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# Group Report: Assessing the Feasibility of an Eradication Initiative

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## Abstract

New global eradication initiatives in the 21st century will face more stringent and rigorous pre-launch review than their predecessors. The assessment of whether a disease can and should be targeted for eradication will involve determination of whether the disease agent meets fundamental biological and technical criteria, demonstration of operational feasibility in large and/or challenging settings, and a comprehensive review of a number of critical enabling factors required for eradication.

This chapter builds on earlier work that describes the biological and technical requirements for disease eradication and focuses in more detail on nonbiological, critical enabling factors. These include durable financing, effective communication strategies, and operational research, each of which plays a cross-cutting role in building and sustaining the necessary political and societal support for eradication. An eradication investment case, program governance, and the interface with health systems are additional enabling factors that are covered in more detail in separate chapters.

Before launching a new eradication initiative, a comprehensive review of feasibility is required. If judged feasible, individual champions and a broad-based partnership will be needed to raise the political and financial support required to launch the initiative. The assessment of feasibility is not a “one-off” activity but rather needs continual monitoring and updating as new technologies and information become available.

## Introduction

The criteria needed to determine whether eradication is able to be achieved have been grouped into three categories: biological, societal/political, and economic factors (Hinman and Hopkins 1998). An additional factor was emphasized by

the Global Taskforce on Disease Eradication; namely, the need to demonstrate that eradication could be achieved in a large geographical area (CDC 1993b). A more recent review of lessons learned from eradication initiatives stresses that biological feasibility is necessary but not sufficient. Nonbiological factors such as political commitment, social acceptability, financial affordability, and strong program management are critical components for success (Aylward et al. 2000a).

Over the last two decades, a wealth of practical experience has been gained from global and regional eradication initiatives that have targeted diseases such as polio, guinea worm, lymphatic filariasis, onchocerciasis, measles, and rubella. The global context in which eradication programs operate has, however, markedly changed during this time. Sudden events, such as high-profile terrorist attacks, large-scale natural disasters, and the 2008 financial crisis, as well as secular trends in the size and age structure of the world's population and the continuing shift from rural to metropolitan areas, globalization, the decentralization and privatization of health services, and increased connectivity through information technology have changed the landscape dramatically. Support for disease eradication programs has also significantly changed: at ever-increasing rates, highly influential nongovernmental organizations and foundations are now involved, and there has been a corresponding decline in the technical, operational, and financial monopoly previously held by multilateral international organizations such as the World Health Organization, UNICEF, and the World Bank.

Over the past decade, the rise in corporate social responsibility has led to an increased involvement of corporations in global public health initiatives. Commensurate with this has been the drive to create innovative financing mechanisms and apply business models and management principles to public health programs. In addition, communication technology has changed considerably. The burgeoning use of social media and the Internet have altered how individuals and communities are able to impact policymaking on health issues and acceptance of the interventions required for eradication. Any side effects from these interventions (e.g., adverse events following vaccination) can quickly achieve prominence on the political and media agendas.

Understanding the complex interaction between disease agents and the interventions used in an eradication initiative is crucial. The need to continue control measures indefinitely—albeit of a different kind and on a smaller scale—has increasingly been recognized. In addition, should eradication be achieved, surveillance at some level is necessary and control of laboratory activities involving pathogens must be maintained (e.g., laboratory containment of polioviruses and management of the remaining stocks of smallpox virus).

In view of these developments, our group was tasked with assessing the feasibility of achieving an eradication goal in the 21st century. Building on earlier work (Dowdle and Hopkins 1998; CDC 1993b), we address the cross-cutting role of sustainable financing, effective communication strategies, and

operational research in building the necessary political and societal support for eradication. We include discussion of additional critical enabling factors (e.g., an investment case, program governance, and an effective interface with health systems) and conclude with a set of conclusions and recommendations.

## **Assessing the Feasibility of Eradication**

We expect that disease eradication initiatives in the 21st century will face more stringent and rigorous pre-launch review than their predecessors. The assessment of whether a disease can and should be targeted for eradication will involve three primary stages: (a) determination of whether the disease agent meets fundamental feasibility criteria, (b) demonstration of operational feasibility in large and/or challenging settings, and (c) a comprehensive review of a number of critical enabling factors required for eradication.

### **Fundamental Feasibility Criteria**

The distinct biological attributes of an organism and the performance characteristics of interventions determine the potential for eradication. These biological and technical criteria have been discussed and reported on in detail (Ottesen et al. 1998) and are therefore summarized below.

