The Measles Initiative: Moving Toward Measles Eradication

Athalia S. Christie1 and Andrea Gay2

1International Services, American Red Cross; and 2United Nations Foundation, Washington, D.C.

The World Health Assembly should establish a target date for measles eradication based on continued progress toward existing mortality reduction goals. We have a safe, effective, and inexpensive vaccine; a proven elimination strategy; high country demand; and an effective global partnership. Since it was founded in 2001, the Measles Initiative has supported the vaccination of >900 million children in supplementary immunization activities. Largely as a result, global measles deaths decreased by 78% between 2000 and 2008, averting an estimated 4.3 million deaths. The Measles Initiative has exceeded its targets and evolved to address increasingly ambitious goals. The current challenges include a decline in funding and weak routine immunization systems in some countries. Skeptics of measles eradication raise 3 main objections: the yet-to-be-achieved polio eradication goal, the high cost, and the impact on health systems. These are important concerns that can be addressed with judicious program planning. All 6 World Health Organization regions have committed to measles elimination, and 5 have set a target date. The World Health Assembly has endorsed interim targets toward eradication, and an independent global measles advisory group has determined measles can and should be eradicated. A target date for eradication will focus efforts and capitalize on the achievements of the last decade.

THE MEASLES INITIATIVE: MOVING TOWARD MEASLES ERADICATION

The World Health Assembly should set a target date for measles eradication based on continued progress toward existing mortality reduction goals. We have a safe, effective, and inexpensive vaccine; a proven elimination strategy; high country demand; and an effective global partnership. The biological feasibility of measles eradication was established in the 1980s and was recently reaffirmed [1]. In July 2010, an independent global measles advisory group assessed the programmatic feasibility and cost effectiveness of measles eradication and concluded that measles can and should be eradicated [2]. A target date for eradication will focus efforts and capitalize on the achievements of the last decade.

BUILDING BLOCKS OF THE MEASLES INITIATIVE

Measles vaccine, first licensed in 1963, carries the highest health return for the money spent of all health interventions, saving more lives per unit cost [3]. The price of the vaccine, bundled with safe injection equipment, averages $0.37 per dose through UNICEF procurement. The vaccine is highly effective, with at least 95% of children developing protective antibodies to measles when the vaccine is administered at 12 months of age. At 15 months, at least 98% of children develop antibodies. Although a small percentage of children do not respond to 1 dose of measles vaccine, 99% develop immunity after receipt of a second dose. Severe adverse reactions to measles vaccine are rare. The vaccine is available in 3 formulations—a single antigen vaccine (M), combined with rubella (MR), and combined with mumps and rubella (MMR)—allowing countries to choose the most appropriate vaccine for their routine schedule.

The strategy for measles elimination was pioneered by the Pan American Health Organization (PAHO)
starting in 1991. The strategy includes: an initial “catch-up” campaign targeting all children aged 1–14 years, regardless of previous vaccination history; “keep-up” vaccination through routine health services; and periodic “follow-up” campaigns targeting children aged 1–4 years. The strategy led to the interruption of endemic measles virus transmission in the Americas in 2002 [4].

THE FIRST DECADE OF THE MEASLES INITIATIVE

Despite the progress in the Americas during the 1990s, measles was still the leading cause of vaccine-preventable death worldwide, killing nearly 1 million persons per year (1999 estimate, 873,000 annual measles-related deaths) [5]. Ninety-four percent of measles-associated deaths occurred in 47 priority countries. The majority of these countries were in Africa, creating high public demand for the vaccine. In the late 1990s, 7 countries in southern Africa successfully applied PAHO’s strategy and reduced the number of measles-related deaths to nearly zero by implementing mass measles vaccination campaigns [6]. Dozens of other countries were eager to do the same but lacked the resources and technical support to move forward. The Measles Initiative was formed in 2001 to address this need. It is a partnership among the American Red Cross, the Centers for Disease Control and Prevention, UNICEF, the United Nations Foundation, and the World Health Organization.

Since it was founded, the Measles Initiative has worked with >70 countries, supporting the vaccination of more than 900 million children in supplementary immunization activities (SIAs), at a cost of less than $1 per child (Measles Initiative, unpublished data). In addition, integrated measles campaigns delivered more than 41 million insecticide-treated nets, 94 million deworming tablets, 127 million polio vaccines, and 213 million doses of vitamin A (Measles Initiative, unpublished data).

