Beyond coverage A scoping review of the most commonly used parameters of effectiveness of health and nutrition service delivery in low- and middle-income countries

Annex 1
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Beyond coverage A scoping review of the most commonly used parameters of effectiveness of health and nutrition service delivery in low- and middle-income countries
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Acknowledgement

UNICEF is grateful to the Taskforce for Global Health and the Health Campaign Effectiveness Coalition for their generous financial and technical support. The work supported by this grant will be pivotal in changing the way the vitamin A programme and health and nutrition programmes in general are monitored and will contribute to improving the understanding of effective delivery platforms from a wholistic point of view.
# Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCG</td>
<td>Bacille Calmette-Guérin</td>
</tr>
<tr>
<td>BMGF</td>
<td>Bill and Melinda Gates Foundation</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
</tr>
<tr>
<td>CHD</td>
<td>Child Health Days</td>
</tr>
<tr>
<td>CHE</td>
<td>Child Health Events</td>
</tr>
<tr>
<td>CMAM</td>
<td>Community-based management of acute malnutrition</td>
</tr>
<tr>
<td>DAC</td>
<td>Development Assistance Committee</td>
</tr>
<tr>
<td>DTP</td>
<td>Diphtheria, tetanus, pertussis</td>
</tr>
<tr>
<td>ENN</td>
<td>Emergency Nutrition Network</td>
</tr>
<tr>
<td>EPOC</td>
<td>Effective Practice and Organisation of Care</td>
</tr>
<tr>
<td>GHO</td>
<td>Global Health Observatory</td>
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<tr>
<td>IA2030</td>
<td>Immunization Agenda 2030</td>
</tr>
<tr>
<td>IGME</td>
<td>Inter-Agency Group for Child Mortality Estimation</td>
</tr>
<tr>
<td>LMIC</td>
<td>Low- and middle-income country</td>
</tr>
<tr>
<td>MDG</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>MNCH</td>
<td>Maternal, newborn, and child health</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-governmental organization</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>PHC</td>
<td>Primary health care</td>
</tr>
<tr>
<td>PHCPI</td>
<td>Primary Health Care Performance Initiative</td>
</tr>
<tr>
<td>REACH</td>
<td>Regular Events to Advance Child Health</td>
</tr>
<tr>
<td>SDG</td>
<td>Sustainable Development Goals</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children's Fund</td>
</tr>
<tr>
<td>VAS</td>
<td>Vitamin A supplementation</td>
</tr>
<tr>
<td>WBG</td>
<td>World Bank Group</td>
</tr>
<tr>
<td>WHA</td>
<td>World Health Assembly</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
Introduction

Preventive public health and nutrition programmes are a key component of a successful primary health care (PHC) system and support progress towards achieving the SDGs.

Background

The global community set 2030 as the deadline for reaching the Sustainable Development Goals (SDGs), including goals related to nutrition and health. These goals include specific targets to end all forms of malnutrition (Target 2.2), to end preventable deaths of newborns and children under five years of age (Target 3.2), and to achieve universal health coverage including access to vaccines for all (Target 3.8) (1,2). Under-five mortality remains above target, particularly in sub-Saharan Africa, and intensified and accelerated efforts are required to meet the under-five mortality target of 25 or fewer deaths per 1,000 live births (3). According to 2020 estimates from the UN Inter-Agency Group for Child Mortality Estimation (UN IGME), infectious diseases such as pneumonia, diarrhoea and malaria remain a leading cause of death among children under five. Children suffering from severe malnutrition are also at a higher risk of death from these illnesses, with malnutrition contributing to 45 per cent of deaths among children under five (3,4). Despite significant progress towards reducing child morbidity and mortality since the pre-Millennium Development Goal (MDG) era (5), millions of children remain at risk.

Preventive public health and nutrition programmes are a key component of a successful primary health care (PHC) system and support progress towards achieving the SDGs. Evidence that PHC interventions – such as immunization, micronutrient supplementation, malaria, and mass drug administration – improve maternal, neonatal, and child health and nutrition has increased steadily in recent decades (6). These interventions contribute significantly to reductions in morbidity and mortality. Moreover, by supporting improved access to preventive and promotive services, including early diagnosis and treatment, community-based interventions can reduce total health-care costs (for example, by reducing avoidable more costly inpatient hospitalizations) and increase efficiency (for example, by reducing disparities) (7,8).

Effectiveness beyond coverage

A variety of PHC delivery strategies are used to deliver preventive and promotive services and reach those most in need. These include routine and outreach service/intervention delivery, Child Health Events/Regular Events to Advance Child Health (CHE/REACH), and mass campaigns. However, despite the successes of these strategies, there remains a gap in our understanding of whether some delivery strategies of community-based interventions are more effective than others and under what conditions.

Importantly, discussions about effectiveness usually focus on the effectiveness of distinct interventions, with only minor consideration given to parameters for measuring effectiveness of service delivery.

There is a gap in our understanding of what constitutes an effective delivery strategy, which then causes a corresponding gap in our ability to meaningfully measure the effective performance of delivery programmes.

Contributing to these shortcomings is an assumption that the effectiveness of programme delivery can be measured comprehensively and exhaustively in terms of coverage. Intervention coverage – referring to the
proportion of the targeted population that is reached with preventive health services – is the main indicator used to measure health impact of community-based programmes (9). Although effectiveness of service delivery is regularly equated with coverage, an encompassing definition would arguably include additional attributes.

This scoping review explores whether effective service delivery goes beyond coverage – and, if so, what are the additional parameters of effectiveness that should be integrated into measuring health and nutrition programme service delivery? For example, prioritized uptake among those who need interventions the most, such as children who have never received the intervention or service, without excluding any at-risk community or population; continued delivery over time, including during acute emergencies; enhanced quality in delivery; and an improved value proposition for health services that enables caregivers to take away improved knowledge, awareness, and intention to change behaviours, and seek out other health and nutrition interventions.

The effectiveness of various community health and nutrition interventions has been well documented (10) and is not the focus of this review. Instead, the aim is to explore current perceptions and use of parameters for the assessment of the effectiveness of service delivery of community nutrition and health interventions. In other words, the review is looking beyond coverage to explore potential limitations in our understanding of what makes for effective delivery of health and nutrition services in low- and middle-income countries (LMICs).

