

The Multi-country Evaluation of IMCI Effectiveness, Cost and Impact (MCE)

PROGRESS REPORT

May 2001 - April 2002



DEPARTMENT OF
CHILD AND ADOLESCENT
HEALTH AND DEVELOPMENT

WORLD HEALTH ORGANIZATION



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Acknowledgements

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The ministries of health of the countries participating in the project and the WHO staff assigned to those countries have striven greatly to find the best ways of applying IMCI to the improvement of child health and to interpret the preliminary results, and we are most grateful for their efforts.

Among the many technical and financial supporters of this work, special acknowledgement is due to the Bill and Melinda Gates Foundation, the United States Agency for International Development, and the Tanzania Essential Health Interventions Project.

The contributions of the investigators, economists and others who have contributed to the project over the past year in Bangladesh, Brazil, Cambodia, Kazakhstan, Niger, Peru, Tanzania and Uganda have been much appreciated.

Cesar Victora and the other MCE Technical Advisors have shown unstinting commitment to the project, and it is a pleasure to acknowledge their generosity in sharing their time and expertise, and their wisdom.

Executive Summary and Highlights

Integrated Management of Childhood Illness (IMCI) is a strategy for reducing child mortality and improving child health and development. It comprises complementary interventions at the community, health-facility, and health-system levels. The efficacy of most of the health-facility treatments has been rigorously tested in controlled trials. There remains the need to determine the impact of the community and health-system aspects of the strategy as a whole in terms of health outcomes, and its cost-effectiveness. Further information on IMCI is available at <http://www.who.int/child-adolescent-health>.

Multi-Country Evaluation of IMCI Effectiveness, Cost and Impact (MCE) is a project coordinated by the Department of Child and Adolescent Health and Development (CAH) of the World Health Organization in Geneva, with support from the Bill and Melinda Gates Foundation. Impact and cost-effectiveness studies are under way in Bangladesh, Brazil, Peru, Tanzania and Uganda. These sites were selected as a result of a worldwide review of possible sites, with site-visits to 12 countries, and the application of a standard set of criteria.

The objective of MCE is to evaluate the impact of IMCI on improving child health and its cost-effectiveness. A major aim is to help determine the best ways of delivering integrated child health care, especially to poor children and families. Its outcome is expected to contribute to the improved delivery of effective interventions for child survival, health and development at high and sustained levels of coverage.

MCE is a collaborative undertaking. Ministries of health are active partners in all the participating countries, as are WHO country and Regional Office staff. The United States Agency for International Development (USAID) is supporting the MCE impact study in Uganda, implemented by The Johns Hopkins University and Makerere University. USAID is also supporting the development and evaluation of the community component of IMCI as part of the project in Bangladesh.

This report provides a summary of MCE work to date, and directions for the future. The 2000–2001 report provided a detailed description of MCE methods and analytic plans; results of the baseline household surveys in Bangladesh, Tanzania and Uganda; and preliminary findings from the health facility survey in Tanzania. This year, the *Report* focuses on the lessons learned from MCE, particularly about the implementation and scaling-up of child health programmes, including IMCI, and preliminary findings on inequities in child health and health care.

Further information about MCE is available at: <http://www.who.int/imci-mce>.



Participants in the 2001 MCE Annual Meeting at Jinja, Uganda

Highlights

- Findings from the series of 12 **country reviews** used to identify sites for MCE have contributed to an improved knowledge-base about the barriers to implementing and scaling up interventions for child health, including IMCI. Further lessons about challenges to implementation are being learned from the five sites selected for studies on impact and cost-effectiveness: Bangladesh, Brazil, Peru, Tanzania and Uganda. (Chapter 3)
- MCE is yielding **new theoretical approaches and methodologies for large-scale cost-effectiveness studies**, including improved methods of economic analyses, plans for dose-response analyses in several countries, and a critique of existing frameworks for effectiveness studies of complex intervention strategies. (Chapter 4)
- Using MCE *Guidelines for Equity Analyses*, investigators in Tanzania and Bangladesh have produced **results on child health inequity** between the poor and the very poor in children's nutritional status, in access to and utilization of health interventions, and in key household practices associated with child health. (Chapter 5)
- This year, MCE **expanded its collaborative network** to include work on child health and equity with the World Bank and the Rockefeller Foundation. (Chapter 6)
- MCE has **developed a website** based on the recommendations of investigators and advisors (<http://www.who.int/imci-mce>). Two **electronic working groups** have been established: one for technical issues related to equity analyses within MCE, and one for dose-response analyses (Chapter 6).

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1 Introduction and overview

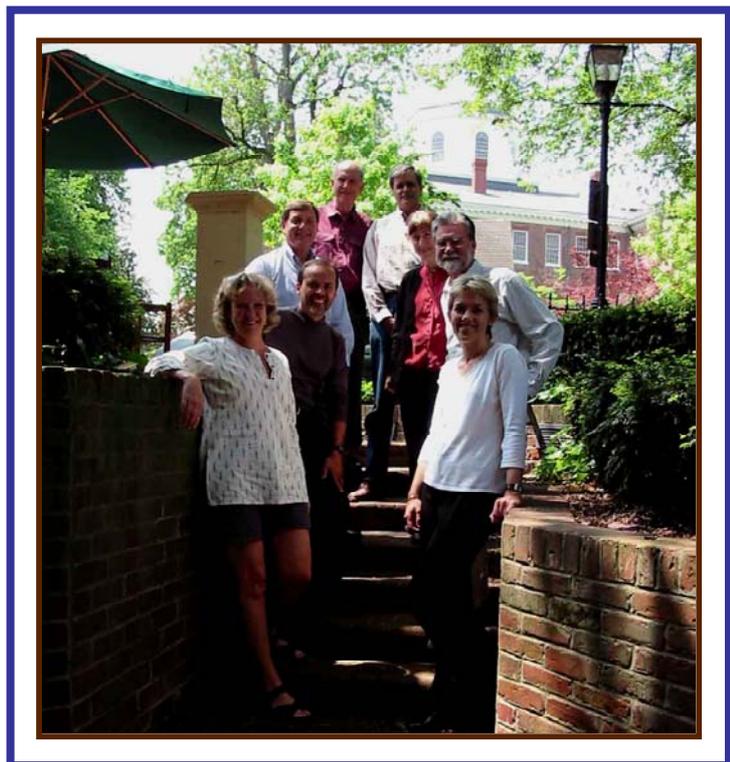
Integrated Management of Childhood Illness (IMCI)

IMCI is a strategy for improving the health of children, developed by UNICEF and WHO in the 1990s, with the specific aim of reducing child mortality. IMCI comprises complementary interventions at the community, health-facility, and health-system levels. The efficacy of the health-facility treatments included in the strategy has been rigorously tested in controlled trials. The community and health-system components of the strategy remain to be tested.

IMCI was introduced in Tanzania and Uganda in 1996. In the six years since then, over 80 additional countries have adopted IMCI, and significant experience has been gained in the early stages of its implementation. Those interested in learning more about IMCI are invited to visit <http://www.who.int/child-adolescent-health>.

The Multi-Country Evaluation of IMCI Effectiveness, Cost and Impact (MCE)

MCE is coordinated by the Department of Child and Adolescent Health and Development (CAH) of the World Health Organization, with support from the Bill and Melinda Gates Foundation, the United States Agency for International Development, and other partners. MCE is guided by a group of seven external technical advisors, representing expertise in epidemiology, public health programme evaluation (including population-based impact and cost-effectiveness studies), nutrition, and the major causes of under-five deaths in developing countries.



Pictured from left, CAH MCE Secretariat member Jennifer Bryce; MCE Advisors Cesar Victora, Robert Black, Jean-Pierre Habicht, Don de Savigny; Joanna Schellenberg; and Patrick Vaughan; CAH MCE Secretariat member Eleanor Gouws. MCE Technical Advisor not shown: David Evans.

MCE is a collaborative effort, sustained by strong partnerships at global, regional and country levels. Partners in the evaluation include ministries of health at each site, WHO country and Regional Office staff, technical assistance agencies, and leading academic institutions. A complete list of those working on MCE, including technical advisors and partners, is available in Annex 1.

MCE is designed to evaluate the impact of IMCI, and its cost-effectiveness, in improving child health. As shown in Box 1, its objectives also include determining the best ways of delivering integrated child health care, especially to poor children and families. Its results are expected to contribute to improved delivery of effective interventions for child survival, and child health and development, at high and sustained levels of coverage.

MCE is based on an impact model describing how the introduction of the IMCI strategy is expected to lead to reduce child mortality and improve child health and development. Computer simulations based on this model were carried out early in the development of IMCI, and demonstrated the need to improve key family-behaviour, especially care-seeking, for IMCI to achieve its full impact. A simplified version of the impact model is shown in Box 2.

Box 1

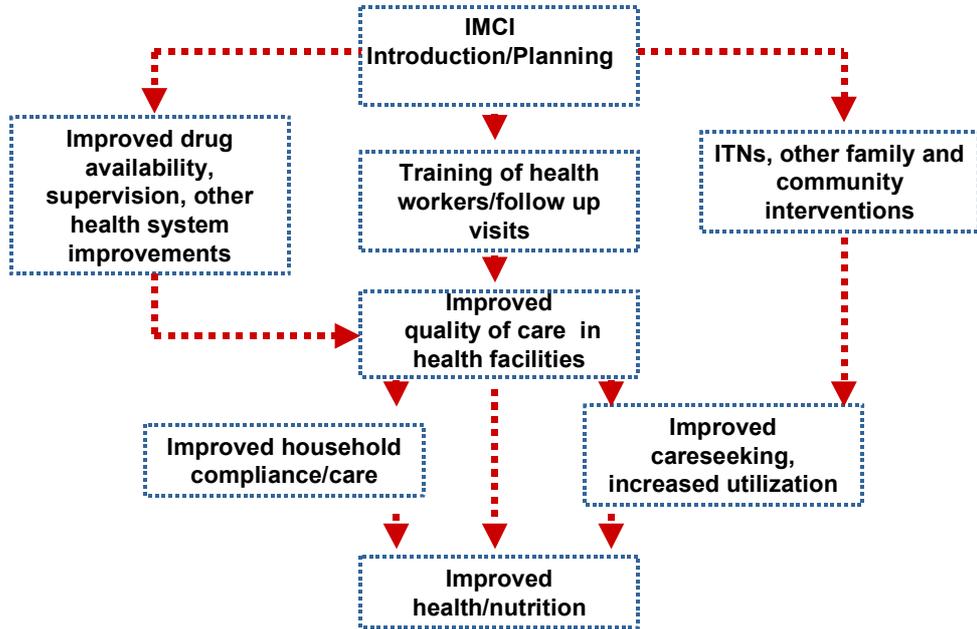
MCE Objectives

1. To evaluate the impact of the IMCI strategy as a whole on child health, including child mortality, child nutritional status, and family behaviours.
2. To evaluate the cost-effectiveness of the IMCI strategy.
3. To document the process and intermediate outcomes of IMCI implementation, as a basis for improved planning and implementation of child health programmes.

