

Polio eradication: mobilizing and managing the human resources

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Abstract Between 1988 and 2004, the Global Polio Eradication Initiative grew to become the largest international health effort in history, operating in every country of the world. An estimated 10 million health workers and volunteers have been engaged in implementing the necessary polio supplementary immunization activities (SIAs) on a recurring basis, and at least 35 000 well-trained workers have been conducting polio surveillance. A combination of task simplification, technological innovations and adaptation of strategies to fit local circumstances has allowed the Initiative to use a wide range of workers and volunteers, from both inside and outside the health sector, to deliver the polio vaccine during SIAs and to monitor progress in virtually every area of every country, regardless of the health infrastructure, conflict, geography and/or culture. This approach has required sustained political advocacy and mass community mobilization, together with strong management and supervisory processes. Non-monetary incentives, reimbursement of costs and substantial technical assistance have been essential. Given the unique features of eradication programmes in general, and polio eradication in particular, the implications of this approach for the broader health system must continue to be studied if it is to be replicated for the delivery and monitoring of other interventions.

Keywords Poliomyelitis/prevention and control; Immunization programs/manpower; Health manpower; Voluntary workers; Delivery of health care (*source: MeSH, NLM*).

Mots clés Poliomyélite antérieure aiguë/prévention et contrôle; Programmes de vaccination/main-d'œuvre; Personnel santé; Travailleurs bénévoles (*source: MeSH, INSERM*).

Palabras clave Poliomiélitis/prevenición y control; Programas de inmunización; recursos humanos; Recursos humanos en salud; Trabajadores voluntarios (*fuentes: DeCS, BIREME*).

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Voir page 272 le résumé en français. En la página 272 figura un resumen en español.

Introduction

In 1988, a combination of scientific evidence, proof of operational feasibility and single-minded advocacy led the World Health Assembly (WHA) to adopt a resolution calling for the eradication of poliomyelitis within just 12 years (1, 2). The humanitarian, scientific and economic rationale for the resolution was sound — polio was endemic in more than 125 countries and paralysed at least 350 000 children every year (3). The scientific feasibility of eradication was being proven in the Americas (4) and it had been calculated that substantial financial savings could be realized from averted treatment costs alone (5).

Although the WHA resolution on polio eradication noted that “achievement of the goal will depend on ... the investment of adequate human and financial resources”, the scale of those investments was not well understood (6). Since that time, the international financial contribution to polio eradication has

been documented (7) and the magnitude of the financial investment by countries in which polio was endemic estimated (8). However, the basic approach that was employed to mobilize, manage and support the millions of people who are participating in the polio eradication initiative has not been well documented (9).

This paper reviews the strategies for polio eradication, summarizes the skills and number of people required for their implementation, outlines the approach used to mobilize and manage these human resources, and discusses the impact of this approach.

The polio eradication strategies and their human resource requirements

The principal strategies used to interrupt the transmission of poliovirus were developed in the WHO Region of the Americas

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R. Bruce Aylward et al.

during the 1980s and have been described in detail elsewhere (10). In summary, the four-pronged strategy for polio eradication consists of:

- achieving and maintaining high coverage with at least three doses of oral polio vaccine (OPV);
- providing supplementary doses of OPV to all children aged less than 5 years during national immunization days (NIDs);
- surveillance for all cases of acute flaccid paralysis (AFP) in children aged less than 15 years and virological examination of stool specimens from each case; and
- house-to-house OPV “mop-up” campaigns, targeting areas in which transmission of wild poliovirus persists.

Because routine immunization is a fundamental component of primary health care and measures to strengthen it would have been pursued even in the absence of polio eradication (11), the issues that must be addressed to reach and maintain high routine coverage are not discussed here (12).

