

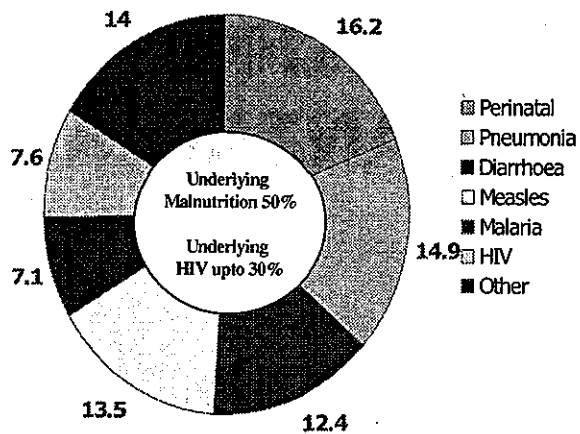


OVERVIEW OF IMCI STRATEGY IN TANZANIA

27TH MAY 2005, JICA MISSION, DAR
DR T. JOHN

Objectives of the IMCI strategy

Distribution of child deaths by cause
Africa, 1999



Source: EIP/WHO, 1999

To contribute to the reduction of morbidity and mortality among children less than 5 years of age.

To promote health growth and development.

IMCI components and intervention areas

Improve health worker skills

- Case management standards & guidelines
- Training of facility-based public health care providers
- IMCI roles for private providers
- Maintenance of competence among trained health workers

Improve health systems

- District planning and management
- Availability of IMCI drugs
- Quality improvement and supervision at health facilities
- Referral pathways and services
- Health information system

Improve family & community practices

- Appropriate careseeking
- Nutrition
- Home case management & adherence to recommended treatment
- Community involvement in health services planning & monitoring

Health
systems

Health worker
performance

IMCI takes advantage of synergisms
between the 3 components

IMCI addresses 5 key diseases:
pneumonia, diarrhoea, malaria,
measles and malnutrition

Families and communities

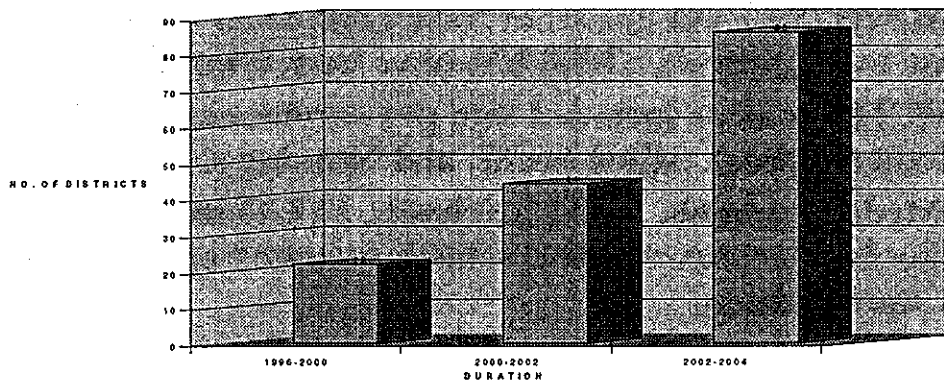
*Integrated Management
of Childhood Illness

STATUS OF IMCI IMPLEMENTATION IN TANZANIA

- **IMCI was introduced in Tanzania in 1996, now its is in the expansion phase**
- **89 out of 114 districts (78%) in Mainland and 8 out of 10 districts (80%) in Zanzibar have conducted at least one case management, >7000 h/w have been trained**
- **IMCI have been included into pre service curricula for Medical school, Allied health and Nursing schools**
- **2 Medical schools, 2 AMO Schools, 10 CO and 7 Nursing schools. 2 private medical schools oriented and planned to start training**
- **Referral care package introduced in 7 hospitals**
- **Community IMCI introduced in 16 districts**

Scaling up of IMCI from 1996-2004

SCALING UP IMCI IMPLEMENTATION 1996-2004



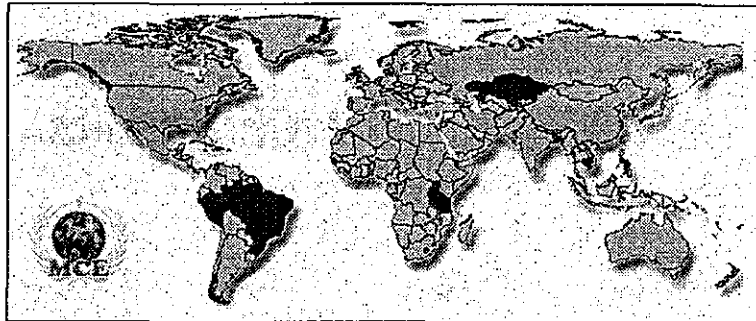


Impact of IMCI on Child Survival

MCE Results

IMCI Evaluation in Tanzania

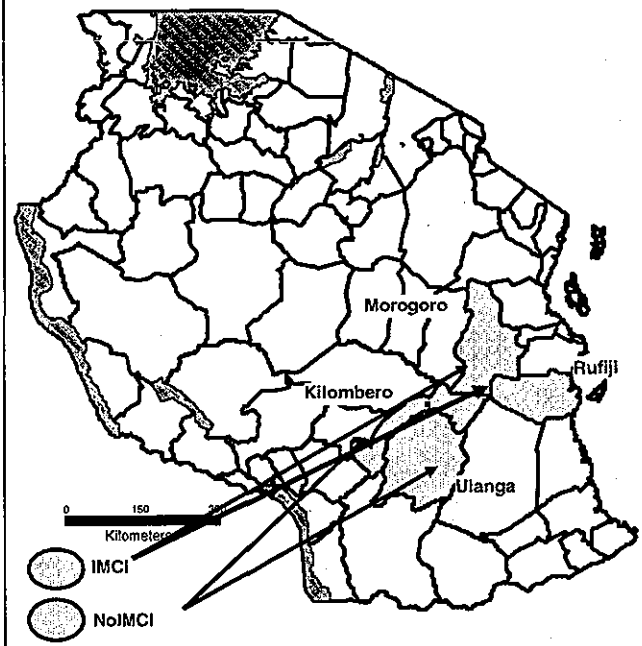
- **Effectiveness, cost and impact of IMCI**
- Programme evaluation
- WHO Multi-Country Evaluation of IMCI (MCE)
 - Tanzania
 - Uganda
 - Brazil
 - Peru
 - Bangladesh



Study Objectives

1. To assess the cost-effectiveness of IMCI relative to routine care in improving quality of care at first-level health facilities in Tanzania
2. To assess the impact of IMCI on child mortality
3. To document and disseminate the results for use in health sector decision making

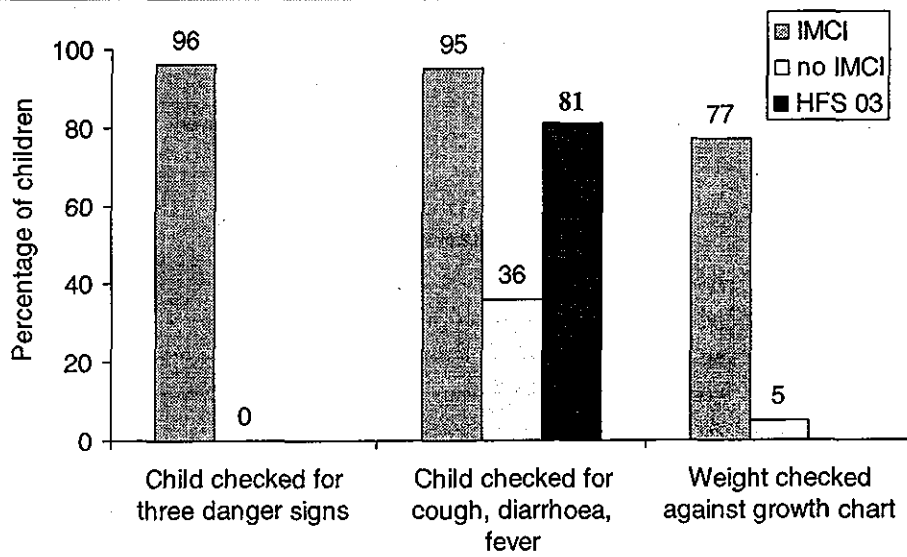
IMCI MCE: Tanzania Component



Design: plausibility study in 4 districts

- Ongoing demographic surveillance in all 4
- Social marketing of treated nets in all 4
- IMCI implemented in 2 districts from 1997-9
- Child mortality 1999-2002 (DSS)
- Household child health indicators (surveys 1999&2002)
- Case-management & facility support indicators (survey 2000)
- Costing (survey 2000)
- **IMCI implemented in all 4 districts from 2002 onwards**

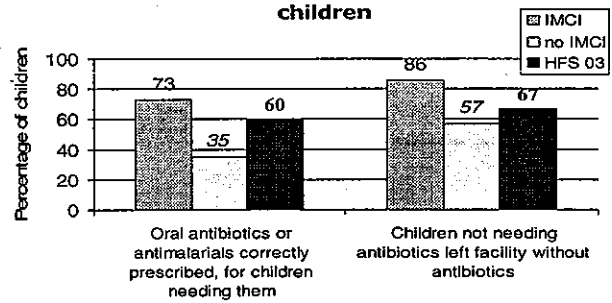
Effect of IMCI on assessment of sick children



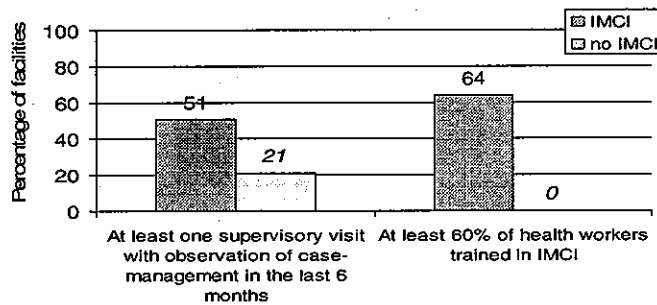
Objective 2. Effect of IMCI strategy on child health care at health facility level.

