



02

Inequalities in the global burden of malnutrition

2013. British Columbia, Canada.
The launch of an initiative encouraging healthy and active lifestyles.
Photo: Province of British Columbia.

KEY POINTS

- 1** Malnutrition persists at unacceptably high levels on a global scale. Despite some improvements in select nutrition indicators, progress is insufficient to meet the 2025 global nutrition targets. Among children under 5 years of age, 149.0 million are stunted, 49.5 million are wasted and 40.1 million are overweight. There are 677.6 million obese adults.
- 2** Progress varies across countries and by form of malnutrition. The latest data shows that no country is 'on course' to meet all eight global nutrition targets being tracked, and just eight countries are on course to meet four targets. No country is on course to meet the targets on anaemia or adult obesity.
- 3** Countries can be burdened by multiple forms of malnutrition, particularly when affected by conflict or other forms of fragility. Addressing drivers and consequences of fragility requires more and better data to inform the design of equitable interventions.
- 4** Global, regional and national patterns mask nutrition inequalities within countries and by sociodemographic characteristics, such as subnational location, age, sex, wealth and education.
- 5** Data gaps are more striking for certain nutrition indicators, subnational locations, and key population characteristics, such as ethnicity and disability. These data gaps prevent both improved understanding of nutrition inequalities and informed priority-setting.

The state of global nutrition

Since 2014, the Global Nutrition Report has provided high-quality, comprehensive and credible data to assess the state of global nutrition, complemented by online Country Nutrition Profiles.¹ The *2020 Global Nutrition Report* continues to shed light on the global state of nutrition and progress towards the 2025 global nutrition targets. It builds on prior reports and uses new and more granular data to go deeper and understand who is affected, where and by what form of malnutrition.

This chapter presents the latest data on the 2025 global nutrition targets, collectively referring to the maternal, infant and young child nutrition (MIYCN) targets, and the diet-related non-communicable disease (NCD) targets. These include targets for six MIYCN indicators: low birth weight, stunting in children under 5 years of age, wasting in children under 5 years of age, overweight in children under 5 years of age, anaemia in women of reproductive age and exclusive breastfeeding. They also include diet-related NCD indicators in adults: salt intake, raised blood pressure, diabetes and obesity. In recognition of the need to evaluate other key nutrition indicators and comprehensively assess the state of global nutrition across the life course, data is also tracked and presented for: multiple infant and young child feeding (IYCF) indicators, child and adolescent anthropometric indicators (underweight, overweight, and obesity), and adult anthropometric indicators (underweight and overweight, in addition to obesity). Definitions of all indicators can be found in Appendix 1.

This chapter provides an overview of inequalities in these nutrition indicators across countries and within countries by location and key population characteristics such as age, sex, wealth and education. More detailed data at global, regional and country levels, at the most granular level available, is available on the Global Nutrition Report website.² This data and findings are an indispensable prerequisite for informed priority-setting targeting the intersections between diet and disease, and ensuring that no one is left behind.

Progress towards the 2025 global nutrition targets

Global progress

Figure 2.1 presents the baseline and latest data for the 2025 global nutrition targets. Multiple sources were used to compile this global data, and global progress towards meeting the targets is assessed as 'on course', 'off course' or 'some progress'. (Appendix 2 gives details of the data and methods used.)

Looking at the MIYCN targets, the world is 'off course' to meet the anaemia target, with 613.2 million (32.8% prevalence) adolescent girls and women aged 15 to 49 years being affected. Anaemia prevalence is substantially higher in pregnant (35.3 million, 40.1%) than non-pregnant (577.9 million, 32.5%) adolescent girls and women. There has been some progress towards achieving the exclusive breastfeeding target, with 42.2% of infants under 6 months being exclusively breastfed; yet, accelerated improvements would be needed to reach the 2025 target. Globally, 20.5 million newborns (14.6%) have a low birth weight, with levels of progress well below those required to achieve the 2025 target. Stunting still affects 149.0 million (21.9%) children under 5 years of age, and wasting affects 49.5 million (7.3%) children under 5 years of age; progress is far too slow to achieve any of those targets. Notably, Asia is home to more than half of the world's stunted children (81.7 million, 54.8%).³ We are also off course to meet the target for overweight in children, with 40.1 million (5.9%) children under 5 years of age being overweight.

FIGURE 2.1

Global progress towards the 2025 global nutrition targets

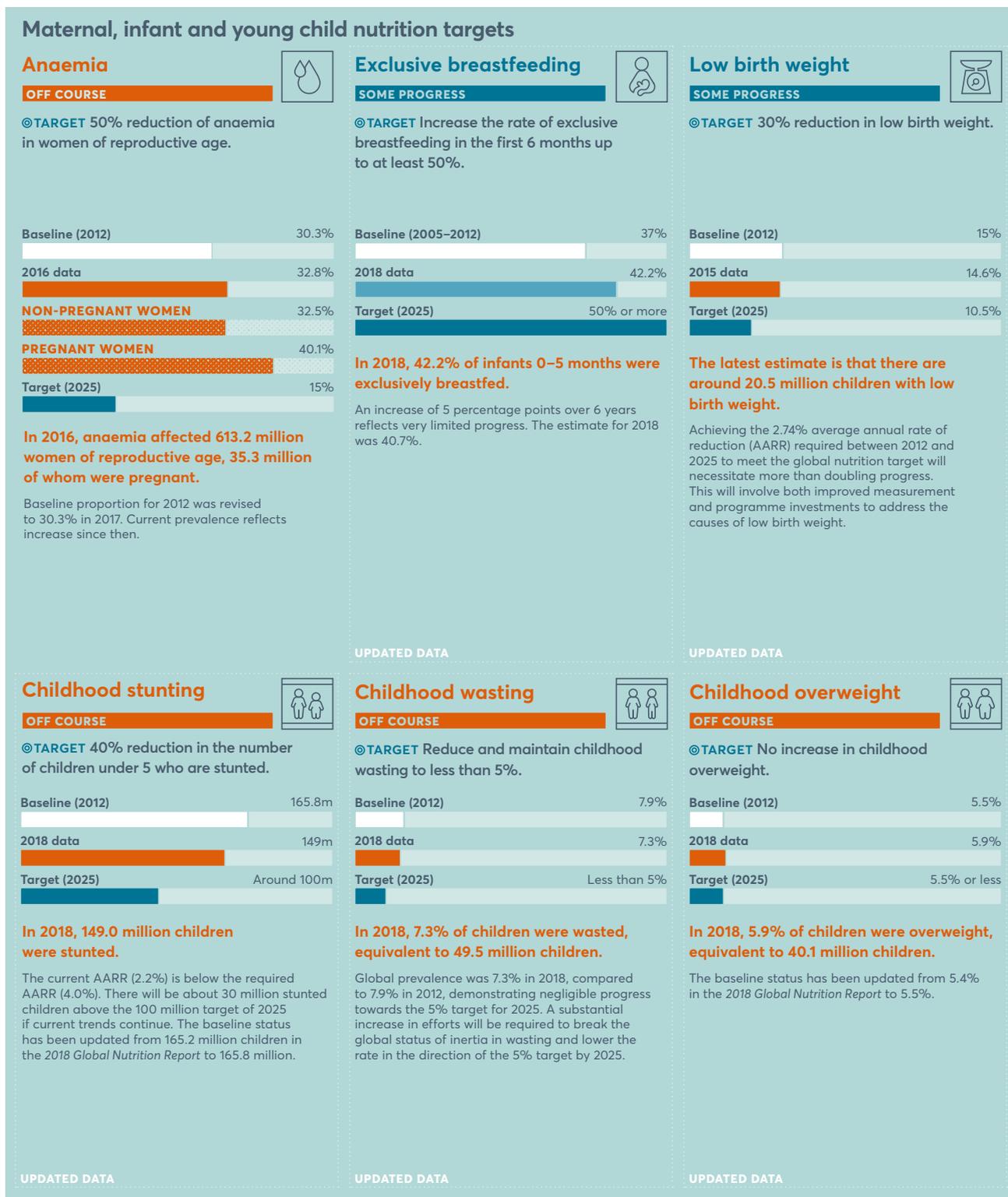
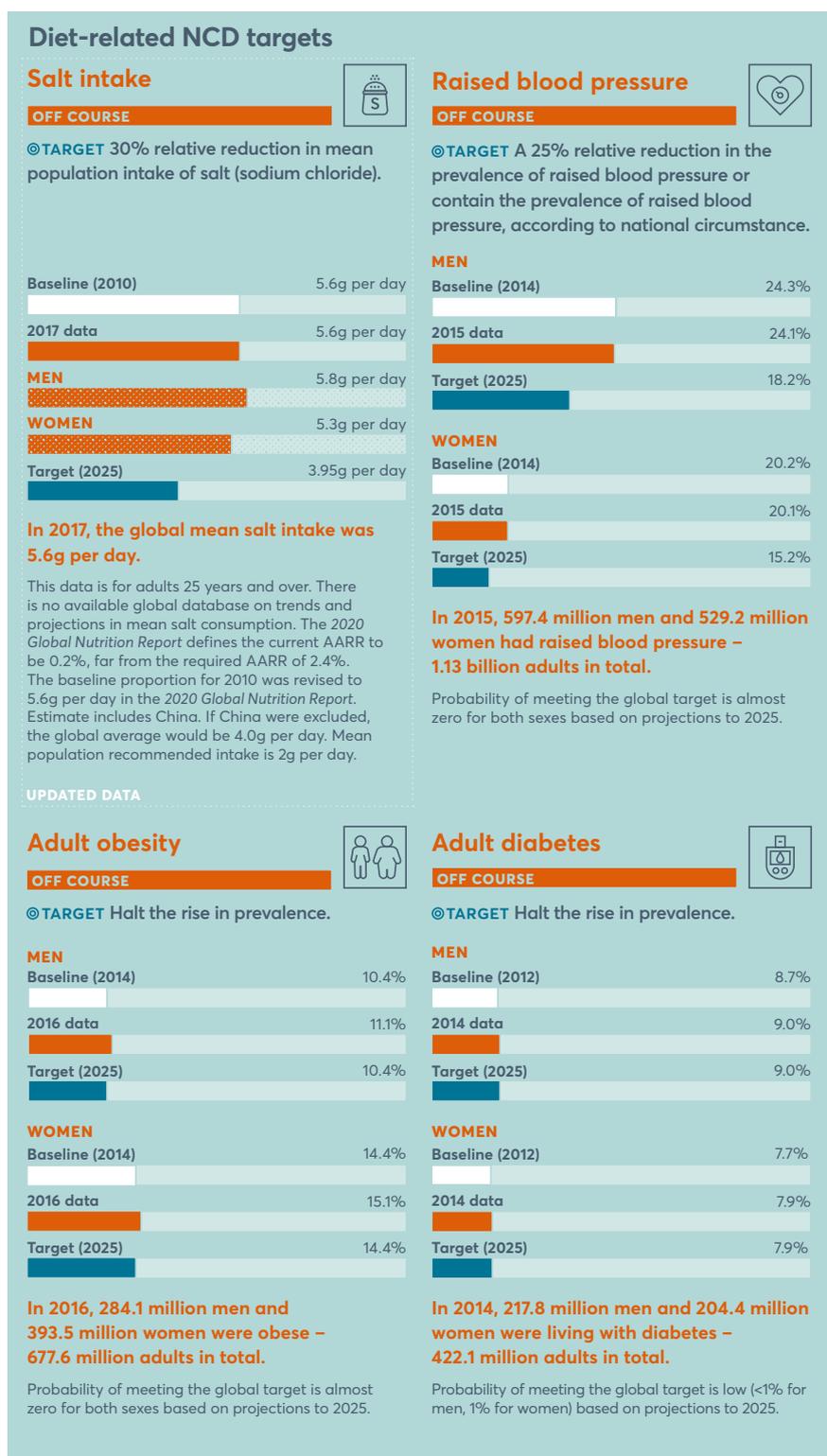


FIGURE 2.1 (continued)

Global progress towards the 2025 global nutrition targets



Source: UNICEF global databases Infant and Young Child Feeding, 2019, UNICEF/WHO/World Bank Joint Child Malnutrition Estimates Expanded Database: Stunting, Wasting and Overweight, (March 2019, New York), NCD Risk Factor Collaboration, WHO Global Health Observatory and Global Burden of Disease, the Institute for Health Metrics and Evaluation, UNICEF-WHO low birthweight estimates, 2019.

Note: Baseline year aligns as close as possible to the year that each target was adopted (generally 2012 for maternal, infant and young child nutrition targets, and 2014 for diet-related non-communicable disease (NCD) targets). For diabetes, given the lack of global post-2014 data, data in 2012 are shown as the baseline for reference. Latest year reflects the most recent year for which data is shown. Childhood refers to children under 5 years of age; salt intake is adults aged 25 years and older, all other adult targets are for those 18 years and over. Data on diet-related NCDs (all but salt) is age-standardised using the WHO standard population. The methodologies for tracking progress differ across targets. See Appendix 1 for definitions of indicators. See Appendix 2 for details on data and methods used to assess progress towards global nutrition targets.

