# Options for Promoting Synergy Between GAVI and Sustainable Measles Mortality Reduction

## 1. Introduction

The purpose of this document is to propose potential areas for synergy between GAVI and reduction of measles mortality activities.

Despite the availability of a safe, highly effective and inexpensive measles vaccine, in 2002 there were between 30 to 40 million measles cases resulting in approximately 643,000 deaths[1]. Measles is the leading cause of vaccine preventable deaths in children and is an important cause of under-5 mortality. Failure to deliver at least one dose of measles vaccine to all children remains the primary reason for continuing high measles morbidity and mortality.

Some important considerations about measles disease burden:

- > 50% of measles deaths occur in Africa
- > 75% of measles deaths occur in children < 5 years of age
- > 98% of measles deaths occur in countries eligible to receive support from GAVI and the Vaccine Fund

In recognition of this unacceptable situation, at its 2002 meeting in Dakar, Senegal, the GAVI Board issued a statement on measles. (Annex 1)

The statement:

- Highlights the unacceptable burden of measles deaths
- Supports the WHO/UNICEF comprehensive strategy for sustainable measles mortality reduction
- Endorses the WHO/UNICEF "Framework for Collaboration" to ensure a sustainable reduction in measles deaths and health system strengthening
- Calls upon GAVI partners to financially support national immunization plans, including the full implementation of sustainable measles mortality reduction strategies

Several global goals have been established for measles mortality reduction:

- The 2000 Millennium Development Goal to reduce under-5 mortality by 2/3 by 2015 compared to 1990 levels. The main immunization indicator for progress toward this goal is the percentage of 1 year old children vaccinated against measles.

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[1] Annual estimates of measles mortality are updated by WHO/IVB. The most recent updated estimates for measles deaths from 1999-2002 are: 870,000, 764,000, 704,000, 643,000.

- The 2002 UN General Assembly Special Session "World Fit for Children" established the goal to reduce measles deaths by 50% by 2005 (compared to 1999 levels of 870,000 deaths).

- The 2003 World Health Assembly resolution on Measles Mortality Reduction requests countries to fully implement the WHO/UNICEF comprehensive measles mortality reduction strategy in order to achieve the above goals.

Accordingly, over 200 senior delegates from over 50 countries and international institutions assembled at a landmark meeting held in Cape Town, South Africa in October 2003. In this meeting, participants examined technical, operational and financial aspects of work already accomplished and discussed plans for the future. The meeting culminated with acclamation of the Cape Town Declaration which translated the commitment of all concerned to further the goal of measles mortality reduction with the utmost sense of urgency. (Annex 2)

## 2. WHO/UNICEF Comprehensive Strategy for Sustainable Measles Mortality Reduction

The achievement of measles mortality reduction requires improvement in both the coverage and quality of immunization services. Sustainable measles mortality reduction is possible by implementing the following comprehensive strategy.

- **Strengthen routine immunization services**
  Countries should aim to achieve at least 90 per cent routine vaccination coverage in each district and nationally with at least one dose of measles vaccine administered to children who are nine months of age or shortly thereafter. Over time, achieving and maintaining high routine immunization coverage of successive birth cohorts can be expected to result in a marked and sustained decline in measles morbidity and mortality.

  In addition to achieving high measles coverage, efforts are needed to assure that all immunizations are administered in a safe manner. Injection safety for all immunizations services must be strengthened through effective training and supervision, use of proper injection equipment, including safety boxes and the safe disposal and management of immunization waste.

  To strengthen immunization services, WHO and UNICEF are working with countries to plan and implement the Reaching Every District (RED) Strategy. Components of this strategy include:

    - Re-establishment of outreach services
    - Supportive supervision
    - Community links with service delivery
    - Monitoring and use of data for action
    - Planning and management of resources

- **Provide all children with a second opportunity for measles immunization**
  A single-dose of measles vaccine administered at 9 months of age with a coverage of 90% will only protect about 75% of each birth cohort. Approximately one quarter of each birth cohort will remain susceptible to measles because they either missed their measles vaccination, or were vaccinated but failed to develop immunity. Without additional immunization efforts, the number of susceptible children will accumulate over time, increasing the probability of a large measles outbreak.

