

# Nourishing our future: the *Lancet* Series on adolescent nutrition



Adolescence is a time of phenomenal growth. During adolescence height velocity is second only to the first 2 years of life<sup>1,2</sup> and every physiological system is transformed.<sup>3</sup> Yet adolescent growth and nutrition have been overlooked in the UN Decade of Action on Nutrition (2016–25). The Sustainable Development Goals for nutrition include no adolescent-specific targets.<sup>4</sup> WHO's global action plan for the prevention and control of non-communicable diseases similarly had no clearly specified targets for overweight and obesity in older children or adolescents.<sup>5</sup> Donor investments in adolescent nutrition remain woefully inadequate.<sup>6</sup> Adolescent underweight and micronutrient deficiencies persist in many places as the world faces increases in adolescent overweight and obesity. From 1990 to 2016, the number of adolescents affected by overweight and obesity globally more than doubled to almost one in five while the absolute number of adolescents with anaemia increased by 20% to almost one in four.<sup>7</sup>

The *Lancet* Series on adolescent nutrition,<sup>8–10</sup> to which we contributed, challenges researchers, governments, and donors to take a broader view of adolescent nutrition and accelerate responses to rapid change in adolescent food environments. This Series builds on earlier efforts to highlight the importance and neglect of adolescent nutrition. The 2016 *Lancet* Commission on adolescent health and wellbeing noted an absence of data on nutritional needs and evidence on what policies, strategies, and interventions work.<sup>1</sup> A 2018 call to action for adolescent nutrition, from more than 100 organisations, underlined the need for better data on the food choices that adolescents make and the evidence to take healthy nutrition to scale.<sup>11</sup>

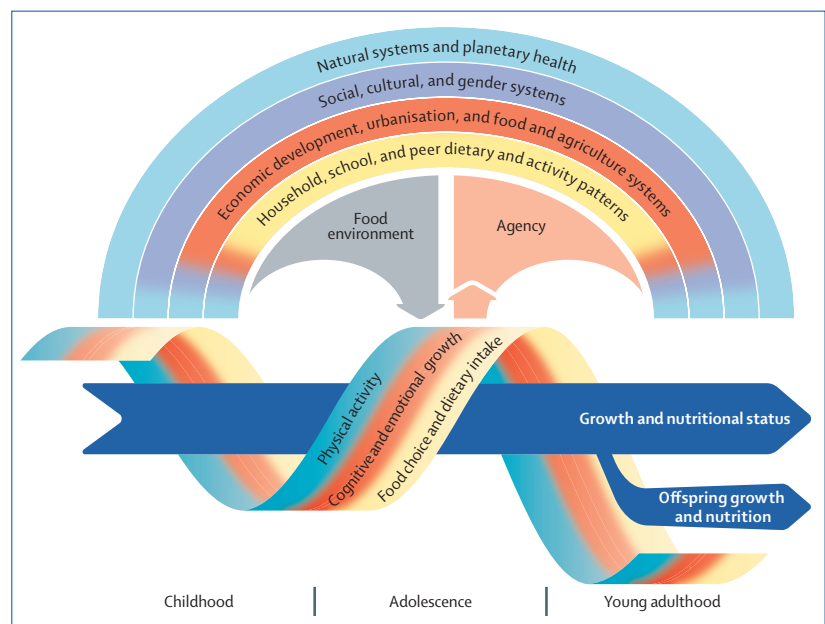
Now this new *Lancet* Series highlights continuing gaps in knowledge and effective programmes to support healthy adolescent growth, nutrition, and development. Although animal studies suggest potent nutritional effects on growth at stages after early life, there are few human studies on the effects of nutrition on adolescent growth and development.<sup>8</sup> Available studies have largely focused on a single physiological system in adolescent growth rather than the interconnections between physiological systems and an intergenerational

life-course approach.<sup>8</sup> A better understanding of how nutrition affects all aspects of growth during adolescence will be essential in responding to the changing food environments for children and adolescents.<sup>8</sup>

Adolescents differ from younger children in exercising greater choice over what and when they eat. The diversity and quality of available and affordable foods vary vastly across income groups and countries, affecting adolescent food choices.<sup>9</sup> Those choices change with economic development, urbanisation, and shifts in the food industry and agriculture. Increasingly, it is peer aspirations and social, cultural, and dietary norms, convenience, taste, and affordability that determine how food is marketed, and what adolescents prefer to eat.

The figure outlines the factors that shape adolescent food environments and the reciprocal relationships of influence with adolescents themselves. However, research on adolescent nutrition interventions and programmes has overwhelmingly emphasised single interventions,

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**Figure: A conceptual framework for adolescent growth and nutrition**  
Adolescence occupies a middle ground in human growth, affected by nutrition in earlier life but also setting trajectories for nutrition into later life and the next generation (blue arrows). The growth and maturation of physiological systems are affected by an adolescent's immediate food environment (grey arrow), shaping dietary intake and norms, physical activity, and body image preferences (multicoloured ribbon). The food environment is shaped by cultural, economic, commercial, and environmental ecosystems that extend down to the family and community settings in which adolescents are growing up. Conversely, adolescents have a growing agency (salmon arrow) to influence these ecosystems shaping their food environment.

