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## Background

For patients receiving home parenteral nutrition (HPN), energy balance is achieved by comparing oral or enteral intake and parenteral intake to weight maintenance. While this is subjective, with a stable disease process it, allows for nutrition management to be easily facilitated. For a complex patient with suspected abnormal energy balance, measurement of resting metabolic rate (RMR) using indirect calorimetry may be important to critical care.

## Case Report

A medically complex 18-year-old male with mitochondrial disease (Complex II) receiving HPN since the age of 4. Gastrointestinal (GI) anatomy consists of an intact small bowel with a total colectomy at the age of 16. GI history is also significant for chronic intestinal pseudo-obstruction/gastroparesis, dysautonomia, and dysmotility. Current height is 60 inches (z = -3.05), weight is 50 kg (z = -2.48), with a body mass index (BMI) of 20 kg/m<sup>2</sup> (z = -0.59), which he has been able to maintain over the previous 2 years.

He is home schooled and not physically active. Because his HPN regimen was lower than recommended intake, energy expenditure was measured using indirect calorimetry.

### Predictive RMR

1450 kcals

Mifflin St Jeor

### Measured RMR

1354 kcals

Indirect Calorimetry

## Study Participant

Table 1: Clinical Characteristics and Home PN Regimen

Year	2023	2022	2021	2020
Age (y)	18	17	16	15
Max Weight (kg)	50	50	54	52
HPN Regimen				
Calories/ day (kcal)	639	639	639-663	663-711
AA PN per day (g)	35	35	30-35	30
Dextrose per day (g)	130	130	130-143	143-157
Fat per week (g)	20	20	40	40

