

GrowthXP

Enhanced Growth Charting

Full Electronic Health Record Integration

“The extensive catalogue of growth curves leaves nothing to be desired.”

Paediatrician



PC PAL 

The Problem with Basic EHR Growth Charts...

Most current Electronic Health Record systems don't allow you to view different measurements all on a single page, such as:

- ◆ Height
- ◆ Weight
- ◆ Bone Age
- ◆ Parental Heights
- ◆ Target Height
- ◆ Puberty Stages
- ◆ Prematurity Correction

This lack of ability to combine data into a single comprehensive overview can make it more difficult to detect growth anomalies or underlying disorders.



“Although the adoption of EHRs has increased, 80% of pediatricians are working with EHRs that lack optimal functionality ...”

The Journal of Pediatrics ¹

Introducing GrowthXP

A comprehensive growth, analysis and decision support system with advanced features:

- ✓ Reading patient data directly from the patient's health record
- ✓ Tight integration into the EHR
- ✓ Providing reference charts for dozens of auxological parameters
- ✓ Displaying multiple parameters in the same chart
- ✓ Accurate, proportional representation of national growth charts
- ✓ Real-time calculation of percentiles and standard deviation scores, growth velocities, BMI, target height, and corrected age for prematures
- ✓ Automatic adult height predictions based on bone age
- ✓ Charts and reports easily exportable to PDF, PNG and JPEG formats for inclusion in reports, billing, and other forms of communication
- ✓ Improving clinic management, and enhancing decision making support
- ✓ Optional module with over 50 disease-specific growth charts overlaid on population references
- ✓ Interactive zoom functionality and informative display tooltips

“Where has this been all my life?”

Nutritionist, Vermont Dept. of Health Nutrition Program

“Amazing, beautifully done software.”

Pediatrician

Common Needs Addressed...

THE ISSUE: DOWN SYNDROME

You're following a child with Down Syndrome and are plotting her height on a standard growth curve. Children with Down Syndrome grow slower than other children, and hypothyroidism, a common problem, will slow growth velocity even further, but it is difficult to detect this on standard growth charts.



THE SOLUTION

GrowthXP provides Down Syndrome-specific growth charts and can overlay them on the standard reference growth curve. GrowthXP also contains disease-specific growth curves for Turner Syndrome and Achondroplasia.² An optional Rare Disease Module provides charts for over 50 conditions.



“The American Academy of Pediatrics has recommended that EHR systems incorporate syndrome-specific growth charts where feasible.”

