basis of a review of progress reports from all other countries, the RCC announced on 29 November 2012 that the WPR has been free of circulating poliovirus for the past 12 months and has retained its polio-free certification status.

## LESSONS LEARNED

When the WPR polio eradication initiative started in 1990, >60 000 paralytic polio cases were estimated to occur annually, leading not only to significant morbidity and mortality but also to disability, productivity loss, and human suffering. This annual disease burden has all been prevented in the 15 years since indigenous WPV transmission was stopped.

A robust AFP surveillance system was established in 1992 and was maintained, despite challenges since regional certification, forming the platform for integrating measles, neonatal tetanus, and other vaccine-preventable disease surveillance and for supporting these regional elimination and control goals.

Since the establishment of the multitiered regional polio laboratory network in 1991, there has been remarkable progress in turning >43 individual laboratories into a functioning and wellcoordinated network with clearly assigned and accepted responsibilities, substantially contributing to polio eradication and its certification in the WPR and maintaining polio-free status. The regional polio laboratory network provides significant examples of structures and processes that are being used for other infectious disease laboratory networks, such as the regional measles laboratory network.

While polio elimination remains one of the most important achievements in public health in the WPR, extended delays in global eradication have, however, led to shifting and competing public health priorities among member states and partners, making the WPR increasingly vulnerable. Significantly ongoing travel, migration, and trade movements to and from the WPR, as well as within the WPR, have further enhanced the risk of WPV importation and subsequent polio outbreaks.

Because of evolving epidemiology and susceptibility, outbreaks following importation in countries free of polio for a long time have affected adolescents and adults, as observed in China in 2011. Because of increased disease severity in adults, fatality rates are higher, and outbreaks affecting larger age groups are more difficult to control and have higher resource requirements.

Ultimate protection against polio can only be achieved by global eradication. In the meantime, continued investments in the polio infrastructure, particularly sensitive surveillance systems and laboratory networks in the WPR, continued RCC oversight, and innovative approaches to strengthen immunization and ultimately health systems are required. Additional advocacy and resource allocations will also be needed to meet posteradication and endgame requirements.

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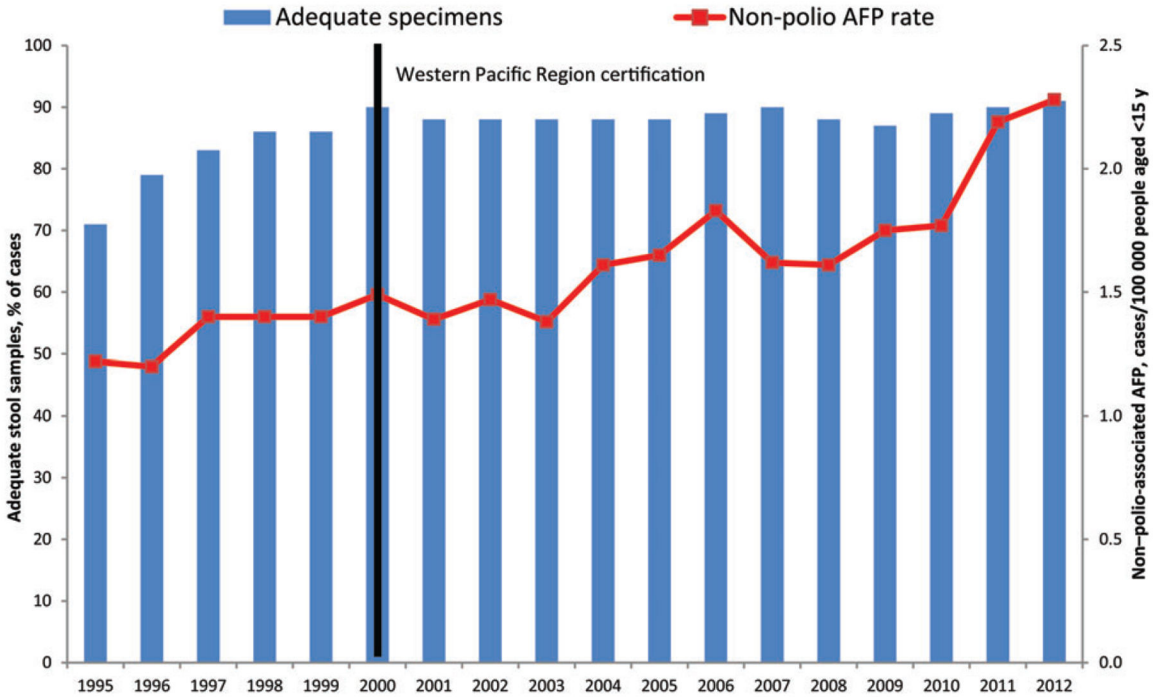