### Parameters of delivery effectiveness

Several frameworks and primary health care (PHC) indicators guided the selection of potential parameters of delivery effectiveness. A starting point for the exploration of additional parameters of delivery effectiveness was the conceptual framework developed for the Primary Health Care Performance Initiative (PHCPI). In 2015, the PHCPI was launched by the WHO, the World Bank Group (WBG) and the Bill and Melinda Gates Foundation (BMGF) to catalyse improvements in PHC in LMICs. The PHCPI conceptual framework guides how to build and measure strong PHC systems, with service delivery at its core (11) (see Figure 1).

The PHCPI conceptual framework references previous models, such as Tanahashi’s model of health system coverage, which includes measures of acceptability, access and availability as well as effective coverage\(^1\) (12), and Starfield’s key characteristics of high performing PHC systems (7,13) (including access, equity, sustainability and quality). Additionally, the PHCPI framework integrates the WHO health systems framework, that includes service delivery as one of its six building blocks (14). The WHO compendium of indicator definitions for health and nutrition services that is part of the WHO Global Health Observatory (GHO) (15) was also included in parameter mapping.\(^2\) These WHO references include indicators for access, equity, sustainability, quality, and efficiency.

Parameters selected for the review were based on the PHCPI conceptual framework of an effective PHC system.

We identified 10 parameters of service delivery effectiveness for prospective use alongside coverage to estimate the comparative effectiveness of public health delivery strategies: community acceptance, access, availability, community awareness, efficiency (cost-effectiveness), equity, quality, resilience, responsiveness, and sustainability.
Interventions

Several interventions were considered for inclusion in the review. To limit the scope of the review, eligible studies were limited to one of four preventive nutrition or health service delivery interventions: vitamin A supplementation (VAS), immunization, and severe malnutrition and malaria programmes. These interventions were chosen based on their impact on mortality in children under five, their inclusion in globally accepted frameworks and targets, and their method of service delivery. Prevention, early detection, and treatment for common childhood diseases are critical to saving many young lives. Preventive interventions included in this review are generally highly cost-effective and deliver extensive benefits to society in terms of averted mortality and morbidity (16,17). The four selected interventions are part of the 2013 Lancet Maternal and Child Nutrition framework for actions to achieve optimum child nutrition and development (4) and are included as WHO and global health priorities in several World Health Assembly (WHA) targets and the SDGs. These four interventions also address the leading causes of mortality in children under five years of age (3,4), and are often delivered together. For example, many countries use CHEs as a delivery system and package VAS with other preventive health services such as immunizations, bednet distribution, growth monitoring and screening for severe malnutrition (18). It has also been well documented that scale-up of various programmes such as the ones included in the review over the past two decades have led to increased coverage and a decrease in child mortality and morbidity globally (19–21).
Chapter 2
Methodology

The search strategy for this review was developed and structured around three overlapping concepts. The following three search concepts were used: 1) service delivery; 2) child health and nutrition interventions; and 3) location (LMICs).

Search topic
The scoping review aimed to answer the following question:

What are the most commonly used parameters of effectiveness of community nutrition and health service delivery in low- and middle-income countries, beyond coverage?

Search strategy
The search strategy for this review was developed and structured around three overlapping concepts (see Figure 2). The following three search concepts were used: 1) service delivery; 2) child health and nutrition interventions; and 3) location (LMICs).

These concepts were identified and aligned with the search question to help investigate the understanding of measurement of effective service delivery for children in low-and middle-income countries. Concept 1 (service delivery) focused the search on service delivery effectiveness. Concept 2 (child health and nutrition interventions) focused the search on child health and nutrition programmes. Concept 3 (LMICs) focused the search on the location of programme delivery. The three concepts provided an overarching framework for the search strategy from which the detailed search terms were derived. The choice of search terms is critical, as language and trends used in describing health and nutrition interventions can change over time and by geographic location and setting. Through brainstorming and search testing, relevant search terms for each concept were identified and used in the review.
Concept 1
Since coverage is currently the main parameter for measuring effectiveness of health and nutrition service delivery, the term ‘coverage’ was included as a search term in the scoping review for this first concept of service delivery. This term (coverage) was used as a proxy to identify relevant studies (i.e., studies that included measures of effectiveness of service delivery). The term ‘effectiveness’ was not included in the final search strategy; when effectiveness was included as a search term, the resulting studies focused more on effectiveness of interventions rather than effectiveness of service delivery. ‘Service delivery’, however, was included as a search term related to the concept of effectiveness (i.e., as a proxy for effectiveness).

Concept 2
For the second concept, the search terms for child health and nutrition were kept deliberately broad so as not to exclude any potential parameters of service delivery effectiveness identified by the first concept (effectiveness). However, in order to ensure a programmatic focus, four interventions were also searched specifically (VAS, immunizations, severe malnutrition and malaria programmes).

Concept 3
Finally, to help identify studies relevant to LMICs, the search terms for location of programme delivery included specific country names as well as generic LMIC search terms developed by the Cochrane Effective Practice and Organisation of Care (EPOC) in collaboration with the World Health Organization (WHO) Library and the Campbell Collaboration. Countries included in the search were based on the 2021 World Bank Country Classification of LMIC economies.
Search terms

A total of three concepts were searched together in this review: concept 1 (service delivery), concept 2 (child health and nutrition), and concept 3 (LMICs). Synonyms (search terms) within a concept were included as ‘OR’ terms, and each concept was linked with the other with an ‘AND’ operator.

The following search terms were used in the review: ‘service delivery’ OR coverage AND ‘child nutrition’ OR ‘child health’ OR malaria OR malnutrition OR undernutrition OR vaccin* OR immunisation OR immunization OR ‘vitamin A supplementation’ AND LMICs.
Study selection

The studies and articles that were included in this review were limited to specific inclusion and exclusion criteria (see Table 1). The review was limited to peer-reviewed publications as well as grey literature published during the 20-year period from 1 January 2000 to 31 January 2021. The date range for the review was chosen to be sufficiently wide to capture the evolution of use of various parameters for service delivery effectiveness. The start date coincides with the pre-MDG era, when the Lancet series on child survival and other key reviews noted the “critical need for strengthened health systems to achieve child health gains” and also identified the need to increase the evidence on measures of effectiveness for child nutrition and health service delivery (22,23).