## Growth Trends

Figure 1. CDC Growth Chart – Weight for Age

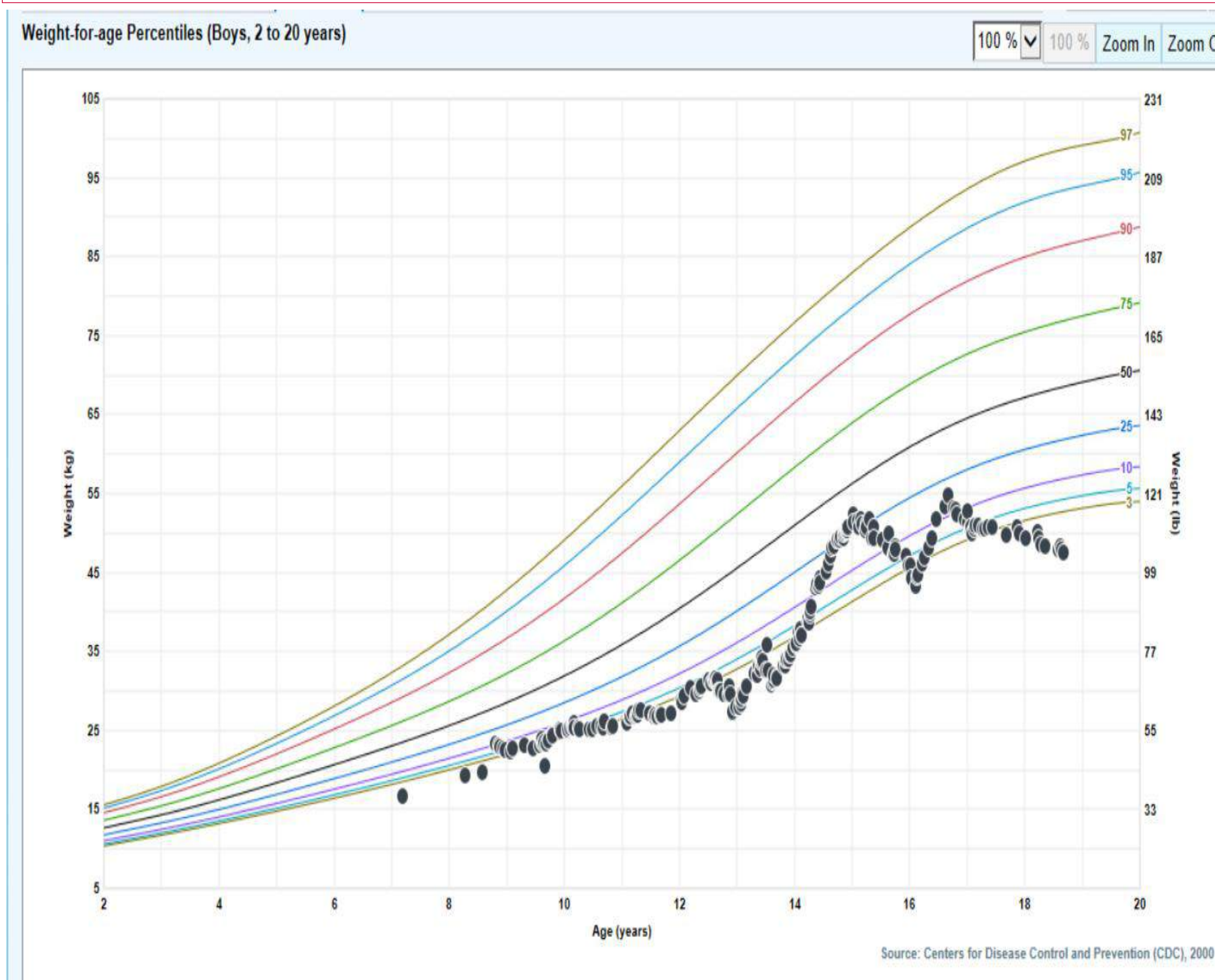
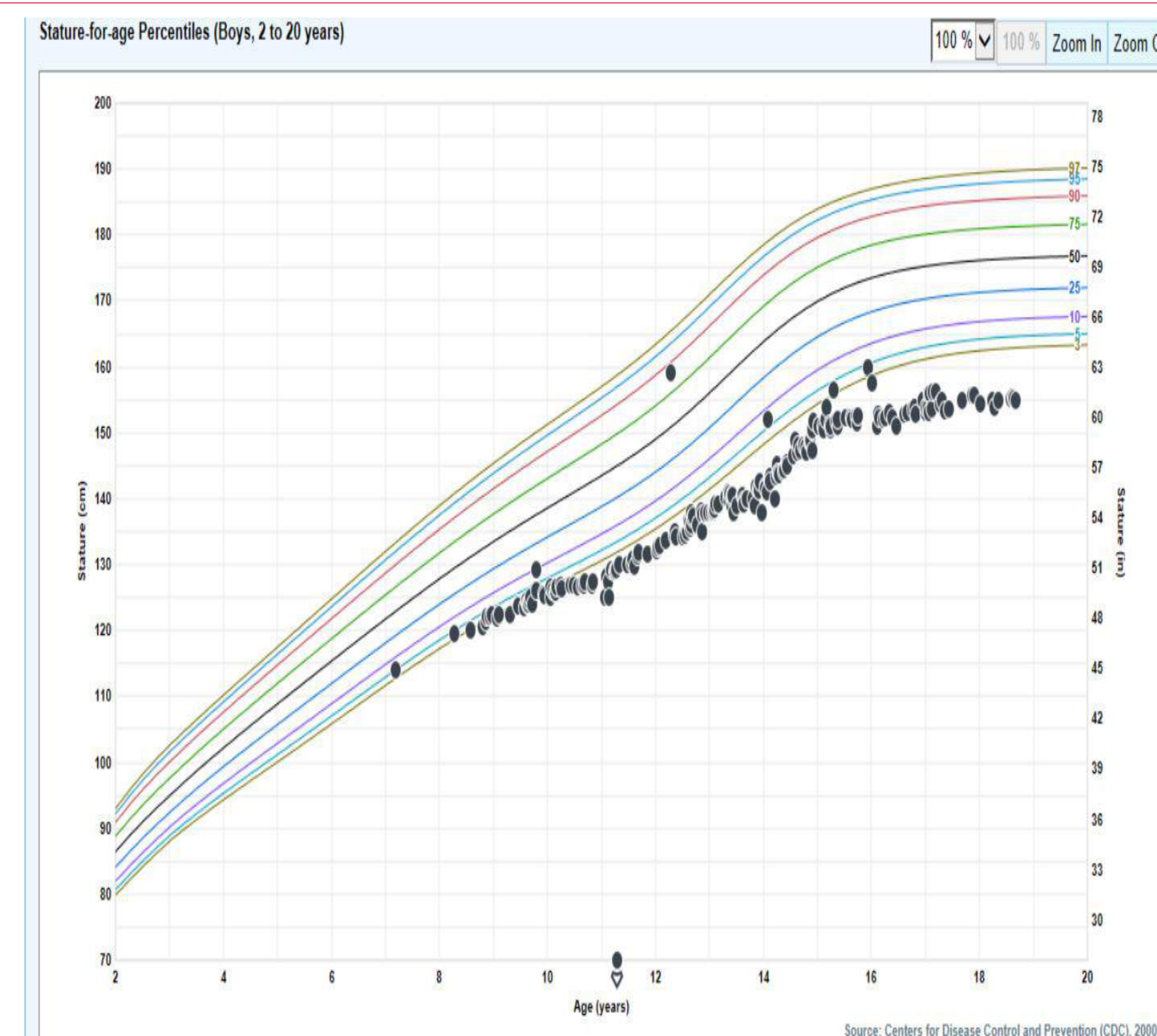


Figure 2. CDC Growth Chart – Stature for Age



- Comparing his actual intake of < 1200 kcal/day from HPN and oral intake to his adjusted RMR of 1625 kcal/day, weight loss would be expected.
- However, he is maintaining his weight and nutrition status on this current regimen, and his family feels he is at his ideal weight.
- In evaluating his height and growth over time, his linear growth stopped at age 15 and his calorie needs have remained stable.



He is thriving and will be attending college away from home in the fall.

## Summary and Implications for Practice

- ✓ The effect of mitochondrial disease on metabolism is not fully understood
- ✓ This patient demonstrates the difference between measured RMR and actual intake that may be seen in clinical practice.
- ✓ Scientifically, increasing his intake should be warranted; however, clinically, he is receiving optimal nutrition.
- ✓ Close individualized clinical monitoring is essential for patients with mitochondrial disease.

The authors recognize Terry Brown, MBA, MPH, RDN for her assistance in preparing this poster.