On the basis of this impact model, advisors and technical staff developed indicators and data-collection tools. As shown in Box 3, MCE has multiple levels of data-sets; cost data are collected at each level.

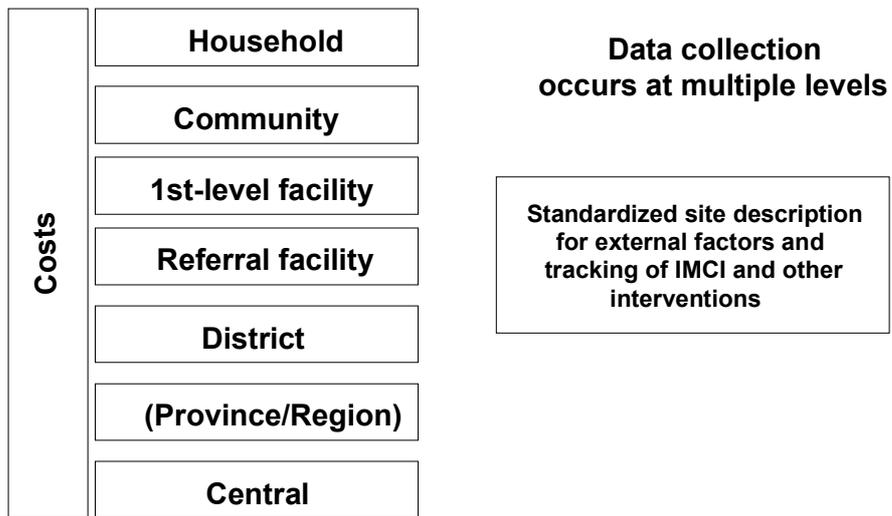
Box 2

A model of IMCI impact



Box 3

MCE Data



Box 4

A stepwise approach to public health programme evaluation

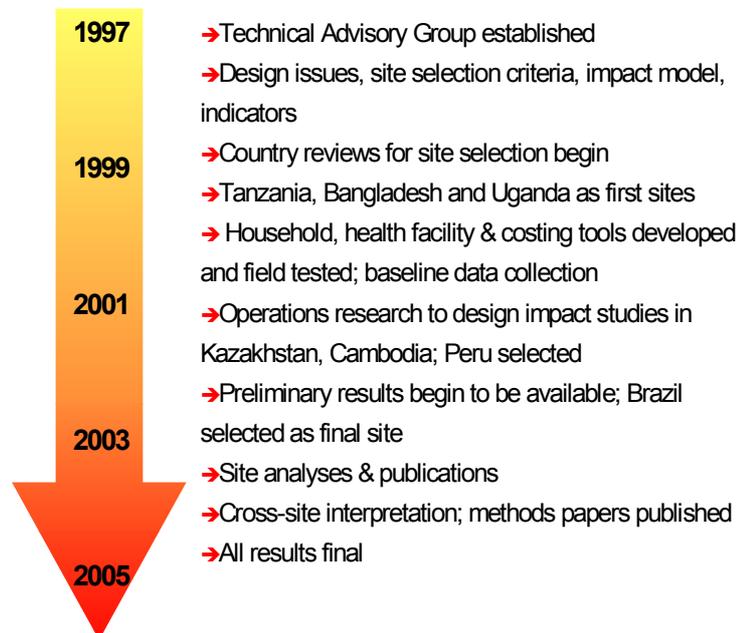
- ✓ Are services being provided?
 - At health facility level?
 - At the community level?
- ✓ Are services being used by the population?
 - ✓ Have adequate coverage levels been reached?
 - ✓ Is there an impact on health and nutrition?

A key feature of MCE is its stepwise design. As illustrated in Box 4, the process at each site moves sequentially through a series of questions designed to provide information on the adequacy of IMCI implementation, before moving on to coverage and eventual impact. It is assumed that a minimum of two years of IMCI implementation at adequate levels of coverage will be needed to achieve at least a 20% reduction in under-five mortality.

Experience with MCE illustrates the time and effort needed to design a sound evaluation of a multi-faceted set of public health interventions such as IMCI. As shown in Box 5, a period of over two years was needed to develop and test the impact model and the associated indicators and data-collection tools. A valuable contribution of MCE is the experience gained with the design of large-scale effectiveness studies. In addition, MCE aims to make its methods, indicators, measurement tools and analysis plans available for adaptation and use by others.

Box 5

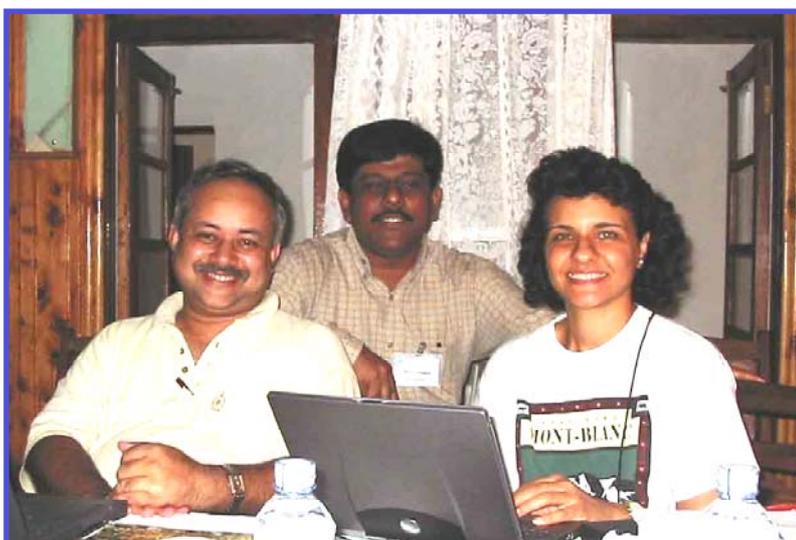
MCE Timeline



For a complete description of MCE design and methods, as well as copies of the indicators and data-collection tools, visit the MCE website at <http://www.who.int/imci-mce>.

Progress at MCE study sites in 2000–2001

In **Bangladesh**, the International Centre for Diarrhoeal Disease Research (ICDDR,B) is collaborating with the Ministry of Health (MoH) to conduct a prospective evaluation of IMCI. Over the past 12 months, the collection of baseline data was completed, and data entry, cleaning and analysis continued for the three baseline surveys: the demographic survey, the household practices survey, and the health-facility survey. Cleaning and analysis of the cost data are also under way, and preliminary results are expected in mid-2003. The Bangladesh site investigators work closely with the Ministry of Health, supporting the introduction of IMCI and ensuring that the interventions evaluated at the MCE site will be as similar as possible to those implemented nationwide.



MCE-Bangladesh Investigator Shams el Arifeen and Economist Shakil Ahmed with MCE Cost Coordinator Taghreed Adam at the 2001 MCE Annual Meeting in Jinja, Uganda.

In **Brazil**, the Ministry of Health collaborated with PAHO in developing a proposal for the collection of retrospective data for evaluation purposes in municipalities in four states. Comparative data will be collected from municipalities with both IMCI and the Family Health Programme (FHP), with IMCI but not FHP, and with neither IMCI nor FHP. The proposal was approved for funding by a panel of four external reviewers in March 2002. Preparations for the collection of the comparative information to support the sampling design are already well under way.

In **Peru**, the *Instituto de Salud del Niño* and the MoH are analyzing secondary data in all 25 districts of the country to assess the impact of IMCI. Preliminary results were presented to MCE advisors and investigators at the Jinja meeting in December 2001, and further analyses are ongoing.

In **Tanzania**, the Ifakara Health Research and Development Centre (IHRDC) is working with the Tanzania Essential Health Interventions Project (TEHIP), the Adult Morbidity and Mortality Project (AMMP), the MoH and others to collect comparative information from two intervention and two comparison districts. Baseline data were collected in 1999. Data cleaning and analyses were completed and a report of the survey is available. Preparation of manuscripts for publication continues. Tanzania was the first site in MCE to undergo a “start the clock” review, in which it was determined that the two-year period of full implementation necessary for impact began in August 2000 and will continue through August 2002. A site visit in September 2001 resulted in improved plans for documenting the IMCI process and in increased support for the Ministry of Health in the development and implementation of supervision and community-based activities designed to improve key family practices.

In **Uganda**, USAID is supporting The Johns Hopkins University in carrying out an evaluation together with the Institute of Public Health of Makerere University and the MoH. Baseline data have been collected in 10 districts at varying stages of IMCI implementation. This has also been a year of intense data cleaning and analysis for the Uganda site, and investigators have completed two rounds of continuous monitoring of IMCI implementation and immediate outcomes. Uganda hosted in the Jinja district the 2001 meeting of MCE Technical Advisors and Investigators.



Uganda MoH IMCI Coordinator Jesca Nsungwa with MCE-Uganda Investigator George Pariyo and WHO/AFRO MCE focal point Leslie Mgalula, singing “Malaika” for their MCE colleagues.

Operations research to determine the feasibility of impact studies in Cambodia and Kazakhstan

In **Cambodia**, the National Institute of Public Health was identified as an MCE collaborating institution in determining the feasibility of conducting an impact evaluation of IMCI. Two MCE country review missions were conducted in the past twelve months. The conclusion of the first review in May 2001 was that Cambodia would be an important site for MCE, especially because of the extremely high under-five mortality rate (estimated at 115 per 1000 live births for the period 1993–1998¹), but that a number of difficult issues including low levels of utilization of public health services and a strong private sector would make it difficult for IMCI implementation to reach the coverage levels needed to support an impact evaluation within the time frame of MCE. The recommendations of this first country review led to: (1) a contract with PATH-Cambodia to carry out a feasibility study on involving the private sector in the delivery of IMCI services; and (2) a stakeholders’ meeting on the evaluation of IMCI in Cambodia. The stakeholders’ meeting was held in October 2001, and provided an opportunity for a second in-depth country review to determine the feasibility of conducting an impact evaluation by 2005. The findings of the review, and careful analysis involving MCE technical advisors and secretariat, led to a decision in May 2002 that, although there was important progress in IMCI implementation in Cambodia, levels of population coverage would not be sufficient to support an impact evaluation within the timeframe of MCE.

¹ National Institute of Public Health, Cambodia. National Health Survey, 1998.



Girl waiting for her family outside a public health clinic in Cambodia.

In **Kazakhstan**, a series of country review missions carried out over the past 12 months resulted in an evidence-based decision that it would not be possible to design an evaluation of IMCI that would capture measurable changes in child nutritional status by 2005. The Kazakhstan Ministry of Health established a National MCE Steering Committee, and joined MCE and WHO staff in visits to potential oblasts and rayons. In early 2002 an operations research study was carried out to determine whether there were differences in the number of referrals from first-level facilities to referral hospitals between IMCI and non-IMCI areas. These results are now being used to support changes in policies to increase support for IMCI.