The following databases were selected for the scoping review, based on the nature of the search question: PubMed/MEDLINE; EMBASE; and Global Health. The database search was complemented by grey literature including reports from the United Nations (UN), non-governmental organizations (NGOs) and donor websites and technical information platforms such as the Emergency Nutrition Network (ENN). Reference lists of selected articles were also screened for potentially relevant publications for inclusion. No language inclusion or exclusion criteria were used, though it was expected that the majority of studies and articles would be in English or French.

Only studies with programme delivery in LMICs were included in this scoping review, representing the target area for the majority of community child health and nutrition interventions related to the SDGs. Strategies and resources that are used for these interventions are very different in high-income countries. Studies were also limited to primary care (community- or facility-based), and those with a main focus on tertiary care (hospitals) were excluded from the review.

Interventions

The four preventive health and nutrition interventions included in the review were: vitamin A supplementation (VAS), immunizations, and severe malnutrition and malaria programmes.

The immunizations selected for this review were limited to the nine WHO-recommended routine immunizations for children under five years of age: Bacille Calmette-Guérin (BCG); hepatitis B; polio; diphtheria; tetanus, pertussis (DTP)-containing vaccine; haemophilus influenzae type b; pneumococcal; rotavirus; measles; and rubella.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Included</th>
<th>Excluded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>January 1, 2000 – January 31, 2021</td>
<td>Prior to January 2000</td>
</tr>
<tr>
<td>Language</td>
<td>All</td>
<td>None (majority in English and French)</td>
</tr>
<tr>
<td>Source</td>
<td>Journal articles and grey literature (e.g., reports, ENN)</td>
<td>Full text not available</td>
</tr>
<tr>
<td>Availability</td>
<td>Full text available</td>
<td>Full text not available</td>
</tr>
<tr>
<td>Geographic location</td>
<td>LMIC</td>
<td>Not LMIC</td>
</tr>
<tr>
<td>Health-care setting</td>
<td>Primary health care (community- or facility-based)</td>
<td>Tertiary care (hospital) as the major focus of the study or report</td>
</tr>
<tr>
<td>Intervention</td>
<td>Vitamin A supplementation, immunizations (BCG, hepatitis B, polio, DTP-containing vaccine, haemophilus influenzae type b, pneumococcal, rotavirus, measles, and rubella), severe malnutrition, malaria</td>
<td>Articles and reports that do not reference at least one of the four target interventions</td>
</tr>
</tbody>
</table>
Screening and data charting (extraction)

After removal of duplicates, a screening of all titles and abstracts of eligible studies was undertaken to determine their relevance and inclusion in the review. Data extracted from eligible studies included type of intervention, description, and frequency of the 10 predefined parameters of effectiveness.

Selection of parameters

The PHCPI framework follows a left-to-right logical framework model and illustrates the relationship between five components or domains. The parameters selected for this review align primarily with two of the PHCPI domains: ‘service delivery’ and ‘outcomes’. These domains were identified as central to the scoping review. ‘System’ and ‘input’ domains were considered too distal and broad for the purposes of the review and were not included. The ‘outputs’ domain refers primarily to coverage of key services, while this review focused on parameters beyond – or in addition to – coverage; hence, the outputs domain was also excluded from the review.

An iterative process was used to develop the parameters included in the review. Parameters from the PHCPI service delivery and outcomes domains were compared to other models and indicators and searched in order to understand what language was being used in published and unpublished literature. The parameters were then adjusted if more common words were used to describe the same domains compared with those used in the PHCPI framework and searched again to ensure the appropriate terms were being identified for the review.

Through this process, we identified 10 parameters of service delivery effectiveness which might be used alongside coverage to estimate the comparative effectiveness of public health delivery strategies: community acceptance, access, availability, community awareness, efficiency (cost-effectiveness), equity, quality, resilience, responsiveness, and sustainability (see Table 2). These 10 were selected for screening and data charting (extraction) in this review. The linkages between the service delivery and outcomes domains of the PHCPI framework and the 10 proposed parameters of delivery effectiveness for effective health and nutrition service delivery are described below.

Service delivery domain

The PHCPI centres on the service delivery domain, which comprises supply and demand components and a people-centred approach. The PHCPI service delivery domain is further divided into five sub-domains, which were all represented in parameters selected for this review: 1) population health management (the parameters of acceptance and community awareness were identified for this sub-domain), 2) facility organization and management (the parameter of sustainability was identified for this sub-domain), 3) access (no change from the PHCPI framework), 4) availability of effective PHC services (no change), and 5) high quality PHC (no change).

Outcomes domain

Outcomes are influenced by the other domains and are divided into the following five sub-domains, which were all represented by parameters selected for this review: 1) health status (the parameter of clinical outcomes was identified for this sub-domain), 2) responsiveness to people (no change), 3) equity (no change), 4) efficiency (no change, also identified as cost-effectiveness), and 5) resilience of health systems (no change).

These 10 parameters are by no means exhaustive but represent a preliminary selection of parameters that were explored in this review. Clinical outcomes were ultimately not included in the selection of parameters for the review. This was not due to a lack of interest or relevance; they are included in the PHCPI conceptual framework. However, including clinical outcomes as a potential parameter was found to shift the focus towards effectiveness of interventions and away from the main exploratory topic of the review – effectiveness of service delivery. In preliminary research, it was also found that including clinical outcomes as a parameter did not enrich the results; studies that focused on clinical outcomes generally did not focus on service delivery. However, since clinical outcomes are critical for programmatic purposes, they were included in subsequent stakeholder consultations on this topic.
The 10 parameters were purposefully not included as search terms. Instead, eligible studies that referred to coverage or service delivery were screened to explore whether parameters other than coverage are used to measure effectiveness of delivery of child health and nutrition programmes. In order to capture all potential references to potential parameters for effectiveness of service delivery, synonyms were also included in the search terms for data extraction: disparities, inequalities and wealth for equity, robustness for resilience, long term for sustainability, as well as any root terms and variations in spelling. The full texts of all articles referring to at least three of the four selected interventions were read as part of a secondary screening.

