

Growth curves for achondroplasia height, weight, BMI and head circumference

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Conclusion

Sex- and age-specific curves for height, weight, body mass index and head circumference were constructed in a format that is useful for clinical practice.

These can therefore support the clinical work when following children with achondroplasia.

Introduction

Close monitoring of growth is vital when following children with achondroplasia, yet existing growth references are illustrated in a rather simple format and their clinical usability is therefore not optimal.

Aim

The aim of this study was to construct age-specific growth curves for height, weight, body mass index and head circumference in a format that makes it easy to follow growth development of the individual.

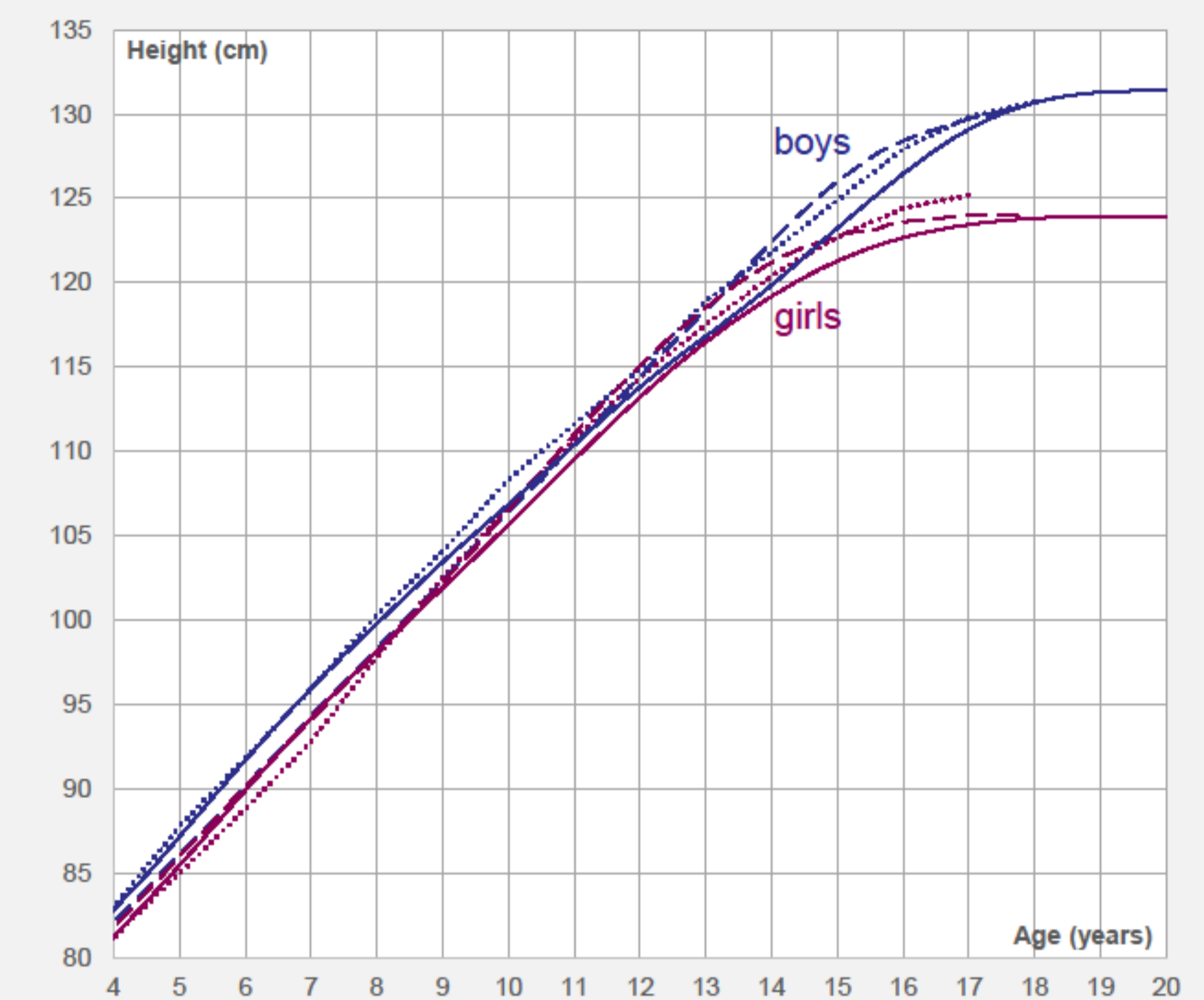
Method

A combination of longitudinal and cross-sectional measurements were collected from about 500 children and adolescents with achondroplasia aged 0 to 20 years. Average number of height measurements per age group was 37 (total n= 3902). Standard deviation curves were estimated using the Generalized Additive Models for Location, Scale and Shape (GAMLSS).

