



Millennials' Growth

Barcelona Longitudinal Growth Study 1995 - 2017

Growth and Body Mass Indexes of 1 453 Healthy Non-Obese
Millennial Children (710 Boys and 743 Girls)



<https://doi.org/10.3266/Pulso.ed.MillennialsGrowth.2018.ENG>



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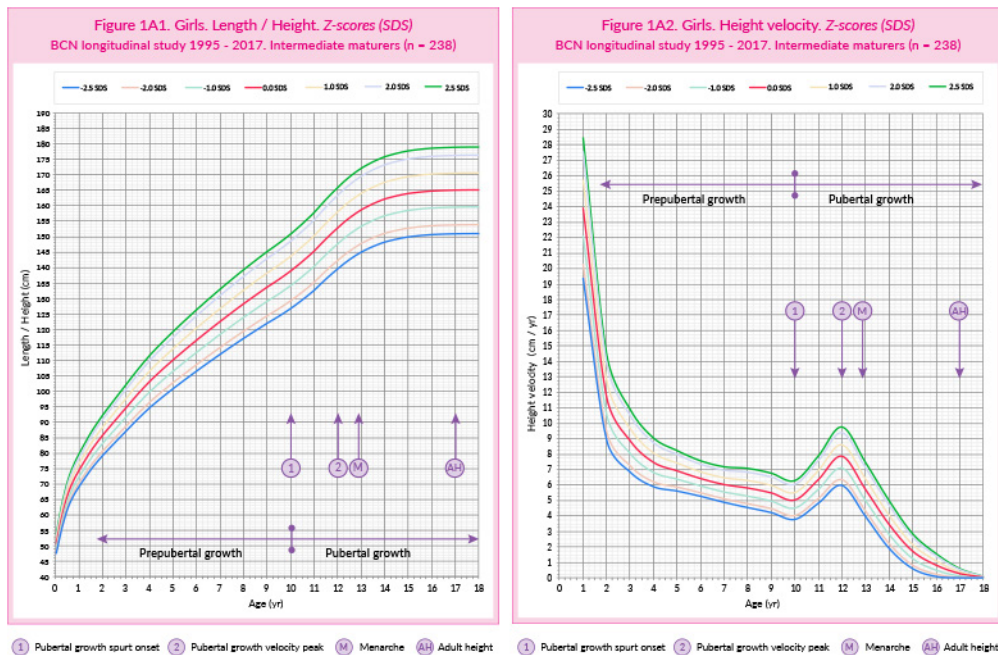
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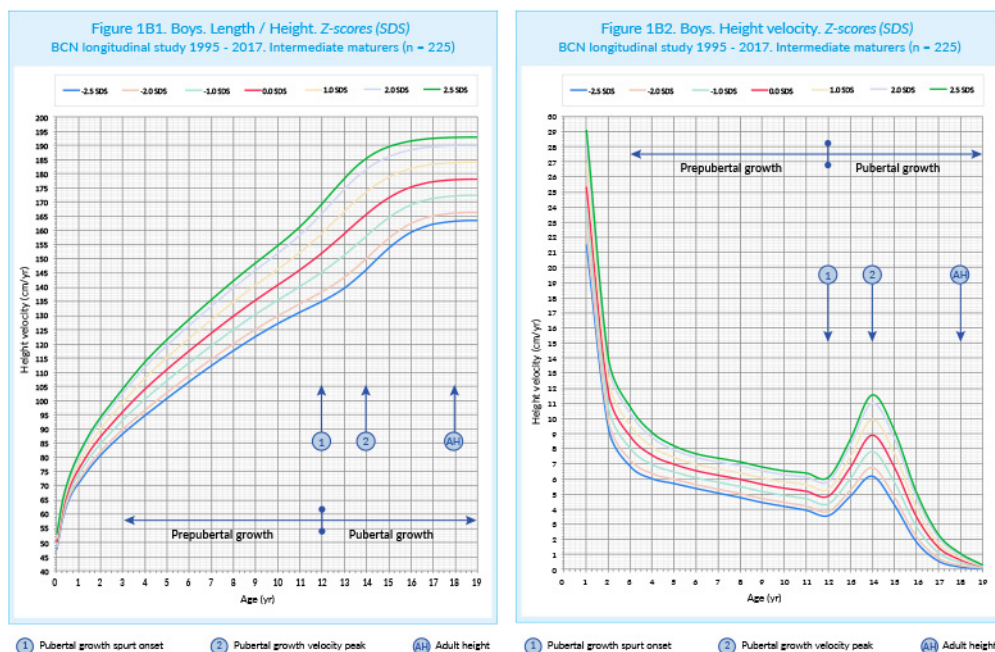
Introduction

Cross-sectional studies are carried out in large numbers of children of different ages (birth to adult height) evaluated over a short period of time. However, as pubertal growth differs according to age at pubertal growth spurt onset, cross-sectional data are not useful for evaluating pubertal growth and should only be applied to evaluate prepubertal growth and adult height.

Pubertal growth spurt onset occurs between 8 and 13 years of age in girls and between 10 and 15 years in boys. Adult height is reached between 15 and 17 years of age in girls and 17 and 19 years in boys (Figure 1).

In longitudinal growth studies, the same children are followed from birth to adult height and age at pubertal growth spurt onset is clearly defined; thus, these studies yield actual data on pubertal growth. However, since they require long-term follow-up (20-22 years), they are difficult to conduct and tend to include low numbers of children.





Our previous Spanish longitudinal growth study (1978-2000) presented pubertal growth reference data of 259 girls and 281 boys allocated to one of five 1-year-age-interval pubertal maturity groups (very-early, early, intermediate, late and very-late) according to how old they were at pubertal growth spurt onset.

However, owing to the low number of children in each pubertal maturity group, a new longitudinal growth study was started in Barcelona (Spain) in 1995 with the aim of recruiting a minimum of 100 healthy non-obese millennial children of each sex in each of the five pubertal maturity groups. These children reached adult height between January 2012 and March 2017 and their data are presented herein.

Here you can find anthropometric reference values to evaluate growth from birth to adult height according to age at the pubertal growth spurt onset. The interpretation of results may be only performed by qualified health care professionals. The authors do not assume any responsibility for the interpretation of results arising from the use of these growth charts.

I would like to thank children, parents, schools and teachers who allowed us to perform this study. I also would like to thank the Scientific Societies which give their support to this work and the Institutions in which I do my scientific and professional activities:

Spanish Pediatric Association.



Catalan Society of Pediatrics.



Spanish Society of Pediatric Endocrinology.



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And also to the medical publishers and software system producers. Pulso Ediciones, SL.



Barcelona. January 2018

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Summary

Height, weight and pubertal development

Each child has its own “tempus” to start pubertal development, which is clearly defined by onset of the pubertal growth spurt.

In girls, pubertal growth spurt onset occurs between 8 and 13 years of age and in boys between 10 and 15 years.

According to age at pubertal growth spurt onset, children were assigned to one of the following five 1-year-age-interval pubertal maturity groups: very-early, early, intermediate, late and very-late. One hundred or more children of each sex were included in each group.

Mean birth length and mean adult height values for girls are similar among the five pubertal maturity groups and the same occurs in boys. However, height for age, growth velocity for age and weight-for age values differs during prepuberty (age < 8 years in girls and <10 years in boys) and are clinically pertinent during pubertal development.

Sexual characteristic development, and age at menarche and height gain from menarche to adult height in girls, differs among the five pubertal maturity groups.

Each of the five groups has its own pubertal development pattern.

These data suggest that individual pubertal growth should be evaluated with the corresponding pubertal maturity group pattern.

Body Mass Index (BMI) and Tri-ponderal Mass Index (TMI)

Mean BMI as well as TMI values, from birth to adult height, are similar among the five pubertal maturity groups for both sexes.

Mean BMI values from birth to adult height are similar between both sexes, and the same occurs for mean TMI.

This suggests that the differences observed in weight for age values among the five groups and among sexes, are mainly related to the corresponding differences in height for age values, which yields similar BMI values and similar TMI values.

BMI and TMI values of the whole population may be representative of the five pubertal maturity groups for both sexes.

Correspondence between centiles and Z-scores (SDS) values

The age distribution of each study variable by sex, in the whole population and in each pubertal maturation group, is charted as smoothed centile or Z-score (SDS) curves. The correspondence of mostly used centile and Z-score (SDS) values, in normally distributed variables, is illustrated in the following table.

Centile	Cent. 2%	Cent. 3%	Cent. 5%	Cent. 25%	Cent. 50%	Cent. 75%	Cent. 95%	Cent. 97%	Cent. 98%
to SDS	-2,05 SDS	-1,88 SDS	-1,64 SDS	-0,67 SDS	0,00 SDS	0,67 SDS	1,64 SDS	1,88 SDS	2,05 SDS
SDS	-2,5 SDS	-2,0 SDS	-1,5 SDS	-1,0 SDS	0,0 SDS	1,0 SDS	1,5 SDS	2,0 SDS	2,5 SDS
to centile	Cent. 0,6%	Cent. 2,3%	Cent. 6,7%	Cent. 15,9%	Cent. 50,0%	Cent. 84,1%	Cent. 93,3%	Cent. 97,7%	Cent. 99,4%

Tables and Growth Charts

Barcelona Longitudinal Study 1995 - 2017

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GIRLS

TABLES

PUBERTAL MATURITY GROUPS

Girls. Height for age. Pubertal maturity groups

Height for age (cm) in girls for each of the five pubertal maturity groups and for whole population (mean $\pm$ SD)						
Age (years)	Very-early n = 119	Early n = 157	Intermediate n = 238	Late n = 127	Very-late n = 102	Whole population n = 743
0	49.6 $\pm$ 1.5	49.7 $\pm$ 1.8	49.8 $\pm$ 1.2	49.7 $\pm$ 1.1	49.4 $\pm$ 2.0	49.6 $\pm$ 1.6
1	75.1 $\pm$ 2.2	74.8 $\pm$ 1.8	73.7 $\pm$ 2.1	73.9 $\pm$ 2.4	73.8 $\pm$ 1.9	74.2 $\pm$ 2.1
2	87.1 $\pm$ 2.5	87.1 $\pm$ 2.1	85.4 $\pm$ 2.7	85.6 $\pm$ 2.7	85.4 $\pm$ 2.4	86.0 $\pm$ 2.6
3	96.2 $\pm$ 2.9	96.2 $\pm$ 2.5	94.3 $\pm$ 3.1	94.1 $\pm$ 3.0	93.3 $\pm$ 2.6	94.7 $\pm$ 3.0
4	103.8 $\pm$ 3.2	103.7 $\pm$ 3.2	102.7 $\pm$ 3.5	102.2 $\pm$ 3.6	101.3 $\pm$ 3.4	102.8 $\pm$ 3.5
5	111.0 $\pm$ 3.4	110.8 $\pm$ 3.4	109.6 $\pm$ 3.8	109.1 $\pm$ 3.9	108.1 $\pm$ 3.6	109.8 $\pm$ 3.8
6	118.0 $\pm$ 3.7	117.4 $\pm$ 3.7	116.1 $\pm$ 4.0	115.5 $\pm$ 4.1	114.4 $\pm$ 3.8	116.3 $\pm$ 4.0
7	124.3 $\pm$ 4.0	123.7 $\pm$ 3.9	122.1 $\pm$ 4.2	121.4 $\pm$ 4.3	120.3 $\pm$ 4.0	122.4 $\pm$ 4.3
8	129.8 $\pm$ 4.2	129.6 $\pm$ 4.1	127.9 $\pm$ 4.5	127.2 $\pm$ 4.5	126.1 $\pm$ 4.2	128.2 $\pm$ 4.5
9	136.6 $\pm$ 4.4	134.9 $\pm$ 4.3	133.4 $\pm$ 4.8	132.7 $\pm$ 4.8	131.5 $\pm$ 4.3	133.9 $\pm$ 4.8
10	145.1 $\pm$ 4.7	141.4 $\pm$ 4.4	138.4 $\pm$ 5.0	138.0 $\pm$ 5.0	136.6 $\pm$ 4.4	139.8 $\pm$ 5.5
11	152.2 $\pm$ 4.8	149.6 $\pm$ 4.6	144.8 $\pm$ 5.2	142.8 $\pm$ 5.2	141.5 $\pm$ 4.5	146.2 $\pm$ 6.2
12	157.7 $\pm$ 4.8	156.1 $\pm$ 4.8	152.7 $\pm$ 5.2	149.1 $\pm$ 5.4	145.8 $\pm$ 4.7	152.6 $\pm$ 6.4
13	161.0 $\pm$ 4.9	160.4 $\pm$ 4.9	158.4 $\pm$ 5.3	156.4 $\pm$ 5.7	151.5 $\pm$ 4.8	158.0 $\pm$ 6.0
14	162.8 $\pm$ 4.8	162.7 $\pm$ 5.1	161.9 $\pm$ 5.4	161.0 $\pm$ 6.0	158.4 $\pm$ 4.8	161.6 $\pm$ 5.5
15	163.6 $\pm$ 4.9	163.7 $\pm$ 5.2	163.6 $\pm$ 5.5	163.3 $\pm$ 6.1	162.4 $\pm$ 4.7	163.4 $\pm$ 5.3
16	164.2 $\pm$ 4.9	164.3 $\pm$ 5.3	164.5 $\pm$ 5.5	164.4 $\pm$ 6.2	164.1 $\pm$ 4.7	164.3 $\pm$ 5.4
17	164.4 $\pm$ 4.9	164.5 $\pm$ 5.3	164.7 $\pm$ 5.6	164.8 $\pm$ 6.3	164.6 $\pm$ 4.8	164.6 $\pm$ 5.4
18	164.4 $\pm$ 4.9	164.5 $\pm$ 5.3	164.8 $\pm$ 5.6	164.9 $\pm$ 6.3	164.8 $\pm$ 4.8	164.7 $\pm$ 5.4
Bold: height for age at pubertal growth spurt onset. SD: standard deviation.						

Girls. Growth Velocity. Pubertal maturity groups

Growth velocity (cm/year) of girls for each of the five pubertal maturity groups and for the whole population (mean $\pm$ SD)						
Age (years)	Very-early n = 119	Early n = 157	Intermediate n = 238	Late n = 127	Very-late n = 102	Whole population n = 743
0-1	25.5 $\pm$ 2.1	25.1 $\pm$ 1.7	24.0 $\pm$ 1.7	24.4 $\pm$ 1.9	24.3 $\pm$ 1.6	24.6 $\pm$ 1.9
1-2	12.1 $\pm$ 0.8	12.3 $\pm$ 1.1	11.7 $\pm$ 1.2	11.7 $\pm$ 1.1	11.5 $\pm$ 1.1	11.8 $\pm$ 1.1
2-3	9.1 $\pm$ 0.6	9.1 $\pm$ 0.8	8.9 $\pm$ 0.8	8.5 $\pm$ 0.6	8.0 $\pm$ 0.4	8.7 $\pm$ 0.8
3-4	7.8 $\pm$ 0.6	7.9 $\pm$ 0.6	7.5 $\pm$ 0.6	7.5 $\pm$ 0.6	7.3 $\pm$ 0.4	7.6 $\pm$ 0.6
4-5	7.3 $\pm$ 0.5	7.1 $\pm$ 0.5	6.9 $\pm$ 0.5	6.9 $\pm$ 0.6	6.8 $\pm$ 0.4	7.0 $\pm$ 0.5
5-6	6.9 $\pm$ 0.5	6.6 $\pm$ 0.4	6.4 $\pm$ 0.5	6.4 $\pm$ 0.5	6.3 $\pm$ 0.4	6.5 $\pm$ 0.5
6-7	6.4 $\pm$ 0.6	6.3 $\pm$ 0.5	6.0 $\pm$ 0.5	6.0 $\pm$ 0.5	5.9 $\pm$ 0.4	6.1 $\pm$ 0.5
7-8	5.5 $\pm$ 0.6	6.0 $\pm$ 0.5	5.8 $\pm$ 0.5	5.7 $\pm$ 0.6	5.7 $\pm$ 0.4	5.8 $\pm$ 0.6
8-9	6.8 $\pm$ 0.5	5.3 $\pm$ 0.6	5.5 $\pm$ 0.5	5.5 $\pm$ 0.5	5.4 $\pm$ 0.4	5.7 $\pm$ 0.7
9-10	8.5 $\pm$ 0.9	6.4 $\pm$ 0.5	5.0 $\pm$ 0.6	5.3 $\pm$ 0.5	5.1 $\pm$ 0.4	5.9 $\pm$ 1.4
10-11	7.1 $\pm$ 0.7	8.2 $\pm$ 0.8	6.4 $\pm$ 0.6	4.8 $\pm$ 0.6	4.8 $\pm$ 0.4	6.4 $\pm$ 1.4
11-12	5.5 $\pm$ 0.7	6.5 $\pm$ 0.7	7.9 $\pm$ 0.7	6.2 $\pm$ 0.6	4.3 $\pm$ 0.4	6.4 $\pm$ 1.4
12-13	3.4 $\pm$ 0.6	4.3 $\pm$ 0.9	5.7 $\pm$ 0.8	7.3 $\pm$ 0.8	5.8 $\pm$ 0.5	5.3 $\pm$ 1.5
13-14	1.7 $\pm$ 0.5	2.3 $\pm$ 0.7	3.5 $\pm$ 0.7	4.6 $\pm$ 0.8	6.8 $\pm$ 0.8	3.6 $\pm$ 1.7
14-15	0.9 $\pm$ 0.3	1.0 $\pm$ 0.4	1.7 $\pm$ 0.5	2.3 $\pm$ 0.7	4.0 $\pm$ 0.7	1.8 $\pm$ 1.1
15-16	0.6 $\pm$ 0.2	0.6 $\pm$ 0.3	0.8 $\pm$ 0.4	1.1 $\pm$ 0.4	1.7 $\pm$ 0.6	0.9 $\pm$ 0.5
16-17	0.2 $\pm$ 0.1	0.2 $\pm$ 0.1	0.3 $\pm$ 0.3	0.4 $\pm$ 0.3	0.6 $\pm$ 0.4	0.3 $\pm$ 0.3
17-18	0.0 $\pm$ 0.0	0.0 $\pm$ 0.0	0.1 $\pm$ 0.1	0.1 $\pm$ 0.1	0.1 $\pm$ 0.2	0.1 $\pm$ 0.1
Bold: growth velocity at the pubertal growth spurt. SD: standard deviation.						

