Using multidimensional poverty and vulnerability indices to inform equitable policies and interventions in health emergencies

Research brief

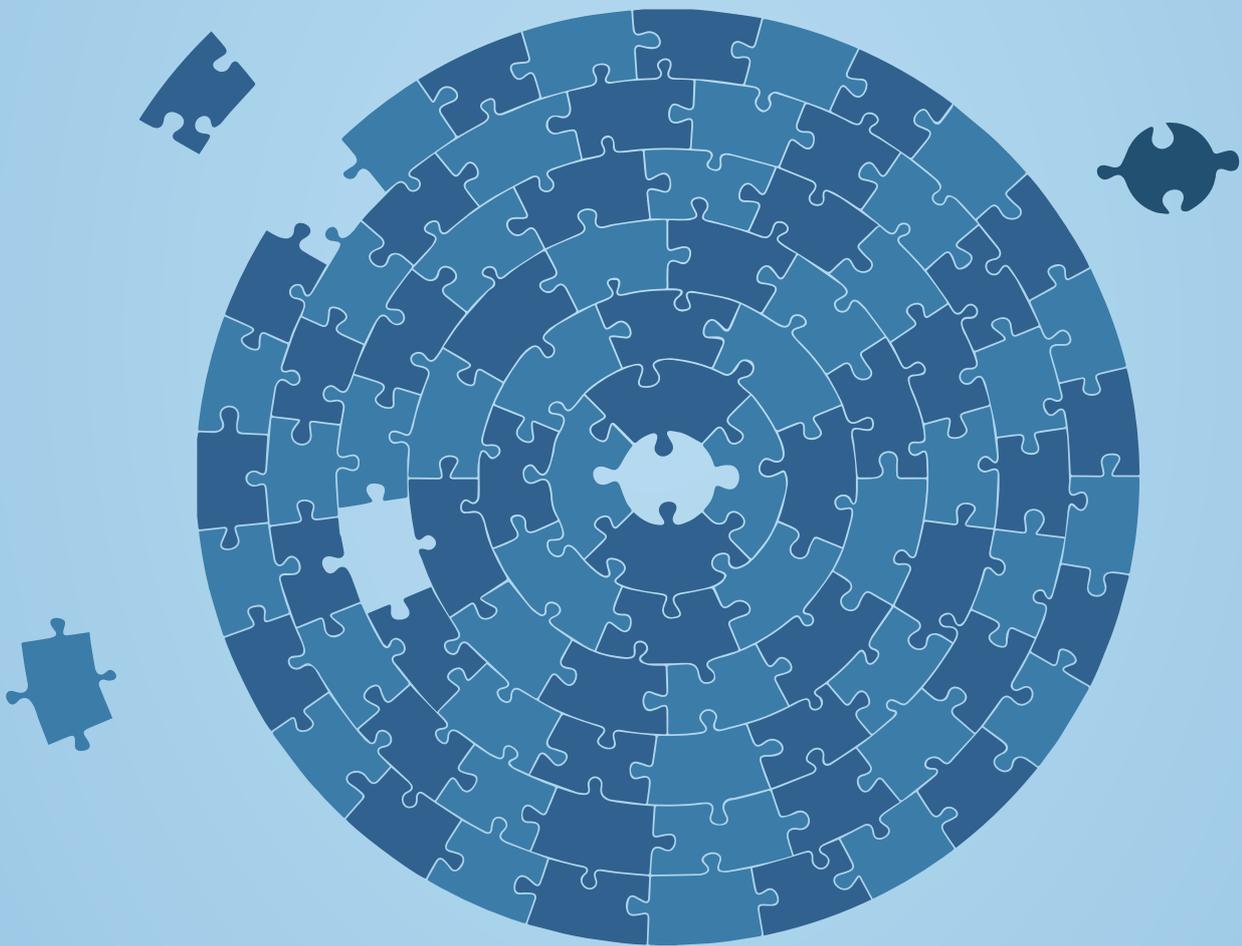**World Health Organization**

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Acknowledgements

Acronyms

DHS	Demographic and Health Surveys
EWARS	Early Warning Alert and Response System
HeRAMS	Health Resource Availability Mapping System
HESPER	Humanitarian Emergency Settings Perceived Needs Scale
HNOs	Humanitarian Needs Overviews
HRPs	Humanitarian Response Plans
IRA	Initial Rapid Assessment
MICS	Multiple Indicator Cluster Surveys
MIRA	Multisectoral Initial Rapid Assessment
MPI	Multidimensional Poverty Index
MVI	Multidimensional Vulnerability Index
OPHI	Oxford Poverty and Human Development Initiative
PHIS	Public Health Information Services
PHSA	Public Health Situation Analysis
RHA	Rapid Health Assessment
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
WHO	World Health Organization
Youth NEET	Youth Not in Education, Employment, or Training

Executive summary

Background

Health emergencies pose serious threats to human lives and livelihoods, including immediate threats to health, survival, the economy and social life. As past and present experiences have shown, for example, the 2013–2015 Ebola outbreak in West Africa or the global COVID-19 pandemic, there is a risk that health emergencies exacerbate disadvantages by disproportionately affecting those who are already worse off. This has been the case both for directly health-related impacts of health emergencies and for their wider implications. Health decision-makers require information on disadvantage – in all its dimensions – linked with additional health data to prevent or mitigate the various impacts of health emergencies and to make sure that they do not exacerbate pre-existing inequalities and deprivation.

In the immediate aftermath of emergencies, rapid assessments are often deployed to identify subpopulations experiencing vulnerabilities. These assessments can take many forms, but can often include standardized processes such as the Multisectoral Initial Rapid Assessment (MIRA), the Initial Rapid Assessment (IRA) and the Rapid Health Assessment (RHA).Tools such as the Humanitarian Emergency Settings Perceived Needs Scale (HESPER), the Health Needs Assessments, and the Global Health Cluster People in Need Calculations further explore needs of an affected population in large-scale emergencies. Emergencies also employ specific tools or systems to monitor epidemic-prone diseases – for example, the Early Warning Alert and Response System (EWARS) – and monitor health service availability – for example, the Health Resource Availability Mapping System (HeRAMS). Data gathered from these individual tools or systems usually feed into strategic preparedness and response plans that will steer preparedness, response and recovery.

WHO and OPHI have been collaborating to explore how the global Multidimensional Poverty Index (global MPI) and national Multidimensional Poverty Indices (MPIs) and Multidimensional Vulnerability indices (MVIs) – could be or are already being used in health emergencies and to address health components of humanitarian crises. This research brief aims to provide an overview of their use, with the goal of sharing insights and lessons learned, as well as informing further exploration. This brief describes how MPIs and MVIs have been used in Afghanistan, Colombia, Honduras, Iraq and the selected countries in south Asia during the COVID-19 pandemic.

" In the immediate aftermath of emergencies, rapid assessments are often deployed to identify subpopulations experiencing vulnerabilities "

Rationale, conceptual framework and methodology

MPIs and MVIs capture the overlapping deprivations that people experience. They identify who is particularly worse off or vulnerable by integrating information on the many dimensions of human development into a more holistic overall assessment, going beyond income or consumption. In line with the WHO Priority Public Health Conditions Equity Analysis Framework, MPIs and MVIs can elucidate how different population subgroups are unequally exposed, susceptible or vulnerable to diseases due to social and environmental determinants of health,

as well as reveal the many social and economic implications of health emergencies. Data permitting, MPIs and MVIs can be disaggregated, for example, by gender, ethnic or religious identity or caste, age groups, disability status, geographical areas, migration status, and many other groups of interest.

Using multidimensional measures to inform equitable health policies, plans and interventions in the context of health emergencies

This brief presents four ways of using multidimensional measures for health emergency preparedness, response and recovery. The first is to construct MVIs that capture overlapping vulnerabilities and provide information that identifies the most vulnerable and the main indicators increasing their vulnerability. During the COVID-19 pandemic, MVIs were used by several countries, including Iraq and Honduras.

- Iraq's MVI was computed by the Minister of Planning in June 2020, with the objective of producing a rapid assessment of multidimensional vulnerability to negative effects of the COVID-19 pandemic and its socioeconomic implications. More than 4 out of 10 people in Iraq exceeded a multidimensional vulnerability threshold of experiencing at least one quarter of the weighted vulnerabilities included in the MVI.

- The Government of Honduras, in collaboration with the United Nations Development Programme (UNDP) and OPHI, created an MVI to identify potential beneficiaries of *Bono Unico*, a transfer programme specifically for COVID-19 emergency social protection. The MVI included indicators related to groups at increased risk of illness, employment, economic resilience, health, food security and housing.

The second method uses existing MPIs to inform the preparation for, response to and recovery from health emergencies. This brief illustrates this method with an analysis of the global MPI in the context of the COVID-19 pandemic. OPHI used the global MPI for an interlinked analysis of multidimensional poverty and vulnerability to disease. This exercise found 3.6 billion people around the world to be affected by undernutrition or lack of a clean source of water or likely exposure to indoor air pollution. At least 435 million people were affected by all three of these factors, 336 million of whom were multidimensionally poor.

With respect to the selected countries in south Asia, a directly linked exercise also explored deprivations in COVID-19 contextually relevant indicators, such as, among others, access to internet and domestic violence. Across four selected south Asian countries in the analysis, the percentage of people deprived in additional indicators included was generally higher among the multidimensionally poor.

" This brief presents four ways of using multidimensional measures for health emergency preparedness, response, and recovery "

Option three merges MPIs or MVIs with aggregate-level data to associate multidimensional measures with other indicators relevant in the context of health emergencies. This brief highlights how this was done in Colombia. The National Statistics Office of Colombia (DANE), for example, merged different data sources to analyse the levels of multidimensional poverty and other relevant indicators in early 2020. Results were integrated into a geoportal that allowed the direct joint analysis of information from Colombia's national MPI and a newly constructed MVI to inform the response to the COVID-19 pandemic.

Option four is to microsimulate how people's vulnerabilities or deprivations might be impacted by shocks, such as those associated with a health emergency. This brief shares an example for this from Afghanistan. In July 2020, the National Statistic and Information Authority (NSIA) of Afghanistan, the United Nations Children's Fund (UNICEF) and OPHI used this method to estimate the potential impact of the COVID-19 pandemic on multidimensional poverty levels in Afghanistan using data from the Afghanistan Living Conditions Survey (ALCS) 2016/17 and the national MPI for Afghanistan. The findings showed that multidimensional poverty levels based on Afghanistan's official MPI could increase between as much as 9 and 20 percentage points.

Data challenges and common data limitations for multidimensional measures and health emergencies

This section focuses on how the four methods introduced are best used in terms of data and measurement structures. It also considers key limitations, especially related to data availability and timeliness – important points in the acute context of health emergencies.

Core considerations and limitations can be related to the following.

- **Data sources.** These may impact which indicators can usefully be included in meaningful analysis. For example, a lack of representativeness may preclude disaggregation by certain groups or levels (such as region, district or neighbourhood).

- **Merging data from additional sources.** There can be trade-offs between focusing on the unit of identification of the multidimensional measure (usually households or individuals) and adding additional information at the level of measurement of other health emergency indicators. These are often only available at the country or regional level and thus may conceal considerable inequalities. In addition, the unit of identification in most MPIs and

MVIs is the household, therefore, this imposes extra challenges in the definition of health indicators.

- **Health indicators.** Few household surveys contain sufficiently detailed information on health outcomes and interventions (for example, information related to communicable or noncommunicable diseases or health access). Many desirable health indicators are either not available or cannot insightfully be included in multidimensional indices for these reasons.

The use of multidimensional measures in the context of health emergencies is new. It is a field that invites further study, discussion and exploration. The technology that these measures are based on is flexible and can be adapted to different purposes, contexts, data types and sources. Measurement and analysis possibilities thus go far beyond what is illustratively presented in this brief, which focuses on exemplifying some of the first official applications of these measures in the context of health emergencies during the COVID-19 pandemic. Some promising angles for further research include:

- the computation and analysis of MVIs and MPIs using data collected during or immediately after health emergencies;

- incorporating larger sets and previously unexplored health indicators and other indicators especially relevant for and/or affected by health emergencies; and

- triangulating the results of multidimensional measures with those from other assessment tools used in health and wider social humanitarian emergency contexts.

1 | Introduction

An emergency is "a type of event or imminent threat that produces or has the potential to produce a range of consequences, and which requires coordinated action, usually urgent and often non-routine" (WHO, 2020b). A health emergency is when the event or imminent threat directly relates to health; however, in all emergencies, there can be a health dimension (in particular through adverse impacts on social and environmental determinants of health, e.g. food security, violence, housing and living conditions).[1]

> " A health emergency is when the event or imminent threat directly relates to health; however, in all emergencies, there can be a health dimension "

Health emergencies cause various adverse disruptions to human lives and livelihoods. One key task of public health research and policy is to anticipate and mitigate the detrimental impacts of health emergencies on individuals, households, societies and economies. Just in the past decade, societies around the world saw themselves confronted with multiple humanitarian crises with exacerbated health components and severe health emergencies, including crises in Syria and Yemen, the renewed outbreak of polio (2014), the outbreak of Ebola in West Africa (2014), the Zika virus epidemic (2015–2016), the Kivu Ebola epidemic (2018) and the currently ongoing COVID-19 pandemic (2020).

The COVID-19 pandemic – against the background of which this research brief is written – reminded the world community of the importance of identifying and protecting people who are disproportionately vulnerable to, and affected by, the many impacts of health emergencies.[2] To protect those most at risk from health emergencies and to achieve equitable health-promoting policies in the preparedness for, response to and recovery from an emergency, there is a need for tools that can help assess risks and potential impacts, guide policies that target some of the most vulnerable individuals and groups, and expose and prevent the exacerbation of pre-existing inequities.