Health facility survey, August 2000

Effect of IMCI on treatment of sick children



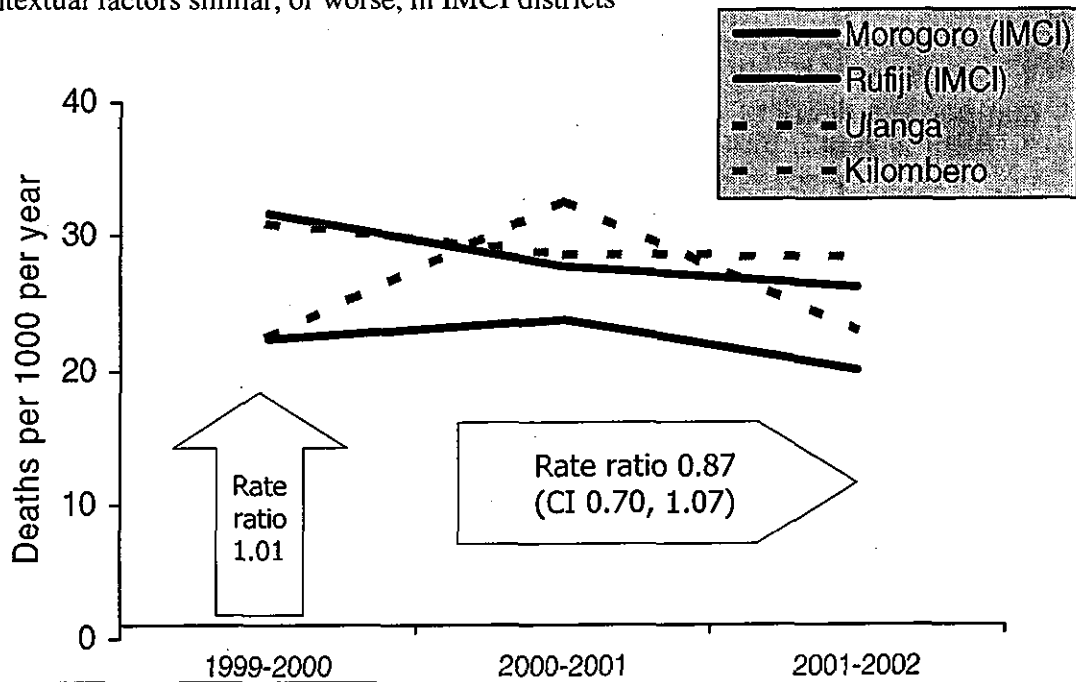
Health systems support



Objective 6. Impact of IMCI strategy on under-five survival.

Observed 13% reduction in child mortality: is due to IMCI

Contextual factors similar, or worse, in IMCI districts



Source: Demographic surveillance in part of each district

Mortality declined

- Baseline mortality levels were the same in IMCI and comparison districts
- After 2 years, mortality was 13% lower in IMCI districts.

District	Under five mortality rate (per 1,000 births)	
	BEFORE	AFTER
IMCI districts	128	115
Comparison districts	127	133

**IMCI could save the lives
of 28,000 Tanzanian children each year.**

Costs of child health care

<i>Source of Expenditure</i>	<i>IMCI Districts</i> \$ (% of total)	<i>Comparison</i> <i>Districts</i> \$ (% of total)	<i>Incremental</i> <i>costs</i> <i>of IMCI \$</i>
National level	0.17 (0.02)	0.04 (0.00)	0.13
District level	2.30 (0.29)	3.39 (0.41)	-1.09
Facility level	3.16 (0.40)	3.31 (0.40)	-0.15
Household level	2.24 (0.29)	1.60 (0.19)	0.64
Total cost per child	7.86	8.34	-0.47

¹Costs have been standardized to a district with 50,000 children under age five.

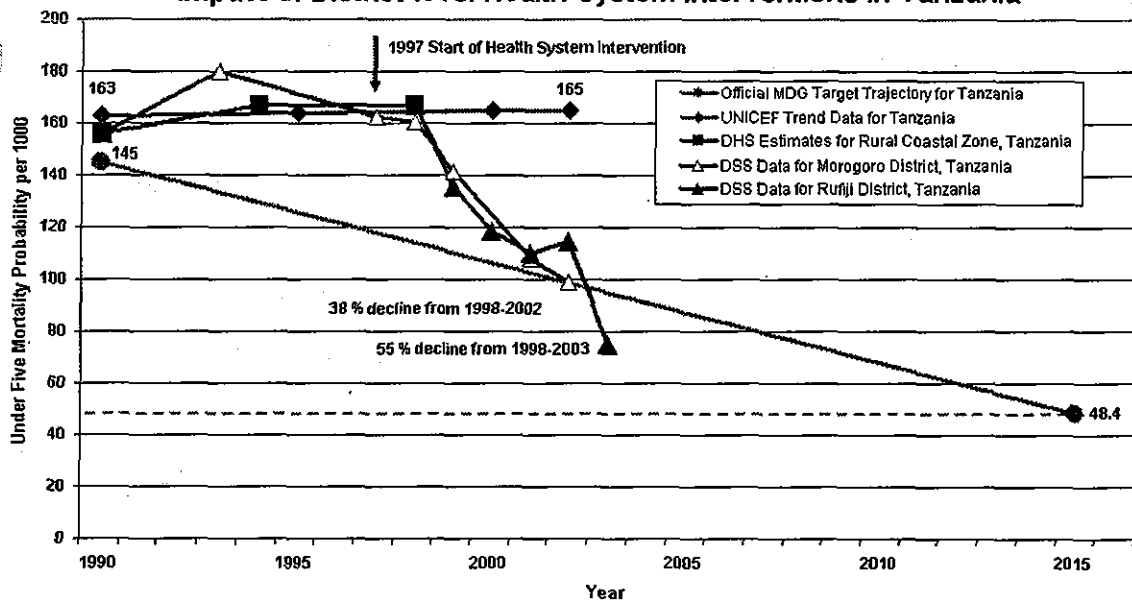
Cost per child managed correctly

Measure	Districts	
	IMCI	Comparison
Input data:		
Standardized ¹ total annual district cost for child health care	\$ 393,193	\$ 416,825
Quality measure (proportion of children managed correctly)	0.65	0.16
Standardized ¹ annual under-five consultations at government primary care facilities	150,745	101,991
Effectiveness (Number of children managed correctly) ²	97,834	16,217
Cost per child managed correctly:	\$ 4.02	\$ 25.70

¹Consultations and costs have been standardized to a district with 50,000 children under age five.

²Annual consultations multiplied by proportion managed correctly.

