

# Italian cross-sectional growth charts for height, weight and BMI (2 to 20 yr)

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**ABSTRACT.** The aim of this study is to extend to pre-school ages the Italian Society for Pediatric Endocrinology and Diabetes (SIEDP)-2002 growth charts for height, weight and body mass index (BMI), to obtain charts (SIEDP-2006) that apply to the Italian population from 2 to 20 yr of age, taken as a whole, or separately in two geographical areas (Central-North Italy and South Italy). The charts are based on a sample of about 70,000 subjects attending infant, primary and secondary schools, between 1994 and 2004. The distribution of the sample by gender, age and geographic area was roughly similar to that of Italian school population in the last decade of the 20<sup>th</sup> century. Height and weight were measured using portable Harpenden stadiometers and properly calibrated scales, respectively. SIEDP-2006 references are presented both as centiles and as LMS curves for the calcula-

tion of SD scores, and include the extra-centiles for overweight and obesity. Large differences in BMI growth pattern emerged between the SIEDP-2006, 2000 CDC and UK90 references: in Italy, BMI is higher and its distribution is more skewed during childhood and adolescence. At the end of growth, median values of the three references are similar, but the 97<sup>th</sup> centile of 2000 CDC charts is much higher and increases more steeply than that of SIEDP-2006 charts, which on the contrary reach a plateau. SIEDP-2006 references intend to supply pediatricians with a tool that avoids the use of charts that are outdated or that refer to other populations, and thus should be suitable for adequately monitoring the growth of their patients.

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## INTRODUCTION

In 2002, under the sponsorship of the Italian Society for Pediatric Endocrinology and Diabetes (SIEDP), Cacciari et al. (1) published the first Italian reference charts for height, weight and body mass index (BMI), traced on the basis of a sample of over 54,000 schoolchildren aged 6 to 20 and covering 16 of the 20 Italian regions. SIEDP charts were presented as a tool that would avoid pediatricians the use of charts which were outdated or

not based on Italian populations, and thus would be suitable for adequately monitoring the growth of their patients.

The use of SIEDP reference, however, was limited by three drawbacks: (1) they did not consider children aged under 6; (2) charts for Central-North and South Italy were given, but not charts for the whole of Italy that could apply to a child who had one parent from the North and the other from the South; (3) the thresholds for height defined as "mean -2 SD" and "mean -3 SD" were not given, these are among the criteria included in the consensus for the diagnosis and treatment of GH deficiency in childhood and adolescence (2).

To overcome the above drawbacks a new edition of SIEDP growth charts is here presented, which includes a further sample of about 14,000 infants aged 2 to 6 and attending kindergarten.

**Key-words:** Italian growth charts, height centiles, weight centiles, BMI centiles, overweight.

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