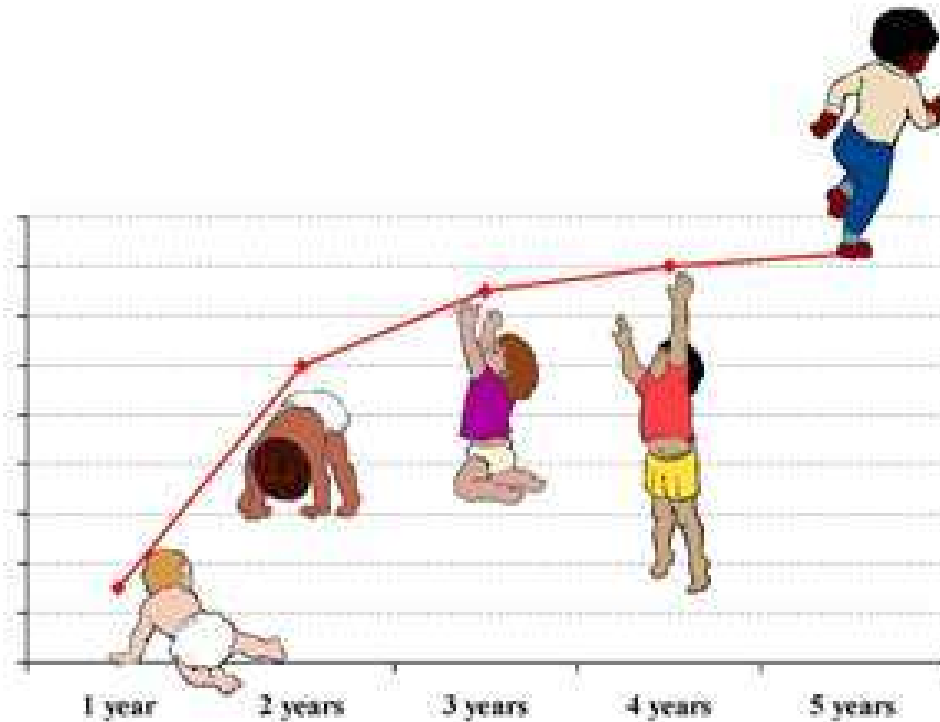




Clinical Growth Charts



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Professor of Pediatrics

Isfahan University of Medical Sciences

Isfahan,Iran



Interpreting Growth Indicators

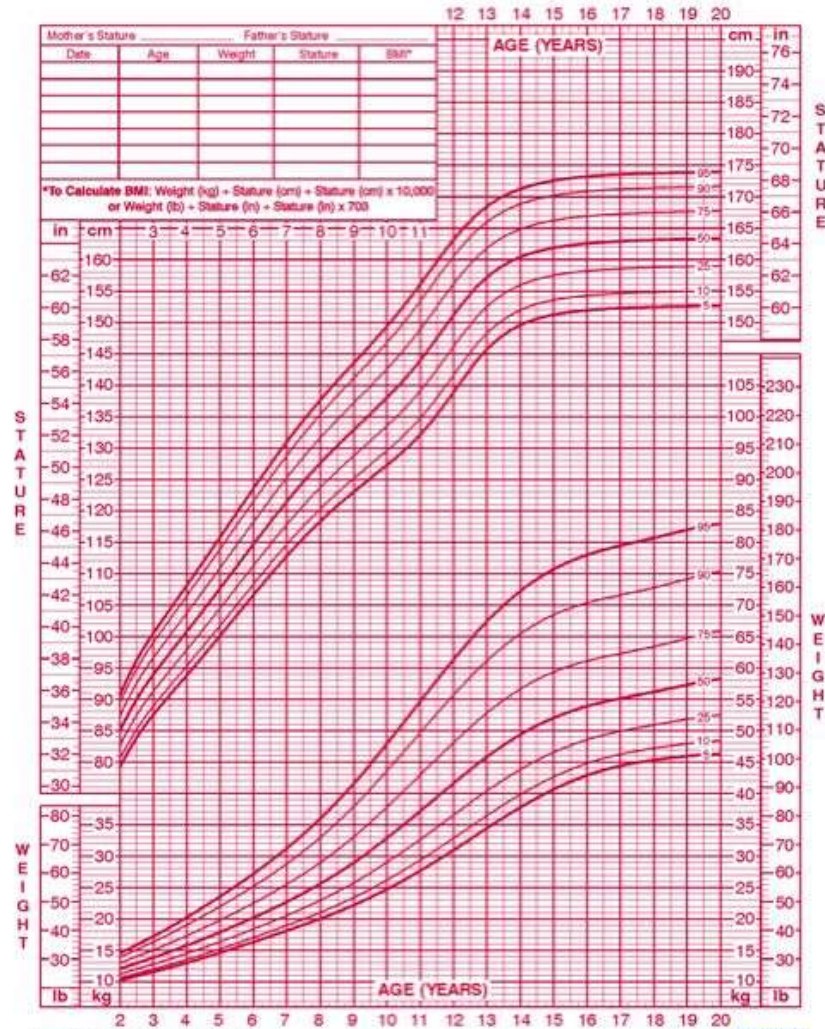
References for growth standards

Parameter value	Reference
IOTF	International Obesity Task Force
NCHS 1978	CDC/WHO 1978 Growth Reference
CDC 2000	CDC 2000 Growth Reference
WHO 1990	WHO Growth References (0-5 years)
WHO 2006 CGS	WHO Child Growth Standards (0-5 years)
WHO 2007	WHO Reference (5-19 years)

2 to 20 years: Girls
Stature-for-age and Weight-for-age percentiles

NAME _____

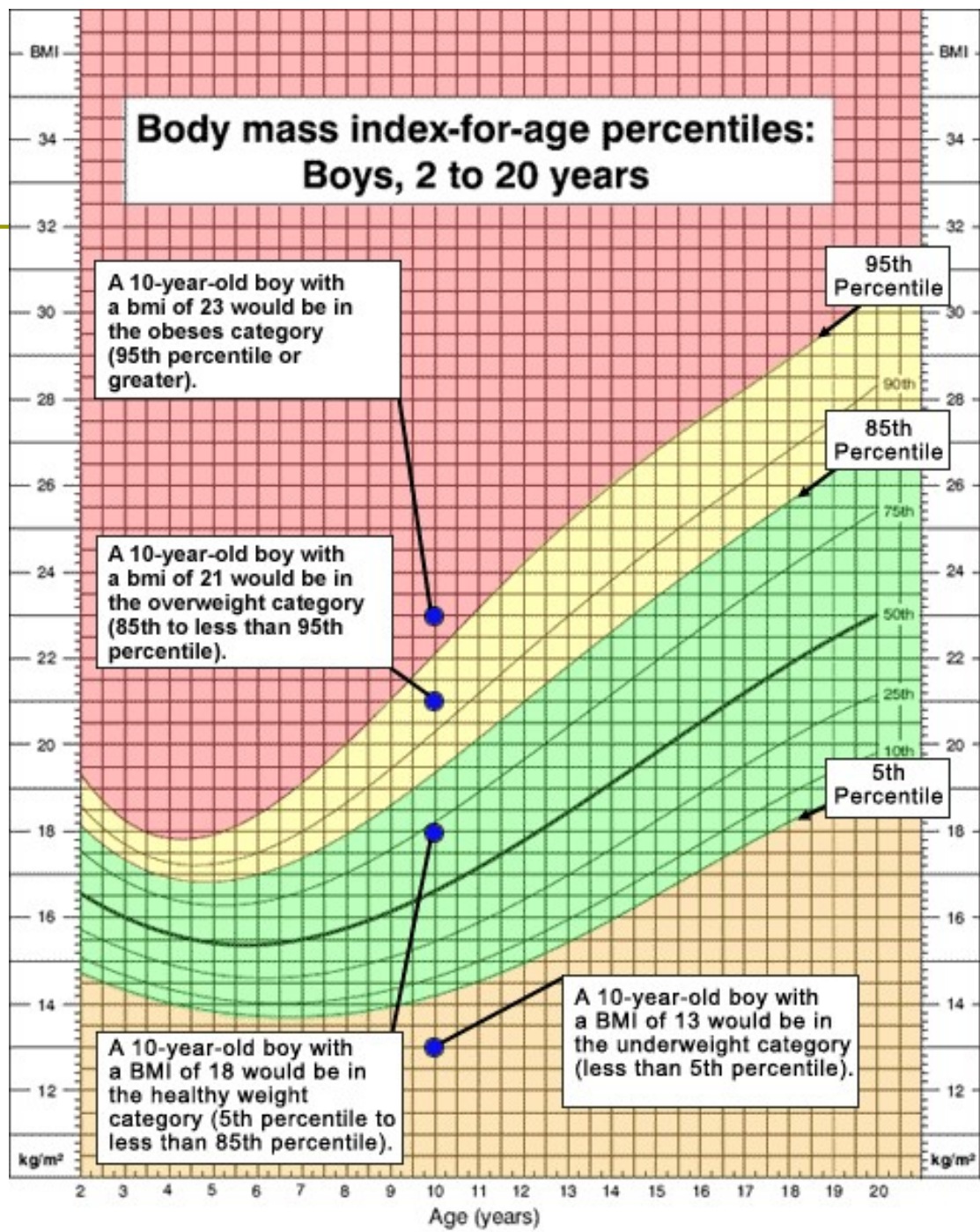
RECORD # _____



Published May 30, 2000 (modified 11/21/00).
SOURCE: Developed by the National Center for Health Statistics in collaboration with
the National Center for Chronic Disease Prevention and Health Promotion (2000).
<http://www.cdc.gov/growthcharts>



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A 10-year-old boy with a bmi of 23 would be in the obese category (95th percentile or greater).

A 10-year-old boy with a bmi of 21 would be in the overweight category (85th to less than 95th percentile).

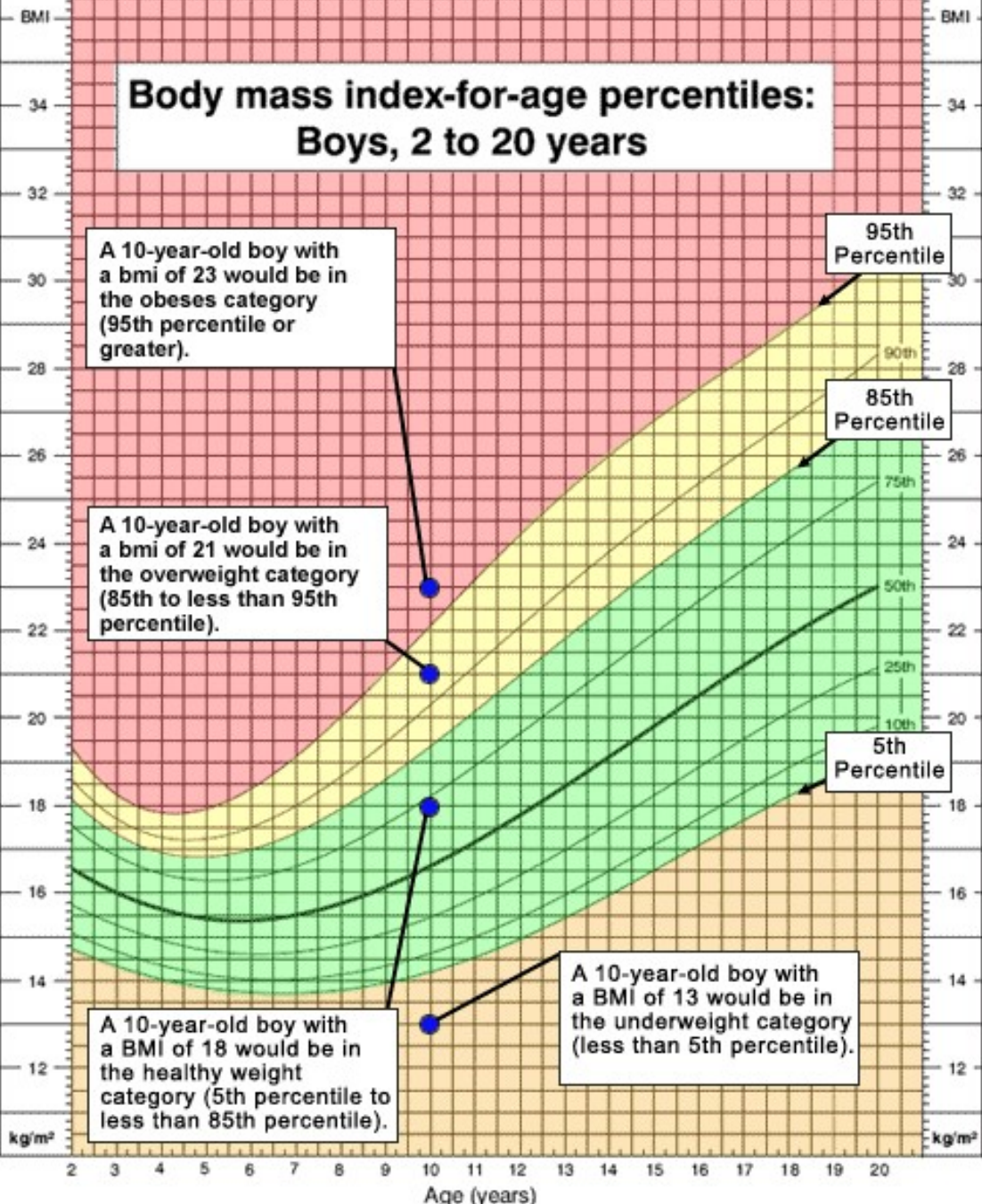
A 10-year-old boy with a BMI of 18 would be in the healthy weight category (5th percentile to less than 85th percentile).

A 10-year-old boy with a BMI of 13 would be in the underweight category (less than 5th percentile).

