Integrated Disease Control Initiatives: Polio Eradication and Neonatal Tetanus Elimination in Egypt

Esmat Mansour, R. Bruce Aylward, and Frank Cummings
Child Survival Project, Ministry of Health, Cairo, Egypt; Global Programme for Vaccines and Immunization, World Health Organization, Geneva, Switzerland; Child Survival Project, Clark Atlanta University, Atlanta, Georgia

Accelerated disease control initiatives, such as polio eradication by the year 2000, may substantially benefit public health programs in general. In Egypt, the control of other vaccine-preventable diseases, most noticeably neonatal tetanus (NT), has been facilitated by the polio eradication initiative. Linking NT reporting with the acute flaccid paralysis (AFP) surveillance system, which had been established for polio eradication, markedly improved the capacity to identify NT high-risk areas and target supplementary immunization activities appropriately. While the close integration of surveillance activities was to the benefit of both programs, mass immunization activities were not conducted simultaneously because of differences in the objectives, target populations, and operational aspects of oral polio vaccine and tetanus toxoid campaigns. In addition to substantial progress toward polio eradication in Egypt since 1988, there has been an 80% reduction in annual NT cases, in part due to the integration of appropriate aspects of these two disease control initiatives.

Since its inception in 1988, the global polio eradication initiative has had the specific goal of eradicating wild polioviruses by the year 2000 while improving the delivery of other health services [1]. Although the consistent fall in reported polio cases has been extensively documented [2, 3], there are few published data demonstrating the impact of the initiative on other programs. Attention to this issue is important, however, as the primary opposition to disease-specific initiatives has been the concern that they may detrimentally affect broader public health programs, particularly through competition for scarce resources [4].

In Egypt, polio eradication efforts have had a substantial impact on the incidence of that disease [5] while facilitating the control of other vaccine-preventable illnesses. Here we illustrate this second effect of the polio eradication initiative by showing how the integration of specific polio and neonatal tetanus (NT) control activities has advanced NT elimination in that country.

Background

The recognition of poliomyelitis and NT as significant public health problems in Egypt resulted in the introduction of compulsory immunization of children with oral poliovirus vaccine (OPV) in 1968 and a policy of immunizing pregnant women with tetanus toxoid in 1973 (compulsory immunization with bacille Calmette-Guérin, diphtheria, diphtheria-tetanus toxoids–pertussis, measles, and hepatitis B vaccines was mandated in 1956, 1959, 1968, 1968, 1977, and 1992, respectively). By 1986, significant progress had been made toward the control of poliomyelitis [5], but 7 of 1000 newborns were still estimated to die of NT annually [6].

Since 1988, the systematic implementation of an NT elimination program in Egypt has resulted in an 80% decline in the number of NT cases that are reported each year. The main strategies that have been used in the NT elimination effort are similar to those being used in the polio eradication program: mass immunization campaigns, strengthening of surveillance, and targeted immunization activities in high-risk areas (table 1). While the effectiveness of these NT control strategies has been proven in many other countries [7, 8], the recent experience in Egypt demonstrates how appropriate activities can readily be integrated with the polio eradication initiative.

Mass Immunization Campaigns

Before the establishment of an infrastructure for the delivery of routine infant immunizations in Egypt, mass OPV campaigns were intermittently conducted between 1976 and 1987 to reduce the incidence of polio [9]. By 1987, routine immunization services were reaching >80% of children with the six Expanded Programme on Immunization antigens, and the campaigns were discontinued. The immunization of women lagged substantially, however, as only 9% of pregnant women received at least two doses of tetanus toxoid (TT2+) in that year. Subsequently, drawing on the success of mass campaigns with TT in other countries [7] and OPV in Egypt [9], a similar strategy
Table 1. Introduction of polio eradication and neonatal tetanus (NT) elimination strategies, Egypt.

<table>
<thead>
<tr>
<th>Disease control initiative</th>
<th>Poliomyelitis eradication</th>
<th>NT elimination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routine immunization</td>
<td>1968; compulsory childhood OPV immunization</td>
<td>1973: ≥2 doses of TT for all pregnant women</td>
</tr>
<tr>
<td>Surveillance improvements</td>
<td>1989: AFP case definition and investigation; 1991: &quot;zero reporting&quot; system</td>
<td>1992: standard case investigation; NT included in AFP immediate and &quot;zero reporting&quot; system</td>
</tr>
<tr>
<td>Targeted immunization</td>
<td>1990: &quot;mopping-up&quot; in districts with ≥2 AFP cases</td>
<td>1992: 2 TT rounds for all women of childbearing age (15–45 years) in districts with ≥1 NT/1000 live births</td>
</tr>
</tbody>
</table>

NOTE. NIDs: National immunization days; AFP: acute flaccid paralysis; OPV: oral poliovirus vaccine; TT: tetanus toxoid.

was adopted to raise TT coverage and promote the use of immunization services by women.