NIDs and mop-up activities, together known as “supplementary immunization activities” (SIAs) are the most labour-intensive of the eradication strategies (13). NIDs are conducted during the low season for poliovirus transmission in two rounds, 4–6 weeks apart, and usually over a 1–5-day period (14); OPV is administered to every child, regardless of prior immunization status. In many countries NIDs have been the largest public health activity ever conducted. Based on the number of people needed to operate a polio immunization post during an NID, and the average number of children immunized per day at such a post, it is estimated that at least 10 million people have participated in polio NIDs at some point in the eradication initiative. The tasks required of the majority of these people (i.e. those who operate the immunization posts) are relatively simple; with half a day of training and continuous supervision these tasks can be conducted by an unskilled workforce that has not had a formal education. The tasks consist primarily of selecting and arranging a local immunization site, organizing the children for immunization, administering to each child two drops of the OPV from a vial containing 10 or 20 doses, recording the number of children immunized (e.g. with a simple tick mark), and submitting the completed tally sheet and unused vaccine to a supervisor.

Although most countries had at least a rudimentary surveillance and laboratory system in place at the start of polio eradication, substantial additional financial and human resources were needed. Eradication required the capacity to identify, notify and investigate tens of thousands of cases of AFP worldwide each year (15). Even in the absence of polio, more than 30 000 cases of AFP occur annually due to other causes and must be investigated to rule out a diagnosis of polio. Diagnostic samples must be collected from each affected individual within 2 weeks of onset of paralysis. This requires the continuous availability of equipped and trained personnel at the district level, globally. Based on the number of first (state/province) and second (district/commune) administrative levels in the 207 countries that have ever conducted AFP surveillance, and given that a minimum of one person is needed at each level, a network of at least 32 500 surveillance officers worldwide is estimated to be implementing the polio surveillance strategy. These “surveillance officers” are often people working in the national health system, for whom AFP surveillance is one of a range of responsibilities. The vast majority of these people (> 25 000) are working in low- and low-middle-income countries. Although the

number of people required for AFP surveillance is substantially lower than that needed for SIAs, the necessary level of skill is much higher as the tasks they must conduct include case detection, case investigation and examination, collection and shipment of diagnostic specimens, follow-up examinations and final classification.

Key elements of the approach to the polio eradication workforce

Polio eradication activities were led, organized, supervised and implemented by the existing routine immunization and surveillance staff and structures in all countries. However, the number of formally trained health workers was often insufficient to fully implement the strategies, particularly in many of the areas with a high burden of polio. Consequently, given the time limit set for achieving the international goal of polio eradication, national eradication efforts relied heavily on the mobilization and management of an “informal” or “volunteer” workforce, especially to implement the NID strategy. At the international level, lessons learnt and best practices were rapidly disseminated through mechanisms such as 6-monthly meetings of the Global Polio Management Team. A review of these lessons commissioned for the Rockefeller Foundation-initiated Joint Learning Initiative on Human Resources for Health (16) identified six major elements that appear to have been central to the success of this approach (Box 1).

First, having recognized that universal implementation of the strategies in many areas would rely heavily on illiterate, unskilled or semiskilled volunteers, *tasks were adapted or modified accordingly*. The most fundamental decision was to forego immunization with inactivated poliovirus vaccine (IPV) in favour of OPV. Despite the immunological benefits of IPV (17), it was not operationally feasible or safe to administer that vaccine in key endemic areas given the scarcity of trained health workers (18). The use of needles and syringes would have complicated the logistics of the campaign while putting minimally trained, often volunteer vaccinators at high risk of contracting blood-borne diseases such as human immunodeficiency virus (HIV) through unsafe injection practices. By contrast, OPV provided better immunity, was safe and could be administered orally by volunteers who had received just a few minutes of instruction (18). Technical solutions and innovations were also sought to simplify various tasks. Monitoring and supervision were simplified by the development of a tiny temperature-sensitive “vaccine-vial monitor” (VVM) which was physically attached to the label of each OPV vial and would change colour if exposed to sufficient heat to inactivate the vaccine. At the field level, tasks were tailored to local realities. For example, in southern Sudan, all training materials were adapted for use by a largely illiterate population and local wisdom was incorporated into the service-delivery strategy. For example, local techniques for preserving fresh meat were used to keep vaccines cold in the absence of electricity and refrigerators. Perhaps most importantly, in all countries every task was designed to minimize the time demand on volunteers.