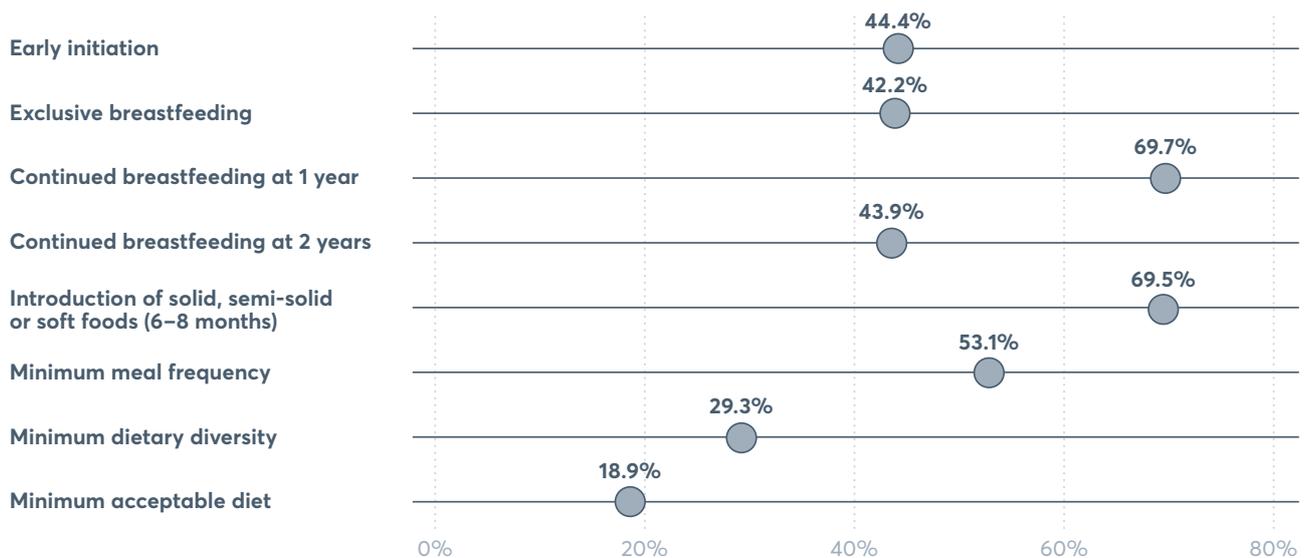
All diet-related NCD targets are globally off course and at alarming levels, with projected probabilities of meeting any of the targets being close to zero. Mean global salt intake for adults (aged 25+ years) is estimated at 5.6g/day, slightly higher in men (5.8g/day) than women (5.3g/day). Globally, 1.13 billion (22.1%) adults (18+ years) have raised blood pressure, more men (597.4 million, 24.1%) than women (529.2 million, 20.1%). A staggering 677.6 million (13.1%) adults (18+ years) are obese worldwide, with more women being obese (393.5 million, 15.1%) than men (284.1 million, 11.1%). Diabetes affects 422.1 million (8.5%) adults (18+ years), with slightly more men living with diabetes (217.8 million, 9.0%) than women (204.4 million, 7.9%).

Overall, malnutrition persists at unacceptably high levels on a global scale. Despite some improvements in exclusive breastfeeding, progress overall is far too slow to meet the 2025 global nutrition targets. Intensified efforts and actions are needed to reach each of those targets.

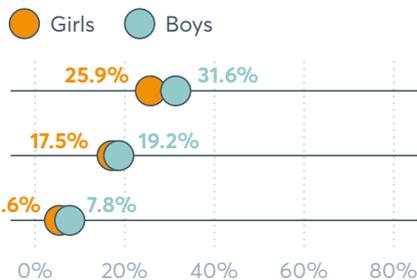
FIGURE 2.2

Global prevalence of infant and young child feeding indicators, child and adolescent and adult nutrition indicators

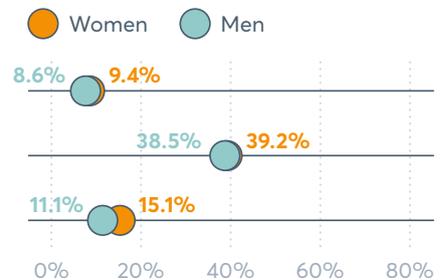
INFANT AND YOUNG CHILD FEEDING INDICATORS, 2018



CHILD AND ADOLESCENT NUTRITION INDICATORS, 2016



ADULT NUTRITION INDICATORS, 2016



Source: UNICEF global databases Infant and Young Child Feeding, 2019, NCD Risk Factor Collaboration 2019, WHO Global Health Observatory 2019 and Global Burden of Disease, the Institute for Health Metrics and Evaluation 2019, UNICEF-WHO low birthweight estimates, 2019.

Note: Data on adult indicators for those aged 18 and older and child and adolescent indicators for those aged 5–19 is age-standardised using the WHO standard population. The methodologies for tracking progress differ between targets. See Appendix 1 for definitions of indicators. See Appendix 2 for details of data and methods used to assess progress towards global nutrition targets.

Beyond these nutrition indicators with global targets, the Global Nutrition Report also tracks several IYCF, adolescent and adult indicators (Figure 2.2). Infant and young child feeding practices remain poor. Fewer than half (44.4%) of all newborns are put to the breast within the first hour of birth (known as early initiation), while only 42.2% of infants under 6 months of age are exclusively breastfed. Around two-thirds (69.7%) of children aged 12–15 months and less than half (43.9%) of children aged 20–23 months are breastfed. When it comes to solid food, only 69.5% of infants aged 6–8 months eat any solid food at all. Of children aged 6–23 months, only roughly half (53.1%) get the recommended minimum number of meals, with fewer than one in three children (29.3%) receiving the minimum diet diversity. This means that fewer than one in five (18.9%) eat a minimum acceptable diet. The latest sex-disaggregated global data on child and adolescent (5–19 years) and adult (18+ years) anthropometrics shows that far more children and adolescents are underweight than overweight or obese worldwide, while far more adults are overweight or obese than underweight. (We discuss this in more detail below in this chapter, under 'Inequalities in malnutrition').

National progress

The Global Nutrition Report also reports on country-level progress towards the 2025 global nutrition targets (Figure 2.3). Country-level progress is assessed as 'on course', 'some progress' or 'no progress or worsening' for MIYCN targets, and 'on course' or 'off course' for diet-related NCD targets (see Appendix 2 for details on data sources and methods used). Of the ten 2025 global nutrition targets, progress was not assessed at the country level for salt intake and raised blood pressure, due to lack of comparable projections.

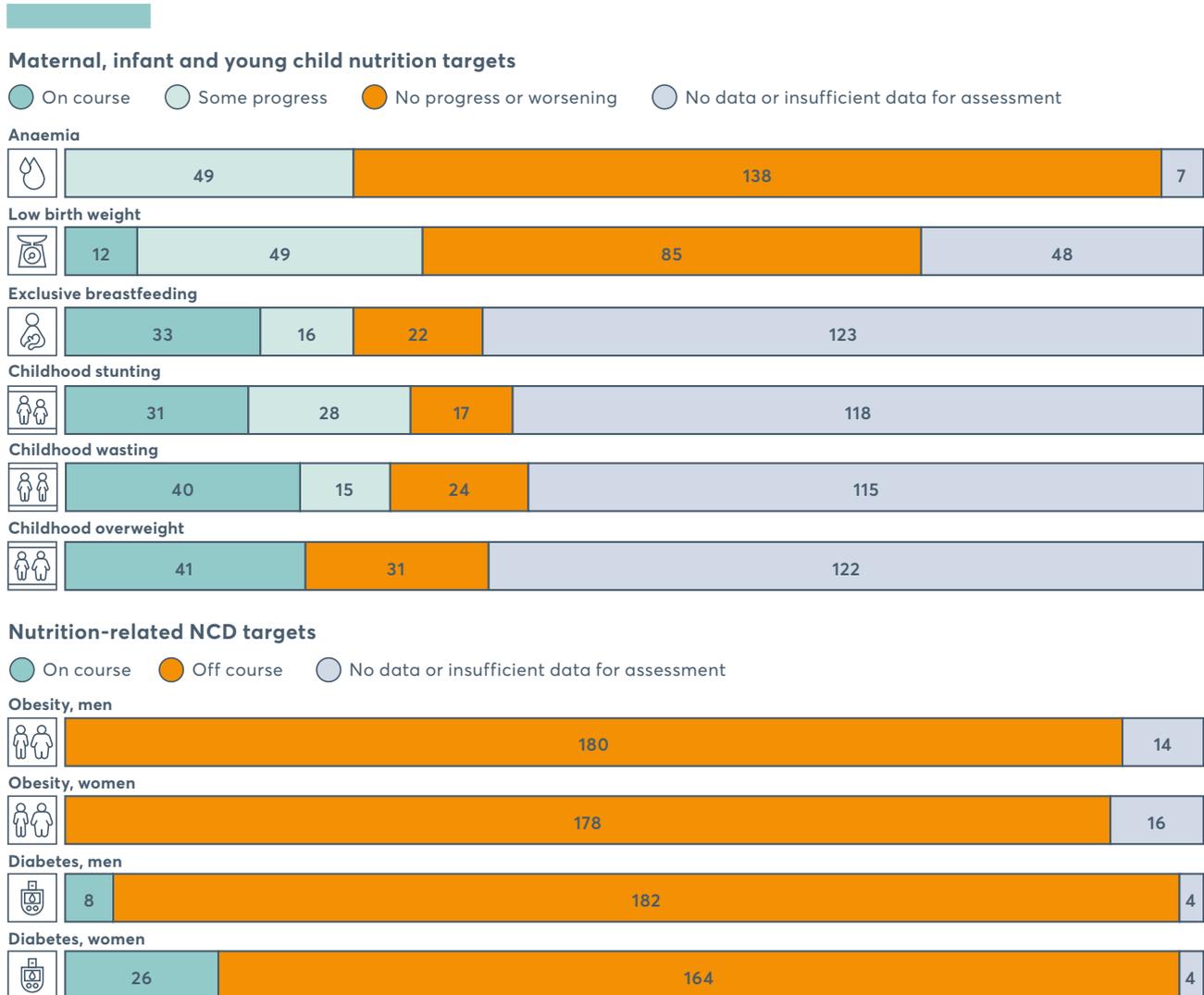
Data availability and quality differ across indicators because of varying methodologies and modelling approaches. It is, therefore, possible that some countries may have made progress towards the targets that is not reflected in these analyses. For instance, data for the MIYCN indicators, excluding anaemia and low birth weight, is based on surveys that mostly cover low-income and lower-middle-income countries, thus the full picture is incomplete. Data for anaemia, low birth weight and the NCD targets is available for all countries, but based on modelled estimates, which may not accurately represent actual country-level status.

The assessment of country-level progress reveals that too few countries are 'on course' to meet any one of the global targets (Figure 2.3). The latest available data shows that 41 countries are 'on course' for childhood overweight, 40 for wasting and 31 for stunting; 33 countries are 'on course' for exclusive breastfeeding, and only 12 for low birth weight. Worse still, no country is 'on course' to reach the anaemia target, nor is any country 'on course' to halt the rise in adult obesity. Likewise, only a low proportion of countries are 'on course' to meet the diabetes target.

Across the targets, 106 countries with available data are 'on course' to meet at least one global nutrition target, with an additional 28 showing 'some progress' in at least one target. Of these 106, 56 countries are 'on course' to meet at least two targets; 21 countries to meet at least three, and just 8 countries to meet four targets, which is the maximum number of targets any country is on track to meet.

FIGURE 2.3

Country-level progress towards the 2025 global nutrition targets



Source: UNICEF global databases Infant and Young Child Feeding, 2019, UNICEF/WHO/World Bank Joint Child Malnutrition Estimates Expanded Database: Stunting, Wasting and Overweight, (March 2019, New York), NCD Risk Factor Collaboration 2019, WHO Global Health Observatory 2019, UNICEF-WHO Low birthweight estimates, 2019.

Notes: Assessment based on 194 countries. Childhood is under-5, and diet-related non-communicable disease (NCD) targets are assessed for adults 18 years and over. The methodologies for tracking progress differ between targets. See Appendix 1 for definitions of indicators. See Appendix 2 for details of data and methods used to assess progress towards global nutrition targets.

The double burden of malnutrition

There are two sides to the global malnutrition crisis we are facing: the major global impacts of food insecurity and undernutrition, which have long been recognised; and the tremendous

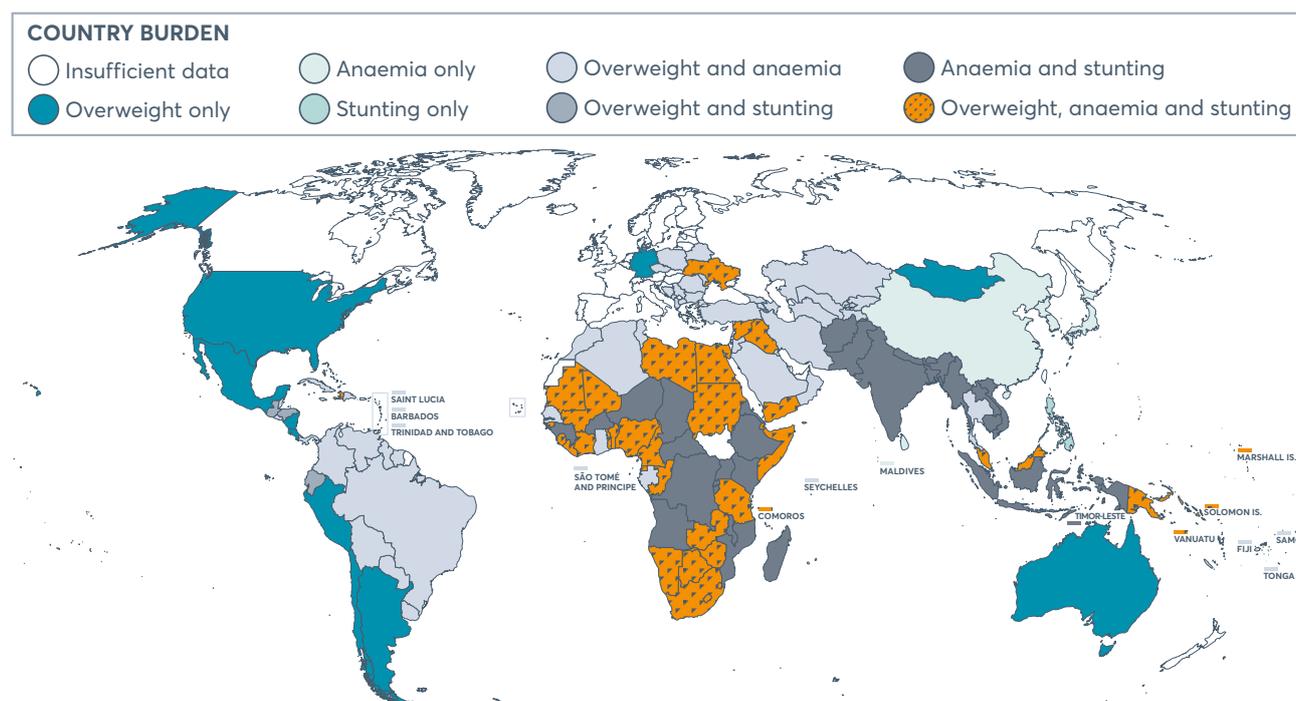
diet-related NCD impacts that have more recently emerged. This double burden of malnutrition is characterised by the coexistence of undernutrition alongside overweight or obesity (a major driver of other diet-related NCDs, such as diabetes and cardiovascular disease). This can occur at any population level: country, city, community, household and individual.⁴

Building on previous Global Nutrition Report analyses, and using the latest available data, the coexistence of three different forms of malnutrition at the country level was assessed (Figure 2.4): childhood stunting (aged under 5 years), anaemia among women of reproductive age (aged 15–49 years), and overweight (including obesity) in adult women (aged 18+ years). Of the 194 countries assessed, 143 have comparable data for all three indicators. All 143 countries experience at least one form of malnutrition at high levels, based on the three indicators and their respective thresholds. Of the 51 countries not represented in this analysis, the majority (40, 78.4%) are high-income. Of the 143 countries, 124 experience high levels of at least two forms of malnutrition (56 countries: anaemia and overweight; 28: anaemia and stunting; 3: overweight and stunting). Of the 124 countries, 37, mainly in Africa, experience high levels of all three forms. Only 19 countries experience high levels of just one form (1: stunting, 7: anaemia, 11: overweight). Although data availability and quality varies between countries and indicators, and over time, it is apparent that most countries globally are burdened by one or more forms of malnutrition.