American Journal of Medical Genetics³

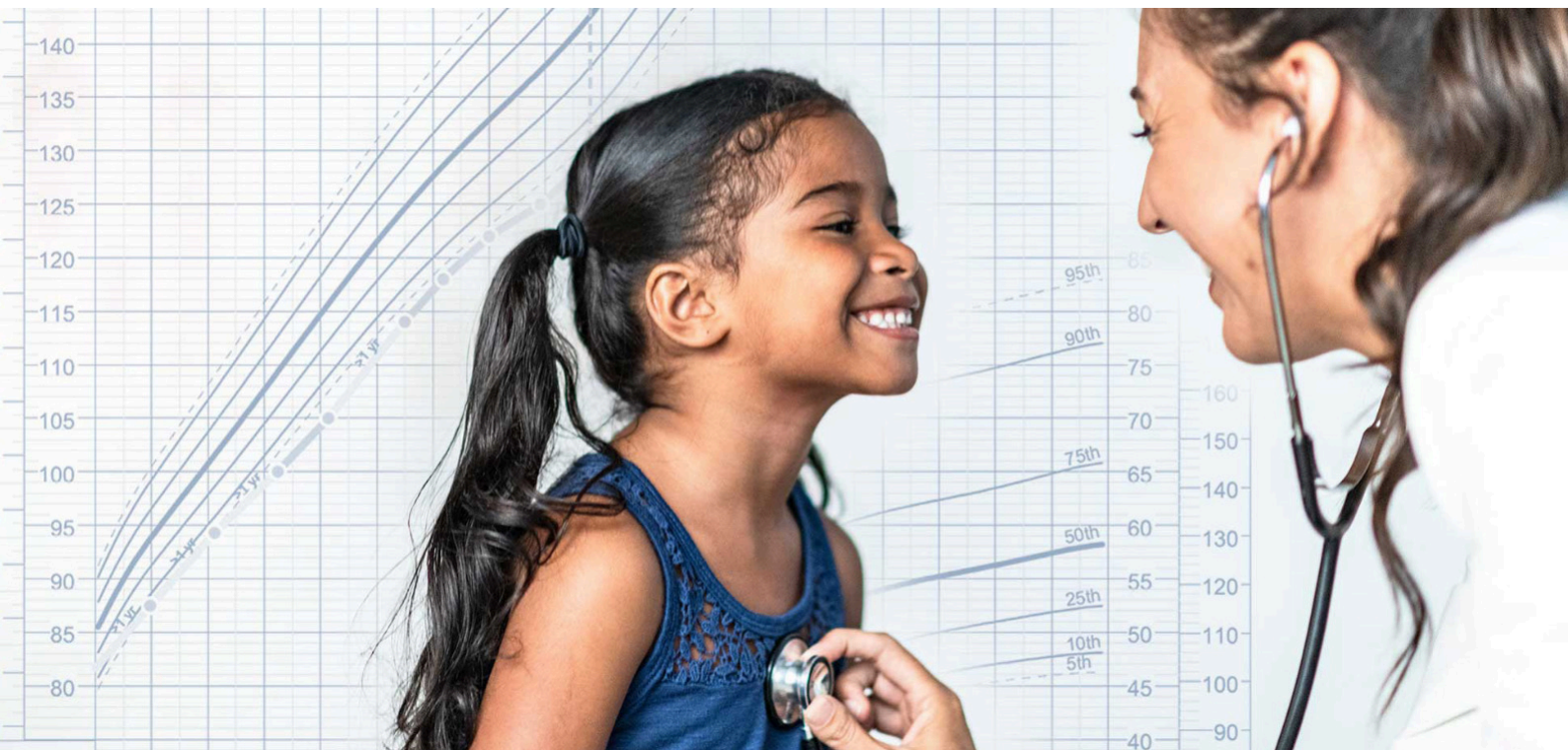
THE ISSUE: 1st GENERATION IMMIGRANT

You're seeing a child with a height well below the third centile on the CDC chart whose parents are from India and are now living in the United States and you are trying to determine if a child's height is appropriate compared to the parents' height.



THE SOLUTION

GrowthXP automatically calculates the target height and target range for the child using the parental height data and displays it on the height curve, and will also calculate the difference between the current SD position and the target height SDS.



"GrowthXP is an excellent application, I use it regularly in my clinic."

Consultant Pediatrician and Clinical Lead for Pediatric Diabetes

Common Needs Addressed...

THE ISSUE: MILD DISPROPORTION

Some short children have a mild genetic problem affecting the growth plates of the long bones in the legs. This can easily go unnoticed clinically, but it will become evident when you measure the standing height and sitting height and analyze the body proportions.



THE SOLUTION

Evaluate sitting height in relation to total height on appropriate growth charts. GrowthXP contains the 2020 US reference charts for sitting height, leg length and sitting height/height for different ethnic groups.⁺



“The features of GrowthXP cover many needs that users don’t even know they have and is yet easy to use.”