  Following a one-time-only "catch-up" campaign (generally targeting children 9 months through 14 years of age), the second opportunity for measles immunization can be delivered through routine or supplemental immunization activities, as appropriate. As coverage with routine services improves the need for periodic "follow-up" supplementary activities decreases. Campaigns are no longer needed when countries can maintain a routine two-dose vaccination schedule capable of coverage of 90% through routine services, and have a functioning system to identify and follow-up defaulters.

- **Enhance measles surveillance**
  Countries should establish effective surveillance for measles and accurate monitoring of vaccination coverage by district as defined in WHO surveillance standards. This is critical for developing appropriate immunization strategies, determining the impact of immunization activities and the ongoing refinement of policies and strategies. Where appropriate, rubella/congenital rubella syndrome (CRS) surveillance activities should be integrated with those of measles.

  Worldwide today, building on the infrastructure developed in the polio eradication initiative, over 600 national and sub-national laboratories have joined in a coordinated measles surveillance and diagnosis network that includes routine performance monitoring and quality control procedures. The same infrastructure is being used to enhance capacity for rubella and yellow fever surveillance.

- **Assure appropriate measles case management**
  Most measles deaths follow complications such as pneumonia, croup and diarrhea, and are also frequently associated with malnutrition. In addition, measles may result in long-term health problems including blindness, deafness, chronic lung disease, poor growth and recurrent infections. Although measles vaccine is the best public health tool for the prevention of the disease, prompt and correct treatment of measles is vital for saving the lives and preventing disability in those who have not been protected. Treatment with vitamin A supplementation is highly effective (reduces measles case-fatality by 50%), along with management of diarrhea, and use of antibiotics for complications.

- **Link sustainable measles mortality reduction activities with other priority public health interventions**
  Measles immunization (both through routine services and supplemental immunization activities) should be used as an opportunity to administer vitamin A prophylaxis in areas where vitamin A deficiency is prevalent. This should contribute

to a reduction of overall mortality among children less than five years of age. Moreover, measles mortality reduction activities provide an excellent opportunity to link other interventions such as maternal and neonatal tetanus elimination, rubella/CRS control, provision of anti-helminthics and the delivery of insecticide treated bed-nets.

To assure that measles mortality reduction activities are appropriately implemented, WHO and UNICEF have adopted a ***Framework for Collaboration*** (Annex 3) to guide their cooperation with countries. Components of this framework include:

- Existence of a comprehensive multi-year immunization plan of action with full integration of measles mortality reduction activities. Measles cannot be an ad hoc activity.

- Clearly defined goals and strategies for measles mortality reduction with articulation of plans for assuring financial sustainability and developing human resources.

- Existence of a surveillance system for monitoring measles epidemiology, supported by an efficient laboratory network, preferably integrated with surveillance for other diseases of public health importance.

- A special focus is needed for countries with very large populations or those experiencing or recovering from complex emergencies.

## 3. Partnership Approach

The key to rapid and high quality implementation in Africa has been the Measles Partnership. Beginning in 2001, The Measles Partnership, with core membership of American Red Cross, United Nations' Foundation, CDC, WHO and UNICEF, committed itself to implementing the WHO/UNICEF Comprehensive Strategy for Sustainable Measles Mortality Reduction. Their goal was to vaccinated 200 million children by 2005.

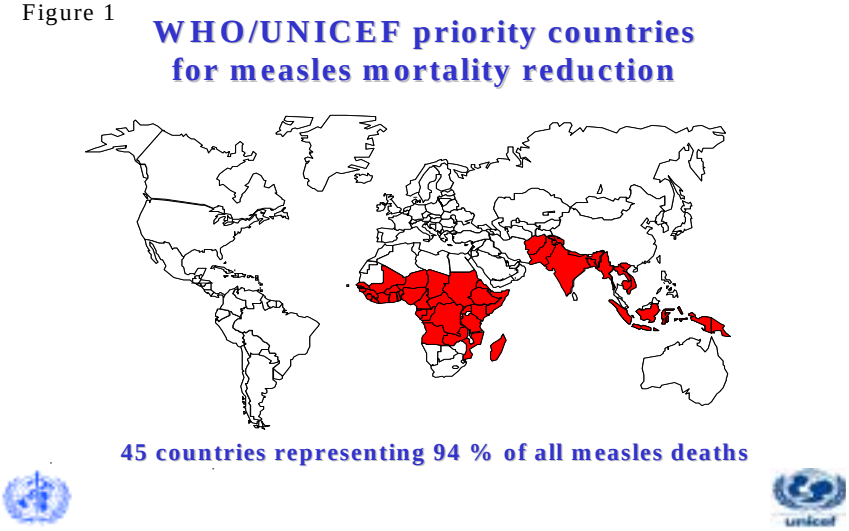
As of December, 2003, over $60 million has been allocated to countries in Africa for catch-up campaigns, and over 100 million children have been vaccinated. The average coverage for second opportunity vaccination is over 90%. The Measles Partnership is ahead of schedule and exceeding targets. The Partnership now includes additional significant support from CIDA, the LDS Church, Vodafone and Gates Foundation as well as in-country donors. Following the Cape Town Measles Meeting, there is substantial interest from other WHO Regions to adopt a similar model for implementing their Regional plans with initial Partnership efforts already under way in EURO, EMRO and WPRO.