Cross-site developments in methods, analysis and dissemination

In June 2001, MCE advisors, investigators and their counterparts from the Ministries of Health met in Talloires, France to develop **procedures and criteria for “starting the MCE clock”** for the two-year period of implementation that will be evaluated in the prospective studies in the evaluation.

Major efforts in 2001-2002 were devoted to **cleaning and analyzing cost data** from Tanzania, Bangladesh and Uganda. The first analyses of the economic and financial costs of IMCI will be available by the end of 2002.

Work has begun on **analytic plans for dose-response studies** to be carried out in several of MCE sites. A statistician was recruited to support this and other approaches to the cross-site interpretation of findings.

The challenges of **documenting the process of IMCI implementation and measuring contextual factors** that may affect IMCI impact are being addressed by MCE investigators. Experiences in Tanzania, Uganda and Peru are being used as the basis for developing consistent approaches for use in other sites.

MCE data are being used to investigate **inequalities in access, utilization, quality of care and health and nutrition outcomes** in Tanzania and Bangladesh. This work has drawn the attention of technical staff at the World Bank and the Rockefeller Foundation, who have proposed further collaboration with MCE.

MCE **guidelines for publication and data use** were agreed upon. MCE investigators are working to publish their results as quickly as possible, with technical support from MCE. An MCE Publications and Data Use Committee was established.

MCE has developed a website based on the recommendations of investigators and advisors (<http://www.who.int/imci-mce>). Two **electronic working groups** have been established: one for technical issues related to equity analyses within MCE, and one for dose-response analyses.

One **paper drawing on MCE data was published** in a peer-reviewed journal; three are under review for publication and four manuscripts are in preparation, seven working documents and reports were prepared (not including the progress reports required in each site), and presentations about MCE were made at professional conferences and seminars. A complete list of MCE products is available in Annex 2.

Overview of the Report

The *2000-2001 MCE Progress Report* provided a detailed description of MCE methods and analytic plans, results of the baseline household surveys in Bangladesh, Tanzania and Uganda, and preliminary findings from the health facility survey in Tanzania. This year, the *Report* includes a summary of MCE work, but focuses on lessons learned about implementation and preliminary findings from the equity analyses.

Interest in the *2000-2001 MCE Progress Report* was high. Over 500 copies were distributed at country, regional and global levels, and follow-up requests for more information were numerous. This year's report has therefore been prepared with a broader public health audience in mind.

Section 2 provides a brief summary of preliminary findings from previous years of MCE, for readers who may be newcomers to the evaluation.

Section 3 describes the findings of the country reviews conducted to select MCE sites, and summarizes their implications for strategic approaches to scaling up delivery of child health services and achieving international goals for child survival, health and development.

Section 4 focuses on MCE progress in improving methods and tools for large-scale cost-effectiveness studies.

Section 5 presents preliminary findings from MCE equity analyses.

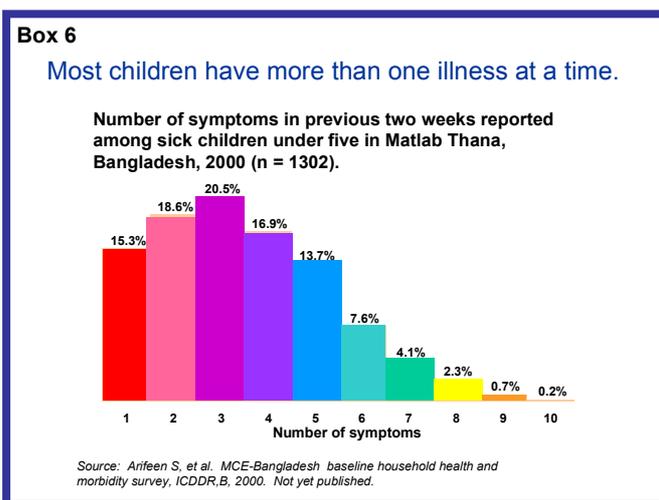
Section 6 focuses on partnerships and communications.

Section 7 reports on MCE management and administration.

2 Examples of MCE findings to date

A selection of MCE findings that have been reported previously are summarized here. A complete list of papers is available in Annex 2, and findings that have been cleared for dissemination by investigators are available at <http://www.who.int/imci-mce>.

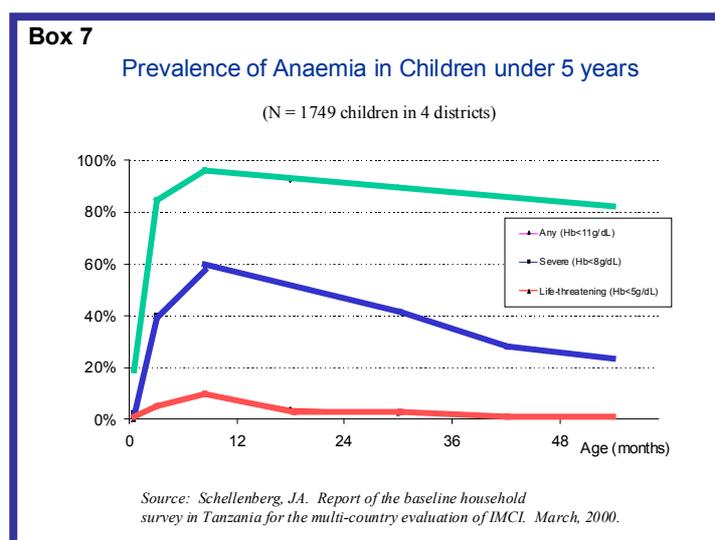
- **Children have multiple concurrent illnesses, underlining the importance of integrated care.**



An important rationale for the development of the IMCI strategy was the assumption that sick children often presented for care with more than one symptom requiring treatment. Box 6 shows the number of symptoms in the previous two weeks reported among a sample of 1302 children in MCE site in Bangladesh. Similar results have been obtained in Tanzania and Uganda.

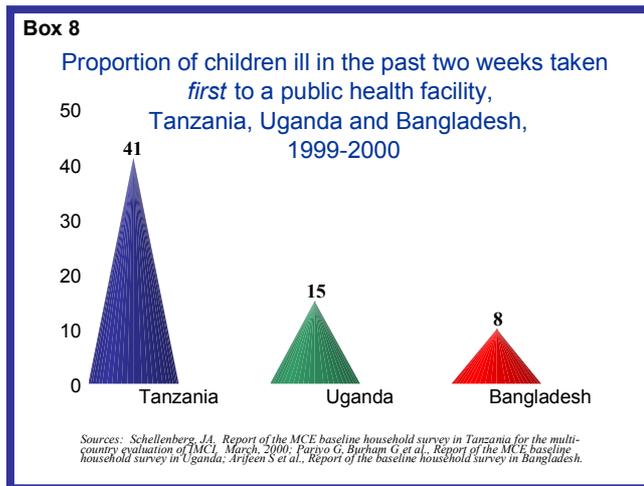
- **Very high levels of anaemia among children in Tanzania and Uganda.**

The standard MCE protocol for household surveys includes the collection of haemoglobin samples to determine levels of anaemia. As shown in Box 7, the prevalence of anaemia is extremely high in Tanzania, with almost 10% of children between the ages of six and 12 months having life-threatening anaemia. The full set of MCE results on anaemia in Tanzania is currently under review for publication.² Similar results were obtained in Uganda.



² Schellenberg D, Armstrong Schellenberg JA, Mushi A, de Savigny D, Mgalula L, Mbuya C, Victora C. The Silent Burden of Anaemia in Tanzanian Children: a Community-based Study. Submitted for publication.

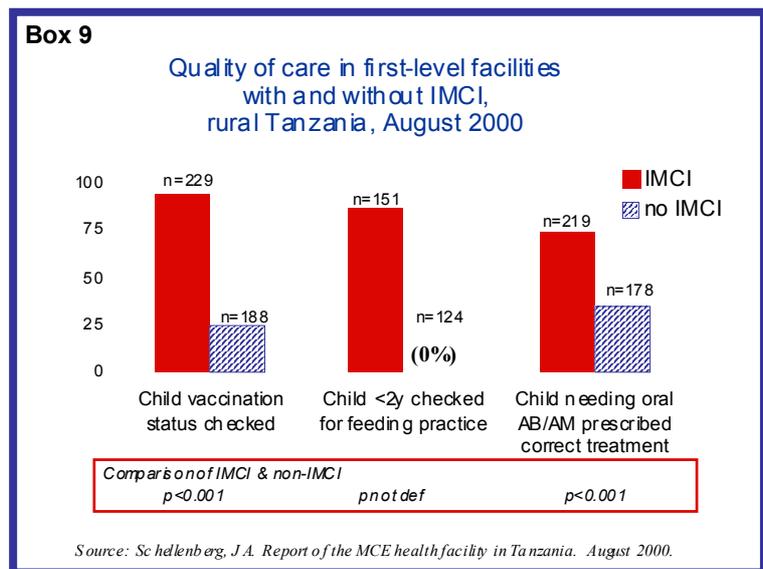
- **Wide variations between MCE sites in rates of utilisation for public health facilities suggest policies and programmes can make a difference.**



As shown in Box 8, an average of 41% of children in four rural districts in Tanzania were taken first to a public health facility. In Uganda the equivalent proportion is 15%, and in Bangladesh 8%. Further analyses are under way to understand the reasons for these variations in utilization.

- **IMCI is associated with dramatic improvements in the quality of case management in Tanzania.**

A health facility survey carried out in IMCI and non-IMCI districts in Tanzania in August 2000 showed that children seeking care at health facilities in IMCI districts were more thoroughly assessed and received better quality care than children seeking care in comparison districts where IMCI had not yet been implemented. A sample of quality indicators is presented in Box 9; the full report is currently being written up for publication.³



³ Tanzania IMCI multi-country evaluation health facility survey study group. Health care for under-fives in rural Tanzania: effect of Integrated Management of Childhood Illness on observed quality of care and health system support. Paper in preparation.

3 Barriers to implementation and achieving high coverage: Findings from MCE country reviews

Background and methods

One early step in MCE was to define the factors to be used in selecting MCE sites, as well as guidelines on how these criteria should be applied. We refer to the process of selecting the sites as “country reviews”. This process has now been completed. The purpose of this section of the *Progress Report* is to document and summarize the lessons learned about IMCI implementation through the country reviews.

The original design of MCE called for impact studies in countries implementing IMCI, representing a mix of retrospective and prospective designs. Factors that were considered in site selection are shown in Box 10.

Box 10

Factors to be considered when selecting sites for the IMCI evaluation

Characteristics that should be present at all sites

Adequate IMCI implementation: covering the three components of IMCI.

Timely IMCI implementation: compatible with the time frame of the evaluation.

Sufficient population size covered by IMCI interventions: to provide required sample size.

Availability of partners: including MoH, researchers and funding agencies to support both IMCI implementation and the evaluation activities.

