

# HEIGHT & BMI TRAJECTORIES OF SCHOOL-AGED CHILDREN & ADOLESCENTS

## Featuring:

Andrea Rodriguez-Martinez, PhD

## TRANSCRIPT

**Maura Bowen:** When my 14-year-old son was much younger, he set his sights on a future career in professional basketball. He still has some growing to do, but he's built small and scrappy rather than lanky and long, so his pediatrician tried to level with him, comparing his measurements to the standard growth charts and estimating he'd be a man just a few inches shy of his six-foot father. He'll be tall, for sure, but not tall enough for the National Basketball Association or maybe even the high school team.

That's genetics, right? He can blame me for that.

But he's also a massively picky kid with food allergies. I suspect he'd be a bit taller if he could explore different food options and make healthier choices. Maybe a future with the New York Knicks isn't in the cards for my kid. But let's face it, growth is more than just genetics. There are a host of other factors that influence childhood growth and nutrition plays a key role in that.

I'm Maura Bowen podcasting for the Abbott Nutrition Health Institute Power of Nutrition podcast. I'm joined today by Dr. Andrea Rodriguez-Martinez who will discuss this topic exactly. Dr. Martinez and her team of researchers recently published an article in The Lancet called Height and Body-Mass Index Trajectories of School-aged Children and Adolescents from 1985 to 2019 in 200 Countries and Territories: A Pooled Analysis of 2,181 Population-based Studies with 65 Million Participants. Now, the title is a mouthful for a reason. It's full of remarkable data and Dr. Martinez is here to talk us through it today.

Dr. Martinez, welcome.

**Andrea Rodriguez-Martinez, PhD:** Hi, thank you very much for inviting me. I am really delighted to be here today.

**Maura Bowen:** First, I should note that Dr. Martinez is based in the UK so she's dialing in from the comfort of her office. I'm in the studio. Then secondly, Dr. Martinez, do you mind telling us a bit about your background and what you're doing now?

**Dr Martinez:** I am originally from Spain. After completing my undergrad studies in biotechnology, I moved to London to do a Ph.D. at Imperial College. I am currently a postdoctoral researcher in population health at Imperial as well. My current research focuses on investigating worldwide patterns in children and adolescent health and nutrition.

**Maura Bowen:** Wonderful. Thank you for sharing your background. I know until recently a large portion of the current research on global pediatric health and nutrition has focused on that period from preconception to five years of age, and few studies have investigated global trends in BMI or health for children five to 19 years old. Why do you think this is?

**Dr Martinez:** It's well established that the growth in the first five years of life is mostly determined by nutrition while growth after five years of age is determined by a much more complex interaction between genetics, nutrition, and environmental factors. Because of that, global health research on growth has almost entirely focused on the first five years of life with huge efforts in improving the nutritional status of young children.

**Maura Bowen:** What led your team to deeply investigate the current evidence on height and BMI trends for older children and teens around the world?

**Dr Martinez:** We were interested in studying growth during their school age and adolescence because increasing evidence from cohort studies is showing that this period represents a great window of opportunity for correcting nutritional deficits, as well as insufficient growth from early childhood. In other words, recent research is increasingly identifying that children's growth trajectories are not fully fixed by the first five years of life.

**Maura Bowen:** Interesting. Okay, thank you. Then, before we delve into your analysis, maybe let's level set for a moment. Height and body mass index, BMI, serve as proxy measures for the quality of nutrition and living environment during early life and childhood and adolescents. Can you speak to the interplay between height and body mass and nutrition quality and living environment as they relate to childhood growth?

**Dr Martinez:** Height and BMI are the main parameters used by pediatricians all over the world to assess the growth and health status of a child. In addition to that, both height and BMI are highly predictive of health outcomes throughout the entire life course. Just to give you some examples, having low height and excessively low BMI are both measures associated with increased morbidity and also mortality. On the other stream, having excessively high BMI is associated with increased risk of disability, as well as premature death in adulthood.

**Maura Bowen:** Thanks for taking a step back to explain that. Now, taking a step forward, can you tell us how you conducted your review?