Many such tools and assessment methodologies exist. These include MIRA, IRA and RHA. Humanitarian Needs Overviews (HNOs) and subsequent Humanitarian Response Plans (HRPs) are also the standardized approaches to assess and prioritize needs of the emergency-affected population, which are key in acute or protracted response (OCHA, 2020a). Tools such as HESPER, the Health Needs Assessments and the People in Need Calculations further explore the perceived needs of an affected population in large-scale emergencies. There is currently work ongoing by REACH in collaboration with the Global Health Cluster to develop a standardized list of question modules for use in Multi Sector Needs Assessments (MSNA). Emergencies also employ specific tools or systems to monitor epidemic-prone diseases – for example, EWARS – and monitor health service availability – for example, HeRAMS. Data gathered from these individual tools or systems usually feed into the Public Health Situation Analysis (PHSA) and strategic preparedness and response plans that will steer preparedness, response and recovery. There is

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[1] For the purpose of simplicity, in this brief the term "health emergency" also refers to the health dimensions/aspects of wider emergencies.

[2] See also The Lancet (2020).

also a tool to help national governments to assess the social and economic impacts of COVID-19, the COVID-19 Recovery Needs Assessment (CRNA), which is drawn from the Post-Disaster Needs Assessment (PDNA) and Recovery and Peacebuilding Assessment methodologies and simple approach to assessing and planning quick response to the pandemic (International Recovery Platform, 2020).

In addition to these methods, MPIs and MVIs have been used for measurement, analyses and policy guidance in several countries around the world. This research brief explores their use. These measures are based on the recognition that human development, poverty and vulnerability are multidimensional. As people all around the world have described, being poor means being deprived in multiple ways at the same time. Deprivations may compromise the possibility of realizing one's health potential, educational opportunities and sustainable livelihoods, as well as mean lack of adequate shelter and nourishment, social connection, political voice and participation, among other things (see, for example, Narayan et al., 2000a, 2000b; Narayan & Petesch, 2002). Vulnerability in the context of health emergencies is also multidimensional: it relates not only to the direct vulnerability of ill-health that some will face more strongly than others, but also to the barriers in access to health care and other services that individuals will need. Furthermore, there is not only direct vulnerability to ill-health and its consequences, there is also vulnerability to the many and various socioeconomic implications of health emergencies.

The use of multidimensional poverty and vulnerability indices in the context of health emergencies is an emerging field of study and application. Using case studies, this brief illustrates how multidimensional measures have been used during the COVID-19 pandemic.[3] It hopes to inform and motivate the further exploration of their usefulness for identifying and effectively supporting people who are disproportionately vulnerable and impacted, or at risk of being left behind, in health emergency contexts. It aims to spark further application-oriented research on, and discussion of, such multidimensional measures as complements to existing techniques or new tools for assessing vulnerability and needs in order to guide plans, policies and interventions in the context of health and humanitarian emergencies.[4]

This research brief aims to inform:

i. policy-makers, planners and technical staff in national health authorities;

ii. national and international nongovernmental organizations; and

iii. civil society organizations, researchers and other stakeholders in the multilateral system working on health and humanitarian emergencies, disaster management and social protection.

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[3] The examples introduced in section 3 are from Afghanistan, Colombia, Honduras, Iraq and the global Multidimensional Poverty Index (MPI). Further applications can be found, for example, in Bhutan (NSB & UNDP Bhutan, 2020), El Salvador (UNDP El Salvador, 2020), Pakistan (UNDP Pakistan, 2020) and Maldives (in progress), among other countries.

[4] Further tools, in addition to the above-mentioned, also include vulnerability measurement (see, for example, Birkmann & Wisner, 2006), vulnerability analysis and mapping (VAM), basic needs assessments and the identification of disease hotspots (for example, Moore et al., 2016) as well as other risk and impact reduction strategies and frameworks, such as the United Nations frameworks for socio-economic response to COVID-19 and associated efforts (United Nations, 2020a, 2020b, 2020c; UNDP, 2020a, 2020b, 2020c; UNDP, 2021) as part of the measures discussed herein have already been used. See also the Additional resources.

2 | Rationale, conceptual framework and methodology

2.1. Multidimensional poverty, vulnerability and health equity

It is well established that ill-health is a cause, consequence and constituent of (multi-dimensional) poverty and vulnerability. In a humanitarian context, deprivations across sectoral domains can adversely impact health. Likewise, health emergencies can have multiple effects on the levels of multidimensional poverty or vulnerability in a country or subpopulation. Indeed, during a health emergency many health-related deprivations are likely to increase, particularly among those who are least advantaged. In addition, health emergencies can increase socioeconomic deprivations, such as food insecurity, unemployment and educational barriers for children (e.g. due to school closures). Thus, the socioeconomic consequences of health emergencies may also directly exacerbate multidimensional poverty and inequality. Health emergencies may leave even further behind those whose deprivation load was already disproportionately high before the emergency. [5]

Because health emergencies, or the health components of wider humanitarian emergencies, are complex situations with implications for many dimensions of human life, policy responses require multisectoral and multi-cluster approaches. Multidimensional poverty and vulnerability indices and analyses are now being increasingly applied in such contexts. An important area for further research thus is to ascertain how they might contribute to equitable health policies, plans, and interventions in the context of health emergencies. [6]

2.2. Alkire-Foster (AF) method

This research brief focuses on multi-dimensional measurement and analysis tools based on the Alkire-Foster method, currently the most widely used method for official measures of multidimensional poverty. The process of creating a multidimensional measure using this method involves the following several normative decisions.

1. **Defining the purpose of the measure:** Examples of such purposes include measuring poverty or vulnerability, guiding targeting or policy interventions, and/or focusing on a particular subpopulation, such as children or refugees and forcibly displaced populations. This is one of the most important steps because it guides many of the other normative decisions that must be taken.

2. **Selecting the space of the measure:** The "space" defines how and against which conceptual background poverty or vulnerability is measured, for example, inputs, outputs or outcomes, such as human rights, basic needs or capabilities.

3. **Defining the unit of identification:** The unit of identification refers to the level at which a person or group is identified as being poor or vulnerable. The most common units of identification are individuals or households.

4. **Selecting dimensions of poverty:** Dimensions are basic categories or components of poverty (or vulnerability) (Alkire, 2002). Concrete indicators are organized into dimensions to

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[5] On these points, see also OPHI & UNDP (2020), UNDP (2020b, 2020c) and United Nations (2020a, 2020b, 2020c).

[6] On the cluster approach for emergencies, see also OCHA (2020b).

facilitate communications and policy action. The selection of dimensions depends in part on data availability and the purpose and societal context of a measure. Education, health, employment and living standards are among the dimensions of poverty most commonly found in multidimensional poverty measures around the world (OPHI & UNDP, 2019; Dirksen, 2020).

5. **Selecting indicators and deprivation cut-offs:** Indicators of multidimensional poverty and vulnerability measures represent the concrete aspects of poverty or vulnerability that are actually measured within each dimension. Like dimensions, their selection depends on the purpose of the measure and the data. Cut-offs for each indicator are standards that define whether each unit is deprived or not in each indicator.

6. **Selecting weights for each dimension and indicator:** Weights represent the relative value of dimensions and indicators of poverty or vulnerability vis-à-vis one another. They represent each indicator and each dimension's "importance" for overall poverty, conceptually and normatively.

7. **Selecting the multidimensional poverty or vulnerability cut-off:** This final step defines an overall cross-dimensional threshold. This is applied to the deprivation score – the sum of weighted deprivations. If a person's deprivation score is equal to or higher than the cut-off, then a person is identified as multidimensionally poor or vulnerable. Just as the selection of weights and deprivation cut-offs, this step is usually accompanied and informed by empirical robustness and sensitivity analyses to make sure that resulting measures are robust to a reasonable range of alternative specifications. This is important, because normative decisions do commonly invite some plausible pluralism and disagreement.

Once the structure of the measure has been established, multidimensional poverty can be estimated. First, a poverty or vulnerability profile is constructed for each person. This profile shows in which dimensions and indicators a person is deprived. Next, these deprivations are aggregated into a counting vector that, for each person, represents the sum of weighted deprivations they experience. Each person is then identified as being multidimensionally poor or vulnerable – or not – based on their levels of deprivations represented in their counting vector against the overall multidimensional poverty or vulnerability cut-off. Then, the incidence of multidimensional poverty is computed as the percentage of people who are multidimensionally poor in the society (H).[7] The intensity of multidimensional poverty (A) captures the average percentage of weighted indicators in which poor or vulnerable people are deprived. Finally, the multidimensional index (poverty or vulnerability) is the product of incidence (H) and intensity (A):

$$H \times A$$

Multidimensional Poverty Index

Multidimensional Vulnerability Index

The incidence of multidimensional poverty is computed as the percentage of people who are multi-dimensionally poor in the society

The intensity of multi-dimensional poverty
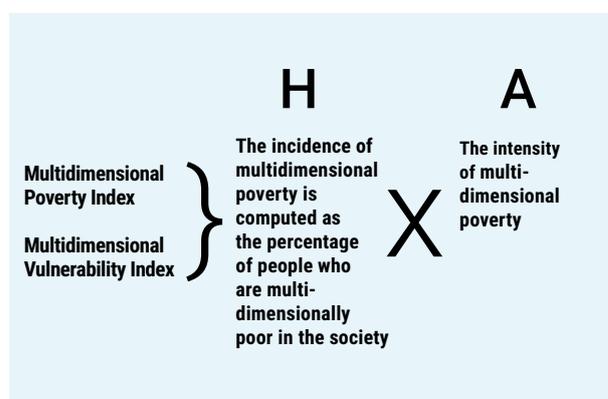
Measures computed using the Alkire-Foster method satisfy a row of desirable mathematical properties that can be useful for policies and interventions. One of these properties is their subgroup decomposability, which allows the exploration of multidimensional measures and their associated information platform by population subgroups (see also Box 1). They can also make visible which deprivations drive poverty or vulnerability across different population

[7] Not to be confused with "incidence" in the epidemiological sense of the term. Poverty incidence means the proportion of people who are poor at a specific point, not over a given period of time.

subgroups. The latter is possible because MPIs and MVIs cannot just be disaggregated by subgroup, they can also be broken down by indicator. Such information allows for the design of cross-sectoral policies and multi-cluster interventions that prioritize key deprivations and some of the most disproportionately disadvantaged. [8]

Box 1. Disaggregation

Data permitting, any multidimensional measure based on the Alkire-Foster method can be disaggregated to identify groups whose members are disproportionately vulnerable to one or more (potential) impacts of a health emergency. Such disaggregations can, in principle, be performed for any socioeconomic or demographic characteristic of interest, for example, by urban–rural areas, age cohorts, gender, sexuality, disability status, income level, education level, ethnicity, migration status or subregion of residence.[9] Disaggregation can thus reveal the disproportionate disadvantage of some groups vis-à-vis others, along, for example, racialized, ethnicized and gendered lines, or to identify left-behind regions. Disaggregation of multidimensional poverty and vulnerability measures can thus be a useful tool for the prioritization and targeting of some of the most vulnerable and disadvantaged population groups, although data limitations can put strong constraints on its application. section 4 discusses data requirements for disaggregation in more detail.

For two recent examples of disaggregating the global MPI, by ethnicity and disability, respectively, see Alkire & Kovesdi (2020) and Pinilla-Roncancio & Alkire (2020).

2.3. The global MPI and national MPIs

To introduce and illustrate how multidimensional poverty and vulnerability measures can and have been used for measurement, analyses and policy guidance in the context of health emergencies, this research brief refers to, and provides examples from, the global MPI and national MPIs as well as their extensions through MVIs.

2.3.1. Global MPI

The global MPI is an internationally comparable measure of acute poverty for 100+ countries. It captures the overlapping deprivations that people are affected by in their households across 10 indicators in the three dimensions of health, education and living standards (Table 1). In its 2020 version, the global MPI covered 5.9 billion people in 107 countries, relying on household survey data from 47 Demographic and Health Surveys (DHS), 47 Multiple Indicator Cluster Surveys (MICS), 3 Pan Arab Population and Family Health Surveys and 10 country-owned surveys (Alkire, Kanagaratnam & Suppa, 2020). It is important to acknowledge the limitations of the measure with regard to specific relevant indicators for health emergencies, such as those related to the receipt of health services for comorbidities/noncommunicable diseases, due to a lack of this information in most household surveys globally.

> " Once the structure of the measure has been established, multidimensional poverty can be estimated "

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[8] See Alkire & Foster (2011) and Alkire at al. (2015) for more details and explanations on the Alkire-Foster method.

[9] The Cochrane PROGRESS-Plus characteristics summarize well-established stratifiers for the measurement of health opportunity and outcome inequalities. See Oliver et al. (2008) and Oliver, Dickson & Newman (2012). See also section 4 on frequent data limitations to their implementation.