#### *Biological Feasibility*

Biological feasibility depends on the inherent properties of the agent and the disease it causes. When humans are essential for the life cycle of the agent, eradication is most feasible, because it is possible to apply an effective intervention tool to humans and interrupt transmission of the agent (Ottesen et al. 1998). This certainly was the case for smallpox eradication. The successful eradication of rinderpest, a disease of cattle and domestic buffalo, expands this concept to include a reservoir for infection in humans or other easily identifiable species. A restricted reservoir enables problems to be quickly identified and targeted interventions to be effectively applied. Other attributes of the agent may also impact eradicability: transmission potential, susceptibility to reinfection, duration of infectiousness and recrudescence, and persistence of the agent in the environment.

#### *Technical Feasibility*

To achieve eradication, an effective intervention (e.g., a vaccine or medication) to stop transmission and practical, accurate diagnostic tools to determine who is infected are necessary. Vaccines, therapeutic agents, behavior modification, vector control, or a combination thereof must be of sufficient efficacy

to interrupt transmission of the agent. Similarly, diagnostic tools must have sufficient sensitivity and specificity to detect infection and be relatively simple to use in diverse settings. The concept of what constitutes an effective intervention or accurate diagnostic tools, however, changes over time as the result of scientific advancement and technical innovations.

### **Demonstration of Operational Feasibility**

The availability of an effective intervention at the individual level does not mean that an automatic scale-up is possible at the population level. Demonstration that eradication can be achieved in a large geographic area provides proof of this principle. In addition, the experience from the polio eradication initiative indicates that interventions need to be tested and tailored (e.g., monovalent and bivalent oral polio vaccine) before they can effectively meet the most challenging settings (e.g., where routine immunization coverage is the lowest and the herd immunity threshold is the highest). Operational feasibility must be viewed as an ongoing process. During the course of an eradication initiative, novel challenges may emerge for which there are no pat solutions. Thus, the criteria necessary for operational feasibility must be considered separately from the more fundamental biological and technical criteria.

In addition to being effective, an ideal intervention needs to be safe, cheap, and easy to apply. This will increase acceptance by communities and support early adoption into national programs. Research should be conducted throughout the course of an eradication program to ensure that “field-friendly” interventions and tools with improved product profiles are developed.

### **Critical Enabling Factors**

Because of their nonbiological nature, critical enabling factors are generally more amenable to organizational and managerial interventions. Understanding the process for developing and maintaining political and societal support is crucial to the success of an eradication effort. Before embarking on new eradication initiatives, a comprehensive assessment of the following enabling factors is required.

#### *Political Commitment*

Success of eradication initiatives is dependent on a consistently high level of political support and engagement far beyond that engendered by national Ministries of Health. Commitment is needed from Heads of State, national parliaments, as well as from provincial and district governments as well as traditional and local community leaders. Before starting an eradication initiative, it is imperative to build the necessary political support at country, regional, and global levels. Depending on the nature of the interventions required for

eradication, intersectoral collaboration across different governmental departments may be required (e.g., support from the education department is crucial for vaccination campaigns in schools). Political commitment, in turn, has to be translated into financial allocations at the country level. Coordination of the various parties is crucial. For example, during polio eradication activities, Interagency Coordinating Committees played a key role in bringing together in-country partners (NGOs, bilateral agencies, international organizations, and the private sector) and government representatives to ensure that the program was fully funded.

A combination of incentives and disincentives is needed to leverage full country participation at the global level and full stakeholder participation within each country. In the polio experience, for example, a World Health Assembly resolution, while nonbinding, served as a useful instrument to exert political pressure on a country to improve performance. Eradication programs in the 21st century may, however, require additional mechanisms (e.g., binding agreements or treaties) to secure formal commitment from governments and partners and to maintain this commitment when setbacks occur.

At the country and community level, lessons from the polio program clearly show that when traditional and religious leaders are engaged as champions and stewards of eradication programs, community acceptance and coverage of immunization campaigns increases. In the Americas, the experience gained from the polio, measles, and rubella initiatives highlights the importance of engaging professional medical societies (e.g., pediatricians, obstetricians, and gynecologists) as well as private sector hospitals and clinics to enhance advocacy, communication, and disease surveillance. Surveys of policy makers may be useful in identifying key stakeholders and potential barriers to success as well as in assessing what actions or information are needed to maximize political commitment (DeRoeck 2004).