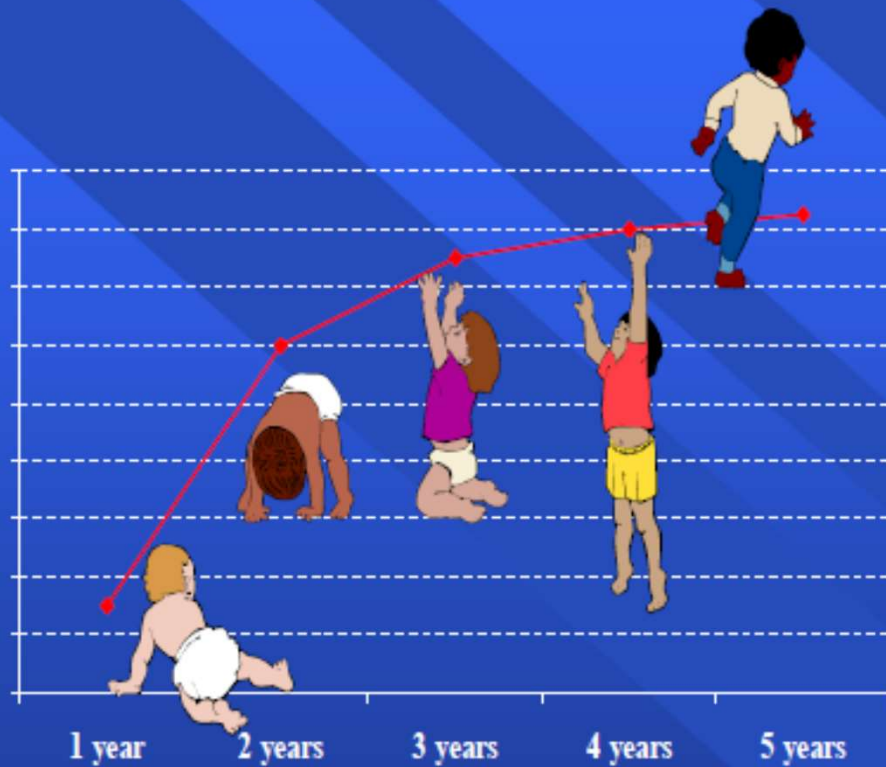
95th Percentile

85th Percentile

5th Percentile



WHO Child Growth Standards



A growth
chart for
the 21st
century



World Health
Organization



Valuable tool to
encourage
breastfeeding & to
allow early warning
of development of
obesity.

WHO Child Growth Standards



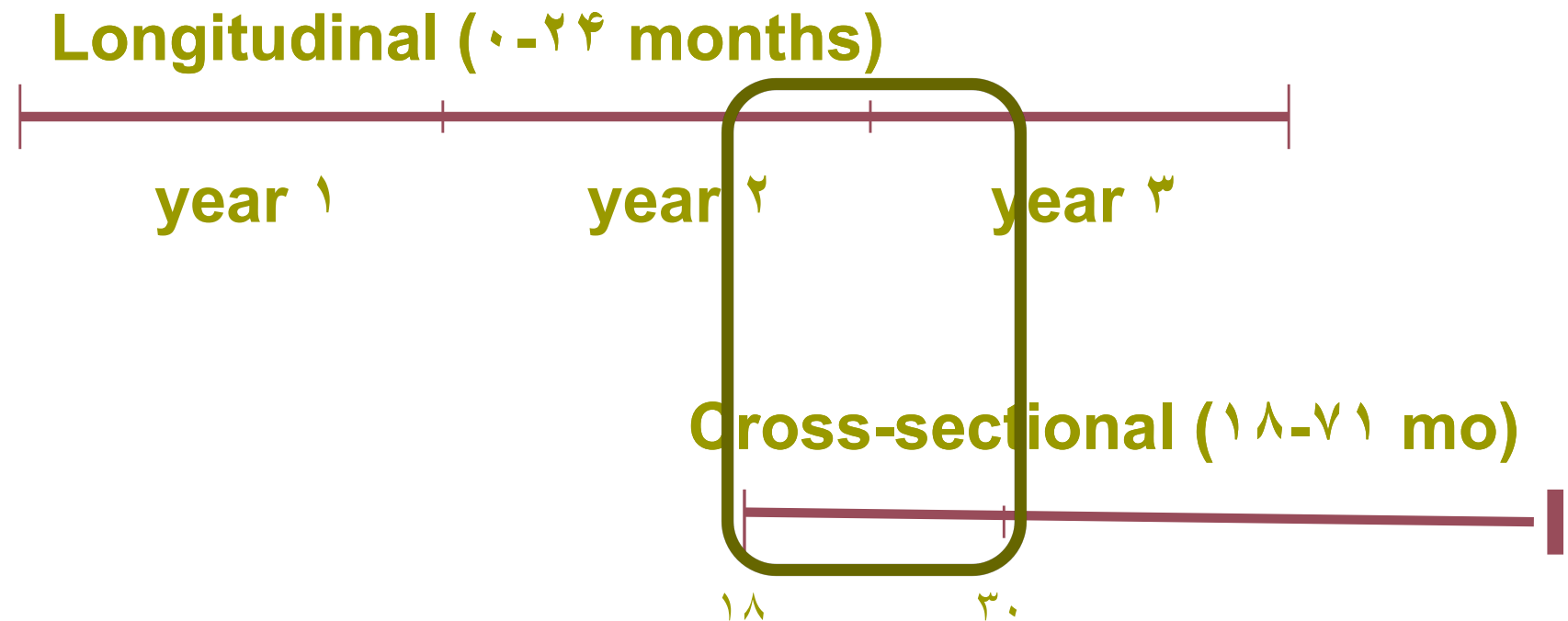
- Breastfed infant as normative model,
- Link between physical growth & motor development.

For the first time
WHO Child Growth Standards:

Describe **how**
children should
grow

Show **what**
growth can be
achieved
With
recommended
feeding & health
care

Multicentre Study Design

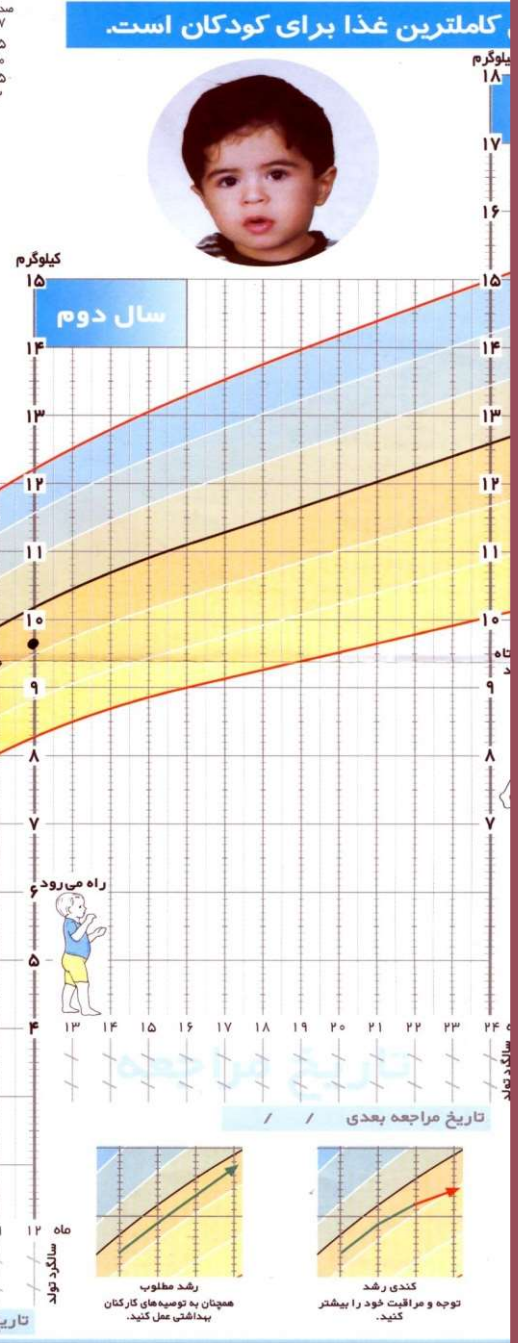
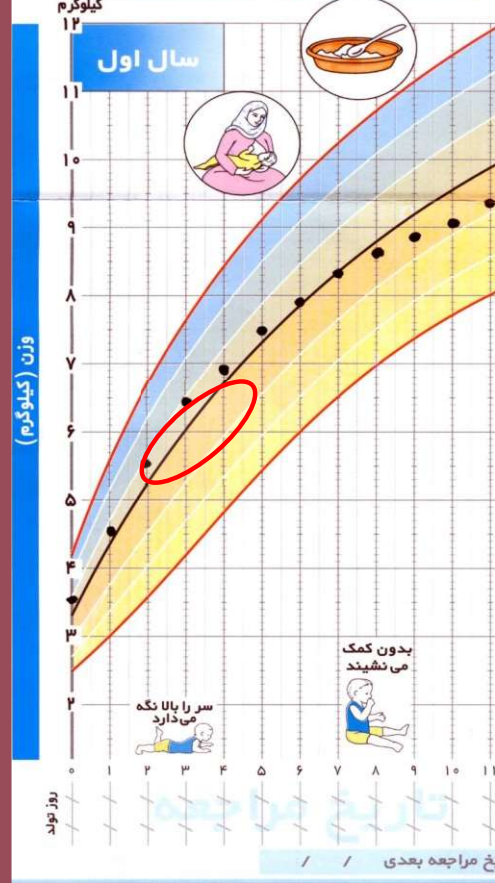
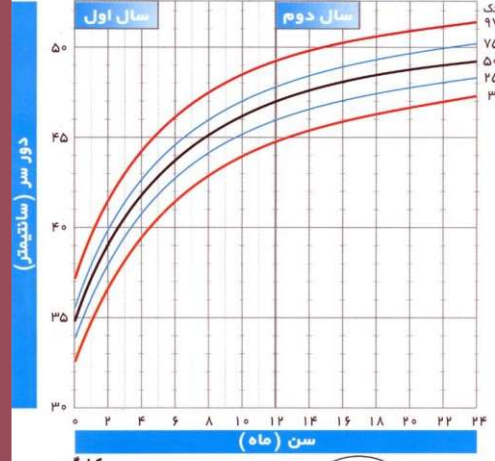


WHO Multicentre Growth Reference Study

WHO Multicentre Growth Reference Study (MGRS)

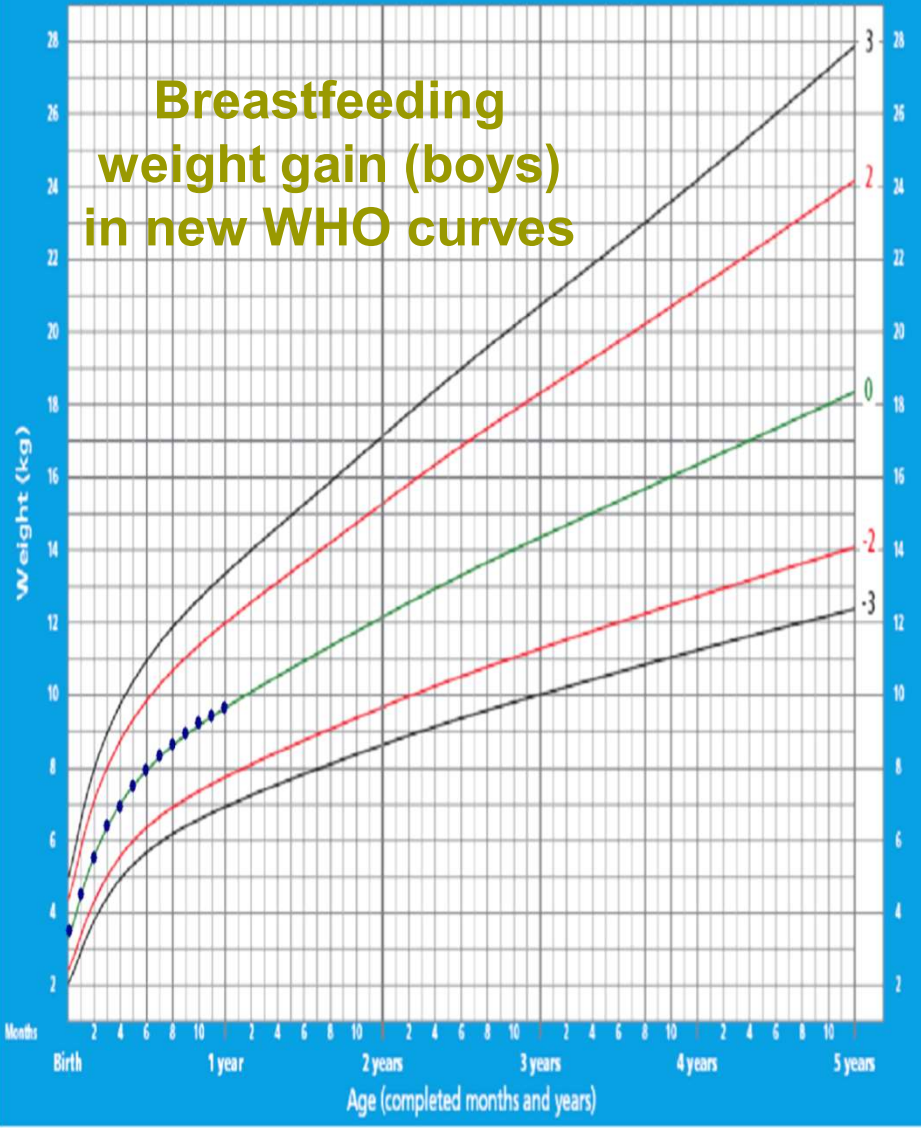


کاملترین غذا برای کودکان است.

