

# Monitoring Child Survival Programmes in Africa: The Africa Child Survival Initiative— Introduction

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This supplement attempts to document the child survival impact of the CCCD (Combating Childhood Communicable Diseases\*) projects of the Centers for Disease Control in two countries of sub-Saharan Africa—Liberia and Zaire. The CCCD interventions were implemented by ministries of health in these countries, and the activities were supported by grant funds from the US Agency for International Development.

The supplement is organized into three sections. There are two introductory pieces, six articles on survey work, and two summary pieces. The two introductory papers include, an overview of the CCCD programme and the MUHS (Mortality and Use of Health Services) survey project by Foster and a descriptive framework of the methods planned for use in the MUHS survey programme by Ewbank. For the two countries ultimately included in MUHS surveys, Liberia and Zaire, there are three articles each. The first paper outlines the methods and results of a

baseline mortality survey before the CCCD project began, the second paper describes the changes in health service provision brought about through the CCCD project and the third paper reports on the repeat survey after the programme had been functioning for 4–5 years. Ewbank interprets the overall achievements and implications of the MUHS surveys in a final paper, while Chen *et al.* provide an alternative perspective on the methods and results.

This supplement, therefore, provides a single coherent body of work on the MUHS surveys that attempts to document the mortality impact of the CCCD programme. An equally important objective is to draw lessons about the more general question of how and when we should measure the impact of health service interventions in developing countries without vital registration systems. While the record of these surveys is carefully laid out, readers may not agree on the interpretations or the implications. Nevertheless, as a body of work, the MUHS programme is a substantial and significant contribution. It provides a rare empirical evaluation of birth history and pregnancy history survey questions through re-interviews of the same mothers.

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# Background

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In Africa, 10–30% of infants born alive die before 5 years of age. As many as 70% of these deaths have been attributed to four groups of infectious diseases: diseases preventable by immunization (measles, neonatal tetanus, and pertussis), malaria, diarrhoea, and acute respiratory tract infection.<sup>1</sup> Selective primary health care, as popularized by Walsh and Warren, addresses the major causes of infant and child morbidity and mortality,<sup>2</sup> and places priority on selected, appropriate, low-cost primary care preventive and treatment strategies. This approach is exemplified by the UNICEF support for GOBI (Growth Monitoring, Oral Rehydration, Breastfeeding, and Immunization). After a decade in which a large proportion of national and international primary care resources have been allocated to these selective strategies, an assessment of their effectiveness is appropriate. Gdomski, Black, and Mosley write: 'While effective in more controlled settings, the large-scale implementation of these (selective) interventions is fraught with problems of limited access, lack of effective targeting, inadequate training of health professionals, lack of co-ordination with other programs, poor community acceptance, and lack of effective use of services'.<sup>3</sup> The effectiveness of child survival strategies is being questioned.<sup>4</sup>

The articles in this supplement report on the activities of the Africa Child Survival Initiative—Combating Childhood Communicable Diseases (CCCD) project and provide an assessment of the impact of national child survival programmes.<sup>5–12</sup> Over the last 10 years (1981–1991), CCCD, along with WHO and UNICEF, has worked with 13 African countries with an aggregate population of 180 million (Burundi, Central African Republic, People's Republic of Congo, Cote d'Ivoire, Guinea, Lesotho, Liberia, Malawi, Nigeria, Rwanda, Swaziland, Togo, Zaire). These countries account for 40% of sub-Saharan births. Funded by the US Agency for International Development (USAID), CCCD has three major objectives:

1. Strengthening the public health capacity of African communities, health systems, and

governments to improve the health and survival of its children;

2. Reducing morbidity, mortality, and disability caused by malaria, diarrhoea, measles, neonatal tetanus, poliomyelitis, and pertussis; and
3. Reducing under-5 mortality.

The Centers for Disease Control (CDC) in Atlanta provides technical assistance and consultation to participating African countries including the assignment of technical officers to work within Ministries of Health.

## CCCD TARGETS

During the project development phase (1980–1981), discussions were held with African countries, other bilateral agencies, WHO and UNICEF about the needs and opportunities in sub-Saharan Africa for technical assistance in child survival. While the original programme design focused on immunization and diarrhoea, African health officials identified malaria as an essential component in any effort to improve child survival. Treatment of fever or malaria with antimalarial drugs was added to the programme agenda, initially as an operational research component and later as an intervention strategy. Regional targets were established to facilitate programme design, monitoring, and evaluation. Over the last 10 years, these targets have been modified to reflect national, regional, and global experience. The immunization coverage target was increased from 50% to 80%, a target of 25% reduction in under-5 mortality was added, and the diarrhoeal disease target was changed from a 50% reduction in diarrhoeal episodes to a 50% reduction in inpatient diarrhoeal deaths. Table 1 summarizes the 1990–1991 regional targets.