Characteristics that will facilitate mortality measurement

High mortality level: to increase likelihood of a measurable impact, but studies could also be carried out in intermediate-mortality settings, where improvements in intermediate outcomes and reductions in cost can be examined.

Characteristics important for specific study designs

Political stability: needed for prospective designs to ensure full implementation.

Characteristics in which diversity is desirable

Region of the world: at least one study in each major region of the world.

Malaria prevalence: studies both in high- and low-risk areas for malaria.

Level of existing services and programmes: studies in areas with different levels of development of health services.

Community organization: studies in areas where communities are poorly organized and in areas with strong community programmes.

The **country review** process was developed to standardize, to the extent possible, the consideration of these factors when selecting MCE sites.⁴ The basic process included at least two steps that were repeated several times in countries in five WHO regions.

The first step was to select the most promising countries in each WHO region, based on the factors presented in Box 10 above. MCE held a series of discussions with WHO staff responsible for the implementation of IMCI. Global, regional and country staff reviewed the selection criteria and drew up a short-list of countries in each region that were most likely to fulfill the criteria. They then constructed a table that summarized the data on each criterion for all countries on this short-list. This table was used as the basis for the selection of the country in each region most likely to meet the full set of criteria. In some regions they selected an additional country or two as a backup in case later steps in the review demonstrated that the first country selected was not a suitable site for an impact evaluation.

The second step was a visit to the “first choice” country in each region, or in some cases the two most promising sites, to assess the feasibility and appropriateness of including it as an MCE site. MCE country review teams consisted of at least one senior member of MCE technical group and at least one WHO regional staff member responsible for IMCI implementation. The teams often included additional staff in these two categories, as well as ministry of health staff responsible for IMCI or child health and WHO staff from headquarters and country offices. In Cambodia, a representative of the Bill and Melinda Gates Foundation participated in one of the two MCE country review visits.

Activities during country review visits were based on a standard set of guidelines from the MCE central team. The aim was to arrive at a decision about whether the proposed country site met the criteria for inclusion in MCE, and whether it would be possible to design an impact evaluation that would yield final results by 2005. Activities at each site included a combination of interviews with ministry of health staff and technical partners, reviews of records and reports, and field visits to facilities and sometimes communities that were implementing IMCI. In some countries visits were also made to locations where IMCI had not yet been introduced, to assess their suitability as comparison areas in the evaluation design.

Results

MCE teams made a total of 24 visits to 12 different countries in the period between August 1998 and February 2002. The dates of these visits and the names of visit team members are listed in Annex 3.

In some countries, arriving at an evidence-based conclusion about whether an impact evaluation would be possible within the time frame of the evaluation required several visits or even the preliminary collection and analysis of data. In Cambodia, for example, MCE supported a review of the feasibility of introducing IMCI in the private, non-formal sector. In Kazakhstan, a retrospective review of rates of hospital referral in rayons with and without IMCI was conducted. In Bolivia, several visits were carried out, leading to the realization that a comparative study would not be possible. In Brazil two separate country review exercises were carried out. In 1998 MCE advisors considered widespread introduction of health sector reform a barrier to a strong design. Three years later, in 2001, the presence of these reform efforts was considered an advantage, increasing the probability that needed health system supports for IMCI implementation were in place.

⁴ The country review process differed in Zambia and Uganda. Details are available in: IMCI Uganda and Zambia Trip Report. 16 March, 1999. Unpublished report of site visits to Uganda and Zambia, available from Dr Gilbert Burnham at The Johns Hopkins School of Public Health.

The database developed through MCE country reviews is a set of reports, each providing a summary of experience in the implementation of IMCI in the country at that time. The database covers countries that were included in MCE and others that were not. It constitutes a systematic investigation of the implementation of IMCI in selected countries in each region. The countries selected were those judged by WHO staff to have the highest probability of implementing IMCI fully in at least some geographic areas within two to three years, according to the global IMCI strategy as defined at that time and adapted by specific regions and countries. This database is now being analyzed in an effort to understand and address the major barriers to implementing and achieving high coverage of IMCI at district and country levels. These analyses will also inform the development of a “second stage” strategy for IMCI implementation. Preliminary results are presented here; more thorough review with participation by those responsible for IMCI implementation is planned for 2002–2003 as a part of an analytic review exercise by WHO/CAH and key implementation partners.

Difficulties in implementing IMCI. Table 1 presents selected findings of MCE country reviews, organized by the three components of the IMCI strategy (health worker training, community IMCI, and health systems). These findings should be interpreted with care, both because they reflect the experience of only 12 countries, and because the country reviews were carried out at different points in time. In some countries MCE review contributed to the identification and resolution of problems in implementation. The results of the country reviews are summarized below.

Table 1: Status of IMCI implementation at time of MCE country reviews, 1998 – 2002.

COUNTRY (Inclusive dates of MCE country review)	Included in MCE?	MAJOR FINDINGS		
		Health worker training	Community IMCI	Health systems issues
Bangladesh (1999-2002)	YES	<ul style="list-style-type: none"> Training is mainly carried out in the context of the evaluation Routine training yet to be started 	<ul style="list-style-type: none"> Community IMCI will be delivered by the evaluation team through CHWs No concrete plans for community IMCI at national level 	<ul style="list-style-type: none"> Slow national IMCI implementation Low utilization of public services (8% of sick children taken 1st to trained providers, including public health facilities) Inadequate supervision High proportion of neonatal deaths not effectively addressed by IMCI Lack of adequately trained staff and facilities in referral hospitals
Bolivia (1999-2000)	NO	<ul style="list-style-type: none"> High coverage in some health districts shortly after training 	<ul style="list-style-type: none"> Plans with partners to train CHWs (<i>Responsibles Populares</i>) 	<ul style="list-style-type: none"> High rates of staff turnover after IMCI training Weak supervision
Brazil (1998-2001)	YES	<ul style="list-style-type: none"> Continuous high training coverage in a limited number of municipalities since 1999. Training quality is mostly adequate, based on HFS results. 	<ul style="list-style-type: none"> National programmes address some of the key family practices High coverage with CHWs delivering key messages 	<ul style="list-style-type: none"> CHWs poorly motivated High staff turnover among doctors High proportion of neonatal deaths not effectively addressed by IMCI Weak supervision
Cambodia (2001)	NO	<ul style="list-style-type: none"> Training in early implementation districts not yet started 	<ul style="list-style-type: none"> Non-existent community IMCI No national programmes (e.g., UNICEF, NGOs) addressing key family practices Some compatible programmes address IMCI key practices in limited areas 	<ul style="list-style-type: none"> Limited organizational support for IMCI at national level Health systems are weak Low staff motivation and pay Donor-driven agenda Weak supervision Lack of adequate referral facilities Low utilization due to <ul style="list-style-type: none"> -Strong private sector -Unofficial fees
Kazakhstan (2000-2001)	NO	<ul style="list-style-type: none"> High coverage of training in selected areas 	<ul style="list-style-type: none"> No national plan for community IMCI, but frequent home visits by public health workers 	<ul style="list-style-type: none"> Existing regulations contradict IMCI guidelines Excess referrals and prescription of medicines
Kyrgyzstan (2000)	NO	<ul style="list-style-type: none"> Training had not started at the time of the visit 	<ul style="list-style-type: none"> No concrete plans for community IMCI 	<ul style="list-style-type: none"> Same as Kazakhstan

Morocco (1999)	NO	<ul style="list-style-type: none"> ▪ High coverage of training in selected areas ▪ Training quality appears adequate 	<ul style="list-style-type: none"> ▪ No community IMCI ▪ National programmes address some of the key family practices but quality and coverage are unknown 	<ul style="list-style-type: none"> ▪ Health sector policies inconsistent with IMCI (e.g., nurses cannot prescribe) ▪ High proportion of neonatal deaths not effectively addressed by IMCI ▪ Weak supervision
Niger (2002)	NO	<ul style="list-style-type: none"> ▪ Slow rate of training ▪ Quality seems adequate 	<ul style="list-style-type: none"> ▪ No community IMCI ▪ No national programmes addressing key family practices ▪ Some compatible programmes address IMCI key practices in limited geographic areas 	<ul style="list-style-type: none"> ▪ Low utilization (0.5 visit/child/year) due to <ul style="list-style-type: none"> -Limited access (47% of pop have no access) -Cost-recovery fees ▪ Staff rotation (37% in a 2-year period) ▪ Weak supervision ▪ Lack of adequate referral facilities
Peru (1999-2002)	YES	<ul style="list-style-type: none"> ▪ Training coverage is high in only one metropolitan department ▪ Quality of care after training is problematic (HFS), reasons not clear. 	<ul style="list-style-type: none"> ▪ Limited community IMCI as such, with CHW training in IMCI messages at an early stage. ▪ Other national programmes address some of the key family practices 	<ul style="list-style-type: none"> ▪ High staff turnover ▪ Slow scaling up of implementation ▪ Inadequate supervision ▪ Drug supply is generally adequate ▪ Presence of multiple-tier health system (public, social security, private) ▪ High proportion of neonatal deaths not effectively addressed by IMCI
Tanzania 1998-2002	YES	<ul style="list-style-type: none"> ▪ High training coverage at facilities in pilot districts ▪ Quality of case management is adequate as confirmed by HFS 	<ul style="list-style-type: none"> ▪ UNICEF-supported community IMCI projects, but not in districts with IMCI training of health workers ▪ Several programmes delivery IMCI-compatible messages at community level ▪ High rate of contact between population and health services can be used for dissemination of messages ▪ Strong mosquito net social marketing programme in some districts 	<ul style="list-style-type: none"> ▪ Slow scaling up of training ▪ Strong investment in child health by district management in TEHIP/MCE districts ▪ Good access and utilization (41% of sick children brought to a health facility) ▪ Integrated supervision exists but quality unclear ▪ Essential IMCI drugs generally available ▪ Lack of adequate referral.

Uganda ^{5, 6} (1999-2001)	YES	<ul style="list-style-type: none"> ▪ Mixed performance of health workers after training (continuous monitoring via HFS); perhaps a result of mass training of lower-level workers that did not meet quality criteria for training. 	<ul style="list-style-type: none"> ▪ National guidelines for community IMCI developed ▪ Multiple partners implementing a variety of IMCI community activities in various districts 	<ul style="list-style-type: none"> ▪ IMCI included in "basket funding" for districts ▪ Low utilization of public services (15% of sick children taken 1st to public health facility) ▪ Inadequate supervision ▪ Lack of adequate referral facilities
Zambia ⁵	NO	<ul style="list-style-type: none"> ▪ Reported to be good by review team, due to earlier BASICS support 	<ul style="list-style-type: none"> ▪ No information available 	<ul style="list-style-type: none"> ▪ Health reforms eliminated central programmes ▪ Drug availability poor ▪ Weak district health management ▪ IMCI part of general package of services

HFS = health facility survey

Health worker training. In three countries where health facility surveys (HFSs) had been conducted prior to the country review visit (Bolivia, Brazil, Morocco), and in one HFS conducted later in Tanzania, IMCI-trained workers performed significantly better than untrained workers, demonstrating that training can improve case management. However, in the 10 countries other than Peru and Bolivia, high levels of training coverage had been reached in only a few geographical areas. In Bolivia, Brazil and Niger, staff rotation precluded the sustained delivery of IMCI services to a defined population. In Niger, Morocco, Peru and Tanzania the pace at which training courses were carried out slowed after an initial impetus on training; expanding IMCI training to additional districts while maintaining quality was reported to be a major concern for all countries that had reached the point of planning for the expansion of IMCI beyond the initial pilot districts.

