

MULTI-COUNTRY EVALUATION OF IMCI EFFECTIVENESS, COST AND IMPACT (MCE)

DATA SYNTHESIS IN THE MCE-TANZANIA

Kingham, Cotswolds, UK, 11-13 September 2003

Note for the Record

Final version, 18 November 2003



Introduction

Kingham Meeting Objectives

- (1) To review the results of the six substudies which together comprise MCE-Tanzania
- (2) To reach consensus on the main findings of the study.
- (3) To outline the implications for child health in Tanzania.

Consensus statement

A major outcome of the meeting was a brief statement summarising the initial key messages from MCE Tanzania in terms of feedback for policy makers, which is given in Annex 1. This statement is to be used as a framework giving feedback until November-December 2003, by which time the study team expect to produce a 'policy brief' leaflet, a set of powerpoint slides and a draft overall report.

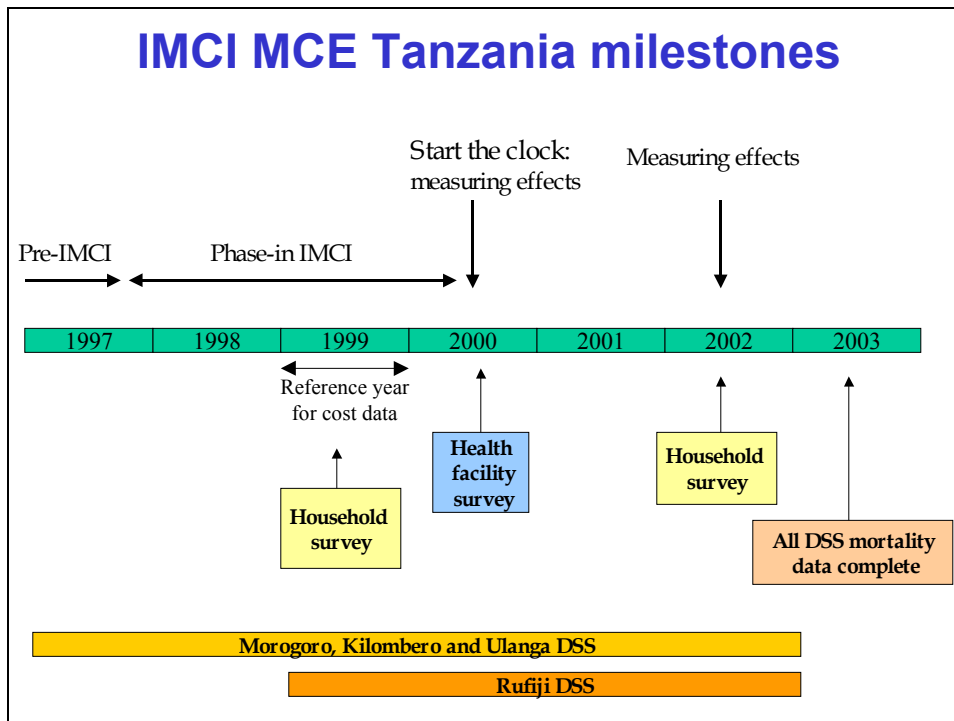
Overview of MCE Tanzania

The overall objectives of the MCE Tanzania study are as follows:

1. Measure the impact of the IMCI strategy on under-five mortality
2. Assess the effect of the IMCI strategy on child health indicators at household level
3. Assess the effect of the IMCI strategy on child health care at health facility level
4. Document the implementation of IMCI in the two intervention districts
5. Describe other relevant activities in all four districts under study, particularly programs and activities not involving IMCI
6. Estimation of economic cost of implementing and maintaining IMCI from a societal perspective (i.e., government provider as well as client cost will be estimated)

The MCE Tanzania study uses a "plausibility design" approach in which outcome indicators in two intervention districts are compared with those in two comparison districts. In the two intervention districts (Morogoro Rural and Rufiji), IMCI started in 1997-8 and was fully implemented before August 2000. In the two contiguous comparison districts (Kilombero and Ulanga), IMCI implementation started in 2002. There are six separate sub-studies, one covering each of the above objectives. The time frame for MCE Tanzania is shown in Figure 1.

Figure 1: Time frame for MCE Tanzania



Outline of this document

This document gives a summary of the discussions at the Kingham meeting, with recommendations and action points from each session. Session 1 involved a review of IMCI in the study area, to remind participants of what the study is evaluating. The session also included a brief reminder of the study design and original plans to achieve the objectives, together with changes in these plans. Session 2 covered the contextual factors sub-study – that is, the documentation of factors other than IMCI in the study districts that might explain any changes in child health indicators. Session 3 focussed on the analysis of mortality impact, with results from regression modelling. Session 4 reviewed methods and findings of the impact of IMCI on child health indicators at household level, and session 5 covered the main findings of costs of child health care in the study area. Session 6 covered the implications of findings for child health in Tanzania, and session 7 involved revisiting the IMCI conceptual model for Tanzania in the light of the study findings. The consensus statement of initial key messages is shown in Annex 1, the meeting agenda is shown in Annex 2, the list of participants in Annex 3, and the mortality section from the original proposal for the study in Annex 4. The **work-plan** for the next months is in Annex 5.

Session 1: IMCI in the study area: what are we evaluating, and how?

Presenters: Conrad Mbuya, Joanna Schellenberg

Chair: Jennifer Bryce

Rapporteur: Leslie Mgalula

Review of the implementation of IMCI Rufiji and Morogoro Districts.

The presentation described a series of conditions that were set in the health system that allowed IMCI to be implemented appropriately. Three main lessons learnt from this presentation concern:

- Conditions needed for implementation to start
- Issues involved once implementation has started
- Ongoing supervision to sustain implementation.

The reason why IMCI is uniquely good in Tanzania is that IMCI implementation in the districts was linked to a lot of intelligent thinking behind the IMCI strategy, for example, the use of Burden of Disease for planning, training of non-clinicians, rapid achievement of good IMCI coverage, and solving supervision problems through cascade supervision. In IMCI Tanzania, there is a strong stable team in the districts – partly as a result of the planning tools and IMCI itself -- that may be rare in other countries. This resulted in improved health-care provision that was evident in the health facility survey results.