Some notable country-level changes are observed over the past two decades, particularly for Guatemala and Peru. In 2000, Guatemala experienced high levels of all three malnutrition forms – overweight, stunting and anaemia – but anaemia has since dropped below the threshold (from 26.1% to 16.4% between 2000 and 2016). Peru was similarly burdened by all three forms of malnutrition in 2000, but has dropped below the high threshold level for both stunting (from 31.3% to 12.9% between 2000 and 2017) and anaemia (from 32.4% to 18.5% between 2000 and 2016).

FIGURE 2.4

Map of countries with overlapping forms of stunting in children under 5, anaemia among women of reproductive age, and overweight in adult women



Source: UNICEF/WHO/World Bank Joint Child Malnutrition Estimates Expanded Database: Stunting, Wasting and Overweight, (March 2019, New York), NCD Risk Factor Collaboration 2019, WHO Global Health Observatory 2019.

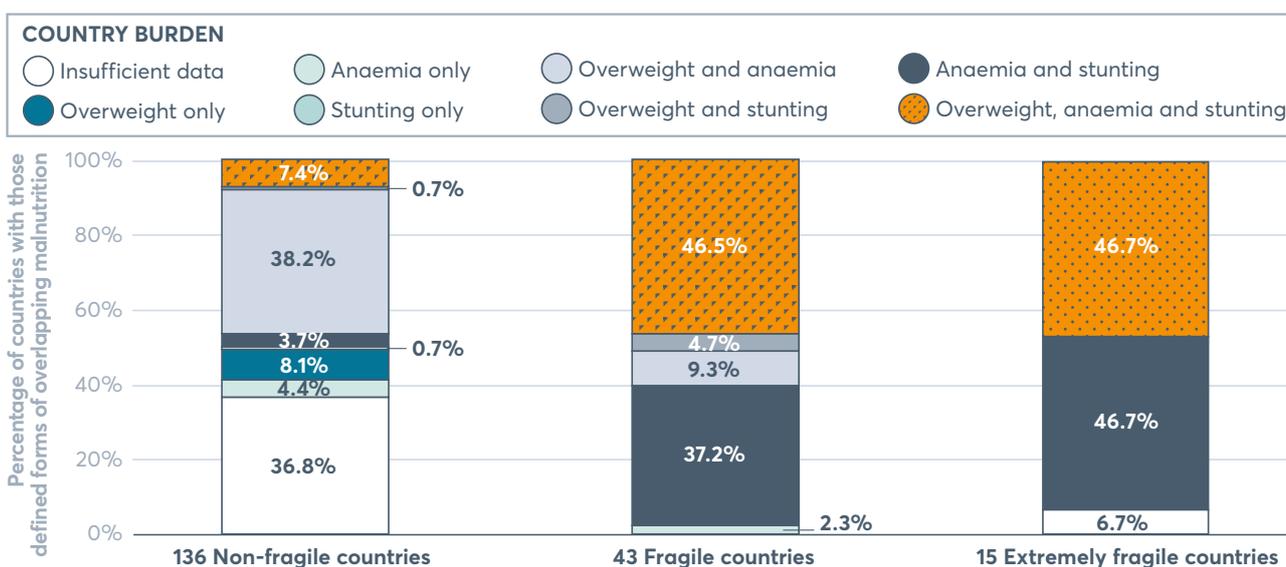
Notes: Prevalence (%) thresholds used to determine whether a country is experiencing a high prevalence for a given form of malnutrition: stunting in children aged under 5 years: $\geq 20\%$; anaemia among women of reproductive age (15–49 years): $\geq 20\%$; overweight (including obesity) in adult women aged ≥ 18 years: body mass index of $\geq 25\text{kg/m}^2 \geq 35\%$. Based on latest data available for 143 countries.

Countries affected by conflict or other forms of fragility (as discussed in Chapter 1) are at a higher risk for malnutrition. In 2016, 1.8 billion people (24% of the world's population) were living in fragile or extremely fragile countries.⁵ This figure is projected to grow to 2.3 billion people by 2030 and 3.3 billion by 2050. In such settings, prevalence of wasting⁶ among children under 5 years of age, an acute form of malnutrition, can be used to assess the recent nutrition status of these young children, as well as the overall food and nutrition situation of the general population.⁷ A wasting prevalence of 15% or more is regarded as very high and a trigger for intervention.⁸ Tufts University carried out a study in four countries: Bangladesh and Niger (both fragile, following the classification of OECD),⁹ and Chad and South Sudan (both extremely fragile, following the same classification). This study found that, over the last decade, acute malnutrition prevalence¹⁰ has occasionally dipped below 15%, but has generally remained above this threshold, despite substantial humanitarian efforts.

New analysis by the Global Nutrition Report demonstrates that fragile countries (20 of 43, 46.5%) and extremely fragile countries (7 of 15, 46.7%) are disproportionately burdened by high levels of all three forms of malnutrition compared to non-fragile countries (10 of 136, 7.4%) (Figure 2.5). Likewise, a greater proportion of fragile countries (42 of 43, 97.7%) and extremely fragile countries (14 of 15, 93.3%) experience at least two forms of malnutrition at high levels compared with non-fragile countries (68 of 136, 50.0%). Of note, there are variations in the forms of malnutrition that fragile, extremely fragile and non-fragile settings mostly face. Non-fragile countries are mostly burdened by high levels of overweight (overweight alone or overlapping with other forms, 74 of 136, 54.4%), whereas fragile countries experience high levels of anaemia (41 of 43, 95.3%) and extremely fragile countries have high levels of anaemia and stunting (14 of 15, 93.3%). These findings highlight the need to understand and address drivers of fragility itself, and how these lead to unequal nutrition outcomes.

FIGURE 2.5

Overlapping forms of stunting in children under 5, anaemia in adolescent girls and women, and overweight in adult women, by fragility



Source: UNICEF/WHO/World Bank Joint Child Malnutrition Estimates Expanded Database: Stunting, Wasting and Overweight, (March 2019, New York), NCD Risk Factor Collaboration 2019, WHO Global Health Observatory 2019, OECD 2018.

Notes: Prevalence (%) thresholds used to determine whether a country is experiencing a high prevalence for a given form of malnutrition: stunting in children under 5 years: $\geq 20\%$; anaemia in adolescent girls and women aged 15–49 years: $\geq 20\%$; overweight (including obesity) in adult women aged ≥ 18 years: body mass index of $\geq 25\text{kg/m}^2$ $\geq 35\%$. The figure is based on latest data for 194 countries. Numbers and percentages shown in each column correspond to each country group, classified by fragility state, as non-fragile, fragile and extremely fragile. This determination is based on the OECD States of Fragility 2018 framework, assessed by five core dimensions: political, societal, economic, environmental, and security.¹¹

As explored in the previous report, multiple forms of malnutrition can also coexist at the individual level.¹² The *2018 Global Nutrition Report* highlighted the coexistence of stunting and wasting at the individual level, meaning that a given child can be both stunted and wasted at the same time, placing them at increased risk for deleterious nutrition deficits, impaired cognitive development and even death. Of the 111 countries with available data, 10 have prevalence above 5% of coexisting stunting and wasting in individuals, and these are concentrated in Africa (7) and Asia (3). Of those, Yemen, South Sudan and Sudan have the highest prevalence, all at 6.7%.

Stunting and overweight can also coexist in the same child at the same time. Across the 111 countries with available data, 10 countries in Africa (5) and Western Asia (5) have a prevalence of at least 5% in coexisting childhood stunting and overweight at the individual level. Syria is the only country in which this prevalence exceeds 10% (11.1%), followed by Equatorial Guinea (8.6%) and Egypt (8.1%). Understanding how different forms of malnutrition can coexist at the individual, household and country level, and across the life course, is crucial, requiring more systematically collected and granular data.

Inequalities in malnutrition

Global, regional and national patterns can mask inequalities in nutrition indicators within countries and by sociodemographic characteristics. Elucidating inequalities in nutrition indicators is pivotal for informed priority-setting, guiding equitable distribution of resources and targeting interventions according to need. This chapter presents disaggregated data for a range of nutrition indicators – both those with a global target, and others of interest as introduced above – by location, age, sex, wealth and education.

Data availability, coverage and granularity can vary by dataset and nutrition indicator, and this chapter leverages and presents some of the latest available data. (Appendix 1 provides details on data sources.) Hence, we have grouped and jointly presented nutrition indicators as determined by their data availability (and how they are usually assessed) and level of available disaggregation, chronologically covering the life course. For all indicators, notably less global data is available by ethnicity or disability, precluding similar assessments.

Inequalities in infant and young child feeding indicators

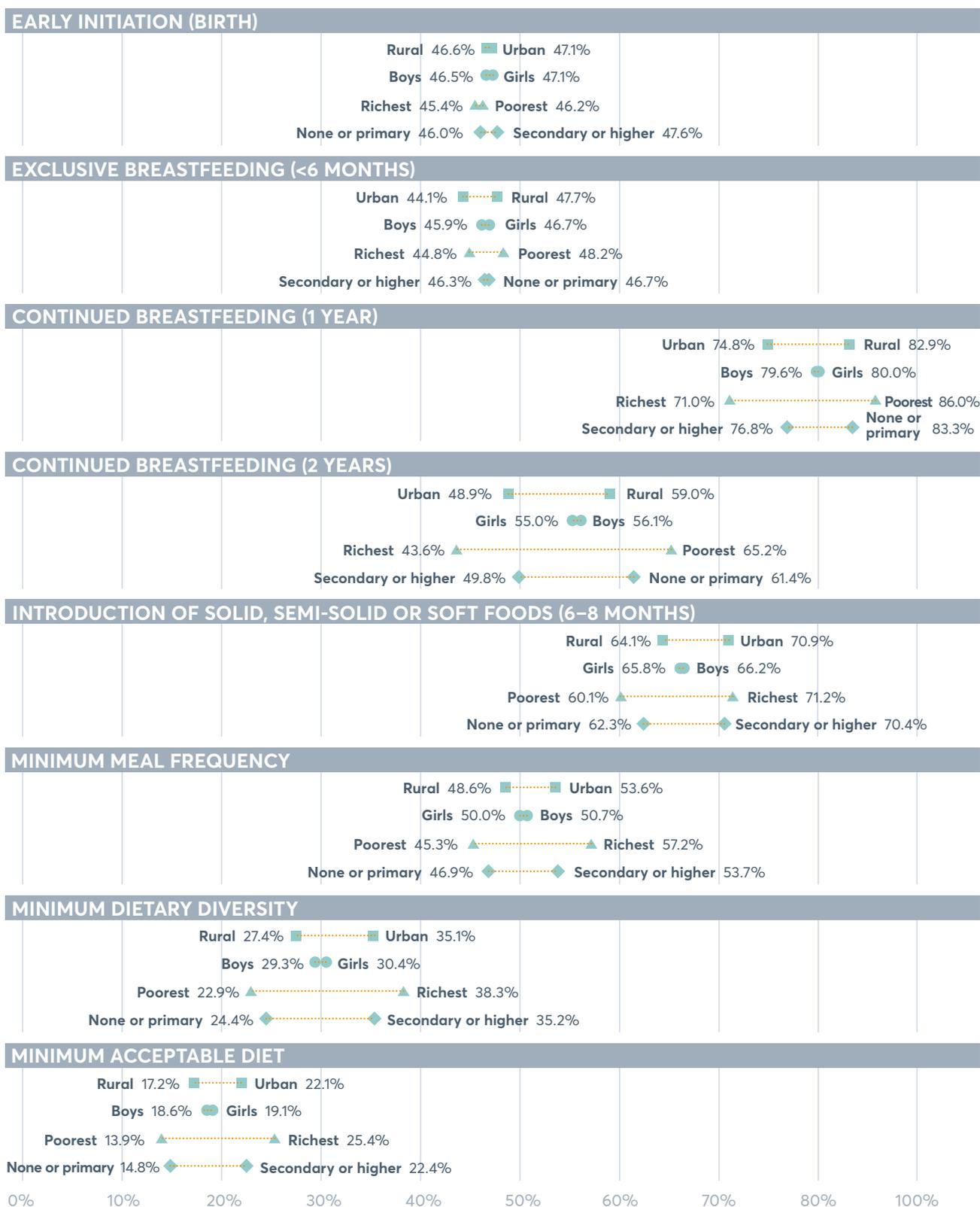
Figure 2.6 shows sociodemographic inequalities in the prevalence of IYCF indicators by urban–rural location, sex, wealth and education. Data availability varies by indicator, ranging from 70 to 85 countries, mostly representing low-income and lower-middle-income countries. The magnitude and direction of observed inequalities differs by assessed indicator and sociodemographic characteristic. Prevalence is generally similar by sex.

