USAID
FROM THE AMERICAN PEOPLE

Maternal and Child Survival Program

What Child Health and Nutrition Data Do 24 Countries' Health Management Information Systems Include?

The Maternal and Child Survival Program (MCSP) is a global, $560 million, 5-year cooperative agreement funded by the United States Agency for International Development (USAID) to introduce and support scale-up of high-impact health interventions among USAID's 25 maternal and child health priority countries,* as well as other countries. The Program is focused on ensuring that all women, newborns and children most in need have equitable access to quality health care services to save lives. MCSP supports programming in maternal, newborn and child health, immunization, family planning and reproductive health, nutrition, health systems strengthening, water/sanitation/hygiene, malaria, prevention of mother-to-child transmission of HIV, and pediatric HIV care and treatment.

This study is made possible by the generous support of the American people through the United States Agency for International Development (USAID) under the terms of the Cooperative Agreement AID-OAA-A-14-00028. The contents are the responsibility of the Maternal and Child Survival Program and do not necessarily reflect the views of USAID or the United States Government.
* USAID's 25 high-priority countries are Afghanistan, Bangladesh, Burma, Democratic Republic of Congo, Ethiopia, Ghana, Haiti, India, Indonesia, Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Nepal, Nigeria, Pakistan, Rwanda, Senegal, South Sudan, Tanzania, Uganda, Yemen and Zambia.

November 2019

Table of Contents

Acknowledgements

This report was compiled by a team from the Maternal and Child Survival Program including (in alphabetical order) Kate Gilroy (John Snow, Inc.), Elizabeth Hourani (John Snow, Inc.), Tamah Hulliams (John Snow, Inc.), Justine Kavle (PATH), Katie Lilly (Jhpiego), Scott Merritt (Jhpiego), Michel Pacqué (John Snow, Inc.), Emily Stammer (John Snow, Inc.) and Patricia R. Welch (PATH). We thank the monitoring and evaluation advisors and local experts from the included countries for their time and provision of HMIS materials for the review.

Acronyms

ACT	Artemisinin-based Combination Therapy
ALRI	Acute Lower Respiratory Infection
ARI	Acute Respiratory Infection
CHAT	Child Health Accountability and Tracking
CHW	Community Health Worker
DHIS2	District Health Information System-2
DT	Dispersible Tablets
HFA	Height-For-Age
HMIS	Health Management Information System
iCCM	Integrated Community Case Management
IMNCI	Integrated Management of Newborn and Child Illness
IYCF	Infant and Young Child Feeding
LMIC	Low and Middle Income Country
LLIN	Long-Lasting Insecticidal Nets
MAM	Moderate Acute Malnutrition
MCSP	Maternal and Child Survival Program
MOH	Ministry of Health
MUAC	Middle-Upper Arm Circumference
OPD	Out Patient Department
ORS	Oral Rehydration Solution
PMI	President's Malaria Initiative
RDT	Rapid Diagnostic Test
RMNCAH	Reproductive, Maternal, Newborn, Child and Adolescent Health
RUTF	Ready to Use Therapeutic Food
SAM	Severe Acute Malnutrition
SDG	Sustainable Development Goal
TEAM	Technical Expert Advisory Group on Nutrition Monitoring
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	United States Government
WFA	Weight-For-Age
WFH	Weight-For-Height
WHO	World Health Organization

Executive Summary

Introduction

Many global level initiatives aim to improve children's survival, health, well-being and nutrition in line with the sustainable development goals (SDG) two and three. Frameworks and specific health and nutrition indicators to monitor progress and ensure accountability accompany these initiatives. For example, Countdown to 2030 tracks intervention coverage, equity, and drivers of reproductive, maternal, newborn and child health across 81 countries. The Global Nutrition Monitoring Framework defines indicators and processes for reporting on nutrition. These monitoring frameworks and global tracking initiatives mostly include policy milestones and population-based indicators collected through periodic household surveys. Standard, population-based indicators derived from household surveys are important to monitor child health and nutrition outcomes at the national and sub-national level in low and middle-income countries (LMIS). However, because of their design and periodicity, surveys do not allow countries to track progress and identify problems in real-time at the lowest levels of the health system. Additionally, surveys cannot always reliably measure health indicators because respondents may not know or recall the answer to the questions. For example, valid indicators of standard treatment for childhood pneumonia cannot be reliably collected through household surveys.

Health management information systems (HMIS) collect and provide essential information which enable health care workers, facility administrators, district health managers, sub-national and national policymakers to manage patients and deliver health services. HMIS information is used across the health system levels to provide accountability to communities; guide quality improvement efforts, program management decisions, and resource allocations; inform research and program priorities; and helps measure progress toward sub-national and national health goals and targets. HMIS data represent an accessible source of service delivery information in most low- to middle-income countries (LMIC), especially when the majority of health services are provided through national government programs and information is collected and aggregated across community and public sector providers. Facility-based and community health workers (CHW) can use HMIS data to monitor the quantity and quality of services they deliver and evaluate quality improvement efforts. As global child health quality standards are rolled out in countries and indicators defined to measure these efforts, child health data collected through the HMIS and used at local levels will become more important.

The Maternal and Child Survival Program (MCSP) sought to help determine whether countries are currently positioned to calculate service utilization, health outcome, and quality of care measures for child health and nutrition services, including recommended global indicators. MCSP reviewed the availability of key data elements in HMIS community and facility recording forms, registers and routine reporting forms in 24 United States Agency for International Development (USAID) priority maternal and child health countries. The goal of this review was to systematically document key child health and nutrition data elements found in HMIS documents at community and primary facility levels in the USAID priority maternal and child health countries. This review complements other MCSP reviews of maternal and newborn data and family planning data in national HMIS.

Methodology

Key data elements related to important child health and nutrition outcomes, utilization of services, and provision of high-impact interventions at community and primary health facilities were selected in consultation with USAID and technical experts. The review includes prevention and management of childhood illnesses, including, but not limited to, diarrhea, pneumonia, fever, and malaria in children 0-59 months. For nutrition, the review focuses on infant and young child feeding (IYCF) counseling and practices, screening of nutritional status, management of acute malnutrition, anemia, micronutrient supplementation, and tracking of stocks/supplies of nutrition commodities. We excluded immunization and pediatric HIV/AIDS from the review as other past initiatives have focused on this data.

We collected patient level forms (such as sick child recording forms), registers, and summary forms at the community and primary health facility level from 24 countries' national HMIS and assessed the presence or absence of data elements. Standardized data abstraction templates created in Excel were used to compile the final list of 228 data elements, categorized by services received, type of form or register and community and facility levels. We used these abstraction templates to extract data elements from more than 280 community and facility forms in nine languages from the 24 countries. During data abstraction, data elements were considered present if: 1) a specific section on the register or summary form was allotted for a particular data element, or 2) a standardized coding scheme was available that included the given data element.

After abstraction, worksheets from all the countries were combined into a single dataset using an excel macro. Our analyses included description of the data elements available across countries and "deep-dives" into the specific language of data elements that were difficult to categorize or inconsistent across countries or forms. We also examined how many countries could calculate recommended indicators above the community and facility levels given the available data elements reported in their summary forms.

Findings

Case management of sick children

Recording and reporting on the assessment, treatment and referral of sick children requires standardized data elements registers/patient records and reporting forms (whether paper or digital) at community and health level to calculate key indicators. Our findings amongst the 24 countries are as follows:

- **Assessment of the sick child:** Less than half of the 24 country HMIS reviewed include data elements about standard assessments of a sick child, such as screening for dangers signs and determining the respiratory rate for suspected pneumonia, in registers or sick child forms in the health facility. Around half of countries record and/or report these data at the community level. More countries record and report screening data at the community level than the facility level. This is likely associated with the introduction and expansion of iCCM programming and the associated data recording and reporting tools over the last decade, while interest and funding for facility IMNCI has lagged, especially for health systems components, such as monitoring and data systems.

- **Recording and reporting childhood illnesses**: The majority of the 24 countries record and report the number of children under five years of age with common illnesses, such as pneumonia, malaria, and diarrhea at the community and facility level.

- **Data elements and their definitions**: The way that pneumonia is classified is not consistent within countries, including across levels (community and facility) or from register to summary form at the same level. Acute respiratory infection (ARI), pneumonia, and fast breathing are used in different settings and sometimes interchangeably, which makes tracking pneumonia cases and the care they receive difficult.

- **Registers/patient records and reports that are not aligned**: Many countries report common child illnesses in their summary forms but do not have any specific data elements in their registers to record this information, especially at the facility level. These countries most often rely on generic outpatient registers that have blank columns for the diagnosis and treatment of illness. This likely contributes to data quality issues and increases the reporting burden on health workers who also may not be using standard classifications for child illness.

- **Malaria indicators**: Only six countries out of 24 can calculate the malaria diagnostic testing ratio (% of febrile children under-five tested for malaria) at the facility level and only six can report on this indicator at the community level from summary forms. Thirteen countries out of 24 can report on the malaria positivity rate (percent of positive malaria tests among tested cases) at the facility level and only eight report on this at the community level. Less than half of countries include the number of children under-five with fever or the number of children tested for malaria in facility or community summary forms.

- **Recording and reporting treatment**: Fewer countries record and report data related to the treatment of child illness than report on the illnesses themselves. Less than half of the countries included in this review could track the proportion of cases of pneumonia, malaria, or diarrhea correctly treated at the facility or community levels. Countries that do report on treatment often rely on generic outpatient registers where the treatment is recorded in a blank column, indicating lack of standardization. Lack of treatment data in countries' HMIS means that countries and programs may be using proxies (such as number of cases) to report standard indicators, such as USAID's "number of cases of child diarrhea treated in United States Government-assisted programs," or managing parallel information systems in order to report.

- **Tracking referrals and counter-referrals**: The overwhelming majority of countries record and report the referral of sick children to higher levels (from the community to a facility or from a primary health center to a higher-level health center or hospital). However, few countries track completed referrals or counter-referrals.

- **Data elements that trigger counseling**: Less than half of the 24 countries include data elements to prompt counseling of caretakers for sick children in their community registers or forms, and only a handful include these data elements at the facility level.

- **Integrated management of newborn and child illness (IMNCI) and integrated community case management (iCCM) forms and registers**: The introduction of IMNCI and iCCM forms and registers, with specific, reportable sick child classifications, can help to harmonize data definitions, reduce workload, and improve data quality.

Child nutrition

Recording and reporting on the IYCF counseling and practices, screening, classification and treatment or referral of childhood malnutrition, micronutrient supplementation requires standardized data elements in registers/patient records and reporting forms (whether paper or digital) at community and health level to calculate key indicators. Our findings amongst the 24 countries are as follows:

- **Data on infant and young child feeding (IYCF) counseling**: We found that few countries include data elements related to IYCF counseling at the facility or community level (including counseling on breastfeeding, complementary feeding, and/or continued breastfeeding), even in registers. Where included, it is often a generic column or tick box for "IYCF counseling" element that does not specify the content of the counseling. Registers or patient forms that include data elements or prompts for IYCF counseling, can remind health workers to complete this vital practice during well or sick child consultations

- **Data on breastfeeding and complementary feeding practices**: More countries record and report on exclusive breastfeeding and complementary feeding practices at the facility and community level than report on IYCF counseling. Data related to continued breastfeeding was only present in two countries. Data related to IYCF practices are recorded using simple forms or tick boxes that most often do not specify the infant's age. Standard indicator measurement of infant feeding involves complex methods, such as the 24-hour dietary recall series of questions in household surveys, disaggregated by target age groups. Although nutrition program managers may want to track a summary indicator such as "number or percentage of infants 0-6 months of age exclusively breastfed" through the HMIS, these data elements may not capture complex IYCF practices in a valid manner.

- **Malnutrition classification**: Countries record and report on underweight at the facility and community level, although many country registers, forms, or operational manuals do not specify the degree of underweight recorded. Approximately half of countries record and report on moderate acute malnutrition (MAM) and severe acute malnutrition (SAM) cases at the community level; most countries use the middle-upper arm circumference (MUAC) to identify MAM and SAM. More than half of countries record and report cases of MAM and SAM at the facility level, with a mixture of weight-for-height (WFH) and MUAC used to identify cases. Despite the large number of countries

that record and report MAM and SAM, few are able to calculate the percentage of children with SAM or MAM above the facility or community level, due to lack of a data element in their HMIS related to screening for malnutrition. Many countries included non-specific data elements related to "malnutrition" for which we could not find the definition or criteria in the registers, forms, and/or HMIS manuals we reviewed. Few countries record and report on stunting, overweight or obesity, despite global goals.

- **Malnutrition treatment and referral:** Few countries recorded or reported on provision of ready to use therapeutic food (RUTF), supplementary food, or treatment of acute malnutrition at the community or primary facility level. Many more countries recorded and reported on referral for malnutrition at these levels.

- **Anemia:** More than half of the 24 countries reported the diagnosis of anemia in children under-five at the facility level. At the community level, some countries record palmer pallor in their registers or patient forms.

- **Vitamin A and micronutrient supplementation**: The overwhelming majority of the 24 countries that we reviewed record and report on vitamin A supplementation at the facility level, with fewer recording and reporting on vitamin A at the community level. However, countries do not report on vitamin A supplementation in a consistent manner, with different countries' records and reports specifying one or more of the following data elements--vitamin A first dose, vitamin A second dose, vitamin A dose within the last six months, vitamin A doses within the last year and vitamin A given (no age or dose information). As health management information systems across countries move towards individual patient records and collecting more longitudinal data, and as vitamin A supplementation is increasingly provided through routine services (rather than through campaigns), they need guidance and a standard set of data elements to capture the delivery of vitamin A and the vitamin A status of children. Few countries recorded or reported micronutrient powders given as a supplement.

Other preventive interventions

- **Deworming**: More than half of the 24 countries record and report on deworming in children less than five years of age at the facility level and just fewer than half record and report deworming at the community level. As it is not clear that countries will be able to continue annual or biannual deworming campaigns to control soil-transmitted helminth infections, the provision of anthelminthic treatment through routine health services and the tracking of this service at the facility and even community level, will become more important.

- **Malaria and WASH:** Some countries use the routine HMIS at the community and facility levels to record and report on interventions to prevent child illness, such as long-lasting insecticidal nets (LLIN) use, water, and sanitation in households and community engagement activities.

Health systems components for child health and nutrition

- **Human resources**: Although other information systems exist to track human resources, some countries use the HMIS to record and report on the number of CHWs and facility-based health workers. Seven countries also use the HMIS summary forms to report and track supervision at the community level, fewer (four) countries track supervision at the facility level through HMIS.

- **Supply chain**: Around half of the 24 countries used the community HMIS forms to report on child health commodities, while just under half used the HMIS to track child health commodities at the facility level. Some countries collect commodity data in logistics management information system and it is likely that these systems do not extend to the community level. Many countries implementing iCCM have used the community HMIS for tracking stock.

Discussion and Recommendations

We did not set out to recommend what data elements and indicators all countries should record and report. Each country must carefully consider what type and quantity of HMIS data are needed at each level to monitor and manage their child health and nutrition programs and services. Our findings point to a number of themes and recommendations related to routine data for child health and nutrition that countries may want to consider as they revise their HMIS. Global groups may also want to consider our findings as they work on developing and updating global guidance and data-related goods.

Include assessment and counseling data elements at the point of care

Countries may want to consider inclusion of key data elements related to IYCF and sick child counseling, as well as the assessment danger signs or vaccination status in the point of care registers or forms at the community and primary facility levels. Aggregating these data at higher levels may be of limited value, but having to record the data can serve as prompts for health workers to perform specific assessment and counseling tasks as they examine the child. As a result, frontline supervisors can also check the quality of assessment, classification, and treatment/referral of sick children through record review.

Harmonize definitions for illness and nutrition classification

We found that data element definitions are not always standardized—i.e. pneumonia, malnutrition, and vitamin A—even within select countries' forms at different levels. Countries should harmonize the definitions of data elements across registers, forms, and levels of the health system and include instructions and definitions in HMIS manuals. At the global level, it is recommended that the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) provide guidance for defining data elements measured through routine HMIS that corresponds to global intervention guidance and recommendations.

Adapt and use IMNCI and iCCM registers

In our review, some countries, such as Malawi, Mozambique, Rwanda, and Zimbabwe, use IMNCI and/or iCCM registers that serve as both job aids (laying out the algorithm) and data collection tools. These registers include data elements that can be used at the point of care and for supervision. They also standardize the classification of child illness and treatment, ensuring better data quality in the register and likely in aggregate data reported in summary forms. Countries with IMNCI and iCCM programs should adapt and use these tools.

Report selected data elements related to processes and symptoms

Countries often record processes, such as screening of a child for malnutrition (through MUAC, weight, or WFH), rapid diagnostic test (RDT) administration, and symptoms (i.e. fever) in registers but do not report counts in summary forms, which serve as denominators for indicators such the percentage of children screened with MAM, malaria test positivity rate and malaria diagnostic testing ratio. Countries may want to consider reporting these types of process and symptom data in order to enable managers above the facility level to better monitor and compare trends over time and different size catchment areas.

Consider inclusion of important data elements

When revising their HMIS, countries should consider the inclusion of child health and nutrition data elements that are important to them and the international community, but not currently in their national HMIS, while also balancing the need to limit reporting burden. Countries' considerations should take into account that some data elements and related indicators are best recorded and reported through the HMIS, such as data they want to track on a continuous basis. For example, tracking suspected cases of measles through HMIS, especially in countries with repeated or widespread measles outbreaks, can strengthen passive case detection in combination with other existing infectious disease surveillance systems. Countries should strongly consider including data elements to calculate the percentage of children with pneumonia treated with an antibiotic, which household surveys cannot validly measure. Additionally, countries not currently able to report on treatment for other child illnesses, such as diarrhea or malaria, should consider incorporation of

these important data elements into their HMIS, as well as data related to referrals given and received at both the community and facility levels.

Conclusion

HMIS data provide important information for health workers to monitor and improve the child health and nutrition services they provide and for program managers to monitor and track progress and quality of care. The scale-up of District Health Information System-2 (DHIS2) has meant that countries have more data available more quickly for management decisions and reporting. This review provides a snapshot of the child health and nutrition data elements included in 24 countries' national HMIS and highlights the opportunities and gaps across countries. Countries and partners can use these results to consider what routine HMIS data can and should be recorded, and how global guidance and reporting requirements take country systems into consideration.

Introduction

Many efforts exist at the global level with the explicit purpose of improving children's survival, health, well-being and nutrition to reach the sustainable development goals (SDG) two and three (Box 1). These initiatives are often accompanied by frameworks specifying health and nutrition indicators to monitor progress and ensure accountability (Anon 2019; WHO, Every Woman, Every Child 2016). At the global level, Countdown to 2030 tracks intervention coverage, equity and drivers of reproductive, maternal, newborn and child health across 81 countries (Boerma et al. 2018) and the Global Nutrition Monitoring Framework defines indicators and processes for reporting on nutrition (WHO 2017b). These monitoring frameworks and global tracking initiatives mostly include policy milestones and population-based indicators collected through periodic household surveys.

Box 1. Global child health & nutrition initiatives

- The Global Strategy for Women's, Children's and Adolescent's Health
- A Promise Renewed
- Every Woman, Every Child
- Standards for improving the quality of care for children and young adolescents in health facilities
- Every Newborn Action Plan
- Every Breath Counts
- Scaling Up Nutrition Movement
- Global Breastfeeding Collective
- WHO/UNICEF Baby-Friendly Hospital Initiative

Population-based indicators derived from household surveys are important to monitor child health and nutrition outcomes at the national and sub-national level. However, because of their design and periodicity, surveys do not allow countries to track progress and identify problems in real-time at the lowest levels of the health system. Global health estimates derived from surveys and other data sources are not always well-received by country officials who were not involved in the processes or do not understand how estimates were calculated (AbouZahr, Boerma, and Hogan 2017). Additionally, surveys cannot always reliably measure health indicators, because respondents may not know or recall the answer to the questions (Arnold and Khan 2018). For example, valid indicators of antibiotic treatment for childhood pneumonia cannot be collected through household surveys (Hazir et al. 2013).

There is a growing recognition that robust, country-owned health information systems can collect and report data on a more routine basis to monitor, evaluate and inform decisions in real-time (Africa Regional Workshop on Improving Routine Data for Child Health in National Health Information Systems; AbouZahr, Boerma, and Byass 2017; Marchant et al. 2019; Nabyonga-Orem 2017; Suthar et al. 2019). The health management information system (HMIS) is an essential part of the overall health information system,[1] enabling the tracking of services delivered to children seen in facilities and communities.[2] Well-functioning HMIS can provide timely and accessible service delivery information aggregated at different levels of the public health system (community, facility, districts, sub-national and/or national) in most low- to middle-income countries (Maina et al. 2017). National policymakers, sub-national managers and administrators use facility and community HMIS data to make program decisions, allocate resources and monitor progress toward national, sub-national and local health goals (AbouZahr and Boerma 2005). Facility-based and community health workers (CHWs) can use HMIS data to monitor the quantity and quality of services they deliver and evaluate quality improvement efforts. As global child health quality standards (WHO 2018d) are rolled out in countries and indicators defined to measure these efforts, child health data collected through the HMIS and used at local levels will only become more important.

[1] HIS refers to paper-based and electronic information systems within a country. It can include components such as a facility and community-based HMIS, laboratory and imaging information systems, hospital management information systems, disease surveillance information systems, routine supervisory information systems, financial and administrative management information systems, human resource information systems, logistics management information systems, and/or infrastructure and equipment management information systems.

[2] HMIS traditionally includes routine service delivery statistics at the facility level. Implementation and institutionalization of HMIS at the community level (usually through community health workers) is less consistent across countries.

While there has been extensive international guidance on impact and intervention coverage measures for child health and nutrition, currently limited global guidance exists for routine indicators of the quantity and quality of child health and nutrition services collected through HMIS at the facility and community levels (Diaz et al.
2018). The World Health Organization (WHO) has recently released a working guide on using HMIS indicators for Reproductive, Maternal, Newborn, Child, Adolescent Health (RMNCAH) that addresses this gap, but the package is not final (UNICEF and WHO 2019). Because HMIS are country-owned and not linked to any particular global initiative, the data elements collected, forms used to collect data, indicators calculated, system design and data flow vary greatly between countries. Child health monitoring and evaluation data are not always integrated and may even be collected in parallel systems (Diaz et al. 2018).

This review documents the ***data elements (see Box 2) related to child health and nutrition in the routine HMIS at the community and facility level in 24 countries.*** We use this information to identify common data elements and gaps across countries, as well as examine how many countries can calculate recommended indicators above the facility level. Data elements definitions are also examined across countries. We anticipate that this review will allow for better targeting of technical assistance to countries to improve routine child health and nutrition indicators. The results of this review can be used to inform the global dialogue on recommendations or guidance for child health and nutrition HMIS data or indicators through metrics groups such as the Health Data Collaborative, the WHO/UNICEF Child Health Accountability Tracking (CHAT) Advisory Group, and/or WHO/UNICEF Technical Expert Advisory Group on Nutrition Monitoring (TEAM).

Box 2. Data elements within national HMIS

Data elements are the building blocks that are collected and aggregated within an HMIS. In most national HMIS, health workers use client records or registers to record raw data elements during the service visit and these data elements are aggregated into summary forms for each facility or CHW/cluster of CHWs. The summary forms are often entered into an electronic database, such as District Health Information System-2 (DHIS2) on a monthly basis, where they can be aggregated across sub-districts, districts, regions or national level. From the facility to national level, these data elements can be used to calculate indicators (i.e. drawing on different data elements for the numerators and denominators) that can track progress, identify issues and potentially allow for international comparisons. For example, data elements related to the number of children with pneumonia and children with pneumonia treated with an antibiotic are needed to calculate the % of children appropriately treated for pneumonia.