The key question, however, is whether these IMCI results are generalizable and whether we can replicate this in other districts in Tanzania. Further work will include a breakdown of what implementation took place in every quarter of the year. A question for future discussion is how these results will be incorporated in the publications plan.

IMCI health facility survey results, August 2000

This presentation included information on survey areas, methodology and inclusion criteria, survey instruments, structure of the survey teams, and a brief description of data collection from sampled health facilities on under five child health indicators. Results of 29 IMCI child health indicators in the IMCI and non IMCI districts were presented. The survey results showed improved case management in districts with IMCI compared to non IMCI districts. There was little evidence of an effect on health system support, however, and there is room for improvement for example on supervision.

On the issue of supervision the group discussed whether there is data available on the frequency of supervision, in addition to that available from the health facility survey itself. Some information is available from the MCE costing study, which may reveal how many supervisory visits were made to health facilities.

The group discussed the possibility of a natural observation bias – independent of IMCI -- in all districts, at the moment of observation of case management. Furthermore, it was pointed out that although the plan was to observe whoever provided care regardless of whether health workers were trained in IMCI or not, in reality the surveyors only observed IMCI-trained health workers in the IMCI districts.

The group also discussed the option of an alternative view of IMCI coverage by looking into trained-health-worker to child exposure ratio: a denominator based on population could be used instead of a district denominator in a situation where there are differences in population sizes across the districts. A smaller group will meet to decide how best this can be done.

The group agreed that on presenting results, we should always try to first present findings in line with the original plan of analysis. In the event that changes having been introduced, the changes should be described with an explanation of why they were made, followed by a description of any additional analyses.

Review of IMCI MCE Tanzania study design

J Schellenberg reviewed the study design, reminding participants of the six study objectives and showing the original and updated plans on how data would be analysed to achieve each objective.

Session 1: Recommendations

- Findings should be presented first in line with the original plan of analysis, and then in other ways.
- Other MCE sites might consider looking at training coverage as a ratio of trained-health-workers to children, using a population-based denominator.

Session 1: Action points

- Include breakdown of implementation quarter by quarter.
- Update publications plan for implementation sub-study.
- Extract supervision information from costing study.

Session 2: Contextual factors for the MCE-Tanzania study

Presenters: Joanna Schellenberg

Chair: Don de Savigny

Rapporteur: Honorati Masanja

Assuming the impact indicators have changed, this could be due to IMCI, or it could be due to other factors. The purpose of the contextual factors study is to summarise those "Other factors" and document whether or not they changed over the course of the study. Data sources for this analysis included household surveys in 1999 and 2002, information from health actors and the demographic surveillance systems in the four evaluation districts. There was some concern about the difficulty in presenting all this information in a standardized way.

Data analysis included summaries of health systems factors such as demographic factors, human resources, health facilities, medical staffing, and training. A selected list of indicators from the household surveys was chosen to cover areas such as nutrition, vaccination, home management of disease, morbidity, etc. For each indicator in turn, a possible link with other child health programmes was considered. For those where a link was possible, evidence of any rapid change in coverage over the study period was summarised.

C Victora stressed that indicators that were selected such as breastfeeding, nutritional status, and anaemia were chosen because it was thought that IMCI would change them.

The group agreed to:

1. Look further at the impact factors if they have changed
2. Focus on things that had a rapid, wide spread change
3. Explore carefully at what were the real imbalances between IMCI and non IMCI districts

JP Habicht reminded the group that the fundamental reasons for looking at contextual factors were:-

- a. Positive confounder.
- b. Negative confounder.
- c. If there were overall changes.
- d. If some areas do, or some areas do not do, a particular activity (these factors may constitute effect modifiers).

Session 2: Action points

- Once the results on impact are clear, this study should be reviewed with a focus on indicators for which there is evidence of change. It should then consider whether any relevant programmes had a rapid, widespread change over the study.

Session 3: Mortality impact of IMCI in the two intervention districts in Tanzania

Presenter: Joanna Schellenberg

Chairs: Cesar Victora / David Schellenberg

Rapporteur: Taghreed Adam

C Victora gave an overview of the original plan of analysis to remind participants of what was stated in the protocol of the Tanzania MCE study and to guide discussions on required versus additional plans of analysis of the mortality data. The relevant part of the original study proposal is given in Annex 4. J Schellenberg presented the main findings of the mortality analysis. She started by presenting the results of the comparison between IMCI and comparison districts in the period 2000-2002 (as originally planned), followed by an analysis of trends in decline in mortality in the two types of districts (additional analysis).

Main findings

- DSS areas are not generally different to other parts of the district, apart from the following:
 - Treated nets: Ulanga and Kilombero DSS have relatively high treated-net coverage
 - Admission to hospital: Kilombero DSS has relatively low admission "rate"
 - Access: All DSSs had slightly poorer access to health facilities than districts as a whole (but still to analyse GPS data)
 - Socio-economic status: in all districts except Kilombero, DSS area is less poor than district overall
 - Anaemia: Morogoro DSS has relatively low Hb (maybe due to altitude differences)
- They are also more similar to each other than the whole districts are. This suggests that the analysis using data from these areas can represent district-level estimates.
- Following the original plan, i.e., the assessment of the difference between IMCI and comparison areas, the adjusted t-test showed 13% difference in mortality rate in favour of IMCI ($p=0.29$). After controlling for age and rainfall, there is a 12% difference ($p=0.24$, confidence interval $-4, 26\%$). This difference was smaller than expected and was not statistically significant, so it may be due to chance.
- Sensitivity analysis, without the Morogoro 2000 data point (which is likely to be underestimated due to data collection problems), revealed a difference of 8% with another very wide confidence interval ($-47\%; 42\%$).
- For the additional analysis of trends in decline in mortality, ie, to assess whether the drop in mortality is faster in IMCI areas than in comparison areas. Ratio of changes over time: 0.94, so mortality drop is 6% greater with IMCI, with a 95% confidence interval ($-3\%, 15\%$), and $p=0.42$ (2-sided test),
- Results are therefore:
 - Compatible with positive effect of IMCI.
 - Compatible with no impact of IMCI.
 - Suggest that difference could be due to chance.