Secondly, because of the simplicity of the tasks to be performed, *the full range of available human resources, from unskilled volunteers to highly skilled workers, both inside and outside the health sector, were considered as potential “vaccinators” and, if necessary, as surveillance officers*. As polio eradication required that NIDs reached every child in every area of a country, it

Box 1. Major elements of the approach used by the Polio Eradication Initiative to mobilize and manage sufficient human resources for worldwide implementation of the strategy

- All basic tasks were simplified through a combination of strategic decisions, technological innovations and locally-appropriate adaptation.
- The full range of available human resources, from unskilled volunteers to highly skilled workers, both inside and outside the health sector, were considered as potential “vaccinators” and, if necessary, as surveillance officers.
- A combination of high-level political advocacy and mass community mobilization was used to mobilize sufficient “volunteers”.
- Simple management tools and strategies were developed and systematically employed, including the widespread use of performance indicators and close supervision.
- Non-monetary incentives (especially transportation and communications equipment) were widely used, with rapid reimbursement of any personal costs incurred in implementing the strategies.
- Substantial technical assistance was deployed to countries in which polio was endemic, particularly those with weak, or virtually nonexistent formal health systems.

was necessary to mobilize a wide range of people simply to administer the OPV. In countries such as Thailand this was achieved by engaging every skilled health worker, whereas in areas such as the southern Sudan, huge numbers of illiterate volunteers were needed. In fact, due to the huge numbers of children who had to be immunized within a very short period of time (1–5 days), in all but a few of the developing countries in which polio was endemic, it was necessary to use human resources well beyond those of the formal health sector. Other public sector workers were recruited, as well as a vast number of people from private sector sources such as private companies, nongovernmental organizations (both national and international) and individuals (19).

Thirdly, *a combination of high-level political advocacy and mass community mobilization was used to mobilize sufficient “volunteers”*. Intensive political advocacy concentrated on ensuring the visible participation of political leaders at national and subnational levels. A primary purpose of this advocacy was to achieve access to the human resources of other government departments (e.g. transport, education and military) and the communications infrastructure needed to ensure massive volunteer participation. Through its 1.2 million members in over 140 countries, Rotary International accessed and engaged political leaders at all levels; its efforts were centrally coordinated and supported by a global advocacy committee. The United Nations Children’s Fund (UNICEF) used its huge community mobilization experience and communications infrastructure to provide countries with additional expertise to ensure that all sectors of society were aware of each NID and actively engaged in its planning and implementation. Such activities were tailored for particularly challenging situations. For example, UNICEF supported a network of over 3000 local community mobilizers in the state of Uttar Pradesh in India, primarily to work with the underserved Muslim population.

Fourthly, *simple management tools and strategies were developed and employed* to ensure optimum efficiency in the use of these resources. Most of these tools used a combination of administrative structures and NID target populations as the basis for programme management decisions (20, 21). For example, NID guidelines based on simple spreadsheets allowed rapid calculation of the human, physical (e.g. cold-chain equipment), transport, social mobilization and financial resources required to immunize the target population in each district (21). This information was then rapidly collated at the provincial or state level to assist central planning. Templates facilitated

the development of timelines for each administrative level and major activity, working backwards from the date of the NID. Recognizing that the number of professional health workers in many countries was limited, particular emphasis was given to preferentially using such staff to supervise activities and to ensure accountability. Local community resources were identified for almost every task, ranging from mapping and microplanning to vaccine transport, so that scarce central-level resources could be reserved for helping lagging or poorly-performing districts. Particular attention was given to cascade training (i.e. training of trainers) and supervision to ensure that the basic elements of the guidelines were respected. Standard performance indicators were used to track every step in the process. The surveillance indicators were particularly robust, even allowing transparent comparison of performance and impact between countries (22).