Girls. Pubertal growth. Pubertal maturity groups

Pubertal growth in girls								
Pubertal maturity group	Number of subjects	Age at onset of pubertal growth spurt (years)	Height at the beginning of pubertal growth spurt (cm)	Peak pubertal growth velocity (cm/year)	Total pubertal gain of height (cm)	Adult height (cm)	Age at menarche (years)	Height gain from menarche (cm)
Very-early	119	8-9	129.8 ± 4.2	8.5 ± 0.9	34.6 ± 2.4	164.4 ± 4.9	11,4 ± 0,4	10,2 ± 1,8
Early	157	9-10	134.9 ± 4.3	8.2 ± 0.8	29.6 ± 2.5	164.5 ± 5.3	12,3 ± 0,3	7,4 ± 1,6
Intermediate	238	10-11	138.4 ± 5.0	7.9 ± 0.7	26.4 ± 2.4	164.8 ± 5.6	12,9 ± 0,3	6,9 ± 1,3
Late	127	11-12	142.8 ± 5.2	7.3 ± 0.8	22.1 ± 2.4	164.9 ± 6.3	13,6 ± 0,3	5,8 ± 1,5
Very-late	102	12-13	145.8 ± 4.7	6.8 ± 0.8	18.9 ± 2.1	164.8 ± 4.8	14,9 ± 0,5	4,3 ± 1,4
Whole population	743	8-13	-	-	-	164.7 ± 5.4	12,9 ± 1,1	7,0 ± 2,3
Mean ± standard deviation.								

Girls. Weight for age. Pubertal maturity groups

Weight for age (kg) in girls for each of the five pubertal maturity groups and for whole population (mean $\pm$ SD)						
Age (years)	Very-early n = 119	Early n = 157	Intermediate n = 238	Late n = 127	Very-late n = 102	Whole population n = 743
0	3.3 $\pm$ 0.4	3.3 $\pm$ 0.5	3.3 $\pm$ 0.4	3.3 $\pm$ 0.4	3.2 $\pm$ 0.4	3.3 $\pm$ 0.4
1	9.9 $\pm$ 0.9	9.9 $\pm$ 0.7	9.6 $\pm$ 0.8	9.6 $\pm$ 0.6	9.5 $\pm$ 0.7	9.7 $\pm$ 0.8
2	12.6 $\pm$ 1.1	12.6 $\pm$ 0.9	12.1 $\pm$ 1.1	12.1 $\pm$ 0.9	12.0 $\pm$ 1.0	12.3 $\pm$ 1.0
3	14.9 $\pm$ 1.3	14.8 $\pm$ 1.3	14.3 $\pm$ 1.3	14.2 $\pm$ 1.0	13.9 $\pm$ 1.2	14.4 $\pm$ 1.3
4	17.3 $\pm$ 1.6	16.9 $\pm$ 1.5	16.5 $\pm$ 1.7	16.0 $\pm$ 1.5	16.0 $\pm$ 1.6	16.6 $\pm$ 1.7
5	19.9 $\pm$ 2.2	19.3 $\pm$ 1.9	18.8 $\pm$ 2.2	18.2 $\pm$ 1.8	18.1 $\pm$ 1.8	18.9 $\pm$ 2.1
6	22.8 $\pm$ 2.6	22.0 $\pm$ 2.4	21.2 $\pm$ 2.7	20.6 $\pm$ 2.2	20.6 $\pm$ 2.3	21.4 $\pm$ 2.6
7	26.1 $\pm$ 3.4	25.1 $\pm$ 3.2	24.0 $\pm$ 3.4	23.2 $\pm$ 2.7	23.1 $\pm$ 3.0	24.3 $\pm$ 3.4
8	29.8 $\pm$ 4.0	28.6 $\pm$ 3.9	27.1 $\pm$ 4.1	26.2 $\pm$ 3.4	25.9 $\pm$ 3.6	27.5 $\pm$ 4.1
9	34.1 $\pm$ 4.6	32.2 $\pm$ 4.6	30.3 $\pm$ 4.8	29.3 $\pm$ 4.1	28.7 $\pm$ 4.0	30.9 $\pm$ 4.8
10	39.2 $\pm$ 5.4	36.2 $\pm$ 5.1	33.9 $\pm$ 5.5	32.7 $\pm$ 4.8	32.0 $\pm$ 4.9	34.8 $\pm$ 5.7
11	44.7 $\pm$ 6.4	41.3 $\pm$ 6.1	38.1 $\pm$ 6.4	36.4 $\pm$ 5.6	35.5 $\pm$ 5.8	39.2 $\pm$ 6.8
12	49.2 $\pm$ 6.6	46.5 $\pm$ 6.3	43.0 $\pm$ 6.6	40.7 $\pm$ 6.1	39.0 $\pm$ 6.3	43.8 $\pm$ 7.2
13	53.1 $\pm$ 6.4	51.0 $\pm$ 6.5	47.9 $\pm$ 6.8	45.7 $\pm$ 6.5	43.4 $\pm$ 6.9	48.4 $\pm$ 7.3
14	55.3 $\pm$ 6.0	53.9 $\pm$ 6.5	51.2 $\pm$ 6.9	49.7 $\pm$ 6.5	48.2 $\pm$ 7.0	51.7 $\pm$ 7.0
15	56.6 $\pm$ 6.1	55.7 $\pm$ 6.4	53.3 $\pm$ 6.5	52.6 $\pm$ 6.3	51.5 $\pm$ 6.7	54.0 $\pm$ 6.6
16	57.4 $\pm$ 6.2	56.5 $\pm$ 6.3	54.5 $\pm$ 6.6	54.1 $\pm$ 6.5	53.5 $\pm$ 6.6	55.2 $\pm$ 6.6
17	57.9 $\pm$ 6.0	56.9 $\pm$ 6.3	55.1 $\pm$ 6.6	54.7 $\pm$ 6.5	54.6 $\pm$ 6.5	55.8 $\pm$ 6.5
18	58.1 $\pm$ 6.0	57.1 $\pm$ 6.1	55.4 $\pm$ 6.5	55.0 $\pm$ 6.6	54.9 $\pm$ 6.5	56.0 $\pm$ 6.5
Bold: weight values at the onset of pubertal growth spurt. SD: standard deviation.						

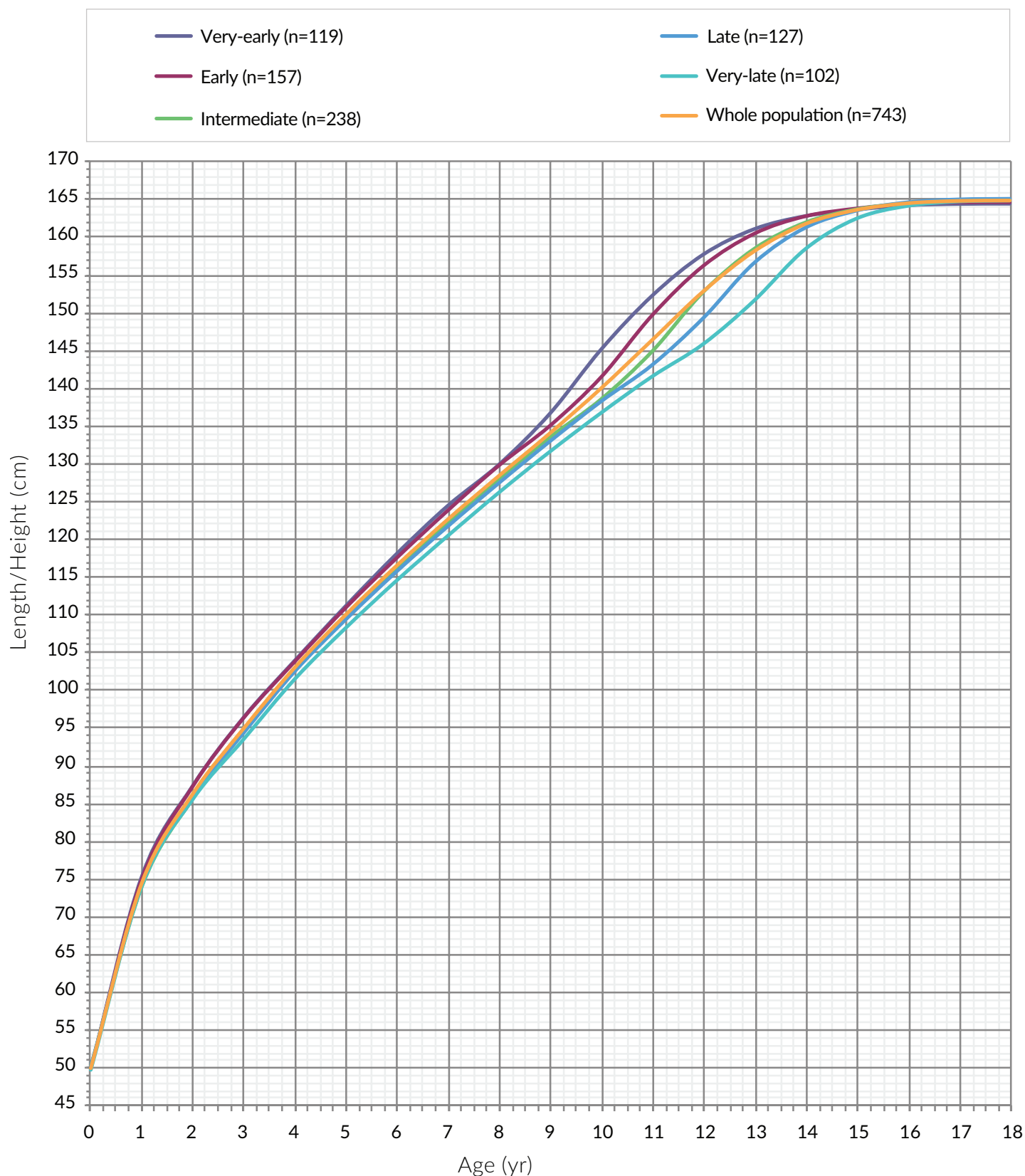
Girls. BMI and TMI.

Body Mass Index (BMI) for age and Tri-ponderal Mass Index (TMI) for age in girls (mean $\pm$ SD)		
Age (years)	BMI n = 743	TMI n = 743
0	13.2 $\pm$ 1.4	26.6 $\pm$ 2.2
1	17.6 $\pm$ 1.0	23.7 $\pm$ 1.5
2	16.5 $\pm$ 1.0	19.2 $\pm$ 1.3
3	16.0 $\pm$ 0.9	16.9 $\pm$ 1.1
4	15.6 $\pm$ 1.2	15.2 $\pm$ 1.2
5	15.6 $\pm$ 1.3	14.3 $\pm$ 1.3
6	15.8 $\pm$ 1.4	13.6 $\pm$ 1.3
7	16.2 $\pm$ 1.7	13.2 $\pm$ 1.4
8	16.7 $\pm$ 1.9	13.0 $\pm$ 1.4
9	17.2 $\pm$ 2.1	12.8 $\pm$ 1.5
10	17.7 $\pm$ 2.2	12.7 $\pm$ 1.5
11	18.2 $\pm$ 2.4	12.5 $\pm$ 1.6
12	18.7 $\pm$ 2.4	12.3 $\pm$ 1.5
13	19.3 $\pm$ 2.4	12.2 $\pm$ 1.5
14	19.8 $\pm$ 2.2	12.3 $\pm$ 1.4
15	20.2 $\pm$ 2.1	12.4 $\pm$ 1.4
16	20.4 $\pm$ 2.1	12.4 $\pm$ 1.3
17	20.6 $\pm$ 2.0	12.4 $\pm$ 1.3
18	20.7 $\pm$ 2.0	12.5 $\pm$ 1.3
SD: standard deviation.		