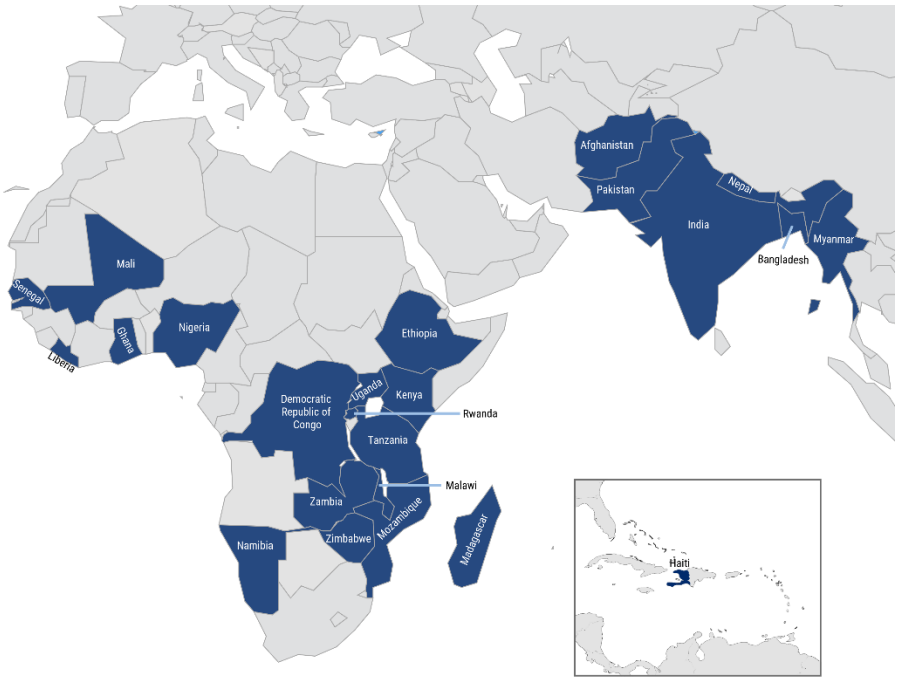
Methods

Scope of the Review

This review focuses on child health and nutrition data elements included in national HMIS systems in 24 low- and middle-income countries. This review complements other MCSP reviews of maternal and newborn data and family planning data in national HMIS. The technical scope of the review includes management of childhood illnesses in primary health care and community settings, including, but not limited to, diarrhea, pneumonia, fever, and malaria in children 0-59 months. For nutrition, the review focuses on infant and young child feeding (IYCF) counseling and practices, screening and classification of anthropometric measures of nutritional status, management of acute malnutrition (moderate acute malnutrition [MAM] and severe acute malnutrition [SAM]), anemia assessment and diagnosis, micronutrient supplementation (vitamin A and micronutrient powders) and deworming. The review also includes selected illness prevention data, as well as health systems data related to human resources for health and stocks/supplies of child health and nutrition commodities. We exclude immunization and pediatric HIV/AIDS from the review as other past initiatives have focused on this data and do not include inpatient management of malnutrition. In addition, the review does not include an assessment of the quality of the data for these data elements nor does it examine how the data were used.

The review focused on USAID priority MCH countries of Afghanistan, Bangladesh, Burma Democratic Republic of Congo (DRC), Ethiopia, Ghana, Haiti, India, Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Namibia, Nepal, Nigeria, Pakistan, Rwanda, Senegal, Tanzania, Uganda, and Zambia (Figure 1). The review also includes Namibia and Zimbabwe, due to the Maternal and Child Survival Program (MCSP) child health programming in these countries and excludes Yemen and South Sudan because of political instability and Indonesia due to inability to collect the required forms.

Figure 1. Map of 24 countries included in the child health HMIS review



Processes

Box 3 outlines the processes used to identify and select the key data elements to include in the review. We first reviewed the existing international guidance for child health and nutrition indicators from the WHO, (WHO 2014a, 2015) previous and current USAID and the President's Malaria Initiative (PMI) guidance,(US Department of State 2018) and initiatives like Countdown to 2030,(Boerma et al. 2018) and the SDGs (WHO, Every Woman, Every Child 2016). While many of these sources provide recommendations for indicators collected through household and facility surveys, we extracted the data elements of the indicators

for the purpose of the review. We also extracted key data elements related to the clinical guidance, algorithms and indicators for integrated management of newborn and childhood illness (IMNCI)(UNICEF and WHO. 1999; WHO 2014b) and integrated community case management of childhood illness (iCCM)(USAID and MCHIP 2013).

We provided the list of identified data elements to experts in child health and nutrition at MCSP and USAID, who provided feedback on which data elements to include. The next step was to request, collect, and catalog forms from the 24 countries selected. We obtained forms for health services offered at both the community and facility level including:

- Sick child recording forms or client-level forms (where they are used)
- Facility and community registers, which at the facility level include the outpatient department (OPD), well child, logistics registers
- Facility summary reporting forms and community summary reporting forms.

Box 3. Process to identify and select data elements

- Desk review of and consultation about international guidance documents for recommended indicators
- Data elements proposed by child health and nutrition experts at MCSP for inclusion in review
- Review of proposed data element list by USAID
- Final list of 228 data elements prioritized. Standardized data abstraction templates created in Excel categorized by services received and level of care
- Review team conducts abstraction from more than 280 community and facility forms in 9 languages from the 24 countries
-

From 2016 through 2018, the review team collected and reviewed the forms provided by MCSP country offices, ministries of health (MOH) and non-governmental organization offices in the 24 priority countries. The team requested updated tools in 2018 for countries where we were aware had undergone HMIS revisions, such as Mali and Senegal. All client level and aggregated national HMIS reporting tools for child health and nutrition services were requested from countries, and data was abstracted from community and facility registers and summary forms. Forms in languages other than English were translated into English or reviewed by team members who spoke the language. Two team members reviewed all forms and discrepancies in coding were identified and discussed until they were resolved.

After abstraction was completed, all worksheets from the countries were combined into a single dataset using an excel macro. Our analyses included description of the data elements available across countries and "deep-dives" into the specific language of data elements that were difficult to categorize or inconsistent across countries or forms. We also examined how many countries could calculate recommended indicators above the community and facility levels given the available data elements reported in their summary forms.

Description of forms and common data flows

As noted above, we procured forms for health services offered at both the community and facility level that included sick child/client recording forms, OPD registers, well child, nutrition and immunization registers, CHW registers and summary forms, shown by country in Table 1. "Other" types of forms included outreach forms, household registers, referral registers, and stock registers. To categorize the different forms appropriately, it was necessary to understand how the various systems operate and where the forms feed into the national HMIS. The data flow at the facility level is mostly consistent across countries. Where applicable, health providers complete sick child/client recording forms for each child seen. Providers may use this information to complete registers or may fill in the registers directly if the system does not have sick child or client level cards (Figure 2). Data from these registers are summarized at the facility level; in many countries, these summary forms are entered into the national system for each facility at the facility or district level. In a handful of countries, the facility summary forms are submitted to the next highest administrative level, where the data are aggregated and entered into the national system.

Table 1. Forms included in the review

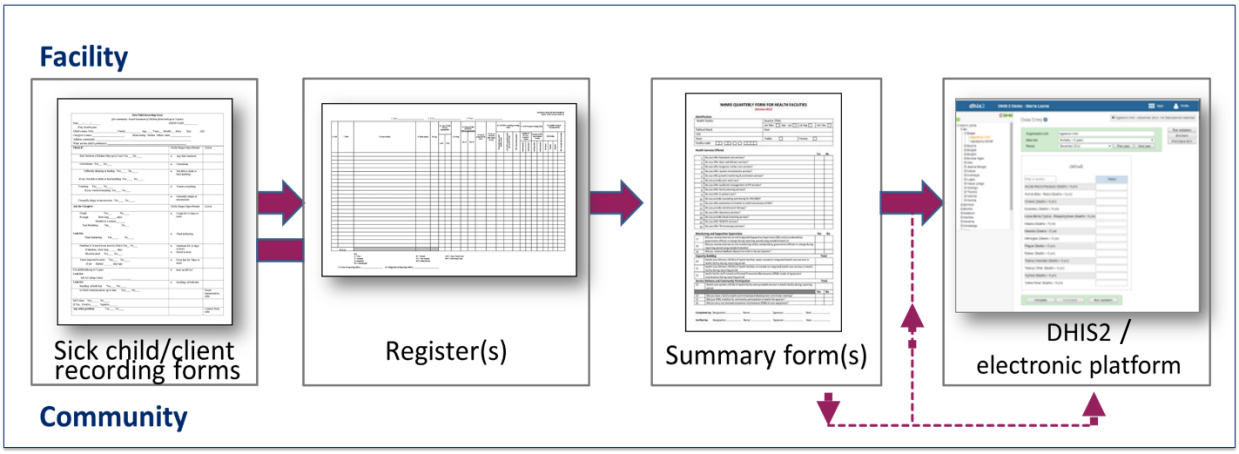
Forms Included in the Review		
Country	**Community**	**Facility**
Afghanistan	■❍	❖❍☒
Bangladesh	❑❖■❍☒	❖◆❍♈☒
Burma	■	❖◆❍☒
DRC	❑■❍☒	❑❖◆❍☒
Ethiopia	■◆❍	❖◆❍☒
Ghana	■◆❍☒	◆❍☒
Haiti	■◆❍☒	❑❖❍☒
India	❑◆❍☒	◆❍☒
Kenya	❑■❍☒	❖◆❍☒
Liberia	■❍☒	❑❖❍☒
Madagascar	■◆❍☒	❖◆❍
Malawi	■❍	❍☒
Mali	❑❍☒	◆❍♈☒
Mozambique	■❍☒	◆❍♈☒
Namibia	■❍☒	❍☒
Nepal	■❍	❖◆❍♈☒
Nigeria	❑■❍	❖◆❍♈☒
Pakistan	■◆❍☒	❖◆❍☒
Rwanda	❑■❍☒	◆❍♈
Senegal	❖◆❍☒	◆❍♈☒
Tanzania	■❍	❖◆❍☒
Uganda	■◆❍☒	❖◆❍
Zambia	❑■◆❍	❖◆❍☒
Zimbabwe	❑❍☒	◆❍♈

Key:

- ❑ Sick child recording form
- ❖ OPD Register (also include basic CHW Registers)
- ◆ Nutrition/immunization/well child register
- ❍ Monthly Summary Forms
- ♈ IMCI/Sick child Register
- ■ CHW register
- ☒ Other Forms

Community data flows are more variable across countries. Where it exists, a sick child or client recording form may feed into the community register, which can be used to populate the community summary forms, similar to the facility level, but if and how the community summary data feeds into the national system is where the variability occurs. In some countries, like DRC, community health workers submit data to the facility where it is recorded in a community section in the facility summary form and, subsequently, enters the national system. Alternatively, in Kenya, CHWs submit their forms to a community health unit. From there, aggregated community data are submitted to the next level and the community health unit summary forms are entered into DHIS2 as a separate organizational unit. Finally, in some countries, like Nigeria, national community forms, including sick child forms, registers and summary forms exist, but the community services are not currently included in the national HMIS and are more project-specific. The Nigerian Federal MOH is currently working to incorporate the community level into the national HMIS through pilot instances in the country, but national scale up has not yet taken place. These examples of the community data flow illustrate the variability taken into consideration by the team when cataloging forms and registers from countries.

Figure 2. Illustrative facility and community HMIS data flow



Data elements for case management of sick children

The presentation of the review's findings begins with case management of sick children, followed by very severe disease, referral, death, nutrition, illness prevention and concludes with health systems components. This section focuses on case management of childhood illnesses that account for the majority of post-neonatal morbidity and mortality in children under five years of age in USAID maternal and child health priority countries, including pneumonia, fever/malaria and diarrhea. Table A.1 in the annex presents findings for the overall number of new attendances, sick children seen and children re-attending services.

Pneumonia

Rationale for recording and reporting

Pneumonia is the leading infectious cause of deaths in children globally (Liu et al. 2016). Recording and reporting cases of childhood pneumonia and if they receive treatment at the facility and community level allows program managers and health workers to track illness trends and monitor quality of services. UNICEF and WHO recommend monitoring the *percentage of children correctly diagnosed with pneumonia who received treatment* at the facility level, although they caution that the accuracy of this metric relies on correct diagnosis of pneumonia (UNICEF and WHO 2019). Recording and reporting on pneumonia screening can help ensure quality and shed light on the diagnosis of pneumonia.

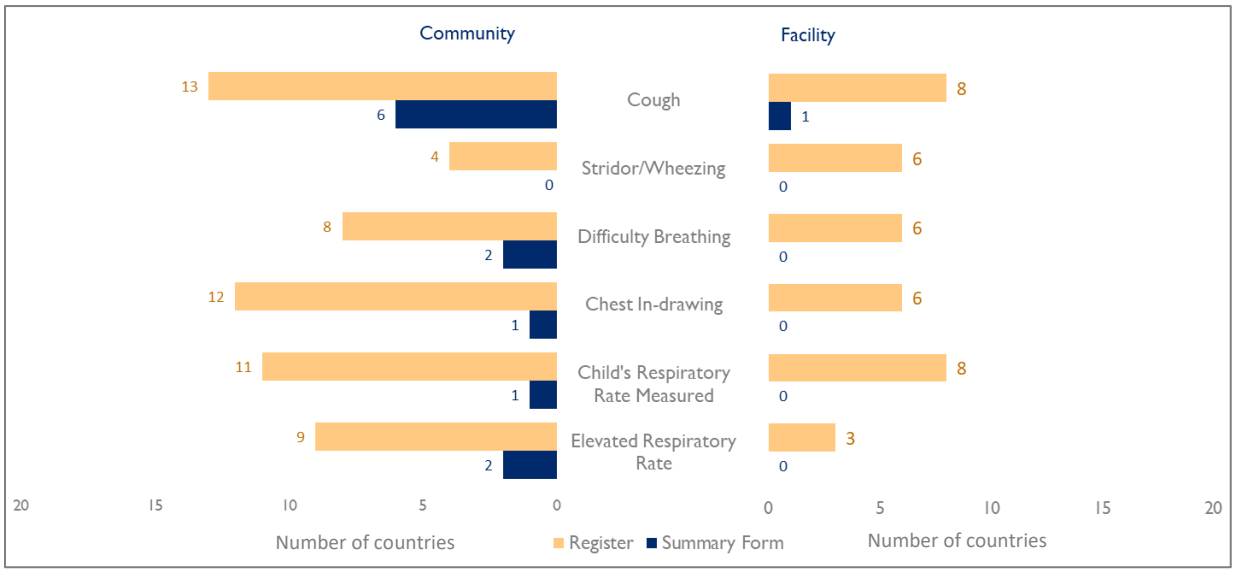
Data elements available across countries

Pneumonia screening

Data elements extracted for pneumonia screening included cough, stridor/wheezing, difficulty breathing, chest in-drawing and both measurement of respiratory rate as well as elevated respiratory rate. Figure 3 displays the number of countries with data element in registers and summary forms at the community and facility levels. Most pneumonia screening data elements are more frequently collected at the community level than the facility level, with the exception of stridor/wheezing. Additionally, these data elements are more commonly reported in summary forms at the community level compared with the facility level. Cough, for example is included in community summary forms in six countries, but is only included in facility summary forms in one country (Madagascar). This is likely associated with the introduction and expansion of iCCM programming and the associated data recording and reporting tools into national policies and guidelines over the last decade. Interest and funding for facility IMNCI has lagged, especially for health systems components, such as monitoring and data systems (Dalglish, Costello, and on behalf of the Strategic Review Study Team 2016).

None of the countries we reviewed collected information about oxygen saturation levels or hypoxemia at the facility level. This is important considering the recommendation by groups like Every Breath Counts for countries to collect such information in their HMIS (F. Lam, personal communication, July 25, 2019).

Figure 3. Data elements for pneumonia screening across 24 countries' HMIS at the community and facility level



Pneumonia classification

Table 2 shows eight different ways that countries we reviewed classify suspected childhood pneumonia. Additionally, the way pneumonia is classified is not consistent within countries, including across levels (community and facility) or from register to summary form at the same level. For example, in Nepal, pneumonia is referred to as "ARI" in facility level registers, but "pneumonia" in facility level summary forms. Thus, it is difficult to compare pneumonia cases consistently across countries and, in some instances, even within countries.

Table 2. Different definitions of childhood pneumonia found in HMIS registers and forms

Variations
1. Suspected Pneumonia
2. Pneumonia
3. Acute Lower Respiratory Infection (ALRI)
4. Acute Respiratory Infection (ARI)
5. Fast breathing
6. Fast breathing/pneumonia
7. Cough and fast breathing
8. Cough and respiratory problems

Table 3. Pneumonia classification across 24 countries' HMIS at the community and facility level

	Child classified with pneumonia			
Country	Community	Definition(s) of pneumonia in community forms	Facility	Definition(s) of pneumonia in facility forms
Afghanistan	❑❍	ARI in register and summary form	❑❍	ARI: Pneumonia in register and summary form
Bangladesh*	❑❍	Pneumonia in register and summary form	❍**	Pneumonia in summary form
Burma			❑❍	Pneumonia in register and summary form
DRC*	❑❍	Pneumonia in register and summary form	❍**	Pneumonia in summary form
Ethiopia		*Only reports on children with pneumonia treated*		*Only reports on children with pneumonia treated*
Ghana	❑❍	Child with cough + noisy breathing, chest indrawing, fast breathing in register and summary form (mostly represented by pictures)	❍**	Pneumonia in summary form
Haiti*	❑❍	Cases of ARI in register and Cases of ARI referred in summary form	❑❍	Pneumonia in register; ARI in summary form
India*	❑❍	Register: "Chest indrawing + fast breathing & danger sign" or "fast breathing" in register. Pneumonia in summary form.	❍**	Pneumonia in summary form
Kenya*	❍**	"Cough & fast breathing" in summary form	❍**	Pneumonia in summary form
Liberia*	❑❍	"Fast breathing/pneumonia" in register and pneumonia in summary form	❑❍	Pneumonia in register and summary form
Madagascar	❑❍	Pneumonia in register and summary form	❍**	Pneumonia in summary form
Malawi	❑❍	"fast breathing" in register and summary form	❍**	ARI in summary form
Mali*	❑❍	Pneumonia in register and Pneumonia (rapid breathing) in summary form	❍**	"Cough<15 days, acute lower respiratory infection; pneumonia, bronchopneumonia" in summary form
Mozambique	❑❍	Pneumonia in register and summary form	❑❍	Pneumonia in register and summary form
Namibia			❍**	Pneumonia in summary form
Nepal	❑❍	ARI in register and summary form	❑❍	ARI in register; pneumonia in summary form
Nigeria*	❑❍	"fast breathing" in register and suspected pneumonia in summary form	❍**	Pneumonia in summary form
Pakistan	❑❍	"Cough and respiratory problems"in register and pneumonia in summary form	❍**	Pneumonia in summary form
Rwanda*	❑	Pneumonia in register. Note: summary form reports pneumonia treated only.	❑❍	Pneumonia in register and summary form
Senegal	❑❍	ARI in register and summary form	❍**	Pneumonia in summary form
Tanzania			❍**	Pneumonia (non-severe) in summary form
Uganda	❑❍	Fast breathing in register, fast breathing/pneumonia in summary	❍**	Pneumonia in summary form
Zambia*	❑❍	"ARI (Pneumonia)" or "cough/difficult breathing with fast breathing in last 2 weeks" in community registers. ARI in community summary form	❍**	Pneumonia in summary form
Zimbabwe*			❍**	ARI: Moderate (pneumonia) in summary form

* Indicates has sick child register

** Blank diagnosis line in register

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary Form

Despite the variation in case definitions, we aggregated the different definitions of suspected childhood pneumonia across countries to examine recording and reporting at the facility and community levels. Table 3 presents the results for pneumonia classification at both community and facility levels. All countries, with the exception of Ethiopia, report on pneumonia diagnosis in summary forms at the facility level. However, in 16 of the 24 countries, it is included in the facility summary form only and not in the registers, meaning that

pneumonia diagnoses are likely summarized from blank "signs and symptoms" or "diagnosis" lines in the register (illustrated in Figure 4). The reliance on these blank fields for summarizing cases may affect the quality of data aggregation from the registers. Nineteen of the 24 countries report on pneumonia classification at the community level and 18 of these countries (excluding Rwanda) include pneumonia classification in their summary forms. This may be a reflection of the scope of services provided by community health workers. For example, CHWs in Burma and Namibia are not authorized to treat suspected pneumonia cases and therefore would not report on pneumonia diagnosis or treatment at the community level.

Table 4 shows classification of severe pneumonia at the facility level, where it *is most commonly diagnosed*. Severe pneumonia is reported by nine of the 24 countries at the facility level and largely in the summary forms. Bangladesh is the only country that reports severe pneumonia at the community level.

Figure 4. Outpatient register with blank diagnosis columns

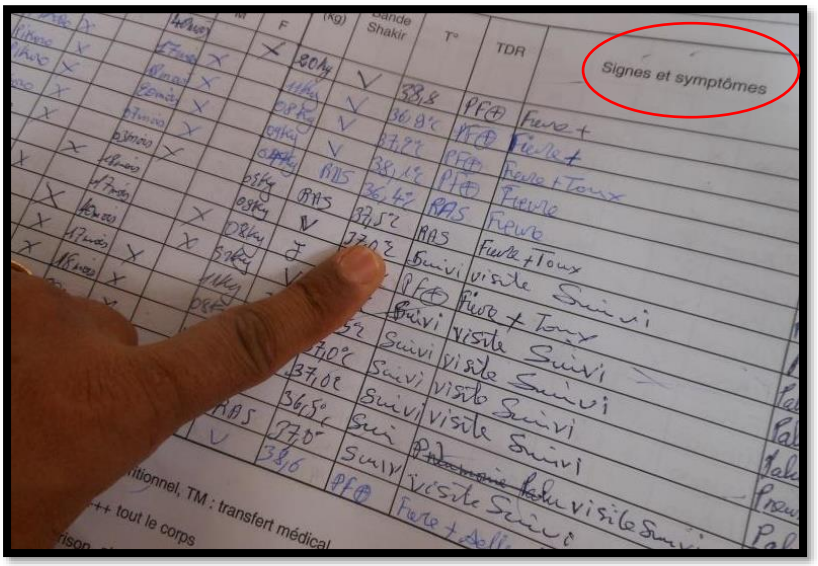


Table 4. Severe pneumonia classification

	Severe Pneumonia
Country	**Facility**
Afghanistan	
Bangladesh*	❍**
Burma	❍**
DRC*	❍**
Ethiopia	
Ghana	
Haiti*	
India*	
Kenya*	❍**
Liberia*	
Madagascar	
Malawi	
Mali*	
Mozambique	
Namibia	
Nepal	❍**
Nigeria*	
Pakistan	
Rwanda*	❑❍
Senegal	
Tanzania	❍**
Uganda	❍**
Zambia*	
Zimbabwe*	❍**

* Indicates has sick child register

** Blank diagnosis line in register

❑ Register Only

❍ Summary Form Only

❑❍ Register and Summary Form

Table 5. Pneumonia treatment

	Child with pneumonia prescribed antibiotic***	
Country	Community	Facility
Afghanistan	❑❍	
Bangladesh*		
Burma		❍**
DRC*	❍**^	❍**^
Ethiopia	❍**	❍**
Ghana	❑❍	
Haiti*		
India*	❑	
Kenya*	❑❍	
Liberia*	❑	❑❍
Madagascar	❑❍	
Malawi	❑	
Mali*	❑	
Mozambique	❑❍	❑❍
Namibia		
Nepal	❑❍	❍**
Nigeria*	❑❍^	❍**
Pakistan		
Rwanda*	❑❍	
Senegal	❍**^	❍**
Tanzania		
Uganda	❑	
Zambia*	❑❍	
Zimbabwe*		

* Indicates has sick child register

** Blank treatment line in register

*** Any antibiotic, Amoxicillin or Amoxicillin DT

^Specifies Amoxicillin DT.

❑ Register Only

❍ Summary Form Only

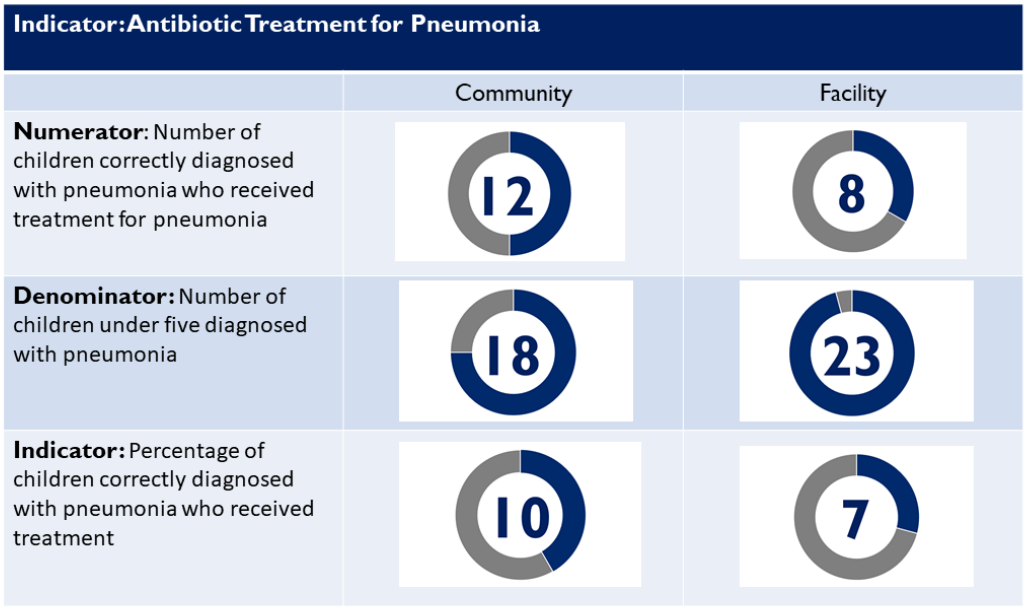
❑❍ Register and Summary Form

Pneumonia treatment

Global guidelines for suspected pneumonia management issued in 2014 recommend treatment with an antibiotic, specifically Amoxicillin Dispersible Tablets (DT), for children ages 2-59 months. However, some countries are still using other antibiotics, including cotrimoxazole, for management of pneumonia. For this reason, we considered any treatment of suspected pneumonia with an antibiotic during the extraction. Table 5 displays countries reporting on pneumonia treatment with antibiotics at the community and facility level. Twelve of the 24 countries report pneumonia treatment in summary forms at the community level. Five countries record pneumonia treatment only in registers at the community level and seven countries do not report on pneumonia treatment at the community level. Comparatively, only eight of 24 countries report on pneumonia treatment with an antibiotic in the summary form at the facility level, which is notable considering pneumonia treatment is a core facility indicator identified by WHO and UNICEF and recommended for collection, aggregation, and reporting for routine health information systems (UNICEF and WHO 2019). Additionally, six of the eight countries that report information on pneumonia treatment only collect this specific information in their summary forms, again, indicating a reliance on non-specific columns in registers.

