Calculation Methods and Tool Limitations

General Limitations

NuTrack™ is intended for healthcare professionals.

The Nutropin NuTrack growth assessment tool is intended for U.S. healthcare professionals (HCPs) only.

• This tool is intended for use with pediatric patients.

• The correct referenced data table is selected based on the patient's age and method of measurement (selected by the user in the initial inputs).

  • If the patient is 0 - 36 months and was measured lying down, the user should select LENGTH.

  • If the patient is 24 – 36 months of age and was measured standing up, the user should select HEIGHT

  • Otherwise, data for 2 to 20 years is based on patient measured standing.

• The formula for estimated Glomerular Filtration Rate (eGFR), developed in a specific cohort of patients (> 1 year of age), is an approximation of true GFR in a specific subject.

• Bayley-Pinneau height prediction is only available for girls with a bone age of 7 years or older and boys with a bone age of 6 years or older.

• This application is for educational purposes only. It is not intended to replace the clinical judgment of HCPs. All HCPs should apply their professional judgment to determine appropriate course of care for all patients.

Conversions

lbs → kg   (weight in lbs) / 2.2 = (weight in kg)

in → cm   (height in in) x 2.54 = (height in cm)

Reference: Babler EK, Betts KJ, Courtney JA, et al. Clinical handbook of pediatric endocrinology. 2nd ed. St. Louis, MO: Quality Medical Publishing, Inc.; 2013:425-431.

Target Height

Target Height = Mid-Parental Height +/- 10 cm. 10 cm represents a 2-SD (standard deviation) range to determine the upper and lower limits of the target height range.

Male
• Mid-Parental Height = [(Mother's Height + 13 cm) + Father's Height] / 2

• Target Height Upper Limit = Mid-Parental Height + 10 cm• Target Height Lower Limit = Mid-Parental Height - 10 cm

Female
• Mid-Parental Height = [(Father's Height - 13 cm) + Mother's Height] / 2

• Target Height Upper Limit = Mid-Parental Height + 10 cm• Target Height Lower Limit = Mid-Parental Height - 10 cm

Reference: Lifshitz F (Ed.). Pediatric endocrinology, volume 2. 5th ed. New York: Marcel Dekker; 2007:6.

Height Standard Deviation

Z Score calculation is based on the **Stature for Age (STATAGE)** or the **Length for Age for Infants (LENGTHAGEINF)** data tables provided by the Centers for Disease Control and Prevention (CDC).

$$Z = \frac{([X/M]^L) - 1}{(L)(S)}$$

Reference: Centers for Disease Control and Prevention, National Center for Health Statistics. "Percent Data Files with LMS Values." www.cdc.gov/growthcharts/percentile_data_files.htm. Page updated August 2009, viewed February 2014.

Height Percentile

Height percentile is determined via a table lookup value given patient sex, age, and height. The table uses CDC data for 3, 5, 10, 25, 50, 75, 90, 95, and 97 percentiles; data points in-between are interpolated.

Reference: Centers for Disease Control and Prevention, National Center for Health Statistics. "Percent Data Files with LMS Values." www.cdc.gov/growthcharts/percentile_data_files.htm. Page updated August 2009, viewed February 2014.

Weight Standard Deviation

Z Score is determined based on the **Weight for Age (WTAGE)** or **Weight for Age for Infants (WTAGEINF)** data tables provided by the CDC.

$$Z = \frac{([X/M]^L) - 1}{(L)(S)}$$

Reference: Centers for Disease Control and Prevention, National Center for Health Statistics. "Percent Data Files with LMS Values." www.cdc.gov/growthcharts/percentile_data_files.htm. Page updated August 2009, viewed February 2014.

Weight Percentile

Weight percentile is determined via a table lookup value given patient sex, age, and weight. The table uses CDC data for 3, 5, 10, 25, 50, 75, 90, 95, and 97 percentiles; data points in-between are interpolated.

Reference: Centers for Disease Control and Prevention, National Center for Health Statistics. "Percent Data Files with LMS Values." www.cdc.gov/growthcharts/percentile_data_files.htm. Page updated August 2009, viewed February 2014.

Growth Velocity

$$\text{Growth Velocity (cm/yr)} = \frac{\text{Height in cm measured at time \#2} - \text{Height in cm measured at time \#1}}{\text{Number of months between time \#2 and time \#1}} \times 12 \text{ (months per year)}$$

Reference: Lifshitz, F (Ed.). Pediatric endocrinology, volume 2. 5th ed. New York: Marcel Dekker; 2007:1.

Body Mass Index (BMI)

$$\frac{\text{(Weight in kg)}}{\text{Height in cm} \div 100)^2}$$

Output: xx kg/m^2 (round to the nearest whole number)

Reference: Babler EK, Betts KJ, Courtney JA, et al. Clinical Handbook of Pediatric Endocrinology. 2nd Ed. St. Louis, MO: Quality Medical Publishing, Inc; 2013: 425-43

Estimated Glomerular Filtration Rate (eGFR)

The formula for eGFR, developed in a specific cohort of patients (> 1 year of age) is an approximation of true GFR in a specific subject.

$$eGFR = 0.413 \times \frac{\text{(Height in cm)}}{\text{Serum Creatinine (mg/dL)}}$$

Reference: Schwartz G, Munoz A, Schneider M, et al. New Equations to Estimate GFR in Children with CKD. Journal of the American Society of Nephrology. 2009; 20: 629-637.

Bayley-Pinneau Height Prediction

In order to calculate the Bayley-Pinneau Height Prediction, patients must have a bone age of 7 years and older for girls, or 6 years and older for boys.

Bayley-Pinneau value is determined by patient's bone age, current height based on the patient's gender and table lookup as follows:

• Retarded = bone age more than one year younger than the patient's chronological age

• Average = bone age within one year on either side of the patient's chronological age

• Accelerated = bone age more than one year older than the patient's chronological age

Reference: *Bayley N, Pinneau S. Tables for predicting adult height from skeletal age: revised for use with the Greulich-Pyle hand standards.* J Pediatr. *1952:40:423-441.*

Contact Us

Should you have any questions concerning calculation methods or the operation of the NuTrack growth assessment tool, please contact Genentech via email.