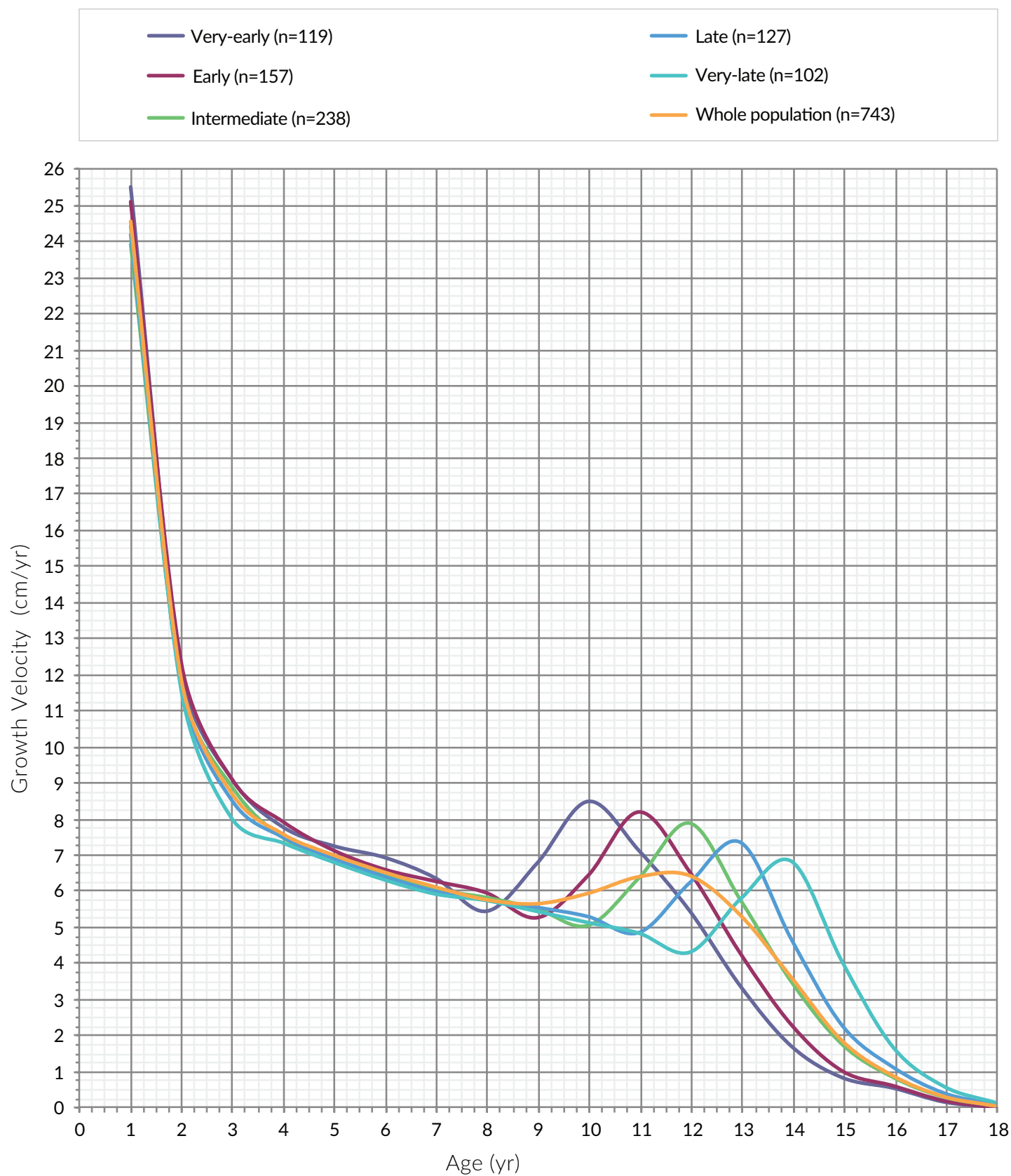
FIGURES

PUBERTAL MATURITY GROUPS

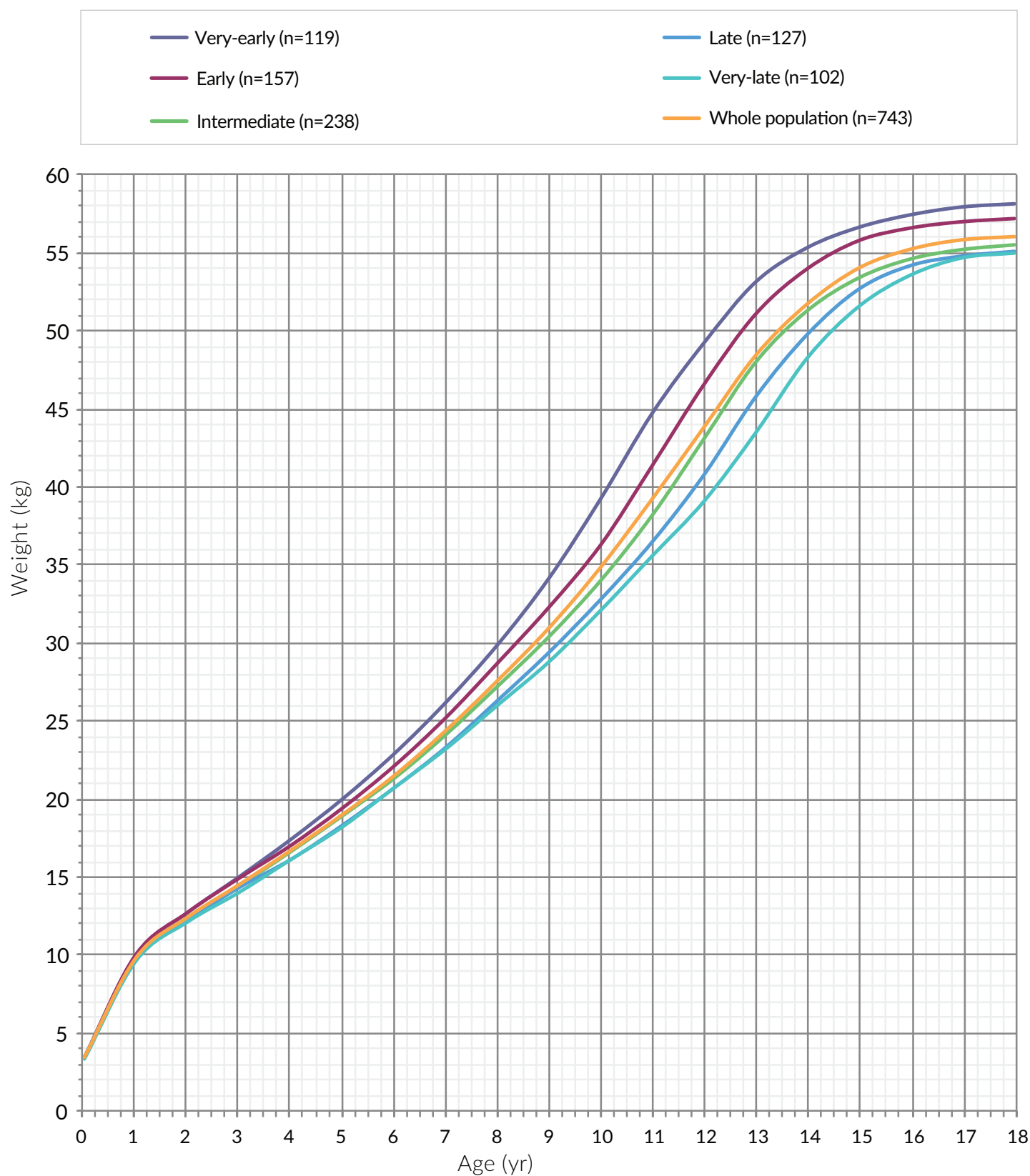
Girls. Length/Height. Median values. Pubertal maturity groups



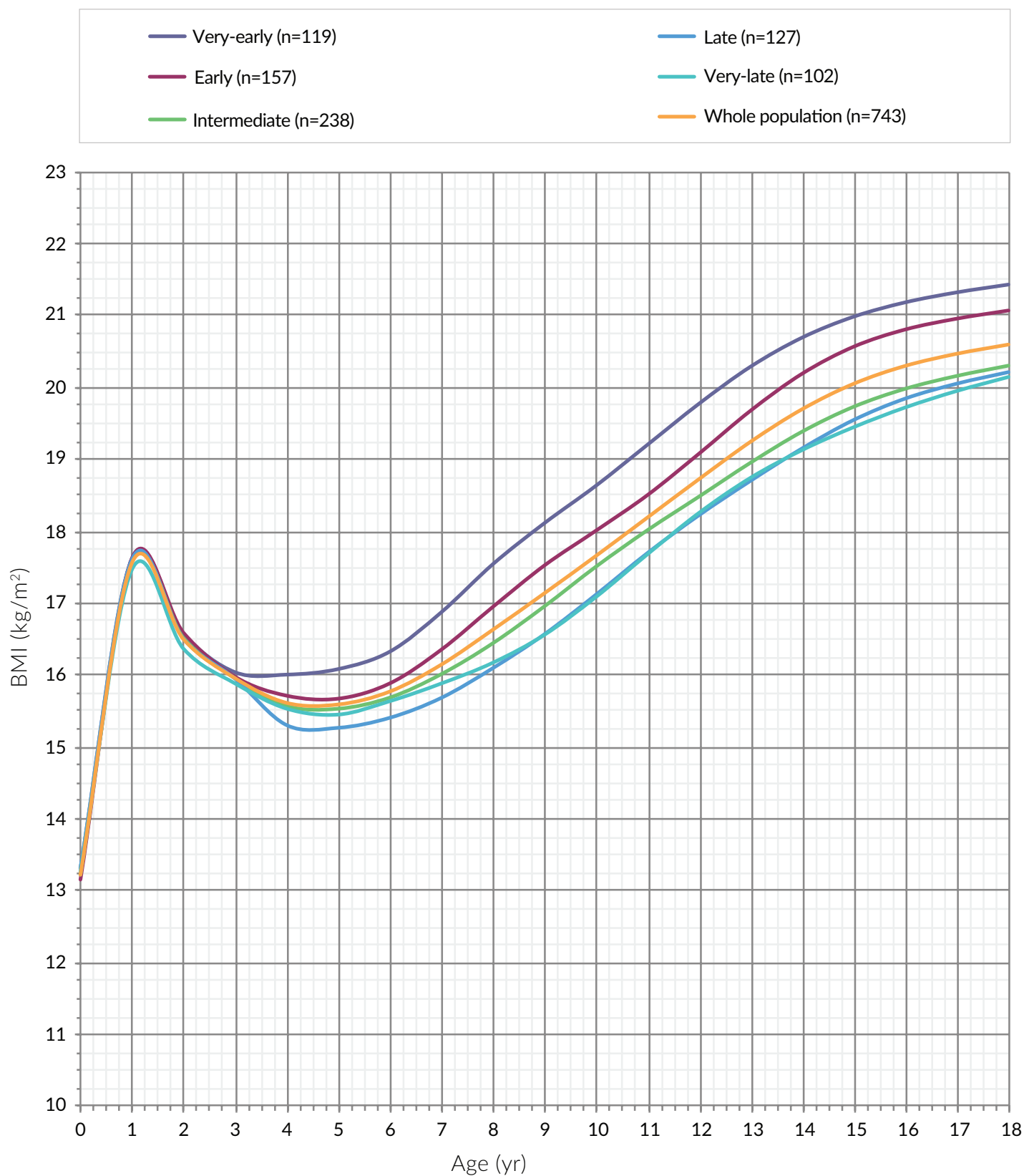
Girls. Growth velocity. Median values. Pubertal maturity groups



Girls. Weight. Median values. Pubertal maturity groups



Girls. BMI. Median values. Pubertal maturity groups



GROWTH CHARTS WHOLE POPULATION



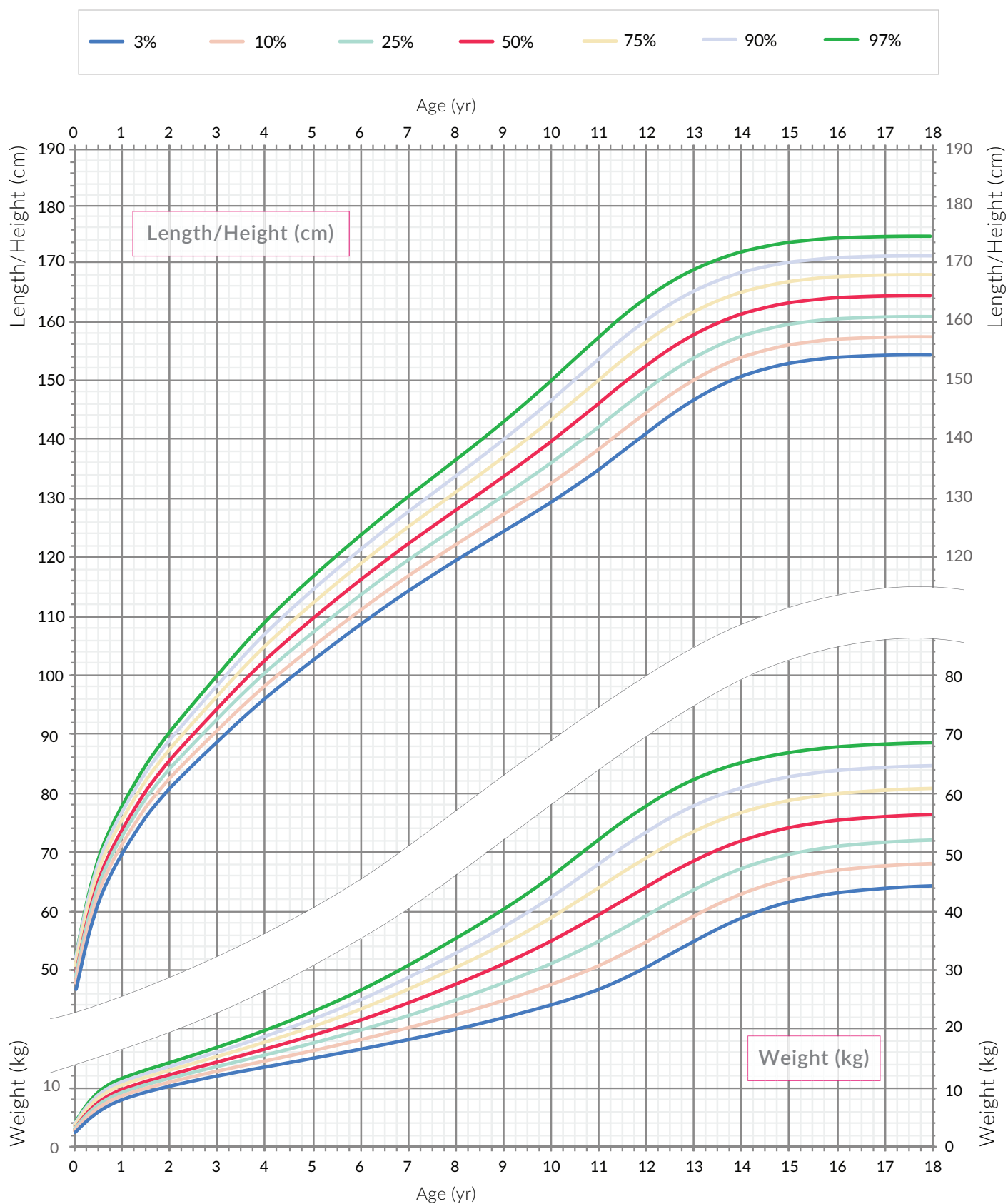
Girls. Height and Weight. Centiles

Whole population (n = 743)

Birthdate:/...../.....

Name:

.....





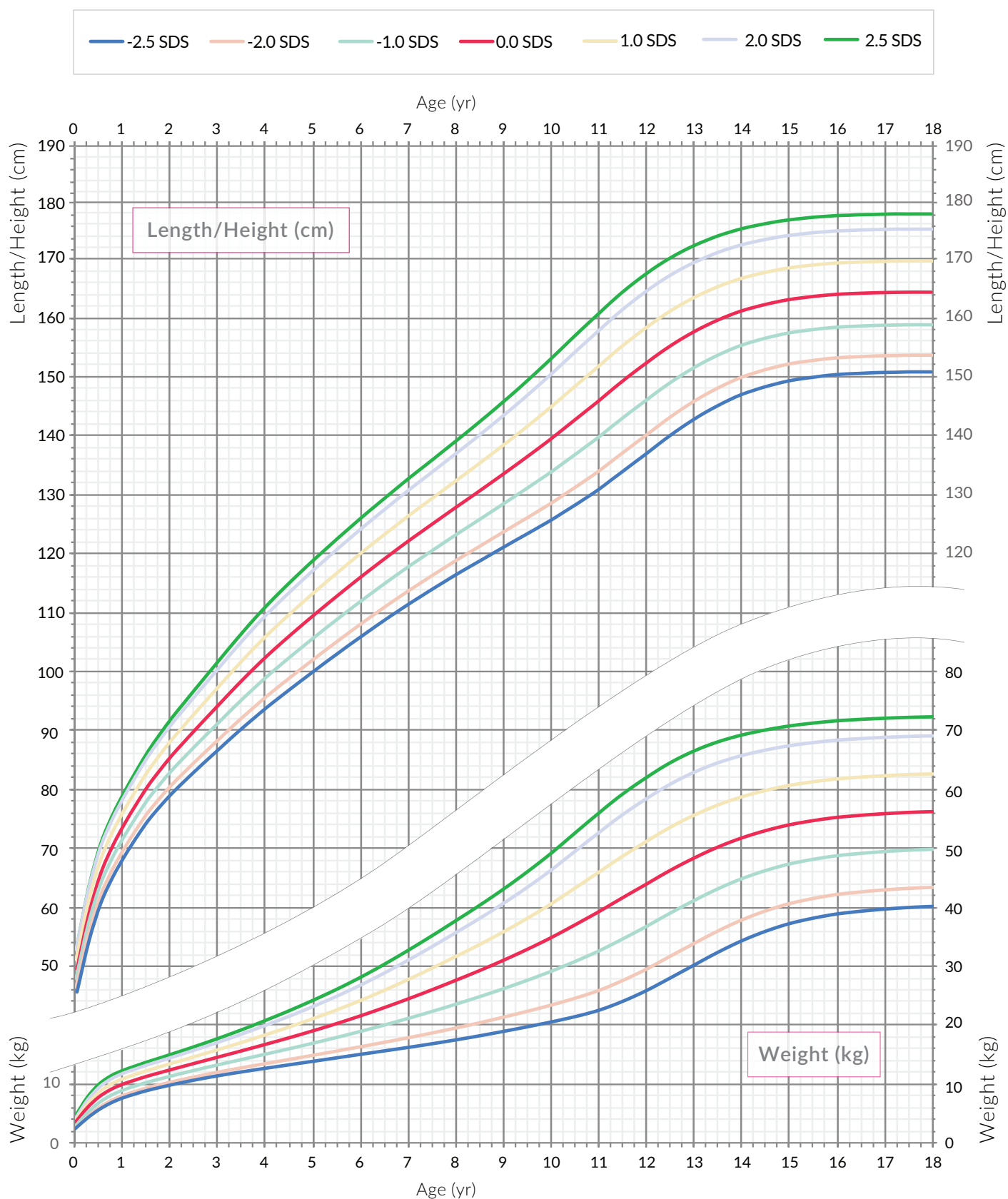
Girls. Height and Weight. Z-scores (SDS)

Whole population (n = 743)

Birthdate:/...../.....

Name:

.....