Prior to the initiation of CCCD activities, country assessments were carried out to determine needs, identify resources, and establish country-specific targets and workplans. Regional targets were adjusted to meet the needs, priorities, and realities of the participating countries. In some countries, the programme was national in scope. In two others, project activities were limited to specific geographical areas, e.g. 3 of 34 prefectures in Guinea and 207 of 304 health zones in Zaire.

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TABLE 1 *CCCD targets*

Category	Indicator	Target %
<b>Community treatment</b>		
Fever	% Treated with antimalarial drug	50
Diarrhoea	% Treated with ORT <sup>a</sup> and feeding	50
<b>Facility case management</b>		
Fever	% Treated with antimalarial drug	80
Diarrhoea	% Treated with ORT	80
<b>Coverage</b>		
Infants	BCG, DPT × 3, polio × 4, measles	80
Pregnant women	TT	60
<b>Morbidity (Community)</b>		
Measles	Incidence compared to baseline	-50
Poliomyelitis	Incidence compared to baseline	-50
<b>Morbidity (Hospital)</b>		
Neonatal tetanus	Incidence compared to baseline	-50
<b>Mortality (Hospital)</b>		
Malaria	Mortality compared to baseline	-50
Diarrhoea	Mortality compared to baseline	-50
<b>Under-5 mortality (Community)</b>		
	Infant, child, and under-5 mortality rate	-25

<sup>a</sup> ORT = oral rehydration therapy.

### PROGRAMME IMPLEMENTATION

African capacity to carry out child health programmes is being strengthened through technical assistance in five overlapping areas referred to as support strategies. These strategies, reported elsewhere,<sup>13</sup> are summarized below as background information for the studies reported in this supplement.

#### *Health Information Systems (HIS)*

At the onset of the CCCD programmes, most national HIS were manual archival systems which provided annual reports some 2–5 years after data collection. The goal of HIS development is to strengthen data collection, analysis, and feedback in order to facilitate informed decision-making. CCCD inputs have included the provision of computer equipment and software, short-term and on-the-job training, and system development. In 1990, 8 of 10 countries completed their analyses and reporting of 1989 data by 1 May 1990.

#### *Training*

Initial training efforts were designed to support the adaptation and use of the Expanded Programme on Immunization (EPI) and Control of Diarrhoeal Disease (CDD) supervisory skills courses developed by WHO.<sup>14,15</sup> A major CCCD initiative was the development of facility-based surveys. Through on-site visits to a sample of health facilities, trained observers assessed: 1) availability of equipment, supplies, and drugs; 2) health worker performance in immunization (sterilization, screening, vaccination, and health education) and clinical management of diarrhoea and malaria (clinical assessment, treatment, and health education); and 3) child caretaker's understanding of follow-up actions needed (as determined from exit interviews). These facility-based assessments led to a reorientation of training priorities that included the development of a unit responsible for continuing education, the decentralization of training to district level, and a shift in training emphasis from short-term

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didactic 'hotel based' courses to skill building training, e.g. diarrhoeal disease demonstration training units, and to practical on-the-job continuing education and supervision.

#### *Health Education*

In Africa, initial treatment for most child illnesses occurs in the home or community. Because of the lack of access to formal government or private health facilities, resources to treat ill children are frequently limited to the home, medicine sellers, pharmacies, and local practitioners (many of whom are unlicensed). Health education services have used focus groups and surveys to assess current community practices.<sup>16-18</sup> These data are used in the design, testing, implementation, and evaluation of strategies to improve community practices. Regional courses in health education for national and district level managers have been established at the African Regional Health Education Center in Ibadan, Nigeria (anglophone), and at the University of Kinshasa School of Public Health, (Zaire) (francophone).