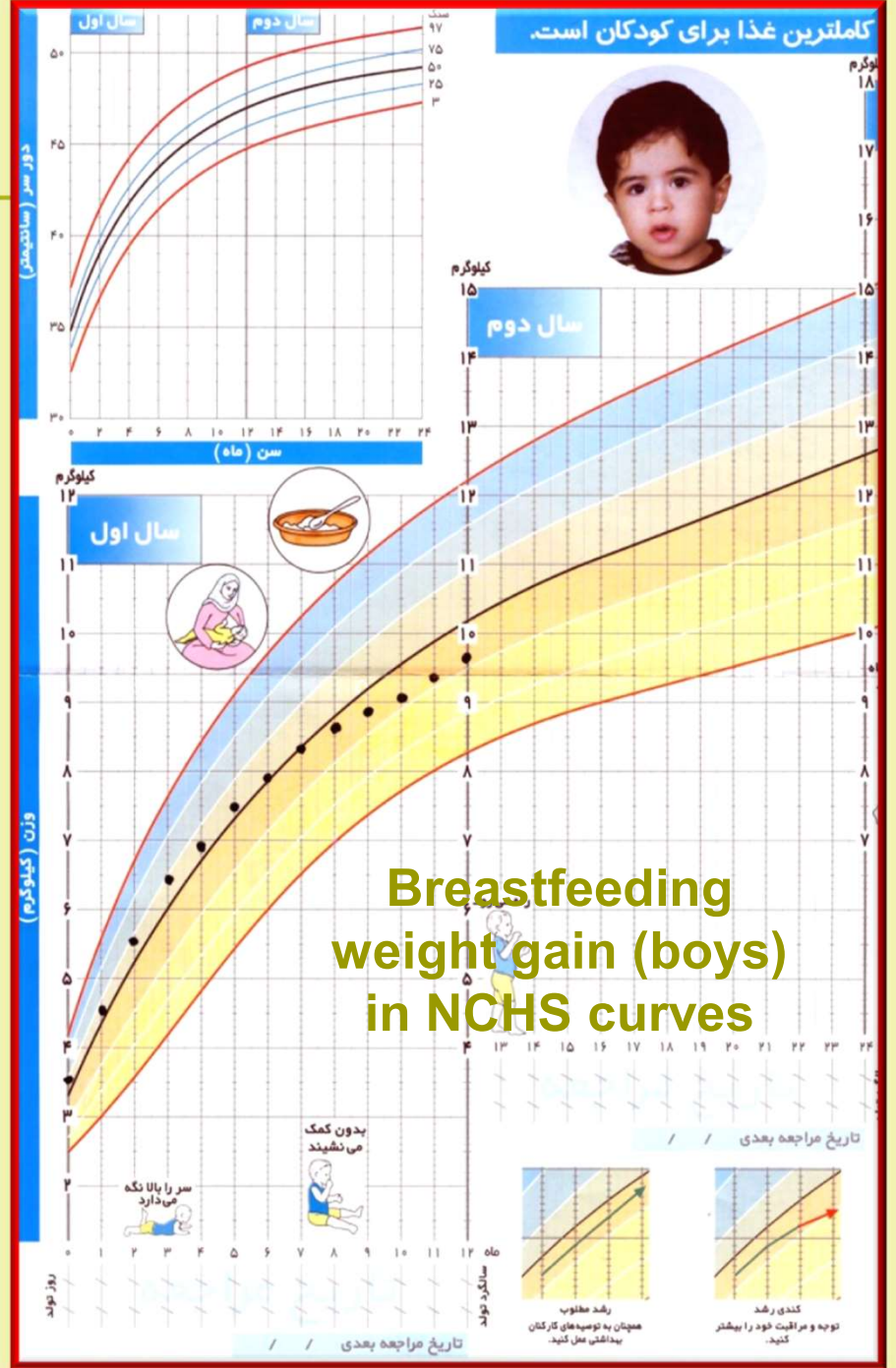


Weight-for-age BOYS

Birth to 5 years (z-scores)



Breastfeeding weight gain (boys) in new WHO curves



کاملترین غذا برای کودکان است.

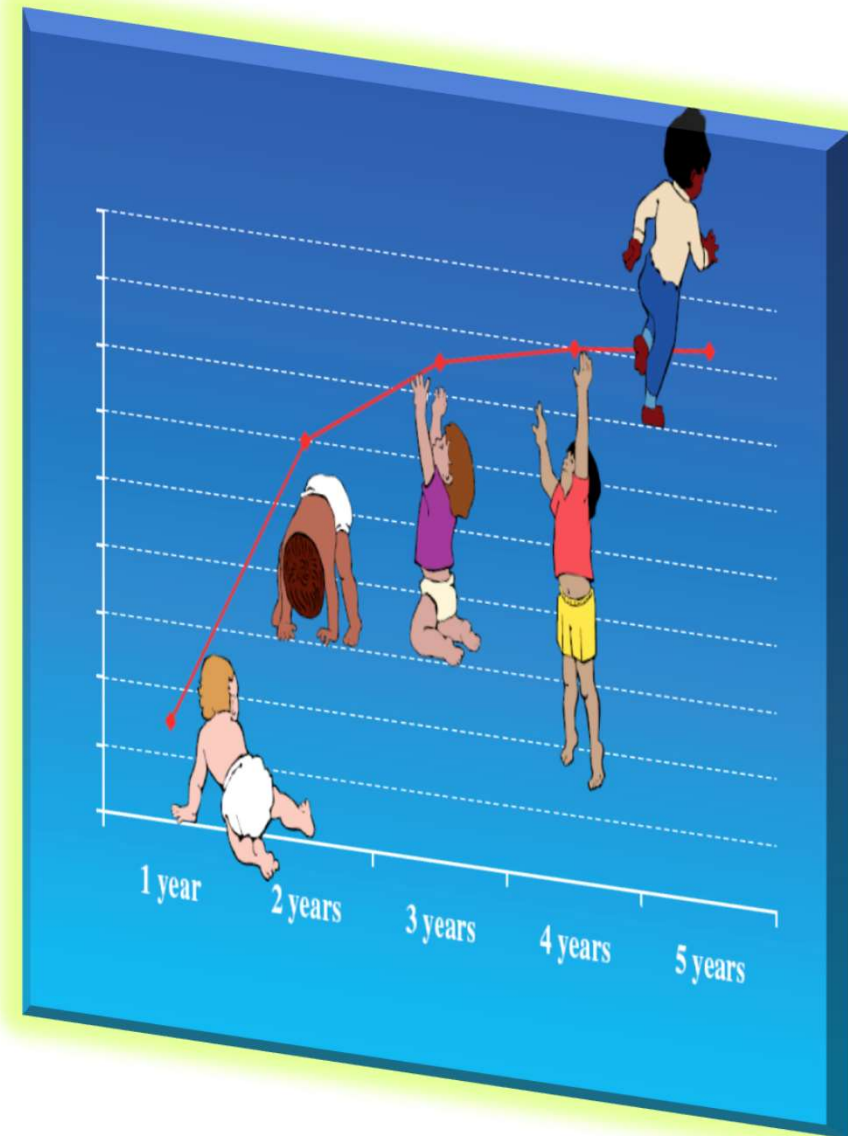


Breastfeeding weight gain (boys) in NCHS curves

تاریخ مراجعه بعدی / /
 رشد مطلوب: همچنان به توسعه‌های کارکنان بهداشتی عمل کنید.
 کندی رشد: توجه و مراقبت خود را بیشتر کنید.

Motor Development Milestones

- Sitting without support
- Standing with assistance
- Hands-and-knees crawling
- Walking with assistance
- Standing alone
- Walking alone



Comparison of WHO Child Growth Standards & NCHS/WHO international growth reference

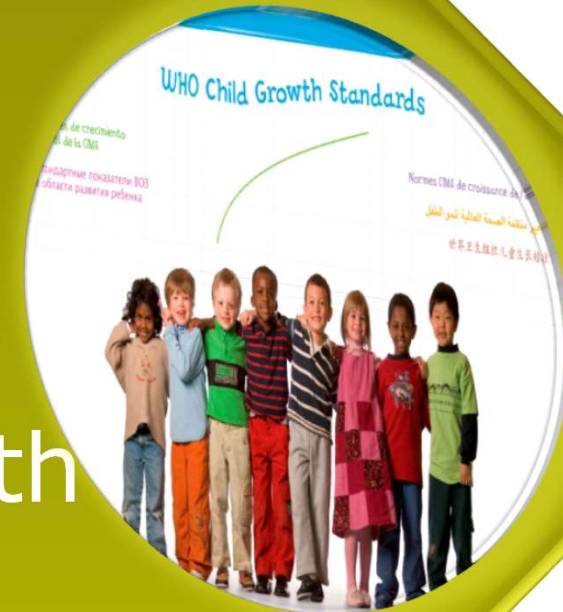


International sample of children
was **thinner** & **taller**

Standards show that:

- **nutrition,**
- **environment** &
- **healthcare**

are stronger factors
in determining growth
& development than
gender or ethnic
background.



Percentiles

z-scores

99/9

+3

97/7

+2

84

+1

50

0

15/9

-1

2/3

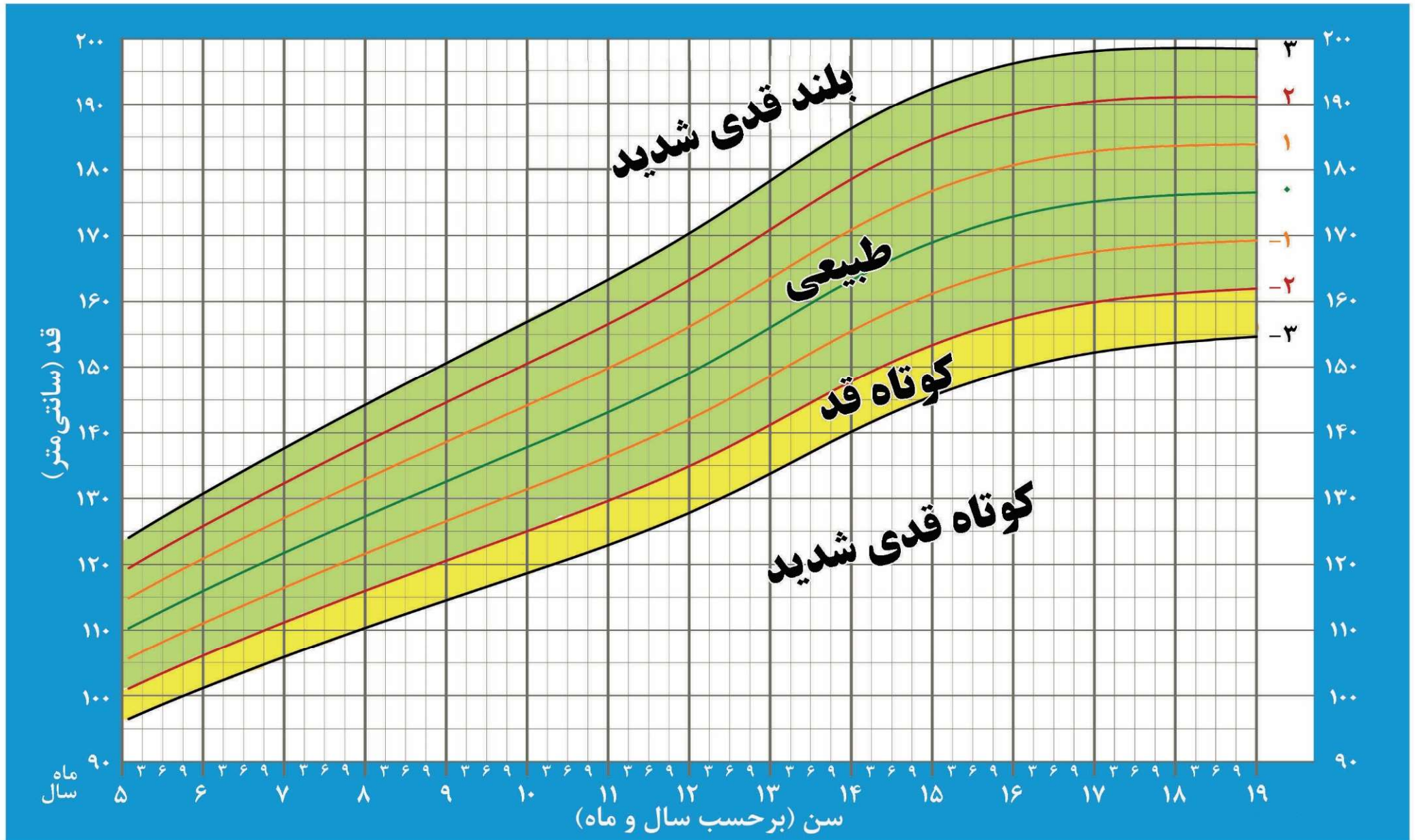
-2

0/13

-3

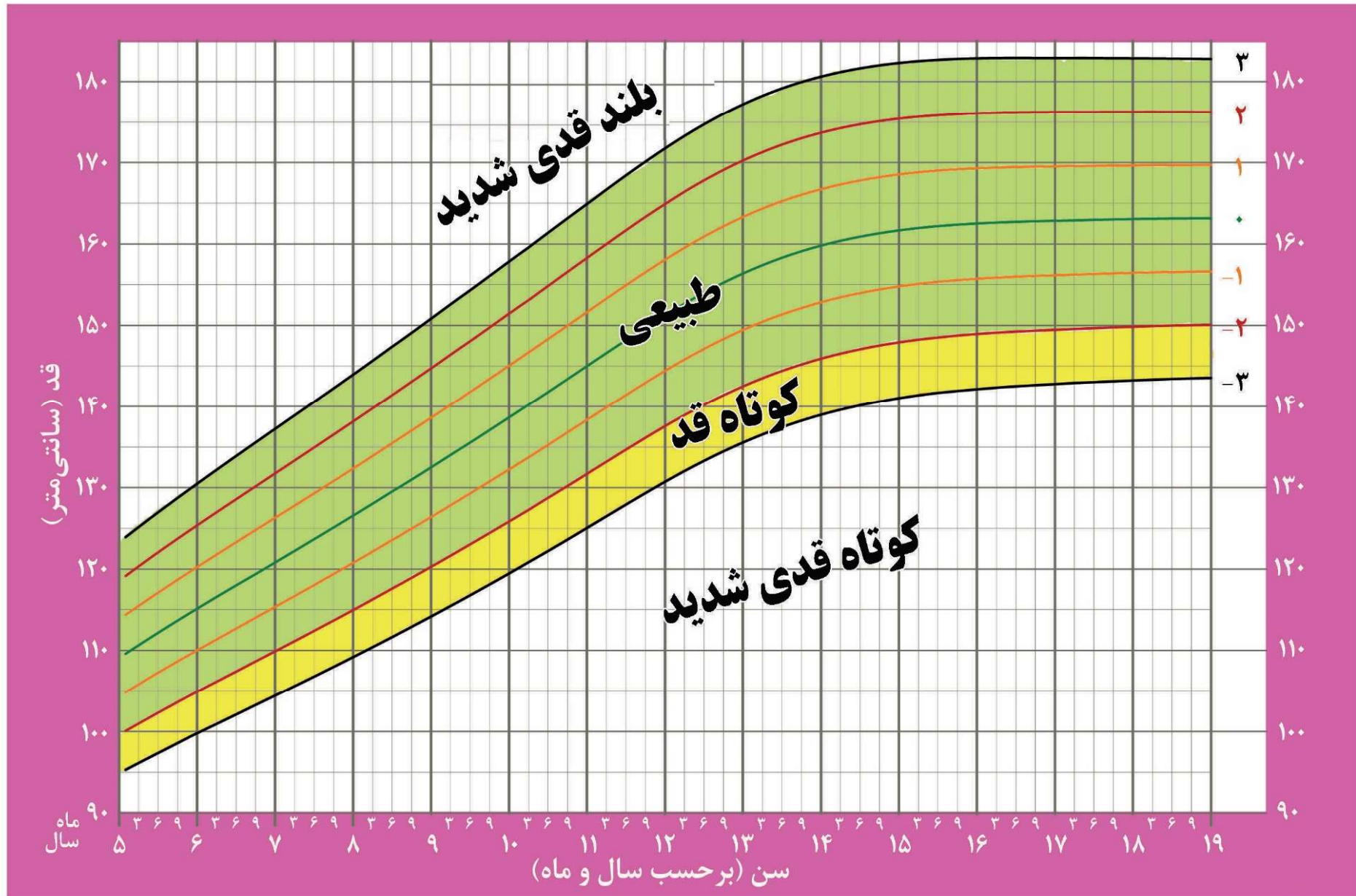
نمودار قد برای سن (پسر)