While no major differences are seen across population groups for early initiation and exclusive breastfeeding, large inequalities are evident for continued breastfeeding at 1 and 2 years. Continued breastfeeding prevalence is lower in urban than rural areas, in line with evidence suggesting an inverse relationship between urbanicity and breastfeeding behaviours¹³ even in low- and middle-income settings. For continued breastfeeding at 2 years, the wealth and education gaps widen, with lower prevalence of continued breastfeeding among children in the richest households or with a more educated mother.¹⁴

There are contrasting inequalities in solid food introduction, meal frequency, dietary diversity and minimum acceptable diet. Children from the richest households do far better, as do those in urban areas, or with a more educated mother. Looking specifically at minimum acceptable diet (the composite measure of meal frequency and dietary diversity), the wealth gap is 11.5%, the location gap 4.9%, and the education gap 7.7%.

FIGURE 2.6

Inequalities in infant and young child feeding indicators by urban–rural location, sex, wealth and maternal education



Source: UNICEF global databases Infant and Young Child Feeding, 2019.

Notes: Prevalence (%) estimates are based on population-weighted means of between 70 and 85 countries, using latest available data across all population groups by indicator (number of countries varies by indicator due to differences in available surveys). Inferences may be affected by the different number of included countries. Location is classified as 'urban' and 'rural' (as defined in the survey). Wealth is asset-based wealth scores at the household level and is classified as 'poor' (lowest wealth quintile) and 'rich' (highest wealth quintile). Education is classified as 'none or primary' and 'secondary or higher' and refers to educational level of the mother. Definitions of all indicators can be found in Appendix 1.

Inequalities in stunting, wasting and overweight among children under 5

Figure 2.7 presents the prevalence of stunting, wasting and overweight (including obesity) in children aged under 5 years by urban–rural location, sex, wealth and education, using the population-weighted mean of 98 countries for which there is available data across all population groups. Similarly to IYCF indicators, mostly low- and lower-middle-income countries are represented. This data suggests that absolute inequalities are more profound for stunting compared to wasting and overweight. Across all three indicators, no major differences are noted by sex, while largest inequalities are seen by wealth: stunting and wasting are more prevalent among the poorest, and overweight among the richest.

Location and education show contrasting inequalities for stunting and wasting versus overweight. Stunting and wasting prevalence is higher among children in rural areas and with less educated mothers, whereas the reverse is seen for overweight, which is higher for children in urban areas and with more educated mothers. Such wealth, location and education gaps are evident even in mostly low- and lower-middle-income settings. This perpetuates vulnerability and creates barriers to escaping poverty, posing a significant challenge to the global community and its commitment to leave no one behind and reach the zero-hunger target.

Stunting

To quantify gaps by sociodemographics, we assessed all countries with available data for a given population group, and not just those with data for all groups. The largest inequalities are seen by wealth, followed by education and location, while stunting is only slightly higher in boys (33.5%) than girls (31.2%). Average stunting rates are estimated to be more than twice as high among children living in the poorest households (43.6%) compared with those in the richest (18.6%). The magnitude of this wealth gap varies across the 92 countries with available stunting data by wealth, with the absolute difference in prevalence being 5% or higher in

79 countries, and 10% or higher in 62 countries. This wealth gap is greatest in Guatemala (poorest 66.4%, richest 17.5%, difference 49.0%), Nigeria (poorest 62.8%, richest 18.3%, difference 44.5%) and Lao PDR (poorest 60.6%, richest 19.7%, difference 40.9%).¹⁵

Stunting is also higher among children with less educated (39.2%) versus more educated (24.0%) mothers. Of 82 countries with available stunting data by maternal education, the education gap is 5% or higher in 62 countries, and 10% or higher in 40 countries. This gap is largest in Guatemala (higher 25.9%, lower 55.4%, difference 29.5%), Burundi (higher 31.3%, lower 58.6%, difference 27.3%) and Eritrea (higher 19.4%, lower 46.2%, difference 26.8%).

Of 110 countries with available stunting data by location, children living in rural areas (35.6%) have higher stunting rates than those living in urban areas (25.6%). The location gap is at least 5% in 70 countries, and at least 10% in 41. It is largest in Burundi (rural 58.8%, urban: 27.8%, difference 30.9%) and Lao PDR (rural 48.6%, urban 27.4%, difference 21.2%). Peru is a country with large location and wealth inequalities. Spotlight 2.1 shows the links between urban–rural location and wealth, and how these impact stunting in Peru.

Wasting

There are modest inequalities in wasting prevalence by wealth, with only small differences by sex, location and education. Rates are only slightly higher in boys (12.8%) than girls (11.5%), for children located in rural (12.4%) versus urban (11.4%) areas, and for children of mothers with less (12.9%) versus more (11.2%) education. For wasting, the gap was largest between children living in the poorest (14.1%) versus the richest (10.0%) households. Of 107 countries with available wasting data, the wealth gap is 5% or greater in 15 countries. It is largest in Djibouti (poorest 28.3%, richest 12.8%, difference 15.5%), South Sudan (poorest 30.1%, richest 17.4%, difference 12.8%) and Eritrea (poorest 20.3%, richest 7.8%, difference 12.5%).

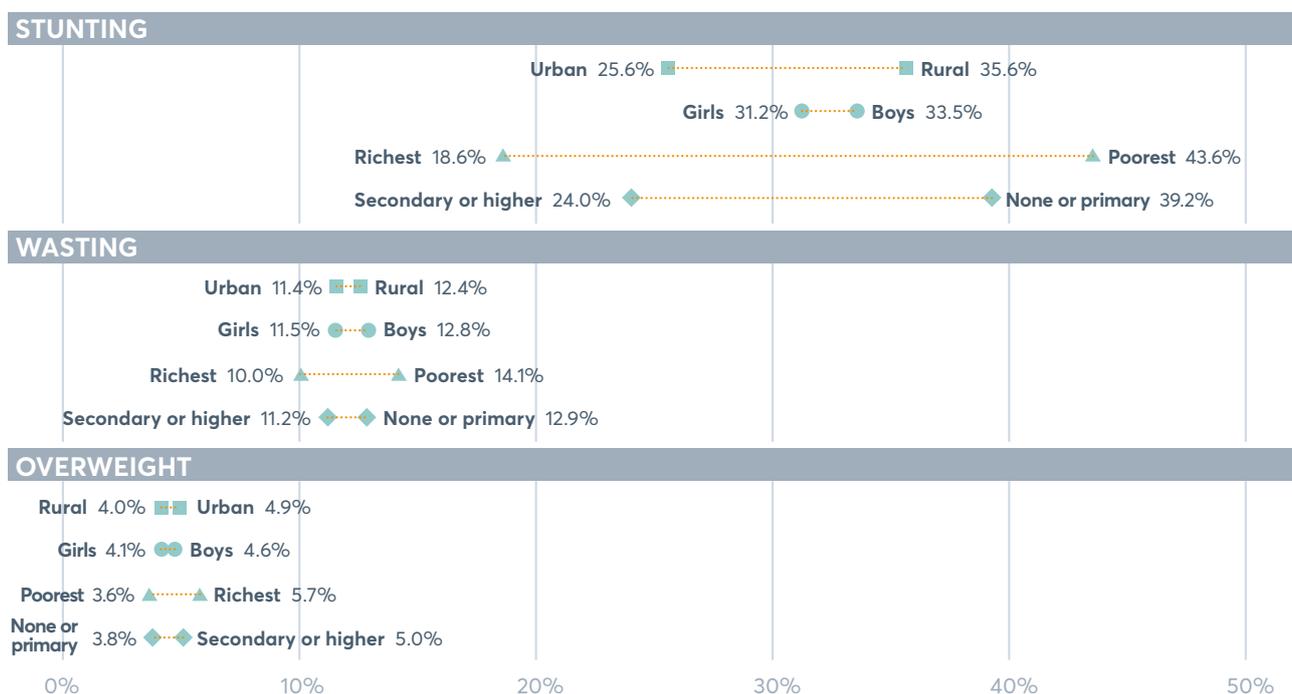
Overweight

Inequalities in childhood overweight are less profound by sociodemographic characteristics. Average rates are minimally higher in boys (4.6%) than girls (4.1%). Despite the relatively similar prevalence by location, wealth and education – partly due to representation of mainly low- and lower-middle-income countries – there are some interesting patterns. Overweight is higher for children in the richest (5.7%) versus poorest (3.6%) households, in urban (4.9%) versus rural (4.0%) areas, and with more (5.0%) versus less (3.8%) educated mothers. Similar patterns are observed on a country-level basis, where the largest wealth gap is seen in Peru (rich 14.8%, poor 2.8%, difference 12.0%) and Eswatini (rich 17.5%, poor 5.8%, difference 11.7%).

Geospatial analytical frameworks can be used to assess malnutrition at subnational level, and to understand within-country inequalities (Spotlight 2.2). Drilling down to the subnational level, analysis reveals heterogeneity in levels and probability of meeting the 2025 global nutrition targets for childhood wasting, stunting and overweight. Such analyses can identify locations disproportionately affected, and inform priority-setting and targeted resource allocation at the community level.

FIGURE 2.7

Inequalities in stunting, wasting and overweight in children under 5, by urban–rural location, sex, wealth and education



Source: UNICEF/WHO/World Bank Joint Child Malnutrition Estimates Expanded Database: Stunting, Wasting and Overweight, (March 2019, New York).

Notes: Childhood refers to 0–59 months. Estimates are based on population-weighted means of 98 countries for which there is available data across all population groups by indicator using the latest available estimates for each country between the years 2000 and 2018. 'None or primary' and 'secondary or higher' refer to education levels of the mother. Wealth quintiles are determined by asset-based wealth scores at the household level, where highest refers to the wealthiest quintile and lowest to the least wealthy quintile. Definitions of all indicators can be found in Appendix 1.

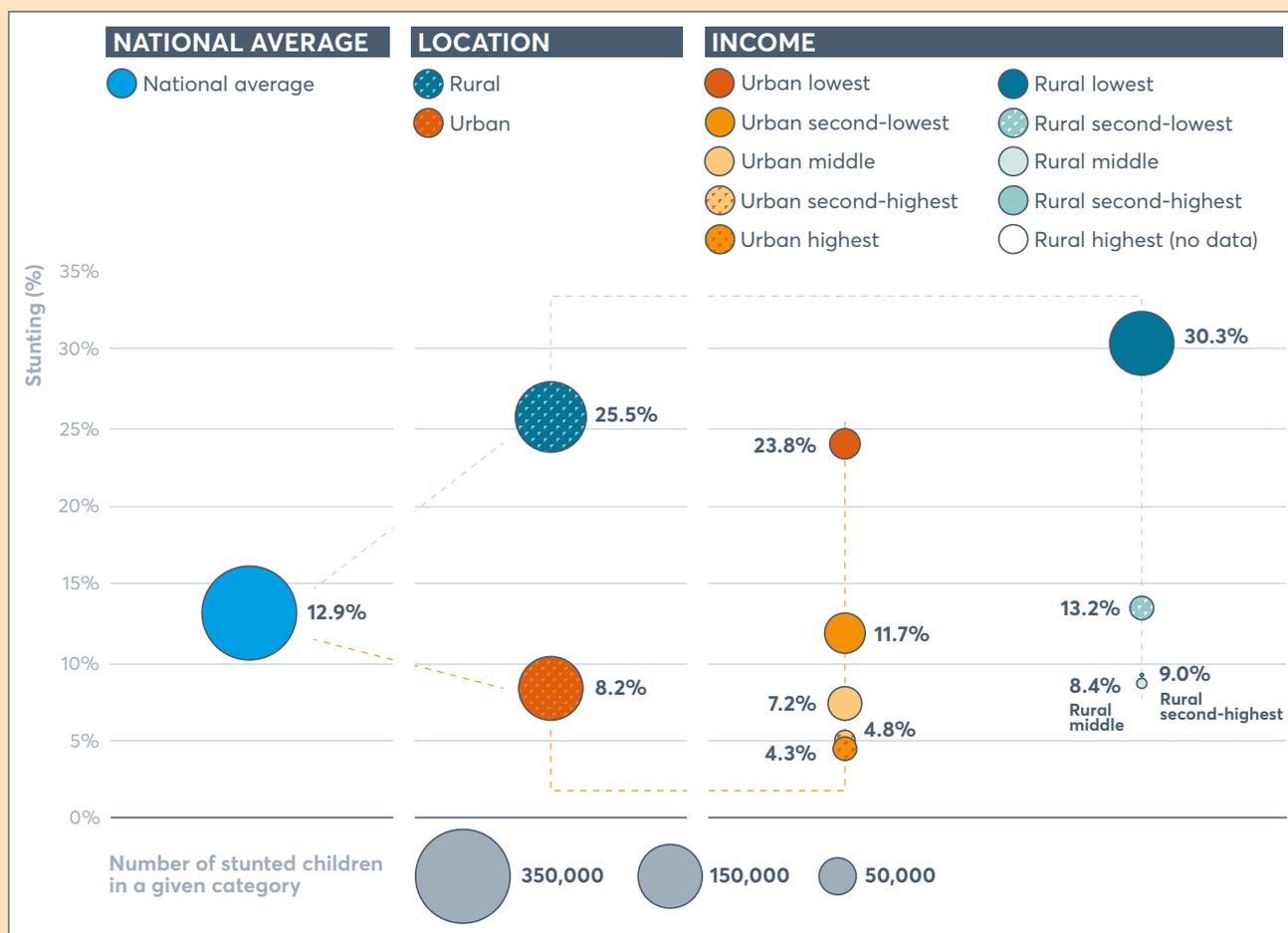
SPOTLIGHT 2.1

The rural–urban divide in Peru

Jordan Beecher

Peru has made progress in reducing stunting, supported by cross-party political commitment to nutrition policy.¹⁶ However, current levels sit at 12.9%. Inequalities in stunting are evident by urban–rural location: stunting affects 25.5% of children in rural areas and 8.2% of children in urban areas. Wealth also interacts with urban–rural location (Figure 2.8): while the richest households are predominantly found in urban areas and the poorest in rural areas, the urban poor have stunting rates almost as high as the rural average; and stunting rates for the rural rich are the same as the urban average. These intersecting inequalities are probably based on inequities such as: marginalised ethnic groups residing predominantly in rural areas; poor access to services in rural areas and for the poor everywhere; and less voice in political or social decision-making for poor and rural populations.¹⁷ We need more information on these deeper determinants of undernutrition in Peru in order to understand and address the drivers of unequal nutrition outcomes.