Figure 5 displays the indicator UNICEF and WHO propose for antibiotic treatment: *percentage of children correctly diagnosed with pneumonia who received treatment*. Nearly all countries report on pneumonia classification in their summary forms (18/24 at the community level and 23/24 at the facility level), but many fewer report on pneumonia treatment, resulting in a small subset of countries that can calculate this indicator easily above the facility level. Ten countries report on both pneumonia classification and treatment at the community level and can calculate this indicator at the community level, including Afghanistan, DRC, Ghana, Kenya, Madagascar, Mozambique, Nepal, Nigeria, Senegal and Zambia. At the facility level, seven countries can calculate the pneumonia treatment indicator using information reported in summary forms, including Burma, DRC, Liberia, Mozambique, Nepal, Nigeria, and Senegal.

Figure 5. Data elements to calculate the pneumonia treatment indicator in 24 countries' HMIS summary forms



Fever/malaria

Rationale for recording and reporting

Across the globe, childhood malaria is responsible for over 300,000 deaths annually, and is among the leading causes of death in countries with high under-five mortality in Africa (Liu et al. 2016). Recording and reporting on childhood malaria morbidity—such as the percent of positive malaria tests and overall number of malaria cases—through the national HMIS at the facility and community levels allows for passive malaria surveillance. Program managers and health workers can identify locations and population groups with high incidence of malaria and track changes in incidence over time, as well as assessing the effectiveness of interventions. Recording and reporting on data related to the testing of febrile children for malaria and treatment of malaria allows for monitoring and improving the quality of services. For malaria surveillance, monitoring and evaluation in high, medium and low burden countries, WHO recommends recording the presence of malaria symptoms (e.g. fever); type of diagnostic (Rapid Diagnostic Test [RDT] or microscopy); malaria test result by parasite species; and treatment given at the community and health center level. These recommendations include weekly or monthly reporting at the district level on number of suspected malaria cases, malaria tests performed and confirmed cases, by species (WHO 2018c). In 2018, the WHO also released "Analysis and Use of Health Facility Data: Guidance for malaria programme managers"(WHO 2018a) to guide countries on the collection and use of data related to use of routine HMIS data for malaria surveillance and monitoring malaria program interventions. This working document recommends tracking of the malaria indicators shown in Box 4 at the outpatient level, disaggregated by age (including under-fives), facility vs. community and geographic area (WHO 2018a).

Box 4: WHO recommendations for malaria indicators in HMIS

- Number of patients tested for malaria
- Malaria diagnostic testing ratio *(Number of malaria tests performed) x 100 / (Number of suspected malaria cases)*
- Number of confirmed outpatient diagnoses of malaria
- Presumed outpatient malaria diagnoses
- Incidence of outpatient malaria *(Annual number of patients with malaria)*10,000 / (Estimated total population of areas at risk of malaria)*
- Malaria test positivity rate
- Malaria cases given ACT *(Number of malaria cases treated with ACT) x 100 / (Number of malaria cases diagnosed)*

Data elements available across countries

In this section, we examine findings related to fever screening, malaria classification and treatment, as well as measles and assess how many countries are able to report on the WHO-recommended indicators. Some countries may have separate malaria program surveillance and monitoring systems that are outside of the national HMIS and not included in this review; therefore, our findings may not be reflective of all the malaria data available in a given country.

Fever screening

Presence of malaria symptoms

Ten countries report on cases of febrile children at the community level in the summary forms and in seven countries, febrile cases are recorded in the registers only at the community level (Table 6). Seven countries do not report on fever cases at the community level. At the facility level, 11 countries record febrile cases of children in registers. Four countries record febrile cases in the registers only and do not report in summary forms. Nine countries report fever cases in summary forms. Most (seven of nine) countries that report febrile cases in children in summary forms at the facility level aggregate the data recorded in registers. However, two countries, Kenya and Nigeria, do not record these cases in their facility registers, which indicates that they rely on "signs and symptoms" blanks in registers for this information. Eleven countries do not record or report information about febrile children at the facility level. This data element is important as a denominator to calculate the *malaria diagnostic testing ratio (% of febrile children under-five tested for malaria),* which can be used to monitor the quality of services, shown below in Figure 6.

Table 6. Fever screening

	Febrile cases of children		RDT/Microscopy performed***	
Country	**Community**	**Facility**	**Community**	**Facility**
Afghanistan				
Bangladesh*	❑❍	❑❍		❑❍
Burma				
DRC*	❑❍	❑❍	❑❍	❍**
Ethiopia	❑			
Ghana	❑❍		❑	❍**
Haiti*	❑	❑❍		❑
India*	❑❍			
Kenya*	❑❍	❍**	❑❍	
Liberia*		❑	❑	❍**
Madagascar	❑❍	❑❍	❑❍	❑❍
Malawi	❑❍		❑❍	
Mali*	❑❍	❑❍	❑❍	❍**
Mozambique			❑❍	❑
Namibia	❑❍			
Nepal				❍**
Nigeria*	❑❍	❍**	❑❍	❑❍
Pakistan	❑			
Rwanda*	❑	❑❍	❑	❑
Senegal		❑❍	❍**	❑❍
Tanzania		❑		❍**
Uganda	❑	❑	❑	❑❍
Zambia*	❑		❑	❍**
Zimbabwe*	❑	❑	❑❍	❑❍

* Indicates has sick child register

** Blank symptom/diagnostic line in register

***Includes (RDT+ and RDT-) or RDT/microscopy performed

❑ Register Only

❍ Summary Form Only

❑❍ Register and Summary Form

Indicator: Number of patients tested for malaria

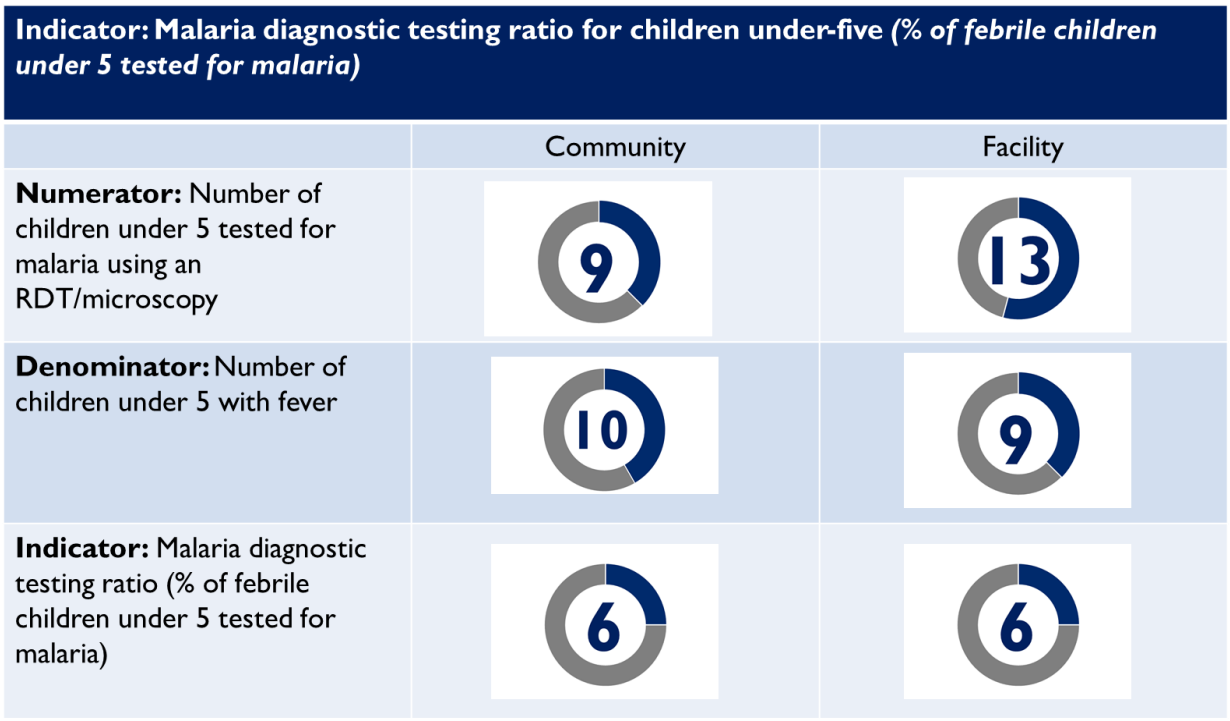
As noted above, WHO recommends that countries collect the number of outpatient malaria tests performed, disaggregated by age, geography, and service site (WHO 2018a, 2018c) Thirteen of the 24 countries record RDT or microscopy testing among children under-five in registers at the community level. In five of these countries, this testing information is only included in the register and not reported in summary forms. Nine of the 24 countries report malaria testing in children under-five at the community level in summary forms. At the facility level, nine countries record malaria testing among children under-five in the registers, although in Haiti, Mozambique, and Rwanda this information is not reported in summary forms. Thirteen countries report malaria testing in children under-five in summary forms, but in seven of these 13 countries, malaria testing appears only in the summary form. Eight countries do not record or report malaria testing in children

under-five in registers or summary forms at the facility level. In summary, nine of the 24 countries included in the review would be able to calculate this indicator based on information in summary forms at the community level and 13 countries would be able to calculate it using summary forms at the facility level.

Indicator: Malaria diagnostic testing ratio

This WHO-recommended indicator, defined as the number of malaria tests performed) x 100/number of suspected malaria cases (Figure 6), can also be calculated for children in malaria endemic areas using the number of children tested and a denominator of febrile children with fever. It can be useful to assess the quality of adherence to protocols to test all febrile children for malaria in malaria endemic areas. Only six countries report cases of febrile children and testing for malaria in summary forms at the community level and can report on this indicator. These countries include the DRC, Kenya, Madagascar, Malawi, Mali, and Nigeria. Similarly, at the facility level, six countries report on these data elements in their summary forms and can report on this indicator, including Bangladesh, DRC, Madagascar, Mali, Nigeria, and Senegal.

Figure 6. Data elements to calculate the malaria diagnostic testing ratio indicator in 24 countries' HMIS summary forms



Malaria classification

Indicator: Number of confirmed outpatient diagnoses of malaria

WHO recommends tracking confirmed outpatient diagnoses of malaria, disaggregated for children under-five, for malaria surveillance (WHO 2018a, 2018c). Defining "confirmed diagnosis" as a positive RDT or microscopy, we estimate that 17 of the 24 countries in the review report on this indicator based on data collected through the HMIS at the facility level in the summary forms and 10 of 24 countries could generate the indicator for the community level. As shown in Table 7, at the facility level, many countries only report confirmed malaria in the summary forms, indicating that the information is likely captured in blank "diagnosis" columns of registers and aggregated into summary forms, similar to pneumonia diagnosis.

Indicator: Presumed outpatient malaria diagnoses

WHO recommends that in addition to tracking "confirmed malaria," countries also report on presumed outpatient malaria, or the number of patients diagnosed with malaria without any laboratory confirmation (WHO 2018a). Countries record and report this as unspecified/unconfirmed malaria, or "presumed" or

"clinical" malaria. This categorization may be useful in settings where rapid malaria diagnostics and microscopy are not widely available or RDTs are stocked out and health providers must rely on signs and symptoms to make a diagnosis. Seven countries report on "clinical," presumed or unspecified malaria at the community level in summary forms and two countries (India and Zambia) record clinical malaria classifications in their registers only (Table 7). Comparatively, 16 of 24 countries report presumed malaria classification at the facility level in summary forms. Thirteen of these countries only report presumed malaria in children under-five in summary forms, again, indicating widespread use of blank "classification" or "diagnosis" columns in registers. Haiti is the only country in the review that records clinical malaria in children under-five in the register only at the facility level.

Table 7. Malaria classification and treatment

	Confirmed Malaria***		Clinical Malaria		Confirmed Malaria treated with an ACT^	
Country	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**
Afghanistan			❑❍	❑❍		
Bangladesh*		❑❍	❑❍	❍**		❍**
Burma		❑		❑❍		
DRC*	❑❍	❑❍	❑❍	❍**	❍**	❍**
Ethiopia	❍**	❍**				
Ghana	❑	❍**		❍**	❑❍	
Haiti*		❑		❑		❍**
India*			❑	❍**	❑	
Kenya*	❑❍	❍**		❍**	❑❍	
Liberia*	❑	❍**		❑❍	❑❍	❑❍
Madagascar	❑❍	❑❍			❑❍	❍**
Malawi	❑❍			❍**	❑	
Mali*	❑❍	❍**	❍**	❍**	❑❍	❍**
Mozambique	❑❍	❑❍	❑❍		❑❍	❑❍
Namibia				❍**		
Nepal		❍**		❍**		❍**
Nigeria*	❑❍	❑❍	❍**		❑❍	❑❍
Pakistan						
Rwanda*	❑	❑❍			❑❍	
Senegal	❑❍	❑❍				❍**
Tanzania		❍**		❍**		
Uganda	❑	❑❍	❍**	❍**	❑	
Zambia*	❑❍	❍**	❑	❍**	❑❍	❍**
Zimbabwe*	❑	❑❍		❍**	❑❍	

* Indicates has sick child register

** Blank diagnosis line in register

*** Child/cases with confirmed malaria/positive RDT/microscopy result

^ Treatment for confirmed malaria/RDT+ (ACT, 1st line antimalarial or "treated")

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary Form

Indicator: Incidence of outpatient malaria

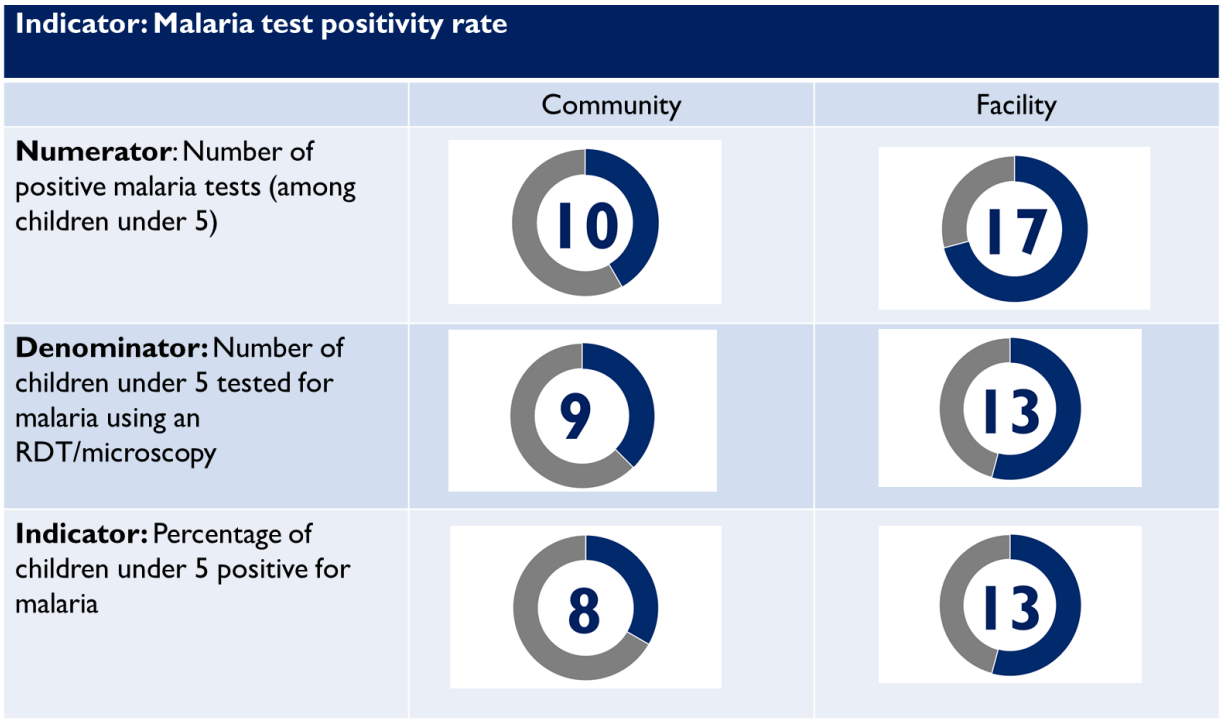
WHO recommends using the HMIS for passive surveillance of the incidence of outpatient malaria (WHO 2018a). The number of cases of confirmed malaria seen in facilities and communities on an annual basis can be combined with the estimated population in the geographical area to calculate the annual incidence of outpatient malaria.

Indicator: Malaria test positivity rate

WHO recommends calculation of the malaria test positivity rate based on the number of positive malaria tests (through RDT or microscopy) among cases tested, disaggregated by age (WHO 2018a). The malaria positivity rate is a useful indicator for surveillance and comparisons over time, population groups, geographic area, or service delivery site. PMI also recommends this indicator to track progress toward elimination (PMI nd; USAID, PMI, and CDC 2019). Figure 7 shows that 10 countries report on the number of positive malaria cases among children under five years of age at the community level in summary forms and 17 countries report this information in summary forms at the facility level. The denominator is the number of children

under-five tested with an RDT or microscopy, which is reported by nine countries at the community level and 13 countries at the facility level. In total, eight countries report on both of these data elements in their summary forms at the community level and can calculate this indicator at levels above the community level. These countries include the DRC, Kenya, Madagascar, Malawi, Mali, Mozambique, Nigeria, and Senegal. At the facility level, 13 countries report both of the necessary data elements to calculate this indicator from their summary forms. These countries include Bangladesh, DRC, Ghana, Liberia, Madagascar, Mali, Nepal, Nigeria, Senegal, Tanzania, Uganda, Zambia, and Zimbabwe.

Figure 7. Data elements to calculate the malaria test positivity testing ratio indicator in 24 countries' HMIS summary forms



Malaria treatment

We considered malaria treatment as confirmed malaria treated with either an Artemisinin-based Combination Therapy (ACT), a "first line antimalarial" or designated as "treated" in the registers or summary forms (Table 8). This outcome data is important because it can be used for program management and checking adherence to clinical guidelines. In malaria-endemic countries, all RDT+ or microscopy-confirmed cases should be treated with the first line antimalarial, translating into a target of 100%. Thirteen countries record malaria treatment at the community level in registers and 11 of the 24 countries report malaria treatment in summary forms. Ten countries do not report on malaria treatment at the community level. At the facility level, only three countries record malaria treatment specifically in registers, but 11 of the 24 countries report malaria treatment in summary forms. Therefore, in most cases at the facility level, malaria treatment is reported in summary forms only, indicating a reliance on blank "treatment" fields in the registers.

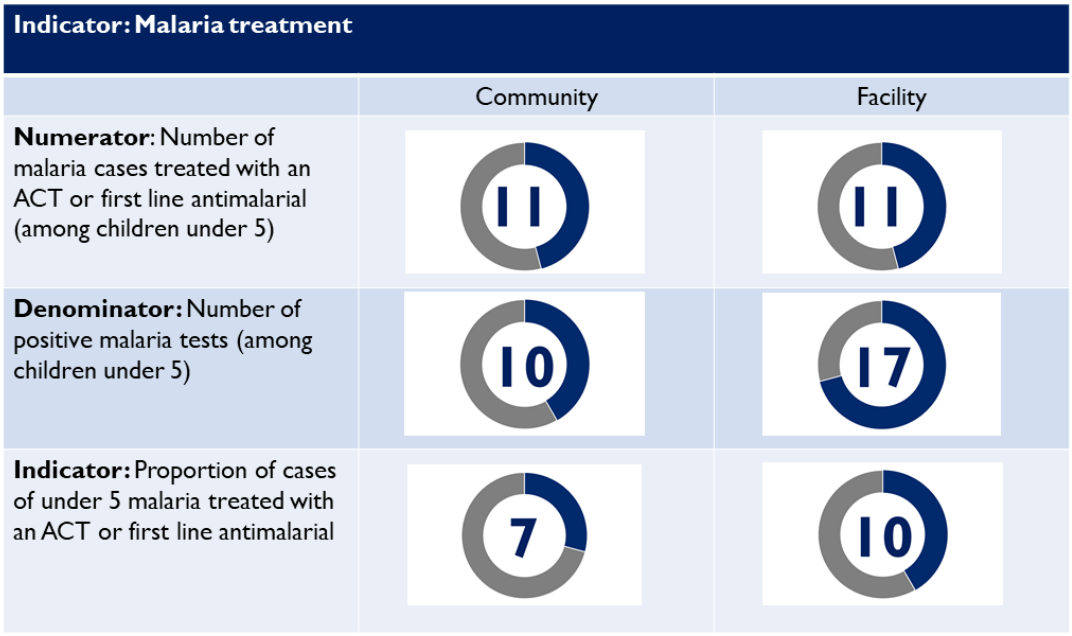
Indicator: Malaria cases given ACT

The WHO recommends reporting on proportion of cases of malaria treated with an ACT, disaggregated by age (WHO, 2018b),[3] and relatedly, UNICEF and WHO recommend reporting on this indicator among children under five years of age (UNICEF and WHO 2019). As shown in Figure 8, the numerator for this indicator is the number of malaria cases treated with an ACT or first line antimalarial among children under five years of age. This information is reported in the summary forms by 11 countries at both the community

[3] We have modified the indicator to capture cases of malaria treated with an ACT or other first line antimalarial as ACT is not necessarily the first line antimalarial in all countries included in the review.

and facility levels. Data to construct the denominator, number of positive malaria tests among children under-five is reported in the summary forms of 10 countries at the community level and 17 countries at the facility level. To report on the overall indicator, proportion of cases of malaria treated with an ACT or other first line antimalarial among children under-five, countries must report on both the numerator and denominator in their summary forms. Seven countries can calculate the indicator based on information included in the summary forms at the community level, including DRC, Kenya, Madagascar, Mali, Mozambique, Nigeria, and Zambia. Ten countries can calculate the indicator based on information included in the summary forms at the facility level. These countries include Bangladesh, DRC, Liberia, Madagascar, Mali, Mozambique, Nepal, Nigeria, Senegal, and Zambia.

Figure 8. Data elements to calculate the malaria cases given ACT/1st line treatment indicator in 24 countries' HMIS summary forms



Measles

Measles remains an important cause of childhood morbidity in many of the countries included in the review including Madagascar, DRC, Ethiopia, and Burma, which have experienced outbreaks in the recent past. The national HMIS can play an important role in the passive surveillance of measles and in recording and reporting of measles cases in countries at all phases of measles case reduction.

The review extracted signs and symptoms of measles, which can include a rash, red eyes, mouth ulcers, eye pus and cornea clouding (Table 8). Seven of the 24 countries included in the review capture information about measles signs and symptoms at the community level, but it should be noted that none of the countries capture the information in both registers and summary forms. Seven of the 24 countries capture information about measles signs and symptoms in registers at the facility level, and two (Kenya and Zimbabwe) report information in summary forms. None of the countries captures this information in both registers and summary forms (Table 8).

Countries may capture the signs and symptoms of measles in the registers at the facility level and the identification of these symptoms may trigger a response in parallel infectious disease surveillance system, which may not have been captured in the review. Measles classification is more commonly collected at the facility level in most countries. Sixteen of the 24 countries report information about measles classification in facility level summary forms (DRC collects in registers only), compared with five countries that capture the same information in community level summary forms. Notably, Nepal is the only country out of the 24 in the review that captures treatment of measles with vitamin A in any of the registers or summary forms.

