

Childhood nutritional status: ongoing surveillance is necessary

Adolfo J. Ariza^{a, b}, Helen J. Binns^{a, b}

^a Mary Ann and J. Milburn Smith Child Health Research Program, Children's Memorial Hospital, Chicago, IL, USA

^b Departments of Pediatrics, Feinberg School of Medicine, Northwestern University, Chicago, IL, USA

On June 25, 2004, ministers and representatives of member states of the European region of the World Health Organization (WHO) responsible for health and the environment, together with the WHO Regional Director for Europe, launched the "Children's Environment and Health Action Plan for Europe" [1]. This document notes that while "safe and balanced nutrition is still an unmet need for too many children", the prevalence of obesity and the risk of morbidity as a consequence of inactivity and an unhealthy diet are on the increase. The report recognises that research knowledge gaps, concerning e.g. prevalence of overweight, causal links and effective intervention strategies, will hamper efforts to address the problems. Further, it recognises the interrelationship of numerous factors affecting child health (e.g., poverty, lack of safe places to play, lack of clean and available water, unclean air and hazardous toxins), all of which may contribute to imbalance in child nutrition. Ministries are called upon to develop and implement child-specific action to address priority goals at the national, subnational and local levels.

Sweeping goals, such as those proposed for the children in the 52 countries of the European region, call for the deployment of major effort and resources if they are to be achieved. It is imperative that the programmes and policies implemented be accompanied by solid assessment of their effectiveness. To evaluate success in the realm of child nutrition will require nutritional surveillance through continuous monitoring of populations' nutritional status. Surveillance can be based on repeated surveys or on data from child health or growth-monitoring programmes [2]. Identification of populations and geographic areas at increased nutritional risk may help to formulate policy and promote local programmes designed to improve overall health. Regional and national evaluations, such as those published in the following pages regarding children in Turkey [3] and Switzerland [4], will provide important benchmarks against which to judge success.

To facilitate comparisons among populations, evaluations of nutritional status must use a common language. The paper of Zimmerman et al. [4] well demonstrates the variations in prevalence rates when different standards are applied in interpreting data. Fewer children fall into the overweight and obese categories when International Obesity Task Force (IOTF) definitions are applied than when applying reference values from the US Centers for Disease Control and Prevention. Programme evaluations must take this fact into account and apply locally relevant measurements. Öner et al. [3] chart the variability in 95th percentile body mass index (BMI) for Iran, Sweden, Turkey, US adolescents and the IOTF standard. While all the curves demonstrate increased BMI in the group aged 12–17 years, at any single age the span between the highest and lowest of the 95th percentile curves is approximately 8 kg/m² for girls and 6 kg/m² for boys. This is a wide difference. The curves do not define a "healthy" weight. Have we established the right cut-off points to define overweight and obesity? At what BMI do the health risks become important? Other indicators of child health, along with anthropometric measurements, need to be evaluated if these questions are to be answered.

Öner et al. [3] used an elegant sampling schema to obtain a representative sample of adolescents in Edirne, Turkey, a city with a population of 120,000. A high prevalence of underweight (11–14%), as defined by the US reference, was noted. This is reportedly similar to the prevalence of underweight in samples of children from Brazil, Russia and China. There is a marked difference between the prevalence of overweight in Edirne (approximately 2%) and that reported for Istanbul (approximately 10%) [5], with a population of approximately 12 million. Zimmerman et al. [4] provide representative data for Switzerland and report prevalence by regional and population clusters. Variations exist across all levels of analysis.

These findings highlight the need to gather and analyze representative data at national and local levels in order to develop programmes di-

rected at the nutritional needs of individual areas. Further, programmes targeted at reducing underweight must be capable of addressing overweight as well. A balance needs to be struck between alleviation of overweight and underweight, without pushing the weight pendulum too far in either direction. Care must be taken to avoid increasing the likelihood of overweight in areas where underweight is prevalent. Public health policies must improve the food supply (in food-insecure households) and provide health education which also addresses the promotion of healthy behaviour such as increased intake of fruit and vegetables and the incorporation of physical activity as part of a healthy lifestyle. US food supplement programmes established to fight under-nutrition may have contributed to the US obesity epidemic through their inability to provide healthy dietary choices (particularly fresh fruit and vegetables) and nutritional education [6]. It may also be helpful to examine differences in causal factors related to nutritional status in individual areas. Solutions will vary according to the needs found.

There is a need to examine nutritional status in younger children. What age of childhood is the most important focus for programmes directed at the prevention of underweight and obesity? Zimmerman et al. [4] and Öner et al. [3] have sampled children beginning at ages 6 and 12 respectively. In both studies worrying rates of underweight, overweight and obesity were reported even among the youngest children sampled. Patterns of nutritional status may already be firmly established by these ages. Factors such as age and timing of the second adiposity rebound have been shown to be strong predictors of future overweight and obesity [7, 8].

