

Measuring Coverage in Maternal, Newborn and Child Health

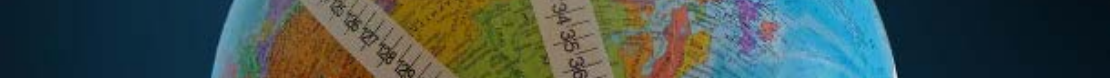


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Measuring coverage for MNCH: Highlights for the CCM-OR Group

Jennifer Bryce
Institute for International Programs
Johns Hopkins Bloomberg
School of Public Health

Plan

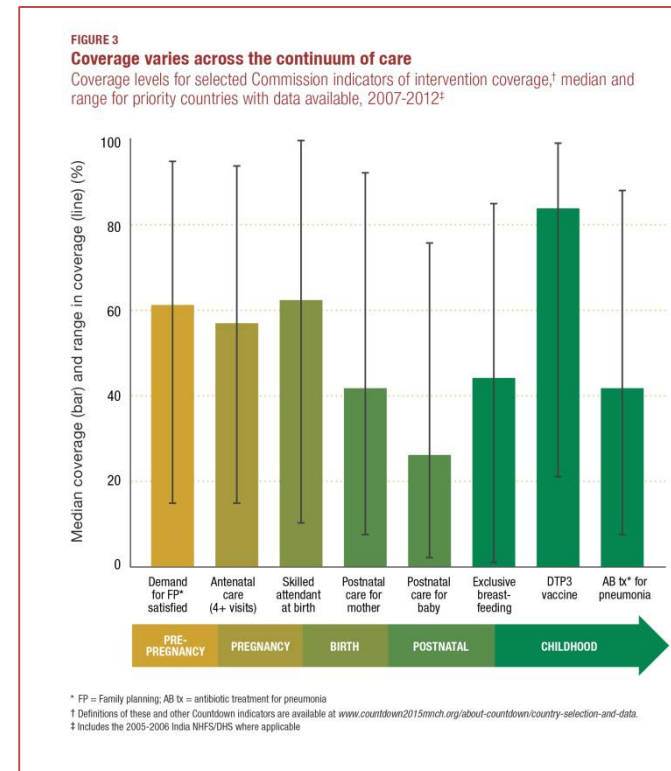
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- 1) Quick overview of the work on coverage measurement and the PLOS Med Collection
 - 2) Some thoughts on the implications for CCM

Discussion

WHY COVERAGE?



- We have life-saving interventions
- But they are reaching too few women and children
- Who are the unreached? Where are they?



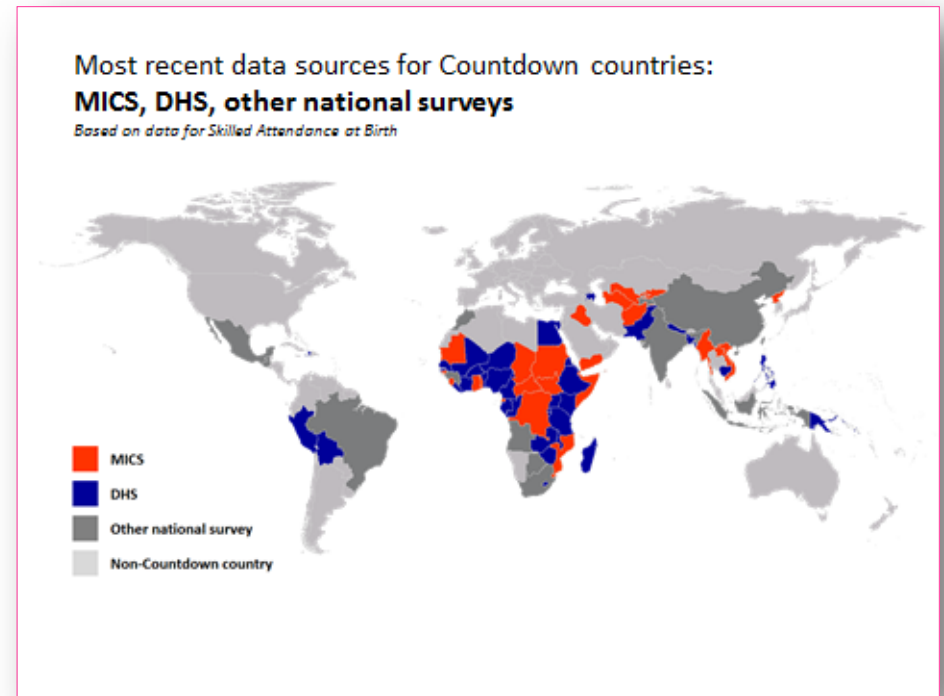
Source: Countdown Report 2013.