Table 8. Measles signs and classification

	Signs of measles (Rash, red eyes, mouth ulcers, eye pus, cornea clouding)		Child Classified with Measles	
Country	**Community**	**Facility**	**Community**	**Facility**
Afghanistan				❑❍
Bangladesh		❑	❑❍	❑❍
Burma				❑❍
DRC	❑	❑	❑	❑
Ethiopia	❑		❑	
Ghana				
Haiti		❑		❑❍
India				❍
Kenya		❍		❍
Liberia		❑		❍
Madagascar	❍		❍	❍
Malawi				
Mali	❑		❍	❍
Mozambique				
Namibia				❍
Nepal		❑		
Nigeria	❍	❑	❍	❑❍
Pakistan				
Rwanda	❑	❑		❑❍
Senegal	❍		❍	❍
Tanzania				❍
Uganda				❍
Zambia				❍
Zimbabwe		❍		

❑ Register Only
❍ Summary Form Only
❑❍ Register and Summary Form

Diarrhea

Rationale for recording and reporting

Diarrhea kills over half a million children under five years of age annually (Liu et al. 2016). Recording and reporting cases of childhood diarrhea and the treatments received at the facility and community level allows program managers and health workers to track illness trends, identify issues to take action, and monitor quality of services. Reporting on different diarrheal illnesses, such as dysentery and cholera, can also feed into surveillance systems. UNICEF and WHO recommend monitoring the *percentage of children with diarrhea treated* at the facility level (UNICEF and WHO 2019). Additionally, the US Department of State and USAID, require reporting on the *number of cases of child diarrhea treated in United States Government (USG)-assisted programs* (US Department of State, 2018).

Data elements available across countries

Diarrhea, dysentery and cholera classification

In this section, we examine findings related to diarrhea classification, dysentery and cholera classification and treatment. Diarrhea classification, much like fever, is largely based on the caregiver's report of the signs of illness. In the case of diarrhea, it is generally defined as three or more loose or watery stools in a 24-hour period. Diarrhea classification is one of the most commonly collected data elements included in the review (Table 9). At the community level, 21 of the 24 countries record diarrhea classification at the community level in registers, and 17 countries report on diarrhea classification in their summary forms. Comparatively, 12 of the 24 countries record diarrhea classification information in registers at the facility level and 22 of the 24 countries report diarrhea classification in their summary forms. Afghanistan and Ethiopia are the two countries that do not report diarrhea classification in their facility summary forms. As with other illnesses, like pneumonia, cases of diarrhea are commonly captured in the summary forms only at the facility level, suggesting a reliance on blank "diagnosis" or "classification" lines in the registers.

Dysentery, defined as diarrhea with blood, is recorded in registers at the community level in 13 of the 24 countries, but is only reported in three countries' summary forms at the community level (Table 9). Dysentery is more commonly captured at the facility level. Twelve countries record dysentery in their registers at the facility level and 16 countries report on dysentery classification in their summary forms. Cholera is also captured more commonly at the facility level in the countries included in the review. Haiti and Mali record cholera classification in their community registers and Senegal is the only country that reports cholera in its community summary forms. Comparatively, two countries (Afghanistan and Burma) only record cholera classification in their facility registers, but eight countries report cholera classification in facility summary forms.

Categorization of diarrhea based on severity is often the first step taken by health providers, which involves asking about duration of symptoms and checking for dehydration. Most of the screening for severity occurs at the facility level (Table 9). Diarrhea with dehydration is recorded in four countries in the community registers and reported in the community summary form in one country (Namibia). Comparatively, at the facility level, five countries record diarrhea with dehydration in their registers and nine countries report on diarrhea with dehydration in their facility summary forms. Diarrhea with severe dehydration is reported in community summary forms in two countries (Haiti and Zambia), is recorded in five countries' facility reporting forms, and reported in seven countries' facility summary forms. Table 9 shows that persistent diarrhea, defined as diarrhea without dehydration lasting more than 14 days, is only recorded in registers at the community level in three countries (Kenya, Malawi and Nigeria). At the facility level, two countries record persistent diarrhea in registers and four countries report this information in their summary forms. Severe persistent diarrhea, defined as diarrhea with dehydration lasting more than 14 days, is recorded in the facility register in Rwanda only and reported in the facility summary forms in four countries (Bangladesh, Kenya, Rwanda, and Zambia). Severe persistent diarrhea classification is not recorded or reported at the community level in any of the 24 countries included in the review.

Table 9. Diarrhea, dysentery and cholera classifications

	Child Classified with Diarrhea		Child Classified with Dysentery		Child Classified with Cholera/Acute Watery Diarrhea		Diarrhea with dehydration		Diarrhea with severe dehydration		Persistent diarrhea (diarrhea>14 days, no dehydration)		Severe persistent diarrhea (diarrhea w/dehydration >14 days)
Country	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**	**Facility**
Afghanistan	❑❍			❑❍		❑❍		❑❍					
Bangladesh*	❑❍	❑❍	❑❍	❑❍						❍**			❍**
Burma		❑❍		❑❍		❑				❍**			
DRC*	❑❍	❑❍	❑	❑❍			❑	❑❍		❑❍		❑	
Ethiopia	❑		❑										
Ghana	❑❍	❍**	❑			❍**							
Haiti*	❑❍	❑❍		❑❍	❑			❑	❑❍	❑			
India*	❑❍	❍**	❑					❍**					
Kenya*	❑❍	❍**	❑❍	❍**		❍**		❍**		❍**	❑	❍**	❍**
Liberia*	❑	❑❍	❑	❑❍		❍**							
Madagascar	❑❍	❍**											
Malawi	❑❍	❍**	❑								❑		
Mali*	❑❍	❑❍	❑		❑		❑						
Mozambique	❑❍	❑❍		❑❍									
Namibia		❍**		❍**			❑❍						
Nepal	❑❍	❑❍		❑				❍**		❍**			
Nigeria*	❑❍	❍**	❑	❑							❑		
Pakistan	❑❍	❍**		❍**									
Rwanda*	❑	❑❍	❑	❑❍			❑	❑❍		❑❍		❑❍	❑❍
Senegal	❑❍	❑❍	❍**	❍**	❍**	❍**		❍**					
Tanzania		❑❍		❑❍		❍**		❑❍		❑❍		❍**	
Uganda	❑❍	❍**		❍**		❍**						❍**	
Zambia*	❑❍	❍**	❑	❍**		❍**			❍**				❍**
Zimbabwe*	❑	❑❍	❑	❑❍				❍**		❑			

* Indicates has sick child register

** Blank classification line in register

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary Form

Diarrhea treatment

The review also examined treatment of diarrhea (Table 10). Treatment for diarrhea, which included treatment with "Oral Rehydration Solution (ORS)/Zinc", "ORS & Zinc", ORS only, Zinc only or "diarrhea treated", is recorded in the community registers in 16 of the 24 countries and reported in community summary forms in 15 of the 24 countries. Diarrhea treatment, as defined above, is only recorded in the facility registers in five of the 24 countries, but is reported in the facility summary forms in 13 of the 24 countries, suggesting a reliance on blank "treatment" lines in the registers at the facility level.

While classification of diarrhea does not have the same definitional issues as pneumonia, treatment of diarrhea varies widely across countries. Table 11 presents the various ways that diarrhea treatment is collected in summary forms. Nearly half of countries at the facility and community level do not report on diarrhea treatment at all. Among those that report diarrhea treatment, few disaggregate zinc treatment, even though treatment of diarrhea with zinc is national policy in all of the included countries. Some countries, such as Kenya and Uganda, use co-packaged ORS and zinc (Schroder et al. 2019); however, not all countries that report ORS/Zinc or ORS & Zinc do so.

Indicator: Number of cases of child diarrhea treated in USG-assisted programs
This indicator, recommended by the USG (US Department of State, 2018) is only reported through the national HMIS in 15 out of 24 countries at the community level and only 13 out of 24 countries at the facility level.

Indicator: Diarrhea treatment (% of diarrhea treated)
WHO's "Analysis and Use of Health Facility Data: Guidance for RMNCAH Programmed Managers" working document, recommends this indicator related to diarrhea treatment (UNICEF and WHO 2019), with guidance for disaggregation by "treatment type (ORS; Zinc)." As shown in Figure 9, the numerator for this indicator is

Table 10. Diarrhea treatment

	Child treated for Diarrhea***	
Country	**Community**	**Facility**
Afghanistan	❑❍	
Bangladesh*		❍**
Burma		❍**
DRC*	❍**	❍**
Ethiopia	❍**	❍**
Ghana	❑❍	
Haiti*	❑❍	❑❍
India*	❑	
Kenya*	❑❍	❑
Liberia*	❑❍	❑❍
Madagascar	❑❍	❍**
Malawi	❑	
Mali*	❑	
Mozambique	❑❍	❑❍
Namibia		❍**
Nepal	❑❍	❍**
Nigeria*	❑❍	❍**
Pakistan		
Rwanda*	❑❍	
Senegal	❍**	❍**
Tanzania		❑❍
Uganda	❑	
Zambia*	❑❍	
Zimbabwe*	❑❍	

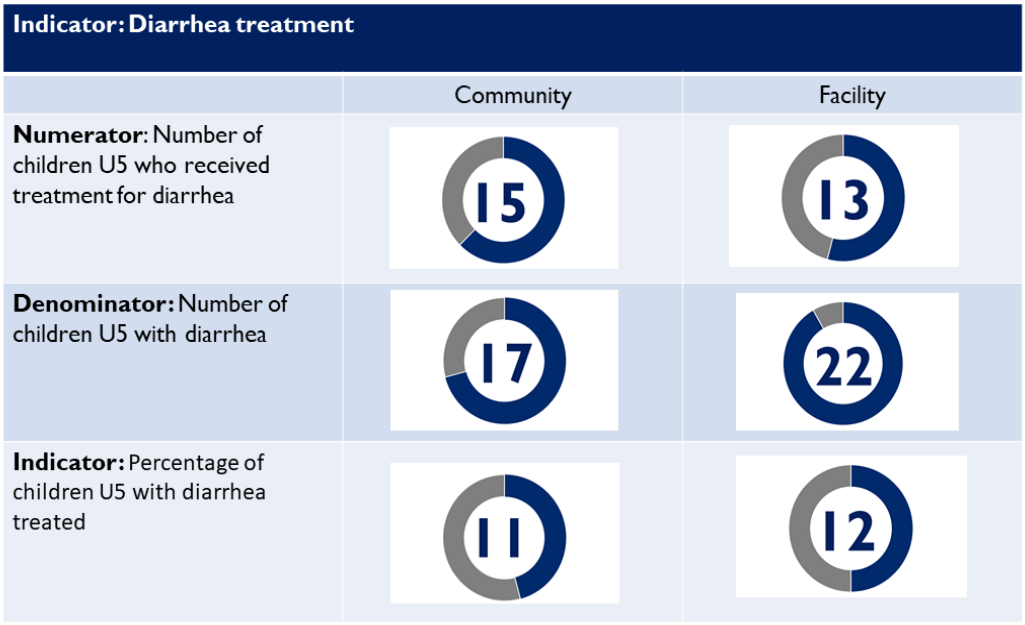
* Indicates has sick child register
** Blank treatment line in register
***Treatment includes treated with ORS/Zinc, ORS & Zinc, Zinc only, ORS only, or diarrhea "treated" (unspecified).
❑ Register Only
❍ Summary Form Only
❑❍ Register and Summary Form

Table 11. Data elements capturing diarrhea treatment among children under-five

Diarrhea Treatment Data Element	Community	Facility
No aggregate reporting on diarrhea treatment	9	11
Diarrhea "treatment" categories		
ORS disaggregated	7	5
Zinc disaggregated	5	3
ORS/Zinc	1	1
ORS & Zinc	8	6
Diarrhea "treated"	6	4
To be included in the table, a country had the data element in both the register and summary form or the summary form only. Countries with the data element in the register only were excluded.		

the number of diarrhea cases treated[4] among children under five years of age. This information is reported in the summary forms by 15 countries at the community level and 13 at the facility level. Data to construct the denominator, number of cases of diarrhea among children under-five, is reported in the summary forms of 17 countries at the community level and 22 countries at the facility level. Only 11 countries are able to construct the indicator from the community level, including Afghanistan, DRC, Ghana, Haiti, Kenya, Madagascar, Mozambique, Nepal, Nigeria, Senegal, and Zambia. Twelve countries, some different, can calculate the indicator based on information included in the summary forms at the facility level, including Bangladesh, Burma, DRC, Haiti, Liberia, Madagascar, Mozambique, Namibia, Nepal, Nigeria, Senegal and Tanzania.

Figure 9. Data elements to calculate the diarrhea treatment *(% of diarrhea cases treated)* indicator in 24 countries' HMIS summary forms



Other common illnesses

In this section, we examine findings related to the recording and reporting of "other" illnesses that make up a significant proportion of the disease burden among children under-five, including eye infections, ear infections and mastoiditis.

Rationale for recording and reporting

Eye infections, also known as conjunctivitis, are common in young children and are characterized by red eyes, occasionally accompanied by a discharge that requires antibiotics for treatment. Ear problems, including ear infections, are a common cause of illness in children. Ear infections are the leading cause of deafness among children in developing countries (WHO 2013b). Additionally, mastoiditis occurs when infection spreads from the ear to the mastoid (the bone behind the ear), which, if left untreated, can cause disability and death (WHO 2013b).

Data elements available across countries

For the purposes of this review, all three types of eye infections were categorized under a single category. Eye infection classification (shown in Table 12) is more commonly collected at the facility level than the community level. Malawi is the only country included in the review that records information about eye infections in its community registers and one of three countries, along with Bangladesh and Senegal that report eye infections in their community summary forms. At the facility level, five countries record eye

[4] We have included here any of the diarrhea treatment categories presented in Table 12.

infection classification in their registers compared with 10 countries that report eye infections in their facility summary forms. Eight of these 10 countries report eye infection classification in the summary forms only, indicating that classification information is pulled from "diagnosis" or "classification" blanks in the registers.

Ear infection classification is similarly reported at the community level in only three countries. Bangladesh, Ethiopia and Namibia record ear infections or problems in their community registers and both Bangladesh and Namibia report these cases in their community summary forms as well (Table 12). Classification of ear infection or ear problems is more commonly collected at the facility level. Nine countries record this information in their facility registers and 11 countries report this information in their facility summary forms. Eight of the 11 countries reporting on ear infection or problem at the facility level do not record this information in their registers, again indicating a reliance on blank "diagnosis" or "classification" fields in registers.

Table 12. Eye infection, ear infection and mastoiditis

	Eye infection		Ear Infection/Ear Problem		Mastoiditis
Country	**Community**	**Facility**	**Community**	**Facility**	**Facility**
Afghanistan		❑❍			
Bangladesh*	❍**	❑	❑❍	❑❍	❑❍
Burma		❑		❑	
DRC*				❑	
Ethiopia			❑		
Ghana		❍**		❍**	
Haiti*		❑		❑	
India*					
Kenya*		❍**		❍**	❍**
Liberia*		❍**		❑❍	❑
Madagascar		❍**		❍**	
Malawi	❑❍				
Mali*		❍**		❑❍	
Mozambique					
Namibia		❍**	❑❍	❍**	
Nepal				❑	❑
Nigeria*					
Pakistan					
Rwanda*		❑❍		❑❍	❑❍
Senegal	❍**	❍**		❑	
Tanzania				❍**	
Uganda				❍**	
Zambia*		❍**		❍**	
Zimbabwe*				❍**	❑

* Indicates has sick child register

** Blank diagnosis line in register

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary Form

Mastoiditis, considered a severe illness, is collected only at the facility level (Table 12). Five countries, Bangladesh, Liberia, Nepal, Rwanda, and Zimbabwe, record mastoiditis classification in their facility registers. In Bangladesh and Rwanda, this information is reported in summary forms at the facility level as well. In Kenya, mastoiditis classification is only reported in the facility summary form.

Counseling sick children

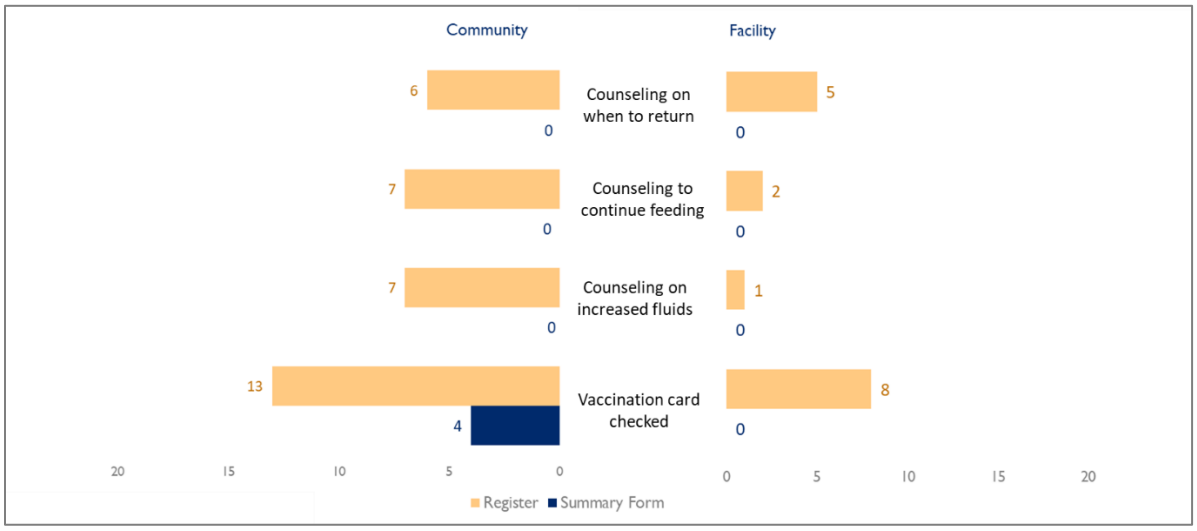
Rationale for recording and reporting

Counseling caretakers of sick children about giving additional fluids and continued feeding, as well as checking for vaccination status are important aspects of IMNCI (UNICEF and WHO. 1999; WHO 2014b) and iCCM. These elements may be included in forms or registers as both a data element and a reminder to health workers to complete these tasks.

Data elements available across countries

Figure 10 shows that more countries record counseling of caretakers of sick children in forms or registers at the community level, with six countries recording if the CHW told the caretaker when to return and seven countries recording counseling to continue feeding and increased fluids. Fewer countries record counseling for sick children at the facility level with only five recording when to return, two on continued feeding and one on counseling for increased fluids. More countries record if the child's immunization card was checked, with 13 countries recording this at the community level and eight at the facility level. No countries include any sick child data elements in their community or facility summary forms. Four countries report on checking the status of the child's vaccination card in the community summary forms. Table A2 in the annex provides more details on counseling for sick children.

Figure 10. Sick child counseling



Very severe disease, referral and death

In the next section, we examine classification of very severe disease, or presence of danger signs, referral of children and death.

Rationale for recording and reporting

Very severe disease in IMNCI is indicated by the presence of one or more danger signs, which include vomiting everything, inability to eat or drink, lethargy, and convulsions. These general danger signs indicate that a child needs urgent medical attention at a health facility or referral to a higher-level health facility for care and treatment (WHO 2014b). The recording and reporting of referral of children is necessary to monitor overall levels of referral from the community to facilities and facilities to higher-level facilities. Drug stock-outs or insufficient health worker confidence can result in high levels of referral, and low levels of referral may indicate health workers' low capacity in identifying danger signs. WHO recommends tracking the

outcome of health facility-based child deaths and case fatality rates (cause-specific where available) (UNICEF and WHO 2019; WHO 2014a) through routine HMIS.

Data elements available across countries

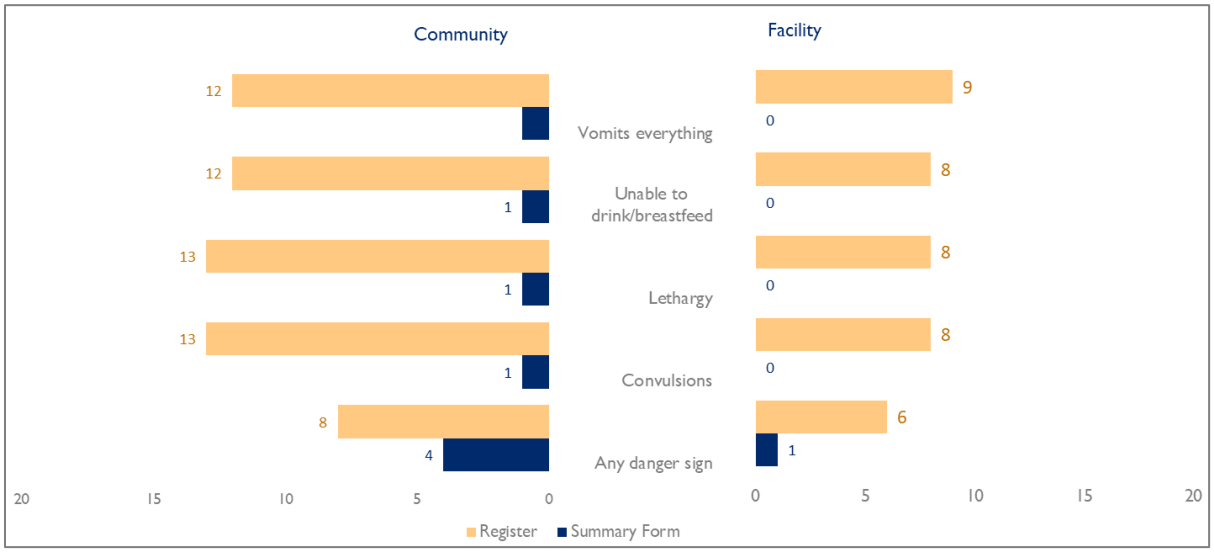
Danger signs

The review abstracted five data elements related to general danger signs, shown in Figure 11. Overall, danger signs are more commonly recorded at the community level and rarely reported in the summary forms at either the community or facility levels.

Referral

The review also examined a number of different data elements related to referral of children (Table 13). The most commonly included data element was a generic "referred" box, tick mark or blank that indicated a child had been referred to a higher-level facility. This referral data element is recorded in registers in nearly all (21) countries at the community level with the exception of Burma, Tanzania, and Malawi, and is reported in the summary forms in 17 of the 24 countries included in the review. At the facility level, 17 countries record referral to a higher-level facility in their registers and 15 countries report this same information in their summary forms. All 24 countries included in the review include this data element somewhere in their forms.

Figure 11. Danger signs



Referral of young infants (children 0-59 days of age) is also captured in registers and summary forms, most commonly at the community level. Eleven countries included in the review record referral of young infants in community registers and 10 countries report this data element in their community summary forms. Comparatively, seven countries record referral of young infants in facility registers and five countries report this information in their facility summary forms.

Another important data element related to referral indicates whether the child referred by the CHW was actually seen at the facility. This data element is not commonly included in forms at the community or facility level, which means that completed referrals cannot be tracked. Only four countries include this data element in their community registers or summary forms and only seven countries include it in their facility registers or summary forms. Counter referral from the facility back to the community is also not collected regularly in community or facility level forms.

Follow up visits by CHWs, usually taking place within three days of the encounter with the CHW, are an important component of iCCM. Capturing this data element in the community forms enables tracking of

these visits, which help ensure that an illness has been successfully treated or if not, is referred to a facility. Thirteen of the 24 countries in the review record information about CHW follow up visits in their community registers and four countries report this information in their community summary forms.

Table 13. Child Referral

	Child referred (any age)		Child referred (0-59 days)		Child referred from CHW seen at facility		Counter-referral from facility		Follow-up visit performed by CHW	Prereferral treatment		Reason for referral (to facility/higher facility)	
Country	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Community**	**Facility**	**Community**	**Facility**
Afghanistan	❑❍	❑❍											
Bangladesh	❑❍	❑❍	❍	❑❍							❑		❑
Burma		❑❍				❑		❑					
DRC	❑❍	❑❍				❑❍	❍	❑❍	❑		❑	❑❍	
Ethiopia	❑	❑	❑	❑					❑				
Ghana	❑❍	❍	❍	❍	❑				❑		❍		
Haiti	❑	❑❍	❍										
India	❑								❑	❑			
Kenya	❑❍	❑❍	❑	❍	❍	❑❍		❑❍	❑❍	❑		❑❍	
Liberia	❑❍		❑❍	❑					❑				
Madagascar	❑❍	❑	❑❍									❑❍	
Malawi	❍		❑						❑	❑			
Mali	❑❍	❑❍	❑❍			❑			❑				
Mozambique	❑❍	❑❍		❑❍								❑❍	❑
Namibia	❑❍		❑						❑❍				
Nepal	❑❍	❑	❑❍	❑		❑			❍				
Nigeria	❑❍	❑❍	❑❍		❑❍				❑❍	❑❍		❍	❑
Pakistan	❑												
Rwanda	❑❍	❑	❍	❑		❍	❑❍		❑				
Senegal	❑	❍	❑❍	❍		❍						❍	❍
Tanzania		❑❍											❑
Uganda	❑❍	❑❍						❑❍					
Zambia	❑❍	❑❍						❑	❑	❑		❑	❑
Zimbabwe	❑❍	❑❍	❑	❑	❑			❍	❑				

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary Form

Death

Table 14 demonstrates where countries record and report child deaths at the community and facility levels. For child deaths, we included registers and forms that specified facility-based death with those that reported on child death generally. Overall, the majority of countries (20) include the number of child deaths in their community summary forms. We found fewer countries (14) included child death in a patient-level form or register at the community level. A similar trend was seen at the facility level, with 16 countries reporting child death in the facility summary form and nine recording child deaths in the facility register or patient form. It is possible that child deaths are tracked in registers or patient forms that were not included in this review. Additionally, while many countries reported death disaggregated by age, such as neonatal, under one and 12-59 months, very few countries reported death disaggregated by cause of death.