#### *Operational Research (OR)*

The operational research component of CCCD has two objectives: 1) development of African research capability through the strengthening of national research review mechanisms and the awarding of research grants; and 2) identification and removal of obstacles constraining the achievement of programme targets. Over 50 individual research projects have been funded by CCCD over the decade including 36 projects funded through a formal OR review process in Nigeria. Regional research projects have included a prospective study of malaria chemoprophylaxis in 4000 pregnant women in Malawi,<sup>19</sup> a city-wide trial of Edmonston-Zagreb vaccines in Kinshasa, Zaire,<sup>20</sup> and clinical and anthropologic studies on acute respiratory infection in Lesotho.<sup>21</sup>

#### *Health Care Financing*

In Africa, government resources for health are shrinking and are inadequate to meet basic needs for preventive and curative services. CCCD inputs have included technical consultation to national policy dialogues on health financing issues in the Central African Republic; development of revolving drug funds in Zaire, Liberia, and Guinea; and assessment of cost-effectiveness of intervention strategies in Malawi,<sup>22</sup> Lesotho, and Swaziland.

### MONITORING OF PROGRESS TOWARD TARGETS

Progress toward the quantitative targets listed in Table 1 are monitored at the local, regional and national

levels. Data collection methods include sentinel surveillance, routine reporting of service statistics and morbidity, facility assessments of health worker performance, coverage surveys, and special studies. Annually, during the first quarter of the year, national authorities summarize and analyse data on programme activities, morbidity, and mortality to assess progress toward targets. These data are summarized in a bilingual annual report and distributed to district level managers in participating countries.<sup>23</sup> Four examples of data collected to assess morbidity and mortality, and to monitor progress toward national and regional targets are summarized below.

#### 1. *Malaria and Anaemia Mortality*

As *Plasmodium falciparum* chloroquine resistance has spread into west Africa,<sup>24</sup> the percentage of paediatric deaths attributed to malaria and anemia at the Centre Hospitalier Universitaire paediatric unit in Lome, Togo has increased (Figure 1). Alternative and backup treatment schedules are being tested.

#### 2. *Quality of Diarrhoea Treatment*

Facility assessments of diarrhoea treatment practices in eight countries have documented suboptimal compliance with diagnostic and treatment standards established by WHO (Figure 2). CCCD inputs are being used to strengthen hands-on training in diarrhoea treatment, in-service education, and supervision. In health facilities with good diarrhoea treatment practices, paediatric diarrhoea admissions, deaths, and costs have decreased.<sup>25</sup>

#### 3. *Immunization Coverage*

Using reports of vaccination doses administered in the first year of life and estimates of the number of surviving infants; local, regional, and national vaccination coverage rates are monitored on an annual basis. Figure 3 compares 1984 and 1990 measles vaccine coverage for countries active in the programme in 1990.

Improvements in coverage have been independently verified through use of cluster sample surveys of home-held vaccination records.

#### 4. *Measles Incidence*

Sentinel and, where available, national surveillance data are used to assess disease incidence trends over time and to measure vaccine effectiveness. Data from four countries document declining measles incidence rates (Figure 4).

Outbreak investigations have documented measles vaccine efficacy rates ranging from 70 to 85%.

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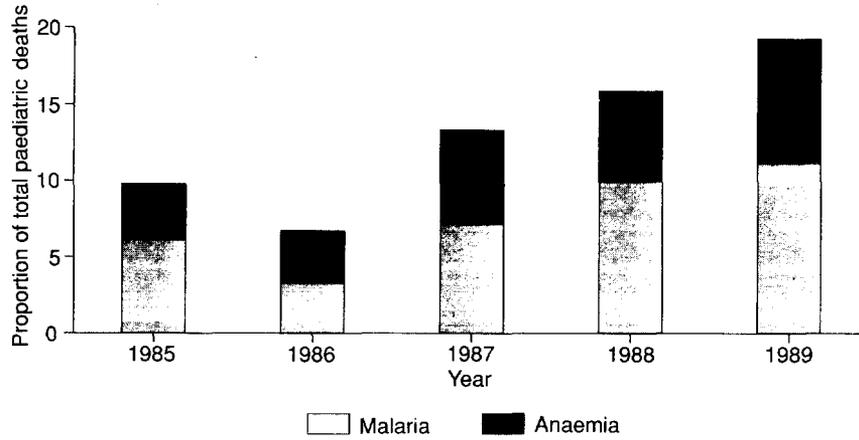