An overview of the ranking of each parameter based on title and abstract screening is presented in the results, along with narrative that is based on full text reading of articles and supplemented by grey literature and other relevant publications.

All citations were managed using Mendeley Reference Manager (Version 1.19.4).
Table 2 Parameters of health and nutrition service delivery effectiveness included in the review and related components of the PHCPI conceptual framework (24)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
<th>Related PHCPI component</th>
<th>Description of PHCPI component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community acceptance</td>
<td>The extent to which the community members are willing to use services being delivered.</td>
<td>Population health management</td>
<td>Are local populations engaged in the design and delivery of health services to ensure that their needs and priorities are met?</td>
</tr>
<tr>
<td>Access</td>
<td>The extent to which the delivery programme ensures access to services and interventions, and minimizes physical, logistic, social, cultural or financial barriers that can prevent community participation in service delivery.</td>
<td>Access (No change)</td>
<td>Do patients have financial, geographic, and timely access to PHC facilities?</td>
</tr>
<tr>
<td>Availability</td>
<td>The extent to which the delivery programme supplies services and commodities in a sufficient and timely manner.</td>
<td>Availability (No change)</td>
<td>Are the staff of primary care facilities present and competent, and motivated to provide safe and respectful care?</td>
</tr>
<tr>
<td>Community awareness</td>
<td>The extent to which the community is aware of the intervention being delivered and/or that service delivery is taking place and when it is taking place.</td>
<td>Population health management</td>
<td>Are local populations engaged in the design and delivery of health services to ensure that their needs and priorities are met?</td>
</tr>
<tr>
<td>Efficiency/Cost-effectiveness</td>
<td>Outcomes divided by cost of delivery.</td>
<td>Efficiency (No change)</td>
<td>Are resources used optimally to improve health outcomes?</td>
</tr>
<tr>
<td>Equity</td>
<td>The extent to which the programme minimizes disparities in either access or health and nutrition outcomes.</td>
<td>Equity (No change)</td>
<td>Are health outcomes equitably distributed across society, by geography, education, and occupation?</td>
</tr>
<tr>
<td>Quality</td>
<td>Services and interventions are provided safely, in a timely way, and in a way that is people-centred.</td>
<td>Quality (No change)</td>
<td>Are PHC services high quality, meeting people’s needs, and connected to other parts of the health system?</td>
</tr>
<tr>
<td>Resilience</td>
<td>A delivery programme’s ability to continue core functions or return to normal operations over an acceptable period following a shock or disruption (such as COVID-19 or other national emergencies). Also referred to as robustness.</td>
<td>Resilience (No change)</td>
<td>Is the PHC system able to continuously deliver health care, regardless of political or environmental instability?</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>The ability of a system to be sensitive and able to pivot in response to shocks (such as COVID-19 or other national emergencies), e.g., changing timing or location of service delivery following a crisis. Sometimes referred to as ‘humanitarian adaptiveness’.</td>
<td>Responsiveness (No change)</td>
<td>Does the PHC system respond quickly to the needs of the population?</td>
</tr>
<tr>
<td>Sustainability</td>
<td>The extent to which a delivery programme maintains operations without interruption over an extended period.</td>
<td>Facility organization and management</td>
<td>Are PHC facilities organized and managed to promote team-based care provision, use of information systems, support staff, and performance measurement and management to drive continuous improvement?</td>
</tr>
</tbody>
</table>
Results

Search results

A total of 13,427 records were identified through database searches and grey literature. Of these, 589 were eligible to be included in the review for data extraction (see Figure 3). Of the 589 eligible records, 88 (15%) referred to vitamin A supplementation, 277 (47%) referred to child immunizations, 107 (18%) referred to severe malnutrition, and 185 (31%) referred to malaria. Several articles mentioned more than one intervention; 60 mentioned at least two of four interventions and seven articles referred to three interventions.

Overall, 14 per cent (80) of articles had a global perspective and 7 per cent (41) were regional in their scope (two or more countries), while the majority (79%, 468) were single-country studies. While all LMIC regions were represented in this review, over half (52%, 307) of eligible articles focused on sub-Saharan Africa. Just under one fifth of studies (19%, 112) were located in South Asia. A full breakdown by region is presented in Table 3.

Table 3 Source of eligible articles, by region

<table>
<thead>
<tr>
<th>Region</th>
<th>Eligible articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global</td>
<td>80</td>
</tr>
<tr>
<td>East Asia and Pacific</td>
<td>50</td>
</tr>
<tr>
<td>Eastern Europe and Central Asia</td>
<td>2</td>
</tr>
<tr>
<td>Latin America and Caribbean</td>
<td>28</td>
</tr>
<tr>
<td>Middle East and North Africa</td>
<td>10</td>
</tr>
<tr>
<td>South Asia</td>
<td>112</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>36</td>
</tr>
<tr>
<td>Eastern and Southern Africa</td>
<td>158</td>
</tr>
<tr>
<td>West and Central Africa</td>
<td>113</td>
</tr>
<tr>
<td>Total</td>
<td>589</td>
</tr>
</tbody>
</table>

Figure 3 Flowchart of articles included in the scoping review
Parameters of health and nutrition service delivery effectiveness

The 10 predefined parameters of delivery effectiveness were searched among the 589 eligible articles in this scoping review. Of the 10, access, equity, efficiency, quality and sustainability were most referenced both overall and by intervention, in descending order. Access was identified most frequently overall among 25% of articles, followed by equity (23%), efficiency (22%), quality (19%), sustainability (16%), community awareness (9%), community acceptance (6%), availability (5%), resilience (0%) and responsiveness (0%) (see Figure 4 and Table 4).

Coverage was identified in 567 (96%) articles overall while only 21 (4%) of articles included ‘service delivery’ exclusively and did not reference coverage (not shown).

To test the assumption that coverage is used as the primary parameter for effectiveness in child health and nutrition programmes, a parallel search was conducted which explicitly specified the four selected interventions along with the LMIC search terms but removed ‘coverage’ and ‘service delivery’ from the search. The result of this search showed the same proportion of coverage (96%), as well as similar proportions of the four interventions.