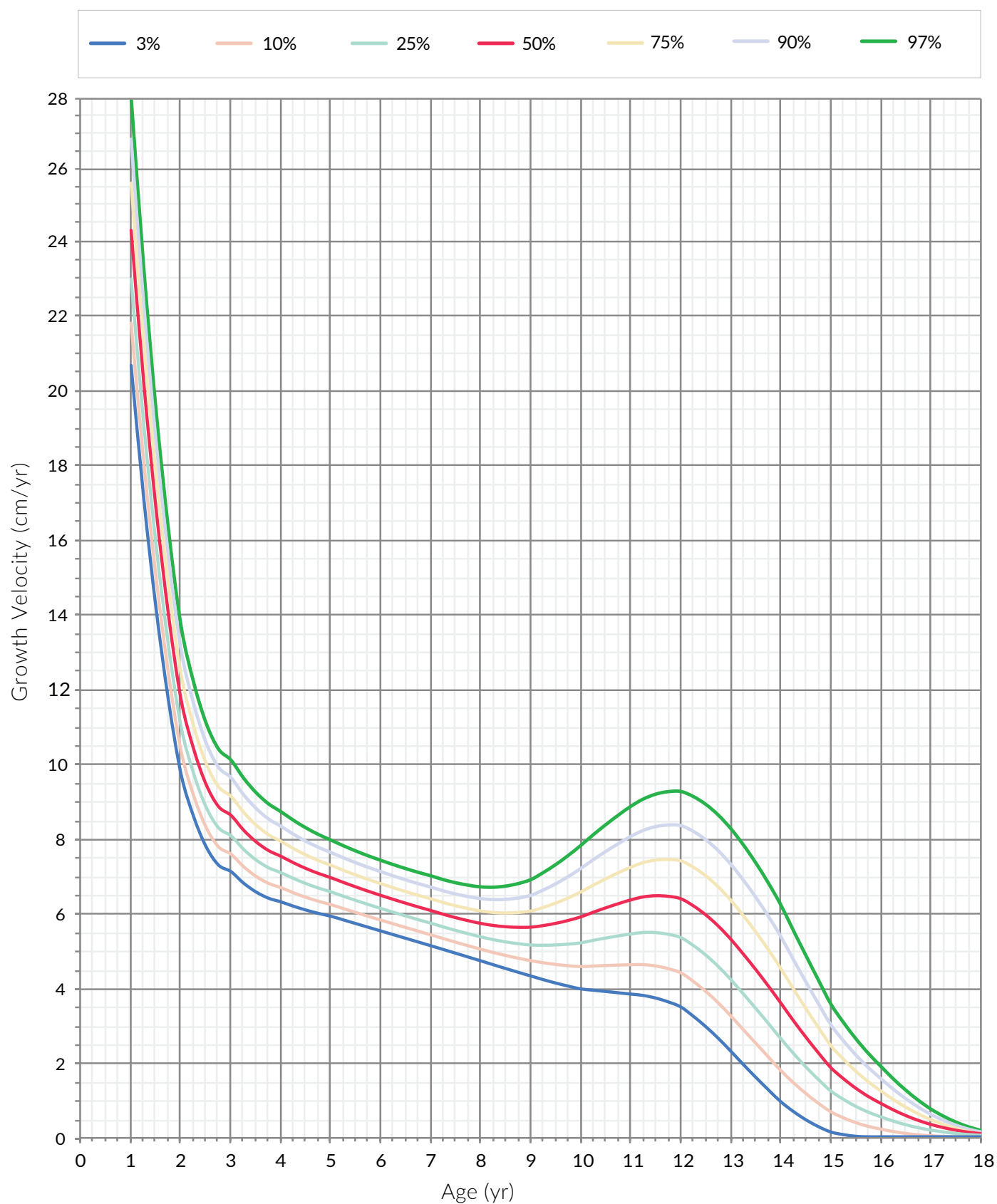
Girls. Growth velocity. Centiles

Whole population (n = 743)

Birthdate:/...../.....

Name:

.....





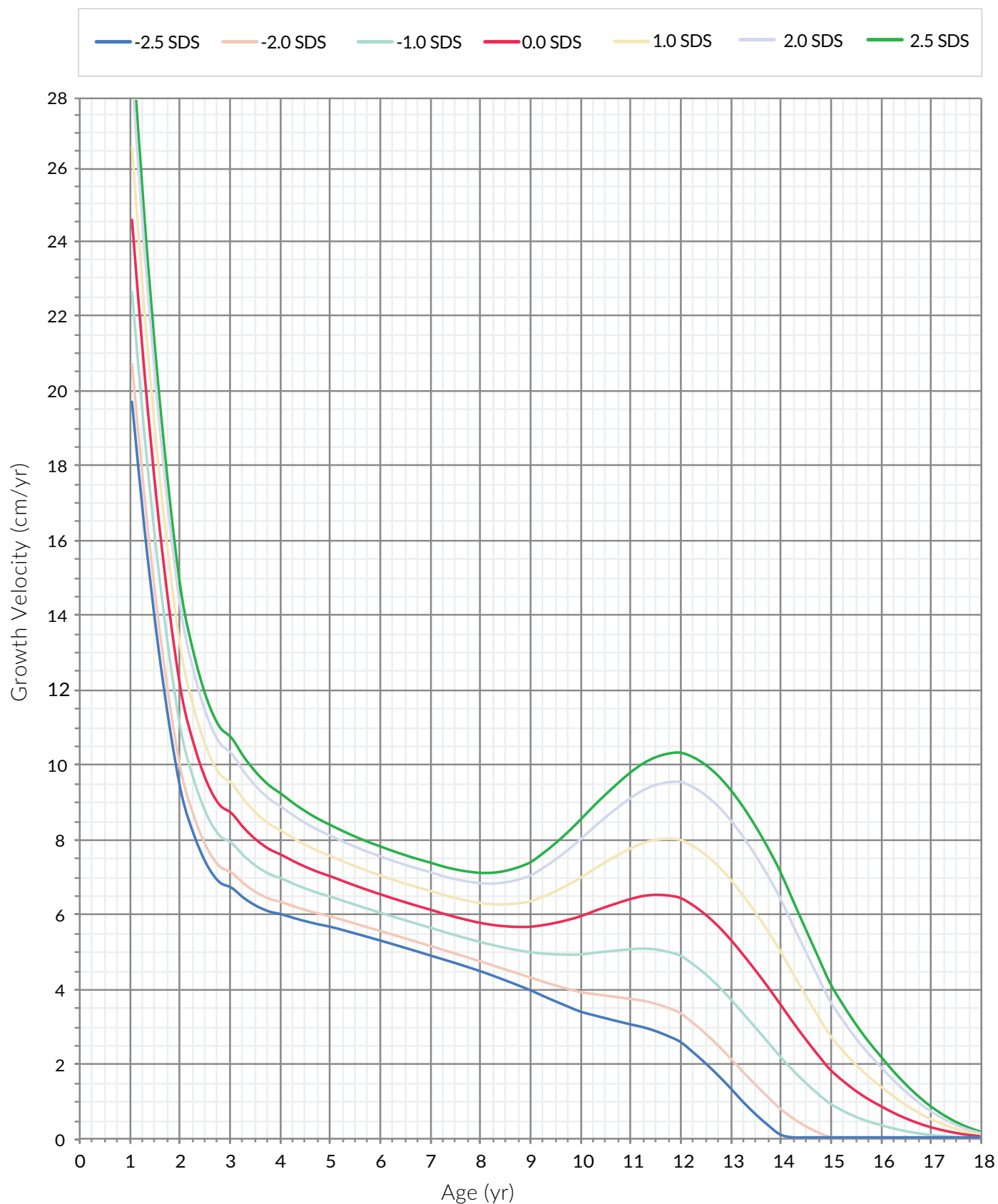
Girls. Growth velocity, Z-scores (SDS)

Whole population (n = 743)

Birthdate:/...../.....

Name:

.....





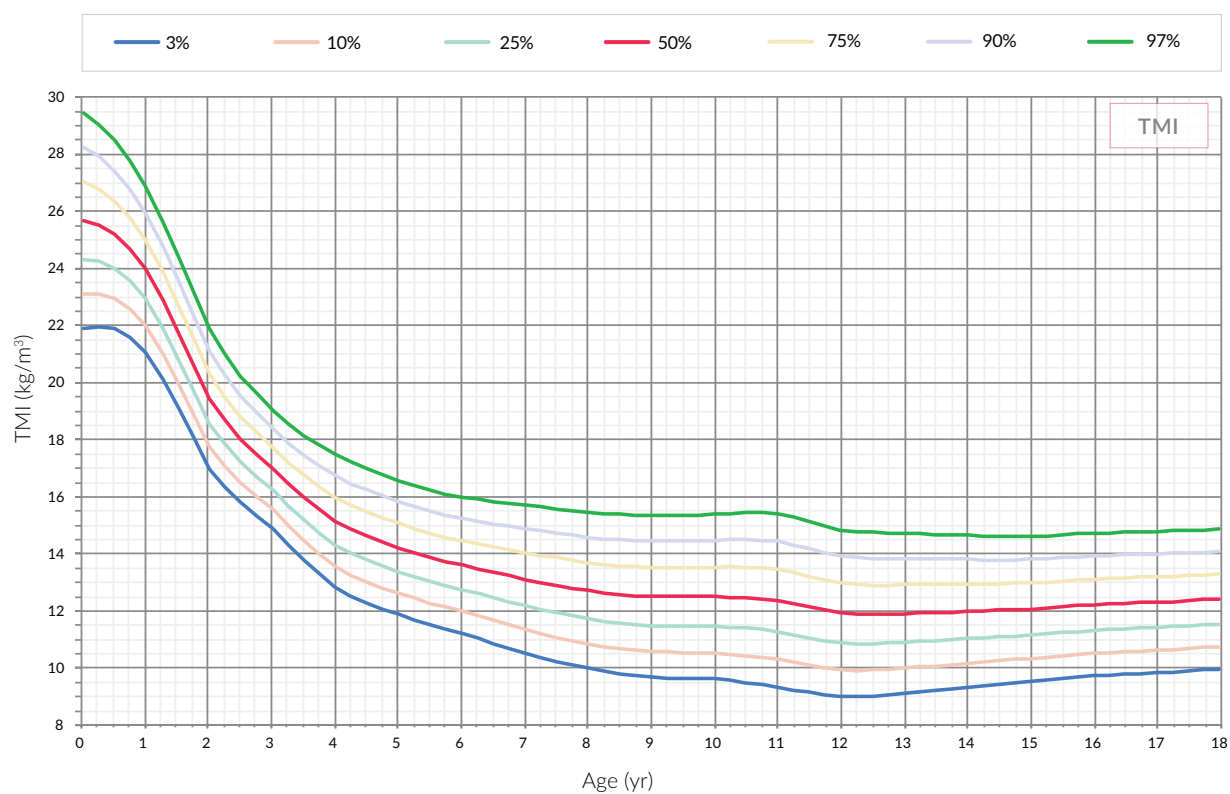
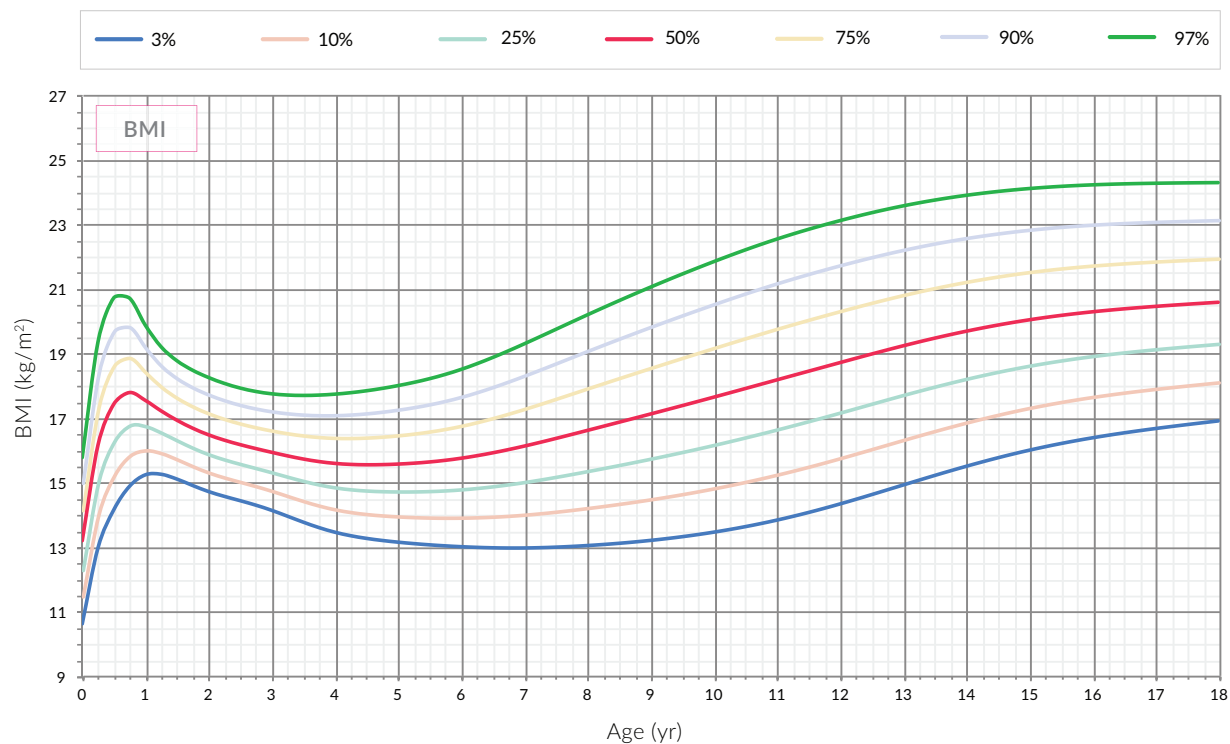
Girls. BMI and TMI. Centiles

Whole population (n = 743)

Birthdate:/...../.....

Name:

.....





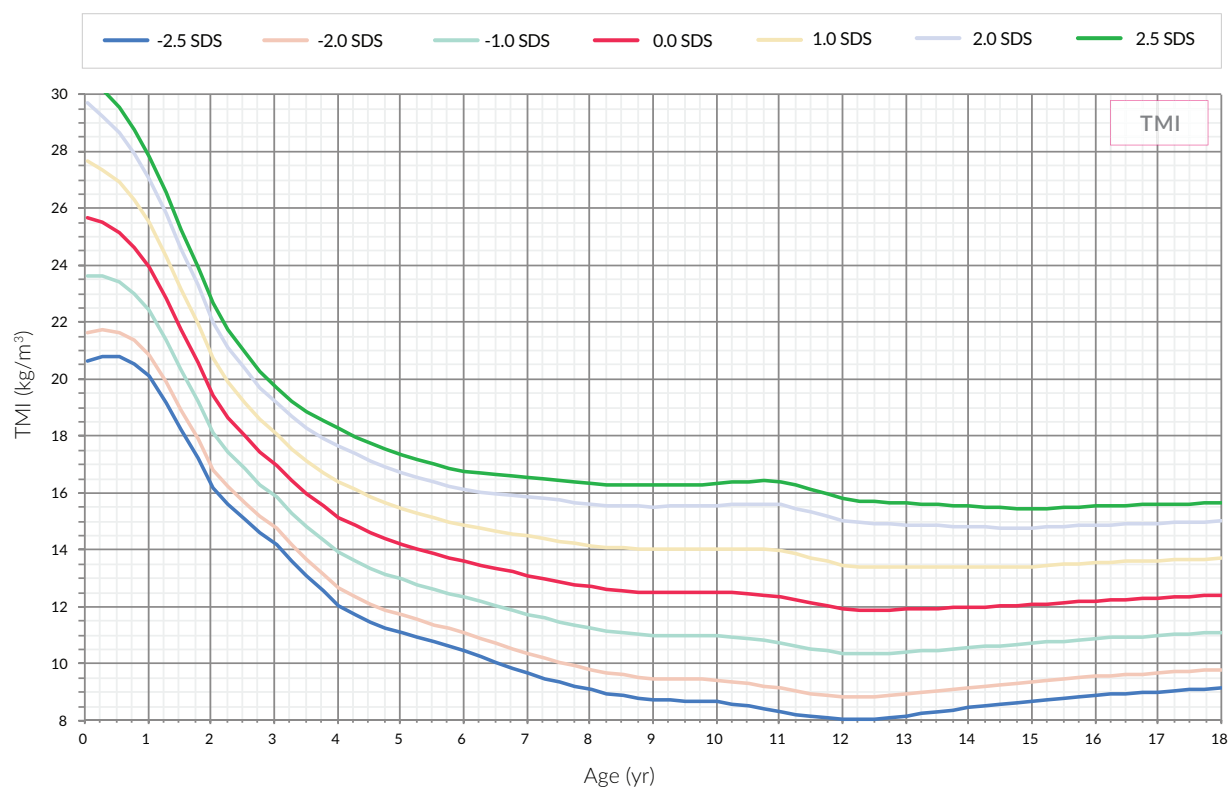
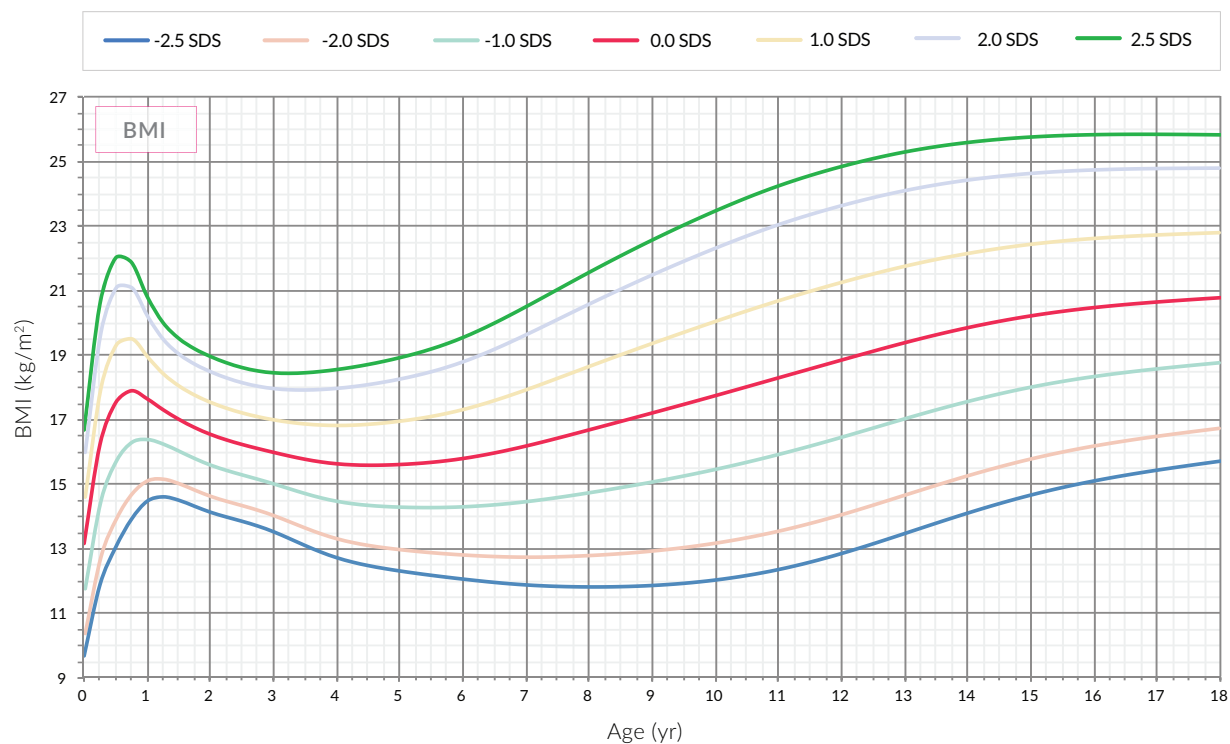
Girls. BMI and TMI. Z-scores (SDS)

Whole population (n = 743)

Birthdate:/...../.....