Accurate measurement of intervention coverage is the basis for effective programs that save lives.

MEASURING COVERAGE



- Most high-burden countries rely on two international survey programs
 - Demographic and Health Surveys (USAID)
 - Multiple Indicator Cluster Surveys (UNICEF)



- The science of coverage measurement continues to evolve – it is not easy!

CHILD HEALTH EPIDEMIOLOGY REFERENCE GROUP



- Established in 2001 to advise WHO and UNICEF on issues related to evidence in MNCH epidemiology
- Working Group on Improving Coverage Measurement established in 2009; technical experts including DHS and MICS
- The *Collection* presents the results of this work, and related work by many others



METHODS



- Scope: Measurement of coverage through household surveys for proven MNCH interventions
- Activities:
 - Validation studies
 - Measurement reviews
 - Commissioned papers on methodological issues
- Quality control: Internal and external peer review

KEY FINDINGS IN THREE AREAS



- 1) Validity of coverage estimates based on respondents' reports
- 2) Potential strategies for improving coverage measurement
- 3) Cross-cutting methodological issues

THE VALIDITY OF RESPONDENTS' REPORTS

Basic design

Step 1: Observe intervention delivery
(and/or review of records, where adequate)



Step 2: Wait,
based on recall period
in DHS/MICS.

Step 3: Conduct household interviews

- 1) Standard DHS/MICS questions
- 2) Additional or modified questions
- 3) Inclusion of strategies to aid recall

Step 4: Compare,
determining validity of
respondents' reports

TERMINOLOGY



- **Sensitivity of recall**: *proportion of caregivers who correctly said the intervention was received*
- **Specificity of recall** : *proportion of caregivers who correctly said the intervention was not received*
- **Accuracy of recall**: *proportion of caregivers who got it right*

RESEARCH STUDIES



- **Emergency C-Sections**
Ghana, Dominican Republic
- **Interventions delivered around the time of birth**
Mozambique
- **Pneumonia diagnosis and treatment**
Pakistan, Bangladesh
- **Malaria diagnosis and treatment**
Zambia
- **Interventions across the MNCH continuum of care**
China

SELECTED RESULTS: STRUCTURAL CHALLENGES



- **Obtaining adequate denominators**
 - For rare events
 - To support analyses for age, sex or equity subgroups

- **Relying on health facility records**
 - Overestimates true coverage
 - Excludes those not in contact with health services

- **Contextual challenges to respondent recall**
 - Information offered by provider
 - Interviewer behavior
 - Recall periods
 - Length of the interview

Selected Results: Strategies for Improvement



- Using memory aides to improve accuracy
- Refining survey questionnaires and procedures
- Linking household surveys to other data sources
- Incorporating information technology
- Increasing the salience of intervention delivery
- Using measures that do not rely on respondents' reports

We can do better – and we will!

CROSS-CUTTING METHODOLOGICAL ISSUES



- Survey quality matters!
- Both sampling and non-sampling error must be taken into account
- Reporting for specific subpopulations makes coverage data more useful to policy and program decision makers

SOME RESULTS HAVE ALREADY BEEN TAKEN UP



- Change in question on Cesarean section, and addition of 1 question to distinguish emergency from non-emergency Cesarean sections
- Addition of questions on place of treatment to provide information on CCM
- Addition of careseeking for pneumonia to global monitoring “short list” to aid in interpretation of progress in treatment
- Development of new MICS module on postnatal care for mothers and newborns

We hope this is just a start

THE BOTTOM LINE (OVERALL)



- High-quality household survey programs are a global public good, and must be continued
- There is an urgent learning agenda in coverage measurement
 - Ongoing improvement
 - Potential for shorter, lighter surveys
 - Links between surveys and comparable assessments in service delivery settings

We can do better – and we will!