۵ تا ۱۹ سال (z-scores)

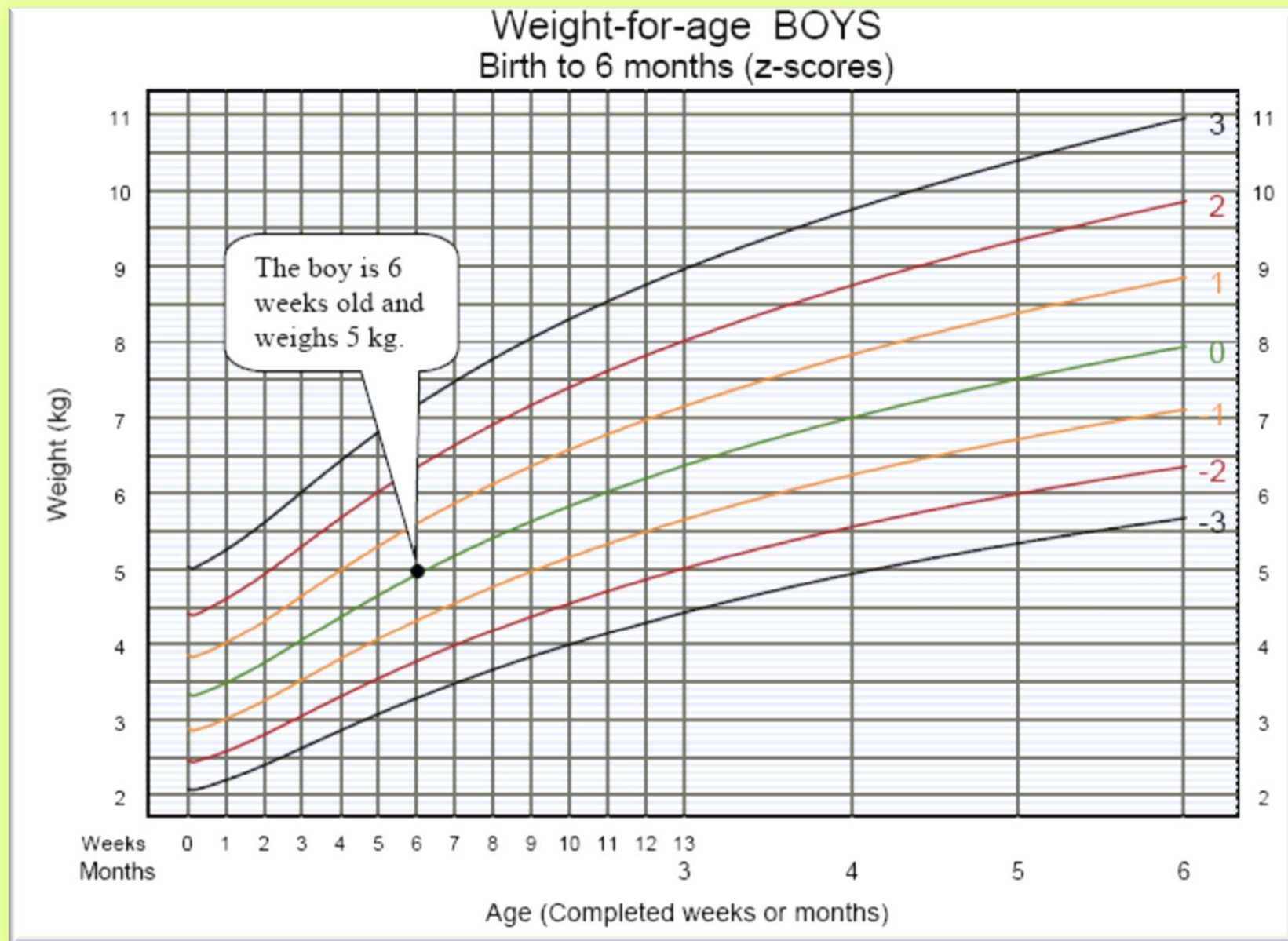


نمودار قد برای سن (دختر)

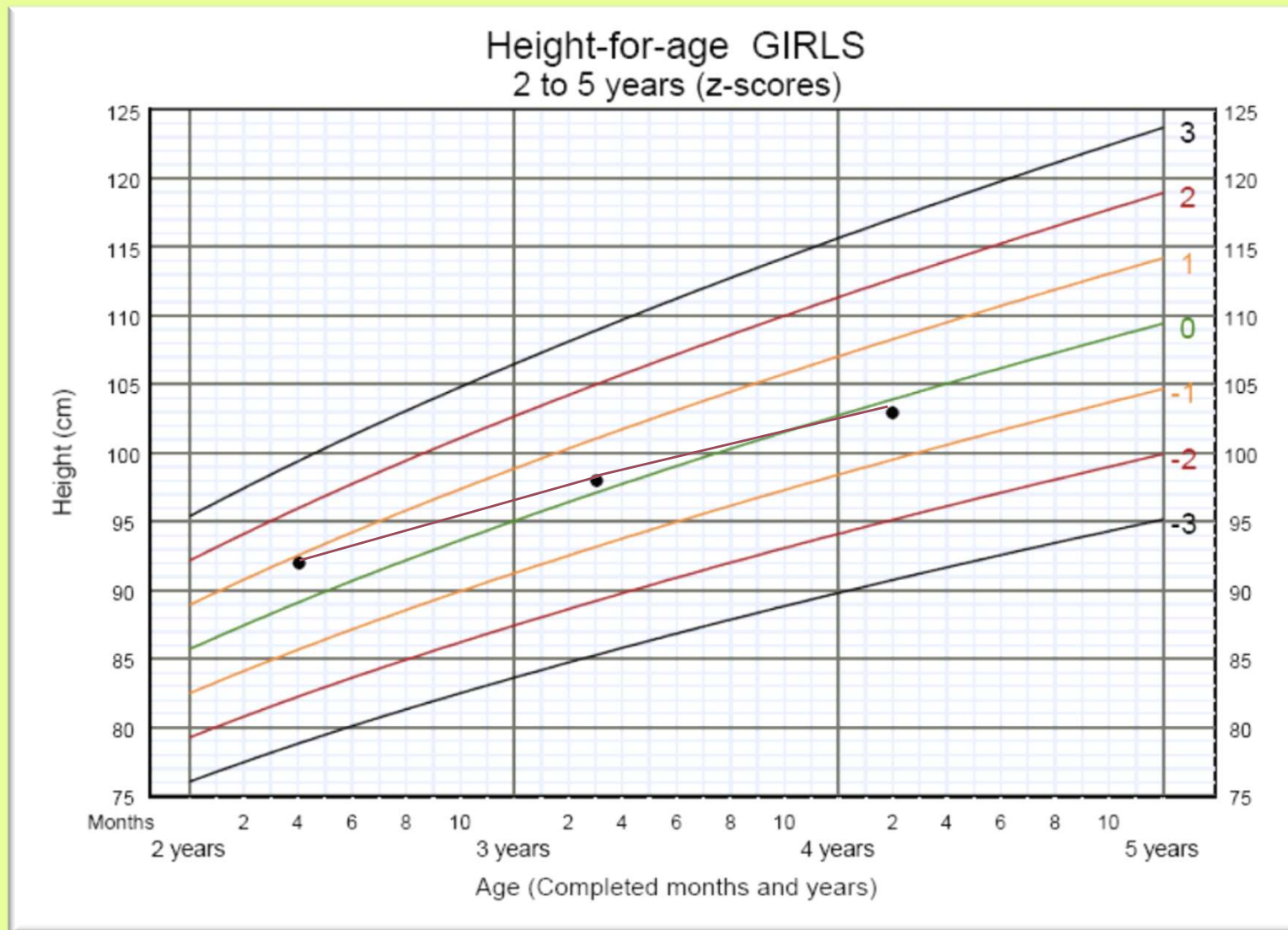
۵ تا ۱۹ سال (z-scores)



Plot Points for Growth Indicators



Maryam



92 cm at 2 yr & 4 mo, 98 cm at 3 yr & 3 mo, &
103 cm at 4 yr & 2 mo

تفسیر شاخص های رشد

نمایه ی توده ی بدن برای سن	وزن برای قد	وزن برای سن	قد برای سن	z-score
چاق (Obese)	چاق (Obese)			بالای ۳
اضافه وزن (Overweight)	اضافه وزن (Overweight)		طبیعی	بالای ۲
خطر احتمالی اضافه وزن	خطر احتمالی اضافه وزن		طبیعی	بالای ۱
طبیعی	طبیعی	طبیعی	طبیعی	میانگین (۰)
طبیعی	طبیعی	طبیعی	طبیعی	پایین - ۱
لاغر (Wasted)	لاغر (Wasted)	کم وزن (Underweight)	کوتاه قد (Stunted)	پایین - ۲
خیلی لاغر (Severely wasted)	خیلی لاغر (Severely wasted)	خیلی کم وزن (Severely underweight)	خیلی کوتاه قد (Severely stunted)	پایین - ۳

Body Mass Index

طبقه بندی ۵-۱۹	طبقه بندی ۰-۵ سال	Z-Score (SD)	صدک
چاقی شدید	چاق	بیشتر از +۳	بیشتر از ۹۹
چاق	اضافه وزن	بیشتر از +۲ تا +۳	بیشتر از ۹۷ تا ۹۹
اضافه وزن	در معرض اضافه وزن	بیشتر از +۱ تا +۲	بیشتر از ۸۵ تا ۹۷
طبیعی	طبیعی	بین -۲ تا +۱	بین ۳ تا ۸۵
لاغر	لاغر	کمتر از -۲ تا -۳	کمتر از ۳ تا ۱
لاغری شدید	لاغری شدید	کمتر از -۳	کمتر از ۱

