

# New growth charts developed for US children with Down syndrome

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Pediatric researchers have developed the first set of growth charts for U.S. children with Down syndrome since 1988. These new charts provide an important tool for pediatricians to evaluate growth milestones for children and adolescents with this condition. With these new charts, pediatricians will be able to compare each patient's growth patterns with peers of the same age and sex who have Down syndrome.

"Growth is a good indicator of a child's health and well-being, so it's an essential part of the pediatric examination," said study leader Babette S. Zemel, Ph.D., director of the Nutrition and Growth Laboratory at The Children's Hospital of Philadelphia (CHOP). "Children with Down [syndrome](#) grow differently from other [children](#), so it is important to have growth [charts](#) that reflect their unique growth pattern."

The study appeared online Oct. 26 in *Pediatrics*.

The study project, the Down Syndrome Growing Up Study (DSGS), was funded by a four-year, \$1.2 million grant to CHOP from the Centers for Disease Control and Prevention (CDC).

Down syndrome, a multisystem genetic disorder resulting from an extra copy of chromosome 21, occurs in about one in 700 U.S. births. Doctors and parents have long known that children with Down syndrome tend to grow more slowly and are shorter than most other children.

Thanks to medical advances and improved access to care, overall health and well-being has improved for these patients; for example, life expectancy has increased from 35 years in 1985 to 53 years in 2007. This study investigated whether growth patterns have also improved.

The researchers followed 637 participants, up to age 20, recruited from the Trisomy 21 Program at CHOP and from community locations and pediatric

practices, mostly in the greater Philadelphia area, between Jan. 2010 and July 2013. All the participants were in their usual state of health at the times of measurement and, on average, had three study visits at which measurements were taken.

Children under age three showed marked improvements in [weight gain](#) compared to the 1988 U.S. growth charts for children with Down syndrome. Improvements in height, reflecting taller stature, occurred mainly in males aged two to 20, relative to the earlier charts. In general, the DSGS charts were consistent with charts from U.K. children with Down syndrome, published in 2002.

The DSGS team also created the first-ever body mass index (BMI) charts for children with Down syndrome. The researchers noted that the charts do not represent an ideal distribution of BMI, but only describe BMI distribution among their study participants. They added that further investigations should determine how to use the BMI charts to screen patients for excess body fat and associated health symptoms.

"These charts more accurately reflect the growth of contemporary children with Down syndrome living in the U.S.," said Zemel. She added, "It is clear that [growth](#) has improved for infants and toddlers with Down syndrome over the past few decades, and that males are taller. The new BMI charts will be helpful for evaluating excess weight gain, which is mainly a concern as children advance through the teenage years. Ongoing research at CHOP, led by Dr. Andrea Kelly, and at Children's National Medical Center, led by Dr. Sheela Magge, will help determine if there are health consequences of excess weight in teens with Down syndrome."

**More information:** "Growth Charts for Children with Down Syndrome in the U.S.," *Pediatrics*, published online Oct. 26, 2015.

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