Community IMCI. This was a weak component of IMCI in nearly all countries. Community IMCI, planned to include the delivery of messages in 12 key areas⁷, had not achieved high levels of coverage at community level in any of the countries visited, even within the limited geographical areas being considered for inclusion in MCE. In some countries, vertical national programmes (malaria, immunization, diarrhoea, or ARI programmes, for example) had delivered IMCI-compatible messages through community health workers, health facilities or mass media.

Health systems support. Major barriers to IMCI implementation arising from broader health system issues were documented in many countries. These barriers included: the difficulties of conducting regular supervisory visits that included systematic observation and feedback on case management; inadequate referral facilities; high staff turnover; low utilization of the public sector for a variety of reasons (accessibility, user fees, poor perceived quality, etc); and inconsistencies between IMCI guidelines and existing policies and regulations.

⁵ Pariyo, et al. Uganda IMCI impact study: Annual progress report for the year 2000/2001.

⁶ IMCI Uganda and Zambia Trip Report. 16 March, 1999. Unpublished report of site visits to Uganda and Zambia, available from Dr Gilbert Burnham at The Johns Hopkins School of Public Health.

⁷ WHO/UNICEF. *Improving family and community practices: A component of the IMCI strategy.* Geneva: WHO. Document No. WHO/CAH/98.2, 1998.

Inconsistencies between IMCI and the health burden at country level. With the exception of Cambodia and of sub-Saharan countries, all countries visited reported that a high proportion of under-five deaths now occurred in the neonatal period, and particularly in the first week of life. This has since been confirmed by MCE baseline demographic survey in Bangladesh, in which 62% of under-five deaths were found to have occurred in the perinatal period. The implication for MCE was that in countries where less than 50% of deaths were directly addressed by IMCI, the sample sizes needed to capture a 20% reduction in child mortality within a 2-3 year period were prohibitively large, and the studies expensive. This made it difficult to find MCE sites outside of sub-Saharan Africa.

Countries with the highest levels of under-five mortality (e.g., Cambodia, Niger), where IMCI was most needed, appeared to have the weakest health systems and therefore were least likely to be able to achieve adequate coverage levels for IMCI within the time frame of MCE.

Discussion

The findings of MCE reviews, conducted in countries identified by WHO as leaders in IMCI implementation, suggest that there are commonalities across regions in the types of challenge that must be met to achieve and maintain high coverage with IMCI. These findings are consistent with reports from IMCI reviews carried out in many countries as a part of implementation, and with reports from those working on IMCI at country and regional levels.

High-quality training in IMCI case management can lead to rapid and dramatic improvement in the quality of case management in first-level health facilities. In this context, “high quality” is defined as training that is based on the IMCI clinical guidelines and includes sufficient opportunities for trainees to practise the new skills in clinical settings. In some Regions this training also includes follow-up visits to health workers in their facilities after training to reinforce skills and assist health workers in applying them.

However, IMCI training can only be effective in improving the quality of case management in the presence of health system supports. A common finding across the 12 MCE country reviews was that these supports were not in place. Although the constellation of health system deficits varies to some extent from region to region, and especially in the post-Soviet countries versus all others, many of the challenges are similar. In Tanzania, health system supports had been reinforced in the two intervention districts through the introduction of two relatively simple interventions: making available district-level data on the burden of disease, and epidemiological mapping. Outside the intervention districts, however, Tanzania faces many of the same health system deficits as the other countries visited.

Development and implementation of interventions to improve key family behaviors has proven more difficult and time-consuming than anticipated at the time MCE was designed. Among the 10 countries visited that were actively implementing IMCI, only Brazil had a community component - delivered by community health workers - that seemed likely to achieve high levels of coverage.

In short, several of the assumptions underlying the IMCI impact model (Box 2) need to be re-examined in light of experience with IMCI implementation to date and the findings of MCE country reviews. For example, the impact model suggests that the introduction of IMCI will lead to the identification and improvement of the health system supports needed for the delivery of IMCI interventions. We now know that, even with a broadly

participatory national-level working group that includes representatives from sections responsible for key areas within and outside the health sector, IMCI alone is unlikely to be able to achieve some of the needed changes. Civil service policies that support – or fail to prevent – rotation of staff and inadequate resources for supervision are two examples of health systems issues with ramifications that extend far beyond IMCI. These and other key health systems issues must be addressed as a part of broader efforts to improve the performance of the entire health sector, and sometimes other sectors as well.

These findings represent precisely the type of contribution WHO had hoped for and expected from MCE. High-quality evaluation leads to high-quality programmes, but only if the findings are incorporated into decisions about policy and planning. The IMCI strategy responded to a perceived need at country level for more integrated approaches to improving child health, and the introduction of IMCI has led to the rationalization of child health policies in over 80 countries. The importance of high-quality training in technically-sound clinical guidelines has been reaffirmed. At the same time, the need to address health system constraints and improve the delivery of child health services has been identified as critical, and as extending beyond the mandate of child health or any single disease-specific initiative. Unless these health system constraints are addressed, effective and affordable interventions to reduce child mortality and improve child health and development will continue to reach too few children, and the Millennium Development Goal of reducing child mortality by 66% by 2015 will not be met.

Implications for MCE and WHO

The findings of the country reviews were analyzed in detail by WHO and MCE technical advisors in December 2001. The advisors and WHO/AFRO agreed that a final country review should be conducted in Niger, and a further review of child health indicators and IMCI implementation plans should be carried out within the regions of sub-Saharan Africa and East Asia. These steps were completed by 1 March 2002.

The Niger site visit was conducted in February 2002 in collaboration with WHO/AFRO and WHO-Niger. As shown in Table 1, the site visit team concluded that it would not be possible to complete an impact evaluation in Niger by 2005, primarily because of low utilization of the public health facilities and high levels of rotation among staff trained in IMCI. These findings were confirmed by MCE Technical advisors in March 2002.

In April and May 2002, MCE (J Bryce and C Victora) prepared an internal report summarizing the findings of the country reviews and circulated it for review and comment to WHO staff at headquarters, regional and country levels and to MCE technical advisors. The report also proposed a series of operations research studies addressing the major barriers to IMCI implementation in selected sites where MCE country reviews had been conducted but it was not feasible to design an impact evaluation. This was followed by a series of meetings with WHO staff and MCE advisors, and finally with representatives of the Bill and Melinda Gates Foundation (G Perkin and S Stansfield).

Each meeting had three aims:

- (1) To share the results of the country reviews with groups working on research, development and evaluation of the IMCI strategy, and to encourage the use of the results to inform policy and programme decisions;
- (2) To make a decision about whether the scope and objectives of MCE should be expanded to include a series of operations research studies; and

- (3) To reach agreement on whether MCE would be limited to the five sites in which there is a possibility of obtaining a measurable impact before 2005.

A summary of conclusions relative to each of these objectives is provided below.

Objective 1: To share the results of the country reviews with groups working on research, development and evaluation of the IMCI strategy, and to encourage that they be used to inform policy and programme decisions.

WHO staff at all levels participated in MCE country reviews, and the plausibility of the results was strengthened by their consistency with country-level experience. Thus the results are already being incorporated into planning at country and regional levels and as a part of the analytic review of the IMCI strategy as well as research and development efforts. MCE advisors, each of whom is an important technical voice in international child health, have reviewed MCE experience carefully and participated in the development of the conclusions; the results can be expected to have a strong influence on their future technical work. The representatives of the Bill and Melinda Gates Foundation were receptive to the findings of the country reviews, and recommended that a small meeting of global child health decision makers be convened to review and discuss the implications of the findings for global child health policy.

Objective 2: To make a decision about whether the scope and objectives of MCE should be expanded to include a series of operations research studies.

WHO staff recognized that MCE had neither the technical nor financial resources to support operations research, and that such research was not a part of MCE mandate, but recommended that MCE continue to provide technical support to the operations research of CAH to ensure that it was done, and done well. MCE Technical advisors responded very positively to the written advice of WHO staff, but after discussion recommended that operations research to address the health system barriers to IMCI implementation and the need to strengthen community IMCI *not* be included within an expanded MCE but instead be taken on as a priority area of work for CAH, in collaboration with partners. Finally, the representatives of the Bill and Melinda Gates Foundation seconded the recommendations of the advisors, recognizing the urgent need for operations research on IMCI and other child health initiatives, but advising that such research be taken on by CAH and partners rather than being included in an extended set of objectives for MCE.

Objective 3: To reach agreement on whether MCE would be limited to the five sites in which there is a possibility of measuring impact prior to 2005.

The original MCE proposal called for studies at eight sites. MCE country reviews were comprehensive, and all those consulted agreed that another country was unlikely to be identified in which an IMCI impact study could be designed within the time-frame of MCE. This decision is based not only on the status of IMCI implementation at country level, but also on the fact that fully retrospective designs proved to be nearly impossible in countries with high mortality because existing primary data were not adequate. A secondary result is that studies in the existing sites must rely on primary data collection, which is very expensive. All parties therefore agreed that the remaining MCE resources should be focused on completing the best possible impact studies in the five existing sites (Bangladesh, Brazil, Peru, Tanzania and Uganda). The representatives of the Bill and Melinda Gates Foundation recommended further that the expertise about large-scale effectiveness studies of child health initiatives developed among the technical advisors and investigators through MCE should be made available to a broader range of policy makers and public health initiatives, but only to the extent that the original objectives of MCE are not compromised.

In summary, MCE will retain its original objectives, and will evaluate the impact and cost-effectiveness of the IMCI strategy in Bangladesh, Brazil, Peru, Tanzania and Uganda. The focus for both technical and financial resources of MCE will be on conducting the best possible evaluation in these five sites, and on working with partners to extend the reach of MCE through technical consultations, dissemination of products such as lessons learned, tools and methods, and proactive dissemination of MCE results.

4 New frameworks and methods for large-scale cost-effectiveness studies

MCE continues to develop and test improved methods of evaluating public health programmes. Three examples are described in this section.