## 4. Progress in sustainably reducing measles deaths during the period 2001-2003

In their joint strategic plan, WHO and UNICEF have identified 45 priority countries to target for enhanced measles mortality reduction activities from 2001-2005 (Figure 1). These countries account for over 94% of global

measles deaths. Of these, 15 countries had routine measles coverage of less than 50% in 2001. Annex 4 summarizes WHO/UNICEF best estimates of routine measles coverage in these countries for the period 1998 through 2002.

Figure 1




By end 2003, 29 (64%) of these countries have provided a second opportunity through national "catch up" campaigns:

> Afghanistan, Angola, Benin, Burkina Faso, Burundi, Cambodia, Cameroon, Cote d'Ivoire[1], Democratic Republic of Congo[1], Eritrea, Ethiopia[2], Ghana, Guinea, Indonesia[1], Kenya, Lao PDR, Liberia[1], Mali, Myanmar[1], Papua New Guinea, Rwanda, Senegal, Sierra Leone, Sudan[1], Tanzania, Togo, Uganda, Vietnam, Zambia.

In these countries, a second opportunity for measles immunization was provided to children in the targeted age groups, generally 9 months through 14 years of age. The Measles Partnership (American Red Cross, CDC, United Nations Foundation, UNICEF and WHO) has provided significant support for measles mortality reduction activities in Africa.
Cumulatively, over 120 million children between 9 months and 14 years of age were vaccinated in these supplementary activities. In each of these countries over 90% of the children targeted were reached resulting in a marked reduction in measles deaths. It is estimated that over 220,000 deaths from measles have been averted in these countries due to the supplementary activities. In the next three years the remaining 16 measles priority countries will be targeted for intervention.

## 5. Financial resources for measles mortality reduction activities

2 These countries will complete their campaign activities in 2004.

On the basis of national plans of action, an attempt has been made to estimate overall costs for implementation of sustainable measles mortality reduction activities in the 45 WHO/UNICEF priority countries (Annex 5). Efforts are being made to refine these cost estimates and to extend them through the year 2010. Preliminary estimates indicate that about US $300 million is required to implement the measles activities needed to achieve the 2005 goal for measles mortality reduction.

Country ownership and financial sustainability are critical components of the strategy for sustainable measles mortality reduction. In this regard, it is expected that the primary responsibility for financing measles mortality reduction activities will be national governments and their local partners.

Coordination of activity and financial planning will occur within national Interagency Coordinating Committees (ICCs). Indeed, it is expected that at least 25% (and up to 100% in some countries) of costs for measles mortality reduction activities will be mobilized locally through national budgets and with support of local partners. Assistance from external partners will be sought to fill funding gaps. All countries are expected to include measles mortality reduction activities within their multi-year Immunization and Financial Sustainability Plans.

Global polio eradication remains the overriding priority and measles mortality activities will need to be planned accordingly.

## 6. Proposed Steps to Achieving Synergy between GAVI and Measles Mortality Reduction Activities

It is imperative that GAVI and Measles Mortality Reduction activities strive to assure synergy, both to build strong immunization systems and achieve rapid reduction in measles deaths. The following sections of this paper put forward a number of options for consideration.

In reviewing the proposed options for greater synergy with measles mortality reduction activities, the Board is faced with a number of challenges:

- GAVI's funding has not been targeted towards the leading cause of vaccine-preventable deaths, and this presents a "moral issue";
- Fundraising for the Vaccine Fund might be enhanced if GAVI presented a mechanism for direct support for measles mortality reduction activities;
- A closer relationship between GAVI and measles activities could help partners (who participate in both) provide more integrated (and less contradictory) guidance to countries.