FIGURE 2.8
Inequalities in stunting in children under 5 between urban–rural location and wealth in Peru, 2017



Source: UNICEF/WHO/World Bank Joint Child Malnutrition Estimates Expanded Database: Stunting, Wasting and Overweight (March 2019, New York). Adapted from Save the Children's GRID data tool (<https://campaigns.savethechildren.net/grid>).

Notes: Prevalence estimates are based on the latest DHS-style survey carried out in 2017 in Peru. Wealth is asset-based wealth scores at the household separated into quintiles. Size of the bubble represents the number of stunted children in a given category.

Using geostatistical analytic frameworks to estimate under-5 childhood stunting, wasting and overweight burdens at subnational levels

Damaris K. Kinyoki, Amelia Apfel, Megan F. Schipp, Lucas Earl, Julia Devin and Simon I. Hay

Substantial inequalities within countries in childhood malnutrition have motivated calls for more granular local estimates to inform appropriate interventions and policies at the subnational level. In addition, rises in childhood overweight and obesity are prompting more holistic targeting of both undernutrition and overweight. Recent geospatial estimates from the Institute for Health Metrics and Evaluation (IHME)¹⁸ reveal how national-level figures can mask inequalities in prevalence and levels of progress within nations and regions. Detailed results by country are available online via an interactive visualisation tool,¹⁹ and the data can be downloaded from IHME's website.²⁰

Using modelled estimates from 105 low- and middle-income countries in 2017, the analysis identified the location of populations with highest prevalence, even within high-performing regions and countries (Figure 2.9). Details on data and methods used have been published elsewhere.²¹ For example, much of Latin America, the Caribbean, and East Asia have low national prevalence of stunting in children under 5 years of age. At the subnational level, however, prevalence can reach above 40% in communities of southern Mexico and central Ecuador, approaching levels seen in sub-Saharan Africa and South Asia. Critical wasting prevalence ($\geq 15\%$) in 2017 was apparent across the Sahelian region, stretching from Mauritania to Sudan, as well as in areas of South Asia. Although patterns varied broadly across countries, large contiguous areas with $\geq 15\%$ child overweight were found across most of Latin America, the Caribbean, northern and southern African countries, and East and Central Asia.

Paired with other data analyses within countries, these results can pinpoint locations with persistently high levels of malnutrition. In 2017, regions with the highest prevalence of stunting were primarily throughout much of sub-Saharan Africa, South Asia, and Oceania. There were communities with estimated levels of 40% and higher in Jigawa State in Nigeria, Karuzi Province in Burundi, Uttar Pradesh State in India and Houaphan Province in Laos. Areas of Somalia, northeastern Kenya, and Ethiopia's Afar and Somali regions experienced critical wasting ($\geq 15\%$), as they coped with erratic climatic conditions, competition for resources and civil instability. Overweight exceeded 15% in eastern Brazilian states (e.g., Rio Grande do Sul and Minas Gerais), and Peru's coastal cities of Tacna, Ilo, Islay and Callao. In Africa, areas with estimated overweight prevalence greater than 15% were concentrated in North Africa throughout Morocco, Algeria, Tunisia, Egypt and parts of Libya, as well as along South Africa's southern coast and in parts of Botswana and Zambia. Large areas in eastern and northern China and throughout Mongolia also had estimated overweight prevalence greater than 15%.

Countries with the largest within-country inequalities in malnutrition rates are also highlighted by this analysis. The largest disparities in stunting were observed in Nigeria, Indonesia and India, where the levels varied four-fold across communities. The greatest levels of disparity in wasting were estimated in Indonesia, Ethiopia, Nigeria and Kenya, with nine-fold differences in wasting prevalence across communities. Within-country differences in child overweight were highest in South Africa, Peru and China, with three-fold differences across communities. Such instances of within-country inequalities highlight areas that lag far behind and require focused attention.

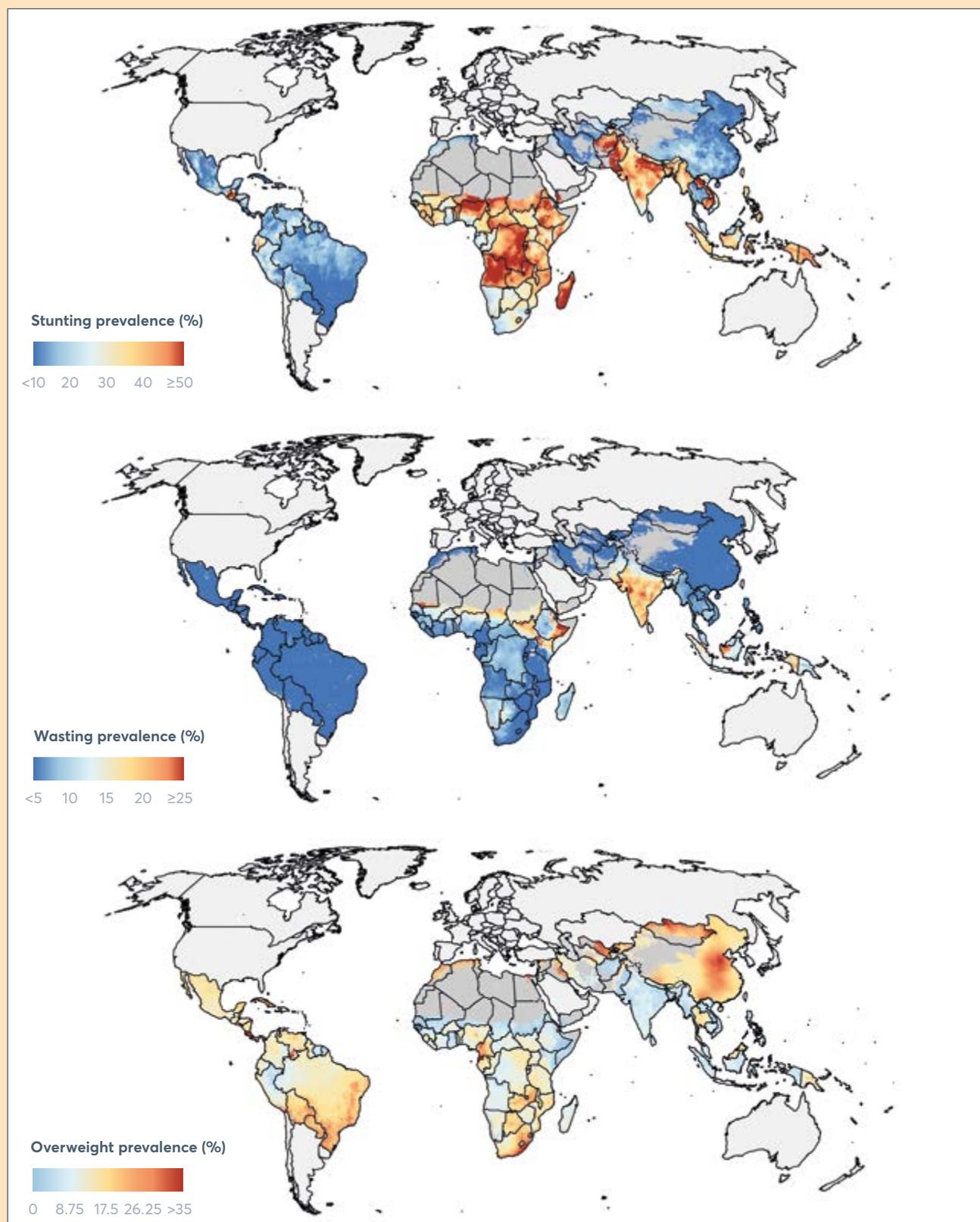
The modelled estimates also confirmed exemplar locations that have demonstrated improvement. For example, Peru's cross-cutting community-level strategy (*El Presupuesto por Resultados*) has been praised for contributing to halving stunting levels in less than a decade.²² Algeria, Uzbekistan and Egypt have shown impressive progress in reducing disparities in malnutrition prevalence during the study period.²³

This data can be used to inform priority-setting and direct resources to the areas of greatest need, particularly when representative survey-based data is not available. Such geospatial analysis can be used to inform decision-makers by identifying locations disproportionately affected by malnutrition, and highlighting within-country inequalities.

SPOTLIGHT 2.2 CONTINUED

FIGURE 2.9

Prevalence of stunting, wasting and overweight among children under 5 at the 5 × 5-km grid cell-level, 2017



Source: Stunting and wasting maps: Kinyoki D.K. et al., 2020. Mapping child growth failure across low- and middle-income countries. *Nature*, 577, pp. 231–34, doi:10.1038/s41586-019-1878-8 Overweight map: doi:10.1038/s41591-020-0807-6

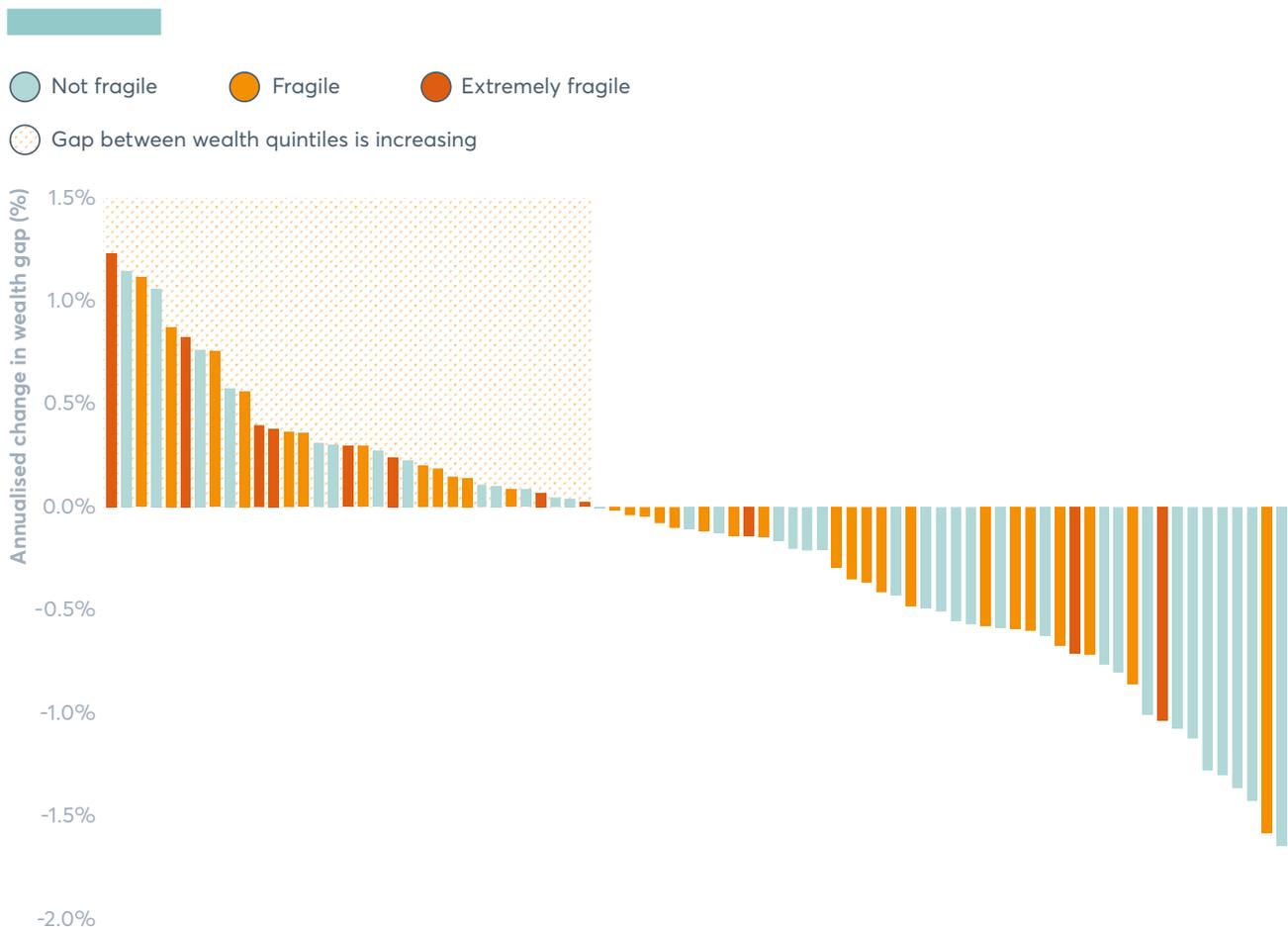
Notes: Based on data from 105 low- and middle-income countries in 2017, at 5km x 5km grid cell-level. Light grey indicates high-income countries that were excluded from the model, while dark grey indicates areas where the total population density was less than ten individuals per 1km×1km grid cell.