Methods of costing complex interventions

For governments, partners and WHO, it is important to document the economic aspects of IMCI implementation and to measure its cost-effectiveness. A substantial amount of MCE effort has been dedicated to developing and field-testing costing tools for data collection at national, district, facility and household levels. The objectives of MCE costing methodology are:

- To estimate the total costs of providing IMCI in a district, defined as the full costs of services to children under five years of age. These costs will be estimated from the perspective of society as a whole. All costs are included, whether or not they come from the health system, the family, or another source. This will allow a generalized cost-effectiveness analysis addressing the question of whether treating children with IMCI is a good use of scarce health resources.
- To estimate the additional (incremental) costs of introducing and running IMCI from the societal perspective - e.g. what resources are required in addition to those already used in that setting. This permits a conventional incremental cost-effectiveness analysis, to determine whether the additional benefits over current practice justify the additional resources.
- To provide MCE sites with information on the financial costs of introducing IMCI and running it subsequently in their setting.

To achieve these objectives, cost data need to be collected from all levels of the system involved in introducing or supporting IMCI. These are typically:

- ⇒ first-level facilities that provide primary services for children
- ⇒ referral (higher-level) facilities that provide care for children
- ⇒ district-level (or regional) administration that supports IMCI implementation
- ⇒ national-level administration in support of IMCI
- ⇒ households that incur costs in seeking and obtaining treatment

Tools and methods to collect these data were developed, adapted to the circumstances of MCE sites, field-tested and used for data collection in Tanzania, Bangladesh and Uganda. Preparations are under way for the collection of cost data in Northeast Brazil, and data collection is scheduled to start in May

Standardized guidelines and templates have been developed for use in summarizing and analyzing MCE cost data. Two MCE staff at central level have worked steadily over the past 12 months with their country counterparts to ensure that the cost data are clean, complete and comparable across levels within sites and across sites. MCE economists and technical advisors addressed analytic challenges as they arose, through a series of technical working meetings, and these meetings will continue.

The basic analysis of both costs and effects will generate three cost-effectiveness ratios in terms of costs per Years of Life Saved by IMCI, scaled to reflect a hypothetical district with 10,000 children under age five:

- (1) **Total costs of IMCI/YLS from treating all under-fives on the basis of IMCI.** This is the cost-effectiveness ratio that will enable policy-makers to decide whether treating children on the basis of IMCI is a good use of scarce resources compared with all other possible uses.
- (2) **Incremental costs of introducing IMCI (aggregate approach) / difference in YLS between intervention and control districts.** This will show the extent to which the additional costs of introducing IMCI into the system were justified by the additional health benefits.
- (3) **Incremental costs of introducing IMCI (disaggregate approach) / difference in YLS between intervention and control districts.** This is another way of determining the extent to which the additional costs of introducing IMCI were justified by the additional health benefits.

Results based on these ratios will not be available until after the final impact data have been collected and analyzed. For most sites the final surveys are scheduled for 2004 or 2005. However, descriptive information on the costs of implementing IMCI at district level should be available by mid-2003 for the Bangladesh and Tanzania sites.

Dose-response analyses, including development of quality of care indices

The need for an analysis plan for the interpretation of MCE findings across sites has been recognized for some time. At the 3rd annual meeting of MCE technical advisors and investigators held at Jinja, Uganda, in December 2001, Jean-Pierre Habicht (MCE technical advisor) and Eleanor Gouws (MCE central team statistician) presented a proposed plan for these analyses. The analyses are particularly challenging as different designs are used at each site (see Annex 4). The proposal for cross-site interpretation focuses on the health facility as the primary unit of analysis, so as to increase the power of the studies (or the possibility of finding significant associations). It also proposes the development of a Health Facility *Quality x Coverage* Index to assess the quality of care at health facility level and a subsequent dose-response analysis to determine the effect on mortality and morbidity. One part of this work involves examining the validity and reliability of the indices in the current plan of analysis for the health-facility survey.

MCE investigators have established an electronic working group to enable ongoing discussion of issues related to cross-site analyses among members of MCE central team, MCE technical advisors and investigators. The initial aim of the group will be to reach consensus on the final analysis plan.

New frameworks for effectiveness evaluation

Evaluation of the large-scale impact of health and nutrition interventions is often based on the principles used for classical trials of new medicines or preventive agents, such as vaccines or nutritional supplements. The experience gained with MCE has taught us that, although randomized controlled trials are extremely useful for initial efficacy studies of curative or preventive agents, their application to large-scale effectiveness studies is problematic. Several limitations related to the internal and external validity of randomized controlled trials have been identified. These trials are ideally suited to short causal chains, such as those between a biological agent and a health outcome. For long causal chains such as in complex interventions such as IMCI, the artificiality of randomized trials precludes the generalization of their findings to different settings. A scientific paper is being prepared that highlights these limitations and proposes alternative design approaches.⁸

⁸ Victora CG, Habicht JP, Bryce J. Evidence-based public health: Moving beyond randomized controlled trials. Paper in preparation.

5 Child health and poverty: Evidence of inequity among the very poor

IMCI was designed to reduce child mortality in countries with high rates of child mortality. Although most children in these countries are poor, addressing (or redressing) child health inequity is not a specific objective of IMCI. It is increasingly recognized that IMCI and other child health interventions will not necessarily reach the poorest of the poor, but that they are nonetheless an essential part of a public health effort to reduce child mortality.

The original MCE design included the investigation of the possible impact of IMCI implementation on inequity in child health by sex, socioeconomic status and ethnicity. In 2001, *Guidelines for equity analyses in MCE* was developed and used for the analysis of baseline household survey data sets in Tanzania and Bangladesh. The *Guidelines* and the preliminary results were presented to, and discussed with, MCE technical advisors and investigators (December 2001 at Jinja, Uganda); with technical staff of the World Bank (November 2001 in Washington DC, and March 2002 in Geneva); and with international child health experts and national leaders at the Global Consultation on Child and Adolescent Health and Development convened by WHO and UNICEF (March 2002 in Stockholm). The Tanzania results have now been written up and submitted for publication⁹ (see Annex 2 for a list of publications and documents drawing on MCE data). This section of the *Annual Report* contains selected findings from MCE analyses, and an update on MCE activities in relation to equity.

Inequity among the rural poor: A study in Tanzania

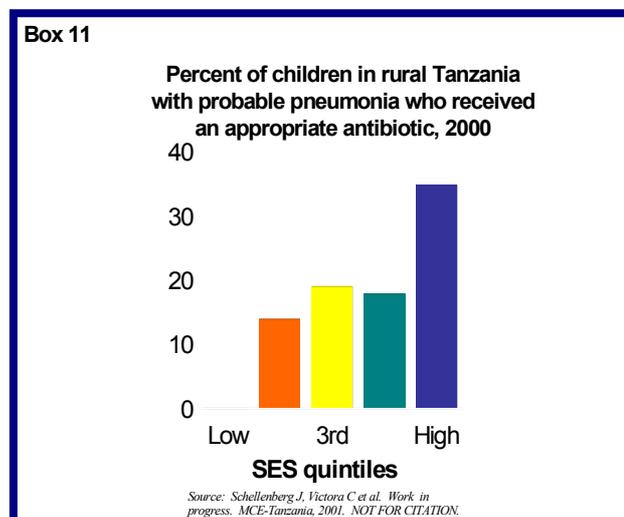
Background. Despite the highest mortality rates in the world, there is an acute lack of published information on health inequity among young African children. The study sought evidence of inequity of health care by sex and socioeconomic status for young children in a poor rural area of southern Tanzania.

Methods. A baseline household survey in Tanzania, carried out before the introduction of IMCI, covered probability samples of 2006 children under five years of age in four rural districts. Questions focused on the extent to which maternal knowledge of illness, care-seeking outside the home, and facility care were consistent with IMCI guidelines and messages. By means of principal components analysis, a relative index of socioeconomic status was developed for each household; the index was derived from weighted scores of information on income sources, education of the mother and the household head, and seven household assets.

⁹ Schellenberg JA, Victora CG, Mushi A, de Savigny D, Schellenberg D, Mshinda H, Bryce J, for the Tanzania IMCI MCE baseline household survey study group. Inequities among the very poor: health care for children in rural southern Tanzania. Submitted for publication .

Results. In the two weeks before the survey, over half of the sample of 2006 children were reported to have had an illness episode (1026: 52%), “fever” was the most common illness, reported for 714 (36%) children. Utilisation of the formal health sector was higher than expected: 415 (41%) had sought care *first* from an appropriate provider, defined as use of a hospital, health centre, dispensary or village health worker. There were no sex or socioeconomic-status differences in terms of reported morbidity, nor was there any evidence of sex differentials either in reported morbidity or in care-seeking behaviour.

Caretakers of children from better-off families, however, were better informed about danger signs than those of poorer families, were more likely to take their children to a health facility when ill, and were more likely to have had a shorter journey to the health facility. Their children were more likely than poorer children to have received antimalarials, and antibiotics for pneumonia (see Box 11), and had been more frequently admitted to a hospital when ill.



Interpretation. This study provides strong evidence that health care is worse among poorer families than among the better-off, even in a rural Tanzanian society that might easily be assumed to be uniformly poor.

Inequity among children in Bangladesh

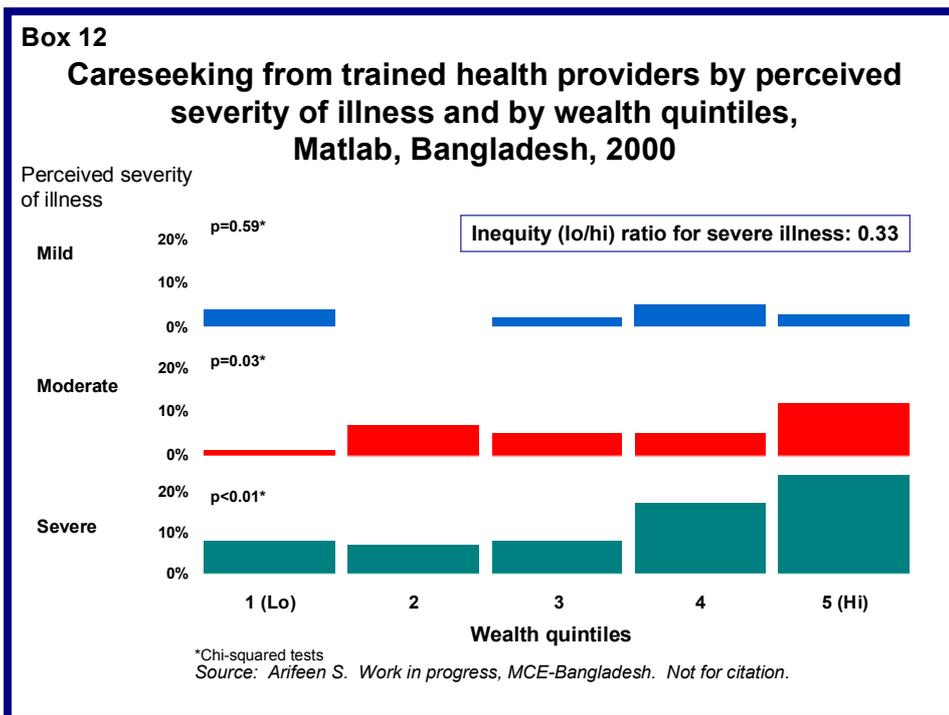
Background. The standard MCE guidelines for equity analyses have also been applied by investigators in MCE-Bangladesh, using data from the baseline household surveys.

