The detection of persons with acute flaccid paralysis (AFP) and laboratory testing of stool specimens from these patients is the surveillance standard for global polio eradication. Using this method, wild polioviruses were successfully eliminated from both the American (1991) and Western Pacific Regions (1997).

In the European Region, environmental sampling is used for virologic surveillance in some industrialized countries with well-developed sewage systems and qualified laboratories. Years of experience on several continents have demonstrated that environmental surveillance under such conditions can detect circulation of wild and/or vaccine-derived polioviruses in the population.

Recent reports of finding lineages of indigenous wild viruses in an endemic country nearly 3 years after the last virus isolation by AFP surveillance has stimulated interest in the use of environmental surveillance in developing countries. Environmental surveillance has been suggested as a method of detecting silent wild virus circulation in high-risk indicator or reservoir populations. Early detection may have important programmatic advantages in the final global eradication strategy, particularly in focusing mop-up operations. Other potential applications for environmental surveillance in developing countries include its use to search for continued circulation of OPV-derived viruses when stopping OPV immunization is contemplated.

Although examples exist for environmental surveillance in polio-endemic developing countries, sampling and laboratory testing offer considerable logistical challenges. Much remains to be learned about sampling variables, laboratory methodology, and the biological and physical requirements for wild poliovirus surveillance under a wide range of environmental conditions. The ubiquitous presence of vaccine-derived polioviruses in endemic countries also adds considerable complexity to the procedure. Failure to detect wild poliovirus is not evidence of its absence.

Environmental surveillance issues were discussed at the recent informal meeting of Regional Laboratory Coordinators and Directors of Specialized Laboratories, 12-13 April, Atlanta. The group concluded that its potential value for suspected high-risk populations in endemic or recently endemic countries should be considered carefully on a case-by-case basis, as well as Programme response options if a wild virus is found.

The guidelines on the following page were proposed by the group to assist Regional and National EPI managers and laboratory directors in making decisions on the use of environmental surveillance.
Proposed Environmental Surveillance Guidelines

- Environmental testing is determined by the Programme to provide important supplemental surveillance for specific populations historically suspected to be indicators or reservoirs of wild poliovirus circulation.
- Sewage sampling sites serve the population at highest risk of wild poliovirus circulation.
- Sewage contains fecal material representative of the age groups at highest risk.
- Sewage has a perceptible flow. (Pit latrines or small lagoons are not suitable sampling sites because of inherent inefficiencies and large potential for non-representative sampling.)
- A sewage system survey reveals no producers of significant effluents that may inactivate polioviruses.
- A comprehensive sampling plan is available, persons are trained, and the appropriate sample collection security, methods, and logistics are selected for local conditions.
- The sampling plan takes into consideration the decreased likelihood of isolating wild virus during and up to 2 months after NIDs and mopping-up operations.
- The type of sewage sample (volume of liquid or exposure of adsorbing materials) is compatible with transport conditions and capacity of the processing laboratory.
- A 4°C cold chain is established to maintain and transport samples to the processing laboratory within 3 days of collection.
- Laboratories are identified with trained personnel and the capacity to process sewage samples within 7 days of collection and report results within 28 days of receipt.
- Advance arrangements are made to ship poliovirus isolates within 14 days of isolation to an appropriate laboratory for sequencing, and that sequence analysis results are reported within 28 days of receipt in that laboratory.
- Options for response to detecting wild polioviruses from environmental samples are discussed with the Regional and Global Programme.

References


WPR PREPARES FOR CERTIFICATION

The last case of indigenous poliomyelitis in the Western Pacific Region (WPR) occurred in Cambodia in March 1997. On the third anniversary of that momentous event, the Western Pacific Regional Office (WPRO) brought together Ministry of Health Officials, EPI officers, and heads of Polio Network Laboratories in all member states to prepare for certification of the Region as polio-free. National documentation is to be submitted on 1 July to the WPR Regional Commission for Certification of the Eradication of Polio (RCC). If all goes well, and the national submissions satisfy the stringent global criteria, certification of polio free status of the Region is anticipated in October 2000.

Each country is required to provide convincing evidence that indigenous transmission of wild poliovirus was interrupted and that imported wild poliovirus would be quickly and reliably detected if it should occur. Convincing evidence includes documentation of surveillance activities, immunization coverage, detection and response to wild virus importation, sustainability of post-certification surveillance, and pre-certification activities for wild poliovirus containment.

Much of the documentation for certification relies heavily on the performance of the Regional Polio Network during the previous three years. The RCC requires detailed information on the quality of laboratory activities, including accreditation ratings, specimen and data management, accuracy of test results, and timeliness of reporting.