**Dr Martinez:** Yes, of course. This study was undertaken in the context of the NCV Risk Collaboration, which is a worldwide network of over 1,000 collaborators providing timely data on major risk factors of cardiovascular disease. Thanks to this collaboration, we have been able to collect an unprecedented amount of data, including height and also BMI measurements of 65 million children from 193 different countries. Before, there have not been studies with this huge size. So it's really unique.

**Maura Bowen:** Right, it sounds unique. As you were preparing to conduct your study, what did you expect to find through your analysis?

**Dr Martinez:** This is a really good question. We were somehow expecting to see some kinds of heterogenous growth patterns, especially comparing high-income versus low-income countries. This is particularly the case for height, because we know that height is a very good proxy for the socioeconomic status of countries.

**Maura Bowen:** Great. Okay. Then, what realizations did you uncover?

**Dr Martinez:** Our study revealed that a school age children's height and weight vary enormously around the world. There is a 20-centimeters gap between the tallest and the shortest nation, which clearly indicates the lack of quality food during the school ages in certain countries.

**Maura Bowen:** A 20-centimeter gap. That's incredible. With that in mind, were you surprised by these findings in any way?

**Dr Martinez:** Observing such a gap within the shortest and the tallest countries was quite surprising, as you said, as it represents an eight-year growth gap for girls and a six-year growth gap for boys. This means for example, that a 19-year-old girl in Bangladesh is as tall as an 11-year-old girl in the Netherlands, which is the tallest country. In addition to this, it was also really surprising to see how much children have grown in emerging economies such as China or South Korea over the past 35 years, while in high-income Western countries, height has remained largely unchanged. It was really interesting to see such a contrast.

**Maura Bowen:** This is so interesting, and it begs a question: what did you think your analysis reveals about the need to focus on nutrition for school-aged children? For instance, why do some children grow at a healthy rate to age five in some countries, but then they don't continue to do so as they grow older? Then, what is the potential influence of nutrition when growth show signs of slowing?

**Dr Martinez:** A very interesting observation from our study is that in a number of middle-income countries, such as, for example, Chile, children have optimal growth at five years of age, but then during the school ages they fell behind so that by the time they are 19 years of age, they are considerably shorter than the median of the WHO reference. Finding that children in some countries grow healthily to age five years, but do not continue to do so during the school ages clearly reflects an imbalance within the investment made in the first five years of life and the investment made during school ages and adolescence in terms of nutritional health and growth.

**Maura Bowen:** With all this in mind, what nutrition strategies might parents consider to help their kids reach their full growth potential?

**Dr Martinez:** Adequate intake of both micronutrients and macronutrients during the school ages could certainly help reverting stunting from early childhood. In particular, interventions that improve the nutritional status of adolescent girls, a group which is particularly susceptible [to] under-nutrition could certainly help break intergenerational cycle of poor growth in low- and middle-income countries.

**Maura Bowen:** What measures can healthcare professionals encourage to ensure school-aged children and adolescents grow taller without excess weight?

**Dr Martinez:** If we look at the WHO recommendations, we can see that children should follow a diet rich in vegetables, fruits, proteins, as well as carbohydrates, and with limited intake of saturated fats, free sugars and lots of salt. Of course, balancing the energy intake, measuring calories with the energy expenditure. Our findings should motivate policies to increase the availability and of course reduce the cost of nutritious foods as this will help children grow taller without gaining excessive weight for their height. These initiatives could include, for example: food vouchers towards nutritious foods for low-income families; free healthy-school-meal programs, especially for those families that are under threat, for example, now during the COVID-19 pandemic. Also, regulatory policies that restrict their consumption of unhealthy foods; the provision of affordable, healthy housing, clean water and sanitation; as well as the provision of facilities for play and sports in the community, and also at the school.

**Maura Bowen:** This is fantastic information, Dr. Martinez. I really want to thank you for your time today and for helping us to build awareness for this important topic. We are so grateful you were able to share your insights. I think they're very important.

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