Normal Weight for age



Underweight Boy



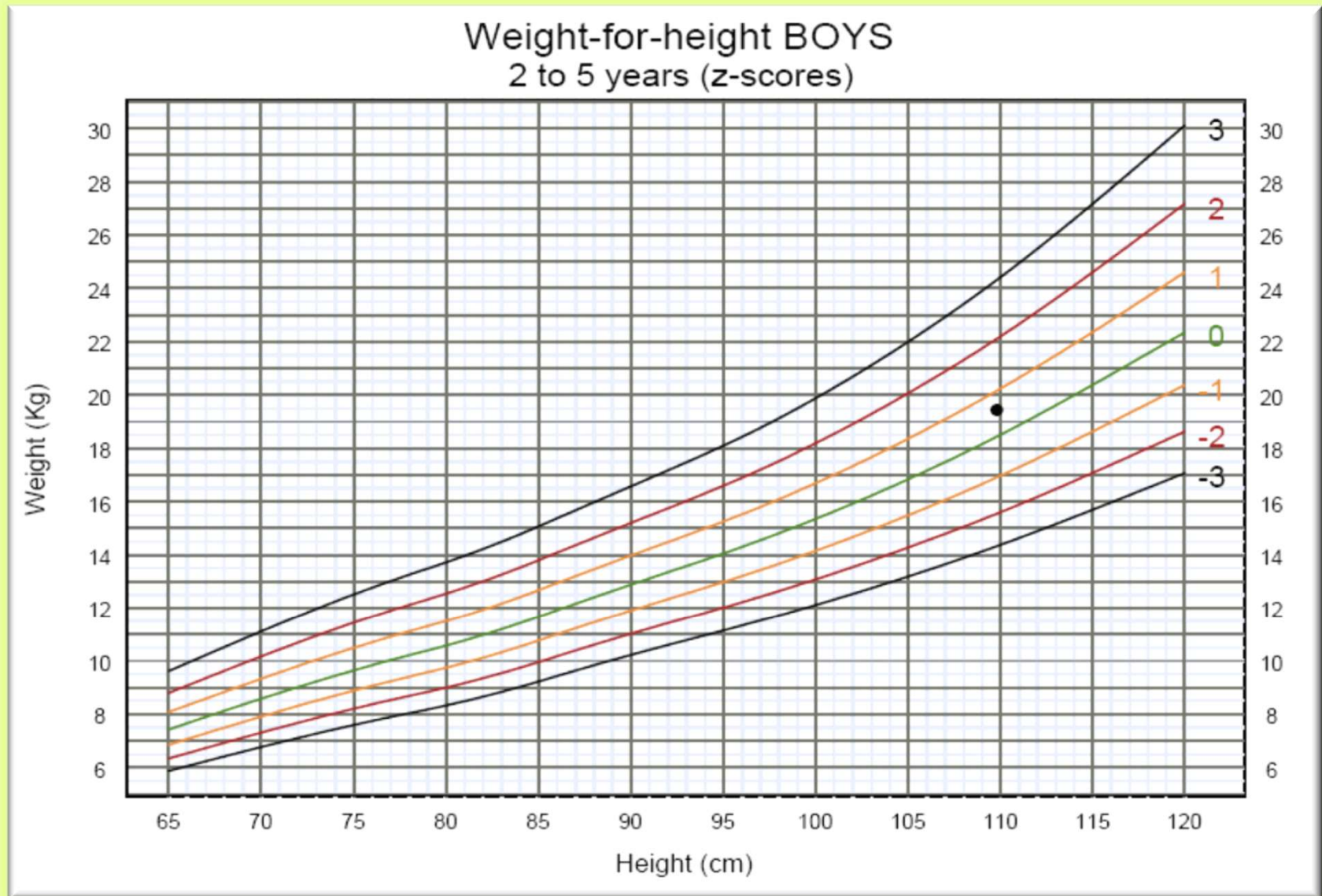
Stunting



Normal Weight for length



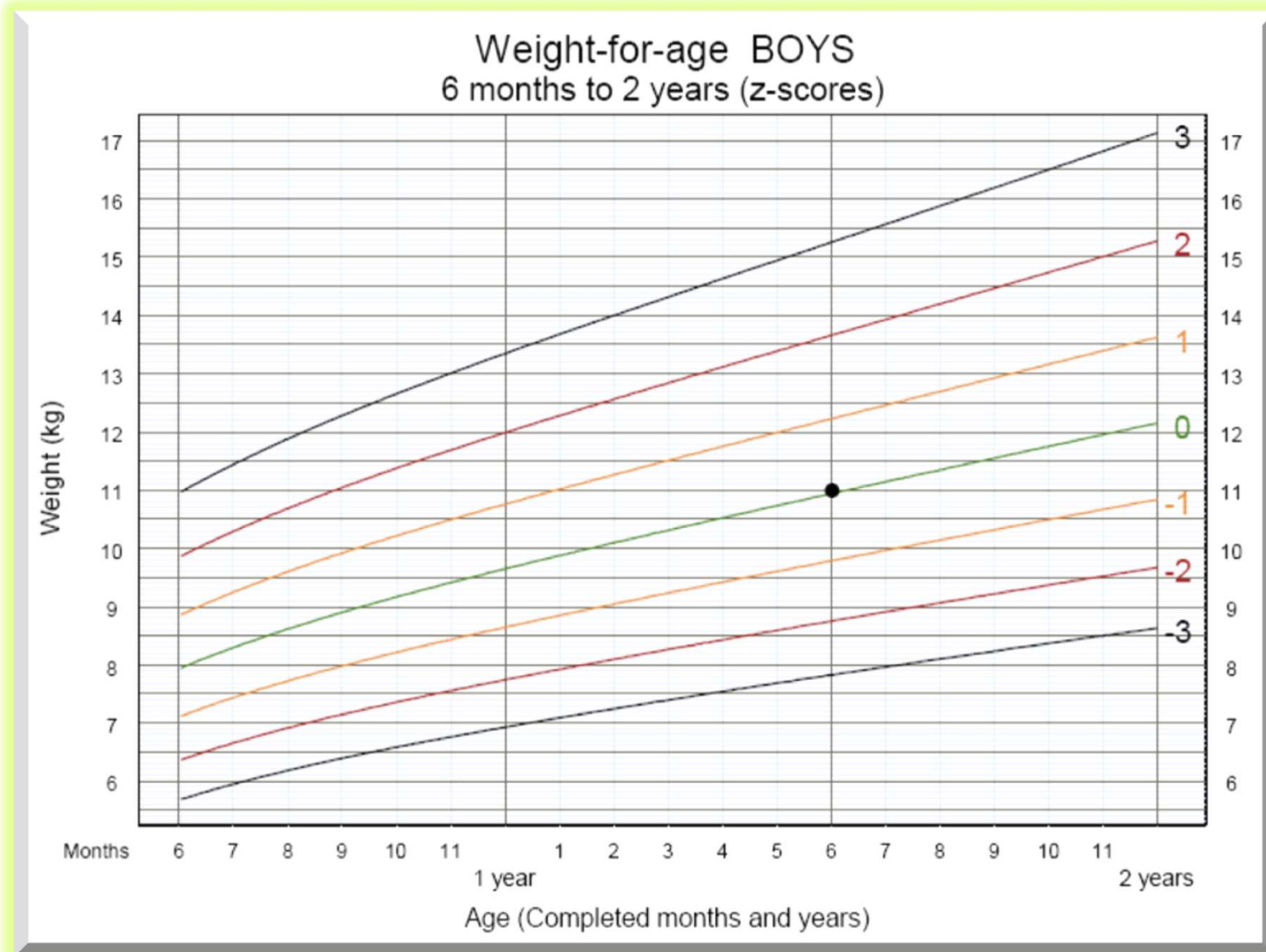
Normal Weight Boy



Obese Boy

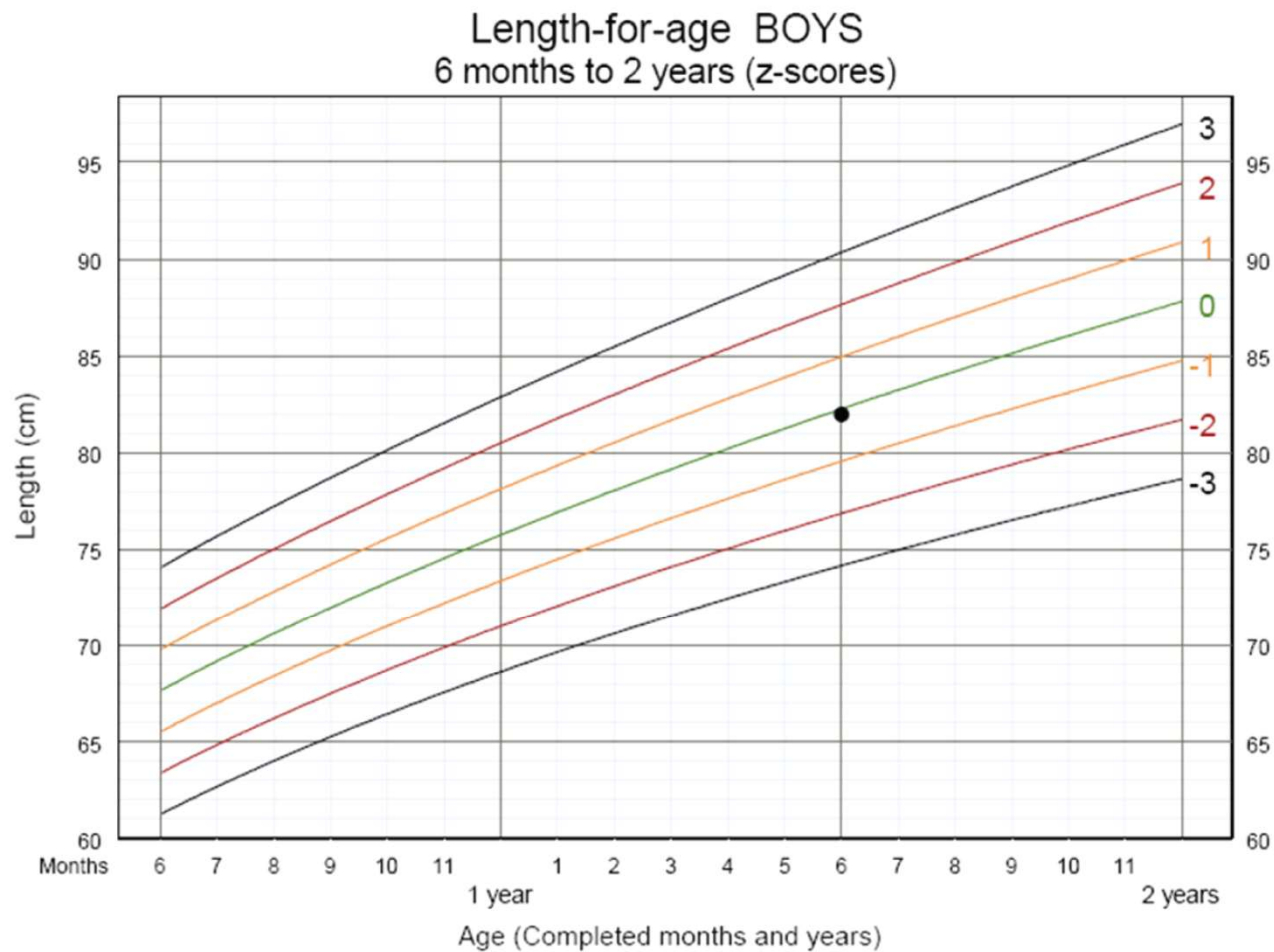


Charts for Ali

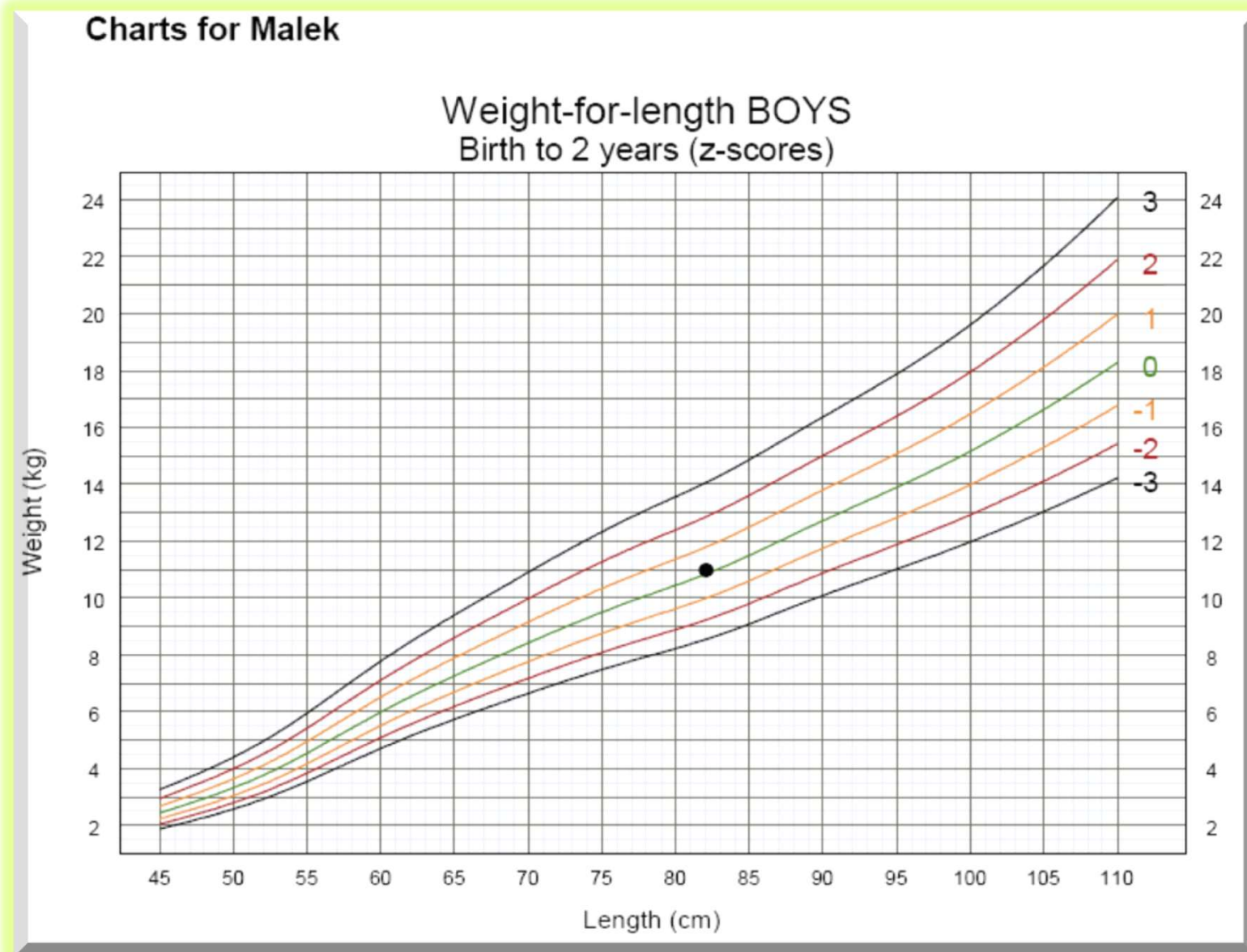


Charts for Ali

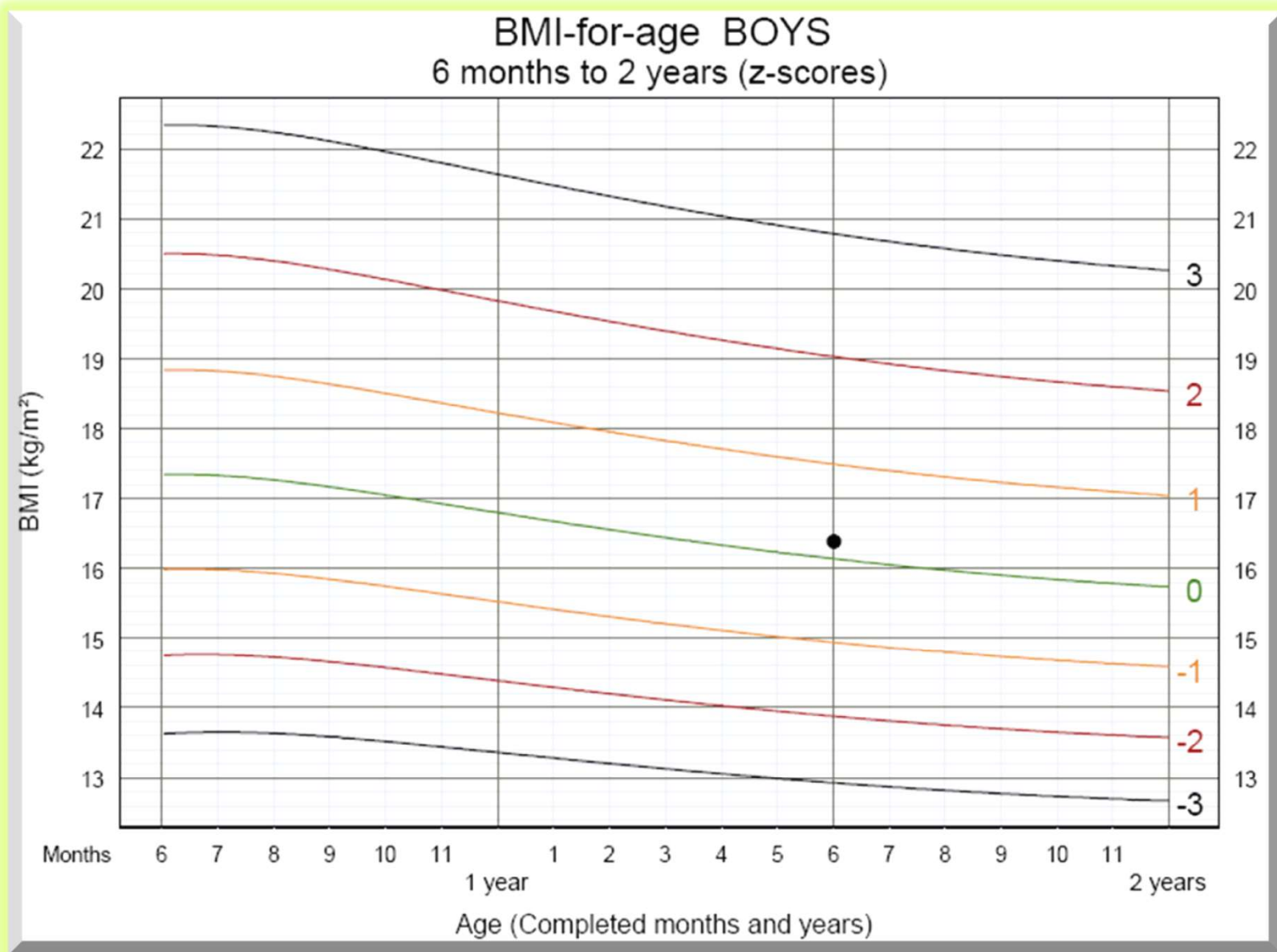
Charts for Malek



Charts for Ali



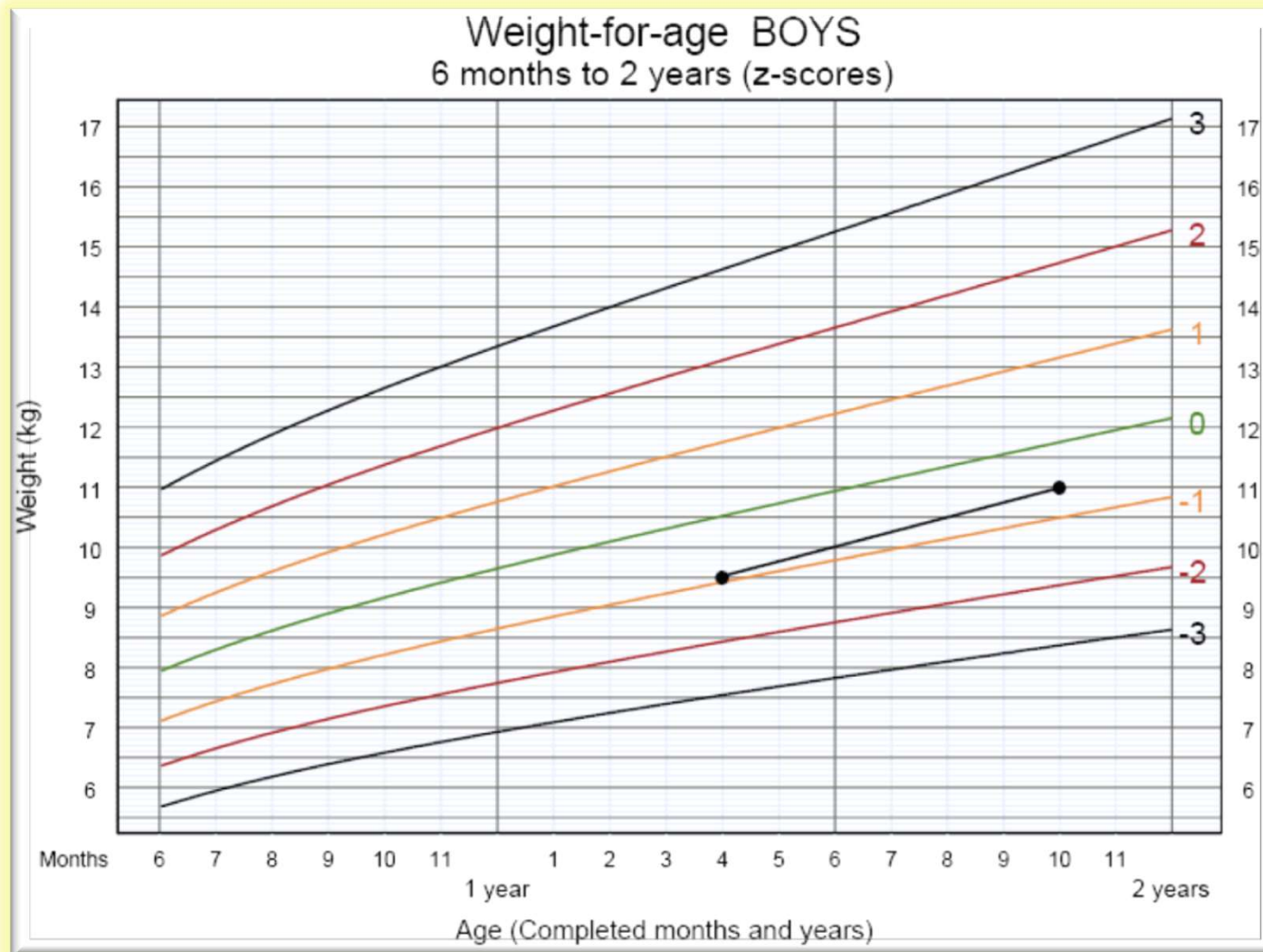
Charts for Ali



Ali

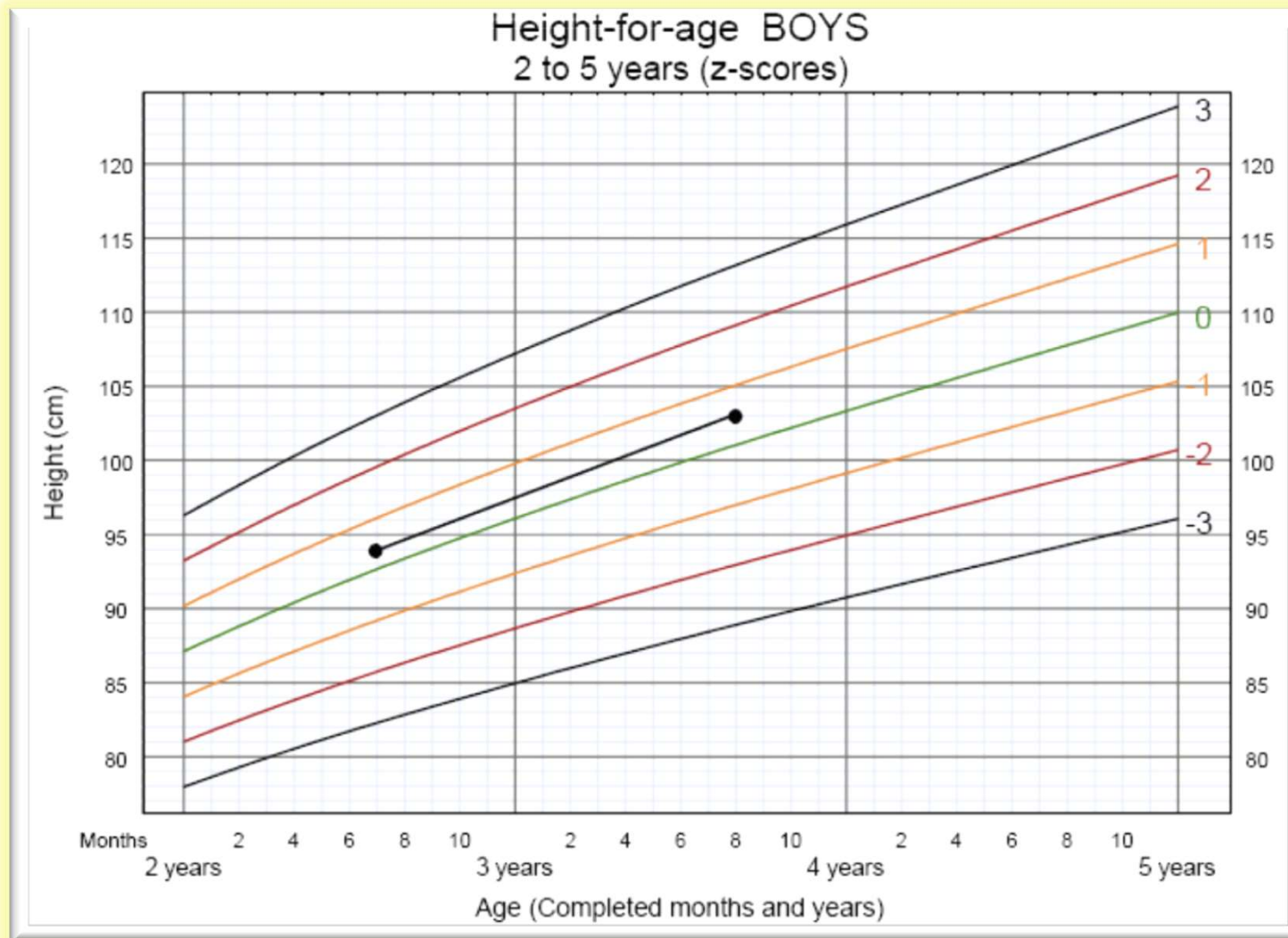