### *Societal Support*

While earlier eradication programs may have relied on the personal experience and intuition of program managers to engage with communities, new eradication initiatives face more informed and potentially more assertive communities. Thus, an eradication program will benefit from applying a structured approach to engage effectively with the community and establish trust.

Behavior change theories and field experience have shown that communities support health initiatives when they perceive that a disease is severe and has the potential to harm them or their families. In turn, they will demand access to the intervention being provided if they believe it to be a safe, effective, and an accessible response to their health needs.

Generating demand for a health service first involves identifying key community stakeholders with whom to engage and target for supporting an intervention. It is important to understand the reasons why these stakeholders may

support or resist the intervention being offered (this kind of analysis should be done based on a communication theory model). Next, potential strategies for overcoming social barriers or exploiting existing opportunities should be tested and implemented in the field. Field experience from the polio program has demonstrated that the messenger is equally, if not more, critical at times than the message itself; thus targeted messages should be delivered by influential champions who carry credibility and trust. Societal support for an eradication program should be continuously monitored through knowledge, attitudes, and practices surveys and other social research. Health staff (e.g., at community health centers and clinics) play a key role in engaging with local communities and serve as critical brokers between the eradication program and the local community. To sustain their commitment and to enable them to garner community support for the duration required in an eradication program, health staff are likely to require continuous training, support, and motivation to persevere as the critical foot soldiers in an eradication program.

### *Strong Economic and Ethical Arguments*

To build the required financial support for an eradication program, an investment case or business plan is necessary—one that addresses the expected costs and benefits of an eradication program as well as delivers an approach to manage risks and provides an exit strategy (see Thompson et al., this volume). The investment case must include an independent assessment of how a specific proposed eradication initiative meets the feasibility criteria discussed above as well as the critical enabling factors identified in this section. Emerson (this volume) proposes that the moral case for eradication should be based on arguments such as the duty to rescue, duty to future generations, societal health equity, and disease eradication as a global public good.

### *Demonstration of Financial Feasibility*

As a result of the 2008 financial crisis, competition for the funding of global public health and eradication programs has intensified. Future disease eradication initiatives will thus need to include a financial feasibility study as a core component of the eradication decision-making process. Such a financial feasibility study must assess the projected financial costs (and possible range of costs), the likelihood of the required funds being made available, and the fiscal attributes of the funds (e.g., their ability to be front-loaded, flexible, predictable, and coordinated). The assessment of financial feasibility should estimate the proportion of funds that can be expected to come from different funding sources (e.g., national governments, partner agencies, partner governments, private sector) and the resulting implications. This includes how funds might be predicted to be earmarked (e.g., geographically and by program component, such as supplies, disease surveillance, operations, and research).



The need for global cooperation to obtain the public good of disease eradication gives credence to a “fair share” financing concept for public sector partners and could have individual countries providing financing in proportion to, for example, their assessed contribution to the WHO or their gross national income. Consideration must be given on how to manage “free-riders” (i.e., those who extract benefit from the provision of the public good without paying their “fair share”). The potential use of newer financing approaches—transaction tax mechanisms, global or regional development bank “buy-downs,” bond issuance to secure up-front financing, and performance-based funding—should be explored. A financing strategy that ensures a diversity of funding sources would help protect against the risks posed by any individual funder exiting the program. An optimal financing model would also include mechanisms to monitor and evaluate financing flows and processes for addressing any deficiencies.

### *Effective Communication Strategies*

Lessons learned from polio and other eradication programs highlight the importance of strategic communications planning as an integral component of any eradication initiative. According to Bates et al. (this volume), over the last few years developments and innovations in the field of communications have enabled communications to be applied to eradication programs through an evidence-based, systematic, and evaluable approach. Well-conceived, professionally implemented communication strategies that are directly linked to an eradication program’s objectives, and which bring an understanding of political, social, and cultural realities, can make the difference between the success and failure of a program.

