2014. Niger.
Mothers screen their own children to pick up on early signs of malnutrition.

03

Three issues in critical need of attention

KEY POINTS

1. Micronutrient deficiencies are estimated to impact a significant number of people around the world, but there remains far too little information on micronutrient status and deficiencies. More essential information and surveillance need to be gathered to make substantial progress on global targets.

2. Fragility, conflict and violence put a heavy toll on populations' health, livelihoods, food security and nutrition. Multiple forms of overlapping malnutrition require responses that overcome traditional silos and target all forms of malnutrition. Humanitarian and development communities need to build common platforms and establish frameworks and joined-up financing mechanisms to effectively address nutritional needs, for immediate and longer-term impact.

3. More data has revealed the importance of investing in adolescent nutrition, particularly for girls and young women. The amount of attention being paid to adolescents as a nutritionally vulnerable group with unique nutritional needs in the life cycle is growing, but they are still frequently overlooked. Innovative new research, programmes and policies show potential in advancing understanding of how to develop good and lasting dietary habits during adolescence, including by involving the voices of young people affected by malnutrition.

Introduction

In this chapter, we highlight three areas that have emerged in recent years as critical for the burden of malnutrition: the need to improve the prevalence data on micronutrient deficiencies, to take a new approach to addressing malnutrition in all its forms during crises, and to build on the emerging focus on malnutrition among adolescents. The chapter provides insights into the state of play and identifies some elements of progress that could be built on into the future.

More and better data needed about the burden of micronutrient malnutrition[1]

Significant data gaps in micronutrient deficiencies

Despite the advances described in Chapter 2, there are still vast gaps in the data available to help us better understand the nature and extent of malnutrition in all its forms. Many countries do not yet collect the necessary data to fully understand the nature of the burden of malnutrition, diet or indicators of progress. We need more comprehensive subnational data to better understand where burdens are located, and what the direct and underlying causes of malnutrition are in these localised areas to better target programming and interventions. Lack of data affects our understanding of several contributors to malnutrition.

A major outstanding laggard is the little notable progress in the collection, analysis and use of micronutrient deficiency data. While old estimates suggest that at least one third of the global population suffers from leading forms of micronutrients deficiency,[2] there are considerable gaps in knowing how many people and who really experiences the different forms of micronutrient deficiency in the world today. These include iron deficiency anaemia and deficiencies of iodine, zinc and vitamin A.

The following is often cited by the nutrition community: "Over 2 billion people worldwide suffer from a chronic deficiency of micronutrients, a condition known as hidden hunger".[3] Yet, how reliable is this number and how can we qualify the data we have now? What is the state of micronutrient deficiencies in nutritionally vulnerable populations such as children under five years of age, women and adolescent girls? These questions are essential to increase accountability, improve programme decisions, and monitor and evaluate progress towards the goal of eliminating major micronutrient deficiencies. The need for a data-driven revolution as emphasised in the *2016 Global Nutrition Report* is still undeniably valid today, and the need for data on micronutrient deficiencies to monitor the situation has never been more pressing.

There have been laudable improvements in the collection of micronutrient data, including the World Health Organization (WHO)'s Vitamin and Mineral Nutrition Information System (VMNIS). This is the only surveillance system that monitors the global prevalence of vitamin and mineral status in populations.[4] It provides useful information on micronutrient deficiencies in more than 150 countries and stems from member states' Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS) and other nationally representative surveys. The database now includes 40 indicators of the status of 17 micronutrients or micronutrient-related conditions, covering both deficiency and excess.[5] Still, it mostly only covers data on vitamin A, iodine and anaemia and a reasonable amount of data on the prevalence of other micronutrient deficiencies is yet to be added for many countries.

Despite commendable efforts in filling data gaps such as the recent Ghana Micronutrient Survey,[6] getting accurate data remains a challenge. Incomplete, poor quality and misrepresentative data are common issues, and countries often lack sufficient resources to update prevalence figures and track coverage trends.[7]

DHS surveys do not collect a complete range of micronutrient status and data collection varies between country surveys. What is collected across most countries, by household, is on anaemia, consumption of vitamin A and iron-rich foods, micronutrient supplementation (vitamin A and iron/folic acid) and presence of iodised salt.[8]

Another concern is that assessment of many micronutrients lacks standardised protocols, which can easily result in data misrepresentation. Proxies used to assess hidden hunger are often inadequate. This is particularly evident in identifying iron status in populations. Prevalence of iron deficiency is regularly derived from anaemia in blood haemoglobin concentration,[9] however a recent estimate shows only 25% and 37% of all anaemia is associated with iron deficiency in pre-school children and non-pregnant women of reproductive age, respectively.[10] Such assumptions distort our understanding of the contribution of iron deficiency to anaemia and incorrectly assume that everyone with anaemia is iron deficient (because anaemia tests measure haemoglobin levels), failing to account for the various causes of anaemia (e.g. infections, malaria, helminths, haemoglobinopathies and other micronutrient deficiencies). This challenges our ability to choose the correct interventions and identify appropriate indicators to assess impact.[11] Likewise, for zinc deficiency, prevalence rates are estimated from predictions of national risks of inadequate zinc intake based on national food supplies, which indicate the risk of insufficient zinc intake, rather than a biological outcome of zinc deficiency.[12] Serum zinc concentration is also not a perfect indicator for zinc deficiency: it can be reliably applied in populations but not in individuals.

Importance of reliable micronutrient data

Precise data is critical for informing and monitoring the impact of policy and programmatic goals to reduce micronutrient deficiencies. Planning interventions aimed at reducing micronutrient deficiency need to develop effective assessment and surveillance methods to identify populations at risk and monitor progress over time.[13] For example, many countries collect data on anaemia status, consumption of vitamin A and iron-rich foods, micronutrient supplementation (vitamin A and

TABLE 3.1
Coverage of micronutrient supplementation programmes and salt iodisation

COVERAGE/PRACTICE INDICATOR	NUMBER OF COUNTRIES WITH DATA	MINIMUM %	MAXIMUM %	MEAN %	MEDIAN % FOR COUNTRIES WITH DATA
Children 0–59 months with diarrhoea who received zinc treatment	46	0.1	50.2	8.6	2.8
Children 6–59 months who received two doses of vitamin A supplements	58	4.5	86.4	57.0	60.9
Children 6–59 months given iron supplements in past 7 days	56	1.3	45.4	14.6	11.6
Women with a birth in last 5 years who received iron and folic acid during their most recent pregnancy	62	22.6	96.6	74.6	81.0
Household consumption of any iodised salt	52	18.0	99.8	82.7	90.9

Source: Kothari, M., and Huestis, A., based on *2016 Global Nutrition Report* and UNICEF global databases, 2018.
Notes: Data is compiled using STATcompiler and taken from country Demographic and Health Surveys for 2005–2017.

iron/folic acid), and presence of iodised salt in households. This enables basic tracking of coverage of key programmes. Table 3.1 shows the percentage of women or children in need of micronutrient supplements who have access to them as well as household consumption of iodised salt (Spotlight 3.2).

There is a need to invest in collecting regular, nationally representative, high-quality micronutrient data.[14] Indicators not impacted by disease state and that account for environmental and use factors are needed, as are innovations in biomarkers for status and function. New approaches applying 'omics' – genomics, metabolomics and proteomics[15] – technology hold promise, also for point-of-care use. All DHS surveys should assess intake and status of multiple micronutrients, and the frequency of national nutrition surveys should be increased and include data on young children and women of reproductive age including adolescent girls. Disaggregated data for income segments and critical age groups is also needed for effective policymaking. While we wait for better data, Spotlight 3.1 highlights a new Global Nutrient database that gives estimates of national available nutrients. While it does not solve the many gaps in micronutrient data, it is a step towards better informing us on what nutrients are available in the food supply.

Steps taken in policies and programmes also have the potential to address micronutrient deficiencies, including through improving dietary diversity (Chapter 4).[16] Spotlight 3.2 highlights another approach – large-scale fortification – that has made progress but still faces significant barriers to effective implementation.