- Suggest that difference in unlikely to be due to contextual factors as they would have the opposite effect.

Main discussion issues

- J. Schellenberg clarified that the compared mortality rate was the standardized rate (standardized for proportion of infants and age one to four years) in each district.
- J-P Habicht suggested to explore whether the two-year-period was not representative of the appropriate time for an IMCI effect to occur- i.e., *could it be that the effect of IMCI was during the period through 1999 and first half of 2000?* If this is true, it assumes that the decline of mortality due to IMCI is expected to be rapid and then stop. This is not likely however, both from the original conceptual thinking of how IMCI would affect mortality and because mortality is still rather high, suggesting that there is still room to decrease the under-five mortality rate.
- C Victora suggested that we do not have to control for age and rainfall, as the results change only minimally if these variable are included in the analysis.
- Given that decline in mortality in Morogoro is more than in Ulanga, and Rufiji is not different from Ulanga but lower than Kilombero, showing the results of paired districts will be powerful.

Recommendations and next steps (follow-up in Session 3b, below)

1. Repeat power analysis in light of the available data, by estimating the power of the current sample size to detect an 18% decline in mortality.
2. Redo the analysis starting from 1999 to the last data point. This will feed into the discussion on the effect on the conclusion, had we set the clock differently - assuming we had reasons to believe it was set incorrectly.
3. Follow up on whether it is possible to obtain information on post-neonatal under-five mortality in Morogoro and repeat the analysis for post-neonatal deaths only. This requires sensitivity analysis to see how is this likely to affect the results.
4. Check what the 6% speed of decline in mortality in IMCI district means. Is it 6% per unit of time, in this case 6 months, meaning the overall effect is approximately 6 times the number of 6-month time periods.
5. No need to control for age and rainfall as they are not confounders.
6. Follow up on paired analysis, as discussed above. This will increase the power to detect any difference. If it is not statistically significant, the conclusion will be that we have some evidence of an effect but that it is not large enough to reach statistical significance.
7. Simulate the effect of mosquito-net coverage as it might be a negative confounder.
8. Analyse GPS data for access to health facilities in DSS areas and districts as a whole.

Session 3b: Mortality impact of IMCI in the two intervention districts in Tanzania – follow-up session

Presenter: Joanna Schellenberg

Chair: Cesar Victora / David Schellenberg

Rapporteur: Eleanor Gouws

J Schellenberg addressed outstanding issues from the previous mortality session:

- Statistical analyses after pairing of the four districts showed results similar to those already presented, with an effect estimate of 14%. It therefore reinforces the finding that although the analysis shows some effect of IMCI on mortality, the effect is not as high as originally expected, and is not statistically significant.
- Analysis of under-five mortality trends on all available data from 1997 to 2002 were shown on a log-scale. Incidence rate ratios showed that reduction in mortality was 5% greater in IMCI districts than non-IMCI districts, measured every 6 months, with the unit of analysis being a rate ratio. There was a 1% reduction in mortality every 6 months in the comparison districts, and a 6% reduction every 6 months in the intervention districts.
- Analysis of trends restricted to 1999–2002 showed statistically significant results using one-sided tests, but it was pointed out that since we are only dealing with 4 points, assumptions about distribution may not be valid and p-values should be interpreted with great care.
- It was pointed out that the study was designed as a two-versus two comparison and that we should not concentrate on p-values when interpreting results.
- All results are compatible with a positive effect of IMCI, although not as large as expected.
- Results are also compatible with the conceptual impact model (see Session 7).
- The estimated change in mortality is very similar using different statistical techniques with an estimate of effect between 13%-18%.
- Results presented by C Victora using paired analysis on annual rates (i.e. changes by year for each pair) showed an average overall ***difference*** in mortality between IMCI and comparison areas of about 9.5%.
- The results above were confirmed by analysis conducted by JP Habicht.
- Expressed as the number of lives saved, results from 2000-2002 showed differences of 3.8 deaths per thousand per year, in favor of those with IMCI.

Session 3b: Action points and recommendations

- Neonatal mortality results from Morogoro should be followed up as a matter of urgency, so that post-neonatal mortality can be analysed.
- Results from the various sets of analyses could be written up and pasted on the web, while the final paper should only concentrate on a selected set of results.

Sessions 3 and 3b: Conclusion

IMCI as implemented in Tanzania did not lead to reductions in under-five mortality of the magnitude expected (20% in two years). Under five mortality in the two intervention districts was 13% lower than in the comparison districts (CI -4; 25), which is compatible with an effect of IMCI on mortality although it is not statistically significant. The mean rate of decline in mortality was 1% every 6 months in the comparison districts, and 6% in the intervention districts, a 5% greater decrease.

Session 4: Impact of IMCI on child health indicators at household level

Presenter: Honorati Masanja

Chair: Hassan Mshinda

Rapporteur: Eleanor Gouws

The presentation included a review of the methods for the household survey and results of selected indicators. Statistical analysis was based on differences in trends between 1999 and 2002 by assessing the significance of the interaction between time and IMCI.

General conclusions

- Generally, the household surveys did not provide evidence of improvements in child health indicators measured at household level between 1999 and 2002 which can be attributed to IMCI as implemented in Morogoro and Rufiji, with the possible exception of hospital admissions during the year before the survey.