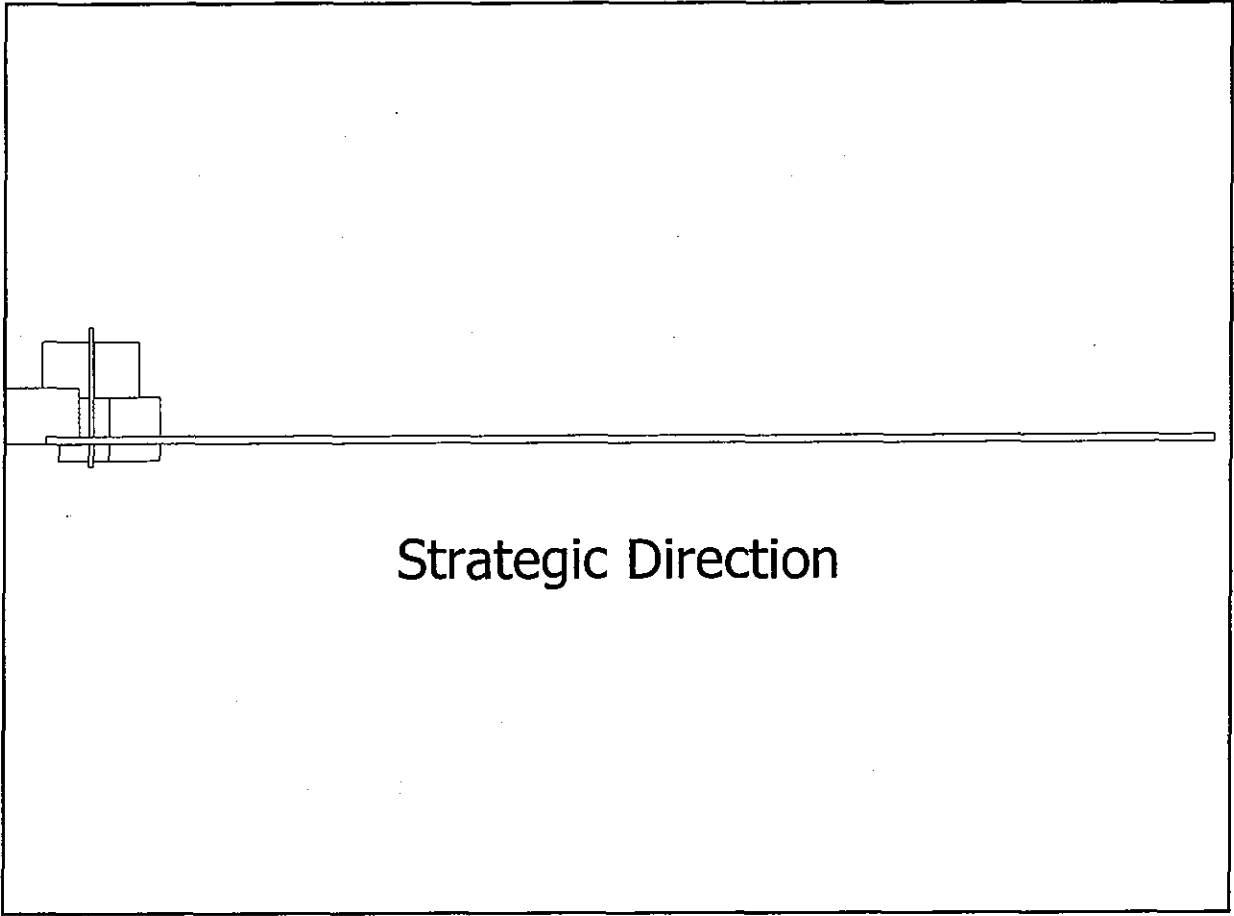
Reversing the Trend in Child Mortality - Impact of District-level Health System Interventions in Tanzania -



SOURCE: TEHIP EXPERIENCE 1996-2004

IMCI saves lives & is good value for money

- IMCI improved quality of care & 13% reduction in child mortality hence impact on child survival
- Economic cost was no greater than cost of child health care in comparison districts
- *Better survival at reduced cost: IMCI is highly cost-effective*
- Resources from “basket funding” are sufficient for IMCI
 - IMCI now in plans of every district in the country
 - IMCI included in phase 2 of the Poverty-Reduction Strategy Paper (MKUKUTA)
- Early results from c-IMCI has shown improvement in early care seeking and identification of missed opportunities for immunization (Documentation of experiences in 7 early learning districts planned for 2005)



Strategic Direction

Strategic Plan 2005/2010

Major focus:

Main focus is moving from process into showing impact:

- Creating capacity at national level for effective coordination
- Creating adequate capacity at zonal, regional and district levels for training and supervision levels

Strategic Plan 2005/2010

Major focus....

- Scaling up of all components; case management, health system, community and quality of care
- Achieving adequate coverage of all components within the districts in order to show impact.
- Strengthen follow up and supervision including case management observation during routine visits

Strategic Plan 2005/2010

Major focus....

- Strengthening advocacy for child health at all levels
- Strengthen resource mobilization to support implementation
- Strengthen monitoring and evaluation to evaluate progress, outcome and impact.

Strategic Plan 2005/2010

Major focus....

- Strengthening collaboration across programmes and among partners.
- Improve documentation and dissemination of good practice and experience.
- Strengthen operational research to guide and improve implementation



Challenges and Constraints

- **Rapid expansion and renewal of child health interest has overwhelmed IMCI unit due to it inadequate human resource**
- **In adequate human resource in terms of adequacy and capacity at the district and facility levels is a major challenge in rolling out of IMCI**
- **Supportive supervision that includes IMCI case management observation still is a major challenge.**
- **Quality of care for at referral facility is inadequate**

IMCI and Millennium Development Goals for child health

- **MDG Goal 1: Eradicate poverty and hunger**
 - Target: Reduce rate of malnutrition in children under 5 years
- **MDG Goal 4: Reduce childhood mortality**
 - Target: Reduce rate of under-five mortality
 - Target: Reduce rate of infant mortality
 - Target: Increase rate of measles vaccine coverage
- **MDG Goal 6: Combat HIV, malaria & other communicable diseases**
 - Target: Reduce incidence & death from malaria
 - Target: Increase rate & use of effective prevention measures
 - Target: Increase effective treatment for malaria
- **IMCI as a strategy with three components will address these MDGs**



Proposed areas for collaboration with JICA

- Improving Quality of Care at referral facilities
 - Management of children with serious infections
 - Equipment and supplies for APCU
 - Diagnostic services
 - Capacity building for h/providers
 - Improving referral pathways
 - Communication and cascade management (Radio calls a& transport)
- Monitoring and evaluation
 - Database for monitoring
- Community IMCI (targeted support)
 - Community interventions for the key practices
- Operational research

***Better survival at
reduced cost:
IMCI is highly cost-
effective***



UPDATE
THE IMPLEMENTATION OF
COMMUNITY IMCI
IN
TANZANIA - May 2005



For every child
Health, Education, Equality, Protection
ADVANCE HUMANITY



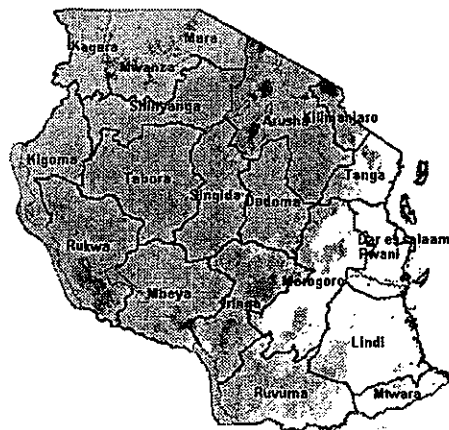
Health Indicators.

- **Under five Mortality rate 153/1000 live births**
- **Infant mortality rate 95/1000 live births**
- **Growth rate 2.9**
- **Maternal mortality ratio 529/100,000**
- **Birth rate 43/1000 with a cohort >1,000,000**
- **Under five population of >6m children**
- **# of Health facilities, 4656 (including RCH services of which 4008 are health dispensaries)**

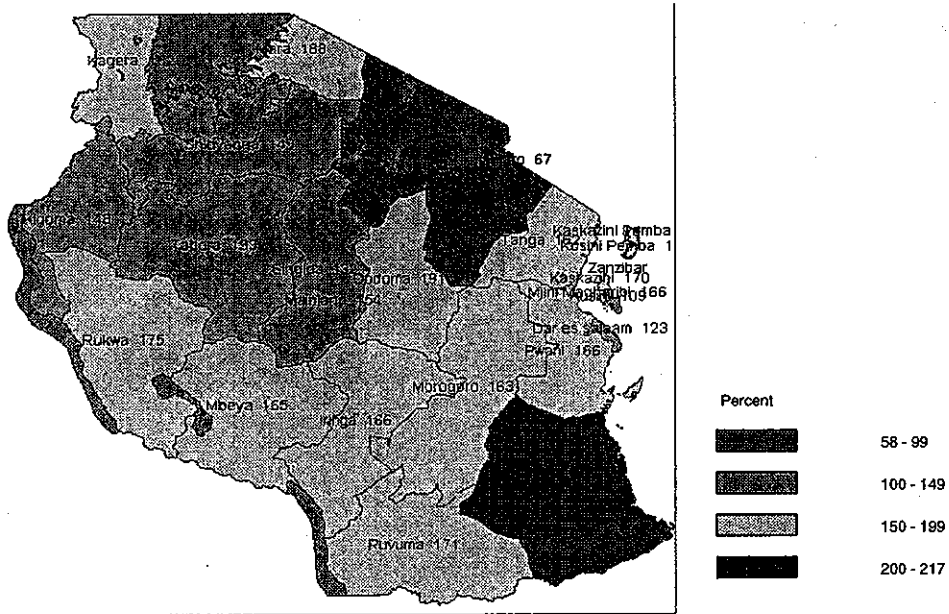
Causes of Deaths in U-5s

Top seven causes

- Malaria
- ARI
- Pneumonia
- Anaemia
- Diarrhoea Diseases
- HIV/AIDS
- Malnutrition



Map of distribution of Under five mortality by region



UNICEF Tanzania
 Map of distribution of Under five mortality by region

UNICEF Tanzania



Introduction

Integrated case management

Danger signs
Main symptoms
Classification
Treatment/Counselling
Follow-up

Health system support

Availability of IMCI drugs
Referral pathways
Health information system
District planning and
Support supervision

Community actions

Nutrition
Exclusive breastfeeding
Home care
Appropriate care seeking
Disease prevention

Improved hospital care

Emergency triage and
Treatment (ETAT)
Management of severe
infections and malnutrition
Care for HIV/AIDS

- Implementation started in 1998 with support from UNICEF under the CSPD Programme
- Started implementing c-IMCI as an integrated package in 2004 with the key partners and other stake holders

Objectives of c-IMCI

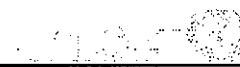
Overall Objective

To improve home and community health care practices to enhance child survival, growth and development.