Because BMI tables are only used for children aged 2 years and over, the use of anthropometry for epidemiological assessment of the nutritional status of children under 2 may require different methods. Distributions of height-for-age and weight-for-height percentiles are most appropriate when describing the nutritional status of relatively well-nourished children, whereas in relatively undernourished populations comparison of height-for-age against weight-for-height is rec-

ommended [9]. In clinical settings the percent of ideal body weight for height-age is commonly used to classify nutritional status for very young children [10, 11]. These useful measures can be applied in performing the very important act of monitoring the nutritional status of children under 2. Health habits are learned early in childhood and interventions aimed at modifying health habits are more likely to succeed when implemented at an early age [12, 13]. Information on the nutritional status of preschool children can be used to develop programmes aimed at improving food availability and dietary and physical activity habits starting at young ages.

It has been reported that the use of various height-weight indices to assess body fat may result in discrepancies in the classification of nutritional status [14]. There is controversy as to whether increases in children's BMI reflect an increase in body fat rather than a large frame size or well-developed muscle mass [15–17]. Several reports support the use of BMI as a measure of adiposity in children and adolescents [17, 18]. By measuring body fat using skin fold thickness, Zimmerman et al. confirmed a highly significant relationship between BMI and percentage body fat [4]. However, in clinical settings it is important to obtain the BMI and also apply other measurements which may help to identify major contributors to increased BMI, such as large frame size or developed muscle mass leading to a larger than expected "healthy" BMI.

Ensuring that children grow up in safe and healthy environments is a worthy goal. Building on evaluations of child nutritional status in developing periodic national nutritional surveillance programmes will contribute substantially to the planning and evaluation processes required by such endeavours. We wish you well.

Correspondence:

Adolfo J. Ariza, MD

Children's Memorial Hospital, Box 157

2300 Children's Plaza

Chicago, IL 60614

USA

References

- 1 Fourth Ministerial Conference on Environment and Health. Children's Environment and Health Action Plan for Europe. June 23–25, 2004. Available at <http://www.euro.who.int/document/e83338.pdf>. Last accessed July 30, 2004.
- 2 World Health Organization. Global database on child growth and malnutrition. Program of Nutrition World Health Organization. Geneva, Switzerland, 1997.
- 3 Öner N, Vatansver Ü, Sari A, Ekuklu G, Güzel A, et al. Prevalence of underweight, overweight and obesity in Turkish adolescents. *Swiss Med Wkly* 2004;124:529–33.
- 4 Zimmermann MB, Gübeli C, Püntener C, Molinari L. Overweight and obesity in 6–12 year old children in Switzerland. *Swiss Med Wkly* 2004;124:523–8.
- 5 Neyzi O, Saner G, Alp H, et al. Relationships between body-weight in infancy and weight in later childhood and adolescence. In: Z. Laron, editor. *Pediatric and Adolescent Endocrinology*. Vol 1. Basel, Karger, 1976, 89–93.
- 6 Dillinger TL, Jett SC, Macri MJ, and Grivetti LE. Feast or famine? Supplemental food programs and their impacts on two American Indian communities in California. *Int J. Food Sci Nutr* 1999;50: 173–187.
- 7 Rolland-Cachera MF, Deheeger M, Bellisle F, Sempé M, Guiloud-Bataile M, Patois E. Adiposity rebound in children: A simple indicator for predicting obesity. *Am J. Clin Nutr* 1984;39: 129–135.