Specific findings

- Analysis of hospital admissions showed evidence of an increase of 1–2 percentage points between 1999 and 2002 in the IMCI areas while there was a decrease of 2–4 percentage points in the comparison areas. In the face of the low frequency of hospital admissions in the study areas, an increase in hospitalisations is a positive finding because it suggests that referral patterns have improved, and that children who need hospital care for severe illness are more likely to get it in the IMCI areas.
- DPT vaccination coverage declined in the IMCI areas over the course of the study, while remaining fairly constant in the comparison areas. However, as coverage was already high at baseline, this finding may not be of public health significance.
- Caretaker knowledge in relation to feeding during illness was general quite low in the community with no difference between IMCI and non-IMCI districts. This result is discrepant with health facility survey results where utilization is high and knowledge increased significantly among those treated by IMCI trained health workers, and needs to be thought through more carefully. It was suggested that the analysis be repeated for those children who had gone to a health facility during the last year.
- Overall, there have been improvements in several indicators of child health since 1999, most notably for nutritional status, vitamin A, mosquito nets and anaemia. These changes took place in all four districts and are thus unlikely to be due to IMCI.
- Sleeping under a mosquito net showed a statistically significant increase in comparison districts compared to IMCI districts. It was pointed out that the metric of measurement may be problematic (eg. we may have to use a log-scale) and we need to consider what would be best to use for IMCI .
- Anaemia is an indicator of malaria as well as nutrition. Consistent results were shown for Kilombero where the use of nets went up and anaemia came down.

- It was agreed that the indicator assessing the use of mother's cards for children under 2 years is not very useful and to drop it from future analyses in the MCE.
- R Scherpier pointed out that IMCI is delivered at an individual level while population measures are considered in the household survey and suggested therefore that denominators for each indicator be re-considered.
- JP Habicht expressed his concern about the use of two-tailed statistical tests in this type of evaluation study and suggested the use of a one-tailed test instead. The group was reminded that the study was designed to show that IMCI is better than non-IMCI.
- JP Habicht suggested that the presentation of household survey results should first focus on assessing the magnitude of the effects by assessing differences in slopes overall, then assessing differences in the two pairs of districts, before presenting results of statistical significance. He agreed to write up some points on interpretation for specific indicators.
- A separate meeting was suggested for discussion among statisticians regarding questions on statistical analysis listed by H Masanja.

Session 4: Action points

- Repeat analysis of caretaker knowledge and practice, restricting to those children who had gone to a health facility during the last year.
- Drop the indicator for the use of mother's cards in children under 2 years.
- Presentation of household survey results: first assess magnitude of the effects (differences in slopes overall), then assess differences in the two pairs of districts, then present results of statistical significance.

Conclusion

Improved quality of care at health facilities, in the absence of interventions delivered directly to households and communities, did not result in measurable changes in household compliance or care, or in careseeking or utilization, even when considered only among those who received care at an IMCI facility in the previous 2 weeks, or among those living in the vicinity of an IMCI facility.

Session 5: Brief summary of main findings about the costs of IMCI

Presenter: Taghreed Adam

Chair: Robert Scherpbier

Rapporteur: Don de Savigny

The main questions of the economic evaluation of the MCE attempted to answer are:

- Is treatment of under-fives based on IMCI good value for money?
- Do the additional health benefits gained by switching from routine practice to IMCI justify the additional costs (if any)?
- What did it cost to implement IMCI and what is it likely to cost to maintain?

Costs were measured at the national, district, district hospital, health center, dispensary, and household levels. Costs were normalized to a standard district of 50,000 children and 1999 USD. Cost per child for under-five care in IMCI districts was \$11.19 vs. 16.09 for routine care in the comparison districts. Costs were generally similar at all levels except hospital where costs were higher in non-IMCI districts because of higher number of under-five admissions in non-IMCI districts.

Hospital Level. At hospital level average cost per bed-day were assumed to be the same. There were fewer children admitted to hospital in IMCI districts (6%) compared with comparison districts (15%). Possible reasons for this are: (1) improved quality of care and drug availability for under-fives at IMCI primary facilities meant that fewer children were subsequently admitted to hospital; or (2) factors other than IMCI, such as differences in access to and quality of the hospitals meant that children in comparison districts were more willing or able to use hospitals. However, even if we assume that this difference was entirely due to other factors, and exclude the hospital component from the analysis, total costs per under-five child in IMCI districts were still lower than in comparison districts (6%).

Primary care facility level. Health workers in IMCI health centres examined more patients per day, on average. They spent more time per under-five consultation, on average, and no less time for an over-five consultation, than those in the comparison districts. It appears, therefore, that they used part of their non-clinical time (including non-productive time) to provide better care for under-fives.

Household costs. Household out-of pocket payments per visit were slightly higher in comparison districts, owing mainly to differences observed in the Kilombero district. This may be due partly to a user-fee system in government facilities in this district. It may also have occurred because this district has the only large urban area of the four districts and because user fees at non-government facilities may be higher than in rural areas. Although the out-of pocket cost per visit was higher in comparison than in IMCI districts, the total out-of-pocket cost per child over a year was similar (\$ 2.70 and \$2.40 in IMCI and comparison respectively).

This might be explained by the fewer visits per child per year to primary-level facilities in the comparison districts (1.8) compared with IMCI districts (2.7).

Regression analysis. Even in randomized control trials, the characteristics of patients in the two groups might differ simply due to chance — simple unadjusted comparison of results might give misleading results and methods that control for differences in initial characteristics of patients need to be used. This type of question also arises in studies such as the MCE where the unit of comparison is the district. It is important to explore whether differences might be related to differences in the characteristics of the districts rather than to the intervention itself. Regression analysis is one way of trying to separate the influence of multiple factors on the quantity of interest. It is particularly useful to the analysis of primary-health-facility unit costs, which could be influenced by many factors other than IMCI, and could well differ systematically between the intervention and comparison districts. The overall conclusion from regression analysis, controlling for number of visits, vehicles and facility type was, regardless of the model, the cost per visit in IMCI facilities was at least 30% less than in comparison facilities ($p < 0.001$). However, districts may differ in ways that can affect the cost of childcare (e.g., population density, case mix, access to health facilities, availability of Non-government facilities). Also, IMCI in the intervention districts was accompanied by measures to strengthen district management.

Suggested next steps

- Revise cost estimates to incorporate results from the follow-up household survey in 2002.
- Analyse the cost results together with quality of care results from the health facility survey.
- Use the cost estimates and the estimates of under-five mortality and morbidity to determine the cost-effectiveness of IMCI.