Specific Objectives:

■ **Prevention**

-To provide adequate knowledge, skills and support to families and communities to accelerate the prevention of common Childhood diseases/killers (malaria, ARI, pneumonia,, diarrhea, measles, HIV/AIDS and malnutrition).



Objectives Cont..

Home care and care seeking.

- To improve home –care for sick and injured children, promote timely and appropriate care seeking behaviors
- To increase compliance with advise and treatment from trained providers.

Improved caring practices by providers

- To improve the quality of care (when care is sought outside the home) from community providers and in health facilities.

Creating an Enabling environment.

- To build capacity at the household, community participation in improving health care practices for women and children.
- To ensure adequate monitoring and evaluation, use of data and to stimulate community action.



cIMCI Implementation - Activities

- Baseline Survey on household and community practices conducted in 1999/2000; current coverage
- Advocacy on c-IMCI at all levels:
 - At the district level participants (head of departments, Councilors, religious leaders, NGO's and other influential people) have been sensitized.
 - At the ward level participants have been sensitized (Village government, leaders, NGO's, / CBO's, Religious leaders and other influential people) were sensitized.
 - At the village level participants have been sensitized (Village Government leaders, NGO's / CBO's Religious leaders and other influential people) were sensitized

Activities Cont....

- Cascade training of TOTs on c-IMCI at all levels was conducted
 - At the District level District t training of trainers (DTOTS) which include multi sectoral participants i.e. Health, Water, Education, Community development, social welfare, nutrition and planning with participants from NGOs were trained.
 - At the Ward level (WTOTS) which included extension workers multi-sectoral were trained.
- Training of community own resources persons (CORPS) on c-IMCI at the village level
- Training of youth groups and drama groups on c-IMCI
- Monitoring and supervision conducted quarterly

c-IMCI Linkages with Other Initiatives

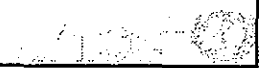
- In the districts there are a series of integrated community based initiatives which have a relationship with c-IMCI:
- Growth monitoring
 - nutrition status of children detected during quarterly village health days
- Vitamin A supplementation namely at MCH clinics and campaigns twice a year June and December
- Early childhood stimulation for cognitive and psychosocial development
- Community based salt monitoring
- HIV Prevention and care
- Immunization

Linkages Cont..

- Safe mother hood initiative
- Community based malaria control (ITN promotion and malaria treatment, national guidelines)
- Participatory hygiene and sanitation transformation (PHAST)
- District surveillance system and community based management information system (DSS and CBMIS)
- Prevention of low birth weight
- Opportunities and obstacles to development (bottom-up planning process) – village plans are generated inc. c-IMCI.

Observed Results (Kibaha as a case study)

- Increased Immunization coverage for children < 1 year of age - this has risen to 98.9% (2004) from 96% (2003)
- <5 and pregnant mothers sleeping under treated nets (ITNs) has risen from 63% (2003) to 95% (2004)
- Vit A supplementation coverage has increased from 92% (2003) to 96% (2004)
- Clean delivery from 92% (2003) to 94% (2004)
- Under five deaths has reduced from 164 (2003) to 153 (2004)
- Maternal deaths has also reduced from 34 (2003) to 20 (2004)
- Moderate malnutrition has been reduced from 10% (2003) to 8% (2004)

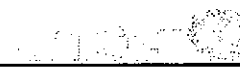


Lessons Learnt:

- Building and sustaining partnership enhances c-IMCI implementation
- Integrating promotion of key family practices (c-IMCI) with ongoing community based interventions enhances child survival growth and development.
- A lot of misconceptions issues on various care issues still exists in most of the communities. Hence, there is need for more advocacy and awareness creation
- Establishment of voluntary counseling and testing centers need to be established in maternal and child health delivery points For effective infant feeding and HIV counseling.
- The multi-Sectoral approach has promoted coordination, collaboration and improved resource mobilization and utilization
- More channels for communication need to be identified besides the community dialogue, targeting school children

Lessons learnt – continued...

- C-IMCI in Tanzania is acting as an entry point for many community-based interventions which are not traditionally part of IMCI, e.g. Prevention of Onchocerciasis, Elephantiasis, Trachoma, etc.
- C-IMCI can strengthen multi-sectoral collaboration.
- Need to strengthen integration in implementation of the three components.
- IMCI can strengthen ongoing programmes e.g. CBGM.
- Need to strengthen support structures for successful community programmes.
- Meaningfully involving communities takes time.
- Communities know the issues, and willing to plan and solve own problems with own resources.



Lessons learnt – continued...

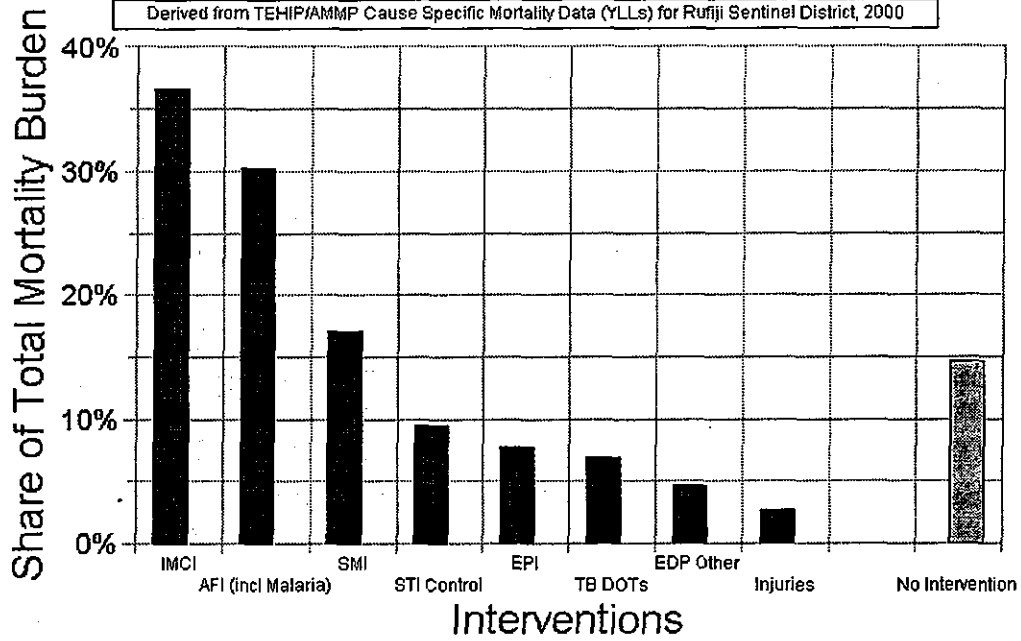
- **Community involvement and participation promotes ownership and sustainability**
- **The multi-Sectoral collaboration has promoted coordination, and improved resource mobilization and utilization**
- **The development of the baseline tool was time consuming . Replication of such a tool in the other districts could be a problem.**
- **Lack of motivation and transport for CORPS increased dropout of CORPS**

Constraints & Challenges

- Lack of effective communication strategy for behavior change affects cIMCI expected results
- Inadequate indicators for proper monitoring of the c-IMCI initiatives
- Short training period of 5 days for WTOTS and CORPS offers insufficient time for adequate transfer of knowledge and practice on c-IMCI.
- Weak integration with Family Planning approaches .
- Impact of increasing HIV/AIDS on IMCI expected results.
- Inadequate c-IMCI materials (guidelines, chart booklet, monitoring forms and other IEC materials) with slow transfer of knowledge and skills to trainees.