WPR National Laboratories are located in Hong Kong, Malaysia, Mongolia, New Zealand, Papua New Guinea, Philippines, The Republic of Korea, Singapore, and Viet Nam. Regional Reference Laboratories are located in Australia and China, with Japan also serving as a Specialized Laboratory. That the last indigenous wild poliovirus in the Region occurred over 3 years ago testifies to the high quality and successful partnerships between the Laboratories and national EPI programs.

WPR Laboratories are increasingly involved, either as advisors or supervisors, in meeting the national pre-certification requirements for laboratory containment of wild polioviruses. Each nation must complete an extensive survey of medical and biomedical laboratories and develop a national inventory of laboratories that retain wild poliovirus infectious and potentially infectious materials. The pioneering roles of the WPR Laboratories in assisting national authorities to develop and implement national plans for pre-certification containment provide valuable lessons for all Regions.

Pre-Certification National Laboratory Survey/Inventory
Lessons from the WPR

- The need for a national survey/inventory is endorsed by highest levels of government
- Each nation must develop its own country-specific plans based on the WHO Global/Regional Guidelines
- National Task Force or equivalent provides oversight and guidance
- Organization/office/person responsible for implementation must have clear authority and accountability
- All relevant trade/professional organizations must be involved early in the planning process
- Multiple communication channels must be used to publicize the initiative and reinforce the message
- Signatures of laboratory chiefs and heads of their organization are required for documentation of laboratories as polio-free or retaining wild poliovirus or potentially infectious materials
- Time lines for completion of laboratory survey and inventory are clear
Poliovirus Surveillance Report, January - December 1999

<table>
<thead>
<tr>
<th>National Lab</th>
<th>Number of AFP cases with specimens</th>
<th>POLIOVIRUS TYPING RESULTS</th>
<th>POLIOVIRUS INTRATYPIC DIFFERENTIATION RESULTS</th>
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<td></td>
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<td>P1 only</td>
<td>P2 only</td>
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<tr>
<td>AFR</td>
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<tr>
<td>EUR</td>
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<td>10</td>
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<tr>
<td>SEAR</td>
<td>1,114</td>
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* Stool specimens

<table>
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<th>Regional Ref. Lab</th>
<th>No. of isolates/ cases submitted</th>
<th>Type 1</th>
<th>Type 2</th>
<th>Type 3</th>
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<tr>
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<td>1,877**</td>
<td>429</td>
<td>238</td>
<td>11</td>
<td>162</td>
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</tbody>
</table>

**132 vaccine mixtures also detected

AFR: No type 2 wild poliovirus was isolated in the Region in 1999. No wild poliovirus was isolated from the Southern and East African Countries. All 257 type 1 and 3 isolates were identified from AFP cases in West and Central Africa. The increase surveillance in Nigeria in 1999 increased the workload from 71 AFP specimens received in 1997 to 2534 specimens in 1999.

AMR: No wild polioviruses detected since 1991.

EMR: Wild polioviruses were detected from 345 cases in six countries during 1999; Pakistan (244), Egypt (9), Afghanistan (50) Sudan (7), Iran (3) and Iraq (32). Number of cases per country were slightly higher than 1998 results due to increased surveillance and an outbreak of wild poliovirus type 1 in Iraq in early 1999. Wild type 3 polioviruses were confirmed in 18% of AFP cases compared with 20% in 1998. As in 1998, no type 2 wild viruses were detected.

EUR: The last reported case of wild poliovirus detected in the European region had an onset of paralysis on 26 November 1998. Despite intensified surveillance in the region in 1999 no further cases have been detected.

SEAR: In 1999 1172 cases of AFP caused by wild virus were detected in this region compared with 1515 cases in 1998. India has witnessed dramatic reduction of cases of wild polio especially in the southern states a combined effort of improved quality of immunisation and surveillance and timely and accurate laboratory testing and reporting. As a result of improved surveillance, wild virus was detected in Nepal for the first time (2 cases) and in Myanmar, the first since 1996 (4 cases). Type 3 virus made up 62% of all wild cases detected in 1999 compared with only 9% in 1998 with most of the cases detected in India. Type 2 was found in approximately 1% of all wild polio cases in both 1998 and 1999 and only in the Ganges Valley in India in 1999.

WPR: No evidence of endemic wild poliovirus circulation since March 1997, despite good AFP surveillance in the region. One AFP case detected in Qinghai province China, had wild polio type 1 identified. A thorough laboratory investigation showed that the virus was closely related to virus from neighbouring India and unlike any virus from China's historical cases. Extensive mopping up vaccination strategies were immediately implemented in the provinces around the case and extensive surveillance has not revealed any