Table 14. Death

	Death/died	
Country	**Community**	**Facility**
Afghanistan	❑❍	❑❍
Bangladesh	❍	❍
Burma		❍
DRC	❍	❑❍
Ethiopia	❍	❑❍
Ghana	❑	❍
Haiti	❍	❍
India	❍	❑❍
Kenya	❑❍	❍
Liberia	❑❍	❑❍
Madagascar	❍	
Malawi	❍	
Mali	❑❍	❍
Mozambique	❑❍	❑❍
Namibia	❑❍	
Nepal		
Nigeria	❑❍	❑❍
Pakistan	❍	
Rwanda	❑❍	❑❍
Senegal	❑❍	
Tanzania	❑❍	
Uganda	❑❍	
Zambia	❑	❑❍
Zimbabwe	❑❍	❍

❑ Register Only
❍ Summary Form Only
❑❍ Register and Summary Form

Data elements for child nutrition

This section focuses on child nutrition, with sub-sections devoted to nutrition counseling and IYCF feeding practices; anthropometric measurement for malnutrition screening, classification and referral and treatment; anemia diagnosis; and micronutrient supplementation.

Counseling on IYCF practices and exclusive breastfeeding and complementary feeding practices

Rationale for recording and reporting

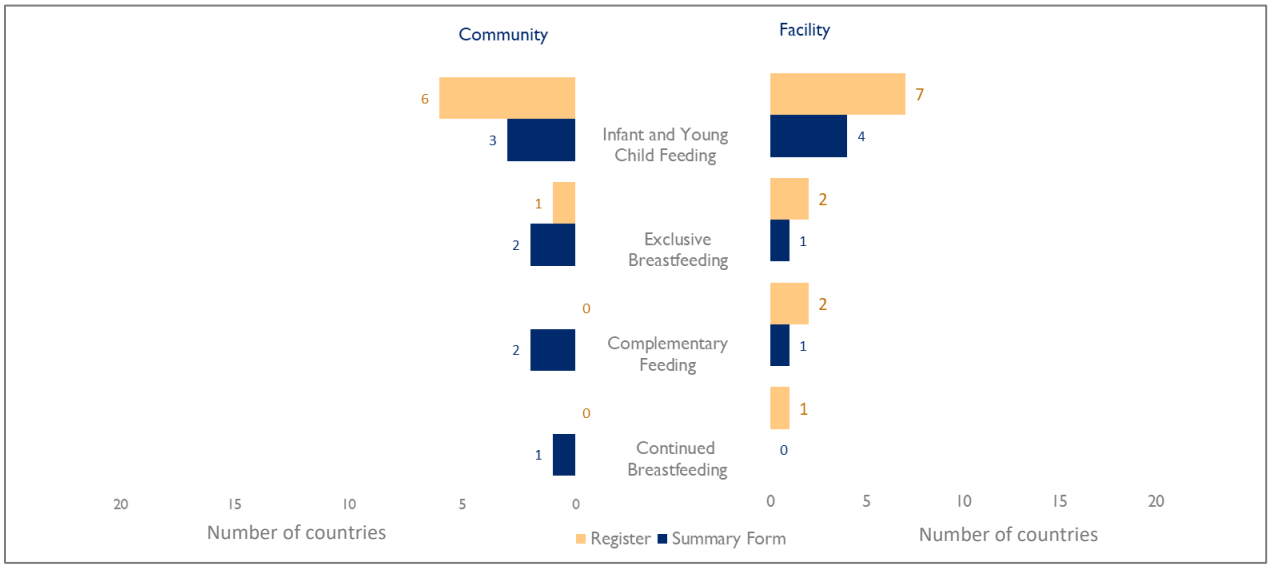
IYCF target children 0 to 23 months of age. The WHO Global Strategy on IYCF recommends exclusive breastfeeding for the first six months[5] and continued breastfeeding for two years or beyond with timely introduction of diverse complementary foods. Health workers providing skilled counselling for IYCF is an essential intervention at the facility and community levels for childhood nutrition (WHO 2004). We do not examine newborns put to the breast in the first hour of life, another important nutrition indicator, as this was included in the MCSP review of maternal and newborn data elements (MCSP 2018).

Data elements available across countries

Counseling on IYCF

Figure 12 shows that specific data elements related to counseling on exclusive breastfeeding, complementary feeding and continued breastfeeding were largely absent from HMIS registers and reporting forms (detailed data shown in Table A3 in the annex). Only DRC recorded data on all three elements in their facility well-child registers and Senegal included the three elements in their community summary forms. Kenya records and reports on exclusive breastfeeding counseling at the community level and Nigeria includes a tick box for counseling on exclusive breastfeeding in their register.

Figure 12. Nutrition counseling data elements in 24 countries HMIS registers and summary forms



A "generic" IYCF counseling (which was defined as "IYCF counseling" or "nutrition counseling"), with no details on content, was noted in registers in six countries at the community level and seven countries at the facility level. Only Bangladesh, DRC and Liberia recorded and reported this information in both register and

[5] Unless advised against for medical reasons

summary forms. Most countries record this data element in the register only, and it is likely included in well-child registers as a prompt for health workers to do the counseling and less so for tracking the quantity or quality of counseling. Thus, countries are limited in their ability to routinely track counseling for specific nutrition practices, like exclusive breastfeeding. The absence of data elements about nutrition counseling may also be related to the fact that routine HMIS data cannot determine the adequacy or quality of nutrition counseling, which are better measured through special studies and other methods.

IYCF practices: exclusive breastfeeding and complementary feeding

Out of 24 countries, 14 recorded exclusive breastfeeding practices in facility registers and nine did in community forms or registers. Eight countries reported this information in facility summary forms and six reported it in community summary forms. Liberia's facility summary form and Nigeria's community summary form reported number of children exclusively breastfed; the review did not identify a register or patient form where this information was recorded. Six countries recorded complementary feeding in their facility registers and three did in community registers. Liberia and Mali include complementary feeding data in the facility summary form and Bangladesh includes it at the community levels summary form. Countries recorded and reported complementary feeding differently. Some countries included a tick box in their register indicating if the infant initiated complementary feeding at six months (DRC, Ghana, and India) or for complementary feeding with no age specified (Senegal). In Liberia, the summary from reports the number of infants 6-8 months who received complementary food yesterday and Mali reports the number of infants 6-11 months who initiated complementary foods, while Pakistan records in their registers infants 6-24 months taking food supplement with mother's milk. Bangladesh's community register records whether children 6-23 months were provided 4 or more complementary foods and reports complementary food started. Haiti asks about complementary feeding and feeding diversity with no age specified. Zimbabwe, as shown in figure 13, collects information on complementary feeding and number of feeds in last 24 hours without age specified.

Table 15. Exclusive breastfeeding and complementary feeding

	Exclusive breastfeeding - less than 6 months		Complementary feeding - 6 to 8 months	
Country	**Community**	**Facility**	**Community**	**Facility**
Afghanistan				
Bangladesh	❑❍	❑	❑❍	
Burma				
DRC		❑❍		❑
Ethiopia				
Ghana	❑	❑❍		❑
Haiti	❑❍	❑		❑
India	❑		❑	
Kenya	❑❍	❑		
Liberia		❍		❍
Madagascar				
Malawi		❑		
Mali		❑❍		❑❍
Mozambique		❑❍		
Namibia	❑❍			
Nepal				
Nigeria	❍	❑❍		
Pakistan	❑		❑	
Rwanda		❑		
Senegal		❑❍		❑
Tanzania		❑❍		
Uganda		❑		
Zambia	❑❍	❑		
Zimbabwe				❑

❑ Register Only ❍ Summary Form Only
❑❍ Register and Summary Form

Data related to continued breastfeeding practices were even rarer. Only DRC and Mozambique record and report this information in the patient register and summary forms at the facility level and Senegal reports it in its community summary form, although we did not identify where this element was recorded in registers or patient forms. Countries' registers and forms often did not identify the age, or had varied age definitions, of the child for which data on exclusive breastfeeding, complementary feeding, or continued breastfeeding was collected.

Valid measurement of feeding practices, such as exclusive breastfeeding and complementary feeding is complex and involves a 24-hour dietary recall series of questions in household surveys. Countries may not include measurement of infant feeding practices is HMIS because of the difficulty of obtaining valid measures using simple forms or tick boxes (see example in Figure 13). In cases where the practices are included in registers, they may be included as prompts for health workers to counsel on these practices.

Figure 13. Zimbabwe IMCI register

METHOD OF FEEDING		
45. Breast feeding	46. Comple-mentary feeding	47. # of feeds in 24 hours?

Anthropometric measurements for malnutrition screening, classification, and referral and treatment

Rationale for recording and reporting

Nutrition screening through measuring and classifying child's weight, height, age, and mid-upper arm circumference (MUAC) provides an opportunity for health providers to screen for anthropometric indicators of malnutrition, including underweight (low weight-for-age [WFA]), acute malnutrition (i.e. wasting; low weight-for-height [WFH]), stunting (i.e. low height-for-age [HFA]), and overweight (high WFH). It is often part of growth monitoring activities (Ashworth, Shrimpton, and Jamil 2008) and allows health providers to counsel, treat and/or refer for the different types of malnutrition (WHO 2013a).

Data elements available across countries

Anthropometric measurements for nutrition screening

Table 16 illustrates countries that are recording and reporting through registers and summary forms whether an under-five child's weight, height, and MUAC measurements were obtained at the community and facility levels.

Table 16. Anthropometric measurement for nutritional screen

	Child Weighed		Child's Height Measured	MUAC measured*	
Country	**Community**	**Facility**	**Facility**	**Community**	**Facility**
Afghanistan	❑❍	❍			
Bangladesh	❑	❑	❑	❑	❑
Burma		❍			
DRC	❑	❑		❑❍	❑
Ethiopia	❑❍	❑❍	❑		❑
Ghana		❑❍	❍		❑
Haiti	❑❍	❑❍	❑	❑❍	❑❍
India	❑❍			❑	
Kenya		❑	❑	❑	❑
Liberia		❑		❑❍	
Madagascar	❑❍	❑❍	❑❍	❑❍	
Malawi					
Mali	❑	❑	❑	❑❍	
Mozambique		❑	❑		❑
Namibia					
Nepal	❍	❑❍			
Nigeria		❑❍	❑	❑❍	
Pakistan	❑			❑	
Rwanda	❑	❑	❑	❑❍	
Senegal	❑❍	❑	❑	❑❍	❑
Tanzania		❑	❑		
Uganda	❑	❑	❑	❑	❑
Zambia	❑	❑❍		❑	
Zimbabwe	❑❍	❑❍	❑		❑

* MUAC measured includes instances where a blank was provided for the MUAC measurement, "MUAC measured" was indicated in a summary form, or "Red" Yellow" and "Green" measures were all indicated [as all categories added together indicate the overall number of children screened with MUAC].

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary

Weight: Fourteen countries record the child's weight/whether they were weighed at the community level and only eight countries report on the number of children weighed in their community summary forms. At the

facility level, 18 countries record the child's weight/if they were weighed in registers or patient forms, while 10 countries report the number of children weighed in their facility summary forms. Of note, two countries (Afghanistan and Nepal) capture this data element in their summary forms but not in the registers we reviewed; this data is likely obtained from another register or source.

Height: Thirteen countries record height in registers or patient forms at the facility level (Table 16). Haiti and Bangladesh also record height at the community level in their registers (data not shown). Only two countries (Ghana and Madagascar) report the number of children measured for height in their summary forms. Thirteen countries record both height and weight at the facility level in their registers; just Ghana and Madagascar do so using summary forms.

MUAC: LMICs often use MUAC measurement to screen for MAM (defined by MUAC between 11.5 cm and 12.5 cm) and SAM (defined by MUAC <12.5 cm). Whereas countries record and report weight and height at the facility level to screen for malnutrition, MUAC is most commonly used to screen for acute malnutrition at the community level. The review examined whether a MUAC measure was recorded in registers and whether the number of children screened with MUAC was reported in summary forms. The overall number of children screened with MUAC must be known to serve as a denominator for an indicator "proportion of children with MAM or SAM," analyzed below. Thus, we determined this data element was present in registers if a blank was provided for MUAC measurement, "MUAC measured" was indicated, and/or "Red" Yellow" and "Green" measures were all present (as all categories added together indicate the overall number of children screened with MUAC). For summary forms, we determined the data element was present if they reported the number of children screened with MUAC and/or if the number of children with all possible MUAC measures ("Red" Yellow" and "Green") were reported in the form.

The data element MUAC measured is recorded in registers in 14 countries at the community level and the number of children screened with MUAC is reported in community summary forms in eight countries. Ten countries include MUAC measured in their registers or patient forms at the facility level, although only Haiti includes the number of children screened with MUAC in their facility summary form.

Malnutrition classification—Stunting, overweight, underweight, acute malnutrition, and nonspecific malnutrition

Stunting and overweight: For this report, we focused the analysis on the tracking of malnutrition classifications of underweight and acute malnutrition. Despite country and global goals to reduce stunting and prevent increases in overweight prevalence—including the World Health Assembly global nutrition targets for 2025 (WHO and UNICEF 2014)—most countries do not routinely record and report stunting and overweight. Stunting (HFA <-2 z-scores) is reported at the community level by Bangladesh only using summary forms. Madagascar, Rwanda, and Tanzania include a stunted classification in their facility registers and Ghana, Madagascar, and Tanzania report the number of stunted children in their facility summary reports. Only Rwanda and Tanzania include severe stunting (HFA <-3 z-scores) in facility registers and Ghana and Tanzania report the number of severely stunted children identified in their facility summary forms. Stunting classification in Ghana may be recorded in a register or patient form that was not included in the review. Overweight (WFH >+2-3 z-scores) is recorded in facility registers in Senegal and Madagascar. Madagascar also reports on the number of overweight children in their facility summary form. Obesity (WFH >+3 z-scores) is recorded in community registers in Uganda and in facility registers in Senegal and Uganda.

Underweight: Table 17 presents underweight classifications recorded and reported at the community and facility levels. Severe underweight (WFA <-3 z-scores) are not commonly recorded or reported at the community or facility levels. Four countries (Bangladesh, Ethiopia, India, and Senegal) report the number of severely underweight at the community level in summary forms. At the facility level, six countries (Ethiopia, Liberia, Mali, Mozambique, Senegal, and Tanzania) record the number of severely underweight children in their facility summary forms. Only Mali and Uganda include an underweight classification in their community

registers. Three countries (Ethiopia, India, and Senegal) report the number of underweight children seen in the community; it is assumed that it is entered in the summary forms from data sources other than the registers we reviewed. Eight countries record underweight in facility registers as part of nutrition monitoring activities or well-child visits, and seven countries report the number of underweight children in facility summary forms. An additional four countries at the community level and nine countries at the facility level record unspecified underweight in their registers and/or summary forms. It is not clear how these classifications are made; hence, they could not be categorized under severe underweight or underweight.

Table 17. Malnutrition classification of underweight

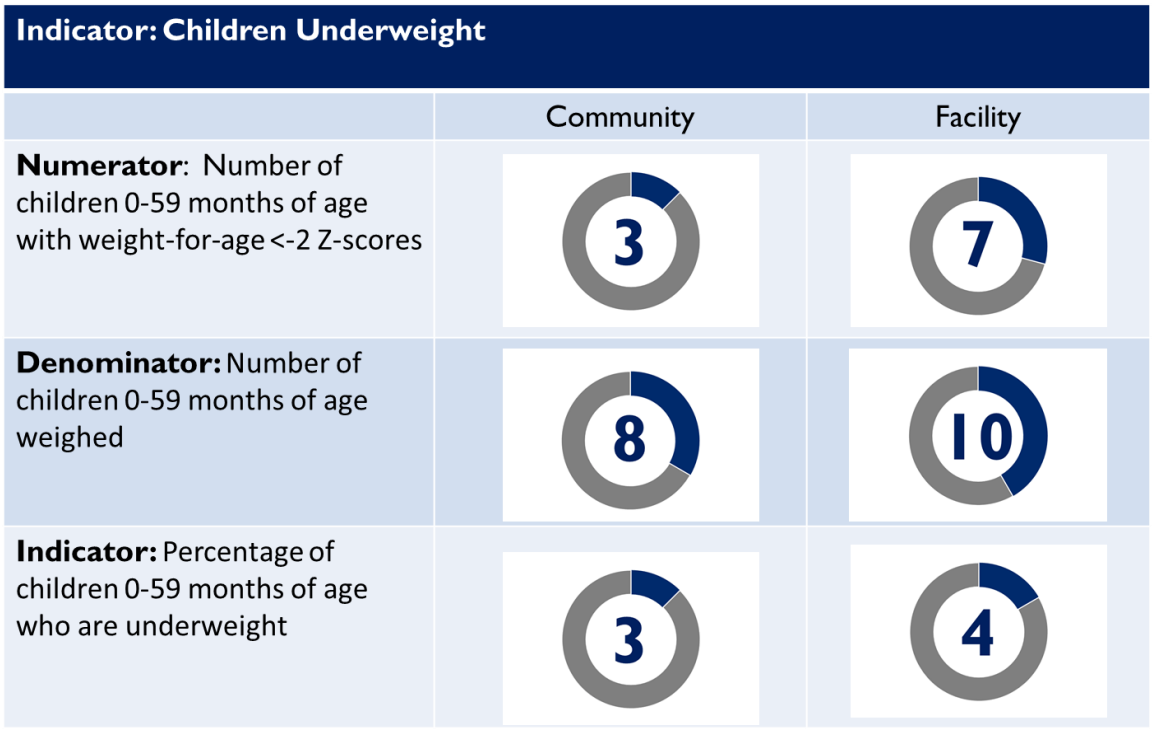
	Severe Underweight (WFA <-3 z-scores)		Underweight (WFA <-2 z-scores)		Low Weight for Age/Underweight - Degree Unspecified	
Country	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**
Afghanistan						
Bangladesh	❍				❍	❑❍
Burma		❍		❍		
DRC						
Ethiopia	❍	❑❍	❍	❑❍	❑	
Ghana		❍		❍		
Haiti						
India	❍		❍			
Kenya						❑
Liberia		❑		❑		❑
Madagascar				❑❍	❑❍	
Malawi						❍
Mali		❑	❑	❑		
Mozambique		❑❍		❑❍		❑❍
Namibia						❍
Nepal					❍	❑
Nigeria						
Pakistan						❑
Rwanda						❑❍
Senegal	❍	❑❍	❍	❑❍		
Tanzania		❑❍		❑❍		
Uganda			❑	❑		
Zambia						
Zimbabwe						

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary Form

Indicator: Children underweight (% of children underweight)

We examined the findings from this review to determine if countries can track the proportion of children underweight through their routine HMIS without having to visit each site/register (i.e. data collected in the summary forms). As shown in Figure 14, the numerator for this indicator is the number of children under five years of age with <2 WFA z-scores. Three countries report this information in the summary forms at the community level and seven countries at the facility level. Data to construct the denominator, number of children under-five weighed is reported in the summary forms of eight countries at the community level and 10 countries at the facility level. Only Ethiopia, India, and Senegal are able to construct the indicator from the community level; only Burma, Ethiopia, Ghana and Madagascar can calculate the indicator based on information included in the summary forms at the facility level.

Figure 14. Data elements to calculate children underweight *(% of children underweight)* indicator in 24 countries' HMIS summary forms



Acute malnutrition: Table 18 shows which countries are recording MAM and SAM classification at the community and facility level using registers and reporting with summary forms, as well as the method of screening (i.e. WFH, MUAC). At the community level, 15 countries record MAM in their registers and 11 countries report this data element in their summary forms. Sixteen countries record SAM in their community registers, and 12 of these countries report this indicator in their community summary forms. At the community level, countries are most frequently classifying MAM/SAM using MUAC (15 of 18 countries), only Bangladesh uses WFH at the community level, and the method of screening is not indicated on community registers or forms from Ethiopia and Namibia. For example, Ethiopia includes MAM and SAM in its community summary form based on weight measurements, despite height measurements not included in the community registers and forms we reviewed.

At the facility level, 12 countries record MAM in their registers and 12 countries report MAM in summary forms. Ten countries record and report MAM in both registers and summary forms. DRC and Pakistan only record MAM in registers and Ghana and Kenya report MAM in summary forms, but it was not included in the registers examined in this review. Sixteen countries include SAM classification in their registers and 16 report on the number of children with SAM in their facility summary forms. Mali and Pakistan only include SAM in registers; Ghana and Zambia report SAM in their summary forms, but we did not identify this data element in their registers. At the facility level, the method of screening for MAM/SAM is more variable than in communities. Eight countries (out of 14) use WFH, four countries use MUAC, and five countries use both MUAC and WFH. It was unclear what measures were used to identify MAM and SAM in facilities in Afghanistan. Additionally, four countries—Bangladesh, Haiti, Mali and Mozambique—report unspecified acute malnutrition in their facility summary forms, and Nepal records unspecified acute malnutrition in its facility register.

Table 18. Malnutrition classification: MAM/SAM

	Community			Facility			
	MAM	SAM	Method of Screening	MAM	SAM	Method of Screening	Acute malnutrition - (WfH) - Degree unspecified
Country							**Facility**
Afghanistan				❑❍	❑❍	Unknown *	
Bangladesh	❍		WFH	❑❍	❑❍	WFH	❍
Burma							
DRC	❑	❑❍	MUAC	❑	❑❍	MUAC, WFH	
Ethiopia	❍	❑❍	Unknown*	❑❍	❑❍	MUAC	
Ghana	❑	❑	MUAC	❍	❍	WFH	
Haiti	❑❍	❑❍	MUAC	❑❍	❑❍	MUAC	❍
India	❑	❑	MUAC				
Kenya	❑❍	❑❍	MUAC	❍	❑❍	WFH	
Liberia	❑❍	❑❍	MUAC	❑❍	❑❍	MUAC, WFH	
Madagascar	❑❍		MUAC		❑❍	WFH	
Malawi	❑	❑❍	MUAC		❑❍	WFH	
Mali	❑❍	❑❍	MUAC		❑	WFH	❍
Mozambique				❑❍	❑❍	WFH	❍
Namibia	❑❍	❑❍	Unknown *				
Nepal							❑
Nigeria	❑❍	❑❍	MUAC				
Pakistan				❑	❑	MUAC, WFH	
Rwanda	❑❍	❑❍	MUAC	❑❍	❑❍	MUAC, WFH	
Senegal	❑❍	❑❍	MUAC	❑❍	❑❍	MUAC, WFH	
Tanzania				❑❍	❑❍	WFH	
Uganda	❑	❑❍	MUAC	❑❍	❑❍	MUAC	
Zambia	❑	❑	MUAC		❍	MUAC	
Zimbabwe		❑	MUAC				

*Note: It is unknown how MAM/SAM is being classified, as this country does not collect height and weight or MUAC measurements in their registers or summary forms

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary Form

Indicator: Children with MAM (% children with MAM)

Figure 15a shows the number of countries that can report on the proportion of children with MAM through their routine HMIS (i.e. data collected in the summary forms). The numerator for this indicator is the number of children under five years of age with <2 WFH z-score or MUAC measure of 11.5-12.5 cm. Ten countries report this information in the summary forms at the community level and 12 countries at the facility level. Data to construct the denominator, number of children under-five screened with MUAC (Table 16) is reported in the summary forms of eight countries at the community level and number of children screened is only reported by three countries at the facility level (MUAC in Haiti and height/weight measured in Ghana

and Madagascar). Without having a data element for the number of children screened (MUAC or weight/height) in addition to the acute malnutrition classification, countries are unable to track the proportion of children with MAM. Haiti, Liberia, Madagascar, Mali, Nigeria, Rwanda and Senegal can track the proportion of children with MAM screened at the community level through their routine HMIS. At the facility level, only Haiti (through MUAC screening) and Ghana (weight/height) can report on this indicator.