The Measles Initiative supports the development of national multiyear plans to reduce measles mortality by consistently applying the PAHO strategy. Technical support for implementation is provided by each partner agency according to its strengths and comparative advantages. Decisions are made collectively by representatives from each partner in the Measles Initiative. There is no secretariat. Responsibility and credit for managing and coordinating activities are shared equally. Partners jointly mobilize resources, pool funds, and require only a plan of action and report from each country. The country plans are combined into a global annual proposal to the donor partners. A single financial account prevents parallel funding, ensures joint planning at the country level, and guarantees flexibility. This structure streamlines program planning and implementation by lowering transaction costs for countries and partners.

The Measles Initiative has exceeded its targets and evolved to address increasingly ambitious goals. Progress has been remarkable and steady. Initially, the partners envisioned a temporary collaboration to address measles deaths in sub-Saharan Africa. In 2003, the World Health Assembly committed to reducing global measles deaths by 50% between 1999 and 2005. Also in 2003, the Measles Initiative convened a global meeting in Cape Town, South Africa, to assess the interest of countries outside of Africa. Country interest in reducing measles deaths was high, and the Measles Initiative began to support governments around the world the following year. By the end of 2005, the Measles Initiative, through the committed efforts of national governments, exceeded the United Nations’ target by reducing measles deaths by 60% globally [5]. The World Health Assembly then endorsed another goal—to reduce measles deaths by 90% between 2000 and 2010. By the end of 2008, 2 years ahead of schedule, all countries but 1 (India) had reached the 2010 goal (Measles Initiative, unpublished data). The accelerated activities supported by the Measles Initiative prevented an estimated 4.3 million deaths during 2000–2008 [7]. In addition, the annual reduction rate in measles deaths among children aged <5 years tripled after the Measles Initiative was formed, from a mean of 3% between 1990 and 2001 to a mean of 10% between 2001 and 2008 [8].

CURRENT CHALLENGES

Despite these achievements, a sharp decline in donor commitment to implement periodic measles campaigns now threatens to reverse progress and potentially prevent the realization of Millenium Development Goal 4. Immunization services are a government responsibility, yet donor support is needed until governments have fully integrated all immunization activities into their annual budgets.

Although most countries contribute an increasing percentage of the cost of measles mortality reduction strategies, many have not been able to raise their expected contribution of 50% of the operational costs for measles campaigns. In addition, donor investment in global measles control has decreased by 55% since 2007 (Measles Initiative, unpublished data). The Measles Initiative has a handful of contributors that include only 3 national governments. In 2010, a funding gap of US $10 million led to cuts in essential campaign activities, such as social mobilization and coverage surveys, as well as the postponement of campaigns in several countries. The inverse relationship between funding and the number of measles cases was well documented in the United States and continued until sufficient funds were invested to eliminate measles [9]. Currently, we see the beginning of a similar trend, as evidenced by 28 countries in Africa with laboratory-confirmed outbreaks.

Routine measles coverage in the 47 priority countries of the Measles Initiative reached 74% in 2008, up from 58% in 2000 [7]. Although this was a remarkable achievement, routine
coverage remained <80% in 31 countries (66%) [10]. The World Health Organization (WHO) recommends that countries introduce a second dose of measles vaccine into the routine immunization system after achieving >80% coverage with the first dose for 3 consecutive years. At the end of 2008, only 10 of the 47 priority countries had met this target, and of those, only 3 (Indonesia, Vietnam, and Pakistan) have initiated the provision of a second dose in their routine schedule. In addition, 4 other priority countries (Afghanistan, Myanmar, Papua New Guinea, and Yemen) added a second dose without reaching the WHO criteria.