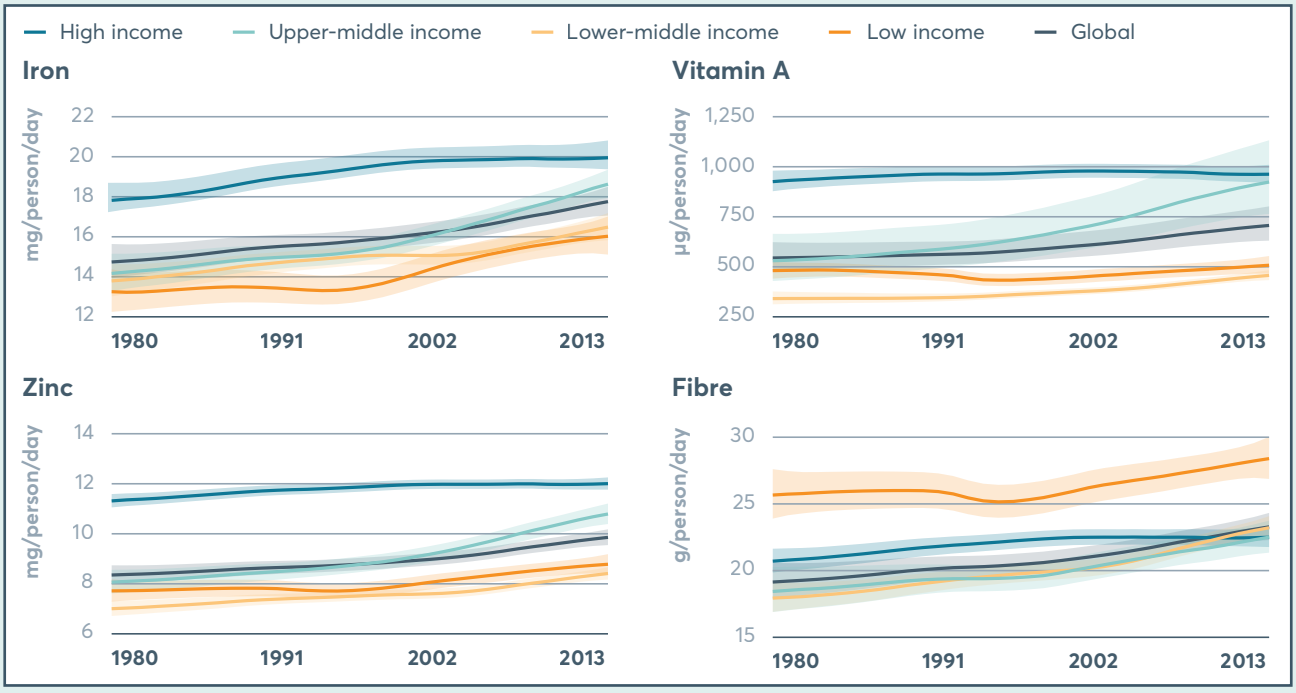
A global nutrient database

Ashkan Afshin and Josef Schmidhuber[17]

To address the data gap on micronutrients, the Food and Agriculture Organization (FAO) in collaboration with the Institute for Health Metrics and Evaluation has established the Global Nutrient Database. This provides estimates of national availability of 156 nutrients between 1980 and 2013. To create this database, data on availability of nearly 400 food and agricultural commodities from FAO's Supply and Utilization Accounts were matched to the food items in the US Department of Agriculture's Food and Nutrient Database. Then, after adjusting for inedible portion of foods, the national availability of each nutrient was calculated as the sum of the contributions of individual food items to the availability of each nutrient.

The estimates of this database show that, in parallel with the increase in energy availability worldwide, the availability of most micronutrients has increased in most countries. Figure 3.1 shows the key nutrients' availability including fibre, iron, zinc and vitamin A in grams per person per day over the last few decades. This data shows that globally and across countries of different income classifications, these nutrients are now more available. However, the rate of increase varied across countries and a significant variation was observed across the level of socioeconomic development.

FIGURE 3.1
Availability of fibre, iron, zinc and vitamin A at global level and by income classification, 1980–2013



Source: The Global Nutrient Database, 2018.

One of the advantages of this database is that its estimates have been validated by comparing them with consumption data from nationally representative nutrition surveys. It provides the opportunity to characterise nutritional deficiencies at the country level more accurately and identify the food sources of each nutrient across countries, hence informing nutrition-sensitive interventions to address these deficiencies. While it should be cautioned that food or nutrient availability are not the same as actual food or nutrient consumption, this data offers a key source of information for identifying shortfalls or surplus in a country's energy and nutrient intake. Countries, international agencies, donors and researchers can use this information as a key advocacy tool for improved food and nutrition policymaking.

SPOTLIGHT 3.2

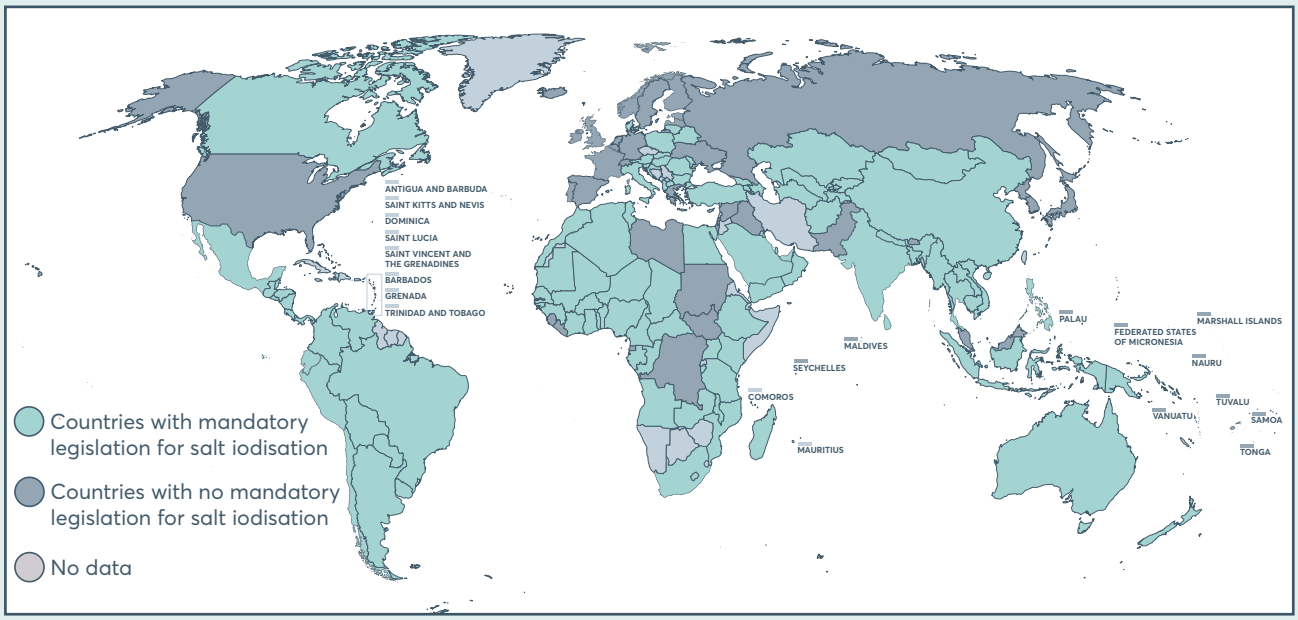
Large-scale fortification as a means of addressing micronutrient deficiencies

Greg S. Garrett, Jonathan Gorstein, Roland Kupka and Homero Martinez

Large-scale food fortification aims to improve nutrient intake by adding essential vitamins and minerals to foods that need to undergo some form of processing to get to market.[18] It has been practised for almost a century, starting in the 1920s with the voluntary fortification of salt with iodine in Switzerland and the US. The UK and Canada were the first countries to legislate for mandatory fortification of wheat flour and salt in 1940 and 1949, respectively. There have been significant advances in this area in recent years: 86 countries now require at least one type of cereal grain to be fortified with iron and/or folic acid (13 introduced legislation between 2014 and 2017), 29 now have national programmes to fortify edible oils with vitamin A (12 mandated legislation in this timeframe).

A systematic review of 41 reports and 76 research papers concluded that in low and middle-income countries there is strong evidence of health impact where food fortification achieved both high coverage and compliance.[19] The most notable advance has been in the area of salt iodisation. Table 3.1 shows that mean household coverage of iodised salt is 83% in the 52 countries for which there is data. The number of countries with mandatory salt iodisation has steadily risen over time and is now 108 (Figure 3.2). Between 2014 and 2017, for example, six countries passed new salt iodisation legislation.[20] Based on available information on the use of iodised salt, the Iodine Global Network and UNICEF estimate that globally over 6 billion people now consume iodised salt.[21] This represents the most significant achievement to date of large-scale food fortification.[22] Only 19 countries are still classified with insufficient iodine intake, a dramatic shift from 110 countries in 1993.[23] (This calculation uses the WHO definition of adequate iodine intake as adults with a median urinary iodine concentration value ≥100 µg/L.)

FIGURE 3.2
Country legislation for salt iodisation



Source: Global Fortification Data Exchange 2018.

Salt iodisation is credited with preventing 750 million cases of goitre over the past 25 years.[24] Ethiopia is an example of national progress: in 2005, national coverage of iodised salt was 4.2%.[25] By the end of 2014, 95% of households had access to iodised salt (containing any amount of iodine), and 42.7% of households had access to adequately iodised salt.[26] This was a result of a dedicated, multi-level and multi-sector effort involving public–private partnerships that focused on improving supply chains, engaging the private sector, reinstating public commitments to enforce iodisation legislation and accessing technical assistance provided by international agencies.

A recent review of national large-scale food fortification programmes point towards a number of key lessons for success.[27]

- They take into account how many people are malnourished and where they live, as well as what food they eat. Success depends on which food is fortified and how much of it is industrially processed.
- They integrate fortification into broader national nutrition strategies.
- National governments commit the requisite capacity, resources and sustained commitment for effective quality control.
- They carry out periodic reviews to check assumptions about dietary patterns.
- They mandate fortification to address a significant public health need or risk.