Methods. MCE-Bangladesh is being implemented in the Matlab thana (sub-district) of Bangladesh, which has a population of about 500,000. ICDDR, B maintains a field site in Matlab where it provides direct child and reproductive health services in a population of about 110,000. The remaining part of Matlab (~400,000) is served by the government and forms the primary study area for MCE.

Two baseline household surveys were conducted in 2000. A demographic survey, based on a complete census of the study area, provided the sampling frame for a household health and morbidity survey of 2066 under-five children conducted from August through October 2000.

Selected results. Almost two-thirds of the Matlab children had been ill in the previous two weeks. About 45% were reported to have fever, about 13% diarrhoea, and about 4% probable pneumonia. Boys were more likely than girls to have had an illness reported in the previous two weeks; the same trend was seen for specific symptoms but none of the differences was significant. Reporting of any illness, fever or diarrhoea was more common at younger ages, but probable pneumonia did not differ with the age of the child. No differences were found in morbidity rates by socioeconomic status. This population of children has extremely high rates of malnutrition, with significantly higher levels of malnutrition among the poorest.

Rates of care-seeking for an ill child from a trained provider were extremely low. About two-thirds of the children with a reported illness were not taken for any care from outside home. Almost all of those who did seek care outside were taken to an untrained local provider or a traditional provider. Only 8% went to a trained provider, namely a health facility, a doctor or a community health worker. Children were often taken to multiple providers; the most for an episode was five providers. Seeking care from a trained provider was more common for younger children and for households of higher socioeconomic status. Sick children were more likely to be taken to a trained provider if caretakers perceived the illness to be severe, if they recognized a danger sign, if several symptoms were present at the same time, or if the illness was of long duration. Use of both untrained and trained providers increased with severity, but even for illnesses perceived as severe by the caretaker, only 13% were taken to a trained provider and 23% did not seek any care. Differences in care-seeking between the poor and the less poor in this setting varied by the perceived severity of the illness; the greatest gap occurred between the poorest and the less poor in care-seeking for children perceived as severely ill (Box 12).



MCE activities in relation to equity

Preliminary MCE results on equity were first presented at the World Bank in a seminar convened by the Health, Nutrition and Population section in October 2001. This stimulated further interest in collaboration on child health and poverty between the Department of Child and Adolescent Health and the World Bank. It will first be necessary to determine whether the Poverty Reduction Strategy framework used by the Bank to guide country programmes reflects the best available technical knowledge on how to improve child survival, health and development among the poor.

In the six months following the seminar (to April 2002), presentations and discussions continued on the preliminary findings on equity; these were supported by the establishment of the WHO/World Bank Working Group on Child Health and Poverty. This group is moving ahead rapidly with a review of available evidence and the development of technical guidelines on improving the health and development of children in poverty.¹⁰ One important part of this effort is the interest of the World Bank staff, and more recently the Rockefeller Foundation, in collaborating with MCE on further analytic work in this area. In January 2002 a proposal was submitted to the Rockefeller Foundation for a workshop titled "Knowledge into action: Improving equity in child health"; it would bring together MCE investigators, collaborators on child health and poverty, and leaders of the CAH Child Health Epidemiology Reference Group to prepare a monograph on reaching the Millennium Development Goals for reduction in infant and child mortality.

¹⁰ WHO/World Bank Working Group on Child Health and Poverty. *Better health for poor children: A special report*. The World Health Organization and the World Bank: Geneva, 2002.

6 Strengthening partnerships for effective child health services

MCE is a collaborative effort. An external technical advisory group provides guidance and oversight. WHO staff, collaborating research institutions, and consultants contribute other inputs. WHO Regional Office and HQ staff cooperate with MCE sites to plan and implement IMCI. Ministries of health take part in all country activities, so that lessons learned may be used to improve IMCI implementation.

The following are examples of partnerships:

- In Tanzania, MCE is evaluating the combined effects of IMCI and district strengthening activities. The latter are implemented by the Ministry of Health and the Tanzanian Essential Health Interventions Project, with support from IDRC.
- In Uganda, MCE is funded by USAID, and implemented by the Bloomberg School of Public Health of The Johns Hopkins University. WHO, USAID and a group of NGOs support the implementation of IMCI, especially its community component, in the ten participating districts.
- In Bangladesh, as reported in 2001, USAID is supporting the community component of IMCI through a contract with ICDDR, B for circa US\$ 0.5 million.
- The World Bank is collaborating with MCE on analyses of equity issues in child health; MCE will provide technical input into the initiative *Reaching the Poor*.
- The Rockefeller Foundation has expressed interest in collaborating with MCE on child health equity issues. This collaboration would go beyond current activities, supported by the Bill and Melinda Gates Foundation, to study the effectiveness of various health-service delivery strategies in meeting the needs of the poor.

MCE partnerships are limited only by the need to maintain focus and to achieve MCE goals. Proposals for collaboration focused on the core work of MCE are welcomed.

At the 2nd Annual Meeting of IMCI Technical Advisors and Principal Investigators at Cusco, Peru, it was agreed that the draft manual providing guidance on the design and conduct of IMCI impact studies for use by ministries of health in countries not participating in MCE would be put “on hold” pending the further development of tools for routine monitoring and evaluation of IMCI outcomes. Work on it will be resumed and completed during the next 12 months, to meet the increasing demand for technical assistance in planning various types of studies of child health interventions.

In response to requests from MCE investigators and others interested in the evaluation of child health interventions, MCE has developed a website on which are posted all MCE background papers, the impact model, indicators, and all MCE instruments and guidelines for their use. Their adaptation and use in the evaluation of child health programmes is encouraged.

7 MCE administration and management

Responsibility for overall management and coordination of MCE rests with the Department of Child and Adolescent Health and Development (CAH) within the cluster on Family and Community Health (FCH) of the World Health Organization. MCE staff at global level are listed in Annex 1.

MCE technical advisors have been working together on this evaluation since 1997 (see Annex 1 for a list of advisors). Their role is to identify and address methodological issues related to the evaluation; to serve as independent reviewers for project proposals and reports; and to provide technical oversight for the implementation of the evaluation. The composition of the Technical Advisory Group may change over time, depending upon the technical challenges to be addressed.

The Principal Investigators (PIs) for MCE sites are selected on the basis of a set of general criteria. Individual PIs are responsible for the implementation of MCE at their different sites, and for meeting contractual obligations for reporting. The annual meeting of IMCI technical advisors and PIs provides a forum for reviewing progress, addressing methodological issues and introducing new tools, and planning for the coming year's activities.

All evaluation studies are carried out in collaboration with local research institutions. The results of each study are applied first in the national context to improve IMCI implementation. WHO is responsible for aggregating and analyzing results across countries, and for ensuring that the findings lead to improved tools and guidelines and their application in developing-country settings.

Annex 1

MCE Technical Advisors

Cesar Victora (Senior Technical Advisor)
Universidade Federal de Pelotas
Brazil

Robert Black
The Johns Hopkins University
USA

Don de Savigny
Tanzania Essential Health Interventions Project
Tanzania

David Evans
Global Programme on Evidence, WHO
Switzerland

Jean-Pierre Habicht
Cornell University
USA

Joanna Schellenberg
London School of Tropical Medicine and Hygiene
England

Patrick Vaughan
London School of Tropical Medicine and Hygiene
England

MCE Principal Investigators & Economists

Bangladesh

Shams el Arifeen, ICDDR,B
Shakil Ahmed, ICDDR,B
Jyotsnamoy Chakraborty, ICDDR,B
Abdullah Hel Baqui, Johns Hopkins School of Public Health
M. Mahmud Khan, Tulane University
Mohammad Yunus, ICDDR,B
Robert E. Black, Johns Hopkins School of Public Health
Lawrence Moulton, Johns Hopkins School of Public Health
J Patrick Vaughan, London School of Hygiene and Tropical Medicine

Brazil

Joao Amaral, Universidade Federal do Ceará
Antonio José Ledo Alves da Cunha, Universidade Federal do Rio de Janeiro
Fernando Pires, Universidade Federal do Ceará
Maria Helena Lima Sousa, MoH, Ceará

Peru

Luis Huicho (Principal Investigator), Instituto de Salud del Niño
Miguel Campos, UPCH
Roberto Ruiz, Instituto de Salud del Niño
Miguel Dávila, PAHO, Peru

Tanzania

Joanna Armstrong Schellenberg, Ifakara Health Research and Development Centre
(IHRDC) and London School of Hygiene and Tropical Medicine
Hassan Mshinda Director, IHRDC
Sosthenes Charles, IHRDC
Fatuma Manzi, IHRDC
Honorathy Masanja, IHRDC and Tanzania Essential Health Interventions Project
(TEHIP)
Charles Mayombana, IHRDC
Conrad Mbuya, TEHIP/MoH
Leslie Mgalula, WHO/AFRO
Robert Mswia, AMMP
Rose Nathan, IHRDC
Don de Savigny, TEHIP, IDRC/MoH
David Schellenberg, IHRDC
Katarzyna Wilczynska, IHRDC

Uganda

Robert Black, Johns Hopkins University
Gilbert Burnham, Johns Hopkins University
Stan Becker, Johns Hopkins University
Chris Mugarura, MoH, Uganda
Ken Hill, Johns Hopkins University
David Bishai, Johns Hopkins University
Fred Wabwire-Mangen, Makerere University
George Pariyo, Makerere University
Elizabeth Nabiwemba, Makerere University
John Ssekamate, Makerere University

WHO Staff Working on MCE

WHO HQ – MCE Product Group

Taghreed Adam, Cost Component Coordinator
Jennifer Bryce, Responsible Officer
Gillian Dawson, Secretary
Eleanor Gouws, Statistician
Carolyn Kakundwa, Technical Assistant, Cost Component
Alexei Mikhailov, Technical Officer, website and computer applications
Alice Ryan, Project Manager

WHO HQ – Regional Focal Points for IMCI Implementation

Samira Aboubaker, Focal point, Africa and Eastern Mediterranean
Bernadette Daelmans, Focal point, South-East Asia
Ivan Lejnef, Coordinator, Technical Support Team and Focal point, Europe
Thierry Lambrechts, Focal Point, Americas

WHO Regional Offices – MCE Focal Points

Leslie Mgalula, Africa
Christopher Drasbek, Americas
Suzanne Farhoud, Eastern Mediterranean
Mikael Ostergren, Europe
Elizabeth Mason, Africa
Neena Raina, South-East Asia
Marianna Trias, Western Pacific

WHO Country Offices

Bangladesh

Suniti Acharya, WHO Representative, Bangladesh

Brazil

Jacobo Finkelman, WHO Representative
Javier Espíndola, WHO

Cambodia

Severin von Xylander, Medical Officer, WHO

Kazakhstan

Aigul Kuttumuratova, Medical Officer, WHO Liaison Office

Niger

R. Zitsamele Cuddy, WHO Representative
Pascoal Lima Neto da Conceição, Associate Professional Officer

Peru

Miguel Dávila, National Professional Officer

Tanzania

Theopista John, National IMCI Program Officer, WHO
Pyandar Mongi, National IMCI Program Officer, WHO

Annex 2

MCE Publications and Documents

Papers on MCE published in peer-reviewed journals

Published

Armstrong Schellenberg J, Abdulla S, Nathan R, Mukasa O, Marchant TJ, Kikumbih N, Mushi AK, Mponda H, Minja H, Mshinda H, Tanner M, Lengeler C. Effect of large-scale social marketing of insecticide-treated nets on child survival in rural Tanzania. *Lancet* 2002 Apr 21; **357**(9264): 1241-7.

