# WEIGHT GAIN DURING PUBERTY

## A Tip Sheet for Healthcare Providers

This resource aims to normalize weight gain in puberty by helping healthcare providers understand why weight gain is necessary, reflect on important considerations when interpreting developmental growth charts, and identify flags for medical assessment when there are deviations from an adolescent's growth chart.

## The Necessity of Weight Gain in Puberty

More nutritional intake is needed during puberty for healthy growth.[1] When adolescents don't gain weight in puberty, there can be negative physical impacts such as growth stunting and decreased bone density.[2]

When adolescents who have reached puberty are not gaining weight, it can be a warning sign of dieting or an eating disorder.[2] Since eating disorders often begin in adolescence and can be fatal,[3] care providers must recognize and address weight loss as abnormal in puberty. Intent to lose weight can be correlated with negative self-image, depression, and anxiety.[4]

- **Energy and micronutrient demands increase** significantly in adolescence to support the rapid pace of development. Older adolescents' energy needs match or outpace those of adults.[5,6] Energy needs are further increased for adolescents who are active and/or have higher metabolic needs.
- **Children gain weight through adolescence as their bodies grow** to adult size and function. Weight gain represents increases in bone length and density, muscle mass, organ size and function, and fat tissue.[5] This development continues for all sexes beyond the end of height growth.
- **Failure to gain enough weight during adolescence disrupts overall development and function**, notably brain/cognitive function, reproduction, and skeletal health,[5,6] and is a risk for long-term health consequences.[6]
- **Changes in body composition and structure happen** along with pubertal development.[5] Both males and females gain fat and lean mass. Females gain more fat mass in support of the reproductive cycle.[6] Increased fat tends to start around the mid-section then spread out during the later years of puberty.

Created by The Manitoba Eating Disorder Network, a collaborative of public health, community, and clinical professionals in Manitoba and the National Eating Disorder Information Centre. Reviewed by Weight Inclusive Dietitians in Canada. For concerns contact mbednetwork@gmail.com

## During Puberty and Beyond

**Puberty is the second most rapid period of growth in a person's life[5]**

- Between ages 10-16, females are expected to gain 40+lbs (18kg),[7] and can double their weight.[5,8]
- Between ages 12-16, males are expected to gain 45+lbs (20kg),[7,9] and can double their weight.[5,8]

**Growth and weight gain continue beyond puberty**

- Between ages 16 to early 20s, adolescents are expected to gain another 20+lbs (9kg)[7]
- Weight changes throughout adulthood are expected as well, with hormone shifts such as lowering levels of testosterone, pregnancy and menopause, as well as stages of life and aging

### What about Children who are in Larger Bodies?

Children in larger bodies before puberty still need to gain weight during puberty. Being at a higher percentile on the growth chart does not indicate a need for weight loss intervention, as the pattern of growth matters more than the specific percentile.[10]
If there is a large deviation on the growth chart, either up or down this warrants asking questions regarding changes to the child's food intake, activity levels, and mental health.

### What Needs to be Considered for Transgender and Gender-Diverse Children?

Puberty can be an especially stressful time for transgender and gender diverse (TGD) adolescents as they begin developing secondary sex characteristics (i.e., breasts, hips, facial hair growth, etc.) and gendered experiences (i.e., menstruation) associated with their sex assigned at birth.[15] Some adolescents may begin to experience gender dysphoria, a condition categorized by experiences of significant distress associated with an individual's experienced gender not aligning with their sex assigned at birth.[16]

Given their heightened experience of body-related distress, TGD adolescents are at greater risk for developing eating disorders and disordered eating behaviours compared to their cisgender peers.[15] Research indicates nearly half of TGD adolescents ages 14 to 18 engage in restrictive eating, binge eating and/or use laxatives, diuretics or diet pills to alter their weight.[17]

To help alleviate gender dysphoria, some TGD adolescents seek medical intervention, such as Gonadotropin-releasing hormone agonists (GnRHa) to suppress puberty and/or hormonal therapies (i.e., testosterone and estradiol) to induce secondary sex characteristics that align with their affirmed gender identity.[16]

These interventions can impact anthropometrics, including height, weight, and body composition.[16] For example, testosterone is associated with increased muscle mass and BMI, while estradiol promotes fat deposition in the hips, lowering the waist-to-hip ratio. GnRHa may delay skeletal maturation, further complicating the relationship between adult height and weight.[16] **Primary care providers should communicate clearly about the effects of medical interventions on physical and mental health to help youth and caregivers understand when and where pubertal changes may typically occur.**