### 6a). How measles mortality reduction activities can help achieve GAVI goals

***(i) Advocacy support:*** Utilize advocacy opportunities to further GAVI cause:

- Use measles activities to stress GAVI's critical support to achieve high routine measles coverage as part of immunization system strengthening

- Use measles safe injection capacity to strengthen routine immunization injection safety

- Use media opportunities (print, web, etc) to promote completion of the routine immunization series for each child.

***(ii) Comprehensive approach:*** Use the WHO/UNICEF comprehensive strategy for sustainable measles mortality reduction to also strengthen routine immunization systems, including:

- Provision of financial support: minimum of 10% of total supplementary immunization budget should be utilized to strengthening routine immunization services, including implementation of the RED strategy with district level assessment and micro-planning;

- Expand measles monitoring (including data management) and surveillance systems to include routine immunization at the district level;

- Use of measles SIAs as a stimulus to provide 'refresher training' for routine immunization, conduct immunization safety reviews (safe injection practices, waste disposal capacity, AEFI surveillance) and support the development and implementation of EPI plans of action;

- Use supplementary immunization activity micro-plans to identify and include "un-reached" children in routine services;

- Use measles as an entry point in areas where measles mortality and demand for measles vaccination is high, to sensitize communities and decision makers to create demand for other available vaccines.

***(iii) Strengthen Linkages:*** Utilize supplementary measles activities to strengthen the routine immunization delivery system, such as:

- Improve the cold chain, including the provision of cold chain equipment

- Build capacity of country EPI staff (e.g. injection safety, epidemiology of vaccine-preventable diseases, management, surveillance, monitoring and evaluation)

- Improve partner coordination at the national level: promoting linkages between routine immunization and measles mortality reduction activities through Interagency Coordinating Committees (ICCs).

## 6b). Options for GAVI to help achieve and sustain the goal of measles mortality reduction

***(i) Advocacy support:*** Advocate for the positive impact that measles mortality reduction activities are having on strengthening routine immunization systems

***(ii) Support monitoring of global targets:*** Promote monitoring of key measles indicators (measles vaccination coverage for both first and second opportunities) and outcomes (progress toward 50% reduction in measles deaths)

***(iii) Vaccine and injection equipment support:*** Contribute US $10 million/per year over the next 2-5 years for purchase of bundled measles vaccine and operational costs for measles mortality control activities in the 45 priority countries.

- This would provide priority countries with upwards of 170 million doses of measles vaccine and demonstrate urgent action by GAVI to measles (and the 2005 and MDG mortality reduction goals) due to underutilization of measles vaccine.

***(iv) Build capacity for the second routine dose of measles vaccine:***

- The second opportunity for measles vaccine is commonly offered through campaigns. As routine systems improve, the second opportunity for measles immunization may be more appropriately delivered through a 2-dose routine schedule. GAVI and measles partners should work together, to support demonstration projects and operations research, to identify appropriate mechanisms for transitioning from campaigns to 2-dose routine delivery.[3]

- Expand the number of interventions (GAVI Objective #2) offered at the second routine measles contact to catch-up all missed vaccinations, provide second dose of vitamin A, bed net re-treatment, and de-worming.

- Ensure that the cost of a second dose routine measles vaccination and any "follow-up" campaigns are included in the Financial Sustainability Planning process supported by GAVI.

[3] Potentially some countries could achieve high 2-dose routine measles coverage in some areas, hence over time the "measles follow-up" supplementary immunization would not need to be national in scale, but rather focus only on those areas with low 2-dose coverage.

# Annex 1

# COMPREHENSIVE IMMUNIZATION STRATEGY CAN GREATLY REDUCE CHILD DEATHS FROM MEASLES

## *GAVI Board Endorses Plan and Calls for More Funds*

NEW YORK/GENEVA, 7 January 2003 - A comprehensive measles immunization strategy could prevent an estimated 2.3 million child deaths in Africa this decade, markedly reducing the death toll from measles on the continent. WHO and UNICEF made this encouraging announcement at a recent board meeting of the Global Alliance for Vaccines and Immunization (GAVI).

Of all the vaccine-preventable diseases, measles is still the leading cause of child deaths. Every year, measles affects over 30 million children and claims the lives of nearly 800,000 – more than half of them in Africa. The new immunization strategy has been extremely effective in a block of seven southern African countries. Through this strategy Botswana, Lesotho, Malawi, Namibia, South Africa, Swaziland and Zimbabwe have reduced measles deaths to near zero since the year 2000.