Interventions

The frequency of parameters of effectiveness differed by intervention; however, access, equity, efficiency, quality and sustainability were consistently identified in the top half for all four interventions. Equally, the lowest frequency parameters across all four interventions were resilience and responsiveness, of which the latter was not identified in any of the articles included in the review. The frequency of the remaining three parameters (community awareness, community acceptance and availability) was slightly different for each intervention but they were all ranked between sixth and eighth of the 10 parameters (see Table 4 and Figures 5-8).

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Figure 4 Overall distribution of parameters of effectiveness among eligible articles (n=589)
The ranking of the top five parameters for malaria mirrors the overall ranking for all interventions combined. Access (30%) and equity (28%) were the top two parameters for malaria. These were followed by efficiency (23%), quality (22%) and sustainability (18%). The bottom ranking parameters are all found in fewer than 10 per cent of articles referring to malaria interventions, with availability ranked sixth (8%).

Severe malnutrition

Efficiency was ranked first among severe malnutrition interventions, followed by access and quality. Almost one third of articles referring to severe malnutrition (31%) mentioned efficiency and one quarter (25%) mentioned both access and quality. Equity was also important among severe malnutrition interventions (23%, ranked fourth). Sustainability was ranked fifth (16%), and the remaining parameters were identified in fewer than 10 per cent of articles (availability 9%, community awareness and community acceptance 8% each, and one article for resilience).

Immunization

Equity was ranked as the top parameter among immunization articles (22%) followed closely by access (21%). The next four parameters were ranked almost equally: efficiency (16%), quality (15%), sustainability (14%) and community awareness (14%). The bottom four parameters for immunizations (community acceptance, availability, resilience and responsiveness) were identified in fewer than 10 per cent of immunization articles.

Vitamin A supplementation

As with severe malnutrition, efficiency was the top ranked parameter for VAS (35%). This was followed by access and sustainability (24% each), equity (23%) and quality (20%). The bottom five parameters for VAS were identified in fewer than 10 per cent of articles.
Parameters

Access

Frequency Access was identified as the most frequent parameter of service delivery effectiveness among all articles screened for this review. Overall, one quarter, or 145 of 589 articles (25%) referred to access. Access was also among the top two parameters for all four interventions and the top (most frequent) parameter for malaria. This parameter was identified in 30 per cent of eligible articles referring to malaria, in 25 per cent of articles referring to severe malnutrition, in 24 per cent referring to VAS, and 21 per cent referring to immunizations.

Description of parameter in reviewed articles
Access refers to the extent to which the delivery programme ensures access to services and interventions, and minimizes physical, logistic, social, cultural or financial barriers that can prevent community participation in service delivery. Access is included as a target for the SDGs (access to quality essential health-care services) (25), and among studies screened in this review it was a common thread that impact of interventions can be improved by improving access, as well as coverage and efficiency (26). Access in reviewed articles was mainly referred to as a lack of physical and logistic barriers that can prevent community participation in service delivery, for example time to reach a community health centre to receive preventive services. In addition to these barriers to access, reviewed articles also identified social, cultural and financial barriers that must be addressed in order to allow children to...
access preventive interventions with ease (26). Trained human resources at community level and, moreover, perception of health provider skills and quality of interaction between health-care provider and client were also identified as important factors for to access to care (27–29).

Preventive child health and nutrition interventions in LMICs are delivered mainly through either outreach activities or at health-care facilities (30). Programme delivery plays a key role in promoting community participation. Providing access to services close to target populations can help overcome this barrier, including outreach and preventive interventions such as community-based management of acute malnutrition (CMAM) with the purpose of achieving “the greatest possible coverage and [to] make services accessible for the highest possible proportion of a population in need” (26). Child Health Events have increased in popularity over the past 20 years, and are also seen as an effective method for reaching high – and equitable – coverage of child health and nutrition interventions. CHEs now commonly include diverse packages of interventions, including delivery of vitamin A supplementation, immunizations, insecticide-treated nets, as well as screening and referral services for acute malnutrition (18,31). These campaigns and health-day style events represent one-off or cyclical events; however, the trend towards routinization of services may decrease access to services, which may in turn reduce coverage. If distances are long or transport is not available or affordable, families may be less likely to travel for preventive interventions (25,32). A reduction or elimination of fees has been shown to improve access as well as equity, with the greatest impact on children from the poorest households as measured by wealth quintile (28).

Equity

**Frequency** Equity was identified in 138 of 589 studies (23%) and was second overall among parameters for effective programme delivery. Within each of the four interventions, equity was the top (most frequent) parameter for immunizations (22%), second for malaria (28%), and fourth for both VAS and severe malnutrition (23% each).

**Description of parameter in reviewed articles** In the review studies, inequity mainly refers to a disadvantaged segment of the population, was usually defined in terms of gender, education, and/or income or wealth quintiles or some other type of socioeconomic status, and grouped geographically (e.g., rural versus urban), experiencing diminished health and/or nutrition outcomes or impaired access to health and nutrition services (33). Equity, or inequities of coverage, are determined by various factors: geographic, economic and sociocultural. An equity-focused approach can result in higher coverage among the most deprived populations who are often those most in need (30,31). Studies included in this review suggest that an equity-focused approach to service delivery results in a reduction in existing disparities in access, especially between most and least deprived groups and geographic areas, and could result in lower child mortality, improved health outcomes, and higher cost-effectiveness compared with “mainstream approaches” (30). "Myriad and complex” links between gender and health service delivery were also identified in the review (34). For example, while one review of VAS in sub-Saharan Africa showed gender-equitable VAS coverage, it identified that gender equity extends to issues related to timing, location, staff, safety, access, and consent for service delivery.

Monitoring equity and ensuring access through community-based approaches have also been seen to increase coverage and utilization of health and nutrition services (35), and programmes should be collecting information on whether and to what extent health and nutrition interventions are reaching the same children (36). Geographic equity can seem straightforward to monitor; however, national success does not always translate equitably at lower administrative levels – specifically regularly unreached children, mostly in dispersed, rural communities (37). These inequities in accessing hard-to-reach areas have very serious implications for preventive health and nutrition services including immunizations (38).