FIGURE 1 Anaemia and malaria deaths Child Health Unit Lome, Togo, 1985-1989

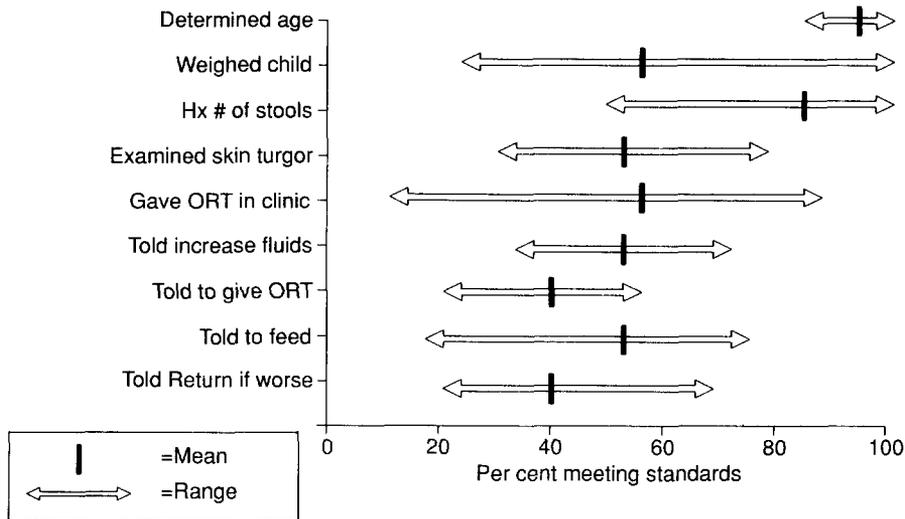


FIGURE 2 Diarrhoea treatment practices—health facilities in eight African countries: % meeting standards

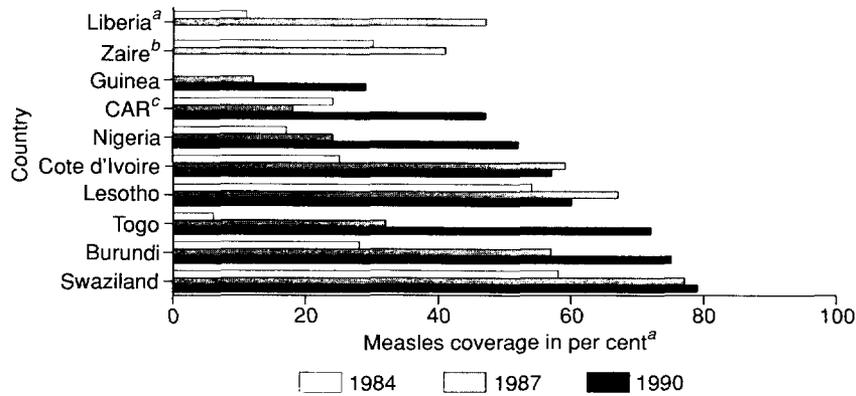


FIGURE 3 Measles vaccine coverage 10 African Countries, 1984, 1987, and 1990  
<sup>a</sup>Measles vaccinations under one divided by surviving infants <sup>b</sup>1990 data not available <sup>c</sup>CAR = Central African Republic

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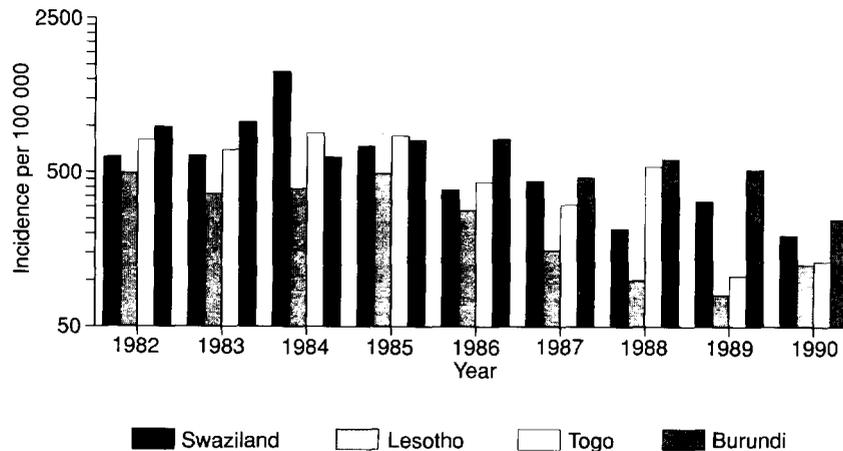