Figure 15a. Data elements to calculate the children with MAM *(% of children with MAM)* indicator in 24 countries' HMIS summary forms

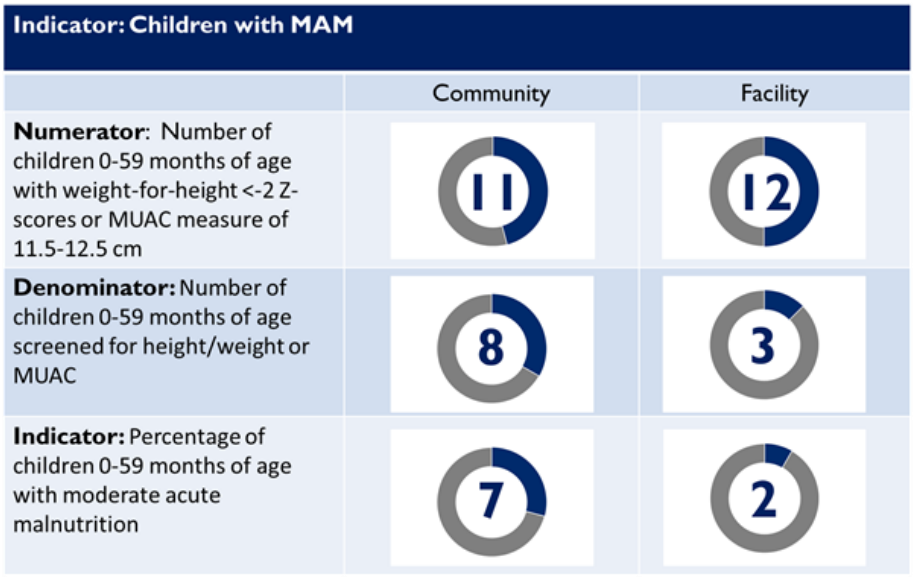
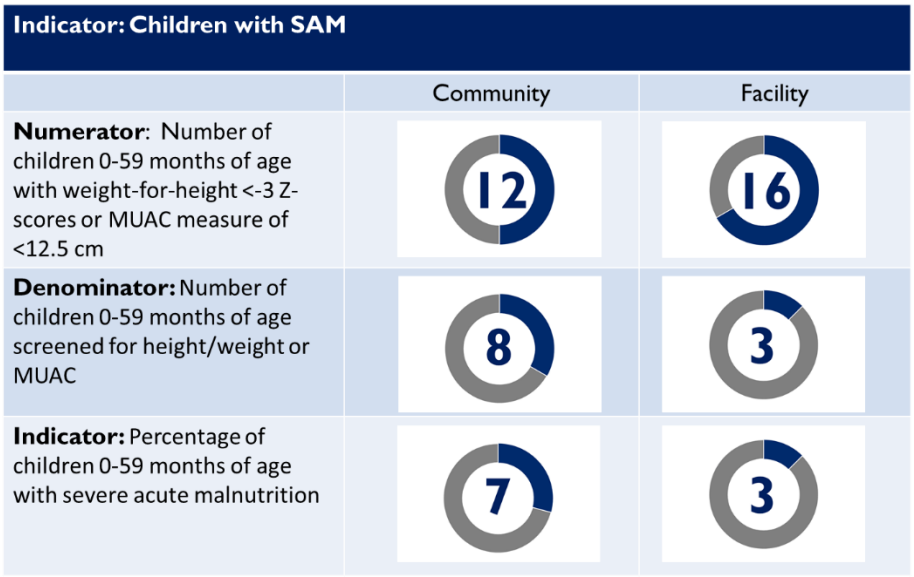


Figure 15b. Data elements to calculate the children with SAM *(% of children with SAM)* indicator in 24 countries' HMIS summary forms



Indicator: Children with SAM (% children with SAM)

Figure 15b shows the number of countries that can report on the proportion of children with SAM through their routine HMIS (i.e. data collected in the summary forms). Similar to MAM, the numerator for this indicator is the number of children under five years of age with <3 WFH z-score or MUAC measure of <12.5 cm. This information is reported in the summary forms by 12 countries at the community level and 16 countries at the facility level. Data to construct the denominator, number of children under-five screened with MUAC (Table 16) is reported in the summary forms of eight countries at the community level and number of children screened is only reported by three countries at the facility level (MUAC in Haiti and height/weight measured in Ghana and Madagascar). Seven countries—DRC, Haiti, Liberia, Mali, Nigeria, Rwanda and Senegal—can report on the proportion of children with SAM at the community level and three countries (Haiti, Ghana and Madagascar) can report on the proportion with SAM at the facility level.

Unspecified malnutrition: A significant portion of countries—one-third at the community level and two-thirds at the facility level—record malnutrition that could not be classified under a specific type of malnutrition, as illustrated in Table 19. For example, Bangladesh tracks in its community registers and summary forms

'protein energy malnutrition' without any corresponding z-scores or other diagnostic information about how they are defining this diagnosis. In total, eight countries capture nonspecific malnutrition at the community level (five using registers, two using summary forms, one using both), and 16 countries do so at the facility level (three using registers, six using summary forms, seven using both).

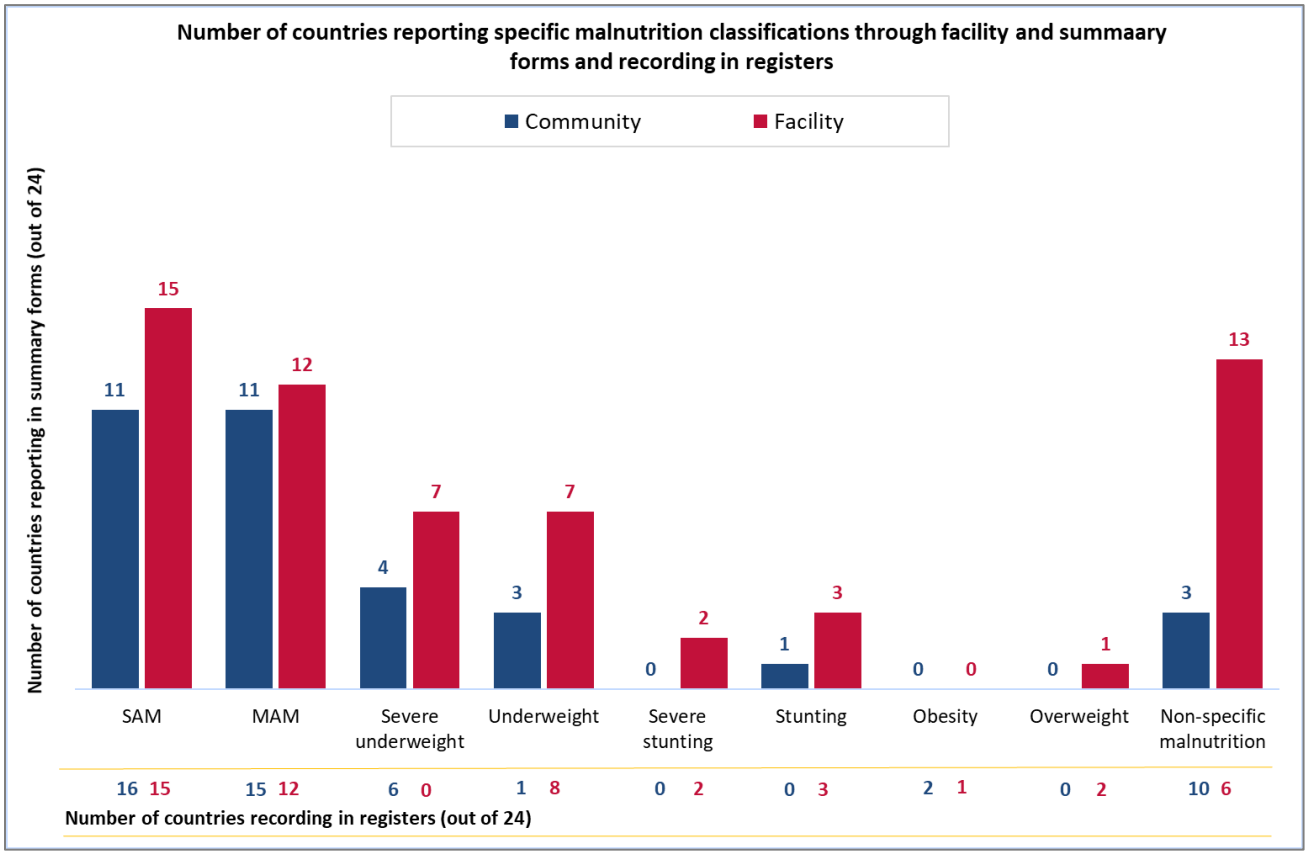
Table 19. Malnutrition classification: Unspecified

	Malnutrition - "other"			
	Community		Facility	
Country		Definition		Definition
Afghanistan				
Bangladesh	❑❍	Register: "Protein energy malnutrition (malnutrition)"; Summary - "Malnutrition/ undernutrition"	❑❍	LBW)"
Burma			❑	Register: "Malnutrition"
DRC	❑	Register - "SAM - visually assessed"	❑❍	Register - Children under the central curve ("Enfants sous la courbe centrale"); Summary - Children under the curve ("Enfants sous courbe")
Ethiopia	❑	Register - "Visible severe wasting"		
Ghana	❍	Summary - "Children with low MUAC (MAM and SAM)"	❑❍	Register - "Z-score" Summary - "Malnutrition", "Obesity"
Haiti			❍	Summary - "Malnutrition"
India				
Kenya			❑❍	Register - "Marasmus, Kwashiorkor, Malnutrition, Others" Summary - "Malnutrition, Marasmus, Kwashiorkor and Faltering Weight"
Liberia			❍	Summary - "Malnutrition"
Madagascar				
Malawi			❍	Summary - "Malnutrition"
Mali			❑	Register - "Nutritional status" / "Etat Nutritional"
Mozambique	❑	Register - "Underweight/overweight"		
Namibia			❍	Summary - "Malnutrition"
Nepal			❑❍	Register - "Low/normal weight" Summary - "Nutrition related/low weight"
Nigeria			❑❍	Register - "Nutrition status: Above the line, below the line" Summary - "Children 0-59 months weighing below the bottom line"
Pakistan			❍	Summary - "Malnutrition"
Rwanda	❑	Register - "Moderate malnutrition"		
Senegal				
Tanzania			❍	Summary - "Moderate malnutrition", "kwashiorkor", "marasmus", "marasmic kwashiokor"
Uganda				
Zambia	❑	Register - "Between -2Z and -3Z scores -, below -3 z scores, above +2Z scores " - no specification if measuring WfH or WfA.	❑❍	Register & Summary - "Between -2Z and -3Z scores -, below -3 z scores, above +2Z scores " - no specification if measuring WfH or WfA.
Zimbabwe	❍	Summary - "Children "below the line""	❑	Register - "Severe visible wasting"

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary Form

Summary: Figure 16 summarizes the number of countries that report specific malnutrition classifications that are at the community and facility levels and record these classifications in their community and facility registers and patient forms.

Figure 16. Summary of specific malnutrition classifications in reporting forms and registers



Malnutrition treatment and referral

As shown in Table 20, few countries record treatment for malnutrition (e.g. Ready to Use Therapeutic Food [RUTF], supplemental feeding, and treatment of acute malnutrition) or referral in their registers or summary forms. The review did not include inpatient forms, which often include treatment of acute malnutrition. The most common of data elements to be captured is number of children referred for malnutrition treatment. At the community level, five countries record this element in the registers we reviewed and 10 countries report it in their summary forms. At the facility level, six countries record it in their registers and seven countries report it in their summary forms. Four countries report cases of acute malnutrition treated at the community level using summary forms, two countries record this data element at the facility level using registers, and four countries report it at the facility level using summary forms. Madagascar records whether supplementary feeding was provided at the community level using registers and reports in summary forms. Five other countries report this in community summary forms, although this data element was not present in their community registers we reviewed. At the facility level, three countries record supplemental feeding in registers, and one does so using summary forms. Only Mali records RUTF given at the community level in registers (none do so using summary forms), three countries record whether RUTF was given at the facility level using registers, and four countries report this in facility summary forms. Similar to treatments given for child illness, it is likely that where treatment for malnutrition is reported in summary forms but not specifically captured in registers, it is drawing on blanks or non-specified columns in the registers.

Table 20. Malnutrition treatment and referral

	RUTF given		Supplementary Food provided		Cases of Acute Malnutrition treated		Children Referred for Malnutrition Treatment	
Country	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**
Afghanistan							❑❍	❍
Bangladesh			❍					❍
Burma								
DRC						❑		❑❍
Ethiopia					❍		❍	❑❍
Ghana								
Haiti		❑		❑	❍	❍	❍	❑
India			❍				❍	
Kenya							❑❍	
Liberia						❍		❍
Madagascar			❑❍				❍	
Malawi								
Mali	❑		❍		❍	❍	❑	
Mozambique		❑❍		❑❍			❑❍	
Namibia								
Nepal								
Nigeria		❍			❍	❑❍	❍	❑
Pakistan								
Rwanda		❑		❑				❑❍
Senegal		❍	❍				❍	❍
Tanzania								
Uganda								
Zambia							❑	❑
Zimbabwe		❍					❍	

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary Form

Anemia diagnosis

Rationale for recording and reporting

Anemia, defined as hemoglobin concentration below cut-off levels, in children under five years of age is a major public health issue (WHO and UNICEF 2004). Severe anemia increases the risk of child mortality and iron deficiency anemia has adverse consequences on the cognitive and physical development of children (Stoltzfus 2001). Thus, identifying and tracking anemia trends at the community and facility level is important.

Data elements available across countries

Table 21 shows that hemoglobin levels or anemia status (anemia defined as hemoglobin <11.0 g/dl) was primarily recorded and reported at the facility level. Burma and Haiti included in registers only and 14 countries include this data element in facility summary forms, although many countries did not record this specific data element in a facility register or form included in this review. Likely, anemia was not captured in registers in distinct check boxes, rather summary forms were populated based on "open observation" or "diagnosis" field in the registers or included in laboratory registers not included here.

At the community level, Bangladesh included hemoglobin status/anemia in a summary form and Pakistan in a register. Palmar pallor, used to identify severe anemia within IMNCI and iCCM, was collected in facility registers or forms in five countries and in eight countries in community registers or forms and was rarely rolled up into summary forms, with the exception of Malawi. Severe anemia was reported in health facility summary forms in only four countries and Rwanda records this in facility registers; no countries recorded or reported severe anemia diagnosis at the community level. These findings suggest that visual assessment of palmar pallor is being used to diagnose cases of severe anemia, rather than hemoglobin ascertainment.

Table 21. Anemia diagnoses

	Palmar Pallor		Hemoglobin level <110g/L / Anemia (6-59m)		Severe anemia
Country	**Community**	**Facility**	**Community**	**Facility**	**Facility**
Afghanistan				❑❍	
Bangladesh		❑	❍	❑❍	❍
Burma				❑	
DRC	❑	❑		❍	
Ethiopia	❑				
Ghana	❑			❍	
Haiti				❑	
India					
Kenya				❍	❍
Liberia		❑		❍	
Madagascar				❍	
Malawi	❑❍				
Mali	❑			❑❍	❍
Mozambique				❑❍	
Namibia				❍	
Nepal					
Nigeria	❍				
Pakistan			❑		
Rwanda	❑	❑		❑❍	❑
Senegal					
Tanzania				❍	❍
Uganda				❍	
Zambia				❍	
Zimbabwe	❑	❑			

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary

Vitamin A and micronutrient powder supplementation

Rationale for recording and reporting

WHO recommends vitamin A supplementation for children 6 to 59 months twice a year in areas where vitamin A deficiency is common (WHO 2011), as it is proven to reduce child mortality and morbidity (Imdad et al. 2017). As countries provide vitamin A through routine health services, as opposed to campaigns, tracking children's receipt of vitamin A at the facility and even community level is important. WHO also recommends point of use fortification of foods with iron-containing micronutrient powders in children aged 6 months to 12 years of age where anemia is a public health problem (WHO 2016).

Data elements available across countries

Countries did not record and report the receipt of vitamin A in a consistent manner within their HMIS (i.e. vitamin A 1st dose, Vitamin A 2nd dose, vitamin A dose within the last 6 months, vitamin A doses within the last year, vitamin A given [no age or dose information]). Table A3 in the annex shows how each country records and reports for vitamin A supplementation in their HMIS. Table 22 shows 12 countries record vitamin A in community registers and eight report vitamin A supplementation in community summary forms. All but two countries (Afghanistan and Pakistan) of the 24 recorded and/or reported on receipt of vitamin A of 6-59 months old children at the facility level. Burma and Rwanda only collected this data in registers and Liberia, Malawi and Namibia included vitamin A supplementation in facility summary forms but we did not find corresponding data elements in the facility registers or patient forms. While 14 countries that tracked receipt of the first dose also tracked the receipt of the second does, data from both vitamin A rounds were not always systematically rolled up because few of the HMIS forms we reviewed collected longitudinal data. Few countries provided confirmation of receipt of the recommended two doses of routine vitamin A per year, through HMIS, which is a gap in ascertaining if children are receiving the recommended twice-yearly vitamin A doses through routine services. Tracking the number of doses of vitamin A given may be the most feasible.

Table 22. Vitamin A and micronutrient supplementation

	Vitamin A		Micronutrient powder given	
Country	**Community**	**Facility**	**Community**	**Facility**
Afghanistan				
Bangladesh		❑❍	❍	❍
Burma		❑		
DRC	❑	❑❍		
Ethiopia	❑❍	❑❍		
Ghana		❑❍		
Haiti	❑❍	❑❍		
India	❑	❑❍		
Kenya	❑❍	❑❍		
Liberia		❍		❍
Madagascar	❑	❑❍		
Malawi		❍		
Mali	❑	❑❍		❍
Mozambique	❑❍	❑❍		❑❍
Namibia		❍		
Nepal	❍	❑❍		
Nigeria	❍	❑❍		
Pakistan				
Rwanda	❑	❑		
Senegal	❑❍	❑❍		
Tanzania		❑❍		
Uganda	❑❍	❑❍		
Zambia	❑	❑❍		
Zimbabwe		❑❍		

❑ Register Only ❍ Summary Form Only

❑❍ Register and Summary Form

Few countries recorded or reported micronutrient powders given as a supplement. Bangladesh, Liberia, and Mali included this intervention in their facility summary form and Bangladesh in its community summary form, although we did not find this data element in the registers we reviewed. Mozambique recorded micronutrient powder in its registers and reported in a summary form.

Deworming

Rationale for recording and reporting

WHO recommends preventive chemotherapy (deworming), using annual or biannual single-dose albendazole or mebendazole as a public health intervention for all children 12 months to 12 years of age, living in areas where the baseline prevalence of any soil-transmitted helminth infection is 20% or more among children (WHO 2017c). Children infected with helminths can benefit from anthelminthic treatment in terms of reduction in worm burden and weight and height gain. As countries provide anthelminthic treatment through routine health services, tracking children's receipt of these anthelminthic drugs at the facility and even community level is important.

Data elements available across countries

Table 23 shows that deworming was captured more often at the facility than the community level. Thirteen countries recorded and reported deworming at the facility level using register and summary forms. Two countries (Kenya and Rwanda) only record deworming in their registers and Madagascar only reports in their facility summary form. Eleven countries at the community level recorded and/or reported deworming. Six record and report in both register and summary forms (Ethiopia, Haiti, Kenya, Mozambique, Senegal and Uganda), three record in registers only and two report with summary forms only.

Table 23. Deworming

	Deworming	
Country	**Community**	**Facility**
Afghanistan		
Bangladesh		❑❍
Burma		
DRC		❑❍
Ethiopia	❑❍	❑❍
Ghana		
Haiti	❑❍	❑❍
India		
Kenya	❑❍	❑
Liberia		❑❍
Madagascar		❍
Malawi		
Mali	❑	❑❍
Mozambique	❑❍	❑❍
Namibia		
Nepal	❍	❑❍
Nigeria	❍	❑❍
Pakistan		
Rwanda	❑	❑
Senegal	❑❍	❑❍
Tanzania		❑❍
Uganda	❑❍	❑❍
Zambia	❑	❑❍
Zimbabwe		

❑ Register Only
❍ Summary Form Only
❑❍ Register and Summary Form

Data elements for prevention of child illness

This section focuses on prevention of child illness, with sub-sections devoted to insecticide treated nets and other illness prevention activities.

Long-lasting insecticidal nets

Rationale for recording and reporting

WHO recommends universal access to and use of long-lasting insecticidal nets (LLIN) by all people at risk of malaria. In endemic areas with intense malaria transmission (stable malaria), all infants should receive one LLIN through a routine health care visit (WHO 2017a).

Data elements available across countries

Countries did not record and report the ownership or use of a LLIN in a consistent manner within their HMIS. Some countries record if the child has a net, while a few ask if the child is sleeping under a LLIN. As shown in Table 24, some countries (Ghana, Namibia, and Uganda) recorded and reported LLIN at the community level, but not at the facility level. Burma, Kenya, Liberia and Mali recorded LLIN ownership or use in the facility registers, but did not report on it in their summary forms. In Haiti, Nigeria, and Tanzania, facility summary forms report on LLIN data elements. Mali, Nigeria, and Senegal report LLIN data at the community level in summary forms, but we didn't find corresponding data elements in their community registers. Zambia was the only country that recorded and reported LLIN ownership/use at community and facility level.

Table 24. LLIN ownership/use

	ITN ownership	
Country	**Community**	**Facility**
Afghanistan		
Bangladesh		❍
Burma		❑
DRC		❑❍
Ethiopia		
Ghana	❑❍	
Haiti		❍
India		
Kenya	❑❍	❑
Liberia		❑
Madagascar		
Malawi		
Mali	❍	❑
Mozambique		
Namibia	❑❍	
Nepal		
Nigeria	❍	❍
Pakistan		
Rwanda		❑❍
Senegal	❍	❑❍
Tanzania	❑❍	❍
Uganda	❑❍	
Zambia	❑❍	❑❍
Zimbabwe		

❑ Register Only
❍ Summary Form Only
❑❍ Register and Summary Form

Other preventative data elements

Although our review focused on services delivered at facilities and communities, we also reviewed data elements related to illness prevention in the forms and registers we collected. Table A5 in the annex shows that some countries collect data related to water and sanitation in their registers and summary forms. At the community level, Kenya and Mali record and report on the use of chlorine or disinfectant. Six countries record and/or report on household handwashing stations and seven countries record and/or report on household water sources in their community HMIS forms. Mali also reports these data elements at the facility level. Table A6 in the annex shows that a number of countries track household visits and community sensitization meetings, mostly through the community HMIS. It is likely that data related to water and sanitation and household and community sensitization may be collected in registers and forms not included in this review for countries where we did not find these data elements.

Data elements related to health systems for child health and nutrition

This section focuses on health systems aspects related to child health and nutrition and covers human resources for health, supervision and stocks. These data are important for management decisions and actions, for example health worker deployment or delivery of stocks. The data presented in this section may be collected through other information systems, such as a human resources information system (HRIS) or logistics management information system (LMIS) in certain countries. Thus, the findings we present here indicate that these data elements are included in the HMIS forms we reviewed; countries without these data elements indicated here may still collect this information in other systems or forms outside the HMIS.

Human resources and supervision

Table 25 shows the countries that report on the number of CHWs and health workers through their routine HMIS. Five countries report on the number of CHWs in their community summary forms; indicating that these countries may have more than one CHW contributing to the community summary form. At the facility level, eight countries report on the number of CHWs in the facility catchment area/reporting to the facility. At the facility level, 10 countries report on the number of health workers in their summary forms. A number of countries report supervision of CHWs and health facilities in their community and facility summary forms, presented in Table 26. Additionally, Mozambique, Kenya and Liberia also record CHW supervision in their community registers.