Name:

.....



GROWTH CHARTS VERY-EARLY MATURERS



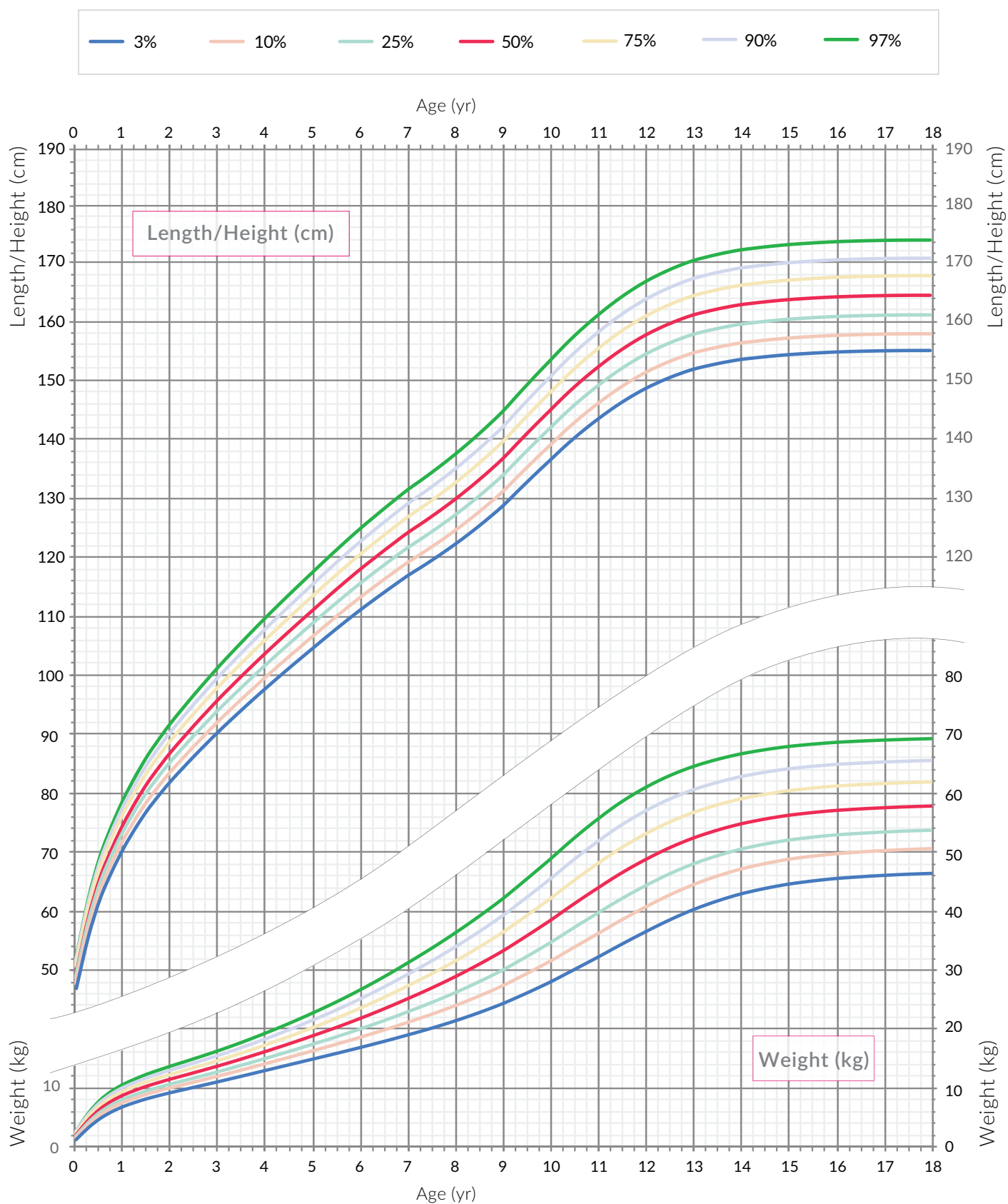
Girls. Height and Weight. Centiles

Very-early maturers (n = 119)

Birthdate:/...../.....

Name:

.....





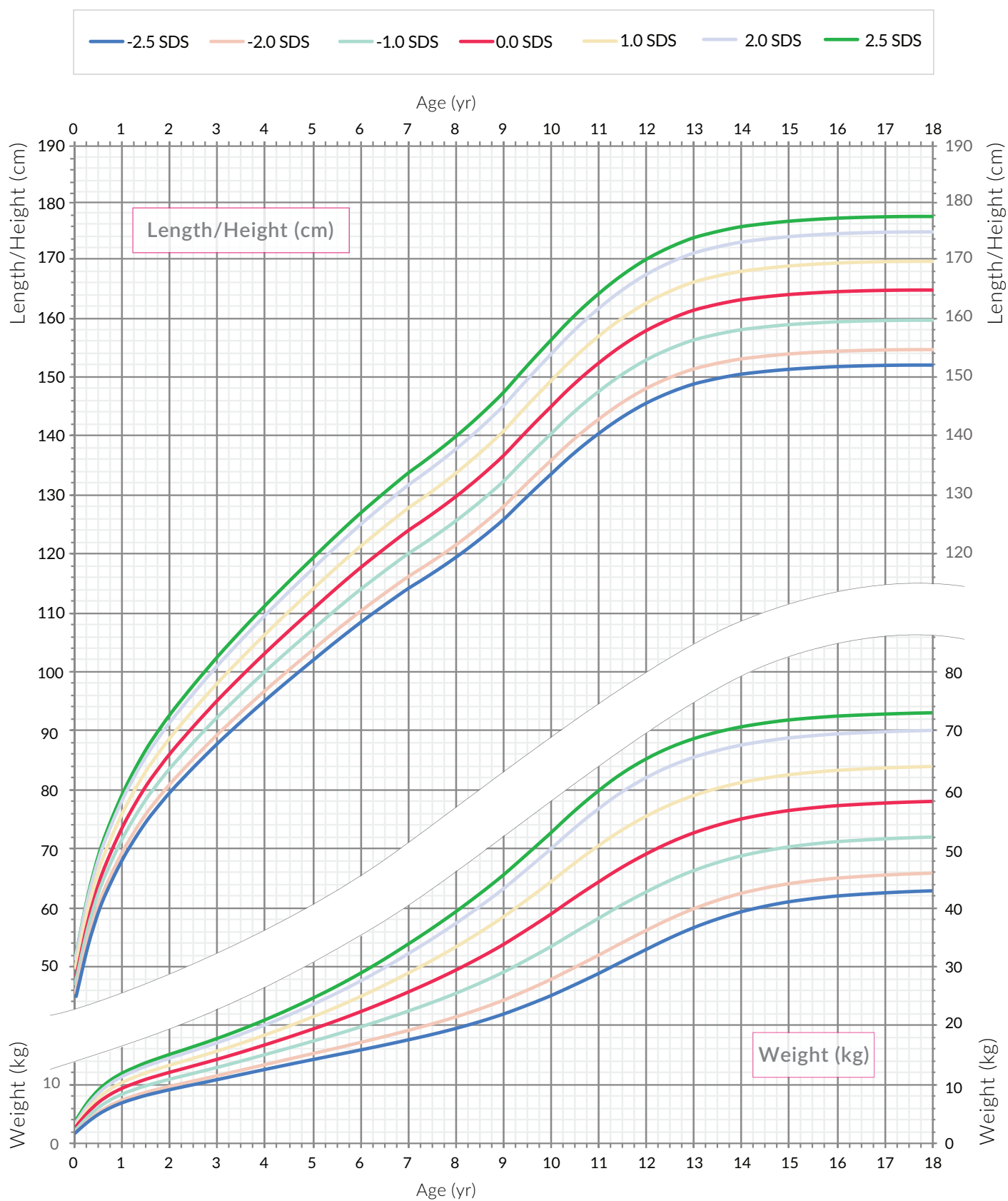
Girls. Height and Weight. Z-scores (SDS)

Very-early maturers (n = 119)

Birthdate:/...../.....

Name:

.....





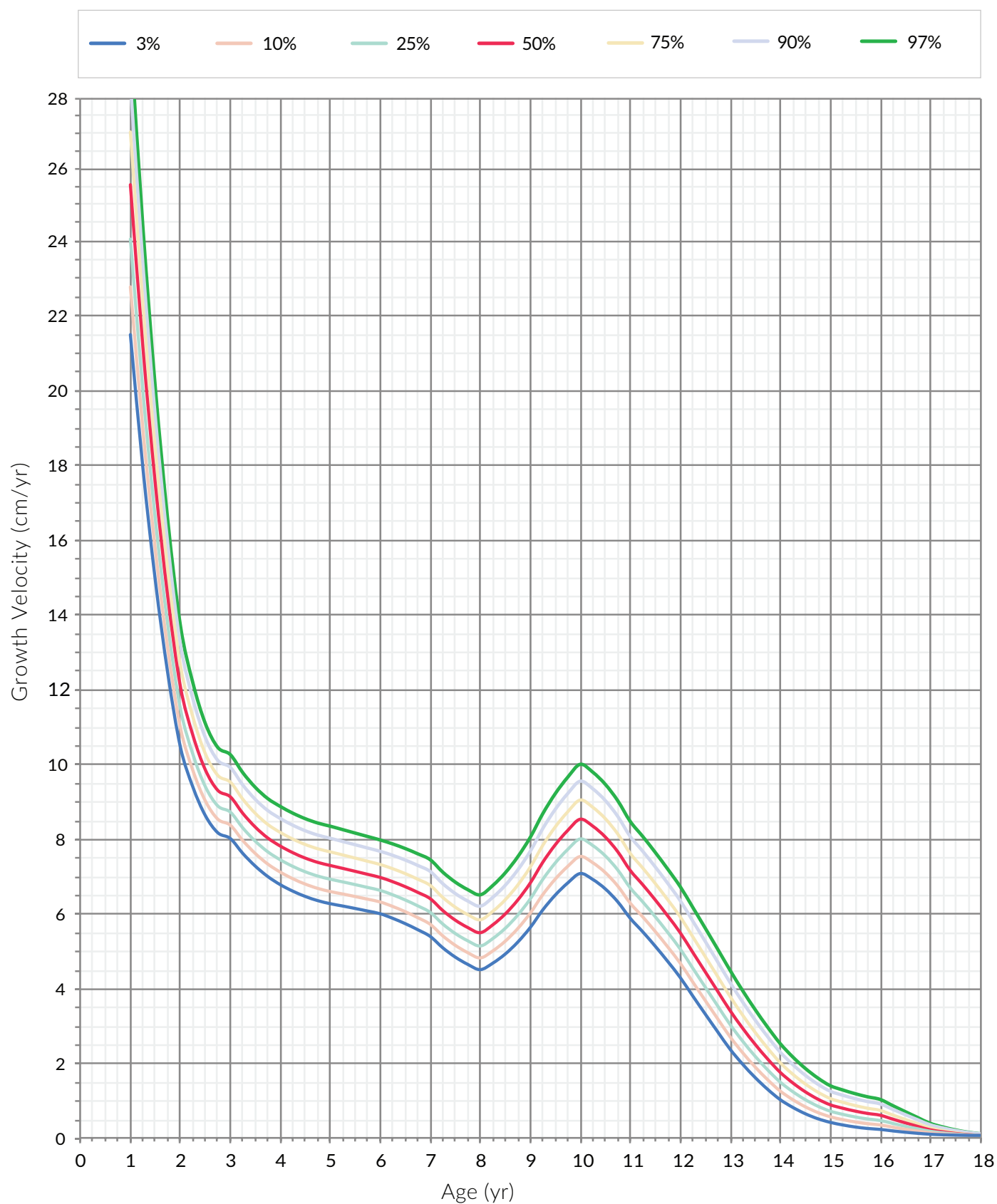
Girls. Growth velocity. Centiles

Very-early maturers (n = 119)

Birthdate:/...../.....

Name:

.....





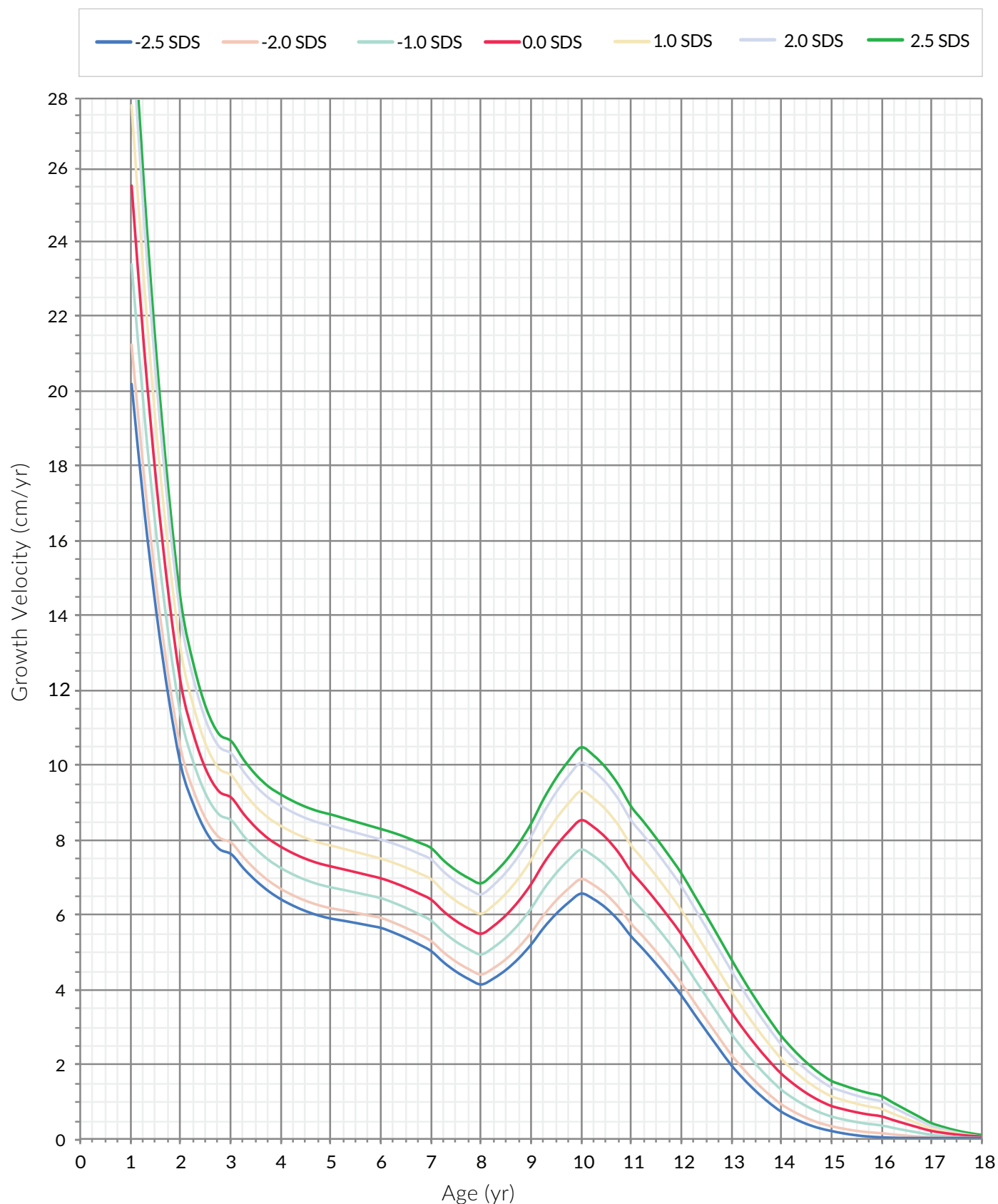
Girls. Growth velocity, Z-scores (SDS)

Very-early maturers (n = 119)

Birthdate:/...../.....