١. Ali's weight-for-age is on median.
٢. Ali's length-for-age is on or just below median.
٣. Ali's weight-for-length is on median.
٤. Ali's BMI-for-age is just above median.
٥. Ali does not seem to have any growth problem or risk of a growth problem.

Case 1



At age 1 yr & 4 mo, this boy weighed about 9.5 kg.
At age 1 yr & 10 mo, this boy weighed about 11 kg.

Case 2



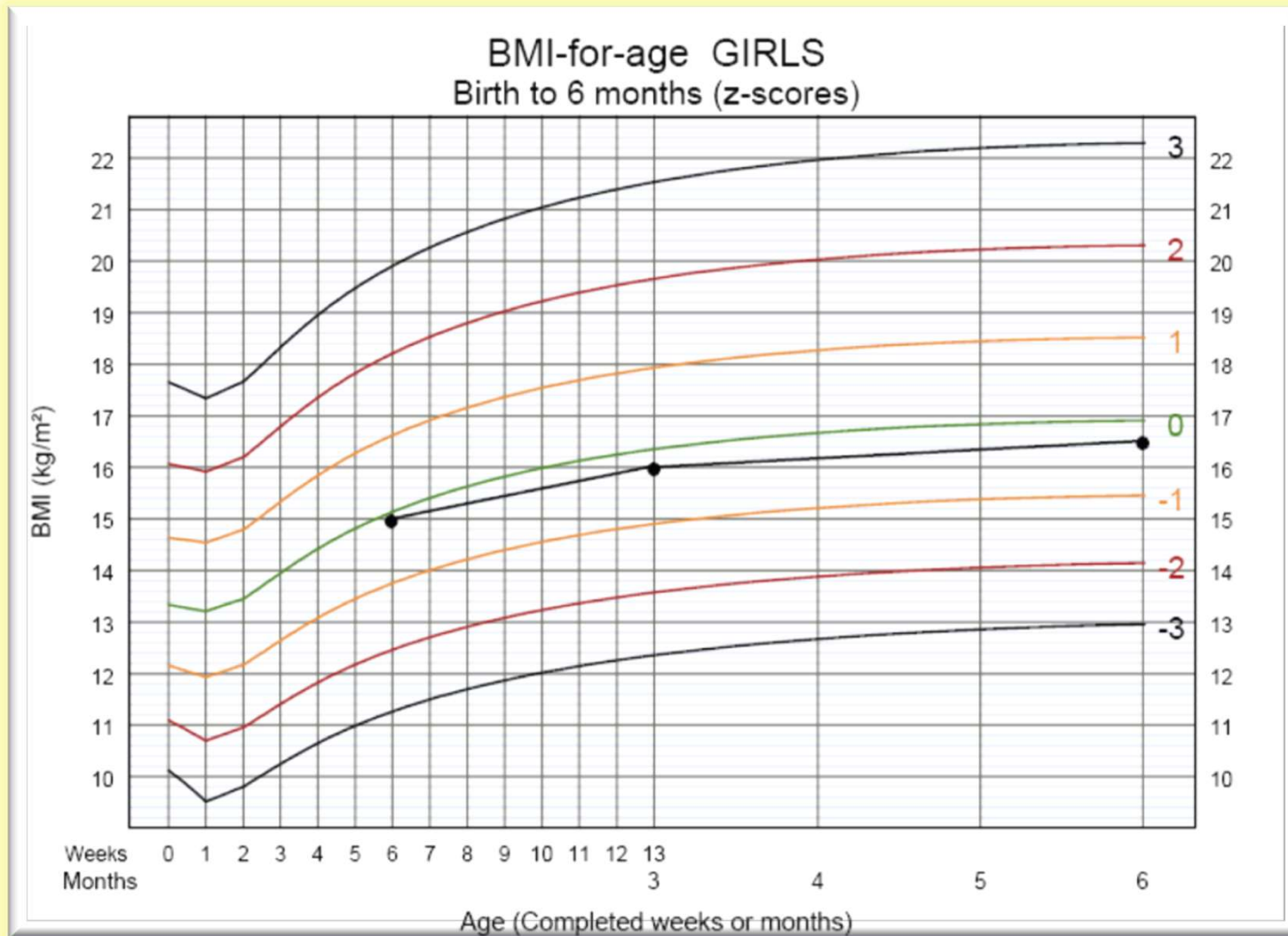
At age 2 yr & 7 mo, this boy was 94 cm in height.
At age 3 yr & 8 mo, this boy was 103 cm in height.