"We have the opportunity to save well over 2 million young lives using a proven strategy," said Carol Bellamy, Executive Director of UNICEF and Chair of the GAVI board. "Measles immunizations have saved the lives of over 130,000 children in Africa this year. We must now build on this success and ensure that every child is adequately vaccinated and protected against measles."

The GAVI board endorsed the WHO/UNICEF comprehensive measles immunization strategy to achieve a sustainable reduction in measles deaths. This strategy provides children with two opportunities for measles immunization. The first opportunity is given at 9 months of age through the country's routine immunization delivery system, and a second through supplementary immunization campaigns conducted every 3-4 years to ensure that every child is reached.

"The child death toll from measles – a completely preventable disease – is unacceptable. GAVI's mandate is to increase children's access to vaccines, and measles vaccine is a proven life saver," said Dr Gro Harlem Brundtland, Director-General of the WHO and a GAVI board member. "But a comprehensive measles immunization strategy requires sustained funding. I encourage the GAVI partners to do their utmost to fund the full implementation of this important strategy."

WHO and UNICEF currently estimate that an additional US$ 200 million will be required to implement the comprehensive measles strategy. The funds would pay for the vaccines, safe injection materials, refrigeration equipment, transportation and personnel both to strengthen routine immunization activities and to conduct the supplementary measles immunization activities in the African region from 2003-2010.

"Reducing measles deaths on a long-term basis is an important part of the UN Millennium Development Goals and measles mortality reduction strategies form an integral part of

countries' immunization plans which the Alliance promotes", said Dr Tore Godal, GAVI's Executive Secretary.

GAVI fully supports the UN goals related to measles prevention. These include the UN Special Session on Children resolution to reduce measles deaths by 50% by the year 2005, as well as the UN Millennium Development Goals, which include the target to reduce the under-five mortality rate by two thirds. The proportion of children immunized against measles by one year of age is a key indicator for measuring the achievement of these goals.

Reducing measles deaths in a sustainable manner is the objective of the ***Measles Initiative***, a broad-based partnership co-ordinated by the American Red Cross and including the Centers for Disease Control and Prevention (CDC), the UN Foundation, UNICEF, WHO, the Canadian International Development Agency (CIDA), governments, civil society and the private sector. In 2001 and 2002, the Measles Initiative has delivered measles vaccine to over 70 million children in 16 African countries.

The Global Alliance for Vaccines and Immunization (GAVI) is a public-private partnership focused on increasing access to vaccines among children in poor countries. Partners include national governments, UNICEF, WHO, The World Bank, the Bill & Melinda Gates Foundation, the vaccine industry, public health institutions and NGOs. The Vaccine Fund is a new financing resource created to support the GAVI immunization goals, providing financial support directly to low-income countries to strengthen their immunization services and to purchase new and under-used vaccines.

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For more on GAVI see www.vaccinealliance.org.
For more on the measles initiative, see www.measlesinitiative.org.

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# Annex 2


# CAPE TOWN MEASLES DECLARATION
## 17 October 2003

**ALARMED** that in 1999 alone an estimated 875,000 infants and children died from measles, and that measles continues to cause hundreds of thousands of child deaths each year, especially in developing countries;

**STRESSING** the importance of achieving the goals adopted by the United Nations General Assembly Special Session on Children in 2002 and the World Health Assembly in 2003 to reduce measles deaths by 50% compared with 1999 levels by the end of 2005, and the United Nations Millennium Declaration target to reduce the under-five child mortality rate by two-thirds by the year 2015 compared with 1990 levels;

**RECOGNIZING** that measles deaths are primarily due to lack of immunization with existing safe, effective and inexpensive measles vaccines and incomplete implementation of proven strategies;

**NOTING** the critical importance of continuing to strengthen routine immunization services, including the provision of a second opportunity for measles immunization, as the foundation of a comprehensive strategy to reduce measles deaths sustainably and the essential role of surveillance in monitoring and guiding measles control efforts;

**HIGHLIGHTING** the importance of developing multi-year immunization plans, the full integration of measles mortality reduction activities with other national health goals and mobilizing necessary human and financial resources for sustainable measles mortality reduction;