Section 2:

A CLOSER LOOK AT FINDINGS WITH IMPLICATIONS FOR CCM

PNEUMONIA TREATMENT

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PLOS MEDICINE

Review

Measuring Coverage in MNCH: Challenges in Monitoring the Proportion of Young Children with Pneumonia Who Receive Antibiotic Treatment

Harry Campbell^{1*}, Shams el Arifeen², Tabish Hazir³, James O'Kelly¹, Jennifer Bryce⁴, Igor Rudan¹, Shamim Ahmad Qazi⁵

1 Centre for Population Health Sciences, University of Edinburgh, Edinburgh, United Kingdom, **2** International Centre for Diarrhoeal Disease Research, Bangladesh, Dhaka, Bangladesh, **3** Children's Hospital, Pakistan Institute of Medical Sciences, Islamabad, Pakistan, **4** Johns Hopkins University, Baltimore, Maryland, United States of America, **5** World Health Organization, Geneva, Switzerland

Abstract: Pneumonia remains a major cause of child death globally, and improving antibiotic treatment rates is a key control strategy. Progress in improving the global coverage of antibiotic treatment is monitored through large household surveys such as the Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS).

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PLOS MEDICINE

Measuring Coverage in MNCH: A Prospective Validation Study in Pakistan and Bangladesh on Measuring Correct Treatment of Childhood Pneumonia

Tabish Hazir^{1*}, Khadija Begum^{2,3}, Shams el Arifeen², Amira M. Khan¹, M. Hamidul Huque², Narjis Kazmi¹, Sushmita Roy², Saleem Abbasi¹, Qazi Sadeq-ur Rahman², Evropi Theodoratou³, Mahmuda Shayema Khorshed², Kazi Mizanur Rahman², Sanwarul Bari², M. Mahfuzul Islam Kaiser², Samir K. Saha⁴, A. S. M. Nawshad Uddin Ahmed⁴, Igor Rudan³, Jennifer Bryce⁵, Shamim Ahmad Qazi⁶, Harry Campbell³

1 Children's Hospital, Pakistan Institute of Medical Sciences, Islamabad, Pakistan, **2** International Centre for Diarrhoeal Disease Research, Bangladesh, Dhaka, Bangladesh, **3** Centre for Population Health Sciences, University of Edinburgh, Edinburgh, United Kingdom, **4** Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh, **5** Department of International Health, Johns Hopkins Bloomberg School of Public Health, Johns Hopkins University, Baltimore, Maryland, United States of America, **6** Department of Maternal, Newborn, Child and Adolescent Health, World Health Organization, Geneva, Switzerland

Abstract

Background: Antibiotic treatment for pneumonia as measured by Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS) is based on self-reported use of antibiotics in the past 2 weeks.

STUDY DESIGN:

field studies in Pakistan and Bangladesh



- 950 children with confirmed pneumonia and 980 children with cough (but who did not have pneumonia) recruited by medical officers
- All followed up at home at 2 or 4 weeks by field workers with DHS / MICS survey questions on pneumonia
- Tested alternative methods including:
 - a video showing children with pneumonia and with “cough or cold”
 - a drug chart illustrating locally available antibiotics

KEY FINDINGS



- 1) DHS / MICS question sensitivity (detection rate) for pneumonia was 50 – 70%
- 2) DHS / MICS question specificity for pneumonia was about 70% (false positive rate 30%)
- 3) No difference between 2 and 4 week recall
- 4) Correct recall of antibiotic treatment 67%
- 5) Performances were a little better with newer methods [video and drug charts] e.g. correct treatment recall increased from 67% to 72%

Context for interpretation of study results: DHS / MICS survey of 10,000 children



1. A survey population of 10,000 children can be expected to include **120 children who have had pneumonia in past 2 weeks**
2. there are at least 10 cases of cough for every case pneumonia

TRUE PNEUMONIA				
REPORTED SYMPTOMS OF PNEUMONIA		PRESENT	ABSENT	Total
	PRESENT			
	ABSENT			
	Total	120	1200	

Context for interpretation of study results: apply 70% sensitivity and 70% specificity



TRUE PNEUMONIA				
REPORTED SYMPTOMS OF PNEUMONIA		PRESENT	ABSENT	Total
	PRESENT	84	360	444
	ABSENT	36	840	876
	Total	120	1200	1320