Session 6: Implications of findings for child health in Tanzania

Presenter: Theopista John

Chair: Don de Savigny

Rapporteur: Theopista John

The session started with a brief presentation on the status of IMCI implementation in Tanzania by T John. The key points of the presentation were:

- Adaptation of IMCI strategy in Tanzania occurred in 1996.
- The IMCI implementation in Tanzania has focussed on the first and second component.
- The third component was delayed in implementation due to lack of guidelines, which are now under development.
- Currently more than 60% of the districts have conducted at least one IMCI case management training course.

- Future plans for IMCI in Tanzania include:
 - Scaling up of IMCI in all districts in the country.
 - Development of the integrated management cascade supervision in order to ensure quality of care.
 - Currently the IMCI HFS is being conducted in 10 districts, the results will be used to develop the 5 year strategic plan for IMCI.
 - To use MCE results for resource mobilization at all levels.
 - Introduce the IMCI community component in districts where IMCI has been introduced.

Issues discussed

- When considering cost-effectiveness of IMCI, it must be clear what outcomes are being considered – for example, quality of care from the HFS and cost per child at district level.
- The group briefly reviewed the conceptual framework (see session 7). According to the IMCI MCE impact model, all three components were expected to be implemented together, and a reduction of 20% in mortality was expected. IMCI has been implemented in a reasonably well functioning health system in the MCE study districts with a high utilization rate and high coverage of key interventions.
- The statement in Annex 1 was agreed to summarise the key take-home messages.
- For community IMCI, it was agreed that there would be a need to focus on a few key practices in order to be able to demonstrate a change in behaviour leading to a change in mortality. It was suggested that the MCE could give guidance on prioritizing key practices/messages which are likely to have impact on child mortality.

Action points: Next steps for dissemination in Tanzania

1. Finalize key findings summary among Kingham group by e-mail (final version in Annex 1).
2. Keep document as a reserve for those who need to know quickly the key findings, but we do not broadcast the document except as follows:

Delegation goes to PS CMO (key findings), week of Sept 16th (HM, TJ, CM).

 - MOH Monday Directors' meeting (key findings) Sept 22 or at least prior to RMOs Meeting (TJ CM, HM) with handout.
 - RMOs 20th MCH 27th October in Arusha (key findings and costs) (CM, TJ).
 - Linkage and implications of results for those involved in current IMCI health facility survey in Tanzania in October (HM, TJ, CM).
3. Stakeholders meeting week of November 17th, with MCE Tanzania investigators invited to review and discuss results in a pre-meeting one day before.
 - DHMT members to be invited to the stakeholders meeting.
 - Glossy materials to be prepared.
 - Meeting to be organised by IHRDC and WHO Tanzania, with JS and FM taking a lead role in planning.

4. Small brainstorming of key Tanzanian stakeholders plus Leslie Mgalula and Claudio Lanata to address implications for IMCI implementation (JS plus all), in same week if possible.
5. WHO Inter-country IMCI Planning Meeting, Harare, 24 Nov (TJ LM).
6. Feedback visits to Districts CHMTs individually early December (**FM** HM JS CM TJ Mrs Ndeki).
7. IMCI Review and Strategic Planning Meeting in January (to include targeted separate key Ministries e.g. finance, Women's & Children's affairs, VPs office, Local Government)(TJ CM).
8. Inputs to March health sector review (all watch for opportunities).

All these events will use a core of 10 or so slides. JS to lead in their preparation.

Session 7: Data Synthesis: Revisiting the IMCI conceptual model for Tanzania

Chairs: J Bryce and D Schellenberg

Rapporteur: J Bryce

The IMCI impact model (Figure 7.1) was re-introduced as a basis for synthesizing and summarizing the findings. As a first step, the model was adapted to reflect how IMCI was implemented in Morogoro Rural and Rufiji Districts during the study period (Figure 7.2). Then, as shown in figure 7.3, the group summarized the findings that had been presented for three specific sets of assumptions (labeled as "A", "B", and "C" in the diagram):

Assumption A: Based on an observation-based study in health facilities, IMCI inservice training combined with 3 DHMT planning support tools was found to be associated with large and statistically significant improvements in the quality of care received by children in the two intervention areas, and did not cost more than existing child health services as delivered in the two comparison areas.

Assumption B: Improved quality of care at health facilities, in the absence of interventions delivered directly to households and communities, did not result in measurable changes in household compliance or care, or in careseeking or utilization, even when considered only among those who received care at an IMCI facility (in the previous 2 weeks) or among those living in the vicinity of an IMCI facility.

Assumption C: Mortality in the two intervention districts was 13% lower than in the comparison districts (CI -4 – 25), which is compatible with a small effect of IMCI on mortality although it is not statistically significant. IMCI as implemented in Morogoro and Rufiji Districts did not lead to reductions in under-five mortality of the magnitude expected (20% in two years). The mean rate of decline in mortality was 1%

every six months in the comparison districts, and 6% in the intervention districts, a 5% greater decrease.