such as weekly iron folic acid supplementation, rather than the many drivers of adolescent food choice and nutritional status.<sup>10</sup> Adolescent food environments and nutrition are affected by factors at multiple levels and across sectors, including agriculture, food processing, retail, and marketing, through to the settings where adolescents are growing up.<sup>12,13</sup> Effective adolescent nutrition programmes will differ across food environments, but in all places strategies will need to be intersectoral, taking action across educational settings, social protection programmes, health services, food retailers, and in local communities and domestic households.<sup>10,13,14</sup> As this Series underlines, the most effective national policies will coordinate actions beyond health and nutrition to engage education, food manufacturing and marketing, and agriculture, with an emphasis on adolescents facing the greatest socioeconomic disadvantage.<sup>9,10</sup> Adolescents also have views on the food they eat that extend beyond the immediate effects on their health and wellbeing. This generation, more than any before, have concerns about the harmful impacts of the food industry and agriculture on planetary ecosystems.<sup>15</sup>

Nutritional investments in the first 1000 days of life have reduced child mortality and early childhood stunting and wasting.<sup>7</sup> However, to end malnutrition in all its forms interventions and investments are needed in later childhood and adolescence. Such investments will benefit later adult health and, in turn, the early growth and development of the next generation.<sup>8,10</sup> Better national data systems are needed to bring greater visibility and understanding of adolescent food choices and their consequences. Together with stronger evidence on improving adolescent nutrition in rapidly shifting food environments, these data will be essential to inform and strengthen policy making.

The expansion of transnational food and beverage corporations into emerging markets is accelerating the nutrition transition for adolescents by promoting the availability, affordability, and attractiveness of high-calorie, ultra-processed foods. National and local manufacturers have followed suit so that such foods feature prominently in adolescents' diets worldwide.<sup>9</sup> Given their long shelf-life and low cost, and the disruptions to food supply chains during the COVID-19 pandemic, the consumption of high-calorie, ultra-processed foods is likely to increase further unless action is taken. Governments everywhere will need to adopt multiple and coordinated actions, including

taxation, front of packet labelling, and regulation of marketing, to reduce the consumption of products that are harmful to young people and the planet. The revenues generated from taxation might, for example, be used to provide access to healthy, affordable, and sustainable foods. Beyond government, multiple stakeholders, including the food industry, will need to take action to reverse the increased consumption of unhealthy, ultra-processed foods and help end adolescent malnutrition.<sup>16</sup> Despite calls for action, transnational food companies continue to influence and reframe national political debates on food regulation.<sup>16</sup> Social media allows direct marketing and influences community attitudes beyond national borders.<sup>17</sup> Given these increasingly transnational dimensions of the ultra-processed food industry, it is timely for WHO, the Food and Agriculture Organization of the UN, and their partners to revisit calls for global regulatory frameworks to assist governments in taking action.<sup>16,18</sup>

Given the speed of nutritional change, there is perhaps no greater immediate threat to the health of adolescents. Equally, tackling adolescent nutrition presents an unparalleled opportunity to interrupt intergenerational cycles of malnutrition and respond to the urgent challenges of planetary change. Young people themselves are demanding roles beyond being consumers. Many already participate in the production of food. A growing number of young people are activists who highlight the effects of agriculture and the food industry on planetary ecosystems. Through a channelling of their energy and creativity into social change movements, young people have the potential to unlock the political and policy paralysis around unhealthy food systems.<sup>19</sup> Adolescents will not only be beneficiaries but also the central actors in driving the transformative change needed to advance healthy, safe, and sustainable food systems and diets.

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## A new global policy framework for adolescent nutrition?

This new *Lancet* series on adolescent nutrition<sup>1–3</sup> sets out the challenges and opportunities for addressing healthy adolescent nutrition and development. Adolescence is a time when the multiple faces of malnutrition clearly materialise, as exemplified by overweight adolescents who were stunted children, or obese children with micronutrient deficiencies. This is also a time of extreme plasticity of the body and of changing lifestyles and norms when unhealthy behaviours can be adopted or instead virtuous circles of healthy behaviours can be established.

Yet this *Lancet* Series highlights insufficient attention to adolescent nutrition in global nutrition policy frameworks. The WHO Comprehensive Implementation Plan on Maternal, Infant, and Young Child Nutrition established the six World Health Assembly Global Nutrition targets and includes mention of the importance of a life-course approach to improving nutrition, with activities targeting older children and adolescents.<sup>4</sup> However, the focus of the plan has been on infants and young children up to the age of 5 years. The UN Decade of Action on Nutrition (2016–25) recognises that multiple sectors need to

be involved in action: education, food environment, health, and social protection. However, without specific adaptation for adolescents, the effectiveness of nutrition programmes and policies could be reduced.

We would agree that the approach has to be multisectoral. WHO's Global Accelerated Action for the Health of Adolescents (AA-HA!)<sup>5</sup> calls for actions to improve adolescent nutrition at the individual, community, and broad structural levels, and considers elements of food affordability and the availability of healthy diets, as well as information to empower decision making for healthy choices. This guidance has been the opportunity to involve other key international actors, such as UNICEF, UNESCO, UNFPA, UNAIDS, UN Women, and the World Bank. It also highlights the need to consider gender specific needs, such as the social norms affecting girls, the discrimination, violence, and abuse girls are often subject to, challenges in accessing education, and the occurrence of pregnancy and parenthood.

But is adolescent nutrition on the agenda of governments around the world? Here we provide an



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