Yet a number of barriers keep large-scale food fortification from achieving its full public health impact. First, many countries with a high burden of hidden hunger have not yet started a fortification programme. For example, 62 low and middle-income countries do not yet have mandatory wheat, maize or rice fortification programmes, yet these meet the general criteria[28] for establishing the intervention.[29] Similarly, an appropriate selection of food vehicles – those regularly consumed by a large proportion of the population, particularly the most vulnerable people – coupled with effective compliance mechanisms will result in substantial increases in the potential impact of fortification programmes.[30]

Second, the quality and compliance of fortified foods must be strengthened and integrated into routine food control systems. One review of external quality assurance activities of staple food fortification programmes from 25 countries found that the percentage of foods meeting national standards averaged between 45 and 50%.[31] Similarly, surveys conducted in nine locations in seven low and middle-income countries between 2014 and 2017 found that coverage rates are not strong.[32] On average only 35% of wheat flour consumed is fortifiable (industrially processed) in the nine locations and yet only 18.5% of available wheat flour was fortified. Nearly three quarters of people (72%) consume fortifiable edible oil but only 42% of all oil was fortified. For maize flour, 48% of people consume fortifiable maize but only 29% was actually fortified.[33]

This low coverage coupled with poor compliance to national standards is arguably the most critical issue facing countries that are already implementing mandatory large-scale food fortification programmes, because these will not achieve the intended health outcomes.

Third, most fortification programmes have been treated as vertical interventions with limited alignment or harmonisation. Although many of the same actors and stakeholders are involved with the fortification of different foods vehicles, the programmes have not been linked to identify potential synergies and opportunities for greater efficiency in design, implementation and monitoring.

Lastly, few national programme assessments have measured the impact of fortification on biological (e.g. on iron deficiency anaemia) and functional (e.g. child development) outcomes.[34]

Critical need to take a new approach to addressing malnutrition in all its forms during crises

Understanding crisis and fragility

The World Bank estimates that around 2 billion people live in countries affected by fragility, conflict and violence,[35] and classifies 36 countries or territories as being in fragile situations now.[36] Crises take many shapes and forms, such as deteriorating governance, prolonged political crisis, post-conflict transition and fragile reform processes, often in a context of natural resource disasters and climate change. The World Bank also estimates that the share of extremely poor people living in conflict-affected areas will rise to 50% by 2030.[37]

Crises are leading to mass population movement either within a country (internally displaced), estimated at 40 million people, or as refugees in bordering countries, estimated at 25.4 million people.[38] This level of movement is higher than any other time in recent history and it is estimated that around 201 million people across the world need humanitarian assistance.[39] Over two thirds of all refugees are from just five countries – South Sudan, Somalia, Afghanistan, Myanmar and Syria – and more than half of the refugee population is under the age of 18.[40] Mass population disruption results in an increased risk of malnutrition, food and social insecurity and sickness, loss of livelihoods and economic opportunities, and death.[41]

One of the key messages from the *2017 Global Nutrition Report* was that peace and stability (SDG 16) is essential for good nutrition. Yet war, instability and climate-related disasters continue to affect an increasing number of countries. They are a significant factor in the estimated 124 million people in 51 countries facing significant food insecurity.[42] The *Global Report on Food Crisis* reports that this had increased by 11 million people from 2016, equivalent to an 11% rise. It also indicates that the rise is due to new or intensified conflict and insecurity in countries such as Yemen, (northern) Nigeria, the Democratic Republic of the Congo, South Sudan and Myanmar. Persistent drought also played a major role in countries including Kenya, Somalia and Uganda, and in southern Africa.

The *2017 Global Nutrition Report* also highlighted that famine was declared that year in South Sudan and a high risk of famine reported for (northern) Nigeria, Somalia and Yemen. The crises in these four countries led to an estimated 10 million people being displaced, and 31.6 million people classified as in crisis.[43] In response to this, humanitarian funding needs in the four countries have more than doubled, from US$2.9 billion in 2013 to more than US$6.5 billion in 2017 and are currently estimated at US$7.27 billion in 2018.[44]

Coexistence of malnutrition in all its forms in crises

Efforts to address malnutrition in crisis situations have historically focused on saving lives by identifying and treating wasting and by protecting and promoting infant and young child feeding. This is critical where the rates of wasting are high, have increased or are in danger of increasing, such as in the famine-risk countries of Somalia, Yemen, South Sudan and (northern) Nigeria.

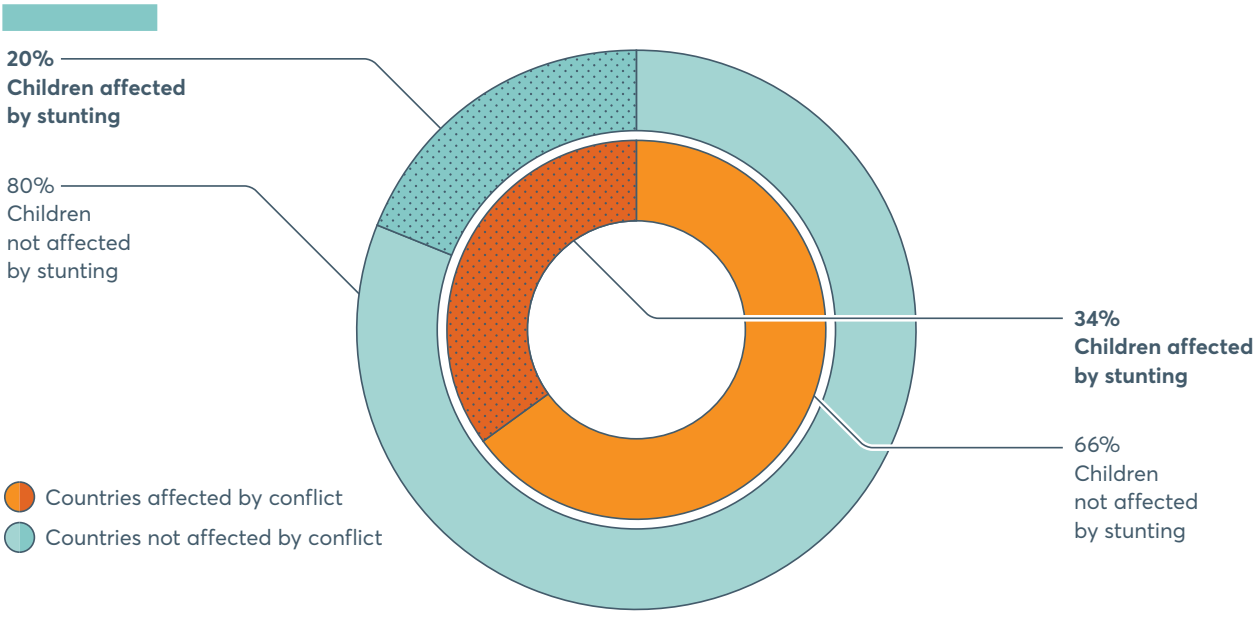
However, the reality of the malnutrition burden is now far more complex. Most of the world's wasted children do not actually live in a humanitarian context – and it is not just wasting which is a problem in crises. Emerging evidence indicates fragility, conflict and violence impact all forms of malnutrition. Both wasting and stunting occur in crisis and stable contexts and there are associations and inter-causality between the forms.[45] There is a greater burden of both wasting and stunting coexisting in young children (see Spotlight 2.5, Chapter 2) and pregnant women who are exposed to conflict give birth to children of lower weight – thus transmitting the adverse effects of conflict across generations.[46]

While the increased risk of wasting in these crises contexts is very well known, there is now increasing evidence that high levels of stunting occur and can even increase in protracted crises. Country-level stunting data shows interesting associations: that the prevalence of stunting is notably greater in countries affected by conflict than those that are not (Figure 3.3). Other estimates suggest that 45–75%[47,48] of the global stunting burden is located in fragile states; however, this is a wide range and points to the need for further data and analyses to confirm the estimates.[49]

Similarly, until recently, micronutrient deficiencies (except for a spate of outbreaks of scurvy and vitamin B deficiencies in refugee contexts in the 1980s and early 1990s) and non-communicable diseases (NCDs)/obesity have barely been on the radar of those responsible for responding to crises. This is beginning to change with growing recognition of the high burden of multiple forms of malnutrition in protracted and complex crisis contexts.[50]

Vast refugee populations in the Middle East present an example of overlapping burdens of wasting, stunting, micronutrient deficiencies and obesity. Spotlight 3.3 describes actions that have been taken to address malnutrition in all its forms among crisis-affected refugee populations in Lebanon.

FIGURE 3.3
Prevalence of stunting in conflict countries versus non-conflict countries



Source: Development Initiatives based on 2018 INFORM Index for Risk Management and Joint Malnutrition Estimates data.[51]
Notes: Prevalence weighted by population based on available data for 148 countries. A country is affected by conflict if it scores 7 or higher in INFORM's 'Currently highly violent conflict intensity' indicator.