Pediatrician, Karolinska Institute Stockholm

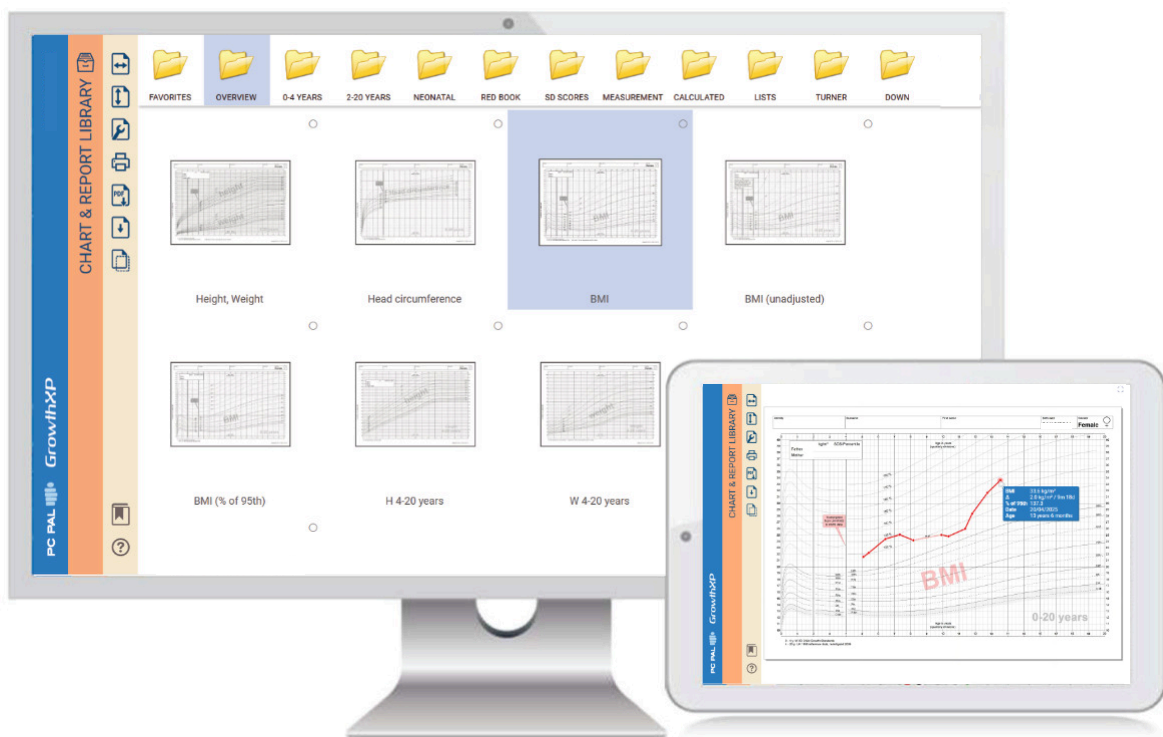
THE ISSUE: MONITORING SEVERE OBESITY

Curves in the BMI charts commonly used to monitor severely obese children and adolescents have not offered sufficient discrimination between even large changes in BMI.



THE SOLUTION

GrowthXP provides BMI charts based on either percentiles or SD scores that offer sufficient separation between curves even at higher BMI values. These charts support more precise tracking of obesity disease change and responses to weight management interventions



“Parents really appreciate the nice printouts”

Head of Paediatric Clinic, Odense University Hospital

Communicating with Parents...

A study of 1,000 American parents found that most of those who thought they understood growth charts actually had trouble interpreting them.⁵

The study, published in the journal *Pediatrics*, found that 79% of the parents surveyed said they were familiar with growth charts, and yet only:

64% could identify a child's weight when shown a plotted point on a growth chart,

68% could identify the percentile of the plotted point, and

23% correctly interpreted charts containing height/weight measurements in tandem.

Charts and reports in GrowthXP provide comprehensive information for better conversations with parents and patients alike.

“A very important tool.”

Paediatrician, University Hospital,
Rouen



GrowthXP

Rare Disease Module

An Extensive Collection of Growth Charts For Over 50 Rare Diseases

In addition to normal population standards, currently GrowthXP contains charts to track the growth of children with achondroplasia and selected syndromes, Turner and Down. By licensing the new rare diseases module, **users can have access to growth charts for over 50 rare disorders in a consistent digital format.**

Until now charts for conditions including Noonan, Prader-Willi, Silver Russel, Kabuki, were only available in paper form in the original publication, and in a variety of sizes, formats and graphic presentations restricting access for routine clinical practice. At the same time, health-care providers are demanding growth charts in digital format and integrated with the patient health record.