A framework for effective communication strategies should include at least the following principles:

- Communication is a planned process. An initial assessment should be conducted to identify all potential stakeholders, so that tailored messages and engagement strategies can be constructed for each group. Stakeholders may include politicians, professional groups, local and international partners, program staff and managers, the media, as well as the general public, including marginalized communities.
- Plan in advance for nonparticipating players. Eradication requires near-universal participation. Hence, special attention is needed to engage and reach “nonparticipating players.” Experiences from other eradication initiatives indicate that those most unlikely to participate are politically or socially excluded groups, as well as inaccessible populations. While it may be unlikely that all nonparticipating players can be identified in advance, a risk assessment can be conducted to plan for most.
- Initial assumptions on knowledge, attitudes, and behaviors should be identified and tested based on a model. A communication theory model

that makes assumptions of behavioral motivation for each key social group or stakeholder should be established and continuously tested throughout the life cycle of the eradication program.

- Repeated messages through diverse communication tools are most effective. A mix of communication mechanisms and approaches is required to respond to the various factors (e.g., threat perception, self-efficacy, intervention efficacy) that are critical for behavior and attitude changes. Mass media, social mobilization, and interpersonal communication are all proven tools for communicating messages to various target groups. Expanded access to the Internet and the use of social media (e.g., blog sites, chat rooms, Facebook) provide additional communication opportunities. However, social media is also capable of rapidly spreading misinformation. Therefore, both the advantages and disadvantages of these communication tools must be carefully factored into an effective communication strategy.
- Community engagement is a central principle for all stakeholders. An exchange of information and ongoing dialog between program staff and stakeholders is necessary to foster an environment of inclusive participation and ownership among as many stakeholders as possible. The media needs to be considered as a critical stakeholder for engagement. Lavery et al. (2010) provide useful guidelines to secure engagement at the community level. Experience from both low-resource and industrialized countries has shown that as disease burden declines, societal demand declines and people become more vulnerable to reports of side effects of the intervention. To offset this, effective communication strategies are needed throughout the entire course of an eradication initiative. In addition, lessons learned in how to exact effective community engagement should be shared between the different eradication initiatives. Compiling this experience will promote a more evidence-based approach in the future.

### *Governance*

The increasing role of private funding from corporations, foundations, and individuals has led to more stringent requirements for financial accountability, strong management, and independent monitoring of eradication initiatives. Stoever et al. (this volume) recommend that the governance structure of future eradication programs needs to be planned and structured to ensure principles of effective management, transparent accounting, and independent oversight.

### *Impact on Health Systems*

As previously emphasized (Cochi et al. 1998), eradication programs should be planned and carried out in the context of health services; they should contribute

to the strengthening of infrastructure and management weaknesses; those health systems which are least developed will need the most infrastructure support; and a functional approach should be taken to balance global, national, and local priorities. Pate et al. (this volume) provide a comprehensive discussion on how an eradication program can be designed to interface effectively with the health system. They also provide a framework for optimal engagement of disease eradication initiatives with health systems.

### *Operational Research Agenda*

Historically, operational research efforts have been both minimally supported and insufficiently incorporated in all global eradication initiatives. The Dahlem meeting clearly identified the need for a research capacity, citing important lessons from past eradication initiatives, which clearly show that technical problems will arise and can only be resolved by operational research (Hinman and Hopkins 1998). Examples include research to develop cheaper, more effective, or easier to use interventions; field studies to improve our understanding of the epidemiology of the disease and the impact of interventions at the population level; and knowledge, attitudes, and practices surveys to guide communication strategies.

Jacobson (this volume) describes a framework that can be used to design the crucial elements of the research plan. Each criterion used to determine the feasibility of an eradication initiative needs to be tested and evaluated to determine weak spots and devise solutions. Operational research should look at all areas of potential failure: the pathogen, the intervention tools, the delivery system, communication strategies, financing, program management, as well as the detection and response to the unexpected. A research agenda must consider how it can respond to new data received from monitoring and evaluation programs as well as how new data generated through research can be used to guide programming.

To establish this program component, two principal challenges must be addressed. First, an appropriate budget should be established for operational research, with perhaps a fixed proportion of the program budget set aside for operational research (e.g., 5% or some other proportion). We note, however, that it is often very difficult for resource-constrained programs to carve from their limited implementation funds the resources required to address questions that might take years to answer. Second, a mechanism is required to ensure that when such funding exists, a fast, efficient, and coherent process is available to identify critical program challenges in need of operational research. This involves developing appropriate research protocols and advancing them to the funding sources.