1. 444 with reported symptoms / signs versus 120 with pneumonia
2. Only 84/444 (19%) with symptoms / signs have true pneumonia

Problems with use of these data as an indicator of pneumonia treatment



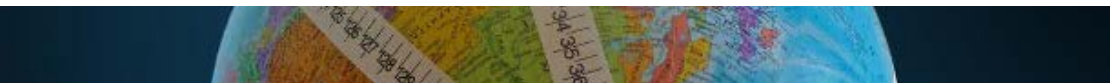
CONSIDER “ideal” programme in which:

- 100% of 120 pneumonia cases treated with antibiotics
- 0% of 1200 children with cough (but who do not have pneumonia) treated with antibiotics

If perfect recall of treatment by caregivers the treatment rate among children with reported signs consistent with pneumonia would be $84 / 444 = 19\%$

If a program interpreted this as a poor coverage of antibiotic treatment, it may take inappropriate action leading to antibiotic overuse

Problems in use of these data as an indicator of pneumonia treatment



Among children in whom the caregiver reports signs consistent with pneumonia, a treatment rate of 19% is consistent with:

1. 100% of the 120 pneumonia cases treated with antibiotics and 0% of the 1200 children with cough (who do not have pneumonia) treated with antibiotics
2. 10% of 120 pneumonia cases treated with antibiotics and 21% of 1200 children with cough (who do not have pneumonia) treated with antibiotics

BOTTOM LINE

(PNEUMONIA TX INDICATOR)



- Our current coverage indicator for AB tx of pneumonia is not “fit for purpose”
- Recommend reporting on careseeking for possible pneumonia in tandem with tx indicator to help in interpretation
- Hoping to do 1-2 similar studies in African settings to determine generalizability, with validation of careseeking indicator

MALARIA RDTs AND TREATMENT

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PLOS MEDICINE

Measuring Coverage in MNCH: Accuracy of Measuring Diagnosis and Treatment of Childhood Malaria from Household Surveys in Zambia

Thomas P. Eisele^{1*}, Kafula Silumbe², Josh Yukich¹, Busiku Hamainza³, Joseph Keating¹, Adam Bennett¹, John M. Miller²

1 Department of Global Health Systems and Development, Tulane University School of Public Health and Tropical Medicine, New Orleans, Louisiana, United States of America, **2** Malaria Control and Evaluation Partnership in Africa, Program for Appropriate Technology in Health, Lusaka, Zambia, **3** National Malaria Control Centre, Lusaka, Zambia

Abstract

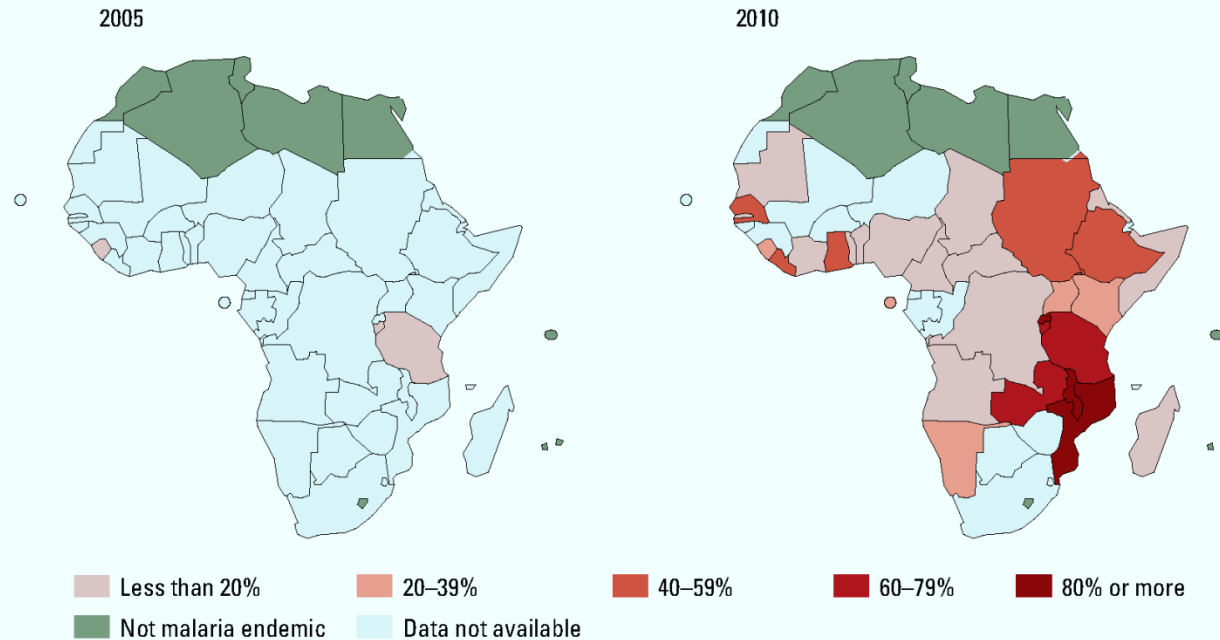
Background: To assess progress in the scale-up of rapid diagnostic tests and artemisinin-based combination therapies (ACTs) across Africa, malaria control programs have increasingly relied on standardized national household surveys to determine the proportion of children with a fever in the past 2 wk who received an effective antimalarial within 1–2 d of the onset of fever. Here, the validity of caregiver recall for measuring the primary coverage indicators for malaria diagnosis and treatment of children <5 y old is assessed.