Fifth, *non-monetary incentives were widely used, together with reimbursement of any personal costs incurred while implementing the strategies*. This approach was particularly important for the global surveillance and laboratory network. As a matter of principle, every surveillance officer, whether government-employed or recruited directly by the polio programme, was provided with transportation and a means of communication. The actual means of transportation and communication varied widely between and within countries, ranging from provision of a vehicle, driver and satellite phone, to a petty cash account for hiring local transport and making weekly calls from a pay phone to report data. These provisions, frequently insufficient or lacking in the national public health system, ensured regular active surveillance visits to major facilities, timely case investigations and rapid transport of specimens. This approach also provided a strong incentive to join and remain with the programme. It has also been a standing policy to provide, wherever possible, a per diem sufficient to cover the costs of local transport, food and other items incurred by vaccinators and supervisors during NIDs.

Finally, *substantial technical assistance was deployed to countries in which polio was endemic*, particularly to help the existing immunization and surveillance structures to establish what has been described as the “organizational capacity” required to mobilize and manage the people needed to implement eradication strategies (23). As an increasing number of countries began planning for large-scale polio NIDs and nationwide AFP surveillance in the mid-to-late 1990s, there was a marked increase in the demand for technical assistance from WHO,

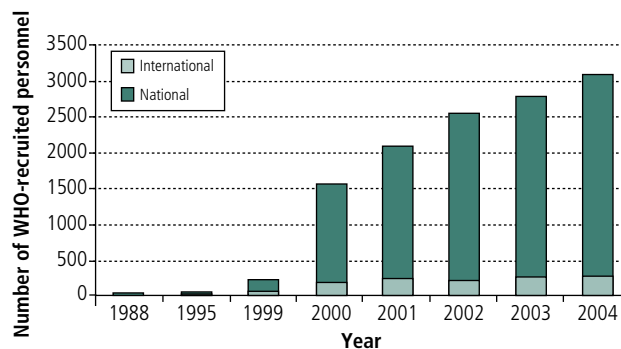
especially for project planning. At the peak of the initiative, WHO deployed 1500 technical staff and nearly twice as many administrative support personnel to work on polio eradication worldwide (Fig. 1). The vast majority of technical staff and virtually all administrative staff are nationals of the country in which they work on polio eradication; many are expected to continue in national service. Ongoing, country-by-country reviews of progress and risks as measured against the standard performance indicators guided the deployment of these staff. Where possible, recruitment and remuneration were negotiated with government authorities to ensure harmony with the broader human resources policies and goals. The Government of India and WHO established a joint programme that seconded government staff to work in a National Polio Surveillance Project for up to 5 years, after which they could return to government service. The remuneration offered was consistent with that of the government. In the Democratic Republic of the Congo, the Ministry of Health promoted the recruitment of national technical assistance for polio eradication through WHO to facilitate the retention of skilled health workers in that country.

Although these six major elements were employed across the polio eradication programme, the degree to which success depended on one or another varied greatly by country and WHO region, as did the specific way in which they were implemented.

The impact of the polio approach to human resources

Through the multi-pronged approach outlined above, the Global Polio Eradication Partnership was mobilizing over 10 million volunteers and health workers each year to immunize nearly 600 million children with 2 billion doses of vaccine at the peak