## Interpreting Growth Charts

Single weight or height measurements cannot indicate health status. Serial measurements are needed to properly determine a child's growth pattern or problems with development.[11]

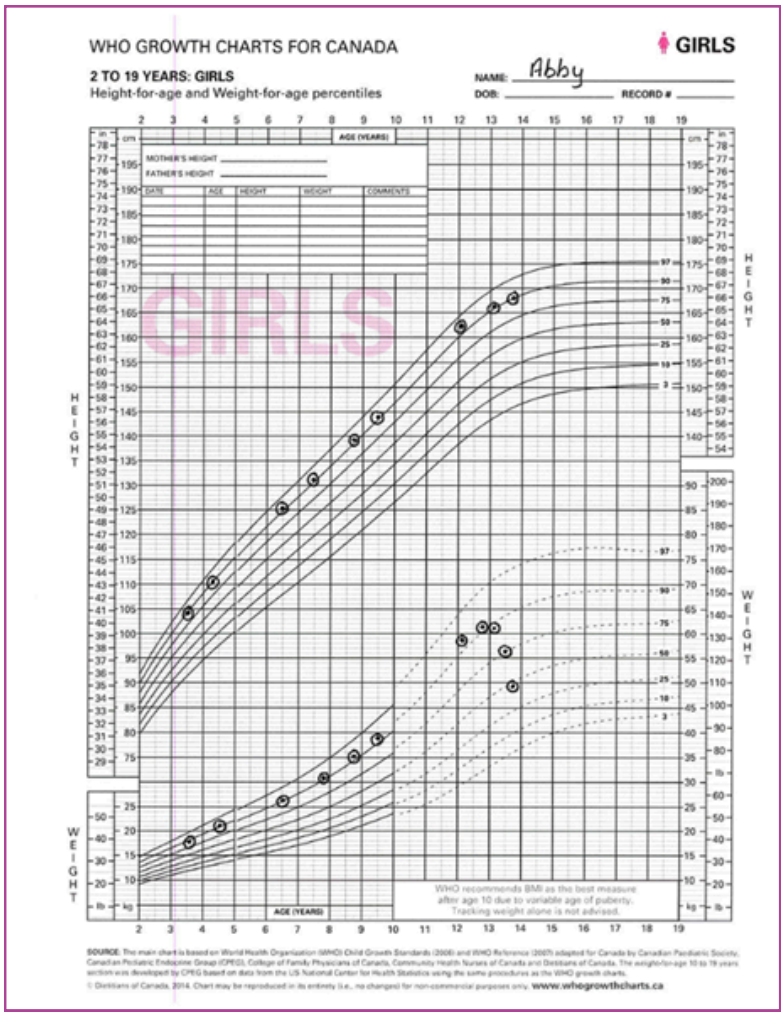
The growth pattern is more important than the percentile[11]; adolescents following their curve generally continue to develop well. Children may "jump" up several centiles for height and weight at the onset of puberty due to the variable timing of onset and rapid rate of growth. This becomes their new baseline growth curve.

Significant deviations from an established growth trajectory should prompt examination and questions regarding nutritional intake, illness/symptoms, activity levels, social factors affecting eating or food security, mental health status and symptoms.

NOTE: These concerns affect people of all genders. Care providers should think critically in deciding which growth chart may be optimal for each individual patient based on factors such as patient history, pubertal stage and their use of gender-affirming intervention that may impact weight and height. Emerging evidence suggests that **transgender and gender-diverse (TGD) adolescents should be tracked on both male and female growth charts** to address the limitations of using gendered charts for TGD adolescents**,** such as **misclassifying weight-related disorders** and **difficulties predicting adult height.**[12,13]

Nonetheless, there is a need for better tools to track growth in TGD youth that do not rely on gendered categories.