Name:

.....



GROWTH CHARTS EARLY MATURERS



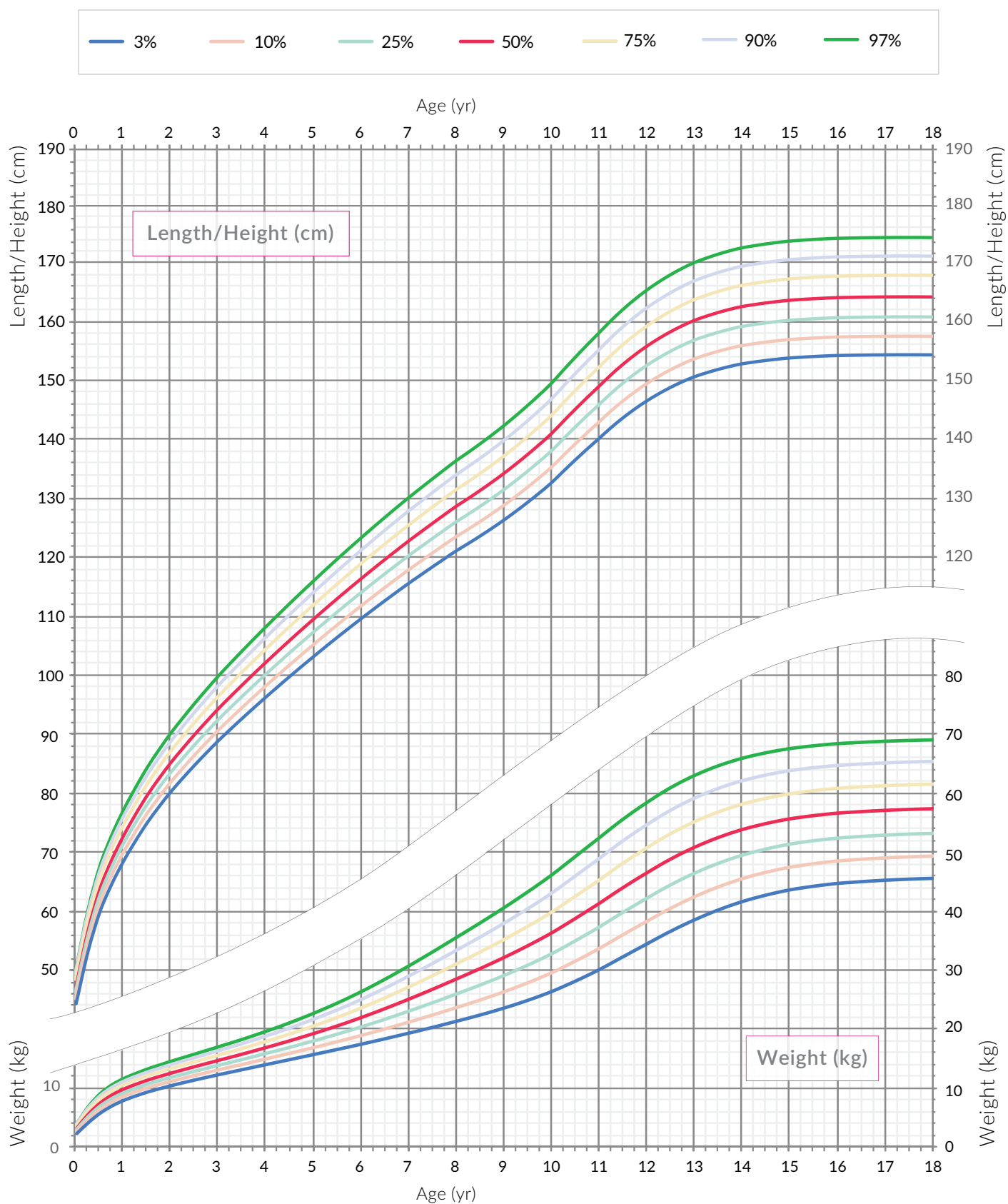
Girls. Height and Weight. Centiles

Early maturers (n = 157)

Birthdate:/...../.....

Name:

.....





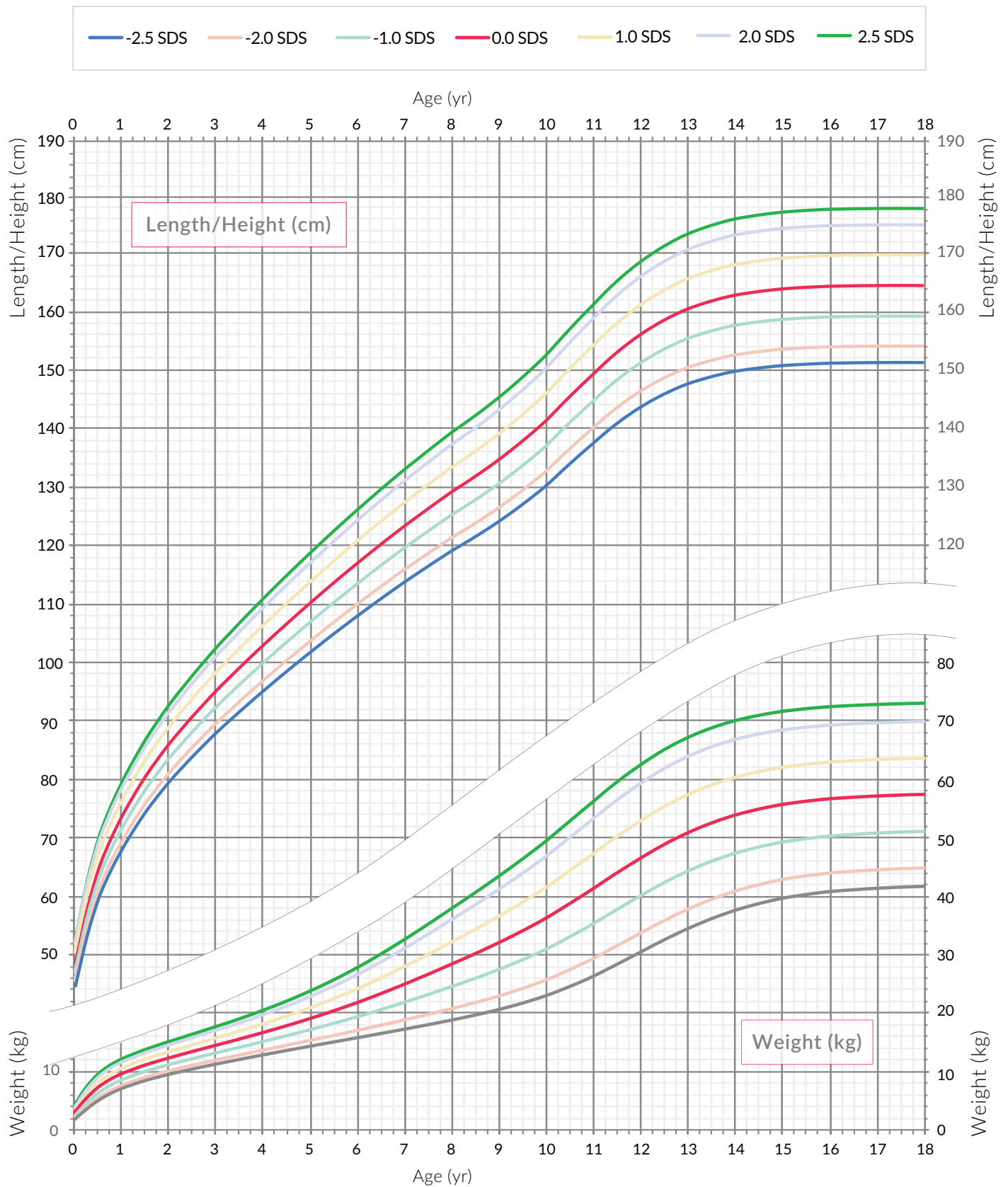
Girls. Height and Weight. Z-scores (SDS)

Early maturers (n = 157)

Birthdate:/...../.....

Name:

.....





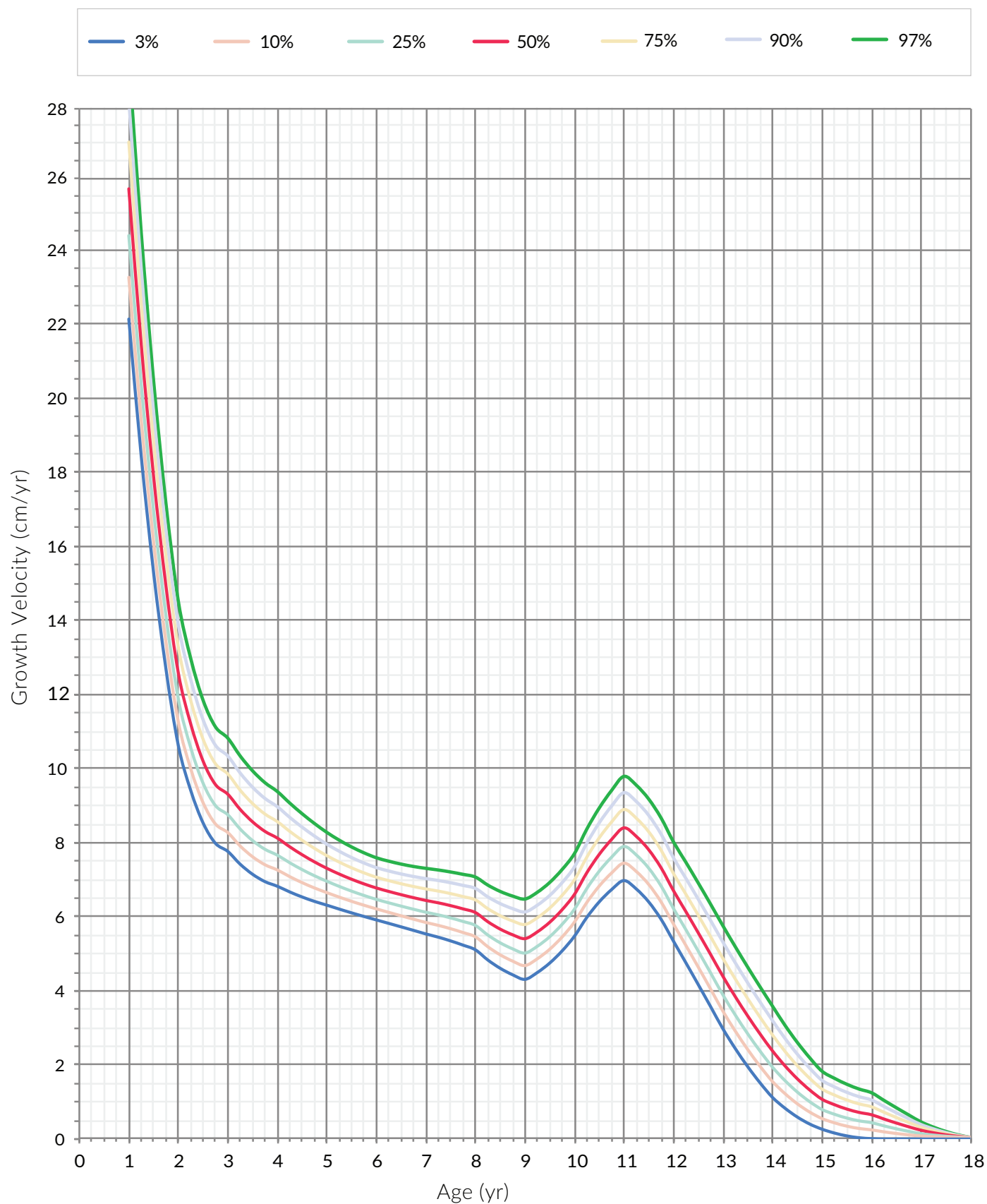
Girls. Growth velocity. Centiles

Early maturers (n = 157)

Birthdate:/...../.....

Name:

.....





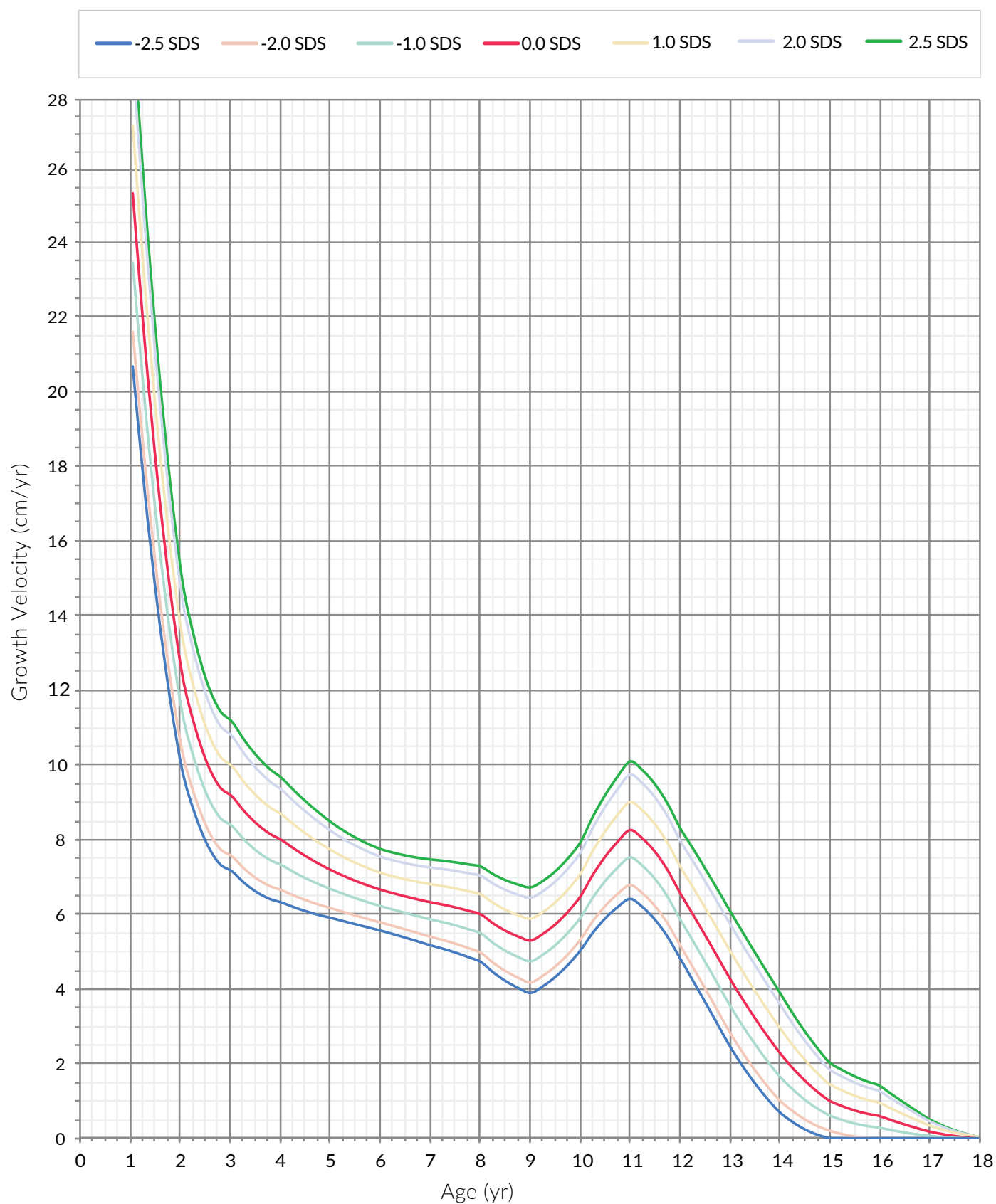
Girls. Growth velocity, Z-scores (SDS)

Early maturers (n = 157)

Birthdate:/...../.....

Name:

.....