Table 1. The global MPI structure: dimensions, indicators, deprivation cut-offs and weights

Dimensions of poverty	Indicator	Deprived if...	SDG area	Weight
Health	Nutrition	Any person under 70 years for whom there is nutritional information is **undernourished**.[a]	SDG 2	1/6
Health	Child mortality	A child **under 18 years** has **died** in the household in the five-year period preceding the survey.[b]	SDG 3	1/6
Education	Years of schooling	**No** eligible household member has completed **six years** of **schooling**.[c]	SDG 4	1/6
Education	School attendance	Any school-aged child is **not attending** school **up to** the age at which he/she would complete **class 8**.[d]	SDG 4	1/6
Living standards	Cooking fuel	A household cooks using **solid fuel**, such as dung, agricultural crop, shrubs, wood, charcoal or coal.[e]	SDG 7	1/18
Living standards	Sanitation	The household has **unimproved** or **no** sanitation **facility** or it is improved but **shared** with other households.[f]	SDG 6	1/18
Living standards	Drinking-water	The household's source of **drinking-water** is **not safe** or safe drinking-water is a **30-minute** or **longer walk** from home, round trip.[g]	SDG 6	1/18
Living standards	Electricity	The household has **no electricity**.[h]	SDG 7	1/18
Living standards	Housing	The household has **inadequate** housing materials in **any** of the three components: **floor, roof** or **walls**. [i]	SDG 11	1/18
Living standards	Assets	The household does **not own more than one** of these **assets**: radio, TV, telephone, computer, animal cart, bicycle, motorbike, or refrigerator, and does not own a car or truck.	SDG 1	1/18

Source: Alkire, Kanagaratnam & Suppa (2020).

Notes: *The global MPI is related to the following SDGs: No Poverty (SDG 1), Zero Hunger (SDG 2), Health and Well-being (SDG3), Quality Education (SDG 4), Clean Water and Sanitation (SDG 6),* and *Affordable and Clean Energy (SDG 7), Sustainable Cities and Communities (SDG 11).*

[a] Children under 5 years (60 months and younger) are considered undernourished if their z-score of either height-for-age (stunting) or weight-for-age (underweight) is below minus two standard deviations from the median of the reference population. Children 5–19 years (61–228 months) are identified as deprived if their age-specific BMI cut-off is below minus two standard deviations. Adults older than 19 years and less than or equal to 70 years (229-840 months) are considered undernourished if their Body Mass Index (BMI) is below 18.5 kg/m².

[b] The child mortality indicator of the global MPI is based on birth history data provided by mothers aged 15–49 years. In most surveys, men have provided information on occurrence of child mortality as well, but this lacks the date of birth and death of the child. Hence, the indicator is constructed solely from mothers. However, if the data from the mother are missing, and if the male in the household reported no child mortality, then no child mortality in the household is identified.

[c] If all individuals in the household are in an age group where they should have formally completed 6 or more years of schooling, but none have this achievement, then the household is deprived. However, if any individuals aged 10 years and older reported 6 years or more of schooling, the household is not deprived.

[d] Data sources for the age children start compulsory primary school: DHS or MICS survey reports; and http://data.uis.unesco.org/

[e] If survey report uses other definitions of solid fuel, If the survey report uses other definitions of adequate sanitation, then the survey report is followed.

[f] A household is considered to have access to improved sanitation if it has some type of flush toilet or latrine, or ventilated improved pit or composting toilet, provided that they are not shared. If survey report uses other definitions of adequate sanitation, then the survey report is followed.

[g] A household has access to clean drinking-water if the water source is any of the following types: piped water, public tap, borehole or pump, protected well, protected spring or rainwater, and it is within a 30-minute walk, round trip. If survey report uses other definitions of clean or safe drinking-water, then the survey report is followed.

[h] A number of countries do not collect data on electricity because of 100% coverage. In such cases, all households in the country are identified as non-deprived in electricity.

[i] Deprived if floor is made of natural materials or if dwelling has no roof or walls or if either the roof or walls are constructed using natural or rudimentary materials. The definition of natural and rudimentary materials follows the classification used in country-specific DHS or MICS questionnaires.

2.3.2. National MPIs

Countries around the globe have designed and computed their own national MPIs, while other countries are in the process of developing one.[10] These measures are tailored to each country's context and their structure reflects national priorities and data sources. They nearly always complement these countries' monetary – that is, income or consumption and expenditure-based – poverty statistics. Insights from national MPIs are used in the design and monitoring of national social policies and strategies to reduce poverty. Among the indicators most commonly included in such measures are housing materials and assets, access to clean water, improved sanitation, electricity and clean cooking fuel (or exposure to indoor air pollution) as well as undernutrition, food security and child mortality, but also indicators related to employment and social protection, education and human security (OPHI & UNDP, 2019; Dirksen, 2020).

2.4. Informing preparedness for, responses to and recoveries from health emergencies

A particular focus of this research brief is the documentation and further exploration of the use of MPIs and MVIs in the study and process of informing risk management and preparedness for, response to and recovery from health emergencies. This section defines these relevant terms as they are used by WHO.

Preparedness is "the knowledge and capacities developed by governments, response and recovery organizations, communities and individuals to effectively anticipate, respond to and recover from the impacts of likely, imminent or current disasters" (WHO, 2017, 2020b). For health systems, for example, being better prepared means being able to respond to an emergency more adequately and swiftly. This comprises coordination of different services and programmes and can involve multisectoral preventive actions at the community, country and global levels (WHO, 2015, 2017).

Response is the "provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected" (WHO, 2020b). Once confronted with a health emergency, the implementation of responses to compensate or minimize its negative consequences is imperative.

Recovery is defined as "the restoring or improving of livelihoods and health, as well as economic, physical, social, cultural and environmental assets, systems and activities, of a disaster-affected community or society, aligning with the principles of sustainable development and 'build back better', to avoid or reduce future disaster risk" (WHO, 2020b). Post-emergency, a policy priority is to build back (or forward) better in all areas impacted by a health emergency and its wider implications. Recovery means reduction of risk and vulnerability and feeds into preparedness for future events. Ideally, it also means improvement of pre-emergency conditions for everyone affected.[11] Box 2 describes some of the possible uses of MPIs and MVIs for health emergency preparedness, response and recovery. Some of these are further explored through examples in section 3; others have been applied elsewhere.[12] All of them present a research frontier for future applications in synergy with other frameworks and tools of the multi-cluster humanitarian and health emergency, development and social protection community.[13]

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[10] See also MPPN (2021) for an overview.

[11] See also UNISDR (2017).

[12] See also footnotes 4 and 5.

[13] See also the WHO *COVID-19 Strategic preparedness and response plan: 1 February 2021–31 January 2022* (WHO, 2021a).

Box 2. Using multidimensional measures for health emergency preparedness, response and recovery

In the context of health emergencies, MPIs and MVIs can help to identify some of the most vulnerable people, where they live and which population groups they may belong to (e.g. through disaggregation, see also Box 1). They can also help to estimate possible effects of emergencies on various dimensions of poverty and vulnerability. Information on especially poor or vulnerable groups can then also inform intersectoral, equity-focused policies and intervention aimed at pre-emptively or restoratively reducing their deprivations – or preventing the exacerbation of disadvantages.

Preparedness

To inform health emergency preparedness, multidimensional measures can help assess a population's exposure and vulnerabilities to health risks and socioeconomic shocks. These may need to be mitigated to reduce suscepti-bility to a disease or barriers to accessing health care services and other implications of a health emergency. Such information can potentially help prevent, or considerably limit, the impacts of a health emergency if used for preparedness, or inform readiness for a rapid response and well-planned recovery.

Response

During a health emergency, MPIs and MVIs can help identify and target groups requiring special protection and support. Multidimensional measures might improve the understanding of how deprivations and risk indicators may overlap and interact for the same person, providing information that can directly feed into the design and implementation of multisectoral strategies to reduce risk and vulnerabilities among the least well off.

Recovery

Building back better after a health emergency requires information on who has been most adversely affected and how. They might require special attention to at least recover their pre-emergency situation and ideally improve upon it to make sure that the impact of the next health emergency will not hit the worst-off and most vulnerable as badly as the previous one. Capturing who is multidimensionally least advantaged ahead of, during and after a health emergency can help ensure that recovery policies are designed to be inclusive and equitable.

2.5. Health emergencies and vulnerabilities: WHO Priority Public Health Conditions Equity Analysis Framework

The WHO Priority Public Health Conditions Equity Analysis Framework (adapted from Blas & Kurup, 2010) can be used to identify who may be at risk of carrying the greatest burden of ill-health and well-being deprivations in a health emergency context. The framework looks at differentials across subpopulations and individuals in health emergencies with regard to five areas. Subsequent sections will show how multidimensional measures can be a tool to identify disadvantaged populations as defined in this framework. The five areas are as follows.

1. **Socioeconomic context and position.** While health emergencies impact everyone, those with the least power (in terms of resources, prestige, social norms and political influence) are often the most vulnerable. That is why marked inequities can be seen across stratifiers, including education, occupation, income, social class, gender, ethnicity, migrant status and persons without regularized documentation (e.g. stay permits, visas, registration with local authorities), persons without birth certificates/ personal identification, disability, religion,

political affiliation, caste, living in a remote rural area or urban informal settlement, living in areas not under control of the government, and others.

2. **Differential exposure.** Daily living and working conditions, largely influenced by the social determinants of health and environmental factors, have an impact on the extent to which some subpopulations are exposed to risk factors for ill-health and have different barriers to seeking essential health services when needed. For example, in the context of a disease outbreak, women are disproportionately more impacted by occupational exposure to risk factors in the health sector, given that 70% of frontline workers in the health sector are women (Boniol et al., 2019; Staab, 2020).

3. **Differential vulnerability.**[14] In the context of a health emergency, differential vulnerability can be due to the clustering of risk factors, such as stress, malnutrition and comorbidities, which make a person more susceptible to a health threat, such as a virus. Whereas this clustering may be a result of the current emergency conditions, for populations that were already experiencing entrenched disadvantage, it often represents an accumulation of risk factors across the life course and even across generations. Differential vulnerability is also determined by the ability of a person to obtain effective coverage with health services. For instance, in the context of a disease outbreak, someone who cannot afford to seek care or who lives a two-day walk from health services will be more vulnerable if exposed to a virus, simply because they will be less likely to receive treatment for it.[15]

4. **Differential health outcomes.** In a health emergency, the reality that subpopulations with less power will be more exposed and vulnerable to risk factors for ill-health will result in differential health outcomes: that is, those

with higher levels of deprivation will typically have higher rates of severe or fatal disease.

5. **Differential consequences.** Health emergencies, as well as wider emergencies, do not only impact health directly, they also impact the daily working and living conditions required for health and well-being (i.e. the social determinants of health), with both immediate and longer-term implications for health equity. For example, health emergencies can cause a loss of income or assets due to having to pay for treatment, increasing catastrophic expenditures or disruption to livelihoods and the economy. They can influence the ability of children to remain in school, and they can influence the extent to which othering, stigmatization and discrimination prevail in a society, as people are more prone to turn to scapegoating and fear in an emergency context. It must be acknowledged that the differential consequences of an emergency, such as a loss of income or livelihood, circle back to exacerbate the differential seen in earlier dimensions of the framework, for example, through enhanced vulnerability due to a reduced ability to pay for health services.

The five areas of analysis of the WHO Priority Public Health Conditions Equity Analysis Framework can be used to illuminate how some individuals and subpopulations fare considerably worse than others in a health emergency. The following sections explore in more detail how measures of multidimensional poverty and vulnerability capture and can thus be used to address these differentials. Indeed, examples cited in section 3 highlight that multidimensionally poor people are frequently among those likely to be unequally heavily affected across all of the framework's dimensions.

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[14] This research brief considers vulnerability in a broad sense, for example, when related to MVIs. Vulnerability in the broader sense also subsumes many of the factors, for example, exposure susceptibility, that may feature more strongly in other stages of the Priority Public Health Conditions (PPHC). See also The Lancet (2020) and Birkmann & Wisner (2006).

[15] See also Dahlgren & Whitehead (2006).

3 | Using multidimensional measures to inform equitable health policies, plans and interventions in the context of health emergencies

This section explains in detail four different approaches to using multidimensional measures to identify key populations and inform risk management and preparedness for, response to and recovery from health emergencies. Using a set of country case studies from the COVID-19 pandemic, it illustrates how each of these approaches has been used for policy and analysis.

3.1. MVIs

MVIs, like MPIs, identify populations that experience a critical mass of deprivations at the same time. However, in addition to including many dimensions of poverty, they consider indicators related to multiple forms of vulnerability. They are aimed at highlighting not (or not only) who is already deprived, but also who may be particularly vulnerable to being disproportionately strongly affected by an incoming negative impact or shock. MVIs can be used as a tool for the analysis of various types of shocks or emergencies, including health emergencies or health components of wider humanitarian emergencies.[16]

In the context of health emergencies, MVIs can help identify individuals or households that are multidimensionally vulnerable, based on the overlap of contextually relevant vulnerability indicators. These can be related to individual or household characteristics that may increase their risk of being detrimentally affected by a health emergency (for example, belonging to a group with a higher risk of getting a disease or living in certain areas). Alternatively, they may capture the effects of disease-control measures in the levels of well-being or other characteristics associated with facing more severe consequences due to the emergency (including those considered under the Priority Public Health Conditions Equity Analysis Framework in section 2.4).

Detailed analyses of the information provided by MVIs, including disaggregation, allow for the identification of some of the most vulnerable groups as well as the indicator composition of their multidimensional vulnerability. MVIs can thus identify differential exposure and vulnerability to, or consequences from, health emergencies. For example, an MVI might capture that some groups are especially at risk from socioeconomic shocks due to vulnerable livelihoods. Others might be particularly exposed to disease because they will not be able to practice key disease prevention measures (such as handwashing and physical distancing) or might be particularly vulnerable to diseases due to (co)morbidity, age or lack of access to quality health care. MVIs can also be further analysed, for example, to uncover gendered inequalities or to find out if people with disabilities are more vulnerable compared to other groups.