Methods and Findings: A cross-sectional study was conducted in five public clinics in Kaoma District, Western Province

Background and rationale

Proportion of febrile children younger than five years treated with any antimalarial drug who received ACT, based on the latest survey data available by the end of 2005 and 2010

While ACTs are the recommended first-line treatment in many countries, rates of administration to febrile children began increasing only late in the decade.



- Household surveys measure if a child had blood taken for a malaria rapid diagnostic tests (RDT) and if the child received first-line malaria treatment (ACTs)

Background and rationale

- Primary diagnosis and treatment coverage indicators:

- *Proportion of children <5 with fever in ≤ 2 weeks who had blood taken with a finger or heel stick (for malaria diagnostic test)*



- *Proportion of children <5 with fever in ≤ 2 weeks who received an effective antimalarial (ACT)*



Background and rationale

- **However**, current diagnosis and malaria case management indicators are subject to caregiver recall of what happened during fever episode - potential information error / bias
- Until now these indicators and their means of measurement have not been validated against a gold-standard to assess accuracy of caregiver recall

Aim and objectives

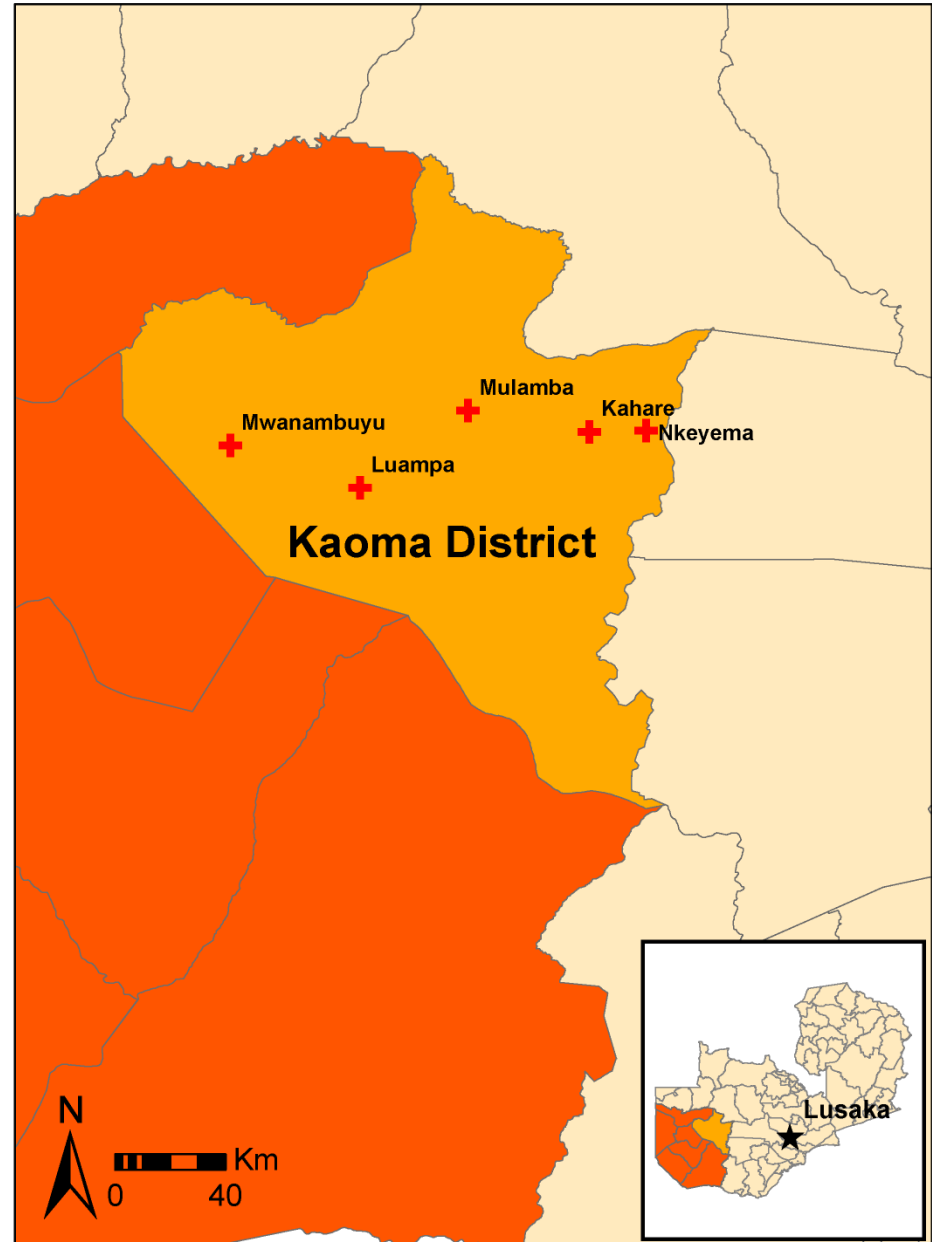
➤ *Objectives*

Compared to a gold-standard of direct observation of child's sick visit for fever at health facility, assess caregiver's accuracy 2 weeks later in recalling:

1. Whether child received a finger/heel stick
2. Result of malaria diagnostic test and malaria diagnosis
3. Whether malaria treatment was given, including type of antimalarial

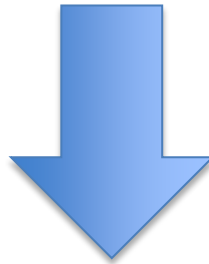