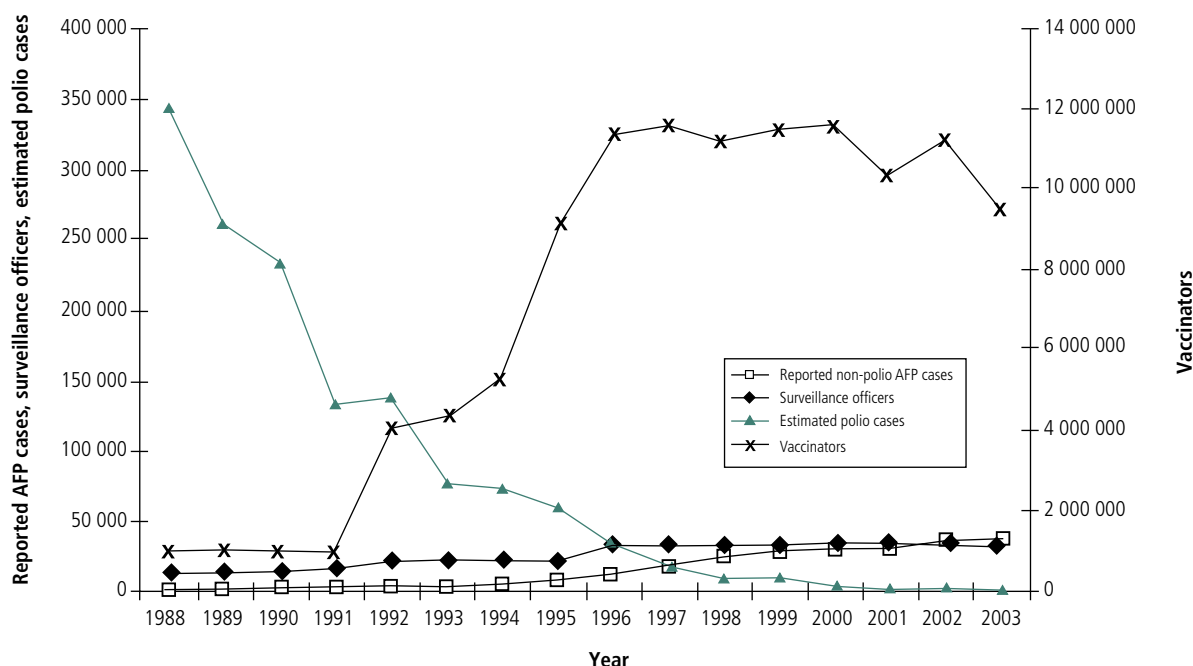
Fig. 1. Growth of national and international staff deployed by WHO to provide technical assistance on polio eradication to Member States, as of June 2004



WHO 05.30

of its activities (24). In China more than 80 million children were repeatedly immunized during NIDs in the 1990s, while over 160 million children continue to be targeted during NID rounds in India (25, 26). By 2000, a global surveillance and laboratory network was investigating, and reporting weekly, over 30 000 AFP cases annually (27). As a result, indigenous wild poliovirus had been eliminated from all but six countries in the world by the end of 2003, while the incidence of the disease had been reduced from an estimated 350 000 cases in 1988 to just under 800 (28). Equally importantly, the programme had succeeded in delivering a health service, at least on an intermittent basis, in places as varied and challenging as Afghanistan, Angola and Somalia. Fig. 2 summarizes, by year, the relationship between the estimated number of polio cases, reported AFP cases, individuals participating in NIDs and health workers conducting AFP surveillance during the period 1988–2003. Fig. 2 demonstrates in particular the marked

Fig. 2. Relationship between the number of vaccinators participating in polio national immunization days, surveillance officers conducting surveillance for acute flaccid paralysis (AFP) cases, estimated polio cases and reported non-polio AFP cases, 1988–2003



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increase that was required in the “volunteer” immunization workforce as the eradication strategies began to be implemented throughout Asia (i.e. from 1994–95) and sub-Saharan Africa (i.e. from 1996–97). The trend in polio cases reflects the impact of NIDs in those areas.

Less well understood is the impact that polio activities have had on the human resources available for other health and non-health activities and the potential replicability of the polio approach for the delivery of other health services. Only two large carefully designed studies have systematically examined the impact of polio eradication on health systems and health services delivery in Africa and Asia (13, 29). One study assessed, among other things, the amount of time that both immunization and non-immunization health workers devoted to polio eradication in the Lao People’s Democratic Republic, Nepal and the United Republic of Tanzania. This study concluded that the polio programme had not compromised other activities, largely because of what the authors referred to as the substantial “slack” that was present in the system (13). Both studies concluded that although disruptions in the delivery of immunization and other health services had occurred, any negative effects could have been prevented with better planning. A new study, commissioned by the Joint Learning Initiative on Human Resources for Health, is in progress to evaluate the replicability of the

polio “human resources approach” for other large health efforts (e.g. Integrated Management of Childhood Illness and Roll Back Malaria) (30).