Box 3 and Box 4 present the case studies of Iraq and Honduras as two examples of MVIs that were developed and used to inform policy responses during the COVID-19 pandemic.

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[16] There also is a strand of literature, for example, on the use of the multidimensional vulnerability technology discussed herein for the measurement of livelihood sustainability and resilience and vulnerability to extreme weather events or natural hazards.

Box 3. Multidimensional Vulnerability Index (MVI) in Iraq

In July 2020, the Minister of Planning of Iraq with the support of UNICEF and OPHI produced a rapid assessment to identify people's vulnerability to the negative effects of the COVID-19 pandemic and resulting economic downturn, with a focus on social dimensions. This MVI was produced using the 2017–18 SWIFT survey.[17] The MVI includes four dimensions (education, health, living standards and financial security) and 12 indicators (see Table 2 for details).

Table 2. Structure of the MVI for Iraq

Dimension	Indicator	Deprivation cut-off	Weight
Education	School attendance	Household is deprived if any child aged 6-17 years is not attending school.	1/8
	School attainment	Household is deprived if no adult member (aged 15+ years has completed at least basic schooling.	1/8
Health	Food security	Household is deprived if over the last 30 days any member has eater fewer meals, had no food, or gone to sleep hungry because of lack of food.	1/12
	Water	Household is deprived if the main source of water is tanker, river/canal/creek/wheel, open/covered well, spring, or other, OR the household reported having insufficient water.	1/12
	Sanitation	Household is deprived if the main means of sewage disposal is covered drain, open drain, or other.	1/12
Living standards	Dwelling ownership	Household is deprived if the household does not own its house.	1/12
	Electricity	Household is deprived if it does not have electricity from a generator.	1/12
	Garbage	Household is deprived if the main means of garbage disposal is thrown outside the housing unit, buried, burnt, or other.	1/12
Financial security	Child labour	Household is deprived if any child aged 6-17 years has worked in the last 7 days.	1/16
	Informality	Household is deprived if any adult household member is self-employed orin unpaid family work.	1/16
	Assets	Household is deprived if it owns fewer than 3 of the following: car, TV, smart-mobile phone, personal computer, motorcycle, refrigerator, freezer.	1/16
	Shocks	Household is deprived if over the last 4 years it has experienced more than one of the following shocks: forced displacement, job loss or loss of business, loss of rations, loss of government assistance, violence/insecurity, damage or destruction of dwelling/assets, or death/illness/injury of a family member and did not fully recover.	1/16

[17] The Rapid Welfare and Poverty Monitoring Survey (SWIFT 2018), implemented with the support of the World Bank, covers 106 of the 120 districts of Iraq. The survey objective was to provide information on welfare and well-being in the country (Central Statistical Organization, 2021).

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Box 3. (contd.)

Some of the main results of the MVI revealed the following:

- Around 42% of the population in Iraq experienced vulnerabilities in more than one quarter of the weighted indicators.
- 15% of the population suffer from severe vulnerability – they were deprived in more than two dimensions or half of the weighted indicator.
- Children had a higher vulnerability rate than adults (48.8% of children were vulnerable) underlining the elevated risk children face in times of shock and service disruption.
- Deprivations in school attainment, garbage disposal, access to a clean source of water and school attendance were most prevalent among people in Iraq.
- People living in multidimensional vulnerability are unequally distributed across the country. Governorates in the west and south of Iraq face the highest rates of vulnerability, while the largest number of multidimensionally poor in any governorate live in Baghdad.
- 13.5% of the population in Iraq were both monetary poor and multidimensionally vulnerable – arguably a group of people who are particularly at risk of experiencing a deterioration of their living and social conditions. In the southern and northern governorates, 23.6% and 18.6% of the populations, respectively, were both monetary poor and multidimensionally vulnerable.
- 28.1% of the population in Iraq were multidimensionally vulnerable but not monetary poor – showing the clear value-added of the MVI in the identification of those who require policy attention.

Emerging policy implications

The results of the MVI provided a list of policy recommendations to be considered. These included the following.

- Scaling up social protection systems in Iraq to reduce the levels of vulnerability, especially for the groups identified as most vulnerable.
- Addressing service gaps and barriers and access constraints to basic services (clean drinking-water, waste disposal) as disease-prevention measures and to protect the most vulnerable.
- Economic response and recovery: the protection of jobs, small- and medium-sized enterprises, and vulnerable workers in the informal economy should be a policy priority.

Source: UNICEF & World Bank (2020).

Box 4. Creating an MVI for targeting: the case of Honduras

In September 2020, the Government of Honduras launched an MVI with the objective to identify potential beneficiaries of a transfer programme called *Bono Unico*. This programme provided electronic consumption vouchers to working-age individuals who were self-employed, employed without social security or unemployed. The process of designing and computing the MVI was led by the National Social Sector Information Centre (CENISS/Centro Nacional de Información del Sector Social) and supported by UNDP and OPHI. The index was computed using data from the National Register (Registro Unico de Participantes), which includes the poorest 40% of the population in the country (around 1.5 million households). This was complemented with data from people working in sectors not usually included in the Register (such as

Box 4. (contd.)

drivers, lawyers and teachers). In addition, a self-register webpage was designed to provide the opportunity of registering as a potential beneficiary.

The structure of the MVI included 4 dimensions and 15 indicators (see Table 3). Each dimension has the same weight, and each indicator has the same relative weight within each dimension. The multidimensional vulnerability cut-off selected to identify beneficiaries was 35%. Thus, any person living in a household vulnerable in 35% or more of the weighted sum of indicators was selected as a beneficiary for the *Bono Unico* transfer programme.

The results of the measure allowed the identification of all beneficiaries, who then received a voucher worth 2000 lempiras (around US$ 60) to buy personal protective equipment, medicine and food. *Bono Unico* was part of the governmental strategy to support individuals most affected by the socioeconomic implications of the COVID-19 pandemic.

Table 3. Dimensions and indicators of the MVI Honduras

Dimension	Indicator
High-risk population	Members older than 60 years in the household
	Members with chronic diseases
	Unemployment as a result of health reasons
Health, food security and housing*	Food security
	Access to a clean source of water
	Improved sanitation
	Overcrowding
Economic resilience	Housing ownership
	Asset ownership
	Access to financial services
	Communication assets
Employment	Permanent employment
	Employment contract
	Employment sector
	Social security

Note: "Members with chronic diseases" and "unemployment as a result of health reasons" are included in the high-risk population, but are also relevant to the health dimension . The objective of the high-risk population dimension is capturing households that had higher risks or morbidity and mortality for COVID-19, and is directly related to the health conditions of the household.

Emerging policy implications

The design and use of the MVI for targeting provided information on the deprivation and vulnerability levels of an individual or household. In the case of Honduras, the MVI allowed for an evidence-based expansion of targeting mechanisms for social transfers. It enabled the government to go beyond an exclusive focus on monetary deprivation as their targeting mechanism. The MVI was tailored to the situation of the country and to the objective of the targeting exercise, allowing the inclusion of deprivation indicators that were relevant during the health emergency, including employment, housing and health, and food security.

Source: UNDP Honduras (2020).

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3.2. Existing MPIs and relevant indicators, including disaggregation and decomposition

Another use of MPIs (and MVIs) – in the study and process of informing risk management and preparedness for, response to and recovery from health emergencies – is to focus on deprivations and subpopulations that are of particular concern in the context of a health emergency.

This approach can also make use of disaggregation and decomposition to identify priority sub-populations and dimensions for policy.

Box 5 presents an example of how the global MPI has been used during the COVID-19 pandemic, in particular identifying vulnerability to disease through specific health determinants and correlates.

The basic intuition behind this approach lies in the

Box 5. Exploring how the global MPI could inform equitable public health policies through interlinked measures of multidimensional poverty and select health determinants

OPHI used the global MPI to identify, based on the prevalence and household-level co-incidence of specific health determinants, some of the worst-off (most vulnerable to disease, in general – not specific to COVID-19, and poor) people in the world. This analysis was conducted using data from the 2019 and 2020 round of results of the global MPI.[18] This was done in parallel to work by the global scientific community to understand the factors that created the highest vulnerabilities for manifestation of severe COVID-19.

Not all important factors for vulnerability to COVID-19, such as age and comorbidities, could be directly accounted for in these analyses. This was mainly due to limitations in household surveys globally. Nevertheless, these analyses were advancing in parallel in the early stages of the global pandemic and profiled important methodological and empirical considerations regarding general determinants and correlates of ill-health, including those deriving from food insecurity, inadequate access to safe drinking-water and exposure to indoor air pollution. Relevant to any health conditions for which undernutrition, indoor air pollution

and unimproved water sources are particularly important determinants or indicators, the findings showed the following.

- Around 3.6 billion people around the world are affected by at least one of these three deprivations; 435 million people are affected by all three at the same time.

- Out of these 435 million people, 336 million are multidimensionally poor, 216 million of whom are severely multidimensionally poor – deprived in not only at least one third, but also in at least half of the weighted global MPI indicators.

Disaggregated results suggested that the burden of vulnerability to disease as captured by these indicators is disproportionately high, in particular, in sub-Saharan Africa and south Asia. The analysis made visible at the household level, rather than merely at a grosser aggregate, the overlap of these indicators – instead of an array of individual indicators. This yielded a vulnerability-to-disease gradient directly linked to varying intensities of multidimensional poverty. The harmonized structure of the global MPI facilitates international comparisons so

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[18] For indicator specifications and definitions, refer to the structure of the global MPI (Table 1).

Box 5. (contd.)

that exercises, such as this one, can be readily performed for any set of countries included in the global MPI.

Analyses such as this can complement case-specific clinical and epidemiological efforts to identify those most vulnerable. Such applications can also be conducted with any existing national MPI and for other

health emergency contexts, provided data are available. It is important to highlight the limitations of this approach, which include the limitation on the number of indicators related to health in most MPIs. In addition, recent quality data from just before or even during a health emergency can greatly increase the accuracy and usefulness of such exercises.

Source: Alkire et al. (2020a, 2020b).

possibility that rapidly re-analysing readily available data and already existing measures can provide new policy-salient insights. Many multidimensional measures may be useful for such purposes because MPIs and MVIs frequently capture indicators that are related directly to health or its social determinants as dimensions and indicators of multidimensional poverty or vulnerability.[19] Such exercises could, for example, be used to inform health emergency preparedness, that is, to pre-emptively identify and target people experiencing aggravated poverty and vulnerability. But the results can also be relevant to facilitate rapid assessments once priority indicators for a particular health emergency become apparent. Apart from helping to mitigate health and socioeconomic vulnerabilities pre-emptively, such measures could then also help to shed light on who might be particularly adversely affected by a health emergency. In this way, this method may also help to ensure that disease control measures do not unnecessarily exacerbate deprivations and vulnerabilities.

Considering such vulnerabilities through an MPI or MVI and associated analysis also allows for the construction of vulnerability gradients (vulnerability to disease or livelihoods vulnerability, for example) that could identify: (i) those who are disproportionately vulnerable to one or multiple health emergency impacts and/or indirect socioeconomic impacts of the emergency; (ii) those who are multidimensionally poor(est);

and (iii) those who belong to both of these groups at the same time.

3.2.1. Using existing multidimensional measures and additional indicators

It is also possible to use multidimensional measures alongside other relevant indicators available from the same household surveys. For example, some household surveys from which the global MPI is computed also provide information on domestic violence, hygiene conditions, etc. Although these indicators were not part of the MPI originally, they can nevertheless be directly incorporated into an interlinked household-level measurement exercise. Effectively, this can additionally make visible those who might be particularly adversely affected by, or vulnerable to, the impacts of health emergencies due to deprivation in one or more of these additional indicators. Such indicators can thus be used to refine a vulnerability gradient (such as the one illustrated above) or to make visible the distribution of additionally salient indicators across population subgroups, for example, by vulnerability gradient or multidimensional poverty status and intensity, or both.

Box 6 illustrates this directly linked method, again, through an application of the global MPI during the COVID-19 pandemic.

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[19] See also the indicators listed in section 2 and the references cited there.

Box 6. Using the global MPI and linked indicators to refine health emergency vulnerability measurement at the household level: the case of four selected countries in south Asia during the COVID-19 pandemic

Building on the analysis presented in section 3.2, a subsequent study of four selected countries in south Asia (Bangladesh, India, Nepal and Pakistan) explored multidimensional poverty (by global MPI) and vulnerability to disease alongside two additional indicators related to exposure to disease: having a handwashing facility with soap on the household's premises;[20] and overcrowding (defined as >3 people per room); as well as a set of indicators that relate to life during lockdown and socioeconomic vulnerability (internet access, domestic violence, ownership of a bank account, assets, and house or land and livestock ownership) (Table 4).

Table 4. Multidimensional poverty and prevalence of vulnerability conditions across Bangladesh, India, Nepal and Pakistan

	No handwashing facility (%)	Overcrowding (%)	No internet (%)	Domestic violence (%)	No bank account (%)	No own house (urban) (%)	No land or livestock (rural) (%)	No small assets (%)
Bangladesh								
MPI-poor	35.0	48.0	84.5	58.6	86.3	41.5	44.8	18.8
MPI Non-poor	19.1	26.2	51.1	55.9	54.9	42.6	31.4	4.0
Total	23.2	31.7	59.6	56.9	62.9	42.4	35.2	7.8
India								
MPI-poor	4.6	72.4	97.0	42.6	18.0	15.9	20.5	94.8
MPI Non-poor	2.6	49.9	85.5	30.0	6.3	14.6	23.8	70.0
Total	3.2	56.1	89.0	33.8	9.6	14.7	22.6	76.9
Nepal								
MPI-poor	35.0	48.0	84.5	58.6	86.3	41.5	44.8	18.8
MPI Non-poor	13.0	24.9	37.4	23.2	20.3	42.3	3.2	1.5
Total	19.6	32.5	48.1	27.4	29.6	42.9	3.1	4.5
Pakistan								
MPI-poor	42.1	89.9	97.1	40.7	82.5	36.5	23.2	68.7
MPI Non-poor	17.7	65.4	82.7	31.4	50.6	21.9	29.3	17.3
Total	27	74.8	88.3	35.1	62.8	24.7	26.2	37.0

Sources: Dirksen, Nogales & Oldiges (2021) based on Pakistan DHS 2017/18, India National Family Health Survey (NFHS) 2015/16, Nepal DHS 2016, and Bangladesh MICS 2019.