SPOTLIGHT 3.3

Actions to address malnutrition in all its forms among refugees in Lebanon

Hala Ghattas, Zeina Jamaluddine and Chaza Akik

It is now estimated that one in every five people in Lebanon is a refugee. Lebanon, a small Mediterranean middle-income country, hosts 992,127 Syrian registered refugees who have arrived since 2011,[52] as well as an estimated 260,000-280,000 Palestinian refugees[53] who have been in the country since 1948, and a further 32,274 Palestinian refugees from Syria.[54] In Lebanon, which faces its own fast-changing nutrition challenges, these long-term refugees face overlapping burdens of poverty, food insecurity, poor diets, rising overweight and obesity, and high rates of NCDs.

Palestinian refugees live mainly in poor conditions in urban camps and gatherings, and rely on the over-stretched UN Relief and Works Agency for Palestine Refugees (UNRWA) for education, healthcare and social welfare services. Among households, 62% experience food insecurity, and 47% of people aged 25 to 59 years report a chronic disease – hypertension and diabetes being the most common.[55]

By 2018, the Syrian conflict was reported to have contributed to the internal displacement of 6.2 million people and an additional 5.1 million refugees in neighbouring countries: Jordan, Lebanon and Turkey.[56] Refugees from Syria have been dispersed across Lebanon since 2011 and live in host communities or informal tented settlements. Their food security gets worse each year, with poor-to-borderline household food consumption increasing from 13% in 2014 to 38% in 2017.[57,58] Diets are particularly low in meat, fruit and micronutrient-rich vegetables.[59,60] Child diet diversity is also low, with only 9% of children aged 6 to 23 months achieving minimum diet diversity.[61] In 2016, global acute malnutrition and stunting prevalence in children aged 0 to 59 months was 2% and 15% respectively.[62] In parallel, 34% and 29% of adults aged 18 to 69 years are overweight and obese respectively, 49% have raised total cholesterol,[63] and more than half of Syrian refugee households include a member diagnosed with one of five NCDs.[64]

Faced with these challenges, humanitarian organisations have established programmes to respond to both the acute and basic needs of refugees, as well as their longer-term healthcare needs. Examples include:

School feeding and nutrition education

The World Food Programme (WFP) runs a school feeding programme in 38 public schools which cater to both Lebanese and Syrian refugee children.[65] Rather than focusing on increasing calorie intake, WFP adapted its programme to contextual needs, aiming to increase diet diversity by providing fresh fruit and milk at school, as well as nutrition education.

Two UNRWA primary schools have piloted an innovative Healthy Kitchens programme, involving refugee women trained in food safety and hygiene who provide a daily healthy snack to Palestinian refugee schoolchildren. These pilots have shown improvements in food security, social support and the mental health of women, a rise in child dietary diversity, and a fall in children's consumption of sugar-sweetened beverages and desserts.[66,67]

Food and cash assistance programmes

Various targeted electronic food voucher and multi-purpose cash programmes have been established over the years to provide food and other basic needs to different vulnerable refugee subpopulations, including Syrians and Palestinians. Impact evaluations have shown that multipurpose cash assistance increases food expenditure, but does not improve access to healthcare services. Both e-food vouchers and cash helped improve diet diversity and other food security indicators, with bigger improvements seen among people receiving unrestricted cash assistance than e-food vouchers.

CONTINUED **SPOTLIGHT 3.3**

Strengthening local healthcare systems

In collaboration with the Lebanese Ministry of Public Health, UNHCR has responded to the basic healthcare needs and the high burden of NCDs among Syrian refugees by supporting the primary healthcare system through subsidised care, and a referral system for secondary and tertiary care. Three quarters (75%) of eligible treatment costs are covered, rising to 100% for vulnerable subgroups. UNRWA also operates a comprehensive primary healthcare system with full coverage for Palestinian refugees, including targeted screening programmes for NCDs, as well as a referral system which covers 90% of secondary and tertiary care. An innovative pilot project in both public and UNRWA primary healthcare centres has trialled an e-health app that has improved case detection and referrals for NCDs.

In this context, the remaining challenges are to ensure sustainability of these programmes to improve healthy diets in childhood, and improve food security and access to health services across these vulnerable populations over time – particularly when humanitarian agencies are increasingly threatened by budget cuts.

Building nutrition resilience by increasing humanitarian and development links[68]

An important emerging issue is how to build resilience to malnutrition in the context of increasing fragility and instability, and the various forms of malnutrition experienced. The impetus behind the growing resilience agenda has been the realisation that an estimated 86% of international humanitarian assistance goes to countries affected by long and medium-term crises.[69] Yet assistance is mostly in the form of short-term programming, which is unable to deliver the resilience building needed for crisis-affected populations to avoid their nutritional status deteriorating.

More lessons are gradually being learned about what it takes to build nutrition resilience, including preparedness planning, early warning and surge capacity for scaling up systems, human and financial capacity and involving multiple sectors.[70,71] Critical to this process of building resilience is bringing together the development and humanitarian communities.[72] This would help, especially in protracted crises, in discussing and developing joint policies and frameworks, predictable financing and funding mechanisms, and ensuring a 'balance' of programmes is achieved across the range of high impact nutrition-direct interventions and other sectoral programming, such as social protection programmes.

Consistent with lack of recognition of malnutrition beyond wasting in crisis contexts is that historically wasting and stunting have been siloed along humanitarian–development lines, with high prevalence of wasting being seen as a 'humanitarian' issue and stunting as a 'development' issue.[73] Discussions about how to bring the two communities together escalated during the 2016 World Humanitarian Summit with participants calling for stronger links between humanitarian and development programming.[74] A key commitment to action from the summit is 'transcending humanitarian–development divides',[75] efforts at which have been described as 'strengthening the humanitarian–development nexus'. The UN Office for Coordinating Humanitarian Affairs (OCHA) has since developed the New Way of Working framework that also calls for more joined-up humanitarian and development analysis, planning, coordination and financing to support collective outcomes.

Organisations such as WFP, with decades of experience providing humanitarian assistance, are shifting from short-term emergency response mechanisms to funding over a three-to-five-year period, along with including stunting reduction targets as an explicit goal in their three-to-five-year country strategies. Under the Inter-Agency Standing Committee[76] the Global Nutrition Cluster, which supports the coordination of nutrition response in crises, is increasingly focused on integrated famine prevention packages including nutrition, food security, water, sanitation and hygiene (WASH) and health measures. Such programmes have been implemented for the first time in northern Nigeria, South Sudan, Somalia and Yemen during 2017. Some countries are also recognising the need to build resilience through a more 'development'-oriented approach to what was previously considered 'humanitarian' context. The Kenyan government's approach presents an example of a country-led approach to resilience. It demonstrates that a stronger development-focused approach can reduce the burden on traditional humanitarian response, benefitting crisis-prone populations.

A challenge to the humanitarian and development communities forging closer links is the lack of disaggregated and aggregated data depicting the extent, relationships and patterns of multiple forms of malnutrition. Better data is needed to effectively advocate for the type of institutional reform so that these multiple burdens before, during and after crises can be adequately addressed. A combination of more evidence describing multiple burdens and of the effectiveness of interventions that can address multiple forms of malnutrition simultaneously should speed up institutional reforms. These reforms can then underpin a more comprehensive set of development and humanitarian responses.

Funding is also a major issue. Highly fragile and conflict-affected contexts include South Sudan, where over half of aid is humanitarian,[77] and Somalia, which has been the recipient of continuous humanitarian aid for around three decades and where over half (56%) of aid has been humanitarian.[78] In such contexts, there is scope for governments to be more transparent and accountable in their aid and financing processes and donors to be less risk averse and consider more multi-year funding as well as pooled resources and direct budget support with the eventual aim of establishing government-funded and controlled services. Implementing partners could also think more strategically about how to strengthen, through programme integration, government and other local agency services, building sustainable and scalable programmes in these complex environments. The humanitarian community cannot build nutrition resilience alone without the effective engagement of development actors and without considering how to use humanitarian funding in a more flexible and resilience/development-orientated way. To date financing is short term and unpredictable while activity planning is based on repeated yearly project cycles that save lives but cannot prevent malnutrition in the first place.

Spotlight 3.4 describes an approach to equip health systems to effectively manage any sudden increases in wasting while at the same time working with multiple sectors to prevent wasting and stunting in the crisis response.

Kenya's resilience-building approach

Jeremy Shoham and Carmel Dolan

Kenya's economy is growing and it has an ambitious 2030 development vision. As a result, its humanitarian system architecture has largely been replaced by greater government investment in resilience building, social protection programmes and early response systems.

A key element of this for nutrition is the integration of wasting treatment into the health system and a surge model which allows for surge treatment response in the most crisis-prone arid and semi-arid lands. In recent years, the government of Kenya has established social protection programmes in these vulnerable areas (65% government funded) and a cash transfer programme for up to half a million people. There are also government-funded social protection programmes for older people, severely disabled persons, orphans and vulnerable children, as well as an asset-creation cash transfer programme implemented by the WFP.