**Figure 1.**

Annual rates of non–polio-associated cases of acute flaccid paralysis (AFP) among individuals aged <15 years and percentages of cases with adequate stool specimens (defined as receipt of 2 samples within 2 weeks), World Health Organization Western Pacific Region, 1995–2009. The vertical dotted line indicates the year the region was certified as free of polio.

**Table 1.**

Indicators, Cutoffs, Risk Points, and Weights Used in Polio Risk Assessment in the World Health Organization Western Pacific Region During 2012

| Variable | Recommended in 2011[a] | Cutoff | Risk Point | Cutoff | Risk Point | Cutoff | Risk Point | Total Risk Point | Weight | Total Weighted Risk Point | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Susceptibility assessment | | | | | | | | | | | |
| National POL3 coverage (WHO-UNICEF best estimates) | Core | <90% | 1 | <80% | 2 | … | … | 2 | … | … | We look at past 3 y but assign a risk point only for the most recent year; for further discussion |
| Trends in POL3 coverage among individuals aged 3–5 y, 2006–2010 (WHO-UNICEF best estimates) | Core | >10% decline | 1 | >10% increase | −1 | … | … | 1 | … | … | We look at past 3 yand assign a risk point based on the difference between first and last year of period |
| Subnational immunity gaps (percentage of districts with DTP3 coverage of <80%) | Core | >10% | 1 | >20% | 2 | 1%−10% in countries with a large population | 1 | 2 | … | … | Countries with a large population: China, Japan, Philippines, and Vietnam |
| SIAs conducted in polio-free countries (particularly those with routine POL3 coverage <90%) | Core | >2 round | 1 | … | … | … | … | 1 | … | … | Increased from 80% to 90% to match GIVS requirement |
| Emergence of cVDPV (or aVDPV with AFP) | Core | … | 1 | … | … | … | … | 1 | … | … | … |
| Percentage of individuals aged 6 mo-5 y who received ≤3 doses of polio vaccine and developed non-polio-associated AFP | Optional | <90% | 1 | … | … | … | … | 1 | … | … | … |
| Accumulation of susceptible individuals (percentage of birth cohort) | Optional | Unavailable | 1 | … | … | … | … | 1 | … | … | Cutoff still has to be assigned, including for countries with a large population |
| Polio vaccine stockouts | Optional | … | 1 | … | … | … | … | 1 | … | … | … |
| Total risk points | … | … | … | … | … | … | … | 10 | 5 | 50 | … |
| Surveillance assessment | | | | | | | | | | | |
| Non-polio-associated AFP rate | Core | <1% | 1 | … | … | … | … | 1 | … | … | … |
| Percentage of non-polio-associated AFP cases with | Core | <80% | 1 | … | … | … | … | 1 | … | … | … |