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[20] When looking at preparedness and rapid response, the availability of a "handwashing facility with soap" on the premises of a household is another instructive indicator that does not feature in MPIs very frequently, but is available from many household surveys from which existing MPIs are constructed. The lack of a handwashing facility with soap is related to risk exposure and the inability to prevent a disease from spreading, in line with key WHO advice during the global COVID-19 pandemic. Deprivation here indicates households whose members will not be able to practise "frequent handwashing with soap" (WHO, 2020a).

Box 6. (contd.)

Results:

- Across the four countries, the percentage of people deprived in all the additional indicators included was higher among the multidimensionally poor.

- Lack of access to internet and an inability to engage with remote schooling point to the disproportionately higher burden that already multidimensionally poor people bear during health emergencies unless pre-emptive or swift redressing measures are taken.

- Domestic violence is more prevalent among MPI-poor than non-poor people (less clearly in Bangladesh, but quite starkly in the other three countries).

- Across the countries studied, the results of the analysis reveal that those who are multidimensionally poor are considerably more vulnerable to being deprived in the additional indicators included in the analysis. They are thus expected to be more likely to face socioeconomic shocks from the health emergency.

3.3. MPIs or MVIs merged with or linked to aggregate-level data

MPIs and MVIs can also be merged with additional, relevant indicators at a more aggregated level, for example, the number of hospitals or physicians in a specific region or per 10,000 people, or the indicators included in the universal health coverage index. Aggregate-level results can also be jointly analysed with statistics on population composition, for example, to see if a region with high poverty or vulnerability levels is also home to a larger share of marginalized populations or has a high gender inequality index (GII). MPIs and MVIs can also be directly linked to data yielded from rapid assessments in emergency contexts, such as those commonly carried out by various clusters engaged in health emergency preparedness, response and recovery. Such exercises can provide information that may help to better analyse how multidimensional measures are associated with other aspects related to health in the context of health emergencies. When doing this, a first step is to identify indicators not included in the multidimensional measure, but relevant in the context of the specific health emergency.[21] Then, it is important to consider the level of aggregation of the potential indicators (see section 4 for a

discussion of possible data limitations on this point). Most existing official MPIs (including national, regional and the global MPI) have been computed using the household as the unit of identification. The closer any linked aggregated indicator is to the MPI or MVI unit of identification the better, because the extent of overlooked inequalities is then reduced to a minimum. However, health indicators are often computed at a higher aggregated level – by country or province, for example.

Merging then allows the study of, for example, the association between high levels of multidimensional poverty or deprivation in a specific region and the number of hospitals or physicians in the same region, or the acute prevalence of a disease or risk factor. These analyses can thus also provide information on how health outcomes, services or interventions are associated with multidimensional poverty, vulnerability or deprivation. Data sources for merging that might be particularly useful for health emergencies may include health cluster information tools, such as the Public Health Information Services (PHIS) Toolkit, including IRA, RHA, and PHSA, among others.[22]

Box 7 illustrates the general functioning of this approach with an example from Colombia.

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[21] Using tools, such as the WHO Global reference list of 100 core health indicators or other lists of potential indicators can be helpful to identify which may be particularly relevant (WHO 2018).

[22] See, for example, Health Cluster, 2018. Since such rapid and health-focused data collection efforts do not (and often cannot) capture information on other dimensions of poverty or vulnerability, they may not be able to function as MPI or MVI indicators directly – at least not at the household level. However, such data may nevertheless be insightfully linked to multidimensional measures at a more aggregate level.

Box 7. Colombia: using the MPI as a tool for policy responses to the COVID-19 pandemic

In March 2020, the National Statistics Office of Colombia (DANE) presented the results of an exercise that merged different data sources to analyse the levels of multidimensional poverty and deprivation of households in the country. This exercise was based on the National Population and Housing Census (NHPC) (2018) to estimate a proxy MPI at the municipal level and was complemented with information from administrative records, the Unique Database of Health Affiliation (BDUA) and the Social Security Register (PILA). In addition, DANE designed an MVI by matching information from the Individual Records of Health Service Provision (Registros Individuales de Prestación de Servicios de Salud, Colombia/RIPS) with the NHPC using the ID number of each individual. The MVI included information about individuals who were diagnosed with hypertension, diabetes, heart disease, chronic lung disease and cancer. Also included in the MVI was information related to the proportion of people affected by overcrowding or considered to be at medium or high risk: household with members older than 60 years and also a member aged 20–29 years for high risk, given that younger members are more likely to be working, or aged 30–59 years for medium risk.

DANE also established a geoportal that allows for the triangulation of information from the MPI and the MVI to inform the COVID-19 pandemic emergency response. The portal includes indicators, such as the percentage of individuals older than 60 years and older than 70, the number of medical facilities, the number of hotels and information about mobility for each municipality of Colombia.

This exercise was possible because of the granularity of the data and the fact that recent census data were available and could be used for COVID-19 pandemic response measurement and analyses. In the last few years, Colombia has made an effort to merge different household surveys with administrative records, and the results of these exercises have allowed a better analysis of the situation in the country. During the COVID-19 pandemic, this provided an opportunity to improve understanding of how the pandemic affects different population subgroups and spreads and exacerbates deprivation and vulnerability.

Policy implications

DANE analysed the distribution of vulnerabilities associated with the levels of multidimensional poverty of each block and triangulated those with indicators, such as the number of health facilities, percentage of people older than 60 years living in an area, and also an MVI, which was produced to identify vulnerable areas in the country, to inform an appropriate and well-targeted COVID-19 emergency response. The analysis of merged data sources with MPI and MVI provided information on the different levels of deprivation of individuals and households and how those are correlated with other indicators.

Merging household surveys with other administrative records helped to reveal if someone identified as multidimensionally poor was already a beneficiary of social protection programmes or at increased risk of contracting disease.

Source: DANE (2020).

3.4. Simulating the effects of health emergencies through multidimensional measures

Microsimulations allow the projection of how people's vulnerabilities or deprivations might be impacted by shocks, such as those associated with a health emergency. They can be used to inform the design and implementation of policies and strategies to reduce the vulnerability of different groups – before, during and after a health emergency.

Microsimulations using multidimensional measures focus on those currently considered *non-deprived* in key MPI or MVI indicators assumed to be upwardly volatile during a health emergency. This also means that those already deprived in the specific indicators with which a simulation is carried out can be considered *still* deprived. Such simulations can be based on assumptions or evidence about which deprivations might be affected and by how much (such as how many people are likely to lose their employment and which groups are more likely to be affected, for example, working-age women in rural areas), or by how much the prevalence of food insecurity and undernutrition may increase, and among whom. Simulating the increase of specific deprivations will affect the projected post-shock incidence and/or the intensity of multidimensional poverty or vulnerability in a country.[23]

The assumptions about how much a deprivation increases or the groups that might be affected can be based on evidence from previous health emergencies. For example, teenage pregnancy rates rose during Ebola-induced lockdowns in West Africa – and are expected to rise during COVID-19, with implications also for school return ratios of adolescent girls (UNESCO, 2020). Furthermore, a considerable share of children who had previously attended school did not return to school, while the number of child labourers increased at the same time (Bausch & Rojek, 2016; Elston et al., 2016, 2017; Onyango et al. 2019; Armitage & Nellums, 2020). Such evidence can inform simulations of the effects of disease prevention and control measures, for instance, lockdowns on indicators such as school attendance, undernutrition or domestic violence, where these have previously been included in an MPI or MVI.[24]

> " The assumptions about how much a deprivation increases or the groups that might be affected can be based on evidence from previous health emergencies "

Box 8 summarizes the example of how micro-simulations on Afghanistan's national MPI have been used to inform emergency response and recovery policies during the COVID-19 pandemic.

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[23] Incidence of multidimensional poverty means its "prevalence", i.e. the proportion of people in a population who are identified as being multidimensionally poor. See also The Alkire-Foster method and section 2.2 of this brief.

[24] See also Dirksen (2020) for an overview of indicators that have previously been included in official MPIs and are thus, in principle, available for such MPI-microsimulations.

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Box 8. Socioeconomic impact of the COVID-19 pandemic in Afghanistan: using microsimulations to project effects on multidimensional poverty

In July 2020, the National Statistic and Information Authority (NSIA) of Afghanistan, UNICEF and OPHI, using data from the Afghanistan Living Conditions Survey (ALCS) 2016/17, conducted microsimulations on the potential impact of the COVID-19 pandemic on multidimensional poverty levels in Afghanistan. Five independent scenarios on six Afghanistan-MPI indicators were performed to project changes in MPI due to COVID-19-induced socioeconomic shocks (Table 5): (i) school attendance; (ii) food security; (iii) unemployment; (iv) underemployment; (v) Youth Not in Education, Employment or Training (Youth NEET); and (vi) dependency. The results of the national MPI for Afghanistan in 2016/17 revealed that more than half of the Afghani population (51.7%) lived in an MPI-poor household and they were, on average, deprived in 52.5% of the weighted Afghanistan-MPI indicators.

The five scenarios were created to analyse changes in the incidence of multidimensional poverty and included increases in deprivations as follows.

- 75% of the population not deprived in food security indicator now become deprived;

- 75% of the population not deprived in school attendance indicator now become deprived;

- 75% of the population not deprived in work-related indicator now become deprived;

- 75% of the people already multidimensionally poor, but not deprived in a work-related indicator, become deprived in at least one work-related indicator; and

- 75% of the economically vulnerable population – households where all working household members hold informal jobs and where tenure is insecure – become deprived in all work-related indicators.[25]

Table 5. Dimensions, indicators, and weights of the Afghanistan MPI (A-MPI)

Dimensions of poverty	Indicator	Household is deprived if…	Weight
Health	Food security	There is no borderline or acceptable food consumption (NSIA definition).	1/10
	Assisted delivery	Any woman who was pregnant in the last 5 years preceding the interview received less than 4 antenatal care OR the delivery did not take place at a health facility OR was not attended by a doctor or a nurse.	1/10
Education	School attendance	At least one child aged 7-16 years is not attending school or never did.	1/10
	Female schooling	No girl/woman aged 10+ years has completed primary schooling or knows how to read and write.	1/20
	Male schooling	No boy/man aged 10+ years has completed primary schooling or knows how to read and write.	1/20

[25] Simulations were also performed with equivalent 25% and 50% assumptions – the findings cited here thus present a worst-case, upper-bound scenario.

Table 5. Dimensions, indicators, and weights of the A-MPI (contd.)			
Dimensions of poverty	**Indicator**	**Household is deprived if…**	**Weight**
Living standards	Access to water	It lacks access to improved water sources.	1/40
	Sanitation	It lacks access to improved sanitation facilities.	1/40
	Electricity	There is no adequate lighting source (i.e. there is no lighting, or it comes from candles or solid fuel).	1/40
	Cooking fuel	There are no adequate fuel cooking sources (i.e. they use animal dung or crop residue, or cooking is done in the dwelling using bushes, twigs, firewood or charcoal).	1/40
	Housing	Dwelling is made of inadequate roof, floor or wall materials.	1/40
	Asset ownership and agriculture	It owns less than three assets (refrigerator, washing machine, vacuum cleaner, gas cylinder, iron, television, mobile, satellite dish, bicycle, and motorbike) OR agricultural items (land and livestock).	1/40
Work	Dependency	There is less than one household member who works for every six people.	1/20
	Unemployment	No one in the household is employed in the labour force.	1/20
	Underemployment	One or more person in the household are underemployed.	1/20
	Youth NEET	There are one or more persons aged 17–24 years who are not employed, and do not attend school or any training programme.	1/20
Shock	Production	They have experienced one or more of the following shocks with a strong negative effect on household members: (i) reduced agriculture or drinking-water; (ii) unusually high crop pest or disease; (iii) severe loss of opium production; (iv) unusually high live-stock disease; or (v) reduced availability of grazing area or reduced availability of Kuchi migration route.	1/20
	Income	They have experienced one or more of the following shocks, with a strong negative effect on household members: (i) increased food prices; (ii) a reduction of household income; or (iii) a decrease in farm food prices.	1/20
	Security	One or more of the following situations apply: (i) they have suffered violence or theft; (ii) they live in a district rated very insecure; (iii) they are displaced; or (iv) they respond that the government's first priority should be to disarm local militia or to increase local security.	1/10

[26] Improved sources are those that have the potential to deliver safe water by nature of their design and construction. These include piped supplies and non-piped supplies (such as boreholes, protected wells and springs, rainwater and packaged or delivered water, e.g. by tanker trucks). Unimproved drinking-water sources that do not protect against contamination are unprotected springs and wells. The category "no service" identifies surface water, such as rivers, streams, irrigation channels and lakes. These, too, are unimproved.

[27] An improved sanitation facility is defined as one that hygienically separates human excreta from human contact. These facilities include wet sanitation technologies (flush and pour flush toilets connecting to sewers, septic tanks or pit latrines) and dry sanitation technologies (ventilated improved pit latrines, pit latrines with slabs and composting toilets).