Resilience programming has become a major component of Kenya's national Mid-Term Development Plan and is a key pillar of the Ending Drought Emergencies (EDE) framework. Central to the EDE is the strengthening of systems that allow earlier responses to threats before a full-scale crisis arises, including by diversifying livelihoods and anticipating risks. This has largely replaced the need for more traditional humanitarian response in Kenya. The National Drought Management Authority, which rolls out the EDE, straddles humanitarian and development programming and is devolved to the 23 most vulnerable counties. Nutrition is a cross-cutting concern and stunting is one of the key indicators for monitoring EDE progress.

In 2011, the response to the severe Horn of Africa drought that affected large parts of Kenya was characterised as late, poorly coordinated, and with low levels of government investment and leadership, little attention to drought resilience building, and high levels of child wasting and death. In contrast, the response to the 2016–2017 drought started earlier and while child wasting remained high in many affected counties, there were fewer deaths. In general, the 2016–2017 drought response demonstrated progress in how Kenya's systems have become orientated to reduce risk and respond more quickly and effectively to crisis. Several factors have contributed to this and, taken together, have enabled a considerable degree of strengthened humanitarian and development links.
The following enabling factors have been identified:

1. National economic growth: Kenya is now classified as a lower-middle-income country.

2. Strong government leadership for the crisis response, with humanitarian partners providing gap filling rather than first-line response and development partners' investments aligned with national risk-reduction priorities.

3. Devolution of government since 2012, which has provided freedom for local governments to manage budgets directly, determine county-level priorities and respond early to emerging crises.

4. The elaboration and initial implementation of the EDE framework to achieve greater sector and humanitarian–development system links.

5. Strengthened health systems and establishment of a surge capacity model for the early treatment of wasting.

6. Establishment of scalable social protection systems for the most vulnerable people.

SPOTLIGHT 3.5

Bridging the humanitarian and development gap

Anushree Rao

In 2013, at the first Nutrition for Growth (N4G) summit, Concern Worldwide pledged US$116.7 million to nutrition programmes, mainly in fragile states. This financial commitment was met ahead of schedule, and another US$100 million promised for 2018 to 2020. This funding is used to test and implement scalable solutions in some of the hardest-to-reach areas and populations, including programmes designed to treat and boost resilience to acute malnutrition.

Concern's funding included expanding its surge model for the community-based management of acute malnutrition. This model equips health systems in fragile settings to manage acute malnutrition effectively by triggering thresholds for a 'surge' humanitarian response, alongside existing management of routine acute malnutrition. It has now been applied in Kenya, Uganda, Niger and to some extent in Chad. The pilot in Kenya's Marsabit County showed that early warning and action alongside longer-term nutrition programmes can help to bridge the humanitarian–development gap. An evaluation concluded that the health system was better equipped to cope with increased cases of acute malnutrition during predictable crises, without undermining long-term health and nutrition work. The Kenyan government is now looking at embedding community-based management of acute malnutrition surge in health facilities servicing other drought-prone areas.

Concern Worldwide has also funded programmes designed to build resilience to acute malnutrition. For example, a community resilience to acute malnutrition (CRAM) programme in Chad aimed to improve nutrition in young children and build community resilience to shocks and stresses adversely impacting health and nutrition. The programme reached 4,000 households with a package of integrated nutrition and health services, WASH, climate-smart agriculture and livestock management. An impact evaluation of CRAM[79] found it protected against an increase in both wasting and stunting; increased the rate of exclusive breastfeeding in children under the age of six months; increased access to, and use of, boreholes and latrines; and boosted knowledge (but not practice) of hand-washing. In CRAM populations wasting rates stabilised compared with increases among control groups, while children's stunting prevalence in the CRAM settlements was 7% lower than those in the control settlements. CRAM showed that integrating multiple sectors such as agriculture, WASH, livelihoods, gender and health can significantly improve childhood malnutrition. However, the impact of CRAM on food insecurity remains ambiguous.

Burden of malnutrition in adolescence

There is growing awareness of the importance of adolescent health and nutrition and increasing recognition that investing in this vital life stage is critical to reaching global targets and goals.[80] In 2017 and 2018 two calls to action were made on adolescent nutrition. In 2017 the Agenda for Action to Close the Gap on Women's and Girls' Nutrition was launched at the Milan Nutrition Summit, which called on the nutrition community to adopt a life-cycle approach that prioritises adolescents.[81] And in 2018, a new call to action was published: Better Data Now to Drive Better Policies and Programs in the Future. The call was launched following a stakeholder consultation in October 2017 on 'Adolescent girls nutrition; evidence, guidance and gaps' co-hosted by USAID's Strengthening Partnerships, Results, and Innovations in Nutrition Globally project (SPRING) and the Pan American Health Organization. More than 100 organisations have now signed up, showing their commitment to this important age group. The call has seven priority actions covering data gaps, policy, indicators and surveillance.

Seven priority actions for improving adolescent girl nutrition[82]

1. Engage and partner with adolescents in the design and implementation of research, policies, programmes, regulations and guidelines, recognising and learning from successful engagement with adolescents in other sectors.
2. Assess how nutrition policies and regulations shape the food environment and influence adolescent nutrition and diet quality.
3. Develop and use standardised indicators for assessing adolescent health, nutrition and social and emotional well-being.
4. Ensure that adolescents are included in national nutrition surveillance, appropriately sampled in population surveys and disaggregated in routine programme-monitoring data.
5. Conduct quantitative and qualitative research to measure, analyse and address the underlying determinants of malnutrition and the context-specific factors affecting adolescents' food choices, diet and eating practices, physical activity and social and emotional well-being.
6. Design implementation research to improve programme delivery, use, cost effectiveness and scale, exploring the use of existing programmes and platforms when feasible.
7. Conduct rigorous evaluations of interventions to assess their impact and determine the right combination and dosage of macro and micronutrients as well as the optimal age and duration for adolescent interventions to enhance growth and development outcomes.

These calls are being made in the context of recognising that adolescence is a critically important life stage to promote good nutrition and sound well-being into adulthood for both boys and girls. Adolescence[83] (from 10–19 years) is a time of not only sexual maturation but also rapid growth, second only to the first year of life with major anatomical, physiological and social changes. A growing body of international evidence suggests that not only is some 'catch-up' growth (height) in adolescence possible, but that optimal growth during this stage can have important knock-on effects on other key outcomes, such as improved cognition and reduced risk of NCDs.[84] Adolescence therefore presents a 'second window of opportunity', not only to improve the health and nutritional status of adolescents themselves, but to break the cycle of intergenerational malnutrition and ill health.

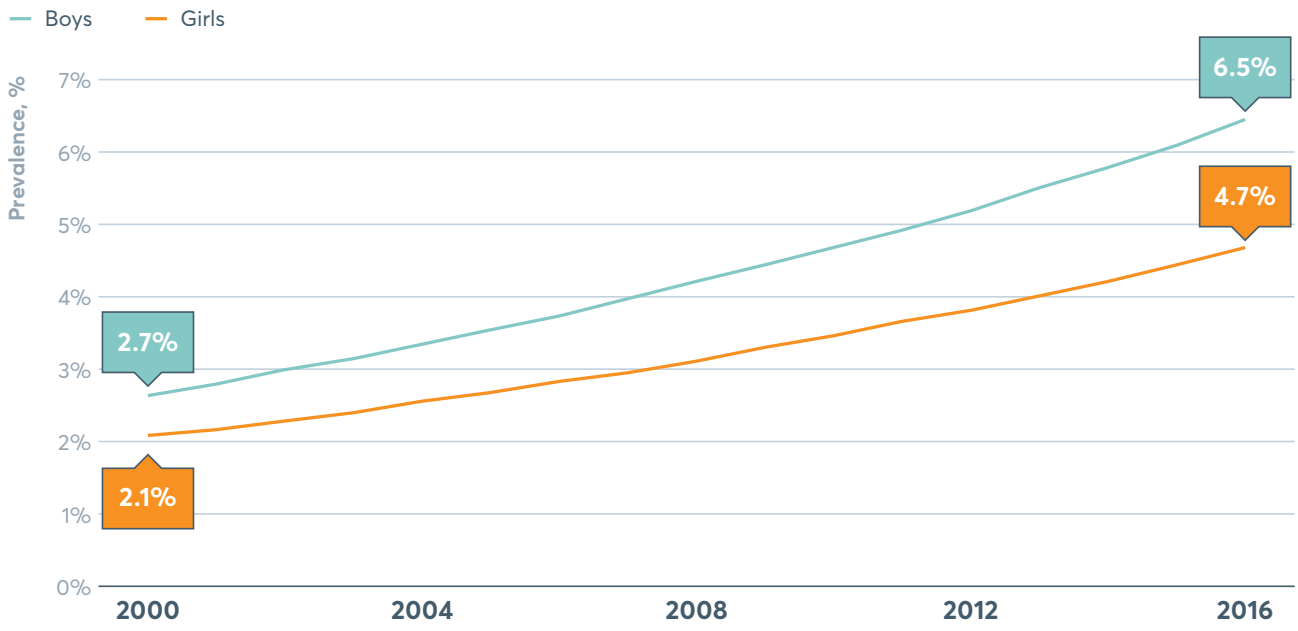
Adolescent girls are often married, which is important because of all the births to girls in developing countries under the age of 18 it is estimated that 9 in 10 are married.[85] Early marriage (i.e. just after the onset of puberty and before girls reach adulthood) occurs in many countries. In Niger for example, 76% of women were married before the age of 18.[86] Pregnancy in adolescence carries additional risks due to the girls' immaturity, especially risks of mortality and adverse outcomes for both the mother and baby.[87] It is estimated that 95% of births to adolescents occur in developing countries, and that 19% of young women in developing countries become pregnant before the age of 18.[88] Evidence suggests that when maternal pre-pregnancy body weight is either too low or too high, risks to both mother and baby are higher. Pre-pregnancy underweight is significantly associated with preterm births, small for gestational-age babies and low birth weight. Meanwhile pre-pregnancy overweight and obesity are associated with increased risk of hypertensive disorders, pre-eclampsia and gestational diabetes.[89]

The uniqueness of the adolescent period in the human life cycle is because it is biologically, socially and culturally sensitive. Adolescence is a period of openness to new ideas making it an ideal opportunity to target and improve dietary behaviours at school, home and via technology such as social media[90] that will influence nutritional status into adulthood.

