1. INTRODUCTION

Growth charts are an essential component of the paediatric toolkit. Their value resides in helping to determine the degree to which physiological needs for growth and development are met during the important childhood period. Beyond their usefulness in assessing children's nutritional status, many governmental and United Nations agencies rely on growth charts to measure the general well-being of populations, formulate health and related policies, and plan interventions and monitor their effectiveness.

The origin of the WHO Child Growth Standards dates back to the early 1990s when a group of experts was appointed to conduct a meticulous evaluation of the National Center for Health Statistics/World Health Organization (NCHS/WHO) growth reference that had been recommended for international use since the late 1970s (WHO, 1995). The limitations of the NCHS/WHO reference have been documented (WHO Working Group on Infant Growth, 1994; de Onis and Yip, 1996; de Onis and Habicht, 1996). The data used to construct the reference covering birth to three years of age came from a longitudinal study of children of European ancestry from a single community in the USA. These children were measured every three months, which is inadequate to describe the rapid and changing rate of growth in early infancy. Also, the statistical methods available at the time the NCHS/WHO growth curves were constructed were too limited to correctly model the pattern and variability of growth. As a result, the NCHS/WHO curves do not adequately represent early childhood growth.

The initial phase of the expert group's work documented the deficiencies of the reference and led to a plan for developing new growth charts that would show how children *should* grow in all countries rather than merely describing *how* they grew at a particular time and place. The experts underscored the importance of ensuring that the new growth charts were consistent with "best" health practices (Garza and de Onis, 2004).

A logical outcome of this plan was the WHO Multicentre Growth Reference Study (MGRS), which was implemented between 1997 and 2003 (de Onis et al., 2004a). The MGRS is unique in that it was purposely designed to produce a standard rather than a reference. Although standards and references both serve as a basis for comparison, each enables a different interpretation. Since a standard defines how children should grow, deviations from the pattern it describes are evidence of abnormal growth. A reference, on the other hand, does not provide as sound a basis for such value judgments, although in practice references often are mistakenly used as standards.

The MGRS data provide a solid foundation for developing a standard because they are based on healthy children living under conditions likely to favour achievement of their full genetic growth potential. Furthermore, the mothers of the children selected for the construction of the standards engaged in fundamental health-promoting practices, namely breastfeeding and not smoking (de Onis et al., 2004b).

A second feature of the study that makes it attractive as a basis for an internationally applicable standard is that it included children from a diverse set of countries: Brazil, Ghana, India, Norway, Oman and the USA. By selecting privileged, healthy populations the study reduced the impact of environmental variation. Assessment of differences in linear growth among the child populations of the MGRS shows a striking similarity among the six sites, with only about 3% of variability in length being due to differences among sites compared to 70% due to differences among individuals (WHO Multicentre Growth Reference Study Group, 2006a). Thus, excluding any site has little effect on the 3rd, 50th, and 97th percentile values, and pooling data from all sites is entirely justified. The remarkable similarity in growth during early childhood across human populations is consistent with genomic comparisons among diverse continental groups reporting a high degree of inter-population homogeneity (Rosenberg, 2002; King and Motulsky, 2002; Jorde and Wooding, 2004). Nevertheless, the MGRS sample has considerable built-in ethnic or genetic variability in addition to cultural variation in how children are nurtured, which further strengthens the standards' universal applicability.

A key characteristic of the new standards is that they explicitly identify breastfeeding as the biological norm and establish the breastfed child as the normative model for growth and development (WHO Multicentre Growth Reference Study Group, 2006b). Another distinguishing feature of the new standards is that they include windows of achievement for six gross motor developmental milestones which are presented elsewhere (WHO Multicentre Growth Reference Study Group, 2006c). Although WHO in the past issued recommendations concerning attained physical growth, it had not previously made any recommendations for assessing motor development.

This report presents the first set of WHO Child Growth Standards and describes the methods used to construct the standards for length/height-for-age, weight-for-age, weight-for length, weight-for-height and BMI-for-age. It also compares the new standards with the NCHS/WHO growth reference (WHO, 1983) and the 2000 CDC growth charts (Kuczmarski, 2002). Electronic copies of the WHO growth charts and tables together with tools developed to facilitate their use are available on the Web: **www.who.int/childgrowth/en.**