Study site

- 5 public health facilities
— *1 urban 4 rural*
- Kaoma District, Western province, Zambia
- Covered by new rapid malaria reporting system



Study design

Direct observation of malaria diagnosis and treatment at clinic (child sick visit for fever)



Caregiver recall of malaria diagnosis and treatment at home using **questionnaire** (1-14 days later)

Assess **accuracy** of caregiver **recall of malaria diagnosis and treatment**



Results: Accuracy of caregiver recall of key questions of diagnosis and treatment of malaria

	Sensitivity		Specificity		Accuracy		n
	(%)	(95% CI)	(%)	(95% CI)	(%)	(95% CI)	
Caregiver recall							
Recall of fever in past 2 weeks	96.0	(94.4 - 97.6)	100.0	-	96.0	(94.4 - 97.6)	601
Recall of finger/heel stick*	62.9	(58.1 - 67.7)	90.0	(85.7 - 94.2)	71.8	(68.1 - 75.4)	577
Recall of positive malaria test result (of those tested at clinic)	62.4	(56.1 - 68.7)	90.7	(86.3 - 95.2)	74.2	(69.9 - 78.6)	388
Recall that malaria diagnosis was made*	76.8	(72.4 - 81.3)	75.9	(70.4 - 81.4)	76.4	(73.0 - 79.9)	577
Recall of any antimalarial given*	82.0	(78.1 - 85.9)	88.8	(84.5 - 93.1)	84.4	(81.4 - 87.4)	577
Recall of ACT given*	81.0	(76.8 - 85.2)	91.5	(87.9 - 95.1)	85.3	(82.4 - 88.2)	577

*Of those with fever reported by caregiver

Key conclusions and recommendations

- In this setting, sensitivity and specificity of caregiver recall of finger/heel stick, test result, and malaria diagnosis were sub-optimal (63-77%)
 - Specificity better for finger/heel stick and test result (~90%)- but poor for malaria diagnosis (75%)
- Sensitivity and specificity reasonable for caregiver recall of ACT (or any antimalarial) given
 - Lab diagnosis appears to improve recall of malaria diagnosis and ACT treatment