Efficiency

**Frequency** Efficiency was third overall among effectiveness parameter search (identified in 132 or 22% of studies). Among individual interventions, this parameter was most frequent for both VAS (35%) and severe malnutrition (31%) and third for both malaria (23%) and immunizations (16%).

**Description of parameter in reviewed articles** Efficiency, or efficiency, generally refers to the outcomes divided by cost of delivery. However, various definitions were used for cost-effectiveness or
efficiency in reviewed articles, including the number of deaths averted per amount invested (30) or cost per life-year saved for a set of interventions, with a benchmark of less than three-times per person income (31). Most eligible articles mentioned or referred to efficiency as a desirable attribute for interventions, while fewer than one third (27%) specifically studied cost-effectiveness or undertook cost–benefit analyses.

Some studies noted that advances in technology and an increase in community-based programming have generated innovative strategies with the potential to reach the underserved in a cost-effective manner (28,30). This shift from centralized, inpatient care towards community-based models “allows more affected children to be reached and is cost effective” (31). There is no longer this trade-off between equity and efficiency when referring to child health and nutrition (and child survival overall) and there is evidence to suggest that an equitable approach to service delivery will be more effective, meaning that coverage will increase, be more equitable, and at the same time more cost-effective (30).

Quality

Frequency Quality was identified as fourth overall, mentioned in almost one fifth (113, or 19%) of articles included in the review. This parameter was also fourth among articles referring to severe malnutrition (25%), malaria (22%) and immunizations (15%), and fifth for VAS (20%).

Description of parameter in reviewed articles

Quality refers to safe and timely provision of services, and in a way that is people-centred.

Several aspects of quality were mentioned in the reviewed articles. These included reference to a reduction of service quality based on number of co-delivered interventions (18), adjusting delivery by increasing the number of community health workers to improve the quality of the service they provide (39), or quality of interaction between health-care provider and user (40). However, no specific or standardized definition of quality was noted. Review of intervention performance was often undertaken using data quality of information systems (41) but not quality of services or service delivery.
Sustainability

**Frequency** Sustainability was fifth overall, mentioned among 94 (16%) of eligible studies. It was tied for second among articles referring to VAS (24%), on a par with access, and fifth for malaria (18%), severe malnutrition (16%) and immunizations (14%).

**Description of parameter in reviewed articles**

One challenge of this parameter is that sustainability is an integrated and interconnected concept, and as such definitions and subsequent measurement depend on perspective (36). The scope of sustainability can refer to financial, economic, social, environmental or institutional capacity that supports long-term benefits (children surviving – and thriving). The Organisation for Economic Co-operation and Development (OECD) definition of effectiveness also refers to achieving objectives in a “sustainable fashion” – or “the extent to which the net benefits of the intervention continue or are likely to continue.” Sustainability in this regard refers to whether supply or benefits from service delivery of interventions can and will continue over time without interruption.

Most studies in this review referred to “sustained approaches” or “sustained progress” or “long-term outcomes.” CMAM programmes place a system design and delivery focus on understanding and acceptance in order to have a sustainable and effective programme (26). Sustainability is a concern for many service delivery platforms, and lack of sustainability may not only affect intervention capacity based on unstable commitments and resources, but it can also specifically increase inequities by concentrating services in smaller or easier to reach populations (18,37).

Community awareness

**Frequency** Overall, community awareness was sixth most common or frequent among the 10 search parameters and was identified in 9 per cent (54) of eligible studies. Community awareness was fifth (tied with sustainability) among immunization studies (14%), and on a par with (similar frequency to) efficiency, quality and sustainability. However, this parameter was identified in fewer than 10 per cent of articles among the remaining interventions: sixth among VAS (9%), seventh among severe malnutrition (8%, tied with community acceptance), and eighth among malaria articles (4%).

**Description of parameter in reviewed articles**

Community awareness refers to community knowledge of the intervention being delivered and/or that service delivery is taking place and when it is taking place. Community awareness in reviewed studies most often referred to community awareness-raising prior to event days (25), or through use of social marketing for bednet distribution (28). Community awareness-raising also intersects with equity and gender (34). For example, taking into consideration social norms during message campaigns, evidence suggests that women are the main target of these campaigns; however, including and targeting fathers or male caregivers during campaigns has been linked to improved health outcomes (42). Other points to consider related to the intersection between community awareness and gender include: timing of delivery of media campaigns, who is chosen to deliver messages (e.g., for in-person campaigns such as town criers) and how they are chosen, who decides on the target audience, what images and vocabulary is used in messaging, and involvement of community leaders (34).

Community acceptance

**Frequency** Community acceptance was identified among 36 (6%) of eligible studies and was seventh overall in frequency among the 10 parameters. This parameter was also seventh for severe malnutrition (8%, tied with community awareness), immunizations (6%) and malaria (5%), and eighth among VAS interventions (1%).

**Description of parameter in reviewed articles**

Community acceptance – the extent to which the community members are willing to use services being delivered – was not frequently mentioned in the reviewed articles. The few articles that did refer to community acceptance presented the parameter as an important factor in service delivery – for example, community acceptance of community-directed interventions (43,44). However, overall, inadequate information on community acceptance was available. Only three reviewed articles focused on community acceptance of specific interventions (45–47); these referred to measures of community acceptance through direct observation, in-depth interviews, and focus group discussions, as well as through impact evaluations based on health outcomes.
Availability

Frequency Availability was eighth of 10 parameters in terms of overall frequency and mentioned in 32 (5%) studies included in the review. This parameter was more frequent (sixth) for both severe malnutrition (9%) and malaria (8%), and less so for the other two interventions – seventh for VAS (5%) and eighth for immunizations (3%).

Description of parameter in reviewed articles
Sufficient and timely availability of commodities and availability of human resources are critical to effective service delivery. In financially restricted economies, programmatic choices can be based on availability of resources (supply) instead of based on need (demand), reflecting mainstream or equity-focused approaches to service delivery, respectively (30). ‘Availability’ in the eligible review articles referred to a range of factors: availability of infrastructure, evidence (data and monitoring documents), health-care services and service delivery, health-care workers, and resources such as immunizations and bednets (48,49).