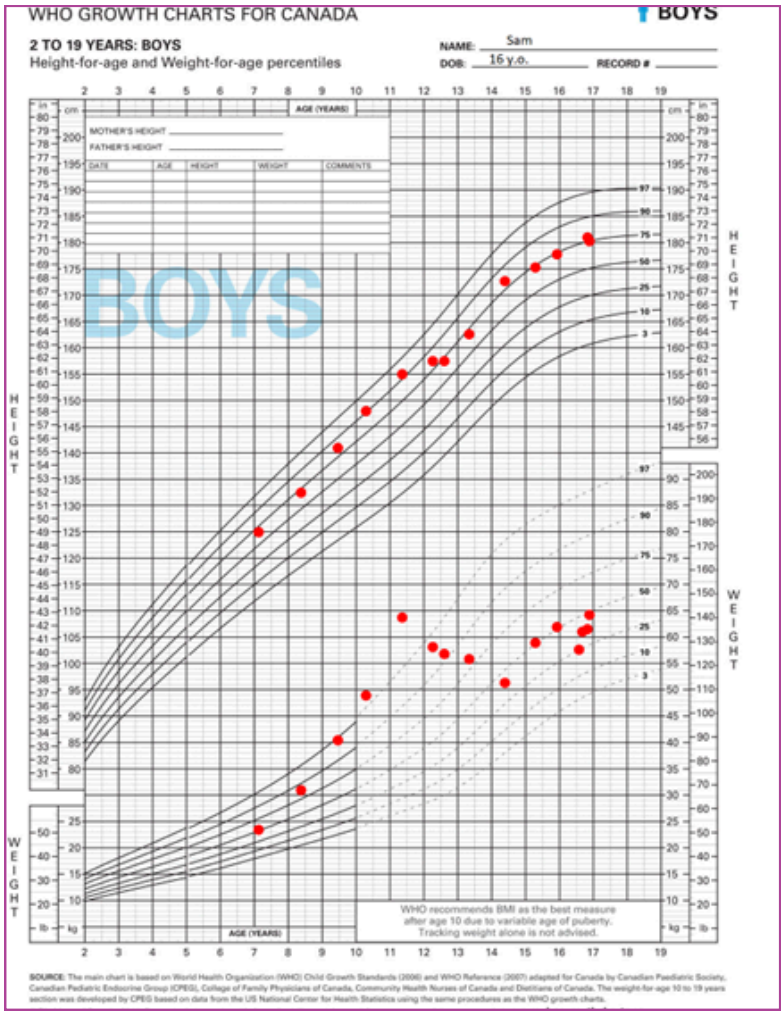
### Example Growth Chart for an Adolescent Girl




This girl's growth followed typical growth patterns through childhood, with height and weight tracking along the 90th percentiles.

At age 13 weight growth stops and weight drops to below the 50th percentile, more than 2 centiles below previous growth pattern. Though her weight at the 50th percentile falls within a "normal" or "average" weight range for adolescent girls, this weight represents failure to maintain growth to genetic potential (90th percentile) for this child.

## Example Growth Chart for an Adolescent Boy




This boy has rapid weight gain departing from typical growth pattern in pre-teen years; it aligns with some height growth. Weight then falls below the 50th percentile, the previous lowest-recorded percentile.

Return to pre-pubertal growth percentiles is a sign of failure to meet genetic growth potential in most cases. Though his weight appears to follow the 50th percentile, it is likely too low for his body.

## Flags for Medical Assessment

### Physical

- Reports of dizziness or fatigue
- Abnormal electrolytes (might indicate purging)
- Sudden weight fluctuation (loss or gain)
- Cold sensitivity
- Swelling around cheeks, tooth damage, bumps on knuckles (“Russell’s sign”)
- Lanugo: soft, fine hair appearing over the body (e.g., back, shoulders, arms)
- Anemia (iron deficiency)
- Fluctuations in blood pressure
- High cholesterol
- Signs of liver disease
- Fluctuations in blood sugar level
- Thinning hair

### Behavioural

- Wearing baggy clothing, even in hot weather
- Being secretive with food (e.g., hoarding, disposing of lunches)
- Significant change in activity levels (e.g., exercise)
- Excessive cooking/baking without eating the food themselves
- Repeated use of a scale with rigid tracking of weight
- Deviations in normal sleep pattern or insomnia

### Social

- Eating alone at meal times
- Social withdrawal, such as avoiding events, particularly if food is involved

### Emotional

- Anxiety and rigidity, particularly around food-related activities
- Irritability
- Low mood

## Questions to Consider Asking

- What does an average day of eating look like for you? Has that changed recently?
- Do you exercise? If so, for how long and how often? What are your exercise goals?
- On a typical day, how much time is your mind occupied with thoughts about food? What about your weight or shape?
- How do you feel about your body? Do others comment on it?

For a focused eating disorder history, consider using **Table 2** from the Canadian Paediatric Society's guide for the community management of pediatric eating disorders[14]

**Eating disorders occur in people of all body types. You cannot tell what type of eating disorder a person is experiencing from their body size or weight.**

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