While the latest available data provides a snapshot of existing inequalities, repeated data shows how these differences have changed over time. Stunting rates have been slowly but steadily declining, with global prevalence falling from 32.5% in 2000 to 21.9% in 2018. Wasting prevalence (measured at one point in time) is typically not analysed over time, as wasting can fluctuate rapidly over the course of a year. In contrast, prevalence of overweight in children under the age of 5 was 5.9% for 2018, with no major differences noted since 2000 (4.9%). Inequalities across nutrition indicators for children under the age of 5, as shown in Figure 2.7, were largest for stunting, particularly by wealth. Therefore, exploring how this wealth gap in stunting changes over time would provide new insights into nutrition inequalities.

Country-level analysis across 80 countries with available survey data, mostly low- or lower-middle-income countries, reveals that the median annualised decrease in stunting prevalence is larger in the poorest group (0.8%) than in the richest group (0.5%). In fact, the inequality between the poorest and richest households in stunting (wealth gap) is decreasing in 47 countries but increasing in 33 (Figure 2.10). For the 47 countries where the wealth gap is decreasing, the median annualised decrease is 0.5%, mainly due to larger decreases in the prevalence of the poorest group. Of the 33 countries where the wealth gap is increasing, the median annualised increase is 0.3%, mainly due to larger decreases in the richest group. In roughly half of fragile or extremely fragile countries, the wealth gap is increasing; in the rest it is decreasing, warranting further investigation.

FIGURE 2.10

Annualised change in wealth inequality in stunting prevalence in children under 5 across 80 countries, by fragility, 2000–2018



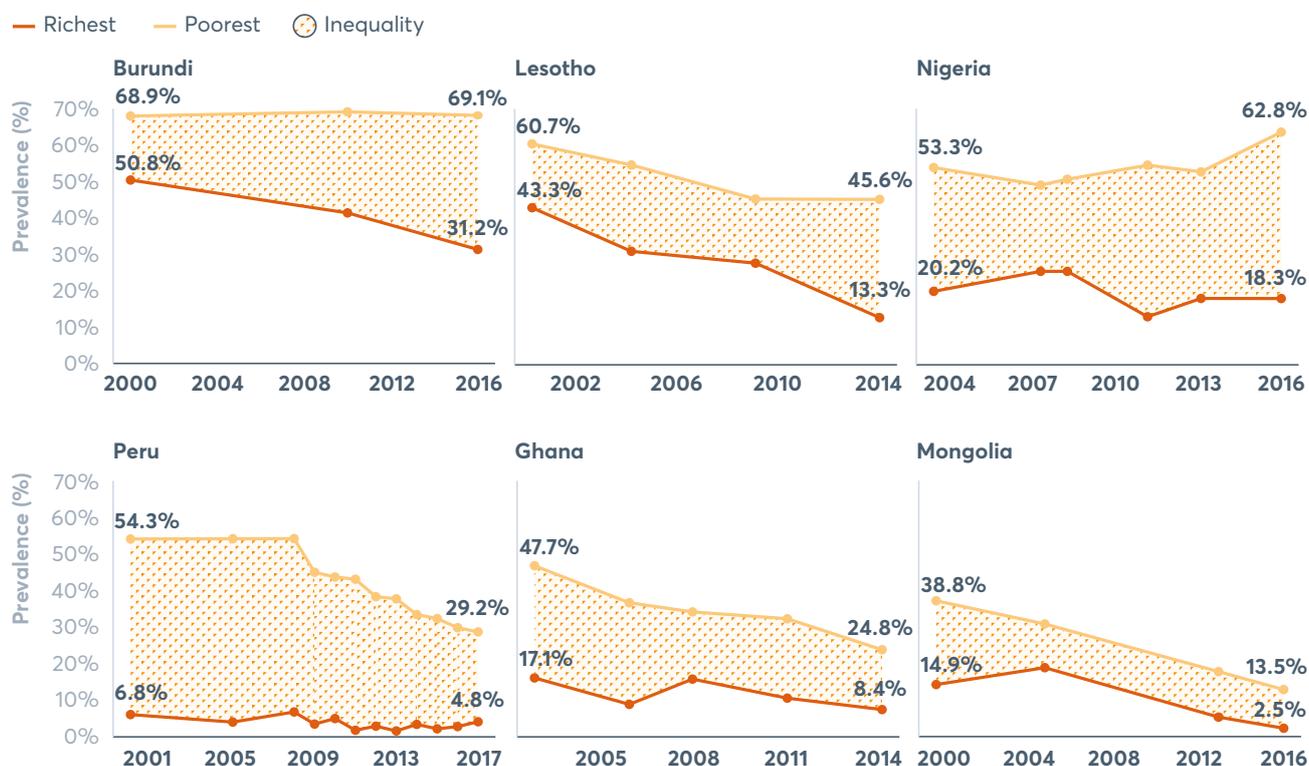
Source: UNICEF/WHO/World Bank Joint Child Malnutrition Estimates Expanded Database: Stunting, Wasting and Overweight, (March 2019, New York) and OECD, 2018.
Notes: Annualised change refers to the difference in stunting prevalence between the lowest and highest wealth quintiles observed in each country (bar) between the years 2000 and 2018. Positive values indicate that the difference in stunting prevalence between the lowest (poorest) and highest (richest) wealth quintiles is increasing (wealth gap increasing), whereas negative values indicate that the wealth gap is closing. Fragility is determined by the OECD States of Fragility 2018 framework, and is based on five core dimensions: political, societal, economic, environmental and security. Wealth quintiles are determined by asset-based wealth scores at the household level, where highest refers to the wealthiest quintile and lowest to the least wealthy. In all but four countries (Madagascar, Trinidad and Tobago, Montenegro, and Bosnia and Herzegovina), the poorest group has consistently higher prevalence than the richest. All of those four have reduced their wealth gap, with a median annualised decrease of 0.6%.

Despite these general declining trends, there are noticeable differences in patterns of change at country level. A notable case is Lesotho, where stunting decreased by 30 percentage points in the richest group (2000 43.3%, 2014 13.3%, difference 30.0%), and by only half that much in the poorest group (2000: 60.7%, 2014: 45.6%, difference 15.1%) (Figure 2.11). In five of the ten countries with the largest wealth inequality in stunting, the increased gap is driven by a decrease in the richest group, coupled with an increase or stagnation in the poorest group. This applies to Benin, South Africa, and three fragile or extremely fragile

countries – Burundi, Lao PDR, and Nigeria. Burundi and Nigeria are shown in Figure 2.11. Such differential patterns in the wealth gap, particularly when the poorest groups are left further behind, should be carefully considered in the design and implementation of nutrition actions. There are cases though in which comparatively greater reductions are seen in the poorest groups, such as in Peru, Ghana and Mongolia (Figure 2.11). Despite these improvements, the wealth gap is still present, disproportionately burdening the poor, and needs to be addressed.

FIGURE 2.11

Prevalence of stunting in children under 5 by wealth for select countries, 2000–2017



Source: UNICEF/WHO/World Bank Joint Child Malnutrition Estimates Expanded Database: Stunting, Wasting and Overweight (March 2019, New York).

Notes: Countries with greatest increases and decreases in the gap between the highest and lowest wealth quintiles for stunting are chosen using the earliest and latest post-2000 data points and calculating the absolute change in gap. Wealth quintiles are determined by asset-based wealth scores at the household level, where highest refers to the most wealthy quintile and lowest to the least wealthy.

Inequalities in childhood and adolescent underweight, overweight and obesity

Comparatively less granular data is available for children and adolescents aged 5 to 19 years. Far more boys and girls are underweight than overweight or obese worldwide (Figure 2.12). Childhood and adolescent underweight has decreased globally, from 37.0% in 2000 to 31.6% in 2016 among boys, and from 29.6% in 2000 to 25.9% in 2016 among girls. During the same period, overweight has increased from 10.3% to 19.2% among boys and 10.3% to 17.5% among girls, and obesity from 3.3% to 7.8% among boys and 2.5% to 5.6% among girls.

By sex, prevalence for each of those indicators is slightly higher in boys than in girls. This modest gap between the sexes is relatively stable over time, with signs of increase for overweight and obesity. Similar patterns are seen on a country level, yet this sex gap can also be wider, or reversed (with girls higher than boys). Latest data suggests that Lesotho has the largest sex gap in childhood and adolescent underweight (boys 32.5%, girls 14.1%, difference 18.4%), followed by Zimbabwe (boys 32.5%, girls 15.0%, difference 17.5%) and DR Congo (boys 37.8%, girls 21.9%, difference 15.9%). For overweight, the largest sex gap is seen in southern and eastern African countries, most notably Lesotho (boys 6.2%, girls 24.7%, difference 18.5%), Eswatini (boys 8.3%, girls 25.0%, difference 16.7%) and Zimbabwe (boys 6.7%, girls 22.3%, difference 15.8%). The largest gaps where overweight prevalence in boys exceeds that of girls are seen in East Asian nations, most notably China (boys 35.0%, girls 20.8%, difference 14.2%) and South Korea (boys 33.7%, girls 21.1%, difference 12.6%). The largest gaps for obesity are observed in Southeastern and East Asian nations, such as Brunei (boys 18.3%, girls 9.9%, difference 8.4%), China (boys 15.4%, girls 7.1%, difference 8.3%) and South Korea (boys 12.9%, girls 4.7%, difference 8.3%).

Looking further at potential inequalities by country income (Figure 2.13), prevalence of childhood and adolescent underweight is on average up to three times higher in low- and lower-middle-income countries compared with upper-middle- and high-income countries. The reverse is seen for childhood and adolescent overweight, where prevalence is up to four times higher in upper-middle- and high-income countries than in lower-middle- or low-income ones. Likewise for obesity, there are up to four-fold differences between high- and upper-middle-income countries versus lower-middle- and low-income countries. This data, coupled with the rising prevalence of child and adolescent overweight and obesity, suggests that high- and upper-middle-income countries are disproportionately burdened.

Inequalities in adult nutrition indicators

Underweight, overweight and obesity

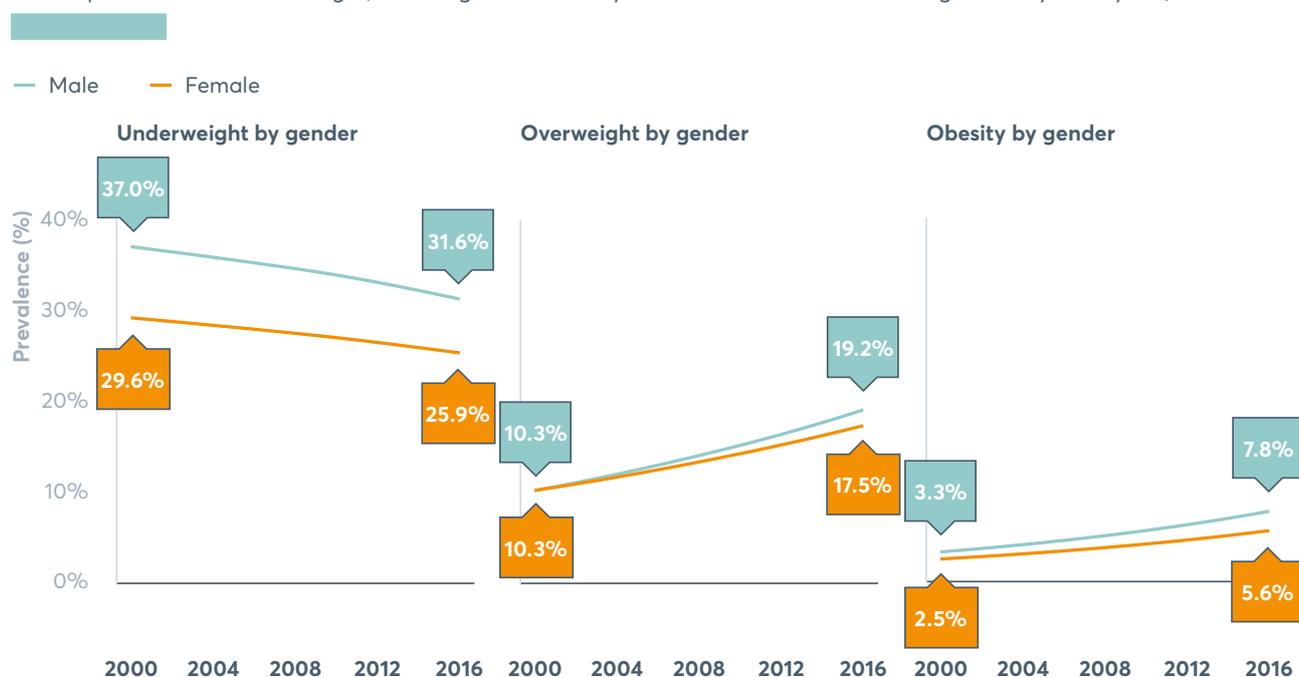
Our world has substantially transitioned over the past four decades,²⁴ from one in which adult underweight prevalence was more than double than that of obesity, to one in which more adults are obese than underweight, both globally and in all regions except parts of sub-Saharan Africa and Asia. The rising global burdens of overweight and obesity, both in adults and in children and adolescents, cannot be ignored. We need more concentrated efforts and actions to slow down and stop the worldwide rise in obesity. Targeting poor diets through effective and cost-effective approaches should be a top priority for governments, policymakers, clinicians, the food system, the health system, and public-private partnerships in the 21st century to reverse the global obesity epidemic.

Far more men and women are overweight or obese than underweight, and women are generally affected more than men (Figure 2.14). Looking at trends since 2000, male underweight has decreased from 11.1% in 2000 to 8.6% in 2016 and female underweight has decreased from 11.5% to 9.4% in the same period. In contrast, overweight (including obesity) has increased from 31.7% (609.8 million) to 39.2% (1.02 billion) in women, and in men from 29.7% (560.0 million) to 38.5% (984.6 million). Obesity in men has risen from 6.7% (124.7 million) to 11.1% (284.1 million), and in women from 10.6% (201.8 million) to 15.1% (393.5 million). These time-trends align with what is observed in adolescents (Figure 2.12).