Adolescence is also the period where potentially harmful behaviours can become established. Current data indicates that unhealthy dietary behaviours among adolescents are getting worse (see Chapter 4). While much attention has been placed on underweight in adolescence, data suggests a significant increase in overweight and obesity among adolescents (Figure 3.4). Data from 200 countries shows both male and female adolescent obesity rates (among 10–19 year olds) are increasing annually, reaching 6.5% and 4.7% respectively in 2016. Interestingly, the burden falls more heavily on boys and Figure 3.4 shows the gap between boys and girls is also widening each year, yet more clarity is needed on the mechanisms of this trend. However, in Africa, adolescent girls have a higher prevalence of obesity than boys (Figure 3.5).

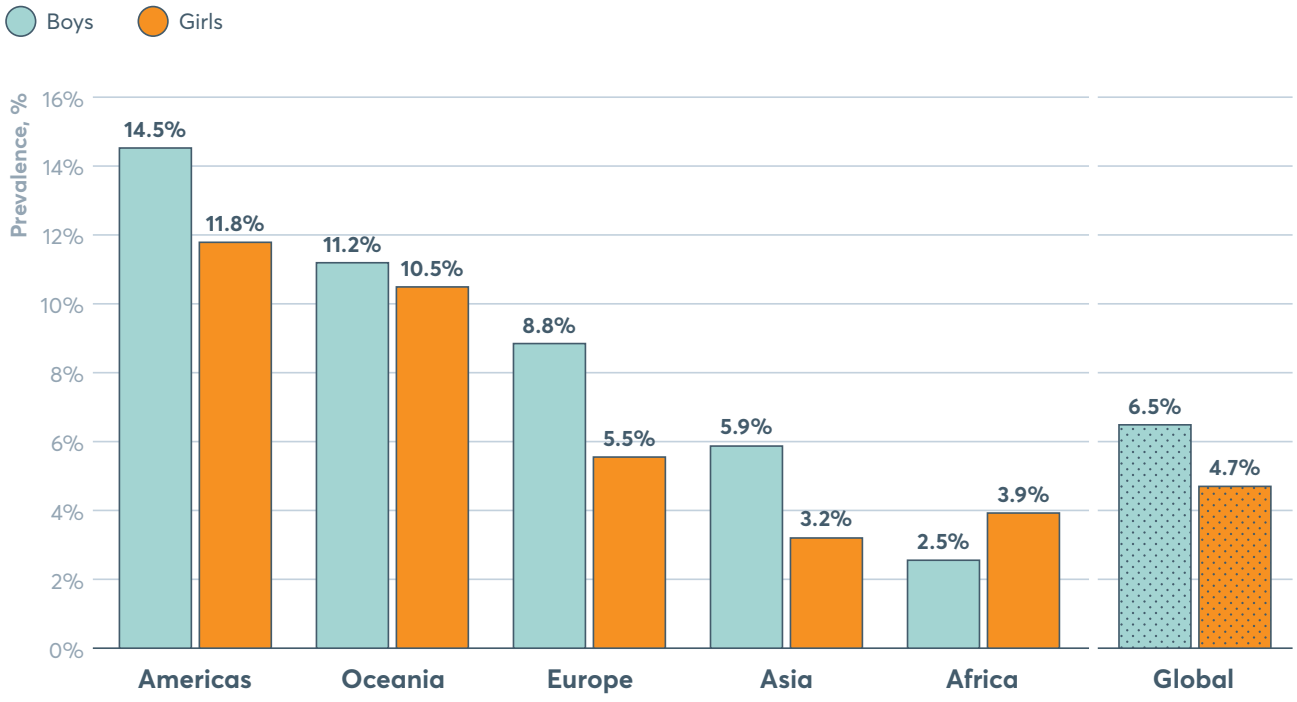
The development of new research, programmes and policies does at least indicate that more attention is now being placed on this critical life stage. Some of these programmes are exemplified in Spotlight 3.5, all of which indicate innovative approaches are being taken to bring in adolescent voices.

FIGURE 3.4
Trends in adolescent obesity, ages 10 to 19 years, 2000–2016



Source: NCD Risk Factor Collaboration.

FIGURE 3.5
Adolescent obesity, ages 10 to 19 years, by region, 2016



Source: NCD Risk Factor Collaboration.
Notes: Regional figures based on data for 195 countries.

SPOTLIGHT 3.6

Bringing in adolescent voices: innovations in research, programmes and policies to tackle malnutrition in adolescence

Juliet Bedford, Sarah Parkinson, Ashish Kumar Deo, Siddharth Kanoria, Justin Stokes, Caroline Fall, Sabiha Sultana, Rudaba Khondker, Mary Penny and Knut-Inge Klepp

Recent research shines a light on adolescent nutrition as a critically important life stage where interventions can have positive ripple effects. For example, Young Lives is an international study of childhood poverty following the lives of 12,000 children in Ethiopia, India (in the states of Andhra Pradesh and Telangana), Peru and Viet Nam over 15 years. This multinational cohort study is contributing to emerging evidence that, under favourable conditions (including targeted programmes such as conditional cash transfers), catch-up growth is possible during childhood/adolescence and is associated with improved cognitive function.[91]

New research programmes are now being initiated to further explore effective interventions. For example, Transforming Adolescent Lives through Nutrition (TALENT) is a consortium of researchers from the UK, India, Ethiopia, Côte d'Ivoire, Kenya, the Gambia and South Africa dedicated to understanding what adolescents eat, what influences their diets and how to make their diets healthier. Established in February 2018, TALENT is funded by the UK Medical Research Council. The first phase involves training nine teams from centres in India and Africa to collect qualitative data from young (aged 10 to 12 years) and older (aged 15 to 17 years) adolescents. The aim is to understand what drives adolescent food choices and behaviour, and how these drivers change throughout adolescence. TALENT will use this new understanding to develop and evaluate context and age-specific interventions to improve adolescent nutrition. The project is innovating new ways of co-creating interventions with adolescents themselves, their communities and policymakers to improve adolescent health, now and in the future.

Another research programme launched in 2018 is Co-CREATE.[92] This EU-funded project brings together a consortium of universities, national public health bodies and civil society organisations and will run until 2023. The aim is to prevent overweight and obesity in European adolescents by promoting healthier diets and increased physical activity. The key innovative aspects of the project are that it includes and involves adolescence in all aspects of the project, including the youth organisation Press (the youth organisation of Save the Children Norway) as a formal partner of the consortium; the focus on policy and a system approach to policy analysis (rather than focus on a single policy or intervention measure characterising much of the research in this field); and a strong focus on social inequality, as the potential differential impact policy measures and interventions have/might have on different social groups are investigated.

During 2016 to 2018, another project used a portfolio of creative tools to facilitate adolescents' participation and capture their priorities and lived experiences in their own voices. Conducted by Anthrologica and the WFP, it involved over 1,300 adolescent girls and boys from across Cambodia, Kenya, Guatemala and Uganda. The adolescents participated in workshops, using tools such as polaroid cameras to highlight issues related to access to food, food cultures and food aspirations. Participants used self-portraits and graffiti walls to depict their personal experiences and developed social network maps to explore relations with their peer groups, household, wider communities, key influencers and preferred communication channels. A key finding of the research was the recommendation made by adolescents across the study that 'you need to speak our language' and 'you need to come to us'.

The 'Adolescent Motivations Study' conducted in early 2018 by the Global Alliance for Improved Nutrition and Quantum Consumer Solutions in Bangladesh also took an innovative approach to delving more deeply into adolescent perspectives. On the basis of earlier work showing that nutrition and health are rarely primary factors in decision-making, it used ethnographic and qualitative methods to explore unstated, irrational and compelling life insights of adolescents to dig deeper into their motivations. The aim was to use the motivations identified to help design nutritional messages that align improving diet quality with fulfilling adolescents' desires and future goals.