Resilience

Frequency Resilience was ninth overall. This parameter was only mentioned in two articles: one that referred to immunizations and one that referred to severe malnutrition and VAS. No studies with malaria referred to resilience.

Description of parameter in reviewed articles
The resilience of a system refers to its ability to absorb disturbance, to adapt, and to respond with the provision of needed services (50). Resilience is not an action but rather a dynamic objective (51) and can be thought of in terms of adaptive resilience (to acute shocks), or planned resilience (to chronic stress) (52). In the face of crises, health and nutrition service delivery must be resilient, meaning able to absorb shocks and not lose any previously made gains. In other words, these services must be able to maintain core functions – continue these critical interventions – when a crisis hits (i.e., business continuity). The OECD definition of sustainability refers to resilience; the terms are linked. Sustainability of service delivery
according to the OECD refers to the “continuation of benefits from an intervention after major assistance has been completed”. This also includes analysis of resilience of the delivery system to withstand any shocks (36).

The mention of resilience in identified articles referred to either enhancing resilience of a population in response to receiving service delivery (53) or to actual delivery of services (polio vaccination) (54). Upon further snowballing, it was noted that resilience could refer to lack of capacity-building and resilience of routine services to respond to increased demand of health-seeking behaviour (55). Many studies mostly use general, sweeping terms when referring to resilience, such as “robust and sustainable systems” (35) or a “robust maternal, newborn, and child health (MNCH) programme” (49) or “resilience of health workers” in conflict areas (56). Overall, there has been little research on service delivery resilience, and how it can best be built and measured. However, studies on health system resilience have begun to increase since the 2014 Ebola epidemic in West Africa (57).

In the case of Ebola-affected countries, efforts have been directed not only to restore how the system functioned before the crisis but to transform and fundamentally improve the health system (50).

### Responsiveness

**Frequency** Responsiveness was not identified in any of the eligible articles.

**Description of parameter in reviewed articles** The responsiveness of a delivery system – sometimes referred to as ‘humanitarian adaptiveness’ (58) – refers to the ability of a system to be sensitive and able to pivot in response to shocks. This means changing humanitarian approaches and interventions in response to change, rather than continuing with a plan that no longer fits the problem it is trying to address. It is a concept that is encountered often in practice but is not well documented, which is reflected in this review.

Responsiveness can refer to changing timing or frequency of data collection and reporting, or to larger systems changes such as linkages of interventions or the way interventions are delivered. Changes can be triggered by various factors. These include changes in the humanitarian situation (needs, location, context), changes in the system or organization, at the beginning or end of a crisis, changes in understanding of quality of a response (programmatic or user feedback), or a change in paradigm of a response such as during new or unexpected crises (e.g., COVID-19). Adapting and responding to complex or changing circumstances is important for effectiveness (36). Hence, the main question when speaking about responsiveness is, *can a health and nutrition service delivery system change when needed?* More specifically, looking operationally – changing where and how, programmatically – changing what and who, and strategically – changing roles and functions.
Chapter 4
Discussion

This means thinking beyond using the proportion of children reached – or coverage – as the only parameter for success and exploring other parameters that contribute to effective service delivery, or that are outcomes of effective service delivery.

To date, no conceptual framework on the effectiveness of service delivery of preventive interventions for child health and nutrition has been adopted, though some work has been done towards proposing a basis for this type of approach (59). Health-care effectiveness generally refers to interventions, for example as defined by the OECD Development Assistance Committee (DAC): “the extent to which the intervention achieved, or is expected to achieve, its objectives, and its results, including any differential results across group” (36). This definition also includes reference to equity (“differential results across groups”); however, it does not otherwise include any specific reference to measuring service delivery.

Coverage remains the primary parameter of service delivery effectiveness among child health and nutrition programmes in LMICs. However, various constraints have been identified concerning why those most in need are not being reached (9,19). In order to better understand how a programme is performing, how that service is being delivered must also be measured and understood (12). This means thinking beyond using the proportion of children reached – or coverage – as the only parameter for success and exploring other parameters that contribute to effective service delivery, or that are outcomes of effective service delivery. The PHCPI conceptual framework that describes the critical components of a strong primary health-care system provided a backbone to identify other parameters that help support the effectiveness of service delivery.

The top three parameters of effectiveness of service delivery for preventive child health and nutrition programmes that have gained popularity since the pre-MDG era are: access, equity and efficiency. It was not
Discussion

It is surprising that access and equity are first and second overall; access is included as a target for health in the SDGs and improving access is often linked with improving equity. The increase in performance-based financing for health and nutrition services in LMICs (60) and general constraints on health and nutrition budgets help support the high frequency of efficiency in this review.

The mid-frequency parameters in this review were quality and sustainability. It has been posited that coverage of interventions potentially overestimates the benefits of health and nutrition services (61) and that a dimension of quality should be added to the measurement of intervention coverage. Finally, donors are increasingly concerned about the sustainability of health and nutrition services (62). However, defining and measuring both quality and sustainability of health and nutrition service delivery remains a challenge, as it does for some of the lower ranking parameters.

The lowest frequency parameters were community awareness, community acceptance, availability, resilience and responsiveness, with the exception of ‘community awareness’ among immunization articles, which was on a par with the mid-frequency parameters. Community awareness, community acceptance and availability are not new concepts or parameters; they are part of well-established frameworks of coverage and characteristics of primary health care, although they are not significantly reflected in the reviewed community-based interventions. It is not clear whether this stems from a lack of documentation or for other reasons. The bottom two parameters – resilience and responsiveness – have only recently been included in narratives on health service delivery; this may help explain their low frequency in this review, including the complete absence of ‘responsiveness’.

It is evident that coverage is not the only parameter that is being used to examine effectiveness of health and nutrition service delivery. Parameters such as access, equity, efficiency, quality and sustainability are interconnected and are used to quantify and describe what it really means to have effective health and nutrition service delivery for children in LMICs. However, this review has not provided strong enough evidence to determine whether the parameters included here should be considered as stand-alone or whether they are supporting actors to coverage – or even whether they are outcomes of effective service delivery.