There are similar sex differences on a country-level basis, although this sex gap can widen even further, or reverse (with men higher than women). For underweight, women generally have a higher prevalence than men but, at the country level, the reverse sex gap can be as high as 7.4% in Lesotho (women 4.5%, men 11.9%), 6.5% in Equatorial Guinea (women 10.1%, men 16.6%), 6.2% in Zimbabwe (women 4.9%, men 11.1%). The largest sex gap where women have higher prevalence than men is in Japan (women 6.8%, men 3.9%). For overweight, the largest sex differences are seen in southern and eastern African countries: 32.5% in Lesotho (women 53.7%, men 21.1%), 30.6% in Zimbabwe (women 52.8%, men 22.2%) and 30.4% in Eswatini (women 52.6%, men 22.2%). Large sex gaps in obesity are found in countries in the same regions, most notably South Africa (women 39.6%, men 15.4%, difference 24.2%), Lesotho (women 26.7%, men 4.6%, difference 22.0%), Botswana (women 29.3%, men 8.1%, difference 21.2%), Eswatini (women 26.2%, men 5.4%, difference 20.8%) and Zimbabwe (women 25.3%, men 4.7%, difference 20.5%).

FIGURE 2.12

Global prevalence of underweight, overweight and obesity in children and adolescents aged 5–19 years by sex, 2000–2016



Source: NCD Risk Factor Collaboration 2019.

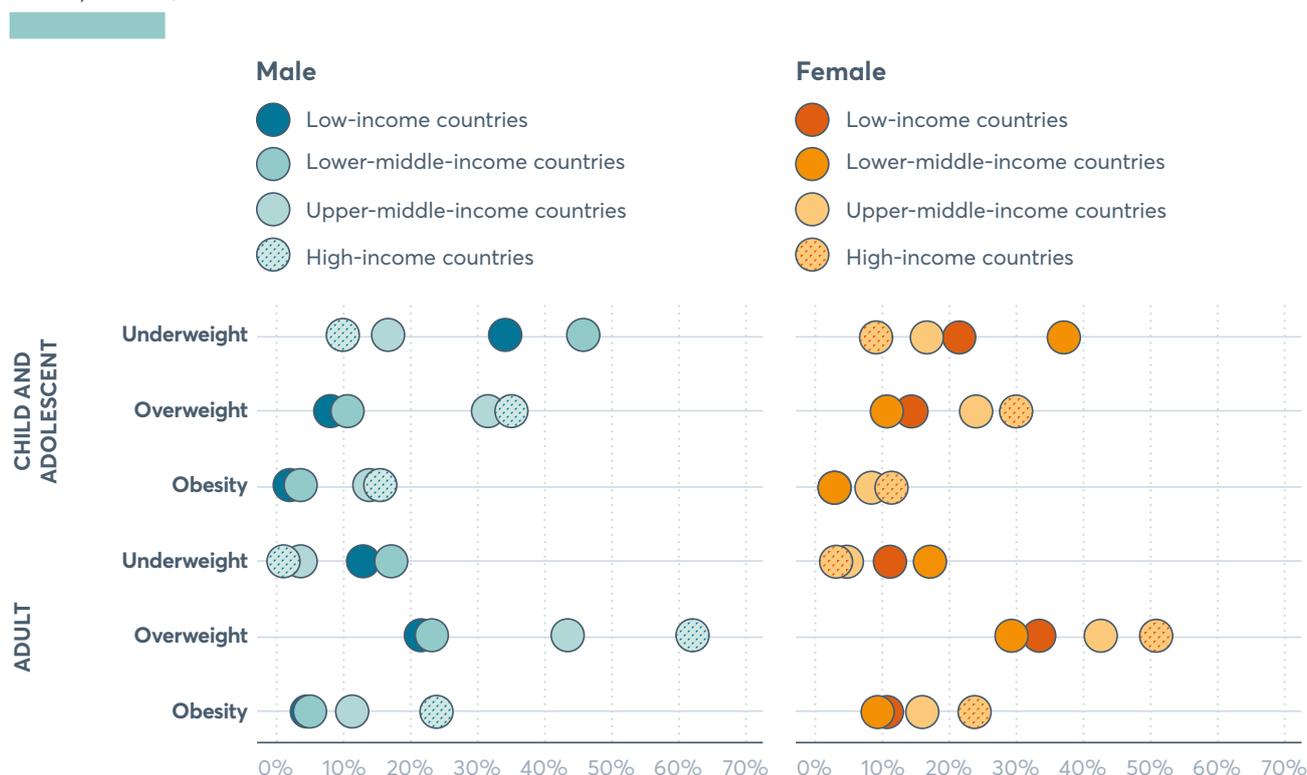
Notes: All indicators are based on global modelled age-standardised estimates up to 2016 using the WHO standard population. Underweight is defined as below minus one standard deviation (SD) from the median of the WHO growth reference, overweight (including obesity) as above one SD, and obesity as above two SDs.

Underweight remains prevalent in the world's poorest regions, especially in South Asia.²⁵ The highest underweight prevalence is seen in low- and lower-middle-income nations, up to ten times higher than in high- and upper-middle-income countries (Figure 2.13). As for adolescents, the reverse is seen for adult

overweight, where prevalence can be up to three times higher in high- and upper-middle-income than lower-middle- and low-income countries. Obesity prevalence in adults can be up to five times higher in high- and upper-middle-income than in lower-middle- and low-income countries.

FIGURE 2.13

Global prevalence of underweight, overweight and obesity in children and adolescents aged 5–19 years and adults, by country income, 2016



Source: NCD Risk Factor Collaboration 2019.

Notes: All child and adolescent indicators are based on modelled age-standardised estimates for children and adolescents aged 5–19 years and all adult indicators are based on modelled age-standardised estimates for adults aged 18+ (using the WHO standard population). All modelled estimates are based on 187 countries from 2016. Childhood and adolescent (5–19 years) underweight is defined as below one standard deviation (<-1 SD) from the median BMI-for-age of the WHO growth reference, overweight (including obesity) as above one SD (>+1 SD) and obesity as above two SDs (>+2 SD). Adult underweight is defined as a body-mass index of less than 18.5kg/m², overweight (including obesity) as equal to or greater than 25kg/m², and obesity as equal to or greater than 30kg/m². Countries are classified by gross national income per capita as in high- (56, 30%), upper-middle- (54, 29%), lower-middle- (47, 25%) and low- (30, 16%) income groups.²⁶

Country-level analysis from 190 countries reveals that the median annualised increase in overweight prevalence is the same in both sexes (0.07%). However, the sex gap is increasing in 120 countries and decreasing in 70 (Figure 2.15). Of the 120 countries where the gap is increasing, the median annualised increase is 0.16%, mainly due to larger increases among women. Of the 70 countries where the sex gap is decreasing, the median annualised decrease is 0.10%, mainly due to larger increases among men. This inequality is widening at a greater rate in most currently fragile and extremely fragile countries than in non-fragile countries, with a few exceptions (Iraq, North Korea, Libya, Occupied Palestinian Territory and Venezuela). Of the 120 countries where the sex gap is increasing, 39 (32.5%) are categorised as fragile and 13 (10.8%) as extremely fragile, with a median annualised increase of 0.20% and 0.18% respectively. In contrast, of the 70 countries with a decreased gap, only 4 (5.7%) are fragile and 1 (1.4%) extremely fragile. This suggests that fragile and extremely fragile settings are more heavily burdened by this sex gap in obesity.

Salt intake

High salt (sodium) intake increases systolic blood pressure, a major risk factor for cardiovascular disease and chronic kidney disease, and the leading dietary risk factor for death and illness worldwide.²⁷ Given the key roles of social and environmental factors in shaping dietary habits, population-based approaches should be a crucial component of efforts to target salt intake. Effective strategies can be designed and implemented at the local level (e.g., in schools, workplaces and community settings), as well as regionally, at the state level, and at national levels, tailored according to need. Nationally representative US analysis has revealed that high salt intake is the leading dietary risk factor for stroke and heart disease, disproportionately affecting men, ethnic groups other than white and people of lower education.²⁸ Global data on salt intake, or any other dietary factor, is not yet available by key sociodemographics. However, such disaggregated global data on at least 55 dietary factors will be made available by the Global Dietary Database in 2020.²⁹

We need such granular global data on what people are actually consuming to investigate drivers of dietary intakes and transitions over time, and to inform the design and implementation of specific policies to reduce diet-related health burdens and inequalities in different nations.

Globally, average salt intake among adults (aged 25 years and over) is virtually unchanged since 2010. Men have slightly higher intake (5.8g/day) than women (5.3g/day) at a global level, with relatively larger differences seen at country level. The difference is greatest in southern and eastern European countries, such as Hungary (men 5.7g/day, women 3.9g/day, difference 1.8g/day), Czechia (men 5.6g/day, women 3.9g/day, difference 1.7g/day) and Slovenia (men 5.5g/day, women 3.9g/day, difference 1.6g/day).

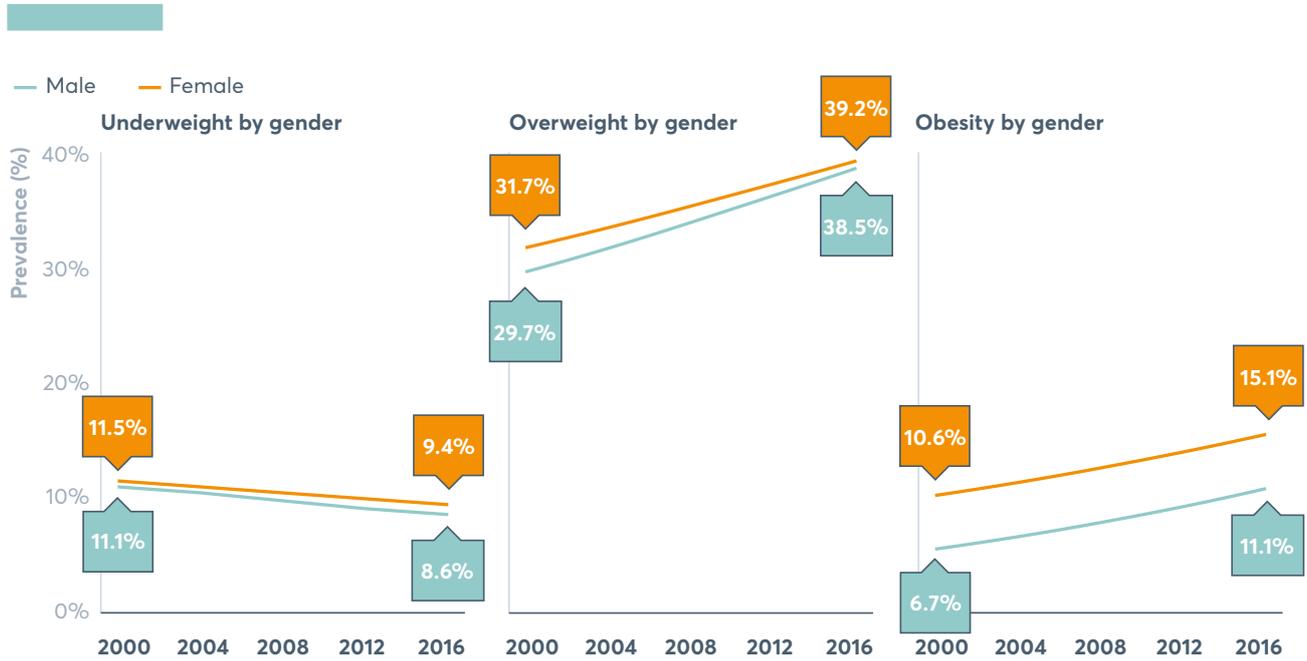
Raised blood pressure

Over the past four decades, the number of people with raised blood pressure in the world has increased.³⁰ Though raised blood pressure has traditionally affected high-income countries, the majority of the observed increase is due to raises in low- and middle-income countries, and driven to a great extent by the growing and ageing population. It is now most prevalent in low-income countries in South Asia and sub-Saharan Africa, while being a persistent health issue in Central and Eastern Europe.³¹

Despite an increase in the number of people affected, the global prevalence of raised blood pressure has remained relatively unchanged with only slight decreases between 2000 and 2015 (Figure 2.16). Globally, more men (24.1%) than women (20.1%) have raised blood pressure, with largest sex gaps at the country level seen in Northern Europe, most notably in Latvia (men 36.4%, women 22.9%, difference 13.5%), Estonia (men 34.3%, women 20.9%, difference 13.4%) and Iceland (men 26.2%, women 13.0%, difference 13.2%).