Burden of Disease Profile 2000 Intervention Addressable Shares

Derived from TEHIP/AMMP Cause Specific Mortality Data (YLLs) for Rufiji Sentinel District, 2000



UNICEF Tanzania
Rufiji Sentinel District
2000

UNICEF Tanzania

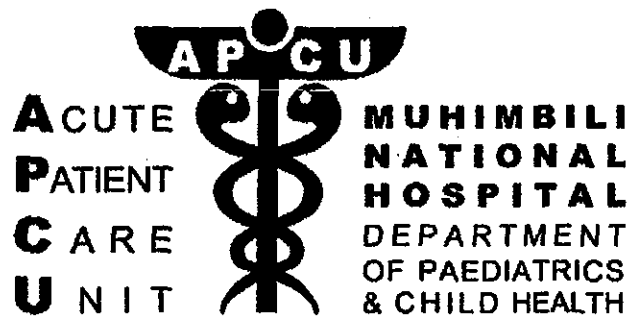


Way Forward

- **Increased funding support for accelerating child survival support**
 - Development of enough c-IMCI training materials, monitoring forms and designing a summary form for reporting
 - Enhancing quality monitoring/ follow-up of c-IMCI and related initiatives at all levels
- **Advocacy for increased partnership and collaboration**
 - Sensitizing partners on supporting WTOTS and CORPS, transport and other token incentives.
- **Programme communication for behavioural changes**
 - MOH-IMCI unit to work with others to develop an effective integrated communication strategy for behaviour change.
- **Full Ownership, capacity building for sustainability**
 - Scaling up c-IMCI coverage through district sensitization on incorporating c-IMCI into their plans and use of other cadres of community health providers

GUIDE LINES FOR PAEDIATRICS

ACUTE PATIENTS CARE



March 2005 2nd edition



Edited by APCU Committee, Department of Paediatrics
Muhimbili National Hospital Tanzania



Supported by Japan International Cooperation Agency

Contents

Foreword	.....ii
Unit 1: Introduction (ABCs, triage and appendix)	.....1
Unit 2: Advanced life support (Resuscitation)	.....14
Unit 3: Very severe pneumonia	.....19
Unit 3 supplement 1: Pneumocystis pneumonia (PCP)	.....23
Unit 3 supplement 2: Severe bronchiolitis	.....26
Unit 4: Asthma	.....28
Unit 5: Severe anemia	.....32
Unit 5 supplement: Acute transfusion reaction	.....35
Unit 6: Congestive heart failure	.....37
Unit 6 supplement: Paroxysmal dyspneic attack	.....42
Unit 7: Fluid therapy (Shock)	.....44
Unit 8: Acute renal failure	.....49
Unit 9: Severe malnutrition	.....54
Unit 10: Status epilepticus	.....61
Unit 11: Altered status of consciousness	.....66
Unit 12: Severe malaria	.....71
Unit 13: Meningitis	.....76
Unit 14: Diabetic ketoacidosis	.....80
Unit 14 supplement: Hypoglycemia	.....85
Unit 15: Poisoning	.....88
Unit 15 supplement: Anaphylaxis	.....92
The medical record form in the paediatric wards	.....95
The medical form for APCU	.....101
The discharge summary for APCU	.....103
Monitoring chart for seriously ill children	.....104
Appendix 1: Procedures	.....105
Appendix 2: ET tube size	.....111
Appendix 3: BSA nomogram for estimation of BSA	.....112

A.P.C.U. **Administrative Manual**



March 2005 version 1



Edited by APCU Committee, Department of Paediatrics
Muhimbili National Hospital Tanzania



Supported by Japan International Cooperation Agency

– Policy Brief – Policy Brief – Policy Brief – Policy Brief –

Multi-Country Evaluation of IMCI Effectiveness, Cost & Impact: Tanzania Component

Evaluation of facility-based IMCI in Rufiji & Morogoro Rural Districts, Tanzania

IMCI in Tanzania

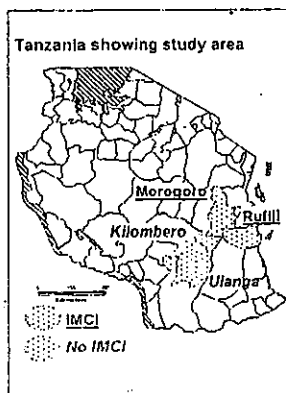
About quarter of a million Tanzanian children die each year. Over 80% of post-perinatal under-five deaths are due to malaria, pneumonia, malnutrition and diarrhoea. Tanzania was one of the first countries to adapt the Integrated Management of Childhood Illness (IMCI) strategy. There are three components of the IMCI strategy:

- Improving health worker skills through training and reinforcement of correct performance. Through adapted algorithms, the health worker is guided through a process of assessing signs and symptoms, classifying illness on the basis of treatment needs, and providing appropriate treatment and education of the child's care-giver.
- Improving health systems support for child health service delivery, including the availability of drugs, effective supervision, and the use of monitoring and health information system data.
- Improving family practices for child health and development.

In Tanzania, many of the practices covered by the third component are already included in existing programs such as malaria control and EPI. (3rd component to be reinforced by the community-based IMCI)

IMCI Evaluation: Study Design

The research team compared child health & survival in Morogoro Rural & Rufiji Districts with neighbouring Kilombero & Ulanga, over the period () 1997 to 2002 (see figure, right). The quality of case-management at health facilities was directly observed during a survey in 2000. A part of each district is included in Demographic Surveillance, which provided data on levels & trends of child survival. Two household surveys of child health were done in 1999 and 2002, to see whether there were any changes that could be attributed to IMCI or other programs. Extensive records reviews and interviews with all health actors in the 4 districts were done to track child health interventions other than IMCI. The costs of child health care in IMCI & comparison districts were estimated at national, district, facility and household levels. The family practices component of the IMCI strategy was not implemented as a separate effort, but included in malaria, EPI & Vitamin A supplementation programs.



IMCI in Rufiji & Morogoro Rural

These two rural districts in the south of the country started to implement IMCI in 1997. They chose the intervention because of an evidence-based planning tool showing the high proportion of the total burden of disease that was addressable through IMCI. They knew that they could afford to implement the strategy because of a second tool, on district health budgeting. Both tools were developed by the Tanzania Essential Health Interventions Project (TEHIP), and are simple to use without special training. TEHIP also provided these districts with no-syringes "basket funding" of around \$0.92 per capita 3 years in advance of "basket funding" being introduced. Within two years, over half of the front-line health workers had been trained in 64% of health facilities, and by 2001 training coverage reached 80%.

Training coverage increased rapidly

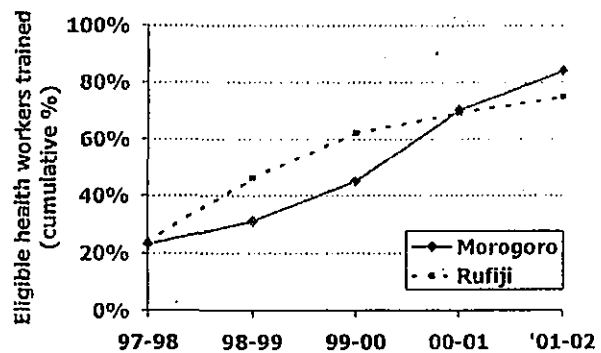
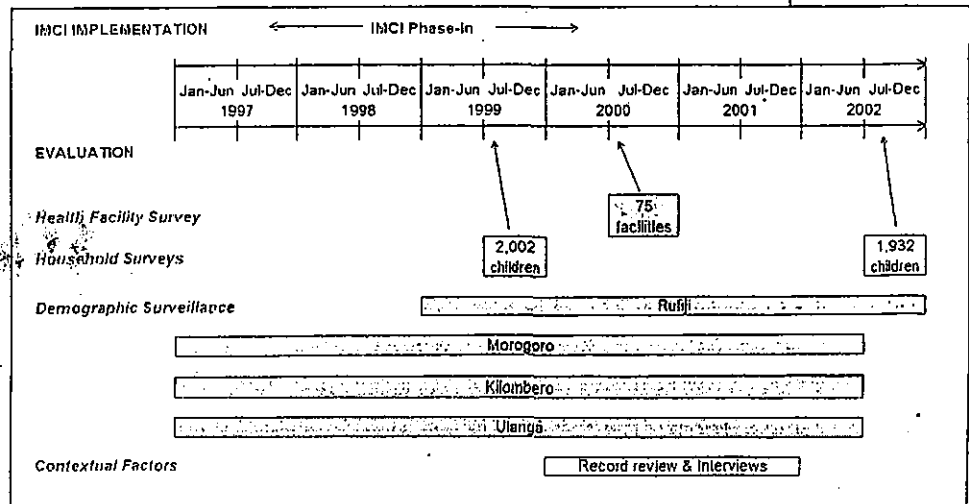