Results

Retrieved averages for the four variables were similar to existing growth references by e.g. Horton et al. and Hoover-Fong et al. To better summarize growth development during the first 4 years of age, the curves for head circumference, length/height and weight were combined on the same page using logarithms for all axes. For 4 to 20 years, a linear age axis was chosen. For the BMI-curve, 0 to 20 years, linear age axis and logarithmic BMI-axis gave the best clinical usability.

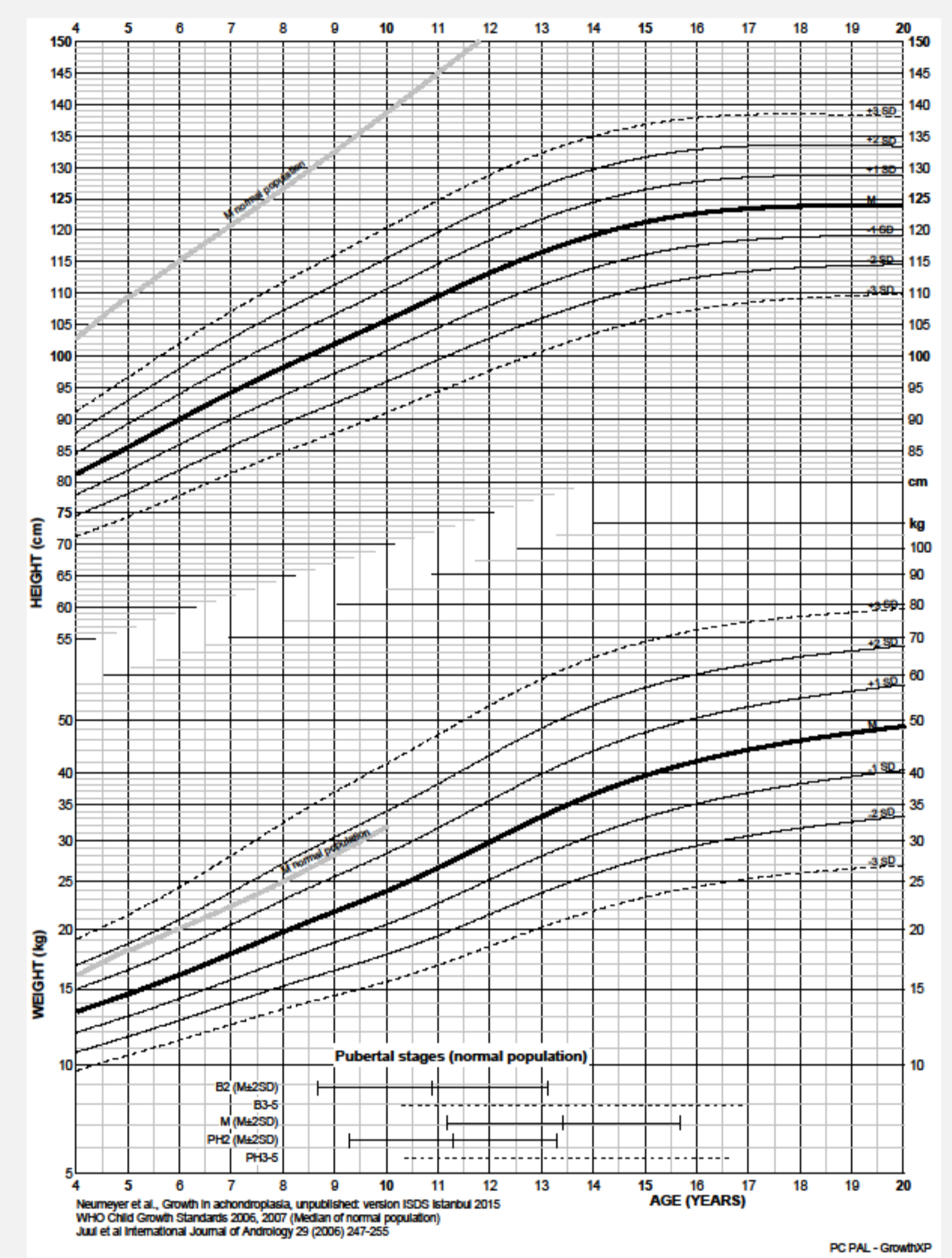
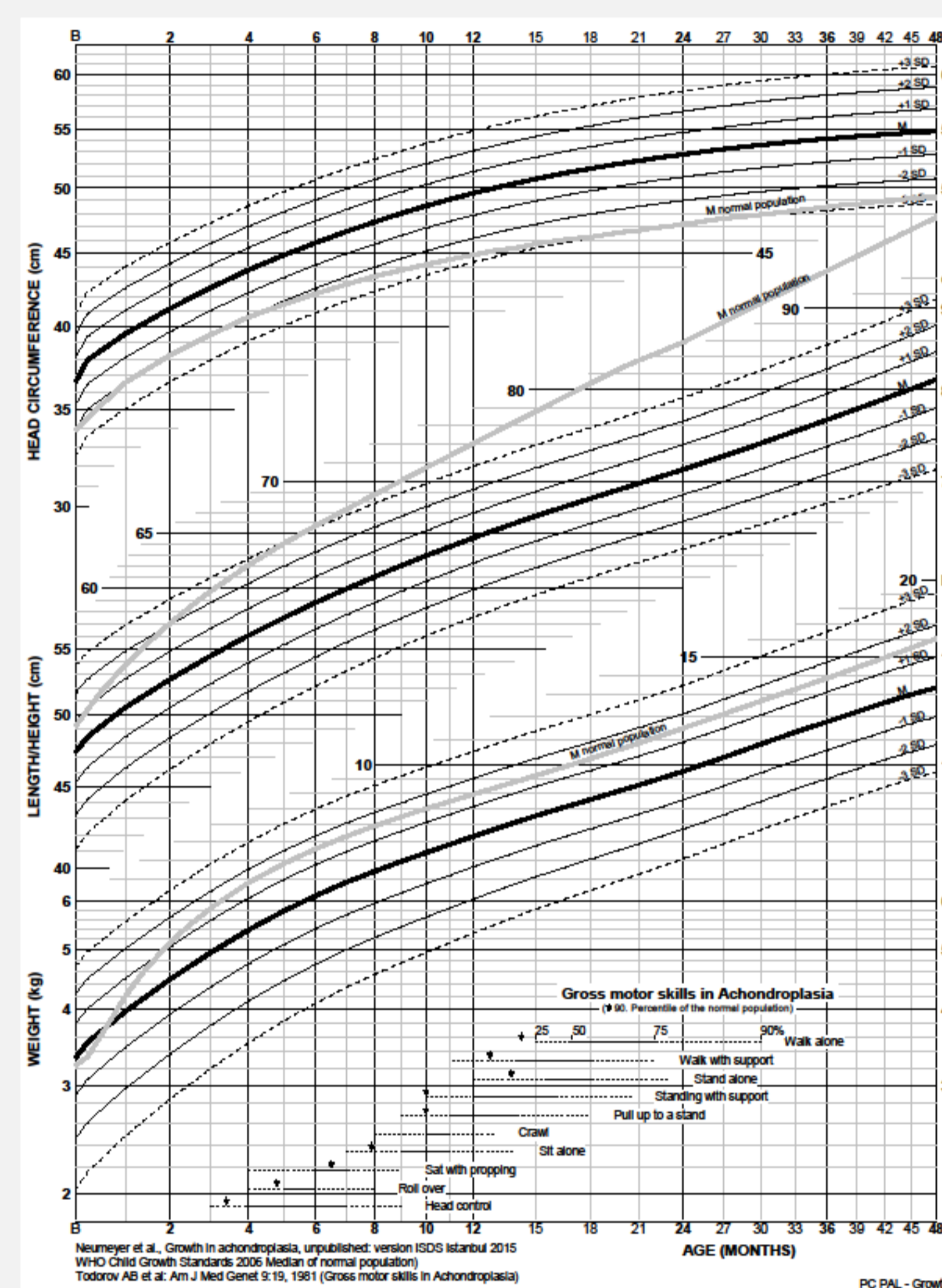
Height for age, 4 to 20 years mean in this study compared to Horton et al. (dotted)* and Tachibana et al. (cross-hatched)