Key conclusions and recommendations

- For tracking progress towards targets for prompt, effective treatment of malaria, household survey data should only be used for measuring coverage of treatment seeking for fevers and access to antimalarial drugs
 - Conforms to Roll Back Malaria Monitoring and Evaluation Reference Group recommendations
- If possible, survey data should be supplemented with data from health systems or exit interview studies to get proportion of suspected malaria cases where national policy on malaria diagnosis and treatment followed

DIARRHEA CASE MANAGEMENT



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PLOS MEDICINE

Review

Measuring Coverage in MNCH: Current Indicators for Measuring Coverage of Diarrhea Treatment Interventions and Opportunities for Improvement

Christa L. Fischer Walker^{1*}, Olivier Fontaine², Robert E. Black¹

¹ Johns Hopkins Bloomberg School of Public Health, Department of International Health, Baltimore, Maryland, United States of America, ² World Health Organization, Geneva, Switzerland (Retired)

Abstract: Diarrhea morbidity and mortality remain important child health problems in low- and middle-income countries. The treatment of diarrhea and accurate measurement of treatment coverage are critical if child mortality is going to continue to decline. In this review, we examine diarrhea treatment coverage indicators collected in two large-scale community-based household surveys—the Demographic and Health Surveys (DHS) and

feeding and the provision of home-based sugar-salt solution and other fluids, diarrhea treatment in the home should now be easier than ever for most community-acquired acute diarrhea episodes and experts had high hopes for accelerated uptake and widespread use of ORS within the community [6]. Unfortunately, although knowledge of ORS has remained high, more than two-thirds of low- and middle-income countries have reported declines in ORS use rates in the years following the initial campaigns and

KEY MESSAGES



- DHS/MICS do not distinguish between mild diarrhea episodes and those at risk for dehydration; additional disease severity questions may be useful, but research needed to define them

- 3 areas for improvement and research in coverage measurement:
 - Eliminate questions on treatment with fluids other than ORS
 - Need consistency on “offered” vs. “given”
 - Breastfeeding should be separated from other fluid and food questions to capture frequency and duration during illness

- Validation of zinc indicator needed

COVERAGE BY PLACE OF TREATMENT



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PLOS MEDICINE

Review

Measuring Coverage in MNCH: Evaluation of Community-Based Treatment of Childhood Illnesses through Household Surveys

Elizabeth Hazel*, Jennifer Requejo, Julia David, Jennifer Bryce

Institute for International Programs, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, United States of America

Abstract: Community case management (CCM) is a strategy for training and supporting workers at the community level to provide treatment for the three major childhood diseases—diarrhea, fever (indicative of malaria), and pneumonia—as a complement to facility-based care. Many low- and middle-income countries are now implementing CCM and need to evaluate whether adoption of the strategy is associated with increases in treatment coverage. In this review, we assess the extent to which

simple cases of childhood pneumonia, diarrhea, and malaria at the community level and to refer cases of more severe illness. The underlying assumption of CCM is that the expansion of treatment capabilities to community health workers will result in increases in access to and coverage of treatment, especially for children living in households far removed from existing health facilities [6].

Clearly, it is essential that countries introducing CCM carefully assess its contribution to increased treatment coverage for childhood illnesses. To do this, population-level data on the place of treatment

KEY MESSAGES




- To monitor and evaluate CCM, careseeking and place of treatment questions should be included in all household surveys
- Historically, MICS and DHS did not include this info; have added as a result of this analysis (but always check!)
- Even if place of treatment data are not available at baseline, there are several analytic strategies that may help you tease out plausible assessments of the effects of implementing CCM on careseeking and treatment for childhood pneumonia, diarrhea and malaria

CONTRIBUTORS




- Authors and their institutions
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 **#CoverMNCH**




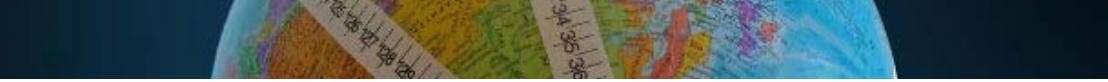
www.ploscollections.org/measuringcoverageinmnc

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Discussion