Photo: Health workers in Ulanga District

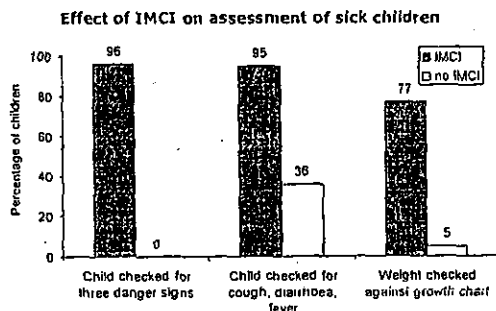
Study design



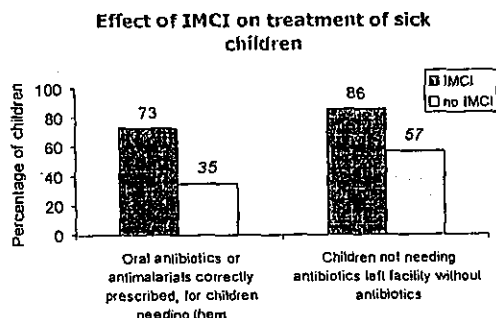
IMCI & quality of care: health facility survey in August 2000

Quality of care

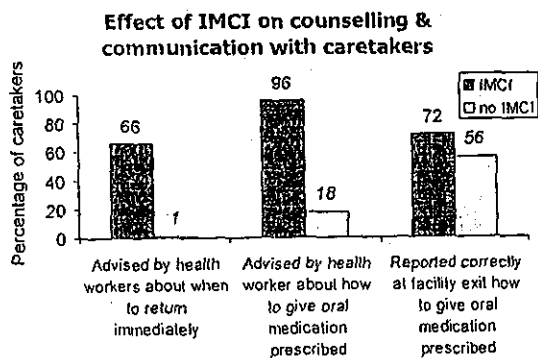
To find out how IMCI implementation had affected the quality of case-management and health systems support, we did a health facility survey in August 2000. The research team visited a representative sample of 75 first-level government health facilities in the four districts. The team spent one day in each facility, and observed the case-management of 419 children – the first six sick children aged 2 months to 5 years whose caretakers consented to take part. Caretakers were interviewed on exit, and then children were re-examined by an IMCI-trained “gold standard” physician.



The results showed that children in IMCI districts received better care than children in comparison districts. Their health problems were more thoroughly assessed, and they were more likely to be diagnosed and treated correctly as determined through a “gold-standard” re-examination (figures above & below).



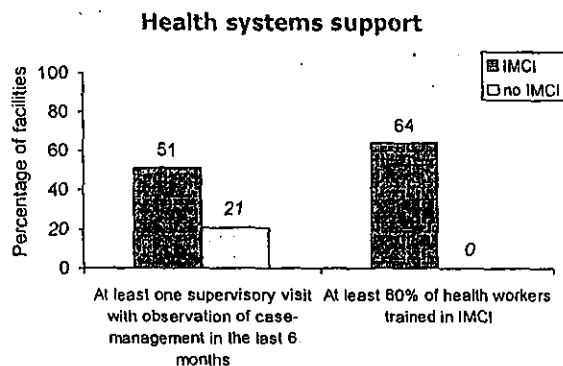
The caretakers of the children in IMCI districts were more likely to receive appropriate counselling and reported higher levels of knowledge about how to care for their sick children (figure below).



All differences shown are statistically significant ($p < 0.05$). In Morogoro & Rufiji Districts, all health workers observed managing children during the survey had been trained in IMCI; and none of those observed in Kilombero & Ulanga had been trained in IMCI.

Health systems support

To be effective, interventions must have adequate health systems support such as availability of drugs, equipment and supervision. There were few differences between the IMCI and comparison districts in terms of health systems support indicators. Drug availability was reasonably good in all four districts. Supervision visits in the 6 months before the survey were reported by almost all the health facilities, but supervision visits that included the observation of case-management were much more common in the IMCI districts (figure).



The survey also found that health workers trained up to 3 years before the survey performed just as well as those trained more recently. And lower-cadre health staff who had been trained in IMCI performed just as well as their more senior colleagues.

Although case-management for malaria was much improved in IMCI districts, the impact of these improvements may have been limited by high levels of drug resistance to chloroquine, which was the first-line antimalarial at the time of the survey.



Photo: Mother & child at a health facility in Morogoro Rural District

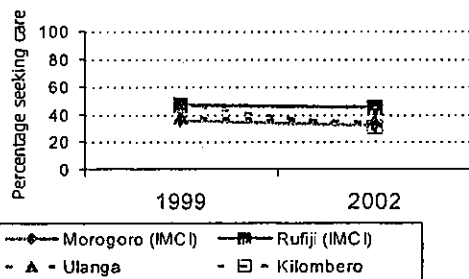
Family & community practices

Household surveys

Over 4,000 children were visited at home in two representative household surveys of under-fives in all four districts, carried out in July-August 1999 and 2002.

These surveys revealed that access to health facilities was good, and utilisation relatively high, with over 40% children sick in the two weeks before the survey having been brought to an appropriate health care provider. This was usually a health facility, but also included visits to village health workers, and private doctors. Utilisation of health facilities is much higher than similar surveys have found in other countries, including Uganda and Bangladesh. But IMCI did not change this utilisation, as far as could be detected by this survey.

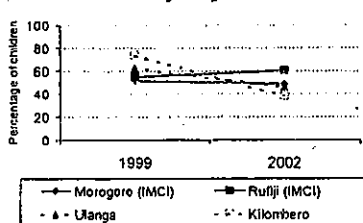
Care-seeking for children sick in the two weeks before the survey



Potential effects of IMCI: care-seeking, ORS use, & home treatment

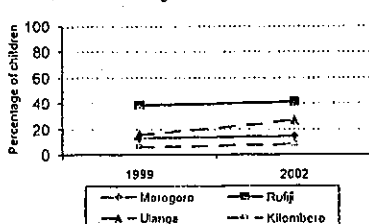
Care-seeking was common for children reported as having had danger signs. 53% of these children had reportedly been taken to an appropriate provider in IMCI districts, and 68% in comparison districts in 1999. But by the time of the 2002 survey, care-seeking for children with danger signs had risen slightly to 55% in the IMCI districts and had dropped in comparison districts to 43% (figure: $p=0.006$).

Careseeking for children with danger signs



For children sick with diarrhoea in the 2 weeks before the survey, use of oral rehydration solution varied a lot between districts, from 6% to 41%. But ORS use was more common in IMCI than comparison areas in both surveys ($p < 0.05$: figure).

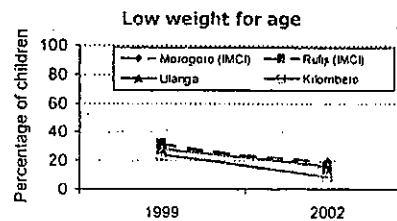
ORS use among children with diarrhoea



Appropriate home management of disease, as measured by the proportion of children sick on the day of the survey who had received increased fluids and continued feeding, was under 10% in all districts and both surveys. Yet this indicator increased by 4% between 1999 and 2002 in IMCI districts, and decreased in comparison areas by 1% ($p=0.05$).

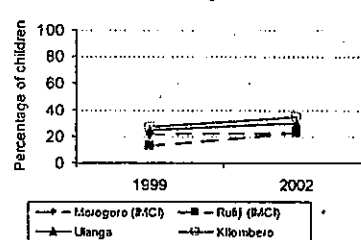
Fall in underweight in all districts

The surveys revealed improvements over time in all districts in underweight and wasting (figure: $p < 0.05$).



Similarly, there were small but statistically significant improvements in all districts between 1999 and 2002 in exclusive breastfeeding in children under four months of age and in children aged 6-9 months receiving both breastmilk and complementary feeding (figure).

Exclusive breastfeeding in children <4m

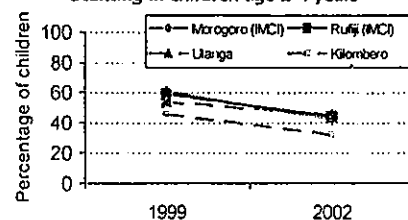


Potential effects of IMCI: meal frequency and stunting

Breastfed one-year-old children in IMCI districts received an average of 2.7 meals each day in 1999, compared to 3.0 in comparison areas. By 2002, children in IMCI districts were receiving an average of 3.1 meals per day, similar to the average number of 3.2 meals given to children in comparison areas ($p=0.03$ for the differential change over time).

Stunting in children aged 24-59 months affected 60% of children in IMCI districts in 1999, about 10 percentage points more than in comparison areas. By 2002, children in IMCI areas had "caught up", and stunting was comparable in IMCI and comparison areas (figure below). When analysed as a mean z-score, this difference was statistically significant ($p=0.05$).

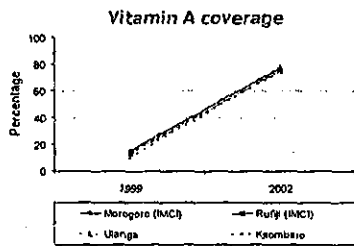
Stunting in children age 2-4 years



Programs & issues other than IMCI

Programs & factors other than IMCI

The research team carried out an extensive review of written records as well as interviews with 40 health actors in the four districts, to check for programs and factors other than IMCI that might have affected child health. Careful review of the findings with reference to the household surveys showed several ways in which child health improved in all four districts, irrespective of IMCI. The most dramatic example of this is Vitamin A supplementation coverage (figure).