Case ۳



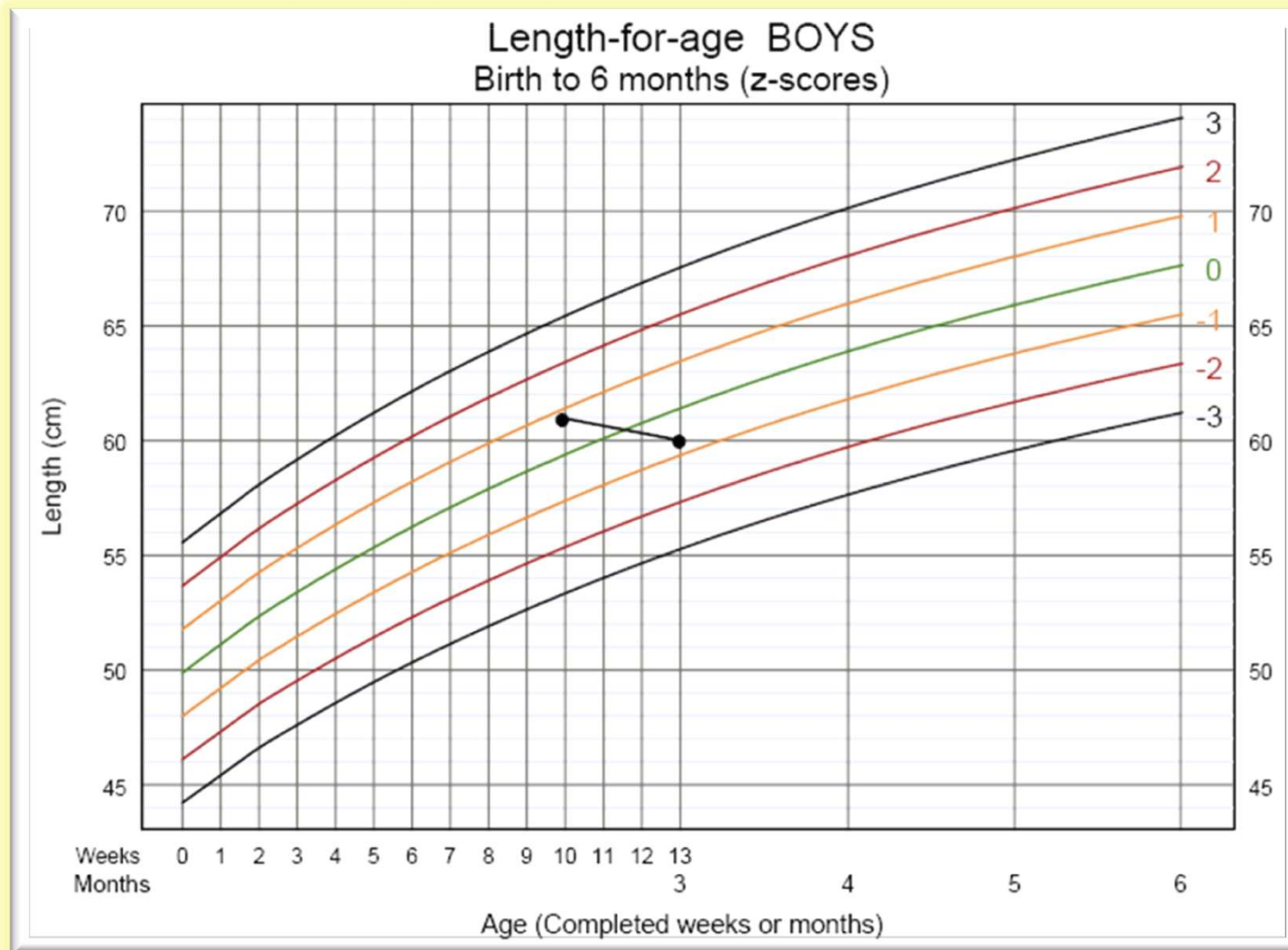
At first visit, this girl was ۶۵ cm in length & weighed ۹ kg.
At second visit, this girl was about ۸۲ cm in length & weighed about ۱۲.۷ kg.

Case ۲



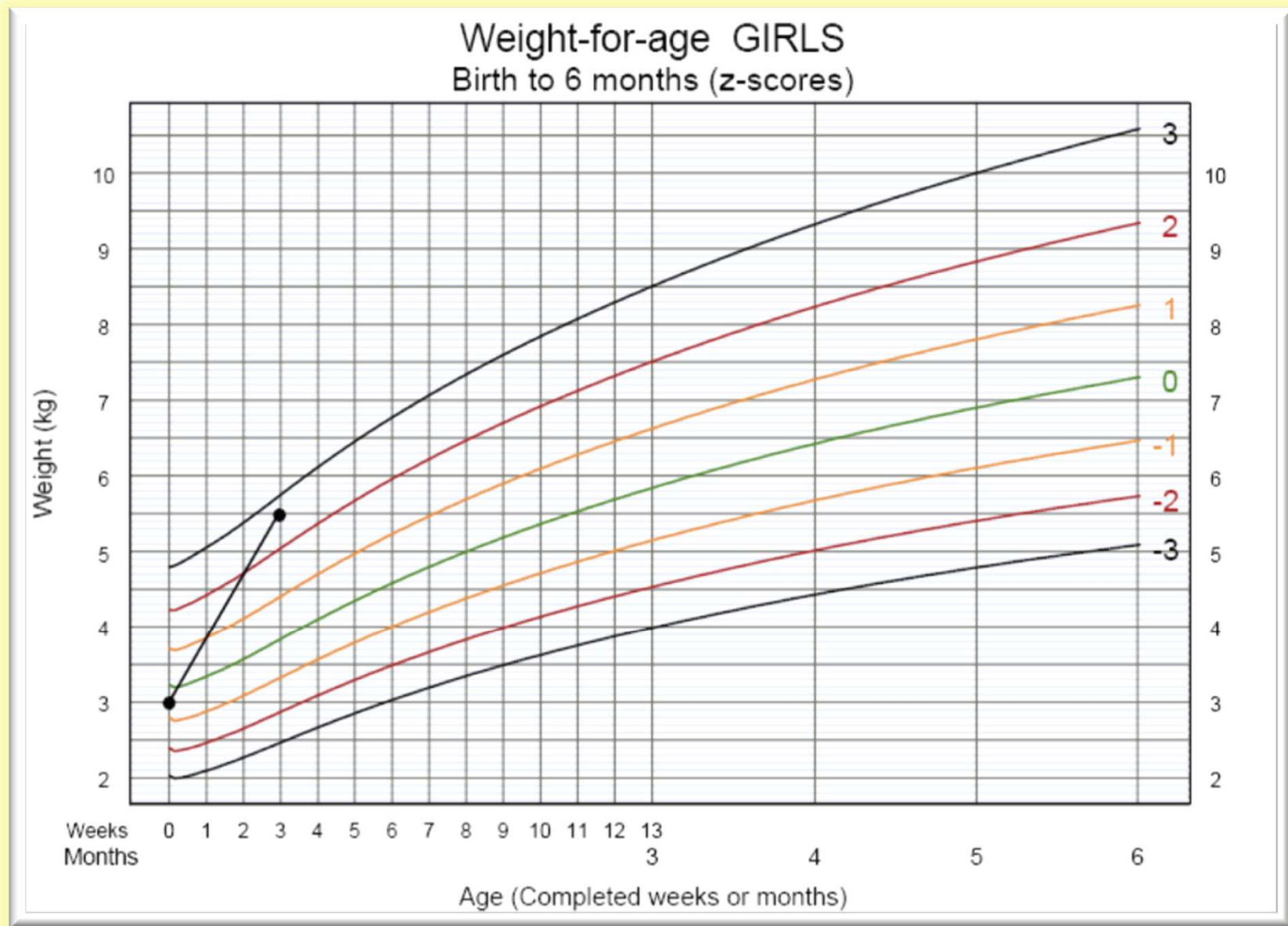
At ۶ wk of age, this girl's BMI was ۱۵.
At age ۳ mo, this girl's BMI was ۱۶.
At age ۶ mo, this girl's BMI was ۱۶/۵.

Case 5



Growth chart suggests that this boy was 61 cm in length at age 10 wk & 60 cm in length at age 3 mo.

Case 6



Case γ



This graph shows a dramatic change in weight-for-age.

Interpret Trends on Growth Charts

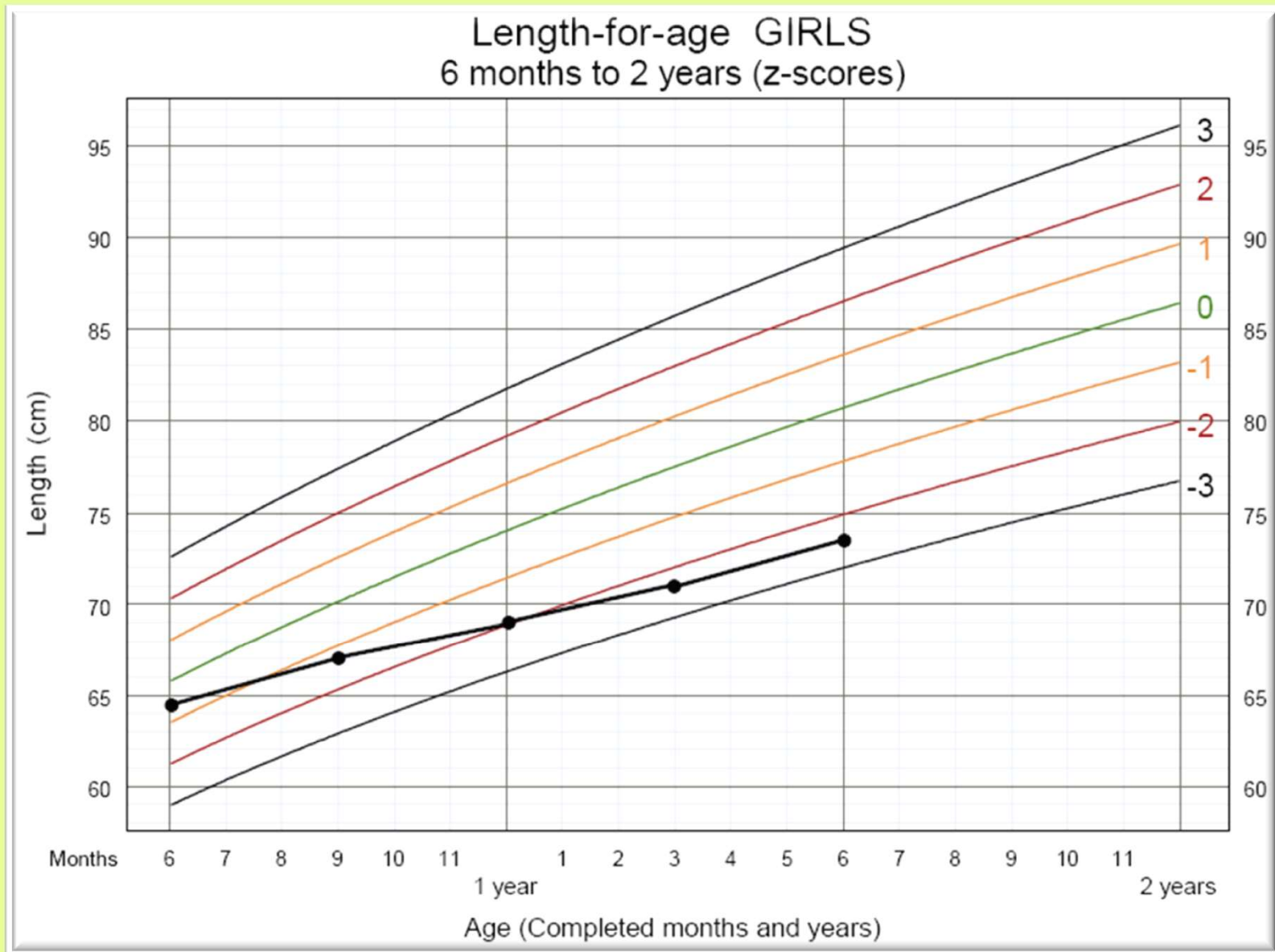
Following situations may indicate problem or suggest risk:

- Child's growth line crosses a z-score line.
- There is a sharp incline or decline in child's growth line.
- Child's growth line remains flat (stagnant); there is no gain in weight or length/height