[28] The use of inadequate (solid) cooking fuels is a direct cause of household air pollution and thus directly associated with respiratory diseases, disabilities and death.

[29] Adequacy is related to durability. Housing in which the outer walls, roof and floor are made of durable materials protects its inhabitants from the extremes of climatic conditions, such as rain, heat, cold and humidity. Fired brick, concrete, mud bricks and stone are considered durable materials. For roofs, wood is regarded as durable.

[30] A person is identified as deprived in assets if their household owns less than three of the considered agricultural items.

Box 8. (contd.)

Findings

- More than 13 million people in Afghanistan could become newly affected by food insecurity, which would also cause the incidence of multidimensional poverty to increase by about 10 percentage points (Scenario 1).

- More than 4 million school-aged children could become out-of-school children, also resulting in approximately a 9-percentage point increase in the incidence of multidimensional poverty (Scenario 2).

- Additional work-related deprivations in the form of high dependency ratios, unemployment or underemployment or Youth NEET could increase the incidence of multidimensional poverty in Afghanistan by more than 20 percentage points (Scenario 3).

- If work-related deprivations affected only the already multidimensionally poor, then the average intensity of multidimensional poverty could increase by about 9 percentage points (Scenario 4).

- If work-related deprivations affected only those economically vulnerable due to informal employment and insecure tenure, then the incidence of multidimensional poverty could nevertheless increase by more than 15 percentage points (Scenario 5).

- There are considerable inter-provincial differences in terms of the potential increase in and effect on overall multidimensional poverty as per these six key indicators (all five scenarios).

Policy implications

Microsimulation scenarios require assumptions that are not easily tested and usually require both careful reasoning and a good evidence base to unfold their potential. They can also be carried out with additional layers of complication. The ones just described, for example, did not consider interactions between, or the joint impact of, two or more such scenarios at the same time. Nevertheless, such simulations can deliver helpful guidance for policy-makers. For Afghanistan, the exercise yielded results that showed not only *what*, but also *where* rapid social protection measures may be most urgently required to minimize the detrimental effect of the socioeconomic implications of the COVID-19 pandemic.

Policies that safeguard children's return to school, avoid surging food insecurity and protect labour from increased precarity were among the key measures identified as necessary to avoid the COVID-19 pandemic causing additional vulnerability to disease (e.g. due to undernutrition) or an exacerbation of socioeconomic disadvantage – not least as a cause and consequence of ill-health.

Sources: NSIA (2019); Gwavuya (2020); NSIA, OPHI & UNICEF (2020).

4 | Data challenges and common data limitations for multidimensional measures and health emergencies

Depending on the method that is being used when preparing for, responding to or recovering from health emergencies with the help of MPIs or MVIs, different data-related considerations and important limitations need to be borne in mind. This section explains the main data requirements and desiderata for using multidimensional measures in the context of a health emergency, exploring how each of the four methods presented in section 3 is subject to some core requirements in terms of data sources and indicator choice and quality. It also discusses some of the limitations and challenges that may be faced when data characteristics cannot be fully met. It may be that measurement and policy purposes do align with making use of the value-added of multidimensional measures; however, outdated, non-representative or inaccurate data can render them counter-productive.

In addition, it is important to remember that multidimensional measures are flexible tools that can be adapted and tailored to the context and the purpose of the measurement exercise. Depending on the data available, the needs of the assessment and the specific stage for which an application is being sought (preparedness, responses or recovery), specific measures can be constructed and computed. If countries already have their own national MPI, then their MPI structure could be used. However, as the example from Honduras showed, where relevant data are available a national MPI can also be adapted and extended for a specific context and purpose, such as a health emergency response. The most crucial challenges and limitations of the measurement and analysis tools presented here as tools for equitable health emergency preparedness, response and recovery are the result of data limitations. This section reflects on these challenges and limitations.

4.1. Data sources

When computing MPIs or MVIs, the choices of data source(s) and the specific set of indicators are fundamental. Ideally, one would want to use the best possible set of indicators to measure as accurately as possible multidimensional poverty or vulnerability. However, a common reality in multidimensional poverty or vulnerability measurement is that data availability limits measurement possibilities. Indicators that might appear attractive at first sight, for example, often lose their desirability because data sources do not cover an adequately large (sub)population, or because they are collected very infrequently.

> " It is important to remember that multidimensional measures are flexible tools that can be adapted and tailored to the context and the purpose of the measurement exercise "

Measures computed based on the Alkire-Foster method apply a deprivation status in each included indicator at the same level – household or individual. To truly capture multidimensional poverty or vulnerability as it affects individuals or households in the form of *joint deprivations*, the chosen MPI or MVI indicators must be available at the level of the selected unit of identification. This

often precludes using indicators from different data sources, unless the two data sources can be linked using information from the same person (e.g. a national ID number) or household in a comparable reference period. But few household surveys contain information that would allow for the merging of individual or household data across different surveys due to sampling, anonymity, privacy and data security issues. So, merging information from different sources of data at the individual or household level in order to compute an MPI or MVI is not usually possible.[31]

MPIs and MVIs can be constructed from many data sources. Most often they rely on household surveys, but they can, in principle, also be constructed using data rapidly collected during a health emergency. MPIs and MVIs have not yet been constructed from such data, however, there is no obstacle to doing so if the rapidly collected data allow for the construction of meaningful and sound multidimensional measures. Indeed, exploring further applications and thus synergies between other health emergency response efforts in this direction is a key area for further research. In any case, it should be ensured that the data used satisfy the usual desiderata for MPIs or MVIs (see also sections 4.2, 4.3 and 4.4). Possible trade-offs are clearly understood and reflected in relation to the intended measurement, analysis and policy use of any MPI or MVI. Any application for health emergency purposes would ideally rely on data collected just before, during or just after the emergency. The data needed to construct sound measures, however, may sometimes date back a few years and thus must be interpreted accordingly. Measures based on older datasets can then nevertheless be linked to indicators collected more recently, for example, rapid health, basic needs or vulnerability assessments, if care is taken to interpret the different time periods.

4.2. Merging data from additional sources

This is a method that, although strongly recommended, has been implemented only on

a few occasions. There is a trade-off between maintaining a more nuanced focus on the unit of identification of the multidimensional measure (households or individuals) and adding additional, salient information at the level of measurement of other health emergency indicators. This brings the challenge of balancing the aim of understanding if multidimensionally poor households face higher deprivation, for example, in access to health care or are more vulnerable to the health emergency, with the fact that, in most cases, such information is not available at the household or individual level.

" When designing an MPI or MVI, one would usually like to explicitly include, and analyse results for, minorities or marginalized groups "

4.3. Target populations

When designing an MPI or MVI, one would usually like to explicitly include, and analyse results for, minorities or marginalized groups, such as refugees, (forced) migrants, persons with disabilities or diseases, LGTBQIA+ communities, and others. Such information would allow for important disaggregations of MPIs and MVIs (see also Box 1). However, a common limitation is that the sampling design of household surveys may not be representative of certain target populations whose situation would be of great interest during a health emergency. Few household surveys include these groups in their sampling frameworks or collect such identity markers. If an MPI or MVI is computed using census data, then some otherwise often overlooked minority groups may be identifiable. For example, the occupied Palestinian territory, including east Jerusalem, and Colombia have included information on people

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[31] See also Box 7 and the paragraphs on linking and merging in section 3.3 – as such exercises are possibly at more aggregate levels.

living in camps, migrants and refugees in their MPIs (see, for example, PCBS, 2020). The World Food Programme has recently used a multidimensional measure for its vulnerability analysis and mapping as part of the world's largest cash transfer programme among refugees in Turkey (WFP & VAM, 2019).

4.4. Measurement structure

This section rapidly overviews three additional aspects of data sources that influence (and may limit) the design of MPIs and MVIs for health emergency responses: the unit of identification; the reference population for each indicator; and health indicators.

> " Given the data currently available from household surveys, most measures of multidimensional poverty or vulnerability use the household as the unit of identification "

4.4.1. Unit of identification

Given the data currently available from household surveys, most measures of multidimensional poverty or vulnerability use the household as the unit of identification. This means that an equal share of deprivations or achievements is generalized across all members of a household. When deprivations strike particular individuals in a household (e.g. nutrition, school attendance, education outcomes or employment situations), gender and intra-household inequalities can be assessed using MPI or MVI indicators. This requires a linked yet separate analysis. Multidimensional measures can also be designed at the individual level. While this has been done

for research purposes, individual measures have strong data requirements that cannot usually be met by common household surveys for an entire population on a sustained basis. Individual measures cannot directly compare groups (children and adults, men and women) because the indicators differ, thus extra analysis is required to provide an overall set of priorities across the different groups.

4.4.2. Reference population

Directly related to the former, an important data-related consideration pertains to the so-called reference population of each potential MPI or MVI indicator. The reference population is the group of people who are eligible to be deprived or non-deprived in a specific indicator and whose deprivation or attainment informs the overall deprivation status of the same household. Depending on the indicator, the reference population could be school-aged children (e.g. for a school attendance indicator), women aged 15–49 years (e.g. for antenatal care or assisted delivery) or all household members (for basic services or housing materials).

When designing an MPI or MVI, it is important to strike a balance between indicators capturing deprivations for specific groups to make sure that an all-population measure does indeed capture indicators that make the final measure meaningful for the entire population, and not unduly increasing any subgroup's probability of being identified as poor. Some indicators' coverage may restrict them from being used for MPIs or MVIs, for example, because too few households have any member who would belong to the reference population. This is often the case where indicators pertain to very narrow age ranges, such as children aged 12–24 months.

4.4.3. Type and quality of health indicators

When choosing indicators for multidimensional measures of poverty or vulnerability, the type and quality of desirable indicators should be carefully

scrutinized. For health-related indicators, in addition to important reference population considerations, the reference or recall periods with which surveys elicit information can often be a constraining factor. On the one hand, indicators may be seasonally volatile.[32] For a permanent poverty or vulnerability statistic, such as a national MPI, a longer recall period is thus often preferable in order to avoid relative overestimations or underestimations of deprivations due to seasonal effects. On the other hand, especially when capturing acute emergency situations, indicators with short reference periods may be easier to remember and more relevant for policy. Indicators on barriers to access health care services during a health emergency, for example, may be required (and available) with a reference period short enough to capture the acute situation during a health emergency, rather than earlier access to health care that has previously been disrupted.[33] As section 2.2 discusses, the specific purpose of any multidimensional measure (how it informs policy action) must guide its design. Which data are best to use and which indicators to prioritize will follow.

It can also be difficult to obtain reliable and interpersonally comparable indicators on health status or outcomes. In the cases from Colombia (see Box 7) and Honduras (see Box 4), governments were able to incorporate information on noncommunicable diseases into their multidimensional measures to inform COVID-19 health emergency responses. The Government of Colombia was able to include data from administrative records, while Honduras (as well as the Maldives)[34] relied on self-reported data. However, including such indicators on noncommunicable diseases may not always be possible or desirable. The problem thus is that some respondents, particularly among the populations experiencing poverty, may not have been tested so may not know that they are affected by conditions, such as diabetes or hypertension, and few surveys actually include these in biomarker data. Household surveys going forward could include more indicators on noncommunicable diseases, as well as whether those affected are receiving treatment that controls them effectively and/or if they experience barriers in accessing health care services.[35] This can help policy-makers identify gaps in health care access and coverage to improve the roll-out of both preventive public health measures and more effective treatments from a multidimensional perspective on poverty and vulnerability.

Lastly, as with other types of indicators, health indicators are subject to measurement error. Information may not be collected properly or not all information needed to compute an indicator may have been collected (incomplete data collection). Therefore, it is important to carefully examine which available source might provide the best possible information on health indicators relevant for the context of equitable health emergency policies.

It may be possible, as in the case of Colombia, in some specific situations to merge individual health records data with household survey data using the ID of the person (and with appropriate ethical safeguards), and such strategies may usefully expand the range of health indicators that can be analysed.

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[32] Many diseases, for example, are subject to seasonality-related climatic conditions (for example, rainy versus dry or harvest versus lean seasons) (Altizer et al., 2006; Grassly & Fraser, 2006; Naumova, 2006; Fisman, 2007; Wijaya, Aldila & Schäfer, 2019).

[33] A remaining challenge may be that such desirable indicators may not be available alongside a sufficiently comprehensive set of indicators to allow for overall measures that could inform preparedness, response and recovery with a multidimensional lens. Merging or linking data from different sources at some level may in such cases be the preferred or only option.

[34] WHO, 2021b.

[35] Some specialized surveys do collect data in this direction. But these often cannot be used for the construction of MPIs or MVIs because they do not usually capture information on other dimensions of poverty or vulnerability. However, such surveys may be candidates for linking or merging with MPIs or MVIs as discussed in section 3.3

4.5. Priority health indicators for future data collection

There are a number of relevant health indicators that may deserve special priority for inclusion as part of future comprehensive data collection efforts (ideally at the individual or household level) to further the usefulness of multidimensional poverty and vulnerability measures for health emergency contexts.[36] For example, although the health dimension has been recognized as one of the most important dimensions for the measurement of multidimensional poverty, few health indicators currently included in national and regional MPIs or the global MPI can be used to measure or accurately approximate health service coverage (e.g. access to health care when needed) or health functionings across dimensions, such as pain, mobility, disability, mental health, and so on. This is a limitation mainly due to the fact these indicators are often not included in household surveys that also collect important information on the other dimensions of poverty.[37]

Exploring and collecting indicators that capture different aspects of health, including health outcomes, service coverage and effective use of health care services is vital and should go beyond the immensely important rapid data collection efforts in emergency settings to also become a more integral part of multipurpose, representative household surveys. Which indicators are relevant for measurement and analysis exercises, such as the ones discussed in this brief, will always depend on the specific health emergency faced, as well as on country-specific contexts and priorities. To overcome some of the above-listed data limitations, a mix of quantitative and qualitative data collection and assessment methods may also be appropriate (see also UNHCR, 2006 and MSF, 2012).