A particularly good model to meet the programmatic needs for operational research appears to be the recently created Polio Research Committee of the

Global Polio Eradication Initiative. The attributes that make this model particularly strong are:

- Its very close association to and management by the program.
- Its membership is largely external but very knowledgeable about the program.
- Regular meetings are conducted, which allows for a rapid intake of proposals as problems arise.
- Its ability to support a range of projects, including those that originate in the field, those that pertain to program monitoring and end-game strategies, as well as those targeting vaccine development and further “upstream” challenges.

Further details on how the research needs of eradication initiatives can best be defined, articulated, and met are discussed by Jacobson (this volume).

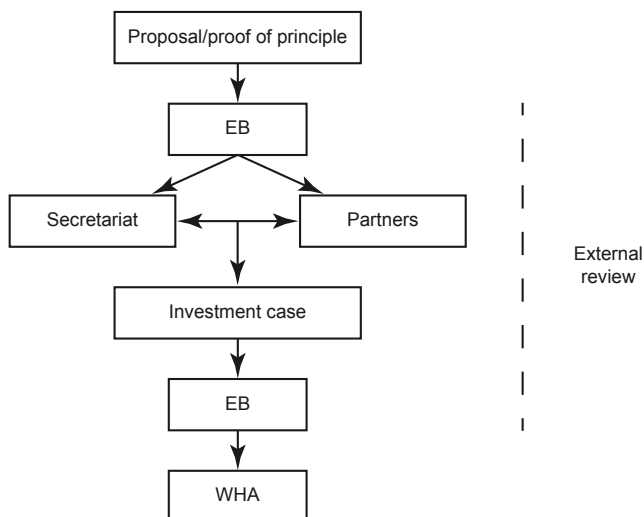
### **What Is the Process for Establishing a New Eradication Initiative?**

The Dahlem meeting (Goodman et al. 1998b) explored three different options for investigating, proposing, and selecting candidate diseases for eradication:

1. Continuation of the status quo in which diverse pathways lead to a resolution by the World Health Assembly.
2. Establishment of a unit at WHO to analyze, evaluate, and make commitments to eradicate specific diseases.
3. Establishment of an interagency work group.

The process for establishing a new global eradication initiative in the 21st century will likely require a sequential approach and may include aspects of one or more of these options. The premise holds that the role of the WHO and a World Health Assembly resolution are necessary, but not sufficient.

A number of different candidate diseases could be periodically assessed by technical advisory groups. If the biological and technical feasibility criteria are met and rapid progress is being made with accelerated control efforts, then the disease-specific partnership could advance an investment case to stakeholders and begin the process of assessing the feasibility of attaining the platform of support required to launch the eradication initiative. Once a comprehensive review of all the critical enabling factors has been conducted and results are favorable, the next step would be to initiate a resolution to establish a new global eradication goal. This would likely be brought to the World Health Assembly by a Member State(s), the WHO Secretariat, or another interested party. This process could start in the different Regional Committees of WHO, thereby ensuring full political support by all countries and regions. This approach is similar to that proposed by Foege (1998) and is illustrated in the Figure 7.1.



**Figure 7.1** Pathway to the establishment of a World Health Assembly (WHA) resolution on disease eradication. EB: executive board.

## Conclusions and Recommendations

The global context in which new disease eradication initiatives will be evaluated is rapidly evolving. The competition for public health resources requires a comprehensive review of all aspects of the feasibility of a new initiative:

1. Assessing the feasibility of a disease eradication initiative requires (a) determination of whether the disease agent and interventions meet fundamental biological and technical criteria; (b) demonstration of operational feasibility in large and/or challenging settings; and (c) a thorough review of critical enabling factors.
2. The critical enabling factors to be assessed include political commitment, societal support, strong economic and ethical arguments (as part of an eradication investment case), demonstration of financial feasibility, an effective governance structure, and the ability to positively impact health systems.
3. Effective communication strategies, operational research, and sustainable financing play an essential cross-cutting role in building the necessary political and societal support.
4. Having assessed an eradication initiative as feasible, individual champions and a broad-based partnership are needed to raise the political and financial support necessary to launch the initiative.
5. The assessment of feasibility is not a one-off activity but rather requires continual monitoring and updating as new technologies and information become available.

6. The process of establishing a new eradication initiative will likely be sequential. Once biological and technical feasibility criteria are met and rapid progress is being made with accelerated control efforts, the disease-specific partnership would then advance an eradication investment case to stakeholders.
7. The role of the WHO and a World Health Assembly resolution are necessary but not sufficient to establish a new global eradication initiative. A robust political and financial platform of support is required to successfully launch the initiative.