Table 25. CHWs and health workers

	Number of CHWs		Number of Health Workers
Country	**Community**	**Facility**	**Facility**
Afghanistan		❍	❍
Bangladesh		❍	❍
Burma		❍	❍
DRC		❍*	
Ethiopia			
Ghana			❍**
Haiti			
India			
Kenya	❍*		
Liberia			
Madagascar			
Malawi	❍	❍	❍
Mali		❍*	❍
Mozambique			
Namibia	❍		
Nepal			
Nigeria			❍
Pakistan		❍	❍
Rwanda	❍		
Senegal	❍	❍	❍
Tanzania			
Uganda			
Zambia			❍
Zimbabwe			

❑ Register Only ❍ Summary Form Only

❑❍ Register and Summary Form

*iCCM trained CHW specified

**IMNCI health worker specified

Stocks

Sick child commodities: Figures 17a and 17b present the numbers of countries that report any stock information in their HMIS summary forms across the 24 countries. Tables A7 and A8 in the annex provide full results. Countries report stock information in many different formats tied to their supply

Table 26. Supervision of CHWs and facilities

Reporting in summary form		
CHW recieves mentoring / supervision	**Community**	DRC; India; Malawi; Mali; Mozambique; Namibia; Pakistan; Rwanda
	Facility	Afghanistan; DRC; Mali
Supervision visit to health facility	**Facility**	Afghanistan; DRC; Mali; Nigeria

chain and our results are only related to the HMIS data collected in communities and facilities. Thus, our analyses should be interpreted with care. Approximately half of the countries collect information on ACTs/first line antimalarial through their HMIS community and facility summary forms, while fewer collect information on RDTs, artesunate (rectal or injectable) and paracetamol (Figure 17a).

Figure 17a. Stock information for malaria/fever commodities reported in summary forms

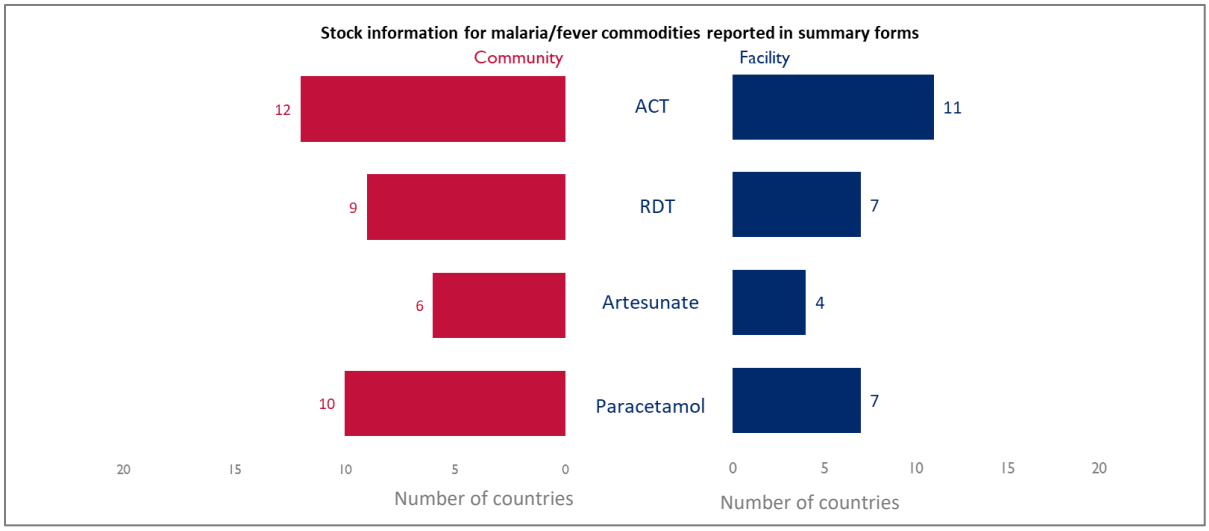
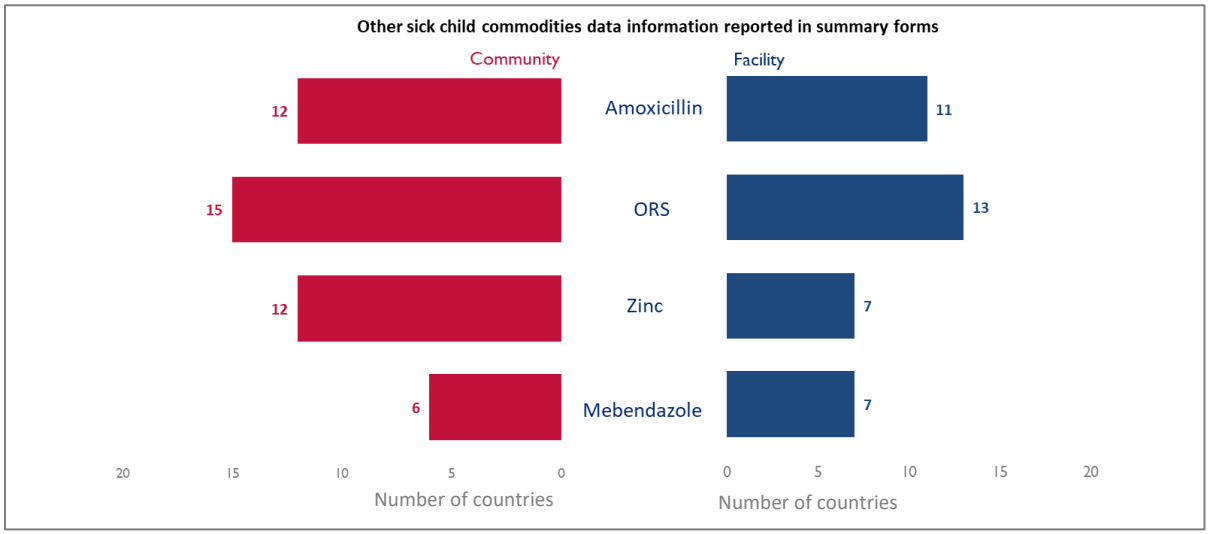


Figure 17b. Other sick child commodities reported in summary forms

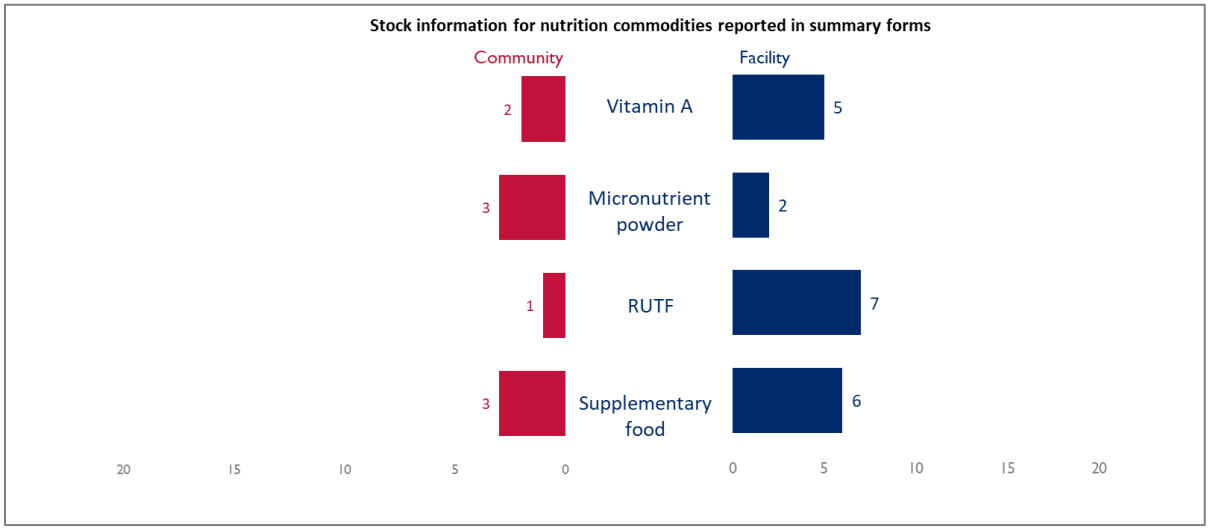


More than half of countries report ORS stocks at the community level (15/24 countries) and facility level (13/24 countries), while fewer report on zinc (12/24 at the community level and 7/24 at the facility level). Amoxicillin stock information is reported in 12 countries at the community level and 11 countries at the facility level.

Nutrition commodities: Figure 18 shows that fewer countries report on nutrition commodities within their HMIS than treatments for child illness. Only five countries report on vitamin A stocks at the facility level and two at the community level. More countries report on stocks of RUTF at the facility level (seven) and supplementary food (six) than report on micronutrient powder (two). At the community level, three countries report on micronutrient powder stocks and three on supplementary food stocks. Only Mali records and reports on

RUTF stocks at the community level. Table A9 in the annex provides more details on countries' inclusion of stocks for nutritional supplement and treatment of malnutrition.

Figure 18. Nutrition commodities reported in summary forms



Discussion

Strengths and limitations

This is the first comprehensive review of the child health and nutrition data elements collected in national HMIS in low- and middle-income countries to our knowledge. We reviewed a large number of data elements across different contexts in 24 USAID priority MCH countries. The review provides valuable information for national level managers about what data is and is not recorded and reported across countries' HMIS and can inform ministries of health as they review and revise their national HMIS. Our results can also support advocacy efforts for incorporating child health and nutrition data elements and indicators that measure high impact interventions into national HMIS. At the global level, stakeholders and working groups can use this review to better understand how indicators derived from national HMIS data across different contexts may or may not be comparable. Additionally, global groups working to identify and define better metrics for child health and nutrition—such as the WHO/UNICEF-led CHAT, WHO/UNICEF-led TEAM, and Every Breath Counts metrics group—can use this information to "ground-truth" the feasibility of global recommendations for indicators to be collected through routine HMIS.

This review has a number of limitations. We only collected nationally-endorsed HMIS registers and summary forms from the primary health center and community levels. We were not able to verify if the national forms we reviewed are used in every facility or community, thus, our results may not always represent the data actually recorded and reported across the countries' HMIS. A challenge for the review team was interpreting how data was to be entered into the registers and forms we reviewed. Where possible, we obtained the HMIS manual and considered any instructions for data elements in the review. In some cases, for example general "malnutrition," we report exactly what was included in the forms if no further clarification was available.

Some data elements that we included in this review may be collected in other registers or forms that were not reviewed. For example, malaria data elements may be collected in a separate malaria reporting or surveillance system and anemia might be collected and reported through a separate laboratory information system. The review scope was limited to the first level health facilities and did not include inpatient or hospital registers or forms, although these forms would include important data elements, such as deaths of hospitalized children and inpatient management of acute malnutrition. We also did not address data quality or completeness in this review. Thus, even if a data element is present within the national HMIS, it does not guarantee that the data is recorded and reported in a complete and high quality manner.

Finally, and most importantly, this review represents a specific point in time in countries' HMIS: 2017 to 2018. Countries update their HMIS and the associated forms on a regular basis, thus the data elements reported here as included in countries' HMIS may change as countries revise their HMIS and include or remove different data elements.

Opportunities and gaps

Over the last five to 10 years, there have been huge strides in the functionality of national HMIS (Suthar et al. 2019). In another positive trend, many countries are scaling-up national community information systems and integrating them into the broader HMIS or making them interoperable (Africa Regional Workshop on Improving Routine Data for Child Health in National Health Information Systems). Routine recording, collating and reporting of childhood illnesses, nutritional status and the services provided to children across communities and facilities allows managers at all levels of the health system to track progress and improve the quality of services using real-time data. The HMIS forms – client cards and registers -- can also serve as job aids to improve the quality at the point of care in the facilities or communities. Below we highlight the gaps and common opportunities by chapter of this report.

Data on case management of sick children

Assessment of child illness data elements

Less than half of countries include data elements about standard assessments of a sick child, such as screening for dangers signs and determining the respiratory rate for suspected pneumonia, at the patient level in registers or sick child forms in the health facility. Around half of countries record and/or report these data at the community level. This is likely due to the widespread and more recent scale-up of iCCM (George et al. 2015), along with the related tools such as the sick child recording forms and specific registers designed as job aids to ensure the consistency and quality of services. With the uneven implementation of IMNCI within facilities (Dalglish et al. 2016), fewer countries have specific IMNCI registers or sick child forms. Including illness assessment data elements in sick child forms and/or registers can serve important purposes, even if these data do not necessarily need to be reported in summary forms. First, they can serve as a job aid or reminder at the point of care to ensure health workers follow the IMNCI or iCCM algorithm to assess sick children and can easily record their findings. They can also allow supervisors to check and monitor the quality of sick child assessment through review of registers or forms during supervisory visits. Newer pneumonia screening data elements, such as oxygen saturation or hypoxemia, should also be included in registers and perhaps summary forms, as countries introduce pulse oximetry for pneumonia diagnosis.

Classification of common child illness data elements

The majority of countries record and report the number of children under five years of age with common illnesses, such as pneumonia, malaria, and diarrhea at the facility and community level. This enables the passive tracking of trends in childhood morbidity in most countries at all levels of the health system, from the community and facility levels to the national level, where program managers can review trends over time and place. However, the data elements related to childhood pneumonia require harmonization in some countries across forms, levels (community and facility), where terminologies can include ARI, pneumonia and fast-breathing across different forms.

We found many countries report common child illnesses in their summary forms, but do not have any specific data elements, instructions or codes in their registers, especially at the facility level. This reliance on generic outpatient registers that have blank columns for the diagnosis and treatment of illness likely contributes to data quality issues and reporting burden. Health workers may not be using standard classifications for child illness. It is much more difficult to extract this almost narrative data into a summary form than from a register that is pre-populated. For example, when reporting on the number of cases of childhood diarrhea seen at the facility in one month, a health work may have to pore over many pages of the outpatient register, triangulating the patient's age and diarrhea diagnosis in order to enter the number of children seen with diarrhea into the summary form. Introduction of IMNCI and iCCM forms and registers, with specific, reportable sick child classifications could harmonize data definitions and increase data quality.

Treatment of child illness data elements

Many fewer countries record and report data related to the treatment of child illness than report on the classification of the illnesses; this lack of treatment data is an important gap in some countries' HMIS. Without recording or reporting treatment data, it is difficult to monitor if sick children are receiving the correct treatment (quality of services) at any level of the health system (i.e. from the community or facility to district/regional levels). ***Fewer than half of the countries included in this review could track the proportion of cases of pneumonia, malaria or diarrhea correctly treated at the facility or community levels***. Lack of treatment data in countries' HMIS also means that countries and programs are using proxies (such as number of cases) to report standard indicators, such as USAID's *"Number of cases of child diarrhea treated in USG-assisted programs,"* if they are not building parallel systems. In countries that do report on treatment, similar to the classification above, they often rely on generic outpatient registers to record the treatment. Only Nepal included data on vitamin A treatment for measles.

Counseling for sick children data elements

Less than half of countries include data elements to prompt counseling of caretakers for sick children in their community registers or forms, and only a handful include these data elements at the facility level. Similar to the assessment data elements discussed above, this reflects countries' use of IMNCI and iCCM tools and

countries should consider including these data elements as prompts to counsel in facility and community register and forms.

Referral

The overwhelming majority of countries record and report the referral of sick children to higher levels (from the community to a facility or from primary health center to a higher-level facility). However, few countries track completed referrals or counter-referrals. Monitoring referral completion—for example, triangulating the number of children referred from the community and number of children referred seen at the corresponding health facility—would allow sub-national managers to identify trends and issues with referral by facility and/or geographic area.

Data on child nutrition

IYCF counseling and practices data elements

Few countries include data elements related to IYCF counseling at the facility or community level, even in registers. Where included, it is often a generic column or tick box for "IYCF counseling" and does not specify the content of the counseling. More countries record and report on exclusive breastfeeding and complementary feeding practices at the facility and community level than report on IYCF counseling. Data related to continued breastfeeding was only present in two countries. The data related to IYCF practices are recorded using simple forms or tick boxes that most often do not specify the infant's age. Standard, valid measurement of IYCF involves complex methods, such as the 24-hour dietary recall series of questions in household surveys, disaggregated by target age groups. A summary indicator such as "number or percentage of infants 0-6 months of age exclusively breastfed" collected through the HMIS may not capture actual IYCF practices in the community by age group, if not probed appropriately. Counting the number of caretakers who received specific IYCF counseling content may be a better indicator of service delivery collected through the HMIS. Registers or patient forms that include data elements or prompts for IYCF counseling (or practices), especially for specific content such as exclusive breastfeeding and timely introduction of complementary foods, can remind health workers to complete this vital practice during well or sick child consultations.

Nutrition screening data elements

The majority of countries record children's weight and MUAC in their facility and community registers and over half record height in facility registers. The nutrition screening data elements recorded and reported in HMIS registers and summary forms is reflective of countries' nutrition programming at the facility and community levels. Many fewer countries report the number of children weighed, measured, or screened with MUAC in their summary forms, which limits the calculation of percentage of malnourished children (underweight, SAM or MAM) because this data element is necessary as a denominator. These data elements related to screening can also be used as a denominator to calculate the percentage of children seen screened for malnutrition (through MUAC, weight, WFH), which can be useful for program managers to ensure that health workers are screening for malnutrition during well child and/or sick child visits.

Malnutrition classification data elements

Few countries record and report on stunting, overweight or obesity, despite global goals (WHO and UNICEF 2014). More countries record and report on underweight at the facility and community level, although many of these country registers, forms or operational manuals do not specify the degree of underweight recorded. Approximately half of countries record and report on MAM and SAM cases at the community level; most all use the MUAC to identify MAM and SAM. More than half of countries record and report cases of MAM and SAM at the facility level, with a mixture of WFH and MUAC used to identify cases of MAM and SAM. Despite the large number of countries that record and report MAM and SAM, few are able to calculate the percentage of children with SAM or MAM above the facility or community level, due to lack of a data element related to screening for malnutrition, as discussed above. Many countries included non-specific data elements related to "malnutrition" where we could not find the definition or criteria in the

registers, forms, and/or HMIS manuals we reviewed. Where definitions are not clear, countries should include specific definitions in the registers, forms and/or HMIS manuals.

Malnutrition treatment and referral data elements

This review did not include any inpatient forms and few countries recorded or reported on provision of RUTF, supplementary food or treatment of acute malnutrition at the community or primary facility level. Many more countries recorded and reported on referral for malnutrition at these levels.

Anemia diagnosis data elements

More than half of countries reported anemia diagnosis in children under-five at the facility level. At the community level, some countries record palmer pallor in their registers or patient forms. It would be important for countries to consistently report type of anemia diagnosis (by hemoglobin or palmar pallor for severe anemia), severity of anemia (general vs. severe anemia) and whether treatment was received.

Vitamin A and micronutrient supplementation data elements

The overwhelming majority of countries record and report on vitamin A supplementation at the facility level, with fewer recording and reporting on vitamin A at the community level. Countries did not report on vitamin A supplementation in a consistent manner and included data specifying vitamin A first dose, Vitamin A second dose, vitamin A dose within the last six months, vitamin A doses within the last year, and vitamin A given (no age or dose information). As HMIS move towards patient records and more longitudinal data, and routine services provide vitamin A supplementation (rather than through campaigns), guidance is needed for the most robust data elements to capture delivery of vitamin A. Specifically, it would be important to count whether a vitamin A dose was received within the last six months for children 6-59 months of age and ensure that children are not double counted/doubly receive vitamin A at various child health services, so that two doses received within the last year can be calculated per child. Few countries track micronutrient powder supplementation. As countries introduce or scale-up this intervention into their programming, including this data element into national HMIS provides an opportunity to track these efforts.

Deworming data elements

More than half of countries record and report on deworming in children less than five years of age at the facility level and just fewer than half of countries record and report deworming at the community level. As it is not clear that countries will be able to continue annual or biannual deworming campaigns to control soil-transmitted helminth infections, the provision of anthelminthic treatment through routine health services and the tracking of this service at the facility and even community level will become more important.

Data on prevention of child illness

Some countries use the HMIS at the community and facility levels to record and report on interventions to prevent child illness, such as LLINs, water and sanitation in households and community engagement activities.

Data on health systems for child health and nutrition

Although other information systems exist to track human resources, some countries use the HMIS to record and report on the number of CHWs and facility-based health workers. Seven countries also use the HMIS summary forms to report and track supervision at the community level, fewer (four) countries track supervision at the facility level through HMIS. Around half of the 24 countries used the community HMIS summary forms to report on child health commodities, while just under half used the HMIS to track child health commodities at the facility level. Some countries collect commodity data in logistics management information system and it is likely that these systems do not extend to the community level. Many countries implementing iCCM have used the community HMIS for tracking stock.

Recommendations and conclusion

Recommendations

This review is not intended to specify or recommend what exact data elements and indicators all countries should record and report. Each country must carefully consider what type and quantity of HMIS data are needed at each level of the health system to monitor their specific child health and nutrition programs and improve the quality of services. More data is not always better, as health workers shoulder a heavy reporting burden already. However, our findings point to a number of themes and recommendations related to routine data for child health and nutrition that countries may want to consider as they revise and improve their HMIS and global groups may want to consider as they work on global guidance and technical resources.

Include assessment and counseling data elements at the point of care

Countries may want to consider inclusion of key data elements related to IYCF and sick child counseling, as well as the assessment of danger signs or vaccination status in the point of care registers or forms at the community and primary facility levels. Prompts for health workers to check the child's immunization status by asking the caregiver and/or checking the vaccination card are especially important in contexts with low vaccination coverage and measles outbreaks. Aggregating these data at higher levels may be of limited value, but having to record the data can serve as prompts for health workers to perform specific assessment and counseling tasks as they examine the child, or to provide additional immunization services. As a result, frontline supervisors can also check the quality of assessment, classification, and treatment/referral of sick children through record review. As countries adopt the new WHO breastfeeding counseling guidelines,(WHO 2018b) they may also consider recording and reporting additional data elements related to breastfeeding counseling.

Harmonize definitions for illness and nutrition classification

We found that data element definitions are not always standardized—i.e. pneumonia, malnutrition, and vitamin A—even within select countries' forms at different levels. Countries should harmonize the definitions of data elements across registers, forms, and levels of the health system and include instructions and definitions in HMIS manuals. At the global level, it is recommended that WHO and UNICEF provide guidance for defining data elements measured through routine HMIS that corresponds to global intervention guidance and recommendations.

Adapt and use IMNCI and iCCM registers

In our review, some countries, such as Malawi and Zimbabwe, used IMNCI and/or iCCM registers for managing sick children that serve as both a job aid (laying out the algorithm) and data collection tool. These registers include more data elements that can be used at the point of care and for supervision. They also standardize the classification of child illness and treatment, ensuring better data quality in the register and likely in aggregate data reported in summary forms. Countries with IMNCI and iCCM programs should adapt and use these tools.

Report selected data elements related to processes and symptoms

Countries often record processes, such as screening of a child for malnutrition (through MUAC, weight, or WFH), RDT administration, and symptoms (i.e. fever) in registers but do not report counts in summary forms. Countries may want to consider reporting these types of process and symptom data in order to enable managers above the facility level to better monitor and compare trends over time and place. For example, the percentage of children screened with MAM, malaria test positivity rate, and malaria diagnostic testing ratio, are important indicators to compare over time across different size catchment areas that require these data elements to serve as denominators.

Consider inclusion of important data elements

When revising their HMIS, countries should consider the inclusion of child health and nutrition data elements included in this report that are important to them and the international community, but not

currently in their national HMIS, while also balancing the need to limit reporting burden. Countries' considerations should take into account that some data elements and related indicators are best recorded and reported through the HMIS. HMIS record and report data on a more continuous basis than other data sources, such as household or facility surveys, and countries should include data elements that they deem important to track on a monthly or quarterly basis. For example, tracking suspected cases of measles through HMIS, especially in countries with repeated or widespread measles outbreaks, can strengthen passive case detection in combination with other existing infectious disease surveillance systems. Countries should strongly consider including data elements to calculate the percentage of children with pneumonia treated with an antibiotic, which household surveys cannot validly measure. Additionally, countries not currently able to report on treatment for other child illnesses, such as diarrhea or malaria, should consider incorporation of these important data elements into their HMIS. Countries at risk for widespread measles outbreaks may also consider including treatment of measles with vitamin A. Similarly, countries should strongly consider inclusion of data related to referrals given and received at both the community and facility levels.

Conclusion

HMIS data provide important information for facility and community health workers to monitor and improve the child health and nutrition services they provide and for those workers and program managers to track progress, monitor quality of care, and identify issues requiring action. The scale-up of District Health Information System-2 (DHIS2) has meant that countries have more data available more quickly for management decisions and reporting. This review provides a snapshot of the child health and nutrition data elements included in 24 countries' national HMIS and highlights the opportunities and gaps across countries. Countries and partners can use these results to consider what routine HMIS data can and should be recorded, and how global guidance and reporting requirements consider country systems. Improving the content and strengthening the functioning of national HMIS provides countries, development partners, and donors the opportunity to limit parallel systems, while being mindful of the need for more data with the reporting burden on health workers and systems.

References

AbouZahr, Carla and Ties Boerma. 2005. "Health Information Systems: The Foundations of Public Health." *Bulletin of the World Health Organization* 6.

AbouZahr, Carla, Ties Boerma, and Peter Byass. 2017. "Bridging the Data Gaps: Do We Have the Right Balance between Country Data and Global Estimates?" *Global Health Action* 10(sup1):1299978.