| Variable | Recommended in 2011[a] | Cutoff | Risk Point | Cutoff | Risk Point | Cutoff | Risk Point | Total Risk Point | Weight | Total Weighted Risk Point | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| adequate stool specimens available within 14 d | | | | | | | | | | | |
| Meeting both primary surveillance indicators at first administrative level | Core | None | 1 | … | … | … | … | 1 | … | … | … |
| Laboratory result available within 31 d after AFP onset | Core | <80% | 1 | … | … | … | … | 1 | … | … | … |
| Trend in non–polio-associated AFP rate | Optional new | Declining | 1 | … | … | … | … | 1 | … | … | … |
| AFP index | Optional | <0.8% | 1 | … | … | … | … | 1 | … | … | … |
| Percentage of AFP cases with inadequate specimens for which follow-up collection of specimen occurs within 60 d of AFP onset | Optional | <80% | 1 | … | … | … | … | 1 | … | … | … |
| Percentage of AFP cases among individuals aged 6 mo-5 y with no information on immunization status | Optional new | >10% | 1 | … | … | … | … | 1 | … | … | … |
| Enterovirus surveillance | Optional | If relevant | −1 | … | … | … | … | … | … | … | Based on RCC assessment |
| Environmental surveillance | Optional | If relevant | −1 | … | … | … | … | … | … | … | Based on RCC assessment |
| Other supplemental surveillance | Optional | If relevant | −1 | … | … | … | … | … | … | … | Based on RCC assessment |
| Total risk points | … | … | … | … | … | … | … | 8 | 3 | 24 | … |
| Program delivery marker assessment | | | | | | | | | | | |
| Status of health system | Core | Poor | 1 | Variable | 0.5 | … | … | 1 | … | … | … |
| Clean water/sanitation | Core | Poor | 1 | Variable | 0.5 | … | … | 1 | … | … | … |
| Availability of current and complete polio importation preparedness plan | Core | No | 1 | … | … | … | … | 1 | … | … | … |
| Percentage of DTP1 recipients who do not receive DTP3 | Optional | >10% | 1 | … | … | … | … | 1 | … | … | … |
| Total risk points | … | … | … | … | … | … | … | 4 | 1.5 | 6 | … |
| Threat/probability assessment | | | | | | | | | | | |
| Presence of vulnerable population groups, including mobile groups where appropriate | Core | High | 1 | Some | 0.5 | … | … | 1 | … | … | … |
| Bordering polio-affected areas | Core | Yes | 6 | … | … | … | … | 6 | … | … | … |

| Variable | Recommended in 2011[a] | Cutoff | Risk Point | Cutoff | Risk Point | Cutoff | Risk Point | Total Risk Point | Weight | Total Weighted Risk Point | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel links with polio-affected areas | Core | High | 1 | Some | 0.5 | … | … | 1 | … | … | … |
| Total risk points | … | … | … | … | … | … | … | 8 | 0.5 | 4 | 84 |

Abbreviations: AFP, acute flaccid paralysis; aVDPV, ambiguous vaccine-derived poliovirus; cVDPV, circulating vaccine-derived poliovirus; DTP1, first dose of diphtheria-tetanus-pertussis vaccine; DTP3, third dose of diphtheria-tetanus-pertussis vaccine; GIVS, Global Immunization Vision and Strategy; POL3, third dose of polio vaccine; RCC, World Health Organization Regional Commission for the Certification of Poliomyelitis Eradication in the Western Pacific; SIA, supplementary immunization activity; WHO, World Health Organization; UNICEF, United Nations Children's Fund.

[a]Recommendation occurred at a meeting in Atlanta, Georgia.

**Table 2.**

Outbreaks of Polio Due to Circulating Vaccine-Derived Poliovirus in the World Health Organization Western Pacific Region, 2001–2012

| Country | Year(s) | Poliovirus Type | Divergence, % | AFP Cases, No. | Positive Contacts, No. | Compatible/Epidemiologic Link, No. |
|---|---|---|---|---|---|---|
| Philippines | 2001 | 1 | >3 | 3 | 1 | 0 |
| China | 2004 | 1 | 1 −1.3 | 2 | 4 | 1 |
| Lao PDR | 2004–2005 | 2 | 1.10 | 1 | 2 | 0 |
| Cambodia | 2005–2006 | 3 | >2 | 2 | 0 | 1 |
| China | 2006 | 1 | 1.4–2.2 | 1 | 6 | 0 |
| China | 2011–2012 | 2 | 0.6–1.2 | 3 | 2 | 0 |

Abbreviations: AFP, acute flaccid paralysis; Lao PDR, Lao People’s Democratic Republic.