Figure 7.1

IMCI Impact Model

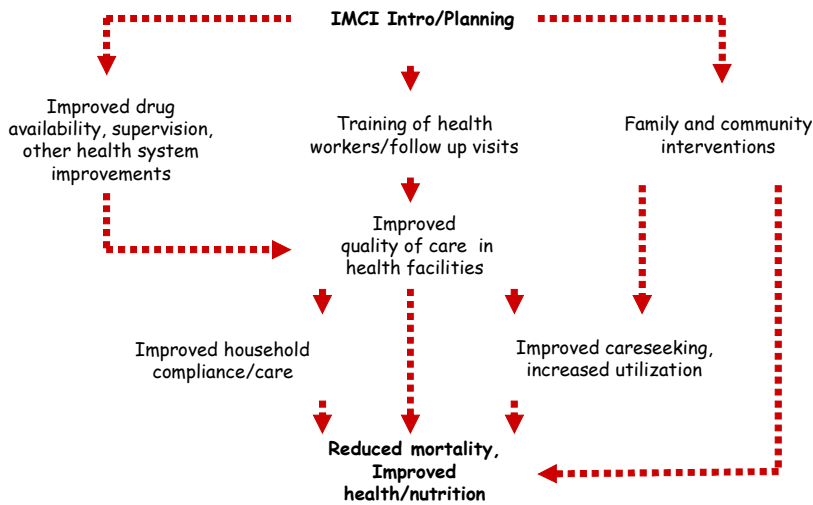


Figure 7.2

IMCI Impact Model As Implemented in Morogoro and Rufiji Districts

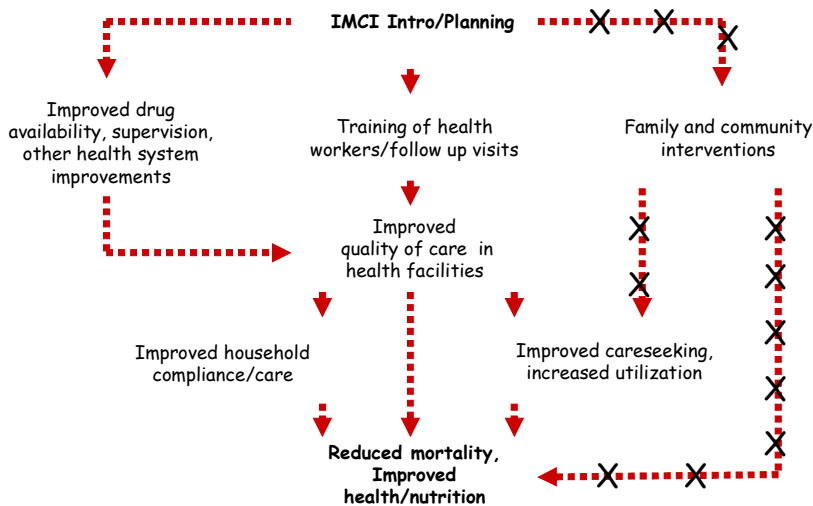
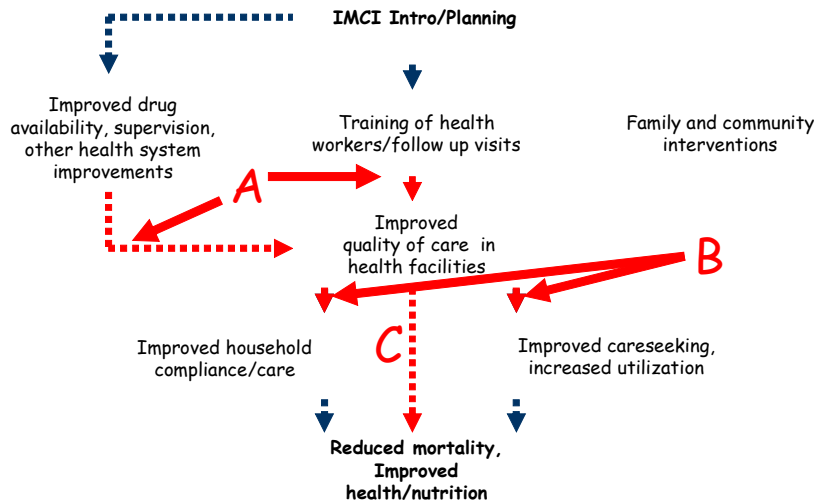


Figure 7.3

IMCI Impact Model As Implemented in Morogoro and Rufiji Districts



D Schellenberg then led a discussion of the relationships and overall consistency of findings across the various substudies. Several anomalies were identified, and efforts made to understand why they occurred and how they could be explained.

One important set of questions focused on the gap between the clear and important improvements in the quality of care in health facilities and the lack of change or improvement in key family practices at household level. One assumption underlying IMCI implementation and the MCE was that contact between mothers and IMCI-trained health workers during facility visits would, over time, lead to higher levels of knowledge and key family practices that could be measured at household level. This assumption was not supported by this set of findings.

A second set of questions focused on the 13% reduction in mortality among children under five in the intervention areas. Although the reduction was less than the 20% expected in the study, a review of various analyses suggests that there was a real, although not statistically significant, reduction of mortality in the IMCI districts. The explanation of the mediating factors leading to this change, and why they may not have appeared in the household survey data set, include:

- The household survey was conducted during the dry season, when there is considerably less morbidity and thus fewer mothers would have had the opportunity to practice key behaviors.
- Most of the children who died would have had severe illness, and thus the improved case management in the health facilities had a rapid impact on case fatality rates, despite the absence of change in the preventive behaviours and home case management reflected in the family practices.

These two interpretations might be evaluated empirically through another household survey conducted after more time has elapsed and in the rainy season when morbidity rates are higher.

Given that mortality is a relatively rare event, focusing on morbidity might yield more information about the effectiveness of IMCI. Morbidity tracking over time, which would be possible within a DSS system, might be a useful way to address this.

Session 7: Action points

- Figure 7.3 and the related assumptions to be used as a framework for the discussion of the results of the study.
- Evidence on a further assumption, supporting the link between the introduction of IMCI and drug availability and supervision (upper-left arrows in Figure 7.3), should be added.