Because measles is so infectious, and virtually all susceptible individuals in endemic countries will contract the disease, countries with weak routine immunization systems will have measles outbreaks and deaths if timely and high quality mass campaigns are not conducted. The WHO used the natural history model [7] to project mortality estimates for 2010–2013 under multiple scenarios. The most realistic scenario—considering the current funding challenge—assumes that routine measles coverage continues to improve at a rate of 1% in low-performing countries and that one-half of the 47 priority countries conduct campaigns (India was excluded as it has yet to conduct large-scale measles SIAs as of September 2010). The result is an estimated 1,000,000 measles-related deaths between 2010 and 2013 (Measles Initiative, unpublished data). In a recent study by Levin et al, the projected impact of stopping SIAs in 3 sample countries (Ethiopia, Bangladesh, and Uganda) was a 49%–784% increase in measles mortality [11]. A global resurgence of measles has begun and will intensify without funding support for periodic campaigns.

A FUTURE ERADICATION GOAL

In 2008, the World Health Assembly requested a study of the feasibility of measles eradication with the aim of setting a new global goal. Currently, there are no known scientific or technical barriers to eradication, although such possibilities must be assessed on an ongoing basis [1]. Skeptics of measles eradication raise 3 main objections: the yet-to-be-achieved polio eradication goal, the high cost, and the impact on health systems. These are important concerns that can be addressed with judicious program planning.

When the World Health Assembly endorsed polio eradication in 1988, a measles eradication goal was tabled until 2000—the original target date for polio eradication. Now, 10 years after the original goal, polio is still endemic in 4 countries. As a result, donors are reluctant to finance another eradication program despite measles’ advantages of a more effective vaccine requiring only 2 doses, rare asymptomatic cases, and a simple diagnostic test. At the country level, the same staff implement measles and polio campaigns and surveillance. Where appropriate, oral polio vaccine is administered during measles campaigns. Simultaneous eradication efforts would allow countries without polio to move forward with measles and countries with polio to coordinate their activities more efficiently.

Measles eradication is significantly more cost-effective than measles control and is cost-saving for high-income countries, according to the recent study by Levin et al [11]. To achieve and sustain the current measles mortality reduction goals requires major recurrent costs for SIAs and outbreak response. From 2000 through 2008, donor investment of $670 million in the Measles Initiative achieved a 78% reduction in global measles deaths at a cost of approximately $184 per death averted (Measles Initiative, unpublished data). However, an eradication goal will bring additional costs not previously supported financially by the Measles Initiative. The estimated incremental cost of measles eradication by 2020 ranges from $1.8 to $3.1 billion of country and donor investment [11]. Given the recent decline in measles funding, it is unclear whether adequate donor interest exists to supply the necessary funds.

The impact of measles elimination activities on immunization and health systems was recently evaluated by the London School of Hygiene and Tropical Medicine. Measles campaigns are periodic and infrequent interventions, occurring once every 3–4 years, with largely positive spill-over on health systems. The specific improvements include, better collaboration, linkages, and involvement at all levels of governments and among partners; improved immunization knowledge and microplanning and management skills among health care workers; increased community demand for immunization; and improved data quality and surveillance [12]. These improvements translate to better coverage for all immunization activities.

The negative impact on the health system in some countries appeared to result from undertaking multiple immunization campaigns over a short period of time. Examples include a temporary interruption of routine immunization services, a temporarily increased workload, and the expectation of incentives [12]. These challenges can be mitigated by proper planning and, when feasible, by integrated campaigns delivering multiple interventions. Measles campaigns serve as an equitable and cost effective delivery platform for other child survival interventions [13]. Most importantly, campaigns reach difficult-to-access populations missed by the health system [13]. To maximize these benefits, periodic campaigns should be planned as a regular component of immunization outreach services not as a separate activity.

Successful elimination in the Americas and the rapid decrease in the number of measles deaths globally in the past decade clearly demonstrate what countries can achieve with adequate support. Strong country commitment and leadership is also evidenced by 5 of the 6 WHO regions setting measles elimination goals. The countries of the sixth region, South East Asia, have agreed to measles elimination in principle but have not yet set a target date. Regional and global goals enable countries to
maintain the focus necessary in the short term to end measles deaths and avoid expensive long-term control efforts.

In May 2010, the World Health Assembly agreed to interim targets as milestones towards measles eradication, including reducing measles mortality by 95% between 2000 and 2015. An independent global measles advisory group assessed the feasibility of measles eradication by reviewing the outcomes of 7 studies in July 2010 and concluded that measles can and should be eradicated [2]. As progress continues, a target date for measles eradication will capitalize on the momentum of the last decade; country leadership and commitment; and the existence of a highly effective global partnership.

References