Using the latest technology, PC PAL has rendered published growth curves for over 50 disorders into a consistent digital format. For these conditions, references can be selected for height, weight, BMI and other parameters.

ACCURATELY TRACKING THE GROWTH OF A CHILD WITH A SPECIFIC DISEASE ON THE APPROPRIATE CHART CAN:

- ✓ Provide parents with a growth chart based on references for their child's rare condition
- ✓ Highlight deviation from the growth curve not explained by the underlying condition
- ✓ Support treatment decisions and authorization
- ✓ Monitor treatment or other intervention effects

The GrowthXP Rare Disease Module is available as an add-on for GrowthXP. Contact us to obtain a quote.

Comprehensive Technical Features...

◆ CHART GROUPS/CHARTS

- 1) Individual:** Length 0-2 years (WHO), Weight 0-2 years (WHO), Head circumference 0-2 years (WHO), Weight for length 0-2 years (WHO), Stature 2-20 years, Weight 2-20 years, BMI 2-20 years
- 2) Clinical:** Length and weight 0-2 years (WHO), Head circumference and weight for length 0-2 years (WHO), Weight and Stature 2-20 years, Weight for stature, BMI 2-20 years, BMI 2-20 years (extended), BMI 2-20 years (% above the 95th)
- 3) 0-36 months:** Length 0-3 years, Weight 0-3 years, Head circumference 0-3 years, Weight for length 0-3 years, Length and weight 0-3 years (WIC), Head circ. and weight for length 0-3 years (WIC), Length and weight 0-3 years, Head circ. and weight for length 0-3 years
- 4) Measurement:** Height, Weight, Head circ., Sitting height, Arm span, Foot length, Waist circ.
- 5) Calculated:** Leg length, Height velocity, Sitting height velocity, Leg length velocity, Rel. sitting height, BMI, IOTF BMI
- 6) SDScores:** Height SDS and BMI SDS, Height SDS and Relative Sitting Height % SDS, BMI SDS and Waist SDS, Height SDS and Height Velocity SDS
- 7) Lists:** Visit list, Visit list (SDS or Percentile), Corrected age list (SDS or Perc), Bone age list, Predicted Adult Height list, Calculated list, Complete patient data extract list
- 8) Premature/Neonatal:** 22-44 weeks, 22-52 weeks, Birth summary report, Bilirubin
- 9) Turner syndrome:** Height and weight 0-2 years, Height and weight 2-5 years, Height and weight 2-20 years, Weight for length 0-2 years, BMI 0-18 years, Height velocity 0-18 years
- 10) Down syndrome:** Height and weight 0-2 years, Height and weight 2-5 years, Height and weight 2-20 years, Head circ. 0-5 years
- 11) Achondroplasia:** Length/height, weight and head circ 0-48 months, Height and weight 4-20 years, BMI and Waist circumference 0-20 years, Sitting height and height/height ratio 2-20 years, Arm span and leg length 2-20 years, Head circumference and foot length 0-20 years

◆ CALCULATIONS

- 1) Relation to statistical dispersion:** Percentile and Standard deviation score for every variable
- 2) Age:** Chronological age, Gestational corrected age
- 3) Basic:** BMI, Leg length, Relative sitting height, Weight for height %, Age for height, Body Surface Area, Arm span/Height ratio, Sitting height/Leg length ratio
- 4) Target height:** Target height, Target height SDS and percentile, Target height range, Height SDS corrected for target height
- 5) Velocity:** Delta (any variable), Height velocity, Sitting height velocity, Leg length velocity
- 6) Adult height predictions:** BoneExpert, Bayley-Pinneau, TW2, TW3, including SDS and percentiles as well as confidence intervals