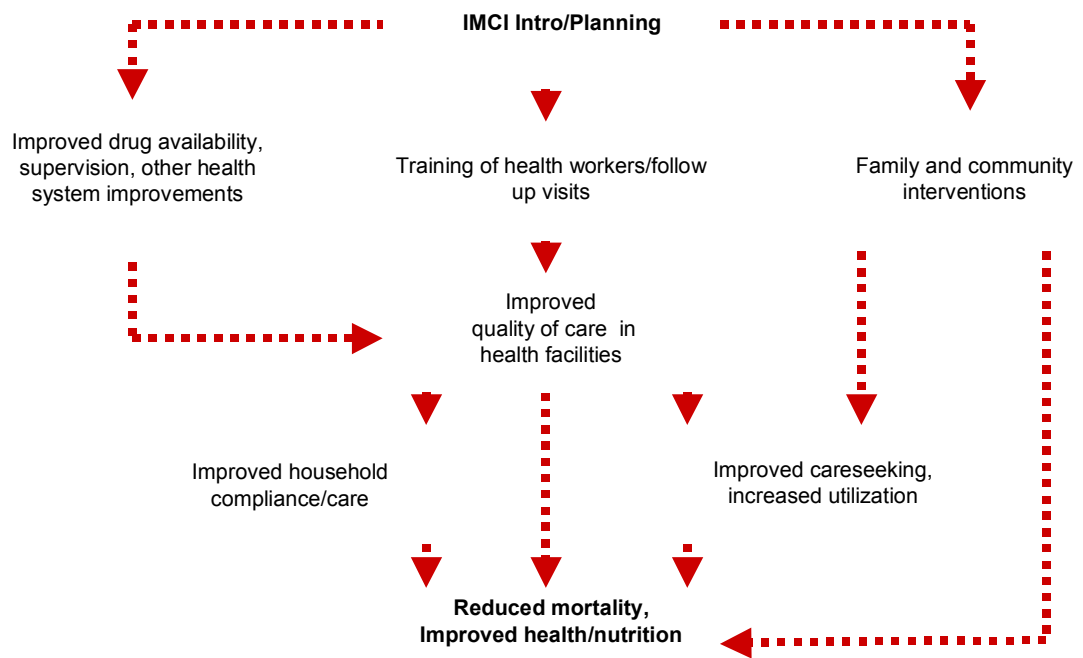
Annex 1: Initial Key Messages from Tanzania MCE

Feedback for policy makers

24 September 2003

1. What were the expectations for the MCE?

- a. The IMCI strategy would be delivered in an integrated way including its 3 components:
 - i. Improving health worker performance
 - ii. Improving health systems support
 - iii. Improving family and community behaviors
- b. According to the proposed IMCI impact model (Figure), a reduction in mortality of at least 20% would be obtained in a two year period by the joint effect of the 3 components
- c. The design of the evaluation would not allow the assessment of the separate effects of the three components of IMCI
- d. The evaluation would be carried out under real-life circumstances



2. What was the actual comparison?

- a. Four districts in rural Tanzania that, over the study period from 1999 to 2002, had:
 - i. Reasonably well-functioning health services
 - ii. Comparable levels of per-capita health expenditure
 - iii. High utilization rates of government health facilities
 - iv. High coverage of selected key interventions (e.g. EPI)
 - v. Large numbers of governmental and non-governmental health actors active in the districts, including health worker training and community activities, mostly with patchy coverage
- b. Two of these districts (Morogoro and Rufiji) also had:
 - i. Strengthened district management skills (priority setting and resource allocation tools)
 - ii. Decentralized control of the health budget
 - iii. High training coverage of IMCI for health workers
 - iv. No increase in provision of IMCI-specific community level activities

3. What did we find? Relative to the comparison districts, Morogoro and Rufiji districts presented:

- a. Substantial improvements in quality of care in health facilities as assessed through a health facility survey
- b. Important weaknesses in health systems support for child health care
- c. No marked changes in utilization rates
- d. Lack of differential change in IMCI-related key family behaviors measurable through a household survey
- e. No increase in overall economic costs of providing care to under-five children
- f. A likely reduction of 13% (confidence interval -4 , 26%) in underfive mortality over a two-year period
- g. The above differences were unlikely to be due to changes in external (or contextual) factors

4. Summing up:

- a. IMCI implementation at health facility level was associated with improved quality of care, no increase in costs, and a possible reduction in mortality, suggesting that IMCI is good value for money;
- b. These improvements were observed in the presence of strengthened district health management skills, decentralized planning and budget control, and tools for resource allocation and priority setting;
- c. Improvements in health systems support for IMCI, including supervision and referral, are still needed;
- d. The lack of a community component may have limited the potential impact of IMCI on mortality and on observed behaviour change;
- e. Given the implementation realities in Tanzania, the design of the evaluation does not allow the assessment of the separate effects of the three components of IMCI;
- f. IMCI implementation in Tanzania should continue to be supported with special attention to reaching a high coverage with the community component.

Annex 2: Agenda

Date/time	Content	Presenter(s)	
Thursday 11 September 9.0	Chair: J Bryce Review of meeting objectives and expected outcomes.		
9.30-10.30	<u>Session 1:</u> IMCI in the study area: what are we evaluating, and how? Chair: J Bryce	<ul style="list-style-type: none"> ▪ Review of the implementation of IMCI and health facility survey findings ▪ Review of the study design ▪ Discussion 	C Mbuya J Schellenberg
11.0-12.30	<u>Session 2:</u> Contextual factors for the MCE-Tanzania study Chair: D de Savigny	Other than IMCI, what else differs between the study districts, and how has this changed over the study time period? <ul style="list-style-type: none"> ▪ Review of contextual factors ▪ Discussion 	J Schellenberg
2.0-5.0	<u>Session 3:</u> Mortality impact of IMCI in the two intervention districts in Tanzania Chairs: C Victora / D Schellenberg	<ul style="list-style-type: none"> ▪ Review of methods and findings ▪ Discussion ▪ Is there a need for single demographic survey? ▪ Agreement on main findings and next steps/further work to be done 	J Schellenberg
Friday, 12 September 9.0 – 11.0	<u>Session 4:</u> Impact of IMCI on child health indicators at household level. Chair: H Mshinda	<ul style="list-style-type: none"> ▪ Review of methods and findings ▪ Discussion ▪ Agreement on main findings and next steps/further work to be done 	H Masanja
11.30 – 12.30	<u>Session 5:</u> Brief summary of main findings about the costs of IMCI Chair: R Scherpbier	<ul style="list-style-type: none"> ▪ Review of methods and findings ▪ Discussion ▪ Agreement on main findings and next steps/further work to be done 	T Adam
2.0-5.0pm	<u>Session 6:</u> Implications of findings for child health in Tanzania? Chair: D de Savigny	<ul style="list-style-type: none"> ▪ What are the implications of the findings for child health in Tanzania? ▪ How will these findings and their implications be presented to and discussed with various audiences? 	To be confirmed
Saturday, 13 September 9.0 – 12.0	<u>Session 7:</u> Revisiting the IMCI conceptual model Chair: J Bryce	<ul style="list-style-type: none"> ▪ Review of the model in the light of the Tanzania findings ▪ Discussion ▪ Agreement on conclusions and next steps/further work to be done 	To be confirmed
12.0	<u>Close</u>		