AbouZahr, Carla, Ties Boerma, and Daniel Hogan. 2017. "Global Estimates of Country Health Indicators: Useful, Unnecessary, Inevitable?" *Global Health Action* 10(sup1):1290370.

Anon. 2019. "Scaling Up Nutrition: Monitoring, Evaluation, Accountability and Learning – MEAL." Retrieved October 10, 2019 (https://scalingupnutrition.org/progress-impact/monitoring-evaluation-accountability-and-learning-meal/).

Arnold, Fred and Shane M. Khan. 2018. "Perspectives and Implications of the Improving Coverage Measurement Core Group's Validation Studies for Household Surveys." *Journal of Global Health* 8(1).

Ashworth, Ann, Roger Shrimpton, and Kazi Jamil. 2008. "Growth Monitoring and Promotion: Review of Evidence of Impact." *Maternal & Child Nutrition* 4(s1):86–117.

Boerma, Ties, Jennifer Requejo, Cesar G. Victora, Agbessi Amouzou, Asha George, Irene Agyepong, Carmen Barroso, Aluisio J. D. Barros, Zulfiqar A. Bhutta, Robert E. Black, Josephine Borghi, Kent Buse, Liliana Carvajal Aguirre, Mickey Chopra, Doris Chou, Yue Chu, Mariam Claeson, Bernadette Daelmans, Austen Davis, Jocelyn DeJong, Theresa Diaz, Shams El Arifeen, Fernanda Ewerling, Monica Fox, Stuart Gillespie, John Grove, Tanya Guenther, Annie Haakenstad, Ahmad Reza Hosseinpoor, Sennen Hounton, Luis Huicho, Troy Jacobs, Safia Jiwani, Youssouf Keita, Rajat Khosla, Margaret E. Kruk, Taona Kuo, Catherine Kyobutungi, Ana Langer, Joy E. Lawn, Hannah Leslie, Mengjia Liang, Blerta Maliqi, Alexander Manu, Honorati Masanja, Tanya Marchant, Purnima Menon, Allisyn C. Moran, Oscar J. Mujica, Devaki Nambiar, Kelechi Ohiri, Lois A. Park, George C. Patton, Stefan Peterson, Ellen Piwoz, Kumanan Rasanathan, Anita Raj, Carine Ronsmans, Ghada Saad-Haddad, Mariam L. Sabin, David Sanders, Susan M. Sawyer, Inacio Crochemore M. da Silva, Neha S. Singh, Kate Somers, Paul Spiegel, Hannah Tappis, Marleen Temmerman, Lara M. E. Vaz, Rajani R. Ved, Luis Paulo Vidaletti, Peter Waiswa, Fernando C. Wehrmeister, William Weiss, Danzhen You, and Shehla Zaidi. 2018. "Countdown to 2030: Tracking Progress towards Universal Coverage for Reproductive, Maternal, Newborn, and Child Health." *The Lancet* 391(10129):1538–48.

Dalglish, Sarah L., Anthony Costello, and on behalf of the Strategic Review Study Team. 2016. *Towards a Grand Convergence for Child Survival and Health: A Strategic Review of Options for the Future Building on Lessons Learnt from IMNCI*. Geneva: World Health Organization.

Diaz, Theresa, Kumanan Rasanathan, Emmanuel Meribole, Isabella Maina, Humphreys Nsona, Kyaw Myint Aung, Bennett Nemser, and Kathryn Patricia O'Neill. 2018. "Framework and Strategy for Integrated Monitoring and Evaluation of Child Health Programmes for Responsive Programming, Accountability, and Impact." *BMJ* k2785.

George, Asha, Daniela C. Rodríguez, Kumanan Rasanathan, Neal Brandes, and Sara Bennett. 2015. "ICCM Policy Analysis: Strategic Contributions to Understanding Its Character, Design and Scale up in Sub-Saharan Africa." *Health Policy and Planning* 30(suppl 2):ii3–11.

Hazir, Tabish, Khadija Begum, Shams el Arifeen, Amira M. Khan, M. Hamidul Huque, Narjis Kazmi, Sushmita Roy, Saleem Abbasi, Qazi Sadeq-ur Rahman, Evropi Theodoratou, Mahmuda Shayema Khorshed, Kazi Mizanur Rahman, Sanwarul Bari, M. Mahfuzul Islam Kaiser, Samir K. Saha, A. S. M. Nawshad Uddin Ahmed, Igor Rudan, Jennifer Bryce, Shamim Ahmad Qazi, and Harry Campbell.

2013. "Measuring Coverage in MNCH: A Prospective Validation Study in Pakistan and Bangladesh on Measuring Correct Treatment of Childhood Pneumonia" edited by D. Osrin. *PLoS Medicine* 10(5):e1001422.

Imdad, Aamer, Evan Mayo-Wilson, Kurt Herzer, and Zulfiqar A. Bhutta. 2017. "Vitamin A Supplementation for Preventing Morbidity and Mortality in Children from Six Months to Five Years of Age" edited by Cochrane Developmental, Psychosocial and Learning Problems Group. *Cochrane Database of Systematic Reviews*.

Liu, Li, Shefali Oza, Dan Hogan, Yue Chu, Jamie Perin, Jun Zhu, Joy E. Lawn, Simon Cousens, Colin Mathers, and Robert E. Black. 2016. "Global, Regional, and National Causes of under-5 Mortality in 2000–15: An Updated Systematic Analysis with Implications for the Sustainable Development Goals." *The Lancet* 388(10063):3027–35.

Maina, Isabella, Pepela Wanjala, David Soti, Hillary Kipruto, Benson Droti, and Ties Boerma. 2017. "Using Health-Facility Data to Assess Subnational Coverage of Maternal and Child Health Indicators, Kenya." *Bulletin of the World Health Organization* 95(10):683–94.

Marchant, Tanya, Zulfiqar A. Bhutta, Robert Black, John Grove, Catherine Kyobutungi, and Stefan Peterson. 2019. "Advancing Measurement and Monitoring of Reproductive, Maternal, Newborn and Child Health and Nutrition: Global and Country Perspectives." *BMJ Global Health* 4(Suppl 4):e001512.

MCSP. 2018. *What Data on Maternal and Newborn Health Do National Health Management Information Systems Include? A Review of Data Elements for 24 Lowand Lower Middle-Income Countries*. Washington DC: Maternal and Child Survival Program.

Nabyonga-Orem, Juliet. 2017. "Monitoring Sustainable Development Goal 3: How Ready Are the Health Information Systems in Low-Income and Middle-Income Countries?" *BMJ Global Health* 2(4):e000433.

PMI. nd. "Reporting Plan for the President's Malaria Initiative (PMI) Strategy 2015 – 2020."

Schroder, Kate, Audrey Battu, Leslie Wentworth, Jason Houdek, Chizoba Fashanu, Owens Wiwa, Rosemary Kihoto, Gerald Macharia, Naresh Trikha, Parth Bahuguna, Harkesh Dabas, Damien Kirchoffer, Lorna Muhirwe, Patricia Mucheri, Andrew Musoke, and Felix Lam. 2019. "Increasing Coverage of Pediatric Diarrhea Treatment in High-Burden Countries." *Journal of Global Health* 9(1).

Stoltzfus, Rebecca J. 2001. "Defining Iron-Deficiency Anemia in Public Health Terms: A Time for Reflection." *The Journal of Nutrition* 131(2):565S-567S.

Suthar, Amitabh Bipin, Aleya Khalifa, Olga Joos, Eric–Jan Manders, Abu Abdul-Quader, Frank Amoyaw, Camara Aoua, Getahun Aynalem, Danielle Barradas, George Bello, Luis Bonilla, Mireille Cheyip, Ibrahim Tijjani Dalhatu, Michael De Klerk, Jacob Dee, Judith Hedje, Ibrahim Jahun, Supiya Jantaramanee, Stanley Kamocha, Leonel Lerebours, Legre Roger Lobognon, Namarola Lote, Léopold Lubala, Alain Magazani, Rennatus Mdodo, George S. Mgomella, Lattah Asseka Monique, Mphatso Mudenda, Jeremiah Mushi, Nicholus Mutenda, Aime Nicoue, Rogers Galaxy Ngalamulume, Yassa Ndjakani, Tuan Anh Nguyen, Charles Echezona Nzelu, Anthony Adofo Ofosu, Zukiswa Pinini, Edwin Ramírez, Victor Sebastian, Bouathong Simanovong, Ha Thai Son, Vo Hai Son, Mahesh Swaminathan, Suilanji Sivile, Achara Teeraratkul, Poruan Temu, Christine West, Douangchanh Xaymounvong, Abel Yamba, Denis Yoka, Hao Zhu, Ray L. Ransom, Erin Nichols, Christopher S. Murrill, Daniel Rosen, and Wolfgang Hladik. 2019. "National Health Information Systems for Achieving the Sustainable Development Goals." *BMJ Open* 9(5):e027689.

UNICEF and WHO. 1999. "IMCI Indicators, Monitoring and Evaluation."

UNICEF and WHO. 2019. "Analysis and Use of Health Facility Data: Guidance for RMNCAH Programme Managers. Working Document, March 2019."

US Department of State. 2018. "Foreign Assistance Resource Library." Retrieved (https://www.state.gov/foreign-assistance-resource-library/#managing ; https://2009-2017.state.gov/f/indicators//index.htm).

USAID and MCHIP. 2013. "Indicator Guide: Monitoring and Evaluating Integrated Community Case Management."

USAID, PMI, and CDC. 2019. "U.S. President's Malaria Initiative FY 2020 Guidance."

WHO. 2004. *Global Strategy on Infant and Young Child Feeding.* Geneva: World Health Organization.

WHO. 2011. *Guideline: Vitamin A Supplementation in Infants and Children 6–59 Months of Age*. Geneva: World Health Organization.

WHO. 2013a. *Guideline: Updates on the Management of Severe Acute Malnutrition in Infants and Children.* Geneva: World Health Organization.

WHO. 2013b. *Millions of People in the World Have Hearing Loss That Can Be Treated or Prevented.* Geneva: World Health Organization.

WHO. 2014a. *Consultation on Improving Measurement of the Quality of Maternal, Newborn, and Child Care in Health Facilities. WHO and Partnership for Maternal, Newborn, and Child Health.* Geneva: World Health Organization.

WHO. 2014b. *IMCI Chart Booklet*. Geneva: World Health Organization.

WHO. 2015. *List of 100 Indicators: Global Reference List of 100 Core Health Indicators*. Geneva: World Health Organization.

WHO. 2016. *Use of Multiple Micronutrient Powders or Point-of-Use Fortification of Foods Consumed by Infants and Young Children Aged 6–23 Months and Children Aged 2–12 Years*. Geneva: World Health Organization.

WHO. 2017a. *Achieving and Maintaining Universal Coverage with Long-Lasting Insecticidal Nets for Malaria Control.* Geneva: World Health Organization.

WHO. 2017b. *Global Nutrition Monitoring Framework: Operational Guidance for Tracking Progress in Meeting Targets for 2025*. Geneva: Licence: CC BY-NC-SA 3.0 IGO.

WHO. 2017c. *Preventive Chemotherapy to Control Soil-Transmitted Helminth Infections in at-Risk Population Groups*. Geneva: World Health Organization.

WHO. 2018a. *Analysis and Use of Health Facility Data: Guidance for Malaria Programme Managers. Working Document.* gene: World Health Organization.

WHO. 2018b. *Guideline: Counselling of Women to Improve Breastfeeding Practices*. Geneva: World Health Organization.

WHO. 2018c. *Malaria Surveillance, Monitoring & Evaluation: A Reference Manual.* Geneva: World Health Organization.

WHO. 2018d. *Standards for Improving the Quality of Care for Children and Young Adolescents in Health Facilities*. Geneva: Licence: CC BY-NC-SA 3.0 IGO.

WHO, Every Woman, Every Child. 2016. *Indicator and Monitoring Framework for the Global Strategy for Women's, Children's and Adolescents' Health (2016-2030)*. Geneva: World Health Organization.

WHO and UNICEF. 2004. *Focusing on Anaemia: Towards an Integrated Approach for Effective Anaemia Control' (Joint Statement)*. Geneva: World Health Organization.

WHO and UNICEF. 2014. *Global Nutrition Targets 2025: Policy Brief Series (WHO/NMH/NHD/14.7)*. Geneva: World Health Organization.

Annex

Table A1. New cases, sick children seen and re-attendances

	New Case/New Attendance		Sick child seen/Number of sick children seen		Re-attendance / old case	
Country	Community	Facility	Community	Facility	Community	Facility
Afghanistan		❑❍				❑❍
Bangladesh		❑	❍	❍		❑
Burma	❑	❑❍	❍	❍	❑	❑
DRC	❍	❑❍	❑	❑❍		❑
Ethiopia	❑	❑	❍	❍	❑	❑
Ghana		❍	❍			❍
Haiti		❑❍		❍		❑❍
India						
Kenya		❑❍				❑❍
Liberia		❑		❍		❑
Madagascar	❍	❑❍	❑❍			❍
Malawi	❍					
Mali	❑❍	❑❍	❑		❑❍	❑
Mozambique		❑❍				❑❍
Namibia	❑❍	❍				
Nepal		❑❍		❍		❑❍
Nigeria	❍	❑	❍	❍		❑
Pakistan		❍				❑
Rwanda		❑❍	❍	❍		❑❍
Senegal		❍				
Tanzania		❍		❍		❍
Uganda		❑❍	❍	❍		❑❍
Zambia		❍		❍		❍
Zimbabwe	❍	❑❍	❍		❍	❑❍

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary Form

Table A2. Sick child counseling

	Counseling on when to return (follow up)		Counseling to give sick child continued feeding		Counseling to give sick child increased fluids		Vaccination card/history checked (for sick child)	
Country	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**
Afghanistan								
Bangladesh		❑					❑	❑
Burma								
DRC	❑						❑	❑
Ethiopia	❑		❑	❑	❑		❑	
Ghana								
Haiti								❑
India			❑		❑		❑	
Kenya	❑		❑		❑		❑❍	
Liberia		❑						❑
Madagascar								
Malawi	❑		❑		❑		❑	
Mali		❑					❑	❑
Mozambique								
Namibia								
Nepal		❑		❑		❑		
Nigeria							❑	
Pakistan								
Rwanda	❑	❑	❑		❑		❑	❑
Senegal							❑❍	❑
Tanzania								
Uganda							❑❍	
Zambia	❑		❑		❑		❑❍	
Zimbabwe			❑		❑		❑	❑

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary Form

Table A3. Nutrition counseling data elements

	Counseling - Exclusive Breastfeeding		Counseling - Complementary Feeding		Counseling - Continued Breastfeeding		IYCF Counseling	
Country	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**
Afghanistan								
Bangladesh	❍	❍	❍	❍			❍	❑❍
Burma								
DRC		❑		❑		❑		❑❍
Ethiopia				❑				❑
Ghana								❍
Haiti								
India							❑	
Kenya	❑❍						❑	
Liberia								❑❍
Madagascar								
Malawi								
Mali								❑
Mozambique								
Namibia								
Nepal							❑	
Nigeria		❑					❍	
Pakistan								
Rwanda								❑
Senegal	❍		❍		❍		❍	
Tanzania								
Uganda							❑	❑
Zambia							❑	
Zimbabwe							❑	

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary Form

Table A4. Vitamin A data elements and definitions

	Vitamin A			
	Community		Facility	
Country		Definition		Definition
Afghanistan				
Bangladesh			❑❍	Register and Summary form: Vitamin A given - no dose or age information provided
Burma			❑	Register: Vitamin A - 1st dose, Vitamin A - 2nd dose
DRC	❑	Register: Vitamin A dose within last 6 months, Vitamin A given - no dose or age information provided	❑❍	Register: Vitamin A - 1st dose, 2nd dose, Vitamin A dose within last 6 months, 2 doses within the last year, Vitamin A given - no dose or age information provided Summary: Vitamin A dose within last 6 months, Vitamin A given - no dose or age information provided
Ethiopia	❑❍	Register: Vitamin A dose within last 6 months, Vitamin A given - no dose or age information provided Summary form: Vitamin A given - no dose or age information provided	❑❍	Register and Summary form: Vitamin A given - no dose or age information provided
Ghana			❑❍	Register and Summary form: Vitamin A - 1st dose, Vitamin A - 2nd dose
Haiti	❑❍	Register: Vitamin A - 1st dose, Vitamin A - 2nd dose, 2 doses within the last year Summary form: Vitamin A - 1st dose, Vitamin A - 2nd dose	❑❍	Register: Vitamin A given - no dose or age information provided Summary form: Vitamin A - 1st dose, Vitamin A - 2nd dose
India	❑	Register: Vitamin A - 1st dose, Vitamin A - 2nd dose	❑❍	Register: Vitamin A - 1st dose, Vitamin A - 2nd dose Summary form: Vitamin A - 1st dose
Kenya	❑❍	Register: Vitamin A - 1st dose, Vitamin A - 2nd dose, Vitamin A given - no dose or age information provided Summary form: Vitamin A given - no dose or age information provided	❑❍	Register: Vitamin A given - no dose or age information provided Summary form: Vitamin A - 1st dose, Vitamin A - 2nd dose
Liberia			❍	Summary form: Vitamin A given - no dose or age information provided
Madagascar	❑	Register: Vitamin A given - no dose or age information provided	❑❍	Register: Vitamin A - 1st dose, Vitamin A - 2nd dose, 2 doses within the last year Summary form: Vitamin A given - no dose or age information provided
Malawi			❍	Summary form: Vitamin A given - no dose or age information provided
Mali	❑	Register: Vitamin A - 1st dose, Vitamin A dose within last 6 months	❑❍	Register: Vitamin A - 1st dose, Vitamin A - 2nd dose, Vitamin A given - no dose or age information provided Summary form: Vitamin A - 1st dose, 2 doses within the last year
Mozambique	❑❍	Register: Vitamin A - 1st dose, Vitamin A - 2nd dose Summary form: 2 doses within the last year	❑❍	Register and Summary form: Vitamin A - 1st dose, Vitamin A - 2nd dose
Namibia			❍	Summary form: Vitamin A given - no dose or age information provided
Nepal	❍	Summary form: Vitamin A given - no dose or age information provided	❑❍	Register and Summary form: Vitamin A given - no dose or age information provided
Nigeria	❍	Summary form: Vitamin A dose within last 6 months	❑❍	Register and Summary form: Vitamin A - 1st dose, Vitamin A - 2nd dose
Pakistan				
Rwanda	❑	Register: Vitamin A dose within last 6 months	❑	Register: Vitamin A dose within last 6 months, Vitamin A given - no dose or age information provided
Senegal	❑❍	Register: Vitamin A given - no dose or age information provided; Summary form: Vitamin A - 1st dose, no dose or age information provided	❑❍	Register: Vitamin A dose within last 6 months, Vitamin A given - no dose or age information provided Summary: Vitamin A given - no dose or age information provided
Tanzania			❑❍	Register and Summary form: Vitamin A - 1st dose, Vitamin A - 2nd dose
Uganda	❑❍	Register: Vitamin A - 1st dose, Vitamin A - 2nd dose Summary form: Vitamin A given- no dose or age information provided	❑❍	Register and Summary form: Vitamin A - 1st dose, Vitamin A - 2nd dose, 2 doses within the last year
Zambia	❑	Register: Vitamin A - 1st dose, Vitamin A - 2nd dose	❑❍	Register and Summary form: Vitamin A - 1st dose, Vitamin A - 2nd dose
Zimbabwe			❑❍	Register: Vitamin A - 1st dose, Vitamin A - 2nd dose, Vitamin A given- no dose or age information provided Summary: Vitamin A - 1st dose, Vitamin A - 2nd dose

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary Form

Table A5. Water and sanitation

	Has Chlorine/Other for Disinfection		Household handwashing facility with soap and water		Type of household water source / Households with improved water source	
Country	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**
Afghanistan						
Bangladesh						
Burma						❑❍
DRC						
Ethiopia						
Ghana			❑❍		❑❍	
Haiti			❍			
India						
Kenya	❍		❑❍		❑❍	
Liberia						
Madagascar						
Malawi						
Mali	❍	❍	❍	❍	❍	❍
Mozambique						
Namibia			❑❍		❑❍	
Nepal						
Nigeria						
Pakistan						
Rwanda						
Senegal					❍	❍
Tanzania					❑❍	
Uganda			❑❍		❑❍	
Zambia						
Zimbabwe						

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary Form

Table A6. Community outreach and sensitization

	Household Visits		Community sensitization/ meetings – MCH specific		Community sensitization/ meetings - WASH		Community sensitization/ meetings-non-specified	
Country	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**
Afghanistan	❑❍			❍				❍
Bangladesh							❍	
Burma								❍
DRC			❍				❍	
Ethiopia								
Ghana		❍						
Haiti	❍						❍	
India							❍	
Kenya	❑❍							
Liberia	❍							
Madagascar	❍		❍		❍		❍	
Malawi								
Mali	❍		❍	❍	❍		❍	
Mozambique	❑❍		❑❍		❑❍			
Namibia	❍						❑❍	
Nepal			❍				❍	
Nigeria			❍		❍		❍	
Pakistan							❍	
Rwanda							❍	
Senegal	❍		❍		❍	❍	❍	❍
Tanzania								
Uganda				❍		❍		❍
Zambia	❍							
Zimbabwe							❍	

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary Form

Table A7. Malaria/fever stock information

	ACT		Artesunate (Injectable or Rectal)		Paracetamol		Malaria RDT	
Country	Community	Facility	Community	Facility	Community	Facility	Community	Facility
Afghanistan		❍				❍		
Bangladesh		❍						
Burma								
DRC	❑❍	❍	❑❍	❍	❑❍	❍	❑❍	❍
Ethiopia	❍	❍		❍*				
Ghana	❍				❍			
Haiti		❍				❍		
India								
Kenya	❍				❍		❍	
Liberia	❑❍	❍	❑❍	❍*	❑❍	❍	❑❍	❍
Madagascar	❑❍	❍	❑❍		❑❍	❍	❑❍	❍
Malawi	❑❍		❑❍		❑❍		❑❍	
Mali								
Mozambique	❍		❍		❍		❍	
Namibia					❍			
Nepal								
Nigeria	❑❍		❑❍		❑❍		❑❍	❍
Pakistan		❍			❍	❍		
Rwanda	❍	❍		❍*			❍	❍
Senegal								
Tanzania								
Uganda	❑❍	❍						❍
Zambia		❍				❍		❍
Zimbabwe	❑❍		❑				❑❍	

*Specifies Injectable Artesunate

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary Form

Table A8. Sick child stock information

	Amoxicillin		Injectable Gentamicin		ORS		Zinc		Mebendazole	
Country	Community	Facility	Community	Facility	Community	Facility	Community	Facility	Community	Facility
Afghanistan		❍				❍		❍		❍
Bangladesh										
Burma										
DRC	❍*	❍*		❍	❑❍	❍	❑❍	❍	❑❍	❍
Ethiopia	❍*	❍*	❍	❍	❍	❍	❍	❍		
Ghana	❍				❍	❍	❍			
Haiti		❍								❍
India				❍		❍				
Kenya	❍				❍		❍		❍	
Liberia	❑*❍*	❍			❑❍	❍	❑❍			❍
Madagascar	❑*❍*	❍		❍	❑❍	❍	❑❍	❍		❍
Malawi	❑❍				❑❍	❍	❑❍			
Mali										
Mozambique	❍*				❍		❍		❍	
Namibia					❍					
Nepal					❍	❍				❍
Nigeria	❑❍*	❍*			❑❍	❍	❑❍	❍	❍	
Pakistan	❍*	❍			❍		❍		❍	
Rwanda	❍	❍			❍	❍	❍	❍	❍	❍
Senegal										
Tanzania										
Uganda	❑❍	❍*			❑❍	❍		❍		
Zambia		❍				❍				
Zimbabwe					❍		❍			

*Specifies Amoxicillin Disperable Tablet

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary Form

Table A9. Nutrition stock information

	Vitamin A		Micronutrient supplements		RUTF		Supplementary Food	
Country	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**	**Community**	**Facility**
Afghanistan		❍						
Bangladesh			❍	❍				
Burma								
DRC								
Ethiopia								
Ghana		❍				❍		❍
Haiti								
India		❍					❍	
Kenya								
Liberia								
Madagascar						❍		
Malawi								
Mali				❍	❑❍	❍	❑❍	❍
Mozambique	❍							
Namibia								
Nepal		❍						
Nigeria			❍				❍	
Pakistan			❍					
Rwanda	❍	❍				❍		❍
Senegal						❍		❍
Tanzania								
Uganda						❍		❍
Zambia								
Zimbabwe						❍		❍

❑ Register Only ❍ Summary Form Only ❑❍ Register and Summary Form