- 8 Whitaker RC, Pepe MS, Wright JA, Seidel KD, Dietz WH. Early adiposity rebound and risk of adult obesity. *Pediatrics* 1998;101(3): E5. Available at www.pediatrics.org/cgi/content/full/101/3/e5.
- 9 Waterlow JC, Buzina R, Keller JM, Nichaman NZ, Tanner JM. The presentation and use of height and weight data for comparing the nutritional status of groups of children under the age of 10 years. *Bull World Health Organ* 1977;55: 489-498.
- 10 Wright JA, Ashenburg CA, Whitaker RC. Comparison of methods to categorize undernutrition in children. *J. Pediatr* 1994;124: 944-946.
- 11 Williams CL, Camparo LA, Squilance M, Botella M. Management of childhood obesity in pediatric practice. *Ann NY Acad Sci* 1997;817: 225-240.
- 12 Cashdan E: A sensitive period for learning about food. *Hum Nat* 1994;5: 279-91
- 13 Davis K, Christoffel KK. Obesity in preschool and school-age children: treatment early and often may be best. *Arch Pediatr Adolesc Med* 1994;148: 1257-1261.
- 14 Sichieri R, Everhart JE, Hubbard VS. Relative weight classifications in the assessment of underweight and overweight in the United States. *Int J. Obes* 1992;16: 303-312.
- 15 Lohman TG. Skinfolts and body density and their relation to body fatness: a review. *Hum Biol* 1981;327: 181-225.
- 16 Franklin MF. Comparison of weight and height relation in boys from 4 countries. *Am J. Clin Nutr* 1999;70(suppl): 157S-62S.
- 17 Pietrobelli A, Faith MS, Allison DB, Gallagher D, Chiumello G, Heymsfield SB. Body mass index as a measure of adiposity among children and adolescents: A validation study. *J. Pediatr*. 1997;132: 204-209
- 18 Daniels SR, Khoury PR, Morrison JA. The utility of body mass index as a measure of body fatness in children and adolescents: differences by race, age and gender. *Pediatrics*.1997;99: 804-7

The many reasons why you should choose SMW to publish your research

What Swiss Medical Weekly has to offer:

- SMW's impact factor has been steadily rising, to the current 1.537
- Open access to the publication via the Internet, therefore wide audience and impact
- Rapid listing in Medline
- LinkOut-button from PubMed with link to the full text website <http://www.smw.ch> (direct link from each SMW record in PubMed)
- No-nonsense submission – you submit a single copy of your manuscript by e-mail attachment
- Peer review based on a broad spectrum of international academic referees
- Assistance of our professional statistician for every article with statistical analyses
- Fast peer review, by e-mail exchange with the referees
- Prompt decisions based on weekly conferences of the Editorial Board
- Prompt notification on the status of your manuscript by e-mail
- Professional English copy editing
- No page charges and attractive colour offprints at no extra cost

Editorial Board

Prof. Jean-Michel Dayer, Geneva
 Prof. Peter Gehr, Berne
 Prof. André P. Perruchoud, Basel
 Prof. Andreas Schaffner, Zurich
 (Editor in chief)
 Prof. Werner Straub, Berne
 Prof. Ludwig von Segesser, Lausanne

International Advisory Committee

Prof. K. E. Juhani Airaksinen, Turku, Finland
 Prof. Anthony Bayes de Luna, Barcelona, Spain
 Prof. Hubert E. Blum, Freiburg, Germany
 Prof. Walter E. Haefeli, Heidelberg, Germany
 Prof. Nino Kuenzli, Los Angeles, USA
 Prof. René Lutter, Amsterdam, The Netherlands
 Prof. Claude Martin, Marseille, France
 Prof. Josef Patsch, Innsbruck, Austria
 Prof. Luigi Tavazzi, Pavia, Italy

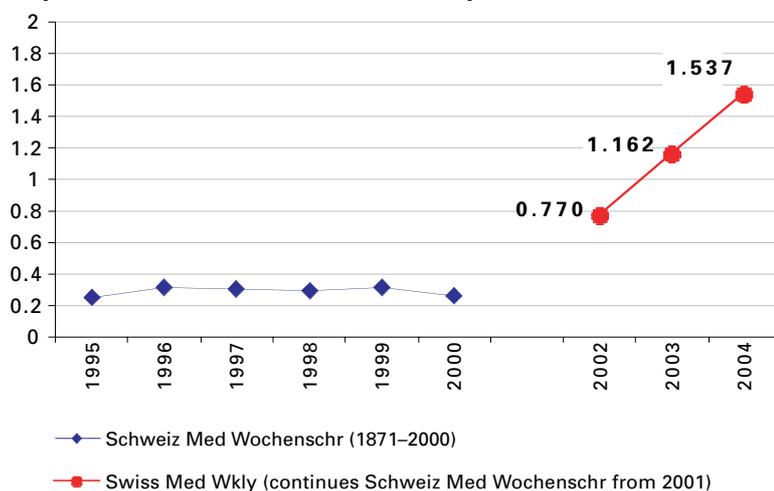
We evaluate manuscripts of broad clinical interest from all specialities, including experimental medicine and clinical investigation.

We look forward to receiving your paper!

Guidelines for authors:

http://www.smw.ch/set_authors.html

Impact factor Swiss Medical Weekly



All manuscripts should be sent in electronic form, to:

EMH Swiss Medical Publishers Ltd.
 SMW Editorial Secretariat
 Farnsburgerstrasse 8
 CH-4132 Muttenz

Manuscripts: submission@smw.ch
 Letters to the editor: letters@smw.ch
 Editorial Board: red@smw.ch
 Internet: <http://www.smw.ch>