Mohsen



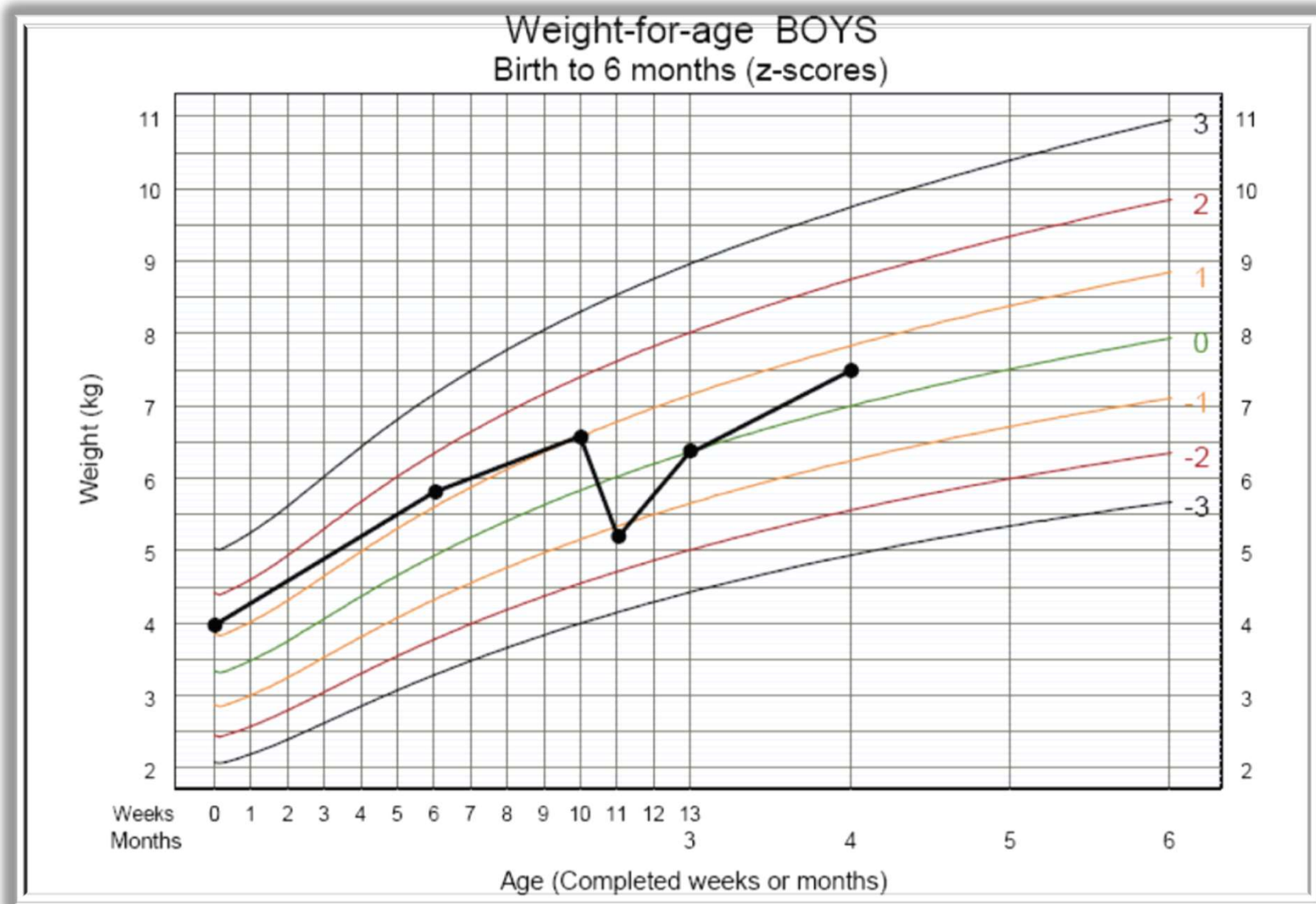
Nazanin



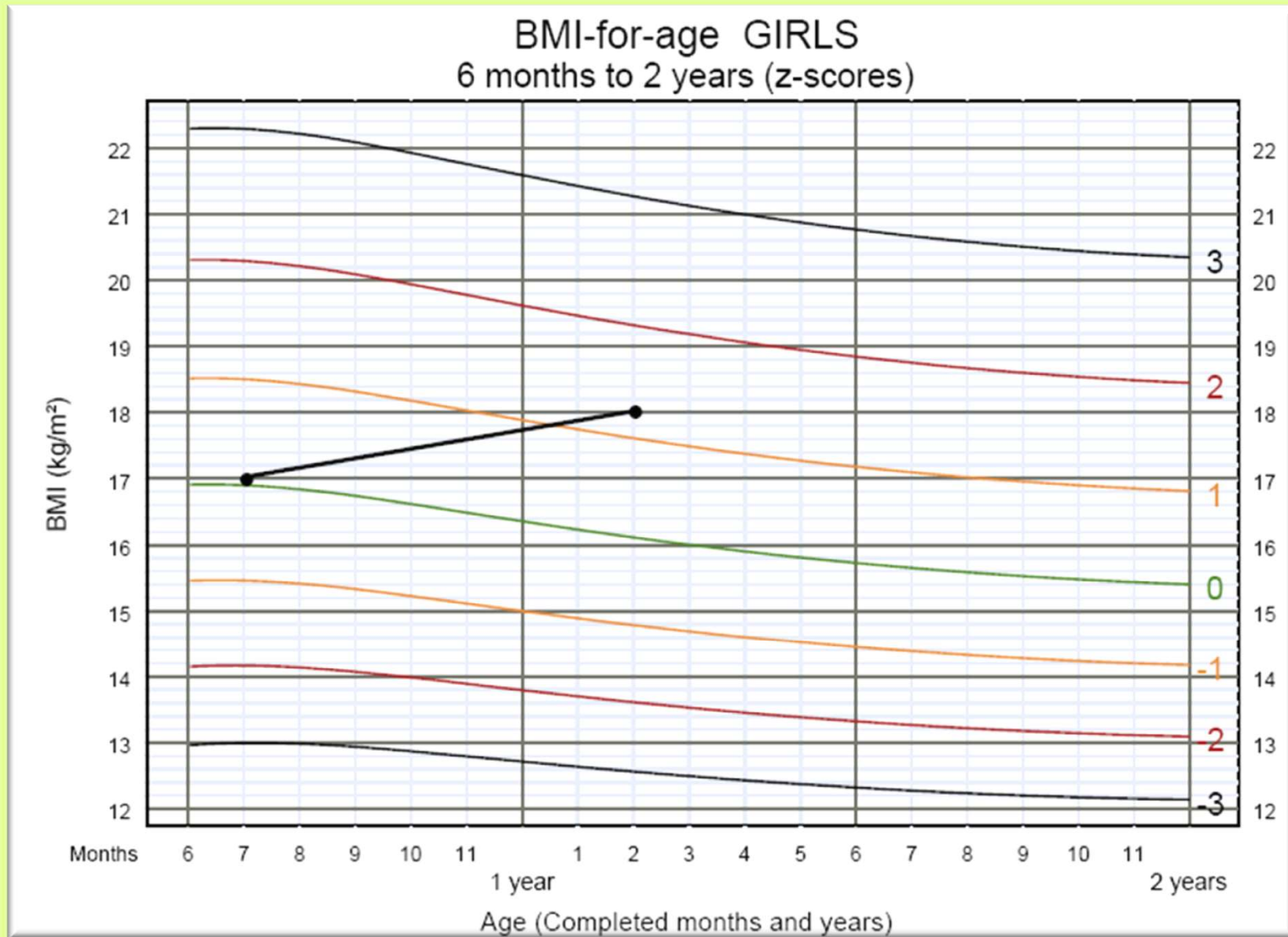
Yaser



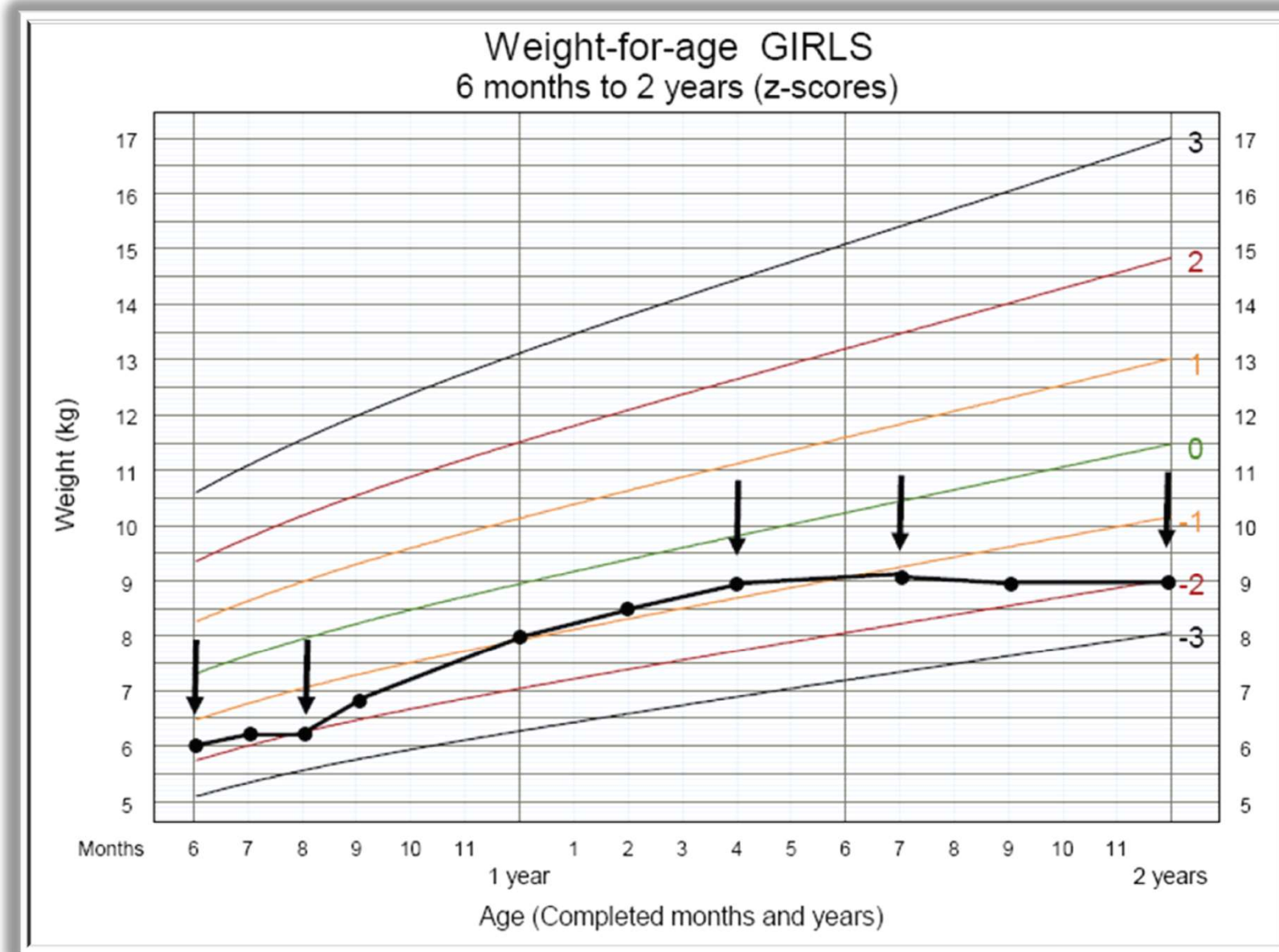
Sharp Incline or Decline in Growth Line



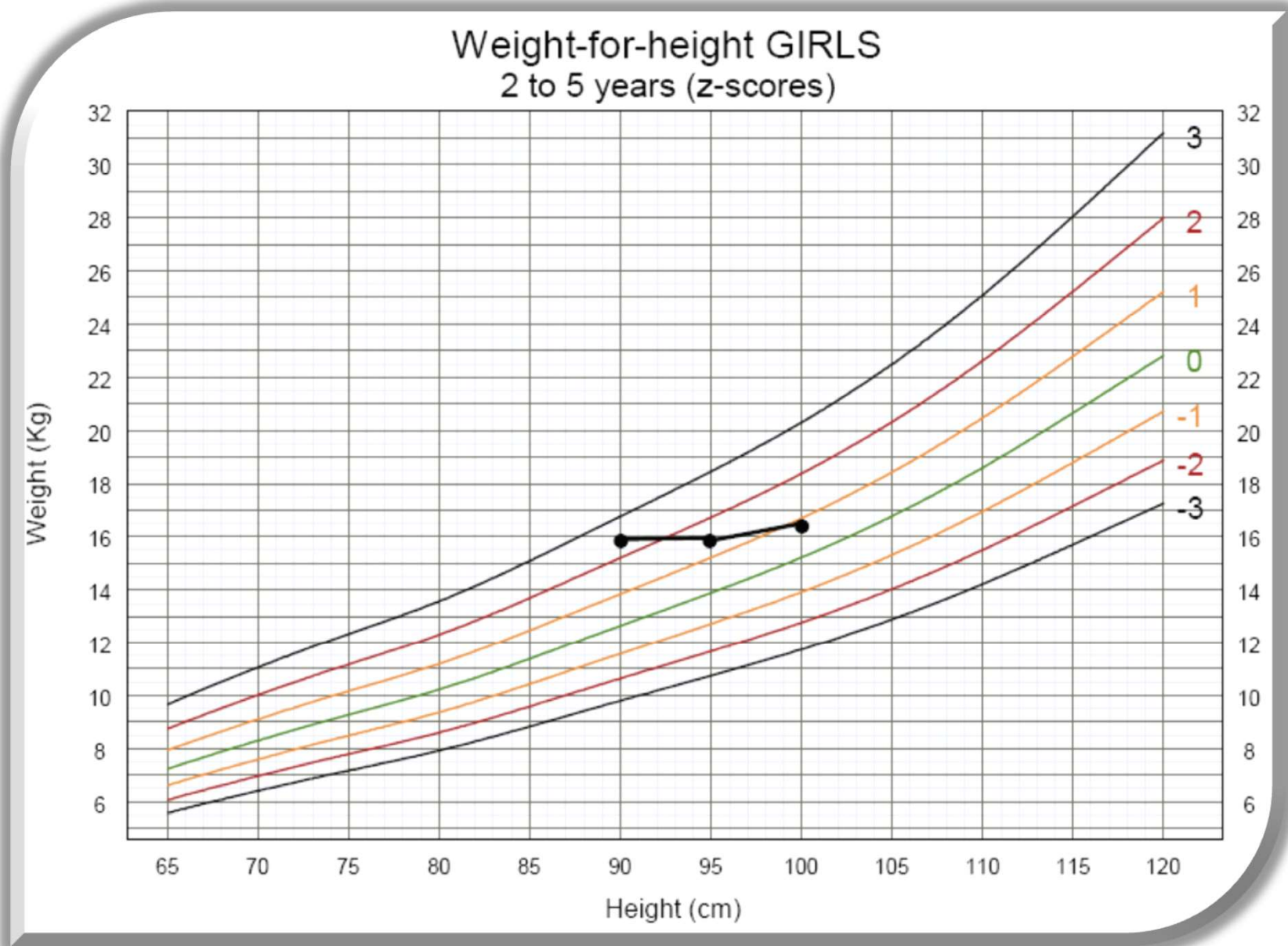
Sara



Flat Growth Line (Stagnation)



Flat Growth Line (Stagnation)



OUR GREAT RESPONSIBILITY