GROWTH CHARTS INTERMEDIATE MATURERS



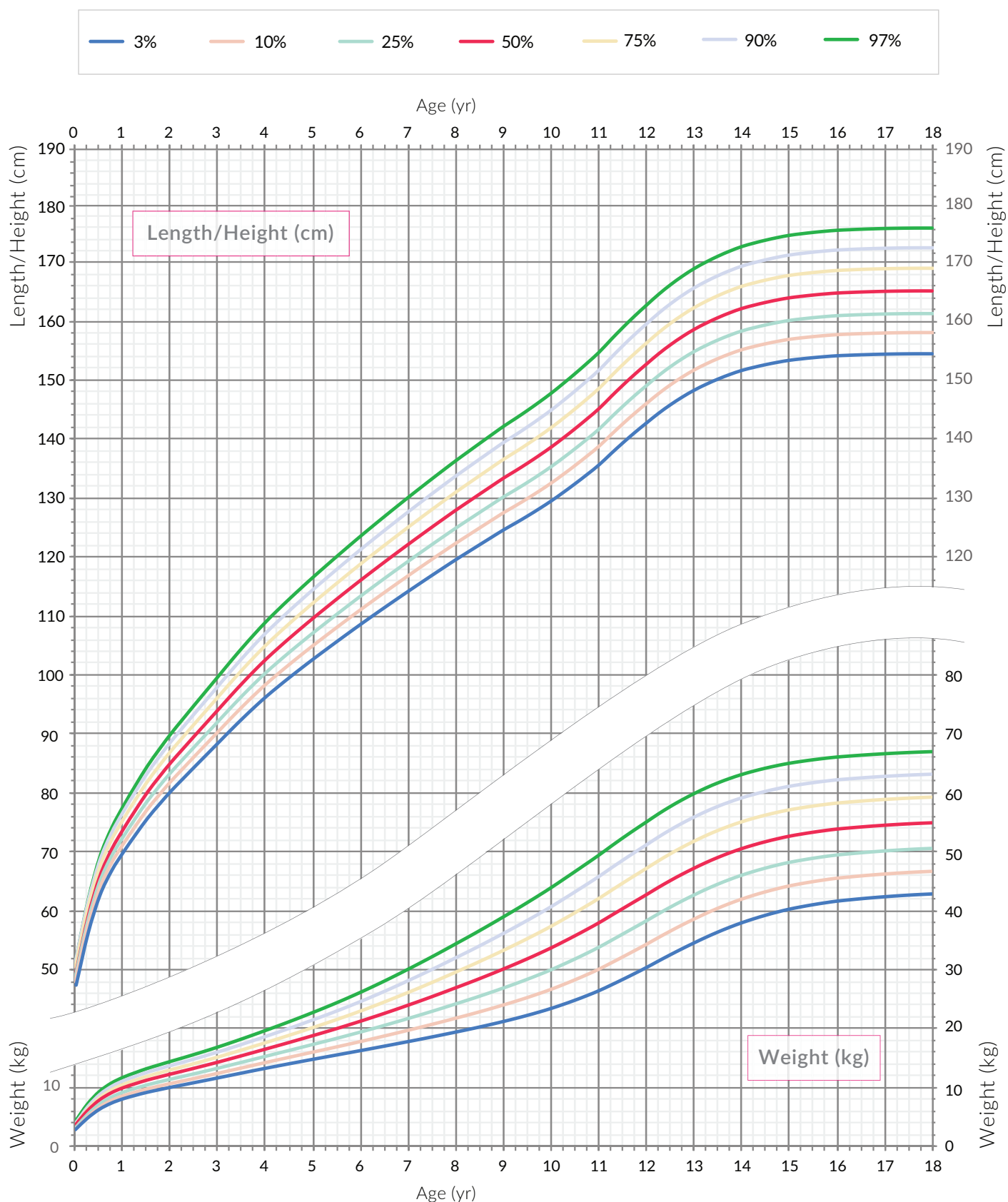
Girls. Height and Weight. Centiles

Intermediate maturers (n = 238)

Birthdate:/...../.....

Name:

.....





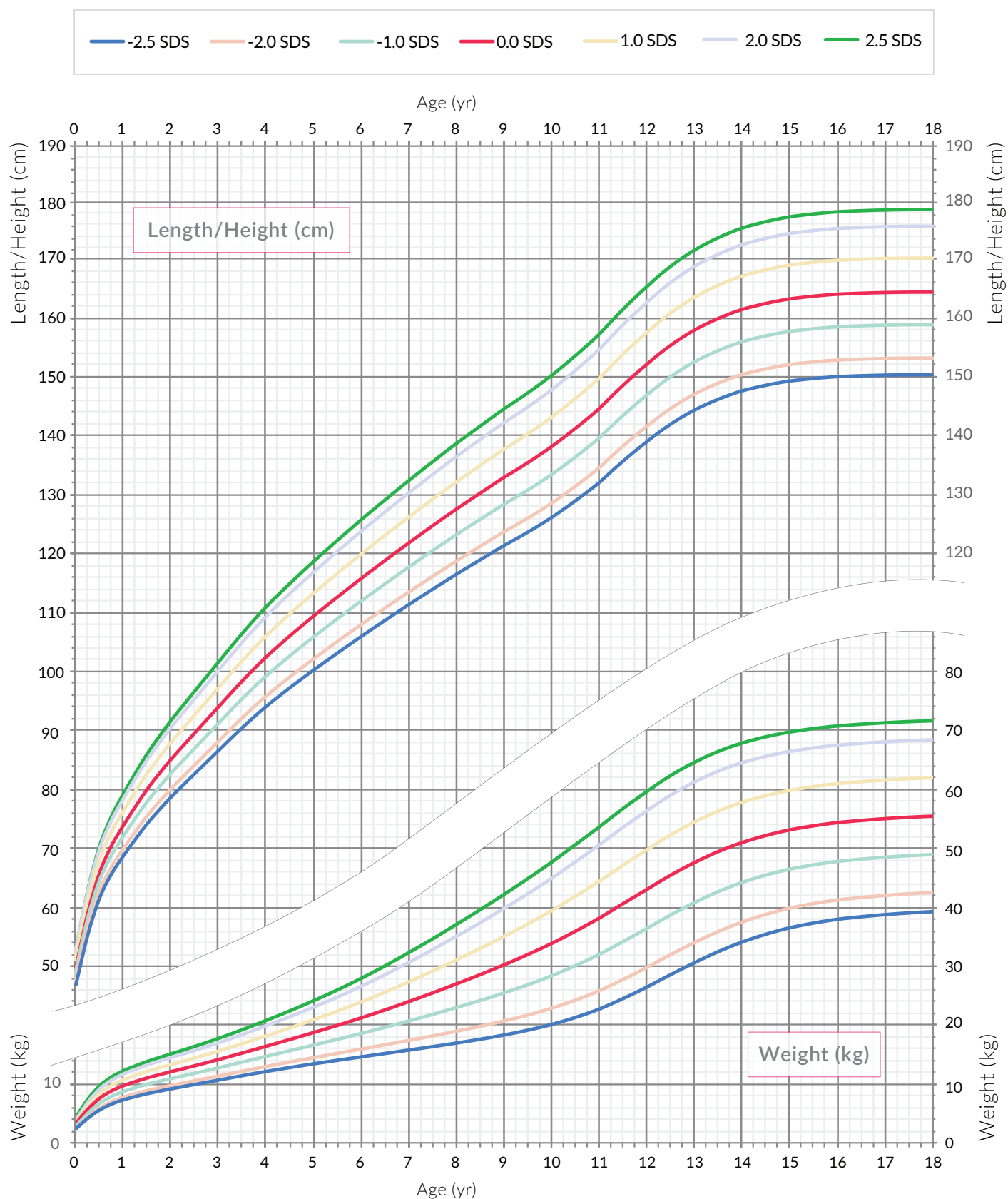
Girls. Height and Weight. Z-scores (SDS)

Intermediate maturers (n = 238)

Birthdate:/...../.....

Name:

.....



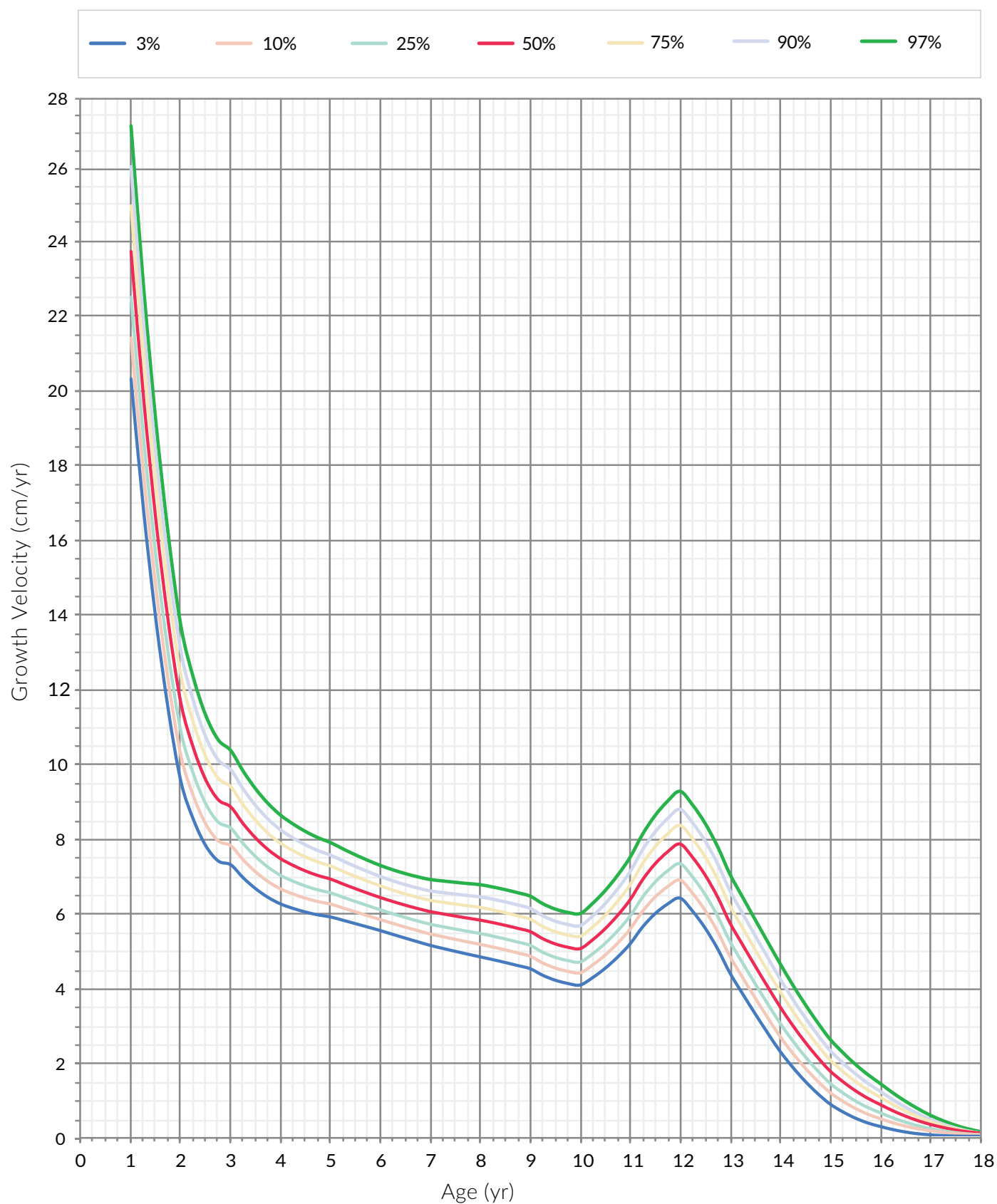


Girls. Growth velocity. Centiles
Intermediate maturers (n = 238)

Birthdate:/...../.....

Name:

.....





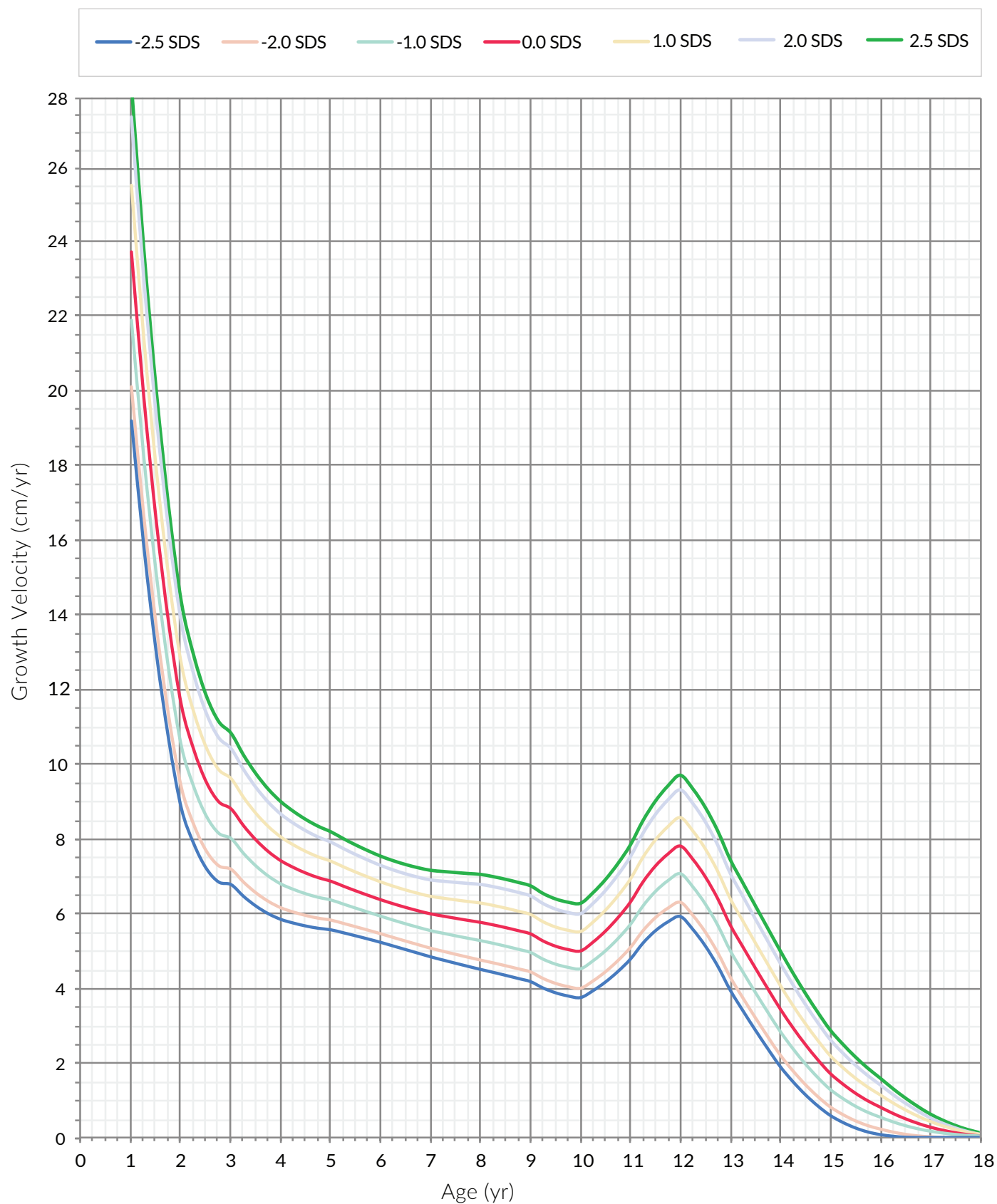
Girls. Growth velocity, Z-scores (SDS)

Intermediate maturers (n = 238)

Birthdate:/...../.....

Name:

.....



GROWTH CHARTS LATE MATURERS



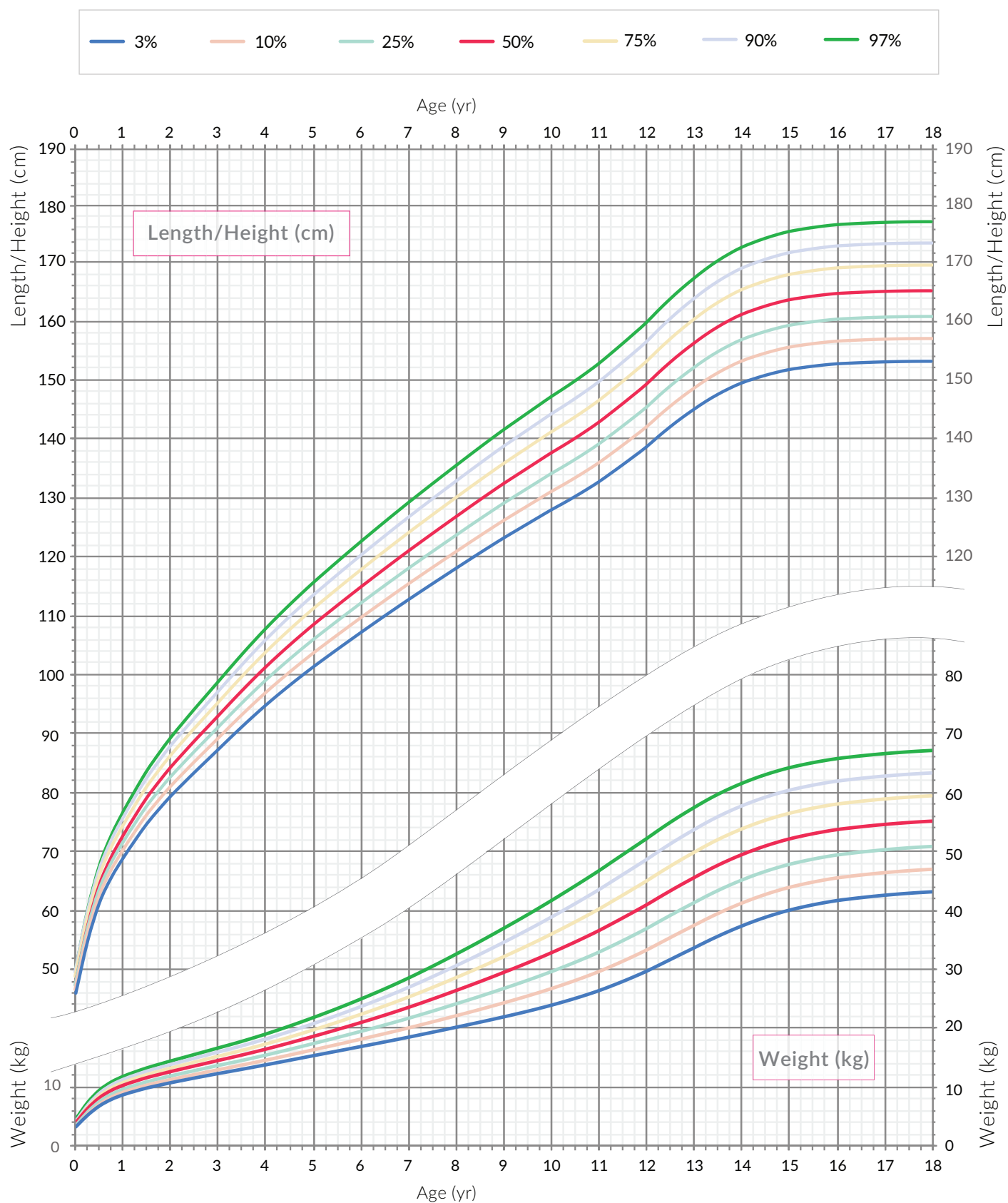
Girls. Height and Weight. Centiles

Late maturers (n = 127)

Birthdate:/...../.....