FIGURE 2.14

Global prevalence of underweight, overweight and obesity in adults by sex, 2000–2016

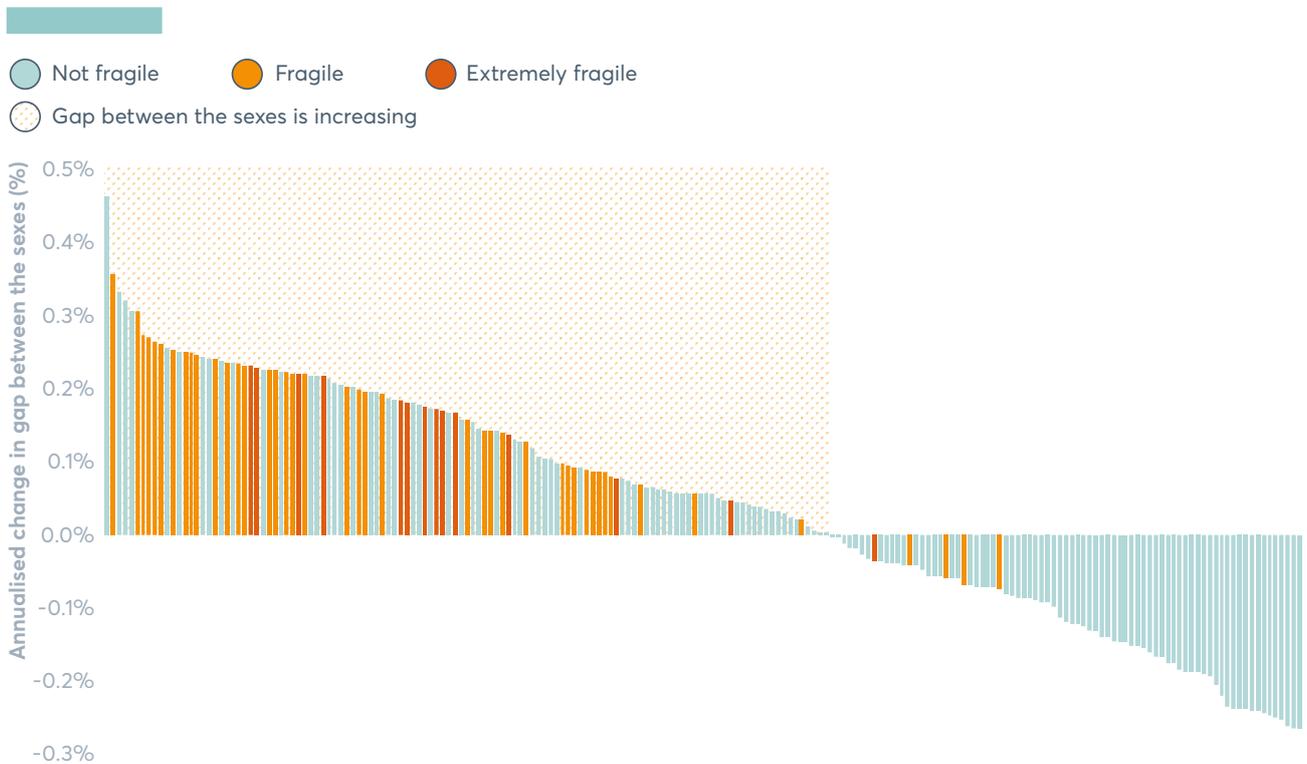


Source: NCD Risk Factor Collaboration 2019.

Notes: All indicators are based on modelled age-standardised global estimates up to 2016 using the WHO standard population for adults aged 18 years and older. Adult underweight is defined as a body-mass index of less than 18.5kg/m², overweight (including obesity) as equal to or greater than 25kg/m², and obesity as equal to or greater than 30kg/m².

FIGURE 2.15

Global annualised change in sex inequality for adult obesity, by fragility, 2000 and 2016



Source: NCD Risk Factor Collaboration 2019 and OECD 2018.

Notes: Annualised change refers to the difference in obesity (BMI $\geq 30\text{kg/m}^2$) prevalence between men and women (ages 18 and over) observed in each of 190 countries (bars) between the years 2000 and 2016. Positive values indicate the difference (gap) between the sexes is increasing, whereas negative values indicate the difference is decreasing. Fragility is determined by the OECD States of Fragility 2018 framework, and is based on five core dimensions: political, societal, economic, environmental and security.³² In most countries, women had higher prevalence than men in 2000 and this gap increased or decreased in the same direction over time. Six European countries (Switzerland, Denmark, Sweden, Austria, Germany and Iceland) had higher prevalence for men than women in 2000 and this gap increased in the same direction to 2016. Nineteen other countries had higher prevalence in women in 2000 but changed to higher prevalence in men by 2016; ignoring the change in direction of the inequality, 6 countries have increased the gap and 13 have decreased it.

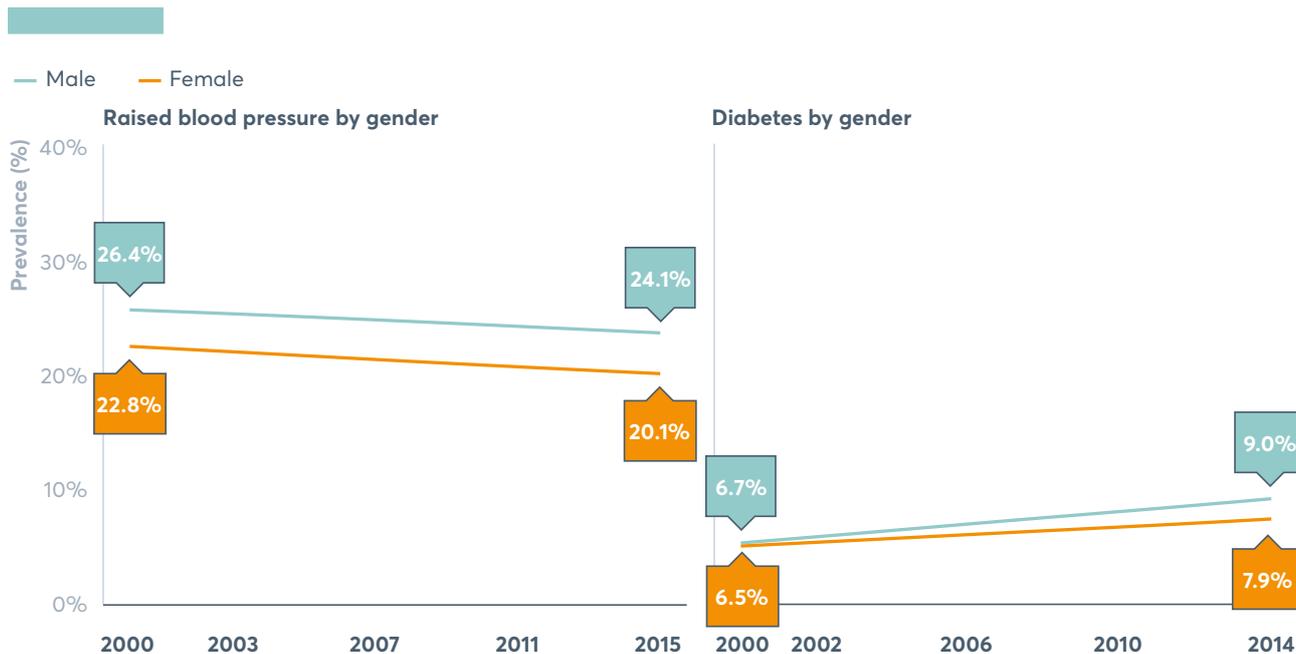
Diabetes

There are tremendous health risks of overweight and obesity. The annual medical costs of treating the consequences of obesity are staggering, and are expected to reach US\$1.2 trillion per year by 2025, with the US being by far the biggest spender.³³ Diabetes is one of these consequences: presently, someone is estimated to die every eight seconds from diabetes or its complications – with projected increases over time.³⁴ Of all global health expenditure, 10% is spent on diabetes (US\$760 billion).³⁵ Some alarming statistics from the International Diabetes Federation reveal that one in two adults with diabetes are undiagnosed, two in three people with diabetes live in urban areas, and three in four people with diabetes live in low- and middle-income countries.³⁶

Over the past four decades, diabetes prevalence in adults has increased, or, at best, remained unchanged, in every country. This increase has been faster in low- and middle-income countries than in high-income countries.³⁷ The picture is similar for the past two decades (Figure 2.16). Globally, only slightly more men (9.0%) than women (7.9%) have diabetes, with similar small differences observed at the country level.

FIGURE 2.16

Global prevalence of raised blood pressure and diabetes in adults by sex, 2000–2015



Source: NCD Risk Factor Collaboration 2019.

Notes: Based on global modelled estimates in adults aged 18 years and over from 2000 to 2015 for raised blood pressure, and from 2000 to 2014 for diabetes. Data presented is age-standardised using the WHO standard population.

RECOMMENDED ACTIONS

- ▶ We need intensified efforts and actions to address the persistent unacceptably high levels of malnutrition.
- ▶ Interventions, policies and prevention initiatives should be equity-sensitive, targeting multiple drivers of nutrition inequities concurrently, particularly for areas or population groups disproportionately burdened by malnutrition.
- ▶ There is a pressing need for high-quality, systematically collected granular nutrition data – such as on diets, anthropometry, micronutrient status and related health outcomes – to investigate drivers of nutrition inequalities and transitions over time, and establish priorities according to need.
- ▶ Countries should commit to and invest in the routine collection of equity-sensitive nutrition data. Data should be granular, disaggregated to the local level and by key population characteristics, such as age, sex, ethnicity, education and wealth.

NOTES

Chapter 2

- 1 Global Nutrition Report – Country Nutrition Profiles. Available at: <https://globalnutritionreport.org/resources/nutrition-profiles/>
- 2 Global Nutrition Report, Country Nutrition Profiles. Available at: <https://globalnutritionreport.org/resources/nutrition-profiles/>
- 3 Global Nutrition Report – Country Nutrition Profiles. Available at: <https://globalnutritionreport.org/resources/nutrition-profiles/>
- 4 The WHO defines 'double burden' as the "coexistence of undernutrition along with overweight and obesity, or diet-related noncommunicable diseases, within individuals, households and populations, and across the lifecourse". For further information, see: The double burden of malnutrition, Lancet series, December 2019. Available at: www.thelancet.com/series/double-burden-malnutrition
- 5 OECD, 2018. States of Fragility. Available at: www.oecd.org/dac/conflict-fragility-resilience/listofstateoffragilityreports.htm
- 6 Wasting reflects one form of acute malnutrition; in humanitarian emergencies, prevalence of global acute malnutrition (GAM), which includes both wasting and bilateral pitting oedema, is often reported on instead of wasting prevalence alone. However, GAM is also often referred to as wasting.
- 7 UNHCR emergency handbook. Available at: <https://emergency.unhcr.org/entry/32604/acute-malnutrition-threshold>
- 8 World Health Organization, 2000. The management of nutrition in major emergencies. Geneva: WHO; De Onis M., Borghi E., Arimond M. et al., 2019. Prevalence thresholds for wasting, overweight and stunting in children under 5 years. Public Health Nutrition, 22:1, pp. 175–79, doi:10.1017/S1368980018002434
- 9 Young H. and Marshak A., 2018. Persistent global acute malnutrition. Friedman School of Nutrition Science and Policy, Tufts University; OECD States of Fragility 2018 framework – a multidimensional approach to measure the magnitude of fragility between countries. This is based on five core dimensions: political, societal, economic, environmental and security. Risks are identified as a contributing factor that could change the forecast of a country's stance in each dimension. Countries are given scores for each dimension based on these risks, which then feed into the country's overall fragility score (www3.compareyourcountry.org/states-of-fragility/about/0/).
- 10 Wasting reflects one form of acute malnutrition; in humanitarian emergencies, prevalence of global acute malnutrition (GAM), which includes both wasting and bilateral pitting oedema, is often reported on instead of wasting prevalence alone. However, GAM is also often referred to as wasting.
- 11 OECD States of Fragility 2018 framework – a multidimensional approach to measure the magnitude of fragility between countries. This is based on five core dimensions: political, societal, economic, environmental and security. Risks are identified as a contributing factor that could change the forecast of a country's stance in each dimension. Countries are given scores for each dimension based on these risks, which then feed into the country's overall fragility score (www3.compareyourcountry.org/states-of-fragility/about/0/).
- 12 2018 Global Nutrition Report: Shining a light to spur action on nutrition. Development Initiatives, Chapter 2, 'The burden of malnutrition,' available at: <https://globalnutritionreport.org/reports/global-nutrition-report-2018/burden-malnutrition>
- 13 Cyril S., Oldroyd J.C. and Renzaho A., 2013. Urbanisation, urbanicity, and health: a systematic review of the reliability and validity of urbanicity scales. Available at: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-13-513>

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- 14 The educational level of the mother is referred to as 'more' (including those with secondary or higher education) and 'less' (those with either no formal or only primary-level education).
- 15 All figures are presented to one decimal place, however differences are calculated with unrounded figures. Therefore, the difference rounded to one decimal place may not be the same as the difference between the two rounded figures.
- 16 Yosef S. and Goulden J., 2016. Commitments and accountability: Peru's unique nutrition journey, in Gillespie S., Hodge J., Yosef S. and Pandya-Lorch R., eds., *Nourishing millions: Stories of change in nutrition*. Washington, D.C., International Food Policy Research Institute (IFPRI), pp. 125–32. Available at: <http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/130409>
- 17 Paredes M., 2008. Weak Indigenous Politics in Peru. Centre for Research on Inequality, Human Security and Ethnicity (CRISE), University of Oxford. Available at: <https://assets.publishing.service.gov.uk/media/57a08bc0e5274a27b2000d25/wp33.pdf>; Anticona Huaynate C.F., Pajuelo Travezaño M.J., Correa M. et al., 2015. Diagnostics barriers and innovations in rural areas: insights from junior medical doctors on the frontlines of rural care in Peru. *BMC Health Services Research*, 15:454. Available at: <https://doi.org/10.1186/s12913-015-1114-7>
- 18 Kinyoki D.K. et al., 2020. Mapping child growth failure across low- and middle-income countries. *Nature*, 577, pp. 231–34, doi:10.1038/s41586-019-1878-8 and doi:10.1038/s41591-020-0807-6
- 19 IHME, 2017. Local burden of disease – child growth failure. Available at: <https://vizhub.healthdata.org/lbd/cgf>
- 20 IHME, 2020. Low- and middle-income country child growth failure geospatial estimates 2000–2017. Available at: <http://ghdx.healthdata.org/record/ihme-data/lmic-child-growth-failure-geospatial-estimates-2000-2017>
- 21 The 2017 prevalence here is based on a model that uses a range of surveys between 1998 and 2018. This method differs from the prevalence figures shown elsewhere in this chapter, which use the latest post-2000 survey data available for each country. The probability estimates are relative to 2012 prevalence estimates when most of the countries adopted the global nutrition targets. For IHME's full methods, please see: Kinyoki D.K. et al., 2020. Mapping child growth failure across low- and middle-income countries. *Nature*, 577, pp. 231–34, doi:10.1038/s41586-019-1878-8 and doi:10.1038/s41591-020-0807-6
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