◆ MEASUREMENTS / DATA SUPPORTED

Medical Record Number, First name, Surname, Birth Date, Gender, Visit Date, Height, Weight, Height measure type, Sitting height, Head circumference, Arm span, Foot length, Waist line, Pubic hair stage (1-5 according to Tanner), Breast (girls) or genital stage (boys) (1-5 according to Tanner), Testicular volume left and right (for boys only), Evaluation method (self-estimated or observed), Menarche (for girls only), Menarche date (for girls only), Bone age (methods: BoneXpert, C&P, TW2, TW2 RUS, TW3), Gestational age weeks, Gestational age additional days, Birth weight, Birth length, Birth head circumference, Bilirubin (serum/transcutaneous), Light therapy, Blood exchange, Mother's height, Mother's weight, Mother's head circumference, Father's height, Father's weight, Father's head circumference

◆ CHART FEATURES

- Zoom / Detail: Page width, Page height, Free form zoom, Return to previous zoom state
- Detailed Hints/Tooltips in all charts
- Save image as: PDF, JPEG, PNG, RTF
- Save data as: JSON
- Briefcase PDF, Briefcase RTF
- All charts are printable
- Chart display settings (varies according to chart/report): Language (English, Spanish & French), Make chart anonymous, Hide patient data, Show Today line,
- Draw line between measurements, Different line between distant points, Show corrected age curve for premature children (GA <37 weeks), Show bone age, Show pubertal section, Show target height and parental heights, Show visit table, Show visits in descending order, Show Comments in visit table, Show shadow reference, Switch age range 1yr / 20 yrs, Switch reference type (percentile/SD), Use metric system, Ethnicity

◆ TECHNICAL INTEGRATION

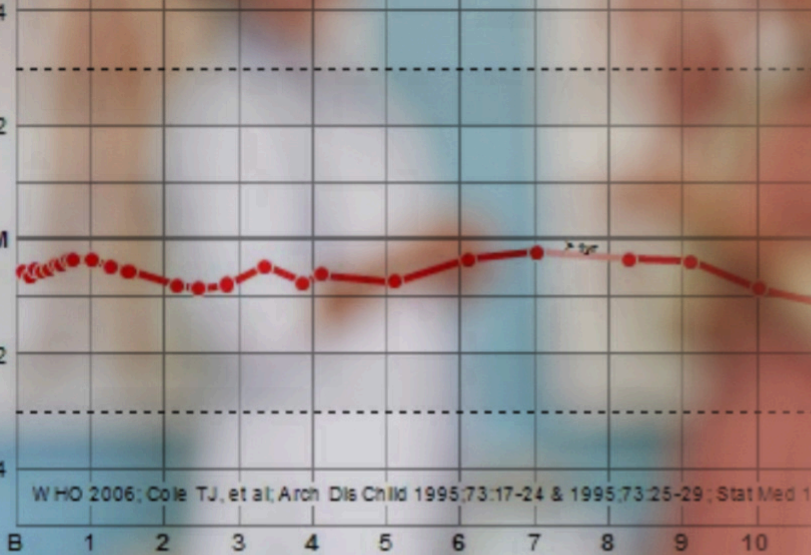
- Integrated with Cerner (App Gallery) and Epic (App Market / App Orchard)
- Also compatible with other FHIR-compliant EHRs
- HIPAA compliant (USA), and PIPEDA compliant (Canada), with no external data storage
- Cloud-hosted by PC PAL in USA and in Canada
- Pure HTML 5 and JavaScript application
- No use of 3rd party libraries or frameworks
- Responsive application design suitable for all devices
- Comprehensive technical support and maintenance
- Listing of references used

“A successfully simple and impressive product.”

