Establishing Acute Flaccid Paralysis Surveillance under Difficult Circumstances: Lessons Learned in Cambodia

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The implementation of the World Health Organization’s recommended strategies for polio eradication, particularly acute flaccid paralysis (AFP) surveillance, can be limited by difficult circumstances beyond the control of immunization personnel. In Cambodia, however, obstacles to establishing AFP surveillance were rapidly overcome using a strategy that improved reporting through active surveillance in a geographically limited area before gradually expanding to include the whole country. The success of the strategy was ensured by the timely provision of the resources that were needed to establish, expand, and monitor surveillance activities.

Effective surveillance to detect and investigate all cases of acute flaccid paralysis (AFP) is a critical component of the initiative to achieve and confirm global poliomyelitis eradication by the year 2000 [1]. In a number of countries, however, disease surveillance systems are weak or even nonexistent due to a variety of factors ranging from a lack of human and financial resources to civil unrest and war [2–4].

The Kingdom of Cambodia has only recently emerged from a prolonged period of turmoil during which the delivery of all health services was markedly compromised [5]. By the mid-1990s, however, routine immunization coverage was rising, supplementary campaigns with oral poliovirus vaccine (OPV) had been initiated, and effective AFP surveillance was established. This progress occurred despite poor transport and communications, a limited number of trained personnel, and finite government funding. Here we outline the strategy that was used to establish AFP surveillance in Cambodia.

**Background**

Beginning in the early 1970s, 20 years of civil disturbance and conflict decimated the public health infrastructure in Cambodia. As detailed recently, the country was left with some of the worst health indicators in Asia [5]. By the early 1990s, adult life expectancy was still <50 years, childhood mortality was almost 200/1000 live births, and the proportion of the population with access to safe water and adequate sanitation was estimated to be only 36% and 14%, respectively [6].

In 1992, accurate estimates of disease incidence were unavailable, as the historical surveillance systems were either unreliable or simply not functioning after the decades of nationwide political troubles and unrest. The need for enhanced AFP surveillance became particularly apparent, however, when >95% immunization coverage was achieved with subnational and then national OPV immunization days (NIDs) in 1994 and 1995, respectively (figure 1). Accurate, timely surveillance data were required to monitor polio incidence, identify high-risk areas, and target future supplementary immunization activities.

Although relative stability returned to the country after national elections in 1993, the prospects for rapidly establishing effective AFP surveillance were daunting; <12% of the population lived in urban centers and only 53% were within a 1-h walk of even the most rudimentary level of health services [6].

**Establishing an Active Surveillance Strategy for AFP**

Because poliomyelitis reporting in Cambodia was often inconsistent, inaccurate, and late during the 1970s and 1980s, an active AFP surveillance strategy was promoted in 1992. EPI staff were trained to regularly visit health facilities to search for unreported AFP cases using ward register reviews, outpatient records, and interviews of physicians and nurses. Each case was to be fully investigated with patient stool samples stored in a “reverse cold chain” and shipped to a World Health Organization (WHO)–accredited laboratory in a neighboring country for virus studies.

In 1994, the WHO-recommended case definition for AFP [7] was added to the new national Health Information System (HIS), and AFP was designated as one of only four immediately reportable conditions in Cambodia. To avoid delays in case investigation, however, parallel notification was established whereby AFP cases were immediately reported to both the EPI person responsible for the investigation and to the HIS.

**Expanding the Network of Reporting Sites**

To ensure that the demands of active surveillance did not overwhelm the limited number of trained staff, it was intro-
duced in a phased manner, beginning with the two main pediatric centers in the capital city of Phnom Penh in mid-1992 before expanding to other national and then provincial-level hospitals. A marked increase in AFP reports and stool sample collection occurred in 1994, when the active surveillance schedule was standardized to ensure regular twice-weekly visits. In the same year, active AFP surveillance was introduced into each of the 21 provinces during a national poliomyelitis eradication workshop.

By early 1995, AFP cases from throughout Cambodia were being detected and investigated (figure 2); however, the majority of cases continued to be found through active surveillance at the referral hospitals in the capital city. Therefore, in mid-1995, a national AFP workshop was conducted and national staff began provincial visits to demonstrate active surveillance and case investigation techniques. In late 1995, provinces began training workshops for district-level staff. A critical factor enabling this increase in surveillance activities was the availability of sufficient resources.

Resource Requirements

Although capable staff had been assigned responsibility for AFP surveillance at the national and provincial levels, the contribution of these personnel was at first severely limited by insufficient funds to undertake active surveillance, even within Phnom Penh. In 1994, a 2-year budget was developed detailing the external support that was needed for items such as office supplies, computers, printing costs, vehicles, fuel, and specimen collection kits.

Subsequently, a number of agencies, particularly Rotary International and the Japanese International Cooperation Agency, assisted the Polio Eradication Unit in Cambodia with equipment and operational costs. Most important, this support ensured reliable transportation for active surveillance, supervisory visits, and case investigation at all levels. This transportation also facilitated other health care activities, including the strengthening of routine immunization services.
Ongoing Constraints and Concerns

A number of problems continue to compromise the overall completeness and timeliness of AFP reporting in Cambodia. The lack of reliable communication frequently delays reporting, case investigation, and the transport of specimens for laboratory studies. Although a telephone has been installed in the central EPI unit, many provincial health offices do not have independent telephone or telex communications, even within the capital city.

Another concern with the current active surveillance system is that it relies heavily on hospital-based surveillance and assumes that a large proportion of patients will eventually be seen at these centers. Although the geographic distribution of AFP cases detected at hospitals in 1994 established that wild poliovirus was still widespread (figure 2), it is increasingly important to improve the sensitivity of surveillance at the peripheral levels to properly target future supplementary immunization activities. To facilitate such reporting, an incentive system has been established to provide a small cash reward to each person who reports an AFP case, with larger payments for remote districts to offset the higher costs of reporting from those areas.

Conclusions

In many countries, implementation of the WHO-recommended strategies for polio eradication may be constrained by difficult circumstances beyond the control of immunization personnel. The rapid development of a functional AFP surveillance system in Cambodia, however, demonstrates that most obstacles can be overcome by adopting an appropriate strategy and introducing it in a phased manner. The critical factors in ensuring the success of AFP surveillance in this country were the following: regular active surveillance at principal health facilities supported by central-level supervision, parallel reporting to ensure that EPI personnel were directly and immediately informed of cases, and provision of the external resources needed to implement this strategy. Having established an immediate notification and active surveillance system that focused on AFP alone, this system can now be expanded to include other diseases of public health importance, particularly those that are vaccine-preventable.

References