" Exploring and collecting indicators that capture different aspects of health, including health outcomes, service coverage and effective use of health care services is vital and should go beyond the immensely important rapid data collection efforts in emergency settings to also become a more integral part of multipurpose, representative household surveys "

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[36] Including those on the WHO *2018 Global reference list of 100 core health indicators (plus health-related SDGs)* (WHO, 2018).

[37] Linking of datasets and connecting in additional health data can nevertheless be beneficial (see section 3.3).

5 | Conclusions and outlook

This research brief introduces how measures of multidimensional poverty and vulnerability have been used as tools to assess the extent, intensity and composition of select deprivations and vulnerabilities in the context of health emergencies. It also discusses how these measures have been used to inform equitable health policy, planning and intervention, and how they could be used in the future. Key uses discussed are the following.

Identifying and prioritizing the multidimensionally worst-off

■ These measures can capture select clustered risk factors and inequities along the differentials of socioeconomic context and position, exposure, vulnerability, health outcomes and consequences.

■ MPIs and MVIs can be used to analyse certain types of inequality between groups, given that is possible to disaggregate the results and analyse how different groups face higher (lower) levels of deprivation, vulnerability or poverty.

■ By making visible the overlapping deprivations that some people and specific population subgroups are affected by, they can thus assist in the targeted prioritization of some of the worst-off and most vulnerable.

■ MPIs and MVIs face some limitations in this regard, including primarily, frequent data constraints that will limit the list of indicators that can be constructed and included in multidimensional measures, as well as the disaggregations that can be meaningfully performed.

PREPAREDNESS

■ MPIs and MVIs can provide baseline assessments for health emergency preparedness strategies, informing pre-emptive actions that need to be taken in order to mitigate the potential impact of health emergencies on lives and livelihoods.

■ The assessments may be limited to some extent by data timeliness (e.g. if the data were collected long before the health emergency, then they may not accurately reflect the actual baseline situation). The more recent the data source, the timelier the measure.

Rapid response

■ MPIs and MVIs can provide a rapid, emergency-specific overview of who are the most vulnerable during a health emergency, thereby aiding appropriate policy responses and adding to the evidence collected through other rapid assessment tools for health emergencies.

■ This is more difficult where no recent data are available.

Recovery

■ MPIs and MVIs can also show who is multidimensionally least advantaged after a health emergency due to its impacts and thus can inform equitable recovery policies that directly feed back into future preparedness.

■ This is possible in particular where MPIs and MVIs can rely on data that accurately capture the post-emergency situation from which societies will try to build forward better.

Multisectoral policy and intervention guidance

■ MPIs and MVIs can capture information on, and interlinkages between, multiple Sustainable Development Goals (SDGs). They are thus useful tools to build back better and leave no one behind in the service of achieving the 2030 Agenda.

- MPIs and MVIs thus (through their indicators and their overlap) also pertain to multiple clusters in humanitarian and emergency response and can hence be used, in conjunction with existing tools, to leverage synergies between humanitarian and health emergency response clusters.

- Within the three phases of planning and implementing equitable health policies – preparedness, response and recovery – MPIs and MVIs can inform budget allocations mechanisms related to reducing multidimensional vulnerability. However, the limitations cited earlier and critical issues related to the timeliness of the data must be borne in mind.[38]

Presently, for a post-COVID-19 recovery, the principle of action is to build back – or forward – better. The COVID-19 pandemic has not only slowed down, but also has even reversed global progress made in reducing multidimensional poverty and advancing the goals of the 2030 Agenda (Alkire et al., 2020c; UNDP, 2020a, 2020b, 2020c).

Forward-thinking policies that are made now to sustainably alleviate vulnerabilities and deprivations of the least advantaged – the multidimensionally poor(est) – can help to pre-emptively mitigate future health (or, for that matter, other) emergencies. Reducing socioeconomic disadvantages, discrimination and inequality, as captured by people-centred multidimensional measures of poverty and vulnerability, should be part of policies for individual well-being, sustainable public health and social welfare.

This brief highlights a subset of the applications that multidimensional poverty and vulnerability indices and associated analyses found in the context of health emergencies during the special context of the COVID-19 pandemic.[39] This is a new context to which these measurement tools are here being applied and so there remains much scope for innovation. Future applications may seek inspiration in what was previously done, trying to tackle important data limitations and challenges encountered, but may also innovate through methodological applications not yet explored. For example, future applications may use different data sources, merge data from sources and toolkits from health and humanitarian emergency clusters, rapidly collect data – especially for multidimensional assessments – and disaggregate measures by additional population subgroups to make visible horizontal inequalities (see also the section on Additional resources). The policy options for which these measures can then be used may also vary from the identification of the particularly disadvantaged, through targeting for social humanitarian and social protection interventions, to budgeting and multisectoral policy coordination.[40]

Finally, the process of recovery post-pandemic demands the participation of different groups in the decision-making process. Including the voices and views of subpopulations experiencing multiple deprivations or risk factors on how different policies should be designed and implemented is vital to guaranteeing that evidence-based policies aimed at reducing inequalities among groups are not blind to the needs and priorities of some of the least advantaged. It is important that their voices are considered in the process of preparing for the next health emergency in order to not only build back, but also to build back in a more inclusive and equitable way. Incorporating these protagonists' voices for the construction and utilization of a flexibly adaptable multidimensional measurement methodology is one way of ensuring that assessments, agenda setting and actions are fit for this purpose. The hope is that this research brief can inspire such inclusive approaches to using multidimensional measures for equitable public health policies and interventions.

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[38] Importantly, for measuring the impact (and cost effectiveness of expenditure) for a specific health intervention, using individual/separate indicators rather than a multidimensional index is likely more appropriate.

[39] For additional applications, see, for example, Alkire et al., 2020a, 2020b; NSB & UNDP Bhutan, 2020; UNDP El Salvador, 2020; UNDP Pakistan, 2020; and Tavares & Betti, 2021.

[40] See also OPHI & UNDP, 2019.

References

Alkire S (2002). Dimensions of human development. World Dev. 30(2):181–205.

Alkire S, Dirksen J, Nogales R, Oldiges C (2020a). Multidimensional poverty and COVID-19 risk factors: a rapid overview of interlinked deprivations across 5.8 billion people (OPHI Briefing 53a). Oxford: University of Oxford, Oxford Poverty and Human Development Initiative.

Alkire S, Dirksen J, Nogales R, Oldiges C (2020b). Multidimensional poverty and vulnerability to COVID-19: a rapid overview of disaggregated and interlinked vulnerabilities in sub-Saharan Africa (OPHI Briefing 54a). Oxford: University of Oxford, Oxford Poverty and Human Development Initiative.

Alkire S, Foster JE (2011). Counting and multidimensional poverty measurement. J Public Econ. 95(7–8): 476–87.

Alkire S, Foster J, Seth S, Santos ME, Roche J, Ballon P (2015). Multidimensional Poverty Measurement and Analysis. Oxford: Oxford University Press.

Alkire S, Kanagaratnam U, Suppa N (2020). The global Multidimensional Poverty Index (MPI) 2020 (OPHI MPI Methodological Note 49). Oxford: University of Oxford, Oxford Poverty and Human Development Initiative.

Alkire S, Kovesdi F (2020). Multidimensional poverty across ethnic groups: disaggregating the global MPI (OPHI Briefing 55). Oxford: University of Oxford, Oxford Poverty and Human Development Initiative.

Alkire S, Nogales R, Quinn NN, Suppa N (2020c). On track or not? Projecting the global Multidimensional Poverty Index. (OPHI Research in Progress 58a). Oxford: University of Oxford: , Oxford Poverty and Human Development Initiative.

Altizer S, Dobson A, Hosseini P, Hudson P, Pascual M, Rohani P (2006). Seasonality and the dynamics of infectious diseases. Ecol Lett. 9(4):467–84.

Armitage R, Nellums LB (2020). Considering inequalities in the school closure response to COVID-19. Lancet Glob Health. 8(5):E664.

Bausch DG, Rojek A (2016). West Africa 2013: re-examining Ebola. In: Scheld WM, Hughes JM, Whitley RJ, editors. Emerging infections 10. Washington, DC: ASM Press:1–37.

Birkmann J, Wisner B (2006). Measuring the un-measurable: the challenge of vulnerability. Bonn: United Nations University Institute for Environment and Human Security.

Blas E, Kurup AS, editors (2010). Equity, social determinants and public health programmes. Geneva: World Health Organization (https://apps.who.int/iris/handle/10665/44289 , accessed 28 May 2021).

Boniol M, McIssac M, Xu L, Wuliji T, Diallo K, Campbell J (2019). Gender equity in the health workforce: analysis of 104 countries. Geneva: World Health Organization (https://apps.who.int/iris/handle/10665/311314, accessed 7 June 2021).

Central Statistical Organization (2021). Rapid Welfare Monitoring Survey (SWIFT) 2017−Iraq 2017−2018. Geneva: United Nations High Commissioner for Refugees (https://microdata.unhcr.org/index.php/catalog/404/pdf-documentation, accessed 7 June 2021).

Dahlgren G, Whitehead M (2006). Levelling up (Part 2): a discussion paper on European strategies for tackling social inequities in health. Copenhagen: WHO Regional Office for Europe.

DANE (2020). Nota metodológica. Índice de vulnerabilidad por manzana con el uso de variables demográficas y comorbilidades (https://www.dane.gov.co/files/comunicados/Nota_metodologica_indice_de_vulnerabilidad.pdf, accessed 28 May 2021).

Dirksen J (2020). Which are the dimensions and indicators most commonly used to measure multidimensional poverty around the world? Dimensions. 11:14−22.

Dirksen J, Nogales, R Oldiges C (2021). Leave no one behind: the COVID-19 pandemic and multidimensional poverty in South Asia. Mimeo.

Elston JWT, Cartwright C, Ndumbi P, Wright C (2017). The health impact of the 2014−15 Ebola outbreak. Public Health. 143:60−70.

Elston JWT, Moosa AJ, Moses F, Walker G, Dotta N, Waldman RJ et al. (2016). Impact of the Ebola outbreak on health systems and population health in Sierra Leone. J Public Health. 38(4):673−8.

Fisman DN (2007). Seasonality of infectious diseases. Annu Rev Public Health. 28:127−43.

Grassly NC, Fraser C (2006). Seasonal infectious disease epidemiology. Proc Biol Sci. 273(1600)2541−50.

Gwavuya S (2020). How the pandemic will aggravate multidimensional poverty in Afghanistan. Dimensions. 10.

Health Cluster (2018). Public Health Information Services (PHIS) toolkit. Geneva: World Health Organization (https://www.who.int/health-cluster/resources/publications/PHIS-toolkit-October-2018.pdf, accessed 29 May 2021).

International Recovery Platform (2020). COVID-19 recovery needs assessment draft guidance note (https://www.recoveryplatform.org/assets/publication/CRNA/COVID%2019%20Recovery%20Needs%20Assessment%20Guidance.pdf, accessed 30 May 2021).

Moore M, Gelfeld B, Okunogbe A, Paul C (2016). Identifying future disease hotspots: Infectious Disease Vulnerability Index. Santa Monica: RAND.

MPPN (2021). Some national measures. Oxford: Multidimensional Poverty Peer Network (https://mppn.org/applications/national-measures/, accessed 28 May 2021).

MSF (2012). Assessment toolkit (Part I): practical steps for the assessment of health and humanitarian crises. Paris: Médecins

Sans Frontières (https://evaluation.msf.org/sites/evaluation/files/assessment_toolkit.pdf, accessed 28 May 2021).

Narayan D, Chambers R, Shah MK, Petesch P (2000a). Voices of the poor (Vol. II): crying out for change. Oxford: Oxford University Press for the World Bank.

Narayan D, Patel R, Schafft K, Rademacher A, Koch-Schulte S (2000b). Voices of the poor (Vol. I): Can anyone hear us? Oxford: Oxford University Press for the World Bank.

Narayan D, Petesch P (2002). Voices of the poor (Vol. III): from many lands. Oxford: Oxford University Press for the World Bank.

Naumova EN (2006). Mystery of seasonality: getting the rhythm of nature. J Public Health Pol. 27(1):2–12.

NSB, UNDP Bhutan (2020). Rapid socio-economic impact assessment of COVID-19 on Bhutan's tourism sector. Thimphu: National Statistics Bureau and United Nations Development Programme Bhutan.

NSIA (2019). Afghanistan Multidimensional Poverty Index 2016–2017. Kabul: National Statistic and Information Authority, Afghanistan.

NSIA, OPHI, UNICEF (2020). The socioeconomic impact of COVID-19 in Afghanistan: microsimulations of effects on multidimensional poverty. Internal report. Kabul: United Nations Children's Fund.

OCHA (2020a). Step by Step Guide 2021 Humanitarian programme cycle. Geneva: United Nations Office for the Coordination of Humanitarian Affairs (https://www.humanitarianresponse.info/en/programme-cycle/space, accessed 07 June 2021).

OCHA (2020b). What is the cluster approach? Geneva: United Nations Office for the Coordination of Humanitarian Affairs (https://www.humanitarianresponse.info/en/coordination/clusters/what-cluster-approach, accessed 28 May 2021).