Limitations

Several limitations have been identified in this study which could affect the strength of the results. The search terms that were used in this review may have unintentionally excluded relevant results. To mitigate this risk, a wide net was cast such that all four interventions were searched directly along with the umbrella terms child health and child nutrition. ‘Impact’ was also excluded as a search term, since it refers to higher-order effects and broader changes, compared to ‘effectiveness’, which is more along the results chain and concerned with interventions at a lower level (36). This decision may have excluded studies using the terms impact and effectiveness interchangeably.

The final selection of the four interventions that were included in the review may have biased the results. Immunizations were over-represented compared with the other three interventions, but it is unclear whether this reflects the fact that there is more funding, and hence subsequent research and documentation on service delivery for that particular intervention compared with the others, or whether there are other reasons why fewer results were attributed to VAS, severe malnutrition and malaria. It is also possible that more research has been published on the topic of service delivery effectiveness in LMICs using other interventions or even among other sectors not included in this review. It is also possible that the low ranking of certain parameters is an artefact of bias in selection of search databases, that studies that include emerging parameters are not yet reflected in the literature, that these types of studies are not published externally or readily searchable, or that search terms do not reflect the correct vernacular.

Importantly, the studies included in this review most often focused on effectiveness of interventions, with only minor consideration given to parameters for measuring effectiveness of service delivery; this distinction was not made when screening titles and abstracts for data extraction and ranking parameters.
Chapter

4
Conclusions

Developing a framework for effectiveness of service delivery would provide a critical and standardized point of reference to improve context-specific child health and nutrition interventions, with the ultimate goal of increasing their impact among vulnerable children and other marginalized populations.

OECD DAC evaluation criteria emphasize the importance of understanding context. Not all services and contexts are the same, and context should dictate how parameters of effectiveness of service delivery are used. Developing a framework for effectiveness of service delivery would provide a critical and standardized point of reference to improve context-specific child health and nutrition interventions, with the ultimate goal of increasing their impact among vulnerable children and other marginalized populations.

The current literature, however, is insufficiently developed to make strong conclusions on which additional parameters, other than coverage (and perhaps equity), could be used to describe effectiveness of health and nutrition service delivery strategies. A large gap remains in our understanding of how to make better use of these potential parameters of service delivery effectiveness – whether to improve upon existing monitoring of programme delivery effectiveness, or perhaps also to gain a better understanding of how decision makers perceive delivery effectiveness. Further exploration is also required in refining parameter definitions, and whether any proposed changes to the PHCPI framework are warranted. More research is also needed to understand practicalities such as availability and usefulness of data for decision-making. Stakeholder consultations in the form of an online survey, interview, or small group discussions would help improve our understanding of the linkages between this scoping review and the operational reality in LMICs regarding additional parameters of service delivery effectiveness.
References


Effective coverage is a concept that has gained momentum in recent years and includes a parameter of quality of care. However, as effective coverage is still an emerging topic, and a standardized definition has not been adopted, it was not included in this review (61).


EPOC LMIC filters 2020 https://epoc.cochrane.org/lmic-filters


The following search terms were used for concept 3 (LMIC):
- 'global south' OR 'africa south of the sahara' OR 'sub saharan africa' OR 'africa, central' OR 'central africa' OR 'africa, northern' OR 'north africa' OR 'northern africa' OR magreb OR maghrib OR sahara OR 'africa, southern OR 'southern africa' OR 'africa, eastern OR 'east africa' OR 'eastern africa' OR 'africa, western OR west africa OR western africa OR 'west indies' OR 'indian ocean islands' OR caribbean OR 'central america' OR 'latin america' OR 'south and central america' OR 'south america' OR 'asia, central' OR 'central asia' OR 'asia, northern' OR 'north asia' OR 'northern asia' OR 'asia, southeastern' OR 'southeastern asia' OR 'southeast asia' OR 'southeast asia' OR 'asia, eastern' OR 'easter asia' OR 'asia, western' OR 'western asia' OR 'europe, eastern' OR 'east europe' OR 'eastern europe' OR 'developing country' OR 'developing countries' OR 'developing nation' OR 'developing nations' OR 'developing population' OR 'developing populations' OR 'developing world' OR 'less developed country' OR 'less developed countries' OR 'less developed nation' OR 'less developed nations' OR 'lesser developed countries' OR 'under developed country' OR 'under developed countries' OR 'under developed nations' OR 'underdeveloped country' OR 'underdeveloped countries' OR 'underdeveloped nation' OR 'underdeveloped nations' OR 'underdeveloped population' OR 'underdeveloped populations' OR 'underdeveloped world' OR 'middle income country' OR 'middle income countries' OR 'middle income nation' OR 'middle income nations' OR 'middle income population' OR 'middle income populations' OR 'low income country' OR 'low income countries' OR 'low income nation' OR 'low income nations' OR 'low income population' OR 'low income populations' OR 'lower income country' OR 'lower income countries' OR 'lower income nation' OR 'lower income nations' OR 'lower income population' OR 'lower income populations' OR 'underserved country' OR 'underserved countries' OR 'underserved nation' OR 'underserved nations' OR 'underserved population' OR 'underserved populations' OR 'under served country' OR 'under served countries' OR 'deprived country' OR 'deprived countries' OR 'deprived population' OR 'deprived populations' OR 'poor country' OR 'poor countries' OR 'poor nation' OR 'poor nations' OR 'poor population' OR 'poor populations' OR 'poor world' OR 'poorer country' OR 'poorer countries' OR 'poorer nation' OR 'poorer nations' OR 'poorer population' OR 'poorer populations' OR 'developing economy' OR 'developing economies' OR 'less developed economy' OR 'less developed economies' OR 'underdeveloped economy' OR 'underdeveloped economies' OR 'middle income economy' OR 'middle income economies' OR 'low income economy' OR 'low income economies' OR 'lower income economy' OR 'lower income economies' OR 'low gdp' OR 'low gnp' OR 'low gross domestic' OR 'low gross national' OR 'lower gdp' OR 'lower gdp' OR 'lower gdp' OR 'lower gdp' OR 'third world' OR 'lami country' OR 'lami countries' OR 'transitional country' OR 'transitional countries' OR 'emerging economies' OR 'emerging nation' OR 'emerging nations'


Breakdown by UNICEF regional classifications https://data.unicef.org/regionalclassifications/