Vitamin A coverage supplementation coverage was only 14% in 1999 in children aged 1 year, and comparable in IMCI and comparison areas. In 2002 coverage had dramatically increased in all districts, to an average of 76% ($p < 0.0001$).

Programs that changed rapidly & differentially over time

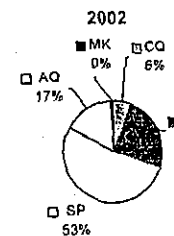
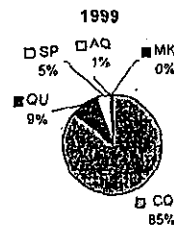
We were particularly concerned to identify any factors that might cause a change in survival between IMCI and comparison districts, i.e. factors which changed rapidly, and differentially, over the study period. Careful review of written records, survey data, and information from interviews suggested that these factors were limited to malaria control efforts and vaccination programmes. In both cases, the changes favoured the comparison districts, making it more difficult to find an impact of IMCI.

Malaria control: treatment

For children who had fever in the two weeks before the 1999 household survey, 42% had been given an antimalarial drug. Most (85%) had chloroquine (figure).

By 2002 chloroquine had been withdrawn and the first-line antimalarial drug was SP. In 2002, only 28% of children with a history of fever had an antimalarial drug ($p < 0.001$) - one-third less than in 1999. In 2002 the most common drugs used were SP (53%), quinine (24%) and amodiaquine (17%). Only 6% had taken chloroquine.

There were no differences in malaria treatment between IMCI and comparison districts. However the dramatic drop in fever treatment is of concern.



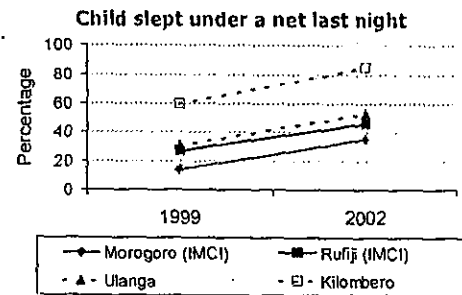
Treatment for fever in 1999 and 2002

CQ: Chloroquine
QU: Quinine
SP: Sulphadoxine-pyrimethamine
AQ: Amodiaquine
MK: Mefloquine

Malaria control: prevention

Social marketed, treated mosquito nets were available through different programs in the four districts, and untreated nets were also available through the private sector. Social marketing programs had been running for longer in the comparison areas than in the IMCI districts.

Use of untreated nets the night before the 1999 household survey varied markedly between districts, from 14% in Morogoro Rural District (with IMCI) to 59% in Kilombero district (without IMCI). Coverage increased dramatically in all four districts by 2002, reaching 85% in Kilombero and 35% in Morogoro Rural. Coverage remained significantly higher in comparison districts than in IMCI districts in 2002 (66% compared with 41%; $p < 0.0001$; figure).



Use of nets that had been treated in the 6 months before the survey was uncommon in all districts in 1999, at less than 7%, and increased in all districts by 2002, by 4 to 14 percentage points, with no evidence of a differential change between IMCI and comparison areas over time ($p = 0.14$).



Photo: Children with net in Kilombero district (H Minja)

Vaccination programs

Vaccine coverage was over 80% in all districts and during both surveys. But there was a differential decline in coverage of DPT vaccine from the 1999 level of 86%. In 2002, DPT coverage increased to 95% in comparison districts but dropped to 82% in IMCI districts ($p = 0.03$).

Although not of public health significance, these differences are potentially worrying and may have been due to the decentralisation of the EPI program.

Child survival: levels and trends

IMCI is associated with 13% higher survival

Ongoing demographic surveillance in a part of each district revealed levels and trends of under-five mortality.

From July 1999 to June 2000, during the phase-in of IMCI, under-five mortality was almost identical in IMCI and comparison districts (27 per 1000 children per year).

Over the two following years, from July 2000 to June 2002, mortality levels were 13% lower in the IMCI districts than in the comparison districts (rate ratio 0.87, confidence interval from -7% to 30%).

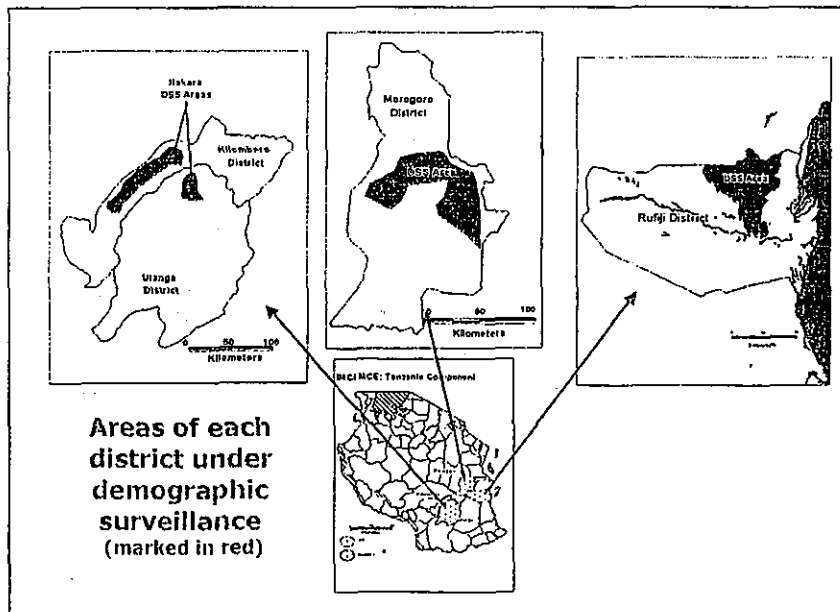
IMCI was associated with 3.8 lives saved for every 1000 children every year. Adjustments for age and estimated rainfall did not affect these results.

Is the mortality difference due to IMCI?

For vaccination coverage and malaria control efforts, the higher coverage in comparison districts would have tended to negate any apparent effect of IMCI on child survival.

For Vitamin A, levels were similarly low in all four districts in 1999 and rose equally by 2002, and cannot therefore account for the greater drop in mortality in the IMCI areas over the study period.

Therefore it seems likely that IMCI, implemented in the context of decentralisation and simple planning and management tools for strengthening the capacity of district health systems, was responsible for the reduction in child mortality.



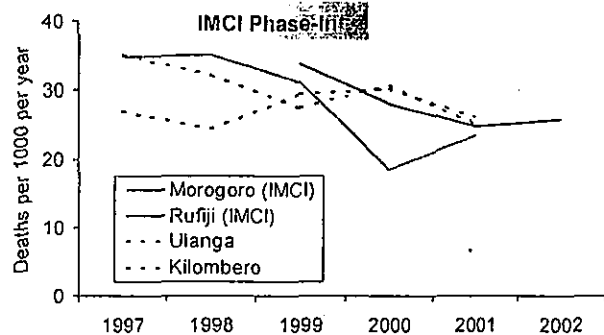
Additional survival data: longer-term trends

Further survival data were available from some of the areas under demographic surveillance from January 1997 until December 2002. All the available data was used to assess trends over time in each district.

In the two districts with IMCI there was an annual drop of 11% in mortality in Rufiji district between 1999 (February) until December 2002 ($p < 0.0001$), and an annual drop of 14% from January 1997 until December 2001 in Morogoro Rural district ($p < 0.0001$). Due to data completeness problems in Morogoro in 2000, the analysis was repeated without these data, with an 11% annual drop in under-five mortality ($p < 0.0001$) (figure, right).

In the comparison districts, there was no change over time in under-five mortality in children in Kilombero District over the five years from January 1997 to December 2001. In the other comparison district, Ulanga, there was an annual decrease in under-five mortality of 7% ($p = 0.007$).

Long-term trends in child survival



Cost of IMCI

Economic Costs

Cost data were collected for the start-up period of implementing IMCI (from 1996 to 1997) and for maintaining under-five health services with IMCI subsequently. Costs were estimated from the societal perspective and were collected from the national, district, hospital, health facility and household levels. Among the costs included were:

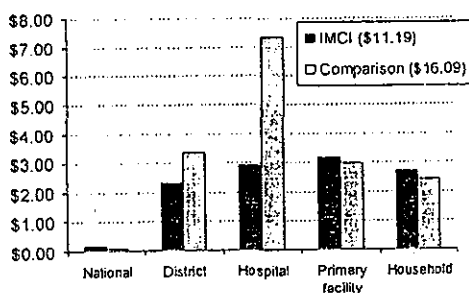
- Drugs and vaccines;
- Training costs attributable to under-five care, including but not restricted to IMCI;
- Annualized cost of capital items;
- Opportunity cost of staff time spent in consultation with under-fives (assessed through a time and motion study) and time spent attending meetings and performing supervision visits.
- Household costs included travel and out-of-pocket expenditures to obtain care for under-fives but did not include a monetary value of time lost in seeking care.