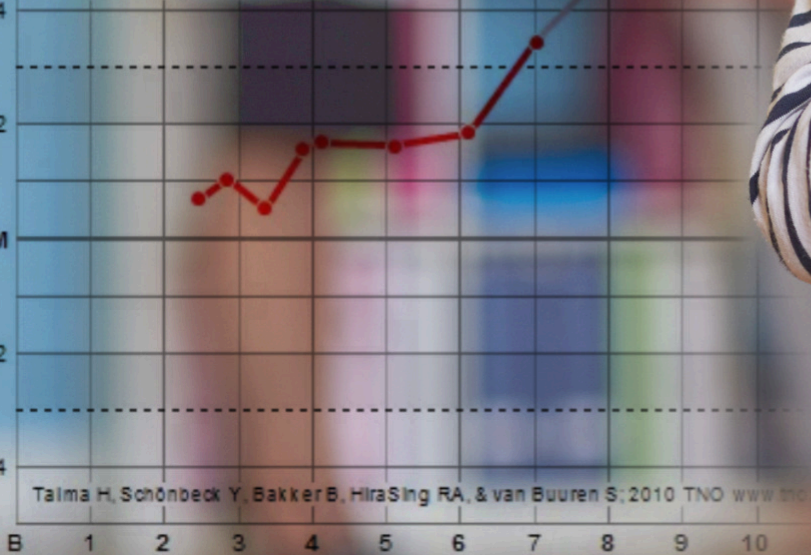
Microsoft Engineer



Height SDS



Relative sitting height SDS



**GrowthXP
Prenatal**

**GrowthXP
Partogram**

**GrowthXP
Neo**

**GrowthXP
Paediatrics**



GrowthXP enables the visualisation of data across the entire continuous care process, from the fetus to the adult. It contributes to continuity and recognition between different care teams, care networks and of course the patient and parents.

GrowthXP is used by 30% of the top 100 hospitals in Europe.

Discover GrowthXP Yourself...

Contact us at the links below to schedule your own personally guided experience of GrowthXP to see for yourself why healthcare providers all over the world have made PC PAL and GrowthXP their choice for advanced Growth Analysis Software.



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REFERENCES

- 1 Temple MW, Sisk B, Krams LA, Schneider JH, Kirkendall ES, Lehmann CU. [Trends in Use of Electronic Health Records in Pediatric Office Settings](#). J Pediatr. 2019 Mar;206:164-171.e2. doi: 10.1016/j.jpeds.2018.10.039. Epub 2018 Dec 5. PMID: 30527749.
- 2 Neumeyer L, Merker A, Hagenäs L. [Clinical charts for surveillance of growth and body proportion development in achondroplasia and examples of their use](#). Am J Med Genet A. 2021 Feb;185(2):401-412. doi: 10.1002/ajmg.a.61974. Epub 2020 Nov 21. PMID: 33220165; PMCID: PMC7839678.
- 3 Rosenbloom ST, Butler MG. [Development and implementation of electronic growth charts for infants with Prader-Willi syndrome](#). Am J Med Genet A. 2012 Nov;158A(11):2743-9. doi: 10.1002/ajmg.a.35581. Epub 2012 Aug 17. PMID: 22903930; PMCID: PMC6815511.
- 4 Hawkes CP, Mostoufi-Moab S, McCormack SE, Grimberg A, Zemel BS. [Sitting Height to Standing Height Ratio Reference Charts for Children in the United States](#). J Pediatr. 2020 Jun 21:S0022-3476(20)30754-X. doi: 10.1016/j.jpeds.2020.06.051. PMID: 32579888.
- 5 Ben-Joseph EP, Dowshen SA, Izenberg N. [Do Parents Understand Growth Charts? A National, Internet Based Study](#). Pediatrics. 2009 Oct;124(4):1100-9.

FURTHER READING

- Endocrine Kids, ["What Kid's Growth Charts Don't Tell You"](#), March 2017.
- Harvard Business Review, ["It's Time For a New Kind of Electronic Health Record"](#) John Glaser, June 2020
- Washington Post, ["Pediatric growth charts often leave parents confused and concerned"](#) Marlene Cmons, June 2012.
- Clinical Growth Charts for Achondroplasia. <https://www.achondroplasia-growthcharts.com>
- CDC Extended BMI-for-age Growth Charts 2022 <https://www.cdc.gov/growthcharts/Extended-BMI-Charts.html>



GrowthXP is a registered CE marked Class I software-only medical device.