Beginning in 1988, week-long nationwide social mobilization campaigns were conducted each year to encourage the TT vaccination of pregnant women at routine immunization sites and, where necessary, temporary posts. As the result of concerted efforts to involve appropriate leaders, the message that immunization was needed widely disseminated through local mosques and traditional mass media channels, such as television and radio [10]. Figure 1 illustrates the substantial impact the campaigns have had on both TT2+ immunization coverage and the reported number of NT cases. The success of the TT campaigns facilitated the introduction in 1990 of national OPV immunization days (NIDs) for polio eradication [11] because political, community, and religious leaders had been sensitized to the concept of supplementary immunization activities and thus readily participated.

Strengthening Disease Surveillance

While reported NT cases fell by 58% nationwide between 1988 and 1991, certain geographic areas appeared to account for a disproportionate number of cases [10]. There were insufficient surveillance data, however, to ensure that additional immunization activities were properly targeted at the areas at highest risk for NT. Although NT surveillance was incomplete,

Figure 1. Reported cases of neonatal tetanus (NT), supplementary immunization activities, and % of pregnant women receiving at least 2 doses of tetanus toxoid (TT2+), Egypt, 1984–1994.
Targeted Immunization Activities in High-Risk Areas

Having established a mechanism for identifying the districts at highest risk of poliomyelitis and NT, it was possible to target supplementary immunization activities more efficiently. In 1990, house-to-house “mopping-up” immunization with OPV was conducted in an effort to interrupt the remaining chains of transmission in all districts where ongoing poliovirus circulation was suspected [11]. The strategy had limited success at that time, however, because wild poliovirus transmission was still widespread [9].

In 1992, a pilot program was conducted to evaluate the use of targeted immunization to eliminate NT [8, 13]. Two doses of TT were administered 1 month apart to all eligible women of childbearing age (15–45 years) in two of the districts with the highest reported incidences of NT. As the total number of reported NT cases in the pilot districts fell by 63% in the following year, these targeted immunization activities were expanded to 24 high-risk districts in 1993 and 40 in 1994 [10].

Although targeted immunization strategies can be resource-intensive, the promotion of such activities in Egypt has also improved routine immunization services in areas at high risk for other vaccine-preventable diseases. The activities were specifically designed and implemented to bring immunization to populations that had been consistently missed by both routine services and campaigns.

Discussion

Specific disease control targets, such as global eradication of polio by the year 2000, have the potential to advance other public health initiatives. In Egypt, the improvements in vaccine delivery and disease surveillance that have been undertaken to eradicate polio have aided the control of other vaccine-preventable diseases, most noticeably neonatal tetanus.

Although mass campaigns, strengthened surveillance, and targeted immunization strategies have been advocated for both polio eradication and NT elimination, it has not always been feasible or appropriate to integrate these activities. A thorough understanding of the objectives of each strategy and the operational issues related to its implementation are critical to ensuring that integration results in a more efficient use of human and financial resources without compromising either initiative.

Combining active surveillance and zero reporting for AFP and NT has been to the advantage of both polio eradication and NT elimination in Egypt. Supplementary immunization activities, however, have not been conducted simultaneously for a number of reasons. The objectives of the NIDs and NT campaigns, for example, were markedly different. Whereas NIDs delivered supplementary OPV doses to interrupt poliovirus transmission, NT campaigns promoted routine TT2+ coverage through regular immunization services. In addition, the logistics of TT and OPV campaigns differed substantially: TT campaigns required injections, screening of each woman’s immunization status, and recording of TT doses, while OPV campaigns used an oral intervention and targeted all children regardless of their prior immunization status.

Although we have concentrated on the integration of polio eradication and NT elimination activities in Egypt, many countries have used the eradication initiative to deliver additional vaccines, the micronutrient vitamin A, and even primary health care messages. In Vietnam, NIDs have been used to administer measles vaccine to children in high-risk areas where routine immunization coverage was low [14], while vitamin A has been delivered during NIDs in a number of countries, such as the Philippines [15].

Conclusions

The benefits of international disease control targets may extend well beyond the immediate, stated goal of reducing the incidence of an illness, eliminating a disease, or eradicating an organism. Of particular value may be the development of skills that are transferable to the control of other diseases of public health importance. In Egypt, the pursuit of polio eradication has facilitated NT elimination particularly by strengthening disease surveillance, promoting case investigation skills, and targeting immunization at previously unreached populations.

References