Adult height (cm) in achondroplasia

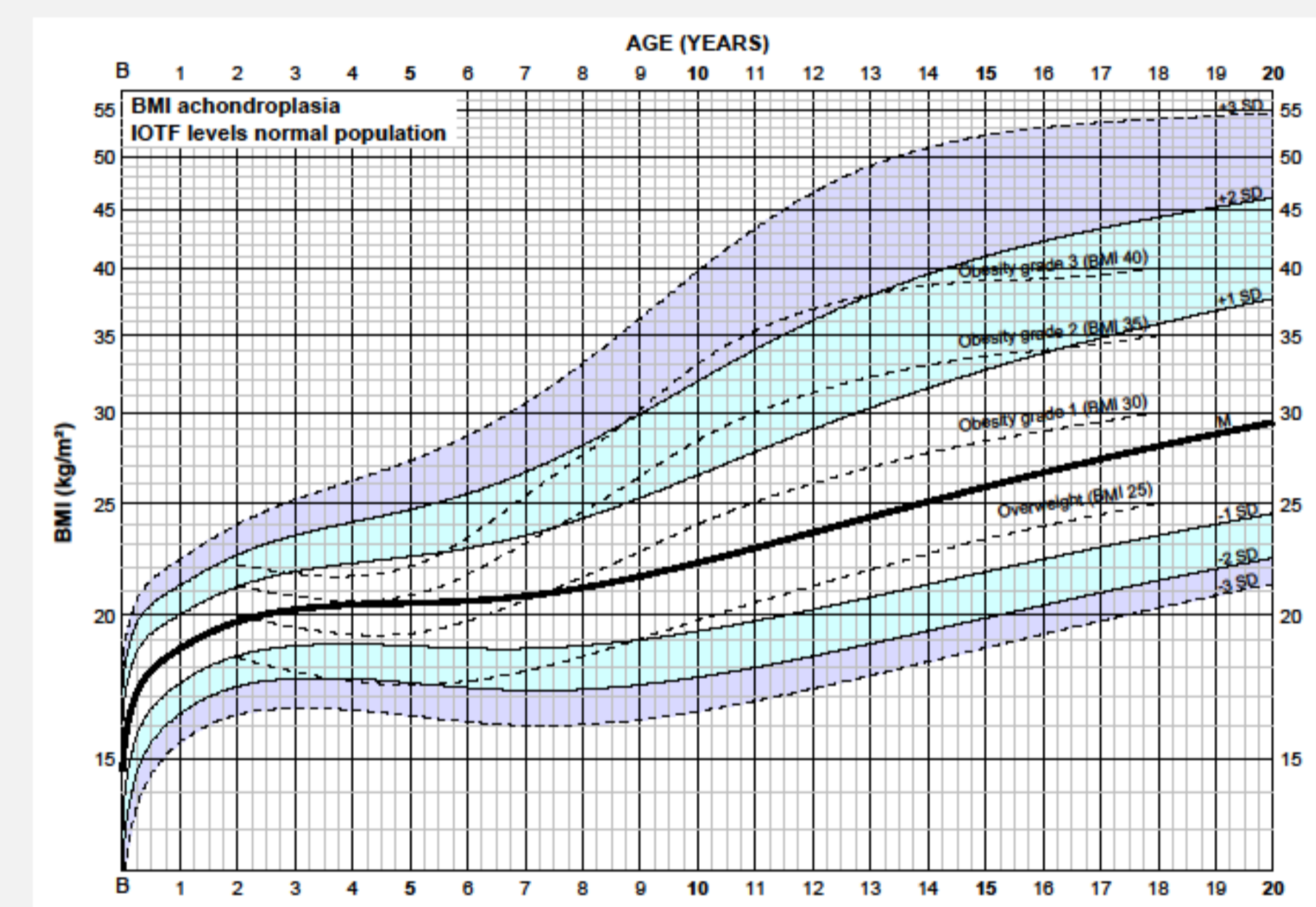
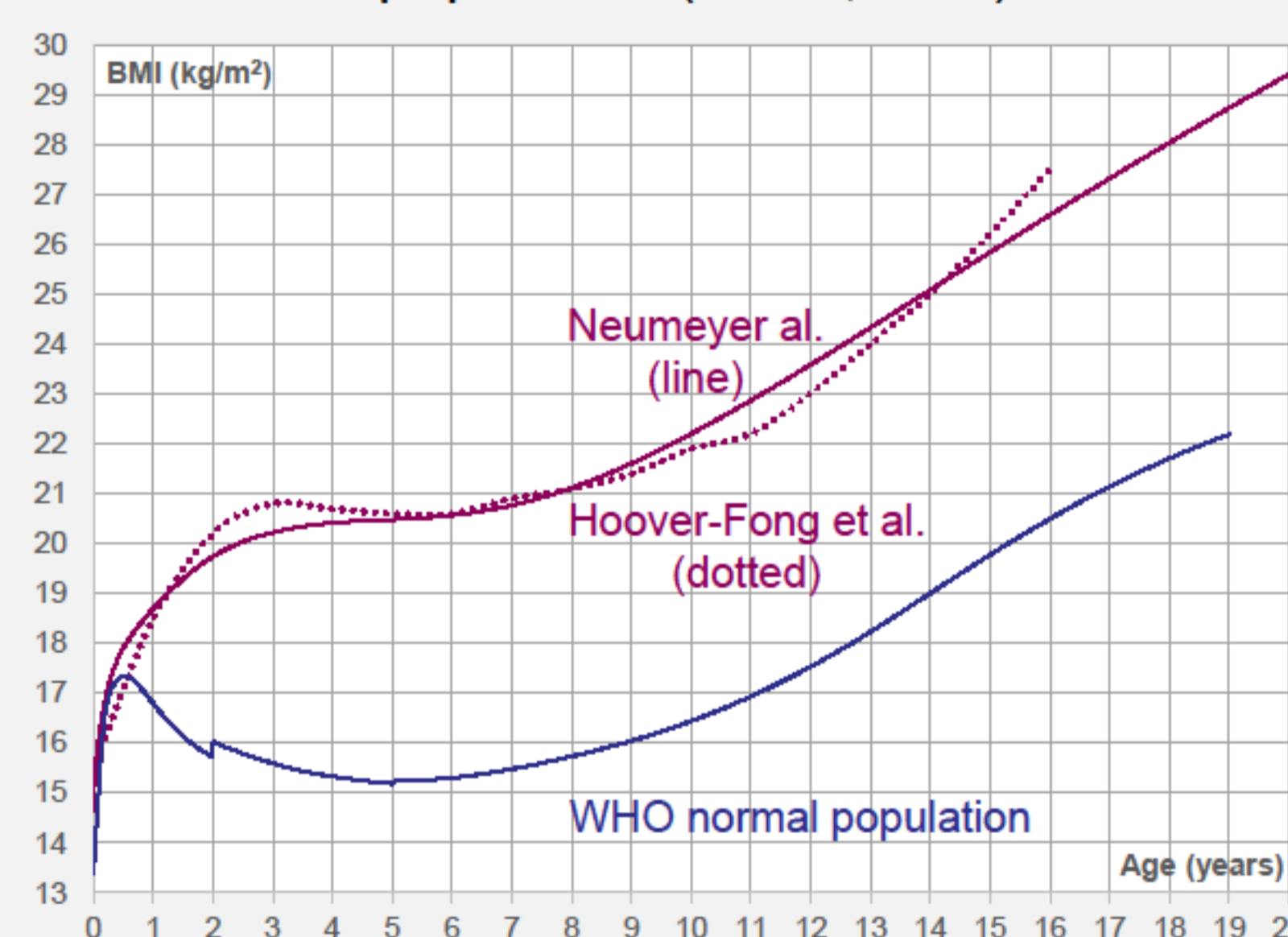
	♂	♀	Δ
this study (Neumeyer et al.)	132 cm	124 cm	8 cm
Horton et al., 1978*	131 cm	125 cm	6 cm
Tachibana et al., 1997	130 cm	124 cm	6 cm
del Pino et al., 2011	128 cm	120 cm	8 cm

Growth chart, 0 to 48 months, ♀ head circumference, length/height & weight



Growth chart, 4 to 20 years, ♀ height & weight

Median BMI for age, 0 to 20 years, ♂ this study (Neumeyer et al.) compared to Hoover-Fong et al. (dotted)* and to normal population (WHO, blue)



Growth chart for BMI, 0 to 20 years, ♂ including International Obesity Task Force (IOTF) levels of normal population

* Read from published figures

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