The government of Bangladesh is also stepping up to focus on adolescents. Since 2010, Bangladesh's national policies on education, children, health, nutrition and population have all included measures on adolescent development, especially for adolescent girls. In 2017, the Ministry of Health and Family Welfare brought these different strands together into the National Strategy for Adolescent Health 2017–2030. This is unique in involving adolescents in its design and considering the broad and holistic understanding of the concept of health to address the overall health and nutritional needs of adolescents. The strategy also covers violence against adolescents, adolescent mental health and cross-cutting issues of social and behaviour change communication, vulnerable adolescents and adolescents in challenging circumstances.

NOTES

Chapter 3

1 Authored by Kraemer, K. Sight and Life

2 WHO, 2006. WHO Guidelines on Food Fortification with Micronutrients. Geneva: World Health Organization.

3 WHO, 2006 (see note 2).

4 Aburto N.J., Rogers L., De-Regil L.M. et al. An evaluation of a global vitamin and mineral nutrition surveillance system. Arch Latinoam Nutr, 63:2, 2013, pp. 105–13. Available at: www.alanrevista.org/ediciones/2013/2/?i=art1

5 WHO, 2018. Vitamin and Mineral Nutrition Information System (VMNIS). Micronutrient Database. Available at: www.who.int/vmnis/database/en (accessed 29 May 2018).

6 University of Ghana, GroundWork, University of Wisconsin-Madison, KEMRI-Wellcome Trust and UNICEF. 2017. Ghana Micronutrient Survey 2017. Accra, Ghana. Available at: http://groundworkhealth.org/publications

7 Sanghvi T., Van Ameringen M., Baker J. et al, 2007. Vitamin and mineral deficiencies technical situation analysis: a report for the Ten Year Strategy for the Reduction of Vitamin and Mineral Deficiencies. International Nutrition Foundation for the UN University Press.

8 DHS, 2014. Tabulation plan for DHS Final Report. Chapter 11: Nutrition of children and adults. Washington DC: USAID.

9 Gorstein J., Sullivan K.M., Parvanta I. and Begin F., 2007. Indicators and Methods for Cross-Sectional Surveys of Vitamin and Mineral Status of Populations. The Micronutrient Initiative (Ottawa) and the Centers for Disease Control and Prevention (Atlanta). Available at: www.who.int/vmnis/toolkit/mcn-micronutrient-surveys.pdf

10 Petry N., Olofin I., Hurrell R.F. et al. The proportion of anemia associated with iron deficiency in low, medium, and high human development index countries: a systematic analysis of national surveys. Nutrients, 8:11, 2016, p. 693.

11 Pasricha S.R., Armitage A.E., Prentice A.M. and Drakesmith H. Reducing anaemia in low income countries: control of infection is essential. BMJ, 362, 2018. p. k3165.

12 Ruel-Bergeron J.C., Stevens G.A., Sugimoto J.D. et al, 2015. Global Update and Trends of Hidden Hunger, 1995-2011: The Hidden Hunger Index. PLoS One 10(12): e0143497. Available at: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0143497 (accessed 24 May 2018); IZiNCG. Assessment of the risk of zinc deficiency in populations and options for its control. Food Nutr Bull, 25: 2 Suppl, 2004, pp. 94S–203S.

13 Trowbridge, F.L., 2018. Surveillance of micronutrient deficiency. UN University. Available at: http://archive.unu.edu/unupress/food/8F154e/8F154E05.htm (accessed 24 May 2018).

14 Gorstein J., Sullivan K.M., Parvanta I. and Begin F. (see note 9)

15 Omics refers to the collective technologies used to explore the roles, relationships and actions of the various types of molecules that make up the cells of an organism.

16 Ruela M.T., Quisumbinga A.R. and Balagamwala M. Nutrition-sensitive agriculture: What have we learned so far? Global Food Security, 17, 2018, pp. 128–153. Available at: www.sciencedirect.com/science/article/pii/S221191241730127X

17 Schmidhuber J., Sur P. and Fay K. The Global Nutrient Database: availability of macronutrients and micronutrients in 195 countries from 1980 to 2013. The Lancet Planetary Health, 2(8), 2018, pp. e353–e368.

18 Section contributed by Garrett G.S.

19 Osendarp, S. J. M., 2018. Large-Scale Food fortification and Biofortification in Low- and middle-Income Countries: A Review of Programs, Trends, Challenges, and Evidence Gaps. Food and Nutrition Bulletin, 39(2), pp. 175–205. Available at: https://journals.sagepub.com/doi/full/10.1177/0379572118774229

20 Global Fortification Data Exchange. Providing actionable food fortification data. Available at: www.fortificationdata.org

21 UNICEF estimates that 86% of the population in low and middle-income countries has access to salt containing iodine. The population in these countries is 6.3 billion x 86% = 5.42 billion people using iodised salt. And the Iodine Global Network estimates that the population in industrialised countries is 1.3 billion and about half of the salt used is iodised, primarily in processed foods and condiments = 650 million people using iodised salt. Thus, the total is 6.1 billion people.

22 Pearce E.N., Andersson M., Zimmermann M.B. Global iodine nutrition: where do we stand in 2013? Thyroid. 23:5, 2013, pp. 523–528.

23 UNICEF, 2018. Globally, 86% of the population has access to iodized salt. UNICEF data. Available at: https://data.unicef.org/topic/nutrition/iodine-deficiency/https://data.unicef.org/topic/nutrition/iodine-deficiency/ (accessed 26 May 2018).

24 Gorstein J., Bagriansky J. and Kupka R. Estimating the impact of salt iodization on clinical iodine deficiency over the past 25 years. Submitted for publication, 2018.

25 Chuko T., Bagriansky J. and Tucker Brown A, 2015. Ethiopia's long road to USI, IDD Newsletter, Iodine Global Network. May 2015, Vol 43-2. Available at: www.ign.org/cm_data/IDD_may15_1.pdf

26 IFPRI, 2016. Global Nutrition Report 2016. From Promise to Impact: Ending Malnutrition by 2030. Washington, DC: IFPRI. Available at: www.ifpri.org/publication/global-nutrition-report-2016-promise-impact-ending-malnutrition-2030

27 Aaron G.J., Friesen V.M., Jungjohann S. et al. Coverage of large-scale food fortification of edible oil, wheat and maize flours varies greatly by vehicle and country but is consistently lower among the most vulnerable: results from coverage surveys in eight countries. J Nutr, 147(5), 2017.

28 This estimate is based on 2017 legislation data from the Food Fortification Initiative; consumption data based on FAO food availability for rice, maize meal or wheat flour using the WHO-recommended minimum consumption pattern of ≥75 g/day to allow sufficient fortificant coverage of micronutrient needs of women of reproductive age, and 2017 World Bank classifications for low, medium, and high-income countries. Implementation research would be needed to ascertain which of these 62 countries do not industrially mill or import most of their grains and thus consume unfortifiable grain products.

29 Garrett G.S. and Bailey L.B., 2018. A public health approach for preventing neural tube defects: folic acid fortification and beyond. The New York Academy of Sciences.

30 Aaron G.J., Friesen V.M., Jungjohann S. et al. Coverage of large-scale food fortification of edible oil, wheat and maize flours varies greatly by vehicle and country but is consistently lower among the most vulnerable: results from coverage surveys in eight countries. J Nutr, 147(5), 2017, pp. 984S–94S.

31 Luthringer C.L., Rowe L.A., Vossenaar M. and Garrett G. 2015. Regulatory monitoring of fortified foods: Identifying barriers and good practices. Available at: www.ghspjournal.org/content/3/3/446

32 Aaron G.J., Friesen V.M., Jungjohann S., 2017 (see note 30).

33 Aaron G.J., Friesen V.M., Jungjohann S., 2017 (see note 30).

34 Aaron G.J., Friesen V.M., Jungjohann S., 2017 (see note 30).

35 IDA. Conflict and fragility. Available at: http://ida.worldbank.org/theme/conflict-and-fragility

36 World Bank. Harmonized List of Fragile Situations. Available at: www.worldbank.org/en/topic/fragilityconflictviolence/brief/harmonized-list-of-fragile-situations

37 World Bank. Fragility, conflict and violence. Available at: www.worldbank.org/en/topic/fragilityconflictviolence/overview

38 UNHCR, 2018. Global Trends: Forced Displacement in 2017.

39 Development Initiatives, 2018. Global Humanitarian Assistance Report 2018. Available at: http://devinit.org/wp-content/uploads/2018/06/GHA-Report-2018.pdf

40 UNHCR, 2018 (see note 38).

41 UNHCR. Nutrition and Food Security. Available at: www.unhcr.org/nutrition-and-food-security.html

42 According to the Integrated Food Security Phase Classification (IPC) in what is classified as phase 3, or above – meaning, crisis. IPC is the protocol for classifying the severity and magnitude of acute food insecurity. The Global Report on Food Crises looks at the most severe IPC phases – Crisis (Phase 3), Emergency (4) and Catastrophe/Famine (5) – as these indicate the number and location of populations in need of urgent assistance. All food insecurity data stems from: Food Security Information Network, 2018. Global Report On Food Crises 2018. Available at: https://docs.wfp.org/api/documents/WFP-0000069227/download/?_ga=2.249914566.1100751467.1533206233-2100957799.1533206233

43 UNHCR. Nutrition and Food Security (see note 41).

44 UN OCHA FTS. Available at: https://fts.unocha.org/appeals/overview/2017; https://interactive.unocha.org/publication/globalhumanitarianoverview/

45 ENN, 2018. Child wasting and stunting: Time to overcome the separation. A Briefing Note for policy makers and programme implementers.