Costs at all these levels were summed to obtain the *total cost* to the district of providing care for under-fives. To allow comparison across districts, cost estimates were standardized to a hypothetical district with total population of around 300,000 people. Estimates of the *additional cost* to the district of implementing IMCI were based on the difference in cost of under-five care between the standardized IMCI and comparison districts that, at the time of the study, had not yet implemented IMCI.

IMCI was not associated with higher costs than conventional care. The cost of under-five care per child was estimated at \$11.19 in IMCI districts and \$16.09 in comparison districts:

The major components of cost were at district, hospital, primary facility and household levels. Estimated hospital-level costs in comparison districts accounted for almost half of the total cost of under-five care per child (46%).

Economic cost per child of under-five care
IMCI and comparison districts, 1999 US\$



Since we would not have expected IMCI to have affected hospital-level costs, we re-calculated the cost of under-five care per child without the hospital component, and found similar total costs per child in IMCI and comparison areas (\$8.30 in the IMCI districts, \$8.76 in the comparison areas) (figure, right).

Financial Costs: can districts afford to implement IMCI?

We estimated the financial cost of IMCI to see whether basket funds might be sufficient for IMCI.

Various assumptions were made:

- Exchange rate (US\$) as at 1st January 2004;
- 48 eligible health workers per district, trained in 3 batches;
- All health workers to be trained are "clinicians", receiving an 11-day training course (non-clinicians need a 16-day course);
- Training is done at district headquarters;
- A CHMT vehicle is available.

Costs would be spent at two main levels:

1. District level
 - Trainers-of-trainers;
 - Training of clinicians;
 - Follow-up after training;
 - Collection of materials from MoH.
2. MoH level
 - Visit by the national team;
 - Training materials;
 - Visual aids (video).

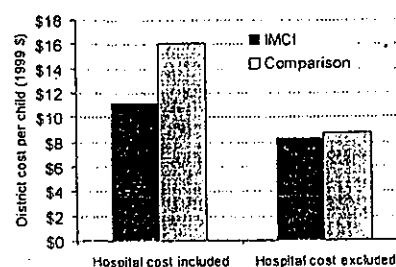
The total district-level financial cost is estimated at 20.5 million shillings per district, or a total of 2.5 billion shillings for the whole country.

The total Ministry-level financial cost is estimated at 2 million shillings per district, or a total of 259 million shillings for the whole country.

Combining district and central level costs, the total cost for the whole country would be around 2.8 billion shillings, or US\$2.7million.

Allowing for implementation already achieved, the total cost of implementing IMCI in the remaining districts in the country would be around US\$1.3 million, or less than \$0.5 million each year for three years. This is expected to be within current basket-funding levels.

What happens to district cost per child if we remove hospital costs?



Going to scale with IMCI – with an equity lens

Implications

This study found improved case-management, a 13% lower under-five mortality rate, and that the costs of child health were comparable or lower with IMCI than with conventional case-management. This research suggests that facility-based IMCI is highly cost-effective in this context.

This was a public-health evaluation and not a randomised trial. Since the intervention was not allocated at random, we cannot be sure that the effect on mortality was not due to some unmeasured confounder rather than IMCI. But careful study of contextual factors – other programs and activities affecting child health which changed differentially over the study period – found only factors that would have tended to cancel out the effect of IMCI on mortality.

Facility-based IMCI could save the lives of 28,000 Tanzanian children each year

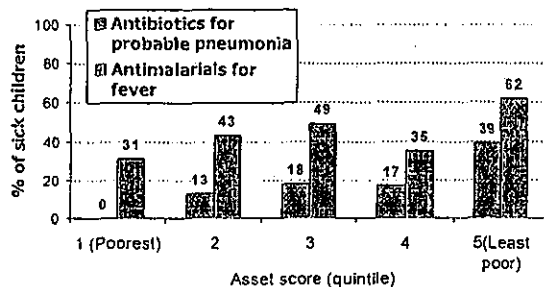
If IMCI were scaled up to cover every district in the country, the 13% survival impact seen in Morogoro and Rufiji could have a dramatic effect. Translating this effect into lives saved across the whole country would be expected to save the lives of over 28,000 Tanzanian children under five every year.

These estimates were calculated assuming the same coverage and impact as achieved in Morogoro and Rufiji, using data from the Tanzania National Census and from the 'State of the World's Children 2004' (UNICEF).

The equity lens

Even within a rural Tanzanian district, where everyone could be labelled as "poor", there are important differences between the poorest families and those who are slightly better off (figure).

Inequities in antibiotics for pneumonia and antimalarials



Reaching the poorest:
None received antibiotics.
31% received antimalarials

Equity:
Poorest/least poor ratios
Antibiotics* = 0 Antimalarials* = 0.5

* P<0.05

As IMCI goes to scale, this 'equity lens' should continue to be applied to ensure that the strategy reaches the poorest families in the poorest districts as well as the majority.



Conclusions

The results of this evaluation suggest that high coverage of facility-based IMCI leads to reduced child mortality and that this is achievable within existing health budgets.

Our findings strongly support going to scale with this intervention in the context of health sector reform, basket funding, good facility access and high utilisation of health facilities.

Simple and practical planning and management tools for strengthening the capacity of district health systems were the essential first step to achieving this impact.

Further information, contacts & funding

Collaborators

The Tanzania component of the Multi-Country Evaluation of IMCI is a collaborative study involving:

- Ifakara Health Research and Development Centre.
- Tanzania Essential Health Intervention Project (Ministry of Health).
- Adult Morbidity and Mortality Project (Ministry of Health).
- World Health Organization, Tanzania office.

Further information

For further information about the study please contact:

Dr H Mshinda, IHRDC, PO Box 53, Ifakara, Tanzania.

Email: hmshinda@ifakara.mimcom.net

Dr J Schellenberg, IHRDC, Ifakara, Tanzania.

Email: dajobelo@aol.com

Dr T John, WHO Tanzania, Dar-es-Salaam.

Email: theo@who.or.tz

Dr C Mbuya, TEHIP, Dar-es-Salaam, Tanzania.

Email: mbuya@tehip.or.tz

Further information about the the Multi-Country Evaluation of IMCI is available at:
www.who.int/imci-mce

Funding

This work is part of the Multi-Country Evaluation of IMCI Effectiveness, Cost and Impact, coordinated by the Department of Child and Adolescent Health and Development of the World Health Organization, and supported by the Bill and Melinda Gates Foundation and the United States Agency for International Development.

The MCE Tanzania study is a collaboration involving Ifakara Health Research and Development Centre, the Tanzania Essential Health Interventions Project of the Ministry of Health, the Adult Morbidity and Mortality Project of the Ministry of Health, and the WHO Tanzania Office.

The work of these collaborators is partly funded by a wide range of sources including: the International Development Research Centre, Canada; the Swiss National Science Foundation, the Swiss Tropical Institute, the Swiss Agency for Development & Cooperation; the Gates Malaria Partnership, based at the London School of Hygiene & Tropical Medicine; the United Kingdom Department for International Development (DFID), and the University of Newcastle-upon-Tyne, UK. The views expressed are not necessarily those of DFID nor of any other funder.

Publications

- IMCI implementation: A report on experiences in Morogoro and Rufiji districts in Tanzania. 2003. Available from TEHIP.
- Analysis report on the cost of IMCI in Tanzania. 2003. Available on www.who.int/imci-mce.
- The silent burden of anemia in Tanzanian children: a community-based study. *Bulletin of WHO* 2003 81 581-590.
- Inequities among the very poor: health care for children in rural southern Tanzania. *Lancet* 2003; 361 (9357): 561-6.
- Health care for under-fives in rural Tanzania: effect of Integrated Management of Childhood Illness on observed quality of care. *Health Policy and Planning* 2004 19 1-10.
- Effect of large-scale social marketing of insecticide-treated nets on child survival in rural Tanzania. *Lancet* 2001; 357: 1241-47.
- Targeted subsidy for malaria control with treated nets using a discount voucher system in southern Tanzania. *Health Policy and Planning* 2003; 18: 163-171.
- Preventive health care and nutritional status in rural Tanzanian children. Manuscript under review.
- Mosquito nets and the poor: Can social marketing redress inequities in access? In Press, *Tropical Medicine & International Health*.
- Does the Integrated Management of Childhood Illnesses Cost more than Routine Care? Results from Tanzania. In Press, *Bulletin of the World Health Organization*.
- Effectiveness and cost of facility-based Integrated Management of Child Illness (IMCI) in Tanzania. Armstrong Schellenberg JRM, T Adam, H Mshinda, H Masanja, G Kabadi, O Mukasa, T John, S Charles, R Nathan, K Wilczynska, L Mgalula, C Mbuya, R Mswia, F Manzi, D de Savigny, D Schellenberg, C Victora. *Lancet* 2004 364 1585-94.



Photo: Child at Mahenge, Ulanga