Oliver S, Dickson K, Newman M (2012). Getting started with a review. In: Gough D, Oliver S, Thomas J, editors. Introduction to systematic reviews. London: SAGE.

Oliver S, Kavanagh J, Caird J, Lorenc T, Oliver K, Harden A et al. (2008). Health promotion, inequalities, and young people's health: a systematic review of research (EPPI-Centre Report No. 1611). London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

Onyango MA, Resnick K, Davis A, Shah RR (2019). Gender-based violence among adolescent girls and young women: a neglected consequence of the West African Ebola outbreak. In: Schwartz D, Anoko J, Abramowitz S, editors. Pregnant in the time of Ebola: global maternal and child health. Cham: Springer.

OPHI, UNDP (2019). How to build a national Multidimensional Poverty Index (MPI). Using the MPI to inform the SDGs. Oxford and New York: Oxford Poverty and Human Development Initiative and United Nations Development Programme.

PCBS (2020). Multidimensional poverty profile in Palestine, 2017. Ramallah: Palestinian Central Bureau of Statistics.

Pinilla-Roncancio M, Alkire S (2020). How poor are people with disabilities? Evidence based on the global Multidimensional Poverty Index. J Disabil Policy Stud. 31(4):206–16.

Staab S (2020). COVID-19 sends the care economy deeper into crisis mode. New York: UN Women (data.unwomen.org/features/covid-19-sends-care-economy-deeper-crisis-mode, accessed 29 May 2021).

Tavares FF, Betti G (2021). The pandemic of poverty, vulnerability, and COVID-19: evidence from a fuzzy multidimensional analysis of deprivations in Brazil. World Dev. 139:e105307.

The Lancet (2020). Editorial. Redefining vulnerability in the era of COVID-19. 395(10230):P1089.

UNDP (2020a). Beyond recovery: towards 2030. New York: United Nations Development Programme.

UNDP (2020b). COVID-19 and human development: assessing the crisis, envisioning the recovery. New York: United Nations Development Programme.

UNDP (2020c). COVID-19 and human development: exploring global preparedness and vulnerability. New York: United Nations Development Programme.

UNDP (2021). COVID-19: socio-economic impact. New York: United Nations Development Programme (https://www.undp.org/content/undp/en/home/coronavirus/socio-economic-impact-of-covid-19.html, accessed 29 May 2021).

UNDP El Salvador (2020). COVID-19 and vulnerability: a multidimensional poverty perspective in El Salvador (UNDP LAC COVID-19 Policy Document Series No. 12). New York: United Nations Development Programme.

UNDP Honduras (2020). Nota técnica Programa de transferencias electrónicas a población vulnerable por el COVID-19. Tegucigalpa: United Nations Development Programme (https://www.hn.undp.org/content/honduras/es/home/library/otros/focalizacion-de-transferencias-electronicas-a-poblacion-vulnerab.html, accessed 31 May 2021).

UNDP Pakistan (2020). COVID-19: Pakistan socio-economic framework. Islamabad: United Nations Development Programme (https://www.pk.undp.org/content/pakistan/en/home/library/development_policy/covid-19-pakistan--socio-economic-framework.html, accessed 29 May 2021).

UNESCO (2020). Adolescent pregnancy threatens to block a million girls across sub-Saharan Africa from returning to school. Paris: United Nations Educational, Scientific and Cultural Organization (https://en.unesco.org/news/adolescent-pregnancy-threatens-block-million-girls-across-sub-saharan-africa-returning-school , accessed 30 May 2021).

UNHCR (2006). The UNHCR tool for participatory assessment in operations. Geneva: Office of the United Nations High Commissioner for Refugees.

UNICEF, World Bank (2020) Assessment of COVID-19 impact on poverty and vulnerability in Iraq. United Nations Children's Fund (https://www.unicef.org/iraq/media/1181/file/Assessment%20of%20COVID-19%20Impact%20on%20Poverty%20and%20Vulnerability%20in%20Iraq.pdf , accessed 31 May 2021).

United Nations (2020a). A UN framework for the immediate socio-economic response to COVID-19. New York: United Nations (https://unsdg.un.org/sites/default/files/2020-04/UN-framework-for-the-immediate-socio-economic-response-to-COVID-19.pdf, accessed 29 May 2021).

United Nations (2020b). Putting the UN framework for socio-economic response to COVID-19 into action: insights. New York: United Nations Development Programme (https://www.undp.org/.../covid19/Brief2-COVID-19-final-June2020.pdf, accessed 29 May 2021).

United Nations (2020c). Shared responsibility, global solidarity: responding to the socioeconomic impacts of COVID-19. New York: United Nations.

UNISDR (2017). Build back better in recovery, reconstruction, and rehabilitation (consultative version). Geneva: United Nations Office for Disaster Risk Reduction.

WFP VAM (2019). Comprehensive vulnerability monitoring exercise: Multidimensional Poverty Index. Rome: World Food Programme Vulnerability Analysis and Mapping (https://reliefweb.int/sites/reliefweb.int/files/resources/WFP%20CVME3%20Multidimensional%20Poverty%20Index_May2019.pdf, accessed 29 May 2021).

Wijaya KP, Aldila D, Schäfer LE (2019). Learning the seasonality of disease incidences from empirical data. Ecol Complexity. 38:83–97.

WHO (2015). Framework for a public health emergency operations centre. Geneva: World Health Organization (https://apps.who.int/iris/handle/10665/196135, accessed 28 May 2021).

WHO (2017). A strategic framework for emergency preparedness. Geneva: World Health Organization (https://apps.who.int/iris/handle/10665/254883 , accessed 28 May 2021).

WHO (2018). 2018 Global reference list of 100 core health indicators (plus health-related SDGs). Geneva: World Health Organization (https://apps.who.int/iris/handle/10665/259951 , accessed 28 May 2021).

WHO (2020a). Glossary of health emergency and disaster risk management terminology. Geneva: World Health Organization (https://apps.who.int/iris/handle/10665/331716 , accessed 28 May 2021).

WHO (2020b). Coronavirus disease (COVID-19). Geneva: World Health Organization (https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public, accessed 30 May 2021).

WHO (2021a). COVID-19 strategic preparedness and response plan: 1 February 2021–31 January 2022. Geneva: World Health Organization (https://apps.who.int/iris/handle/10665/340072, accessed 25 July 2021).

WHO (2021b). Using the Multidimensional Poverty Index (MPI) for preparedness, response and recovery to health emergencies, including COVID-19. Geneva: World Health Organization (https://www.who.int/news-room/events/detail/2021/04/13/default-calendar/using-the-multidimensional-poverty-index-(mpi)-for-preparedness-response-and-recovery-to-health-emergencies-including-covid-19, accessed 30 May 2021).

Additional resources

Multidimensional poverty and vulnerability indices

Alkire S, Foster J (2008). OPHI Working paper No. 7. Counting and multidimensional poverty measurement. Oxford: University of Oxford, Oxford Poverty and Human Development Initiative (https://www.ophi.org.uk/wp-content/uploads/ophi-wp7_vs2.pdf, accessed 25 July 2021).

Dirksen J (2020). Which are the dimensions and indicators most commonly used to measure multidimensional poverty around the world? Dimensions MPPN magazine. December 2020:11 (https://mppn.org/national-mpi-dimensions-and-indicators/, accessed 7 June 2021).

OPHI (2021). Dimensions: Magazine on multidimensional poverty. In: Multidimensional Poverty Peer Network (MPPN) [website]. Oxford: University of Oxford, Oxford Poverty and Human Development Initiative (https://mppn.org/dimensions/editions/ , accessed 7 June 2021).

OPHI (2015). Multidimensional poverty measurement and analysis: contents. Oxford: University of Oxford, Oxford Poverty and Human Development Initiative (https://ophi.org.uk/multidimensional-poverty-measurement-and-analysis-contents/, accessed 28 May 2021).

OPHI. Online training portal on multidimensional poverty measurement. Oxford: University of Oxford, Oxford Poverty and Human Development Initiative (https://ophi.org.uk/courses-and-events/online-training-portal/#bgrd, accessed 28 May 2021.

OPHI. Some national measures. Multidimensional Poverty Peer Network (MPPN) [website]. Oxford: University of Oxford, Oxford Poverty and Human Development Initiative (https://mppn.org/applications/national-measures/, accessed 28 May 2021).

UNDP, OPHI (2019). How to build a national multidimensional poverty index (MPI): using the MPI to inform the SDGs. New York: United Nations Development Programme (https://www.undp.org/content/dam/undp/library/prosperity/inclusive-growth/How_to_Build_a_National_Multidimensional_Poverty%20Index.pdf, accessed 28 May 2021).

UNDP, OPHI (2021). Designing a multidimensional poverty index (2021): massive open online course. Oxford and New York: Oxford Poverty and Human Development Initiative and United Nations Development Programme (https://www.learningfornature.org/en/courses/designing-a-multidimensional-poverty-index-2021/, accessed 28 May 2021).

Established frameworks and tools for assessments and data collection in humanitarian and health emergency settings

Standardized Monitoring and Assessment of Relief and Transitions (SMART) (2002). Toronto: Action Against Hunger Canada (https://smartmethodology.org/, accessed 28 May 2021).

ACAPS (2021). Assessing severity to support evidence-based decision making. Geneva: ACAPS (https://www.acaps.org/methodology/severity, accessed 7 June 2021).

Global Health Cluster (2020). GHC Guidance: People in Need Calculations (PIN). Geneva: WHO (https://www.who.int/health-cluster/resources/publications/GHC-PiNGuidance-05-08-2020.pdf?ua=1, accessed 28 May 2021).

WHO (2020). Health cluster guide: a practical handbook. Geneva: World Health Organization (https://apps.who.int/iris/bitstream/handle/10665/334129/9789240004726-eng.pdf?sequence=1&isAllowed=y, accessed 28 May 2021).

Inter-Agency Standing Committee (2015). Multi Cluster/Sector Initial Rapid Assessment (MIRA) Manual: Revision. July (https://www.humanitarianresponse.info/sites/www.humanitarianresponse.info/files/documents/files/mira_revised_2015_en_1.pdf, accessed 28 May 2021).

IPA. Poverty Probability Index (PPI). Washington, DC: Innovations for Poverty Action (https://www.povertyindex.org/, accessed 28 May 2021).

OCHA (2021). Humanitarian programme cycle: 2021 humanitarian needs overviews (HNOs) and humanitarian response plans (HRPs) templates. Geneva: United Nations Office for the Coordination of Humanitarian Affairs (https://www.humanitarianresponse.info/en/programme-cycle/space, accessed 7 June 2021).

OCHA. Humanitarian response. Geneva: United Nations Office for the Coordination of Humanitarian Affairs (https://www.humanitarianresponse.info/en, accessed 7 June 2021).

OCHA. Needs assessments and analysis. Geneva: United Nations Office for the Coordination of Humanitarian Affairs (https://www.unocha.org/themes/needs-assessment-and-analysis, accessed 7 June 2021).

Health Cluster (2017). Public Health Information Services (PHIS) Toolkit: version 20 December 2017 (https://www.who.int/health-cluster/resources/publications/PHIS-toolkit.pdf, accessed 29 May 2021).

Health Cluster (2018).Public Health Information Services (PHIS) Toolkit: version October 2018 (https://healthcluster.who.int/our-work/task-teams/information-management-task-team/public-health-information-services-toolkit, accessed 29 May 2021).

UNHCR (2019). Standardised Expanded Nutrition Survey (SENS). Geneva: Office of the United Nations High Commissioner for Refugees (https://sens.unhcr.org/, accessed 7 June 2021).

UNHCR (2021). Health needs assessment: version 1.8. Geneva: Office of the United Nations High Commissioner for Refugees (https://emergency.unhcr.org/entry/38357/health-needs-assessment, accessed 7 June 2021).

WHO. Early Warning, Alert and Response System (EWARS). Geneva: World Health Organization (https://www.who.int/emergencies/surveillance/early-warning-alert-and-response-system-ewars, accessed 7 June 2021).

WHO. Health Resources and Services Availability Monitoring System (HeRAMS). Geneva: World Health Organization (https://www.who.int/initiatives/herams, accessed 7 June 2021).

WHO, King's College London (2011). The Humanitarian Emergency Settings Perceived Needs Scale (HESPER): manual with Scale. Geneva: World Health Organization (https://apps.who.int/iris/handle/10665/44643, accessed 29 May 2021).

WHO, UNHCR (2012). Assessing mental health and psychosocial needs and resources: toolkit for humanitarian settings. Geneva: World Health Organization (https://apps.who.int/iris/handle/10665/76796, accessed 28 May 2021).

COVID-19-specific preparedness, response and recovery

International Recovery Platform (2020). COVID-19 recovery needs assessment: draft guidance note (https://www.recoveryplatform.org/assets/publication/CRNA/COVID%2019%20Recovery%20Needs%20Assessment%20Guidance.pdf, accessed 30 May 2021).

United Nations (2020). Global humanitarian response plan COVID-19: United Nations coordinated appeal April−December 2020. New York: United Nations (https://www.unocha.org/sites/unocha/files/Global-Humanitarian-Response-Plan-COVID-19.pdf, accessed 7 June 2021).

WHO (2021). COVID-19 strategic preparedness and response plan: 1 February 2021-31 January 2022. Geneva: World Health Organization (https://cdn.who.int/media/docs/default-source/3rd-edl-submissions/who_sprp-2021final18022021.pdf?sfvrsn=ce5092f9_1&download=true, accessed 7 June 2021).

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