**WELCOMING** the remarkable progress that has been made by the Region of the Americas in interrupting measles virus circulation and the ongoing efforts in Africa, with strong support from the Measles Initiative to reduce measles deaths;

**Those present at the Global Meeting for Sustainable Measles Mortality Reduction and Immunization Systems Strengthening declare our intent to:**

**SUPPORT** the WHO/UNICEF Global Strategic Plan for Measles Mortality Reduction and Regional Elimination, 2001-2005 with special attention to increasing routine measles immunization coverage to at least 90 per cent coverage in all countries, combined with providing all children with a 'second opportunity' for measles immunization either through the routine immunization schedule or periodic supplemental immunization activities;

**WORK TOGETHER** to identify the human and financial resources to strengthen immunization and health systems and to reduce measles deaths throughout the world;

# Annex 3

## WHO/UNICEF Framework for Collaboration to ensure sustainable measles mortality reduction

To achieve sustainable reduction of measles it is important to set out a framework for good practice. Based on experience gained in a number of countries, at a Measles Informal Consultation in held in Geneva in January 2002, WHO and its partners identified and agreed upon criteria that should be used to assess national plans of actions, so that the sustainability objective is achieved. These criteria are outline below.

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The following criteria should be satisfied before embarking on accelerated measles control efforts or there should at least be a commitment by the country and its partners to fulfil them in timely manner.

1. There must be a multi-year immunization plan including measles activities, with a detailed 1-year work-plan, both endorsed by the national inter-agency coordinating committee (ICC) and with a clearly defined role for all key stakeholders.

2. The plan should include a defined strategy, financing plan and adequate human resources (technical support) to sustain the impact for at least 5 years. This involves identifying and addressing the reasons for low coverage to ensure that at least 90% of children receive a first opportunity for measles immunization, and providing a second opportunity for measles immunization through either routine immunization or measles supplementary immunization activities, as appropriate.

3. If measles supplementary immunization activities are implemented, they should be in accordance with broader country and regional immunization and health goals, and include funding for a comprehensive evaluation plan. When conducting measles supplementary immunization activities, the priority is to protect children at highest risk from dying from measles (in general children <5 years), as well as those in older age groups as they are often important sources of measles virus infection for young children.

4. Measles surveillance activities should be in place, or in the process of being established, to obtain and analyse basic data for monitoring and evaluating impact. These activities should be built on existing infrastructure (e.g. AFP surveillance) and facilitate development of integrated surveillance systems.

**5.** Countries with large populations or those experiencing complex emergencies represent an opportunity for partners to work in close collaboration in reducing measles deaths. Sufficient planning time is essential to ensure high-quality and sustainable impact of measles mortality reduction activities. Careful assessment of feasibility and operational issues (e.g. considering progressive implementation by geographic area and/or age group) is needed, particularly in polio-endemic countries, to ensure that measles mortality reduction and polio-eradication activities are synergistic.

# Annex 4

## WHO/UNICEF "best" estimate of routine measles vaccination coverage in the 45 priority countries for sustainable measles mortality reduction activities, 1998-2002