Annex 3 – List of participants

1. Hassan Mshinda (Co-principal investigator, MCE-Tanzania)
2. Joanna Schellenberg (Co-principal investigator, MCE-Tanzania)
3. Conrad Mbuya (Investigator, MCE-Tanzania)
4. Honorati Masanja (Investigator, MCE Tanzania)
5. David Schellenberg (Investigator, MCE Tanzania)
6. Theopista John (WHO Tanzania Focal Point for MCE)
7. Cesar Victora (MCE Senior Technical Advisor)
8. Don de Savigny (MCE Technical Advisor)
9. Jean-Pierre Habicht (MCE Technical Advisor)
10. Jennifer Bryce (MCE Consultant)
11. Robert Scherpbier (MCE Responsible Officer, WHO/CAH)
12. Eleanor Gouws (MCE Technical Officer, WHO/CAH)
13. Taghreed Adam (MCE Technical Officer, WHO/CAH)
14. Leslie Mgalula (WHO-AFRO)



Annex 4: Mortality sub-study (Excerpt from original proposal for MCE Tanzania)

Substudy 1: Continuous demographic surveillance of underfive mortality

Data Sources

Continuous, direct, demographic surveillance recording all births, deaths, pregnancies, and in/out migrations in a sample of 138,000 people (21,500 under-fives) is underway in three of the four districts: Rufiji (83,000); Kilombero (28,000) and Ulanga (27,000). These DSS systems use census and continuous re-enumeration to establish and maintain the denominator and a network of community key respondents to identify vital events in the numerator. All events are confirmed by a DSS supervisor. Rufiji, Kilombero and Ulanga Districts use the Navrongo DSS Household Registration System (HRS). A further 102,000 people (15,000 underfives) are under demographic surveillance in Morogoro Rural District using the AMMP system of annual censuses. The total population under surveillance is 240,000 (36,000 underfives). Information on cause of death based on verbal autopsies is currently available for Morogoro and Rufiji.

Mortality data for Morogoro are available since 1992, for Kilombero and Ulanga since 1997, and for Rufiji since 1998. Under-five mortality levels have been stable in all districts to date. The approximate annual numbers of births and of under-five deaths in the four districts are respectively 3,000 and 500 for Morogoro, 2,500 and 415 for Rufiji, and 800 and 125 each for Ulanga and Kilombero.

Indicators

These systems will allow us to measure two of the priority MCE indicators: the under-five mortality rate and post perinatal under-five mortality rate. Years of life lost due to under-five mortality will also be calculated. Cause-specific mortality can be calculated for the two IMCI districts.

By collecting information on mortality over a two-year period (2001 and 2002), it will be possible to detect an 18.5% reduction in mortality comparing IMCI intervention districts with the control Districts. It will also be possible to detect a 23% reduction in mortality in Morogoro relative to Ulanga, or in Rufiji relative to Kilombero. These calculations assume an alpha level of 5% (two-tailed), 90% power, a design effect of 1.3 and baseline underfive mortality of 160.

Analysis

The above indicators will be calculated for all the DSS areas in each district. Although these areas are not strictly representative of the whole district population, it is expected that they will reflect overall trends in mortality. Time trends as well mortality levels will be compared. In the two IMCI districts, it will be possible to separate time trends into estimated IMCI-preventable and other causes of death.

Annex 5: Workplan: September 2003 to March/April 2004

Topic	Work needed	Lead person	When
Mortality (sub-study 1)	Finish & check analysis (include power calculation)	JS	Oct/Nov 03
	Get post-neonatal mortality data for Morogoro	JS	Oct 03
	Add post-neonatal mortality	JS	Nov 03
	Add interpretation given contextual factors results (including simulations)	JS	Oct/Nov 03
Household surveys (sub-study 2)	Finalise & check all results*	HMas	Oct 03
	Vitamin A coverage report (for UNICEF)	HMas	Nov/Dec 03
Health Facility Survey (sub-study 3)	Results for final version of indices	EG	(After 13-17 October)
Documentation of Implementation (sub-study 4)	Expand section on health systems support, and include implementation quarter-by-quarter	CM	
	Draft of paper	CM	
Contextual factors (sub-study 5)	Finish & check analysis & conclusions	JS	Oct/Nov
Costing & cost-effectiveness (sub-study 6)	Per capita costs in Kilombero and Ulanga (Health Accounts Tool already done by Muna/Kasale?)	CM	Oct
	Draft paper on out-of-pocket costs	FM	Sept/Nov
	Draft papers on <ul style="list-style-type: none"> • Overall cost • Cost per child correctly managed • Cost per death averted 	TA	
	Contribution to "policy brief"	TA	Oct/Nov
Putting them all together	Rethink & recheck Kingham meeting take-home messages after all results finalised	JS	Oct/Nov
	Draft overall results paper	JS	By Dec 03
	Update publication plan	JS	By Dec 03
	Submission of all papers	Lead authors	Jan-Apr 04
	Brainstorming on next steps for child health in Tanzania	JS/FM	17-21Nov03
	Policy briefs: Draft, produce and print booklet and one-page summary	JS	By end 03
Dissemination meetings	Feedback to PS, CMO and MoH Director's meeting	HM/CM/TJ	By 27 Oct
	Tanzania MCE team meeting	JS/FM	17-21Nov03
	Tanzania stakeholders meeting	JS/FM	17-21Nov03
	Input to annual health sector review	JS/FM	Mar 04
Develop agenda for follow-on research	Discussions at November meetings and at Bangladesh MCE P.I.'s/T.A.'s meeting	JS	Dec 03

*Including GPS data on access, and also caretaker knowledge and practice for children who went to a health facility in the two weeks or in the year before the survey.