Conclusions

Through a combination of task simplification, technological innovations, and adaptation of the strategies to fit local circumstances, the Global Polio Eradication Initiative has been able to use a wide range of skilled and unskilled workers and volunteers, both inside and outside the formal health sector, to successfully deliver OPV and monitor progress in virtually every area of every country, regardless of health infrastructure, conflict, geography and culture. This approach has depended heavily on sustained political advocacy and mass community mobilization, underpinned by strong management and supervisory processes. Non-monetary incentives, reimbursement of costs and substantial technical assistance have been essential to the success of this approach. Given the unique features of eradication programmes in general, and polio eradication in particular, the broader health system implications of this human resources approach must continue to be studied if it is to be replicated for the delivery and monitoring of other interventions. ■

Competing interests: none declared.

Résumé

Éradication de la poliomyélite : mobilisation et gestion des ressources humaines

Entre 1988 et 2004, l’Initiative mondiale pour l’éradication de la poliomyélite a pris de l’ampleur jusqu’à devenir le plus grand effort international en faveur de la santé mis en œuvre dans l’ensemble des pays du monde. On estime à 10 millions le nombre d’agents de santé et de volontaires impliqués périodiquement dans les activités de vaccination supplémentaires (AVS) et au moins 35 000 personnes, convenablement formés, assurent la surveillance de la polio. Grâce à la fois à une simplification des tâches, à des innovations technologiques et à une adaptation des stratégies aux conditions locales, l’Initiative parvient à ce qu’un grand nombre d’agents et de volontaires, appartenant ou non au secteur de la santé, administrent le vaccin antipoliomyélique dans le cadre des AVS, et suivent les progrès enregistrés dans pratiquement

chaque région de chaque pays, indépendamment de son infrastructure sanitaire, des conflits qui y sévissent éventuellement, de sa géographie et de sa culture. Cette démarche a exigé une promotion politique permanente et une mobilisation massive de la communauté, ainsi que des procédés de gestion et de supervision solides. Les incitations non monétaires, le remboursement des coûts et l’assistance technique de grande ampleur ont joué un rôle essentiel. Compte tenu des caractéristiques spécifiques des programmes d’éradication en général, et de celui visant la poliomyélite en particulier, il convient de poursuivre l’étude des implications de cette démarche pour le système de santé au sens large, si l’on veut pouvoir l’appliquer à nouveau à la mise en œuvre et au suivi d’autres interventions.

Resumen

Erradicación de la poliomiélitis: movilización y gestión de los recursos humanos

Entre 1988 y 2004 la Iniciativa de Erradicación Mundial de la Poliomiélitis se expandió hasta convertirse en la mayor acción sanitaria internacional de la historia, con actividades en todos los países del mundo. Según las estimaciones, unos 10 millones de agentes de salud y voluntarios han participado en las actividades suplementarias de inmunización que ha habido que llevar a cabo de forma recurrente contra la poliomiélitis, y al menos 35 000 trabajadores bien preparados se han dedicado a la vigilancia de esta enfermedad. Gracias a una combinación de simplificación de tareas, innovaciones tecnológicas y adaptación de las estrategias a las circunstancias locales, en la iniciativa se ha podido hacer uso de un amplio espectro de trabajadores y voluntarios, tanto de dentro como de fuera del sector de la salud, para administrar la vacuna antipoliomielítica durante las actividades suplementarias de

inmunización, así como para vigilar los progresos en prácticamente todas las zonas en todos los países, con independencia de la infraestructura sanitaria, los conflictos, la geografía o la cultura. Este enfoque ha exigido una promoción política sostenida y una movilización masiva de las comunidades, así como procedimientos sólidos de gestión y supervisión. Los incentivos no pecuniarios, el reembolso de los gastos y una ayuda técnica sustancial han sido fundamentales. Considerando las peculiares características de los programas de erradicación en general, y de la erradicación de la poliomiélitis en particular, es preciso seguir estudiando las implicaciones de este enfoque para el conjunto del sistema de salud si se desea reproducirlo para llevar a cabo y vigilar otras intervenciones.

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