| Country | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| Afghanistan | 40 | 40 | 35 | 46 | 44 |
| Angola | 65 | 46 | 41 | 72 | 74 |
| Bangladesh | 72 | 76 | 76 | 76 | 77 |
| Benin | 66 | 75 | 68 | 65 | 78 |
| Burkina Faso | 46 | 46 | 46 | 46 | 46 |
| Burundi | 76 | 75 | 75 | 75 | 75 |
| Cambodia | 52 | 55 | 65 | 59 | 52 |
| Cameroon | 57 | 62 | 62 | 62 | 62 |
| Central Afr Rep | 39 | 37 | 36 | 35 | 35 |
| Chad | 30 | 30 | 42 | 36 | 55 |
| Congo | 21 | 23 | 34 | 35 | 37 |
| Côte d'Ivoire | 66 | 62 | 73 | 61 | 56 |
| DR Congo | 20 | 15 | 46 | 37 | 45 |
| Djibouti | 21 | 23 | 50 | 49 | 62 |
| Equatorial Guinea | 82 | 51 | 51 | 51 | 51 |
| Eritrea | 81 | 88 | 86 | 84 | 84 |
| Ethiopia | 46 | 27 | 52 | 52 | 52 |
| Gabon | 56 | 55 | 55 | 55 | 55 |
| Ghana | 73 | 73 | 84 | 81 | 81 |
| Guinea | 52 | 52 | 52 | 52 | 54 |
| Guinea-Bissau | 61 | 70 | 59 | 48 | 47 |
| India | 51 | 50 | 56 | 56 | 67 |
| Indonesia | 71 | 71 | 73 | 76 | 76 |
| Kenya | 78 | 76 | 77 | 78 | 78 |
| Lao | 71 | 71 | 42 | 50 | 55 |
| Liberia | NA | NA | 52 | 78 | 57 |
| Madagascar | 46 | 55 | 55 | 55 | 61 |
| Mali | 54 | 52 | 49 | 37 | 33 |
| Mozambique | 58 | 58 | 58 | 58 | 58 |
| Myanmar | 85 | 85 | 84 | 73 | 75 |
| Nepal | 72 | 72 | 71 | 71 | 71 |
| Niger | 35 | 36 | 34 | 51 | 48 |
| Nigeria | 40 | 40 | 40 | 40 | 40 |
| Pakistan | 55 | 56 | 56 | 57 | 57 |
| Pap New Guinea | 59 | 57 | 68 | 58 | 71 |
| Rwanda | 78 | 78 | 74 | 69 | 69 |
| Senegal | 62 | 60 | 48 | 48 | 54 |
| Sierra Leone | NA | 62 | 37 | 53 | 60 |
| Somalia | 47 | 38 | 38 | 36 | 45 |
| Sudan | 49 | 53 | 47 | 67 | 49 |
| Togo | 50 | 57 | 58 | 58 | 58 |
| Uganda | 53 | 57 | 56 | 61 | 77 |
| Tanzania | 78 | 72 | 78 | 83 | 89 |
| Viet Nam | 96 | 93 | 97 | 97 | 96 |
| Zambia | 85 | 85 | 85 | 85 | 85 |

# Annex 5

### Estimated Costs of Measles Mortality Reduction Activities, 2004-5

Costs have been estimated by combining the costs of bundled vaccine, syringes and safety boxes with the estimated operational costs of providing the second opportunity for measles immunization as part of the comprehensive strategy. The operational costs include: transport, training, per diems, injection safety, social mobilization, cold chain strengthening and surveillance. These estimates need to be considered as general estimates only. Actual costs vary both between and within countries. The five larger targeted countries with a population over 100 million (India, Indonesia, Pakistan, Bangladesh and Nigeria) will conduct multi-year phased supplementary immunization activities to implement the second opportunity most of them starting in 2005.

The following assumptions have been made in estimating costs:

- Vaccine/syringe cost = $0.29/dose
- Operational costs = $0.60/child vaccinated
- Wastage rate for vaccines/syringes = 10%

**Table 1. Financial resource requirements to provide a second opportunity for measles immunization in the 45 WHO/UNICEF priority countries by donor supported activity and by country size, 2004-2005**

| Year | Children Targeted | Vaccine Cost | Ops Cost | Total | Local Funding | Partner Pledges | Funding gap |
|---|---|---|---|---|---|---|---|
| **2004** | | | | | | | |
| Group 1 | 94,414,000 | $27,380,060 | $56,648,400 | $84,028,460 | $17,702,600 | $41,542,160 | $24,783,700 |
| Group 2 | 32,127,000 | $9,316,830 | $19,276,200 | $28,593,030 | $12,047,792 | $14,135,880 | $2,409,358 |
| **TOTAL** | 126,541,000 | $36,696,890 | $75,924,600 | $112,621,490 | $29,750,392 | $55,678,040 | $27,193,058 |
| **2005** | | | | | | | |
| Group 1 | 32,815,000 | $9,516,350 | $19,689,000 | $29,205,350 | $6,152,815 | $10,336,725 | $12,715,810 |
| Group 2 | 173,533,000 | $50,324,570 | $104,119,800 | $154,444,370 | $73,076,100 | $54,662,895 | $26,705,375 |
| **TOTAL** | 206,348,000 | $59,840,920 | $123,808,800 | $183,649,720 | $79,228,915 | $64,999,620 | $39,421,185 |

Group 1 Countries: Priority countries with population less then 100 million.

Group 2 Large Countries: India, Indonesia, Pakistan, Bangladesh and Nigeria

**Figure 1. Financial resource requirements to provide a second opportunity for measles immunization in the 45 WHO/UNICEF priority countries, 2004-2005**