Under Review

Schellenberg JA, Victora CG, Mushi A, de Savigny D, Schellenberg D, Mshinda H, Bryce, for the Tanzania IMCI MCE baseline household survey study group. Inequities among the very poor: health care for children in rural southern Tanzania. Submitted for publication .

Schellenberg D, Armstrong Schellenberg J, Mushi A, de Savigny D, Mgalula L, Mbuya C, Victora C. The Silent Burden of Anaemia in Tanzanian Children: a Community-based Study. Paper submitted for publication.

Adiel K Mushi, Joanna RM Armstrong Schellenberg, Haji Mponda, Christian Lengeler. Targeted subsidy for malaria control with treated nets using a discount voucher system in southern Tanzania. Submitted to Health Policy and Planning.

In Preparation

Tanzania IMCI multi-country evaluation health facility survey study group. Health care for under-fives in rural Tanzania: effect of Integrated Management of Childhood Illness on observed quality of care and health system support.

Arifeen S et al. Determinants of health care utilization in Bangladesh.

Victora CG, Habicht JP, Bryce J. Evidence-based public health: Moving beyond randomized controlled trials.

Armstrong Schellenberg et al. Preventive health care and nutritional status among children from four rural Tanzanian districts.

Guidelines and protocols developed 2001 - 2002

Gouws E, Habicht, JP. *Proposal for plans for the Multi-Country Evaluation cross-site analysis and analysis of dose response within sites.* February 2002.

Multicountry Evaluation for IMCI Effectiveness, Cost and Impact. *Guidelines for publication and ownership of data resulting from the Multi-country Evaluation of IMCI Effectiveness, Cost and Impact (MCE)*. Geneva: Department of Child and Adolescent Health and Development, World Health Organization, March 2002. WHO Document No. FCH/CAH/02.04.

Victora CG and Schellenberg J. *Guidelines for Equity Analyses in MCE*. Geneva: WHO/CAH, *Multicountry Evaluation of IMCI Effectiveness, Cost and Impact*. January 2002. Geneva: Department of Child and Adolescent Health and Development, World Health Organization, March 2002.

Papers presented at professional conferences and seminars

Bryce J and Troedsson H. *Meeting the Millennium Development Goals for child mortality*. Paper presented at a seminar on Monitoring Health, Nutrition and Population Goals using the PRSP Framework. Washington DC: The World Bank, November 2001.

Mshinda H. Mosquito nets, poverty & equity in rural Southern Tanzania. Presented at the Global Consultation on Child and Adolescent Health, Stockholm, March 2002.

Schellenberg JA. Mosquito nets, poverty & equity in rural Southern Tanzania. Bellagio workshop on "Working towards greater equity in the fight against HIV/AIDS, malaria and tuberculosis." 12-16 November 2001.

Victora CG. Large-scale impact evaluations: Moving beyond randomized trials. Paper presented at the annual meeting of the Brazil Epidemiological Society: March 2002.

Meeting reports and other products developed in 2001- 2002

The Multi-country Evaluation of IMCI Effectiveness, Cost and Impact. *MCE progress report, May 2000 - April 2001*. Geneva: Department of Child and Adolescent Health and Development, World Health Organization, May 2001. WHO Document No. WHO/FCH/CAH/01.15. Available at <http://www.who.int/imci-mce>

The Multi-country Evaluation of IMCI Effectiveness, Cost and Impact. *Report of the 3rd annual meeting of MCE Principal Investigators and Technical Advisers, Jinja, Uganda, December 2001*. Department of Child and Adolescent Health and Development, World Health Organization, March 2002. WHO Document No. FCH/CAH/02.02.

Informal Consultation to Determine Indicators and Procedures for the "Start the Clock" Review in Sites for the Multi-Country Evaluation of IMCI, Talloires, France, 13-15 June 2001. Note for the Record. Geneva: Department of Child and Adolescent Health and Development, World Health Organization, June 2001. WHO Document no. FCH/CAH/01/05.

IMCI: Good Health for Children (article prepared for inclusion in "Milestones", a Global Health Program newsletter of the Gates Foundation) Geneva: Department of Child and Adolescent Health and Development, World Health Organization, October 2001.

Annex 3

MCE Country Review Visits

Bangladesh

3, and 9-11 June 1998	Cesar Victora, WHO/CAH Consultant
6-11 June 1999	Hans Troedsson, WHO/CAH Cesar Victora, WHO/CAH Consultant
17-21 May 2000	Cesar Victora, WHO/CAH Consultant

Bolivia

7-12 August 1999	Thierry Lambrechts, WHO/CAH Christopher Drasbek, PAHO, Washington Martha Mejia, PAHO, Bolivia Cesar Victora, WHO/CAH Consultant
17-24 April 2000	Cesar Victora, WHO/CAH Consultant

Brazil

18-20 August 1998	Cesar Victora, WHO/CAH Consultant
15–20 October 2001	Cesar Victora, WHO/CAH Consultant Christopher Drasbek, PAHO, Washington Joao Amaral, Pricipal Investigator designate Antonio da Cunha, Co-Investigator

Cambodia

30 April – 5 May 2001	Jennifer Bryce, WHO/CAH Sally Stansfield, Bill and Melinda Gates Foundation Cesar Victora, Senior Technical Adviser Marianna Trias, WPRO Severin von Xylander, WHO, Cambodia
8-12 October 2001	Jennifer Bryce, WHO/CAH Cesar Victora, WHO/CAH Consultant Marianna Trias, WPRO Valerie Flax, WPRO Consultant Severin von Xylander, WHO, Cambodia

Kazakhstan

7-8 and 14 September 2000	Cesar Victora, WHO Consultant Aigul Kuttumuratova, WHO Liaison Office, Kazakhstan Mikael Ostergren, EURO
28 January - 7 February 2001	Aigul Kuttumuratova, WHO Liaison Office, Kazakhstan Stefan Peterson, WHO/CAH Consultant
27 July - 4 August 2001	Mikael Ostergren, EURO Aigul Kuttumuratova, WHO Liaison Office, Kazakhstan Stefan Peterson, WHO/CAH Consultant
2-10 September 2001	Stefan Peterson, WHO Consultant Aigul Kuttumuratova, WHO Liaison Office, Kazakhstan Patrick Vaughan, WHO/CAH Consultant Gaukhar Abuova, Principal Investigator designate

Kyrgyzstan

10-13 September 2000	Cesar Victora, WHO/CAH Consultant Aigul Kuttumuratova, WHO Liaison Office, Kazakhstan
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Morocco

23-27 October 2000	Jennifer Bryce, WHO/CAH Suzanne Farhoud, WHO, EMRO Saul Morris, WHO/CAH Consultant
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Niger

20-25 January 2002	Jennifer Bryce, WHO Cesar Victora, WHO/CAH Consultant Leslie Mgalula, AFRO Youssouf Gamatié, AFRO
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Peru

4-7 August 1999	Thierry Lambrechts, WHO/CAH Cesar Victora, WHO/CAH Consultant Christopher Drasbek, PAHO Adelid Zamora, PAHO Consultant, Bolivia
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Tanzania

30 August – 3 September 1998	Cesar Victora, WHO/CAH Consultant
20-30 January 1999	Cesar Victora, WHO/CAH Consultant
17-21 September 2001	Jennifer Bryce, WHO/CAH Francis Onyango, WHO/AFRO Joanna Schellenberg, MCE-Tanzania Theopista John, WHO-Tanzania Colletta Kibasa, IMCI Coordinator, MOH Katarzyna Wilczynska, In-Country Co-ordinator, MCE-Tanzania

Uganda

March 1999

Al Bartlett + USAID team
The Johns Hopkins University team
Gottfried Hirnschall, WHO/CAH

17-24 June 2000

Jennifer Bryce, WHO/CAH
Andrew Mbewe, WHO/AFRO
The Johns Hopkins University team

21-27 March 2001

Thierry Lambrechts, WHO/CAH
Stefan Peterson, WHO/CAH Consultant

Zambia

1999

Al Bartlett, USAID
Masse Bateman, USAID
Robert Black, The Johns Hopkins University
Gilbert Burnham, The Johns Hopkins University
Kenneth Hill, The Johns Hopkins University

Annex 4

Designs used for the studies included in the Multi-Country Evaluation of IMCI

Country	Design	Type of inference	Population size covered for Mortality assessment	Sample size	
				Household coverage	Health facility
Bangladesh	Randomized trial of HF's, matched, with and without IMCI	Probability	DSS HH: 88,647 Children <5: 51,094	HH: ± 2,600 Children <5: 2,289 IMCI 987 Comp 1,302	IMCI: 10 Comparison: 10 (children per facility: ± 15)
Tanzania	Pre-post comparison, 2 IMCI and 2 comparison districts	Plausibility	DSS Total pop: 240,000 IMCI 185,000 Comp 55,000 Total < 5yr: 36,000	HH: 2,417 (±600; 30 clusters of 20 HHs in each district) Children <5: 1994 IMCI 1006 Comp 988	IMCI (random selection): 40 Comp (all): 35
Uganda	Comparison of districts with different levels of IMCI (n=10)	Plausibility	Survey HH: 14,000 (± 1,400 per district: 6 IMCI districts, 4 comparisons)	HH selection using 30 cluster approach in each district.	40 facilities in 5 districts have been visited; 246 children and 63 health care workers.
Peru	Comparison of districts with different levels of IMCI (n=25)	Ecological	Vital statistics from 25 departments	Standardized questionnaires answered by IMCI coordinators in 25 depts.	
Northeast Brazil	Mixed retrospective / prospective design. 32 municipalities with IMCI to be compared to non-IMCI municipalities with and without FHP.	Plausibility	Brazilian DHS of 1996 and 2002	HH: 9600 in 32 IMCI municipalities + 9600 in comparison municipalities.	32 HF's with IMCI and 64 without IMCI (32 with FHP and 32 without). Six children per facility.

For further information please contact:

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