46 Mansour, H. and Rees, D.I., 2011. Armed Conflict and Birth Weight: Evidence from the al-Aqsa Intifada. Journal of Development Economics, 99(1), pp. 190–199. Available at: www.sciencedirect.com/science/article/pii/S0304387811001209

47 ENN (Khara T., Dolan C. and Shoham J.) 2015. Stunting in protracted emergency contexts. What are the implications for humanitarian programming of responding to stunting in protracted emergency contexts, and what should we be doing about it? ENN, Oxford, UK.

48 FAO, International Fund for Agricultural Development, UNICEF, WFP and WHO, 2017. The State of Food Security and Nutrition in the World 2017. Building resilience for peace and food security. Rome, FAO.

49 Mates E., Shoham J., Khara T. and Dolan C., 2017. Stunting in humanitarian and protracted crises. ENN Discussion Paper.

50 Perone S.A., Martinez E., du Mortier S. et al. Non-communicable diseases in humanitarian settings: ten essential questions. Conflict and Health, 11:1, 2017.

51 Based on data for 148 countries from INFORM Index for Risk Management and UNICEF/World Health Organization (WHO)/World Bank Group: Joint child malnutrition estimates data.

52 UN High Commissioner for Refugees, Population Statistics database, 2018, Available at: http://popstats.unhcr.org/en/overview

53 Chaaban J., Ghattas H., Habib R.R. et al., 2010. Socio-Economic Survey of Palestinian Refugees in Lebanon. American University of Beirut and UNRWA.

54 UNRWA,2018. Annual Operational Report 2017. Available at: www.unrwa.org/resources/reports/annual-operational-report-2017

55 Chaaban J., Salti N., Ghattas H. et al, 2016. Survey on the Socioeconomic Status of Palestine Refugees in Lebanon: 2015. Report published by the American University of Beirut and UNRWA. Beirut: UNRWA.

56 UN High Commissioner for Refugees, Population Statistics database, 2018. Available at: http://popstats.unhcr.org/en/overview (accessed 4 October 2018).

57 WFP, UNICEF and UNHCR, 2014. Vulnerability Assessment of Syrian Refugees in Lebanon 2014. Available at: https://fscluster.org/sites/default/files/documents/VASyR%202014%20FINAL.pdf

58 WFP, UNICEF and UNHCR, 2017. Vulnerability Assessment of Syrian Refugees in Lebanon 2017.

59 WFP, UNICEF and UNHCR, 2017 (see note 58).

60 WHO, 2017. WHO Stepwise approach for non-communicable diseases risk factor surveillance.

61 WFP, UNICEF and UNHCR, 2017 (see note 58).

62 WFP, UNICEF and UNHCR, 2016. Vulnerability Assessment of Syrian Refugees in Lebanon 2016.

63 WHO and Ministry of Public Health Lebanon, WHO Stepwise approach for non-communicable diseases risk factor surveillance, Lebanon, 2016-2017.

64 Doocy S., Lyles E., Hanquart B. and Woodman M. Prevalence, care-seeking, and health service utilization for non-communicable diseases among Syrian refugees and host communities in Lebanon. Conflict and Health, 10:1, 2016, p. 21.

65 WFP, 2018. WFP Lebanon Country Brief.

66 Jamaluddine Z., Ghattas H., Choufani J., and Sahyoun N. (editors), 2017. The Healthy Kitchens, Healthy Children study; a community-based school nutrition intervention improves diet diversity in Palestinian refugee schoolchildren in Lebanon. Annals of Nutrition and Metabolism, 2017.

67 Ghattas H., Jamaluddine Z., Choufani J. and Btaiche R., 2017. A Community-Based Intervention Improves Economic, Social and Food Security Outcomes of Refugee Women-The Healthy Kitchens Experience. The FASEB Journal. 31: sup 1, 2017, 313.6.

68 Dolan C. and Shoham J, ENN Technical Director.

69 Development Initiatives, 2018 (see note 39). Long, medium or short-term classification is determined by the length of time the country has received an above-average share of its official development assistance in the form of humanitarian assistance: >8 years = long term, 3–7 years = medium term.

70 ENN, 2015. Nutrition and resilience: a scoping study. Available at: www.ennonline.net/attachments/2450/Resilience-report-final.pdf

71 European Commission. Building a resilience programme: Ten key lessons from the EU RESET programme in Ethiopia. Available at: https://europa.eu/capacity4dev/file/80100/download?token=6FwZeQZ8

72 Agenda for Humanity, 2016. Grand Bargain. Available at: www.agendaforhumanity.org/initiatives/3861 (accessed 19 September 2018).

73 Agenda for Humanity, 2016 (see note 72).

74 UN General Assembly, 2016. Outcome of the World Humanitarian Summit Report of the Secretary-General. Available at: https://reliefweb.int/sites/reliefweb.int/files/resources/A-71-353%20-%20SG%20Report%20on%20the%20Outcome%20of%20the%20WHS.pdf

75 Agenda for Humanity. Commitment to action: transcending humanitarian-development divides. Available at: www.agendaforhumanity.org/initiatives/3837 (accessed 30 September 2018).

76 Inter-Agency Standing Committee (IASC) is the primary mechanism for inter-agency coordination of humanitarian assistance.

77 Development Initiatives, 2018 (see note 39).

78 Development Initiatives based on OECD Development Assistance Committee (DAC). Includes only aid from DAC donors and multilateral donors.

79 Concern Worldwide, 2017. Evaluation Briefing Paper: Community Resilience to Acute Malnutrition Programme in Chad. Available at: https://doj19z5hov92o.cloudfront.net/sites/default/files/resource/2017/03/cram_evaluation_brief.pdf

80 Patton G.C., Sawyer S.M. and Santelli J.S. et al, 2016. Our future: A Lancet commission on adolescent health and well being. Lancet, 387:10036, 2016, pp. 2423–78.

81 Global Nutrition Summit, 2017. An agenda for action to close the gap on women's and girls' nutrition. UN Decade of Action on Nutrition 2016–2025. Available at: https://nutritionforgrowth.org/wp-content/uploads/2017/11/An-Agenda-For-Action-To-Close-The-Gap-On-Womens-And-Girls-Nutrition.pdf

82 USAID, 2018. Adolescent Nutrition call to action: Better Data Now to Drive Better Policies and Programs in the Future. Available at: www.spring-nutrition.org/about-us/news/adolescent-nutrition-call-action-better-data-now-drive-better-policies-and-programs

83 Text by Kamran Lassi Z. and Bhutta Z.A.

84 Prentice A.M., Ward K.A., Goldberg G.R. et al. Critical windows for nutritional interventions against stunting. Am J Clin Nutr, 97:5, 2016, pp. 911–8; Fink G., Rockers P.C, 2014. Childhood growth, schooling and cognitive development: Further evidence from the Young Lives Study. Am J Clin Nutr, 100, 2014, pp. 182–83; Turner T., Spruijt-Metz D., Wen C.F., Hingle M.D. Prevention and treatment of pediatric obesity using mobile and wireless technologies: a systematic review. Pediatr Obesity, 10:6, 2015, pp. 403–9.

85 UN Population Fund, 2013. The state of world population: Motherhood in childhood. Facing the challenge of adolescent pregnancy. New York: UN Population Fund.

86 Girls not Brides. Child marriage around the world. Available at: www.girlsnotbrides.org/where-does-it-happen

87 UNFPA, 2012. Marrying Too Young. Available at: www.unfpa.org/end-child-marriage

88 UN Population Fund, 2013 (see note 85).

89 Dean S.V., Lassi Z.S., Imam A.M., Bhutta Z.A. Preconception care: nutritional risks and interventions. Reprod Health, 11, 2014, p. S3.

90 Turner T., Spruijt-Metz D., Wen C.F., Hingle M.D. Prevention and treatment of pediatric obesity using mobile and wireless technologies: a systematic review. Pediatr Obesity, 10:6, 2015, pp. 403–409.

91 Young Lives, 2018. Early is best but it's not always too late: Young Lives evidence on nutrition and growth in Ethiopia, India, Peru and Vietnam. Available at: www.younglives.org.uk/content/early-best-its-not-always-too-late-young-lives-evidence-nutrition-and-growth-ethiopia-india

92 Norwegian Institute of Public Health. Our team. Available at: www.fhi.no/en/studies/co-create/our-team