FIGURE 4 Measles incidence per 100 000 Swaziland, Lesotho, Togo, Burundi

#### MEASURING PROGRAMME IMPACT—MUHS SURVEYS

During an early evaluation of the programme, the lack of a methodology to assess the impact of national child survival programme on under-5 mortality was identified as a programme deficiency. In consultation with demographers from the University of Pennsylvania, Johns Hopkins School of Hygiene and Public Health, and Princeton University's Office for Population Research, CDC developed a strategy to assess the levels of infant and child mortality and in the community use of immunization, ORT for diarrhoea, and chemotherapy for fever/malaria.<sup>5</sup> Data from these surveys are provided in eight papers in this supplement.<sup>5-12</sup>

Initially, it was planned to carry out surveys in each of the 13 countries participating in CCCD. Liberia, Togo, and Zaire were selected as the first three countries for survey implementation. Their selection was based on the timing of the initiation of programme activities, the interest of the relevant ministry of health in undertaking these studies, and the availability of qualified staff. However, after the initial experience with baseline studies in these three countries and in view of their high resource demands, it was decided not to undertake additional surveys and to limit the follow-up surveys to the two countries with highest mortality (Liberia and Zaire). A follow-up study was not carried out in Togo because of the large sample size required to show a change in mortality.

The papers in this supplement are presented to share one technical assistance programme's experience in assessing the effectiveness of national child survival strategies in providing selected primary health care services and reducing infant and child mortality. Each of the two country's MUHS experience is detailed in

three articles: baseline studies of mortality,<sup>6,9</sup> levels and changes in the use of health services,<sup>7,10</sup> and post-intervention data on mortality.<sup>8,11</sup> While these data are useful in assessing the impact of two programmes, it is our expectation that these articles will contribute to the further development of strategies to monitor progress toward the Year 2000 targets endorsed at the World Summit for the Child.<sup>26</sup>

#### ACKNOWLEDGEMENTS

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# A Strategy for Evaluating the Mortality Impact of Child Survival Programmes in Africa: Combatting Childhood Communicable Diseases Project

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The Mortality and Use of Health Services surveys were designed to measure the mortality impact of the Combatting Childhood Communicable Diseases programmes which are based on childhood vaccinations, prenatal immunization against tetanus, home-based use of oral rehydration therapy, and presumptive treatment of malaria. The survey design includes pretest and post-test surveys in programme and non-programme areas. The questionnaires are designed to collect information on use of health services and on pregnancy histories to provide retrospective reporting of child mortality. When combined with data from surveillance systems (particularly information on cases of measles cases seen at clinics and health centres), these data should provide reasonable estimates of programme impact.

There is increasing pressure from national governments and international and bilateral funding agencies for health programmes to demonstrate that they have been successful. The measures of success that have been used range from number of health workers trained to days of healthy life saved. While information on the quantity and quality of services delivered are an important part of any programme evaluation, data on mortality and morbidity are more closely linked to the stated goals of these programmes, namely improving the health of the population. Despite the importance of mortality in programme goals, measurement of programme impact on mortality is generally only feasible for field trials and large health delivery programmes. For many programmes, evaluation of mortality impact is prohibitively expensive. For most programmes it is generally adequate to demonstrate that they have delivered services of documented quality in sufficient quantity to have had an impact. However, in order for programme managers to assert that service delivery implies mortality reduction, they must be able to point to studies that have demonstrated the impact of similar programmes on mortality.

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A number of carefully designed health programmes have been evaluated in terms of mortality impact. However, there are very few evaluations of the mortality impact of typical health programmes that do not involve extra personnel (often expatriates), extra inputs (e.g. availability and servicing of vehicles, cold chain equipment), and additional training and supervision. Although these studies are very important in establishing the potential of these programmes, they do not necessarily reflect the impact that might be expected from standard government health programmes in most countries. It is important, therefore, to attempt to measure the impact of typical programmes.

This paper describes the general approach used in two countries to evaluate the programmes implemented by the Ministries of Health in 13 African countries with assistance from the US Agency for International Development (USAID) as part of the Combatting Childhood Communicable Diseases (CCCD) programme. In 11 of these countries, the programmes were evaluated using coverage surveys and other types of process surveys.

The programmes in two countries carried out surveys on Mortality and Use of Health Service (MUHS). The basic design included pretest and post-test surveys in programme and, if possible, in non-programme areas.