Name:

.....





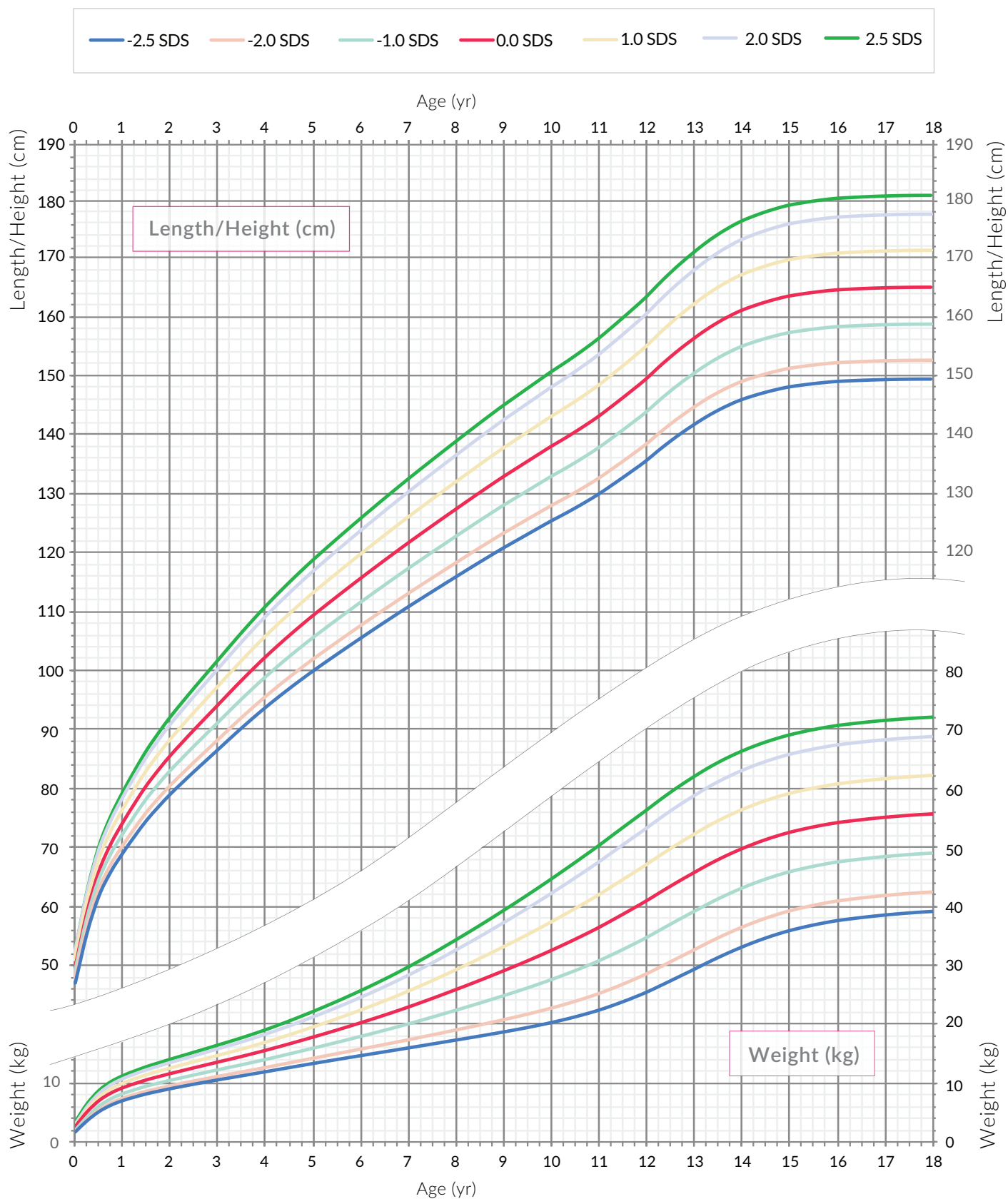
Girls. Height and Weight. Z-scores (SDS)

Late maturers (n = 127)

Birthdate:/...../.....

Name:

.....





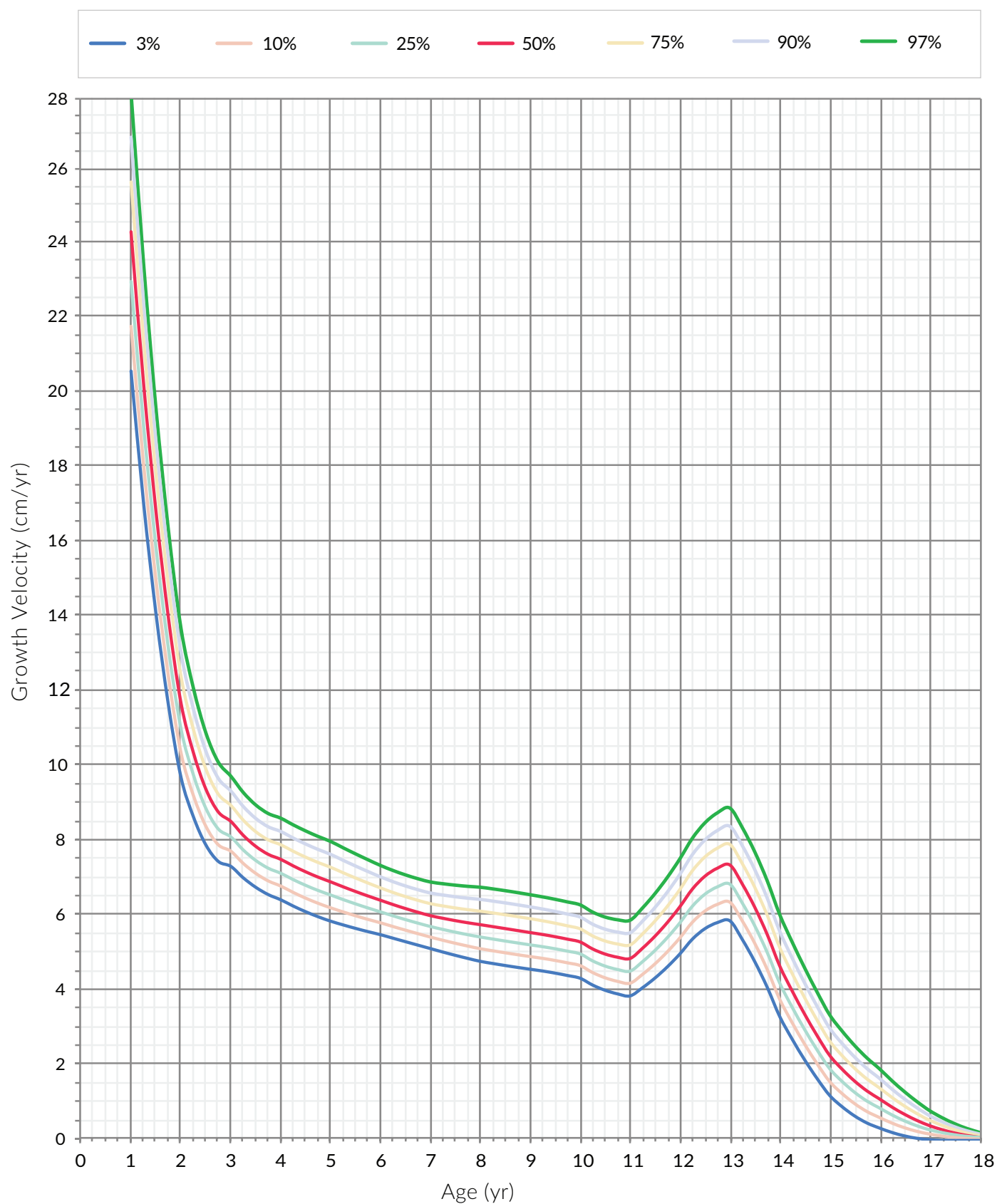
Girls. Growth velocity. Centiles

Late maturers (n = 127)

Birthdate:/...../.....

Name:

.....





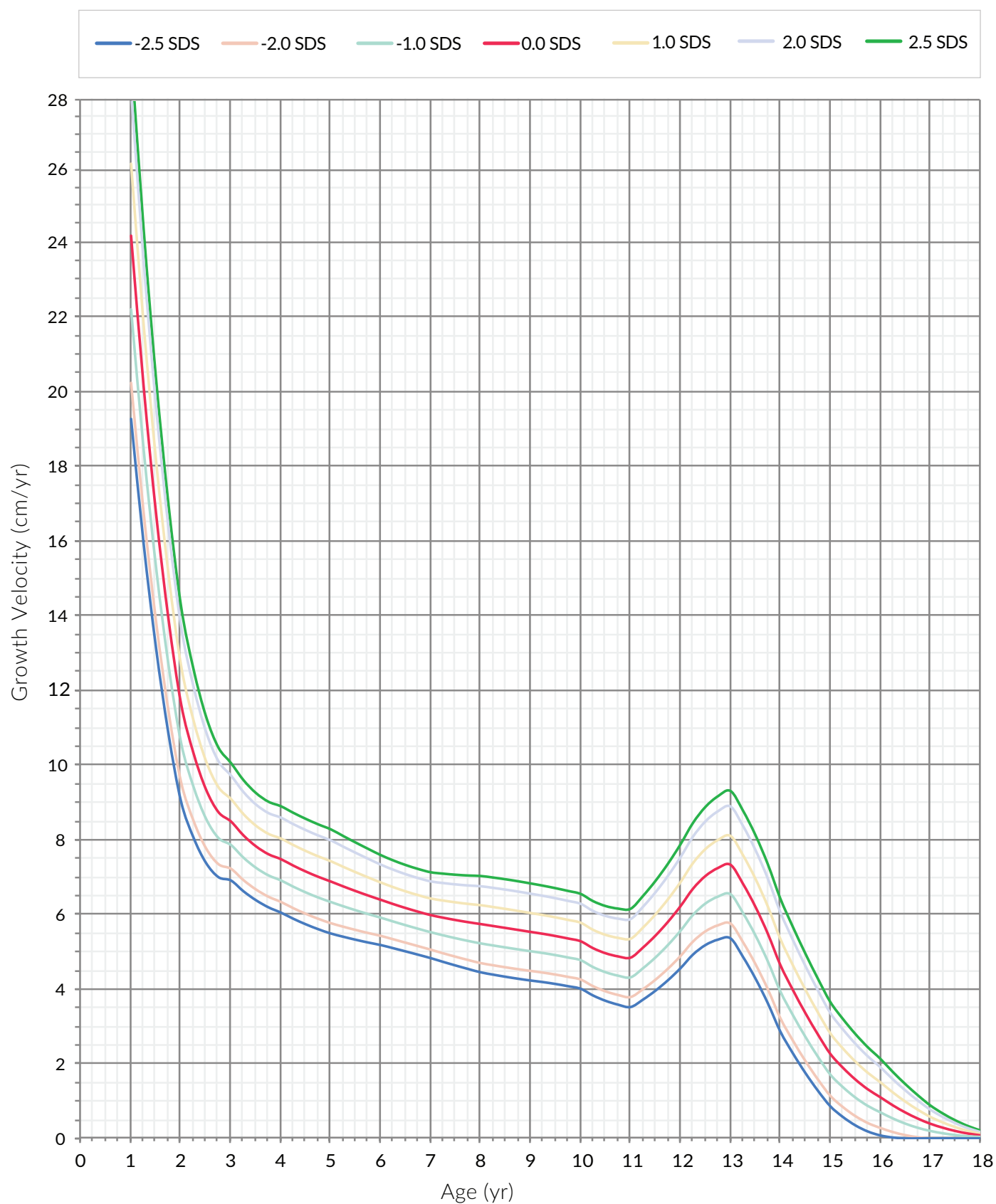
Girls. Growth velocity, Z-scores (SDS)

Late maturers (n = 127)

Birthdate:/...../.....

Name:

.....



GROWTH CHARTS VERY-LATE MATURERS



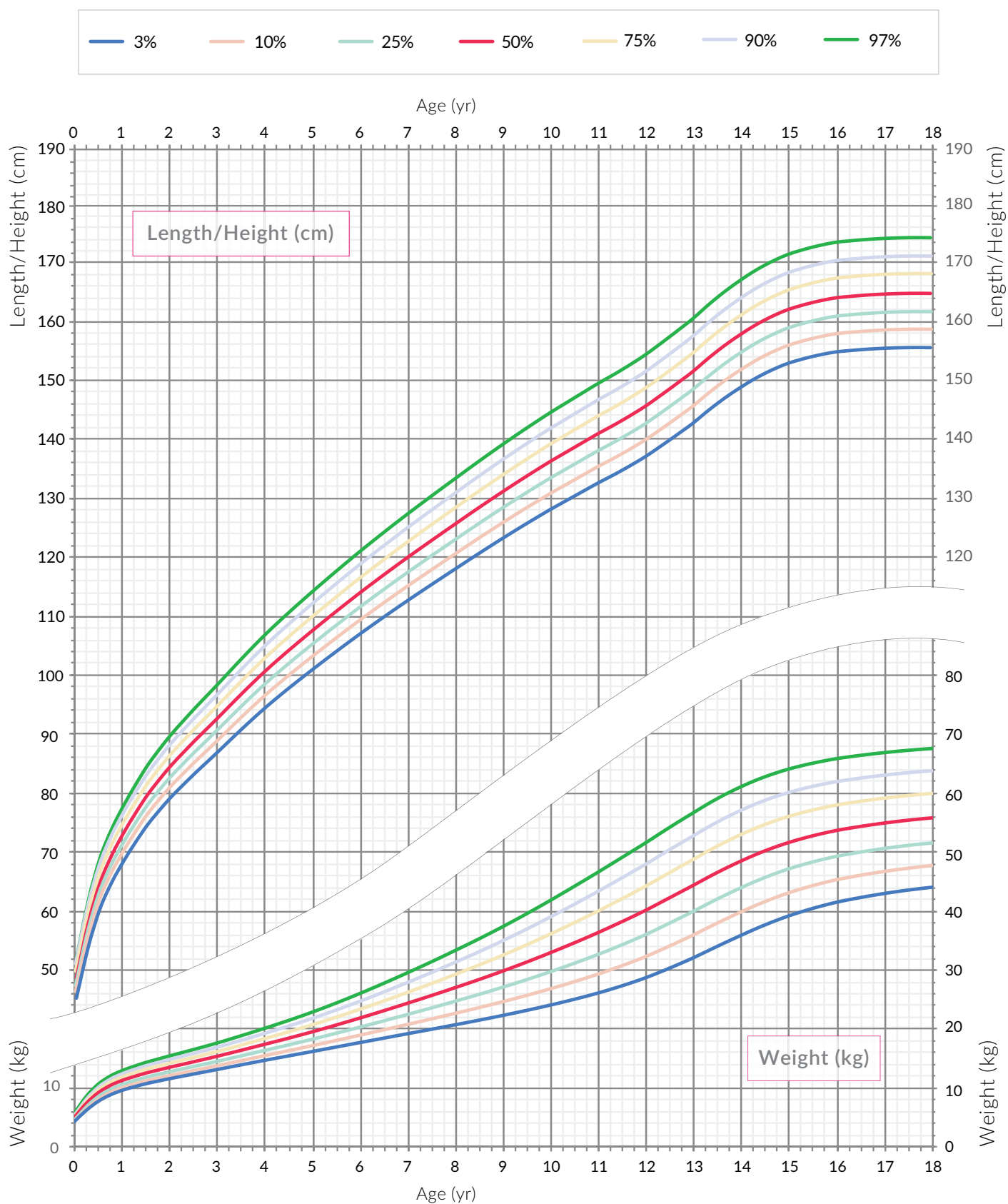
Girls. Height and Weight. Centiles

Very-late maturers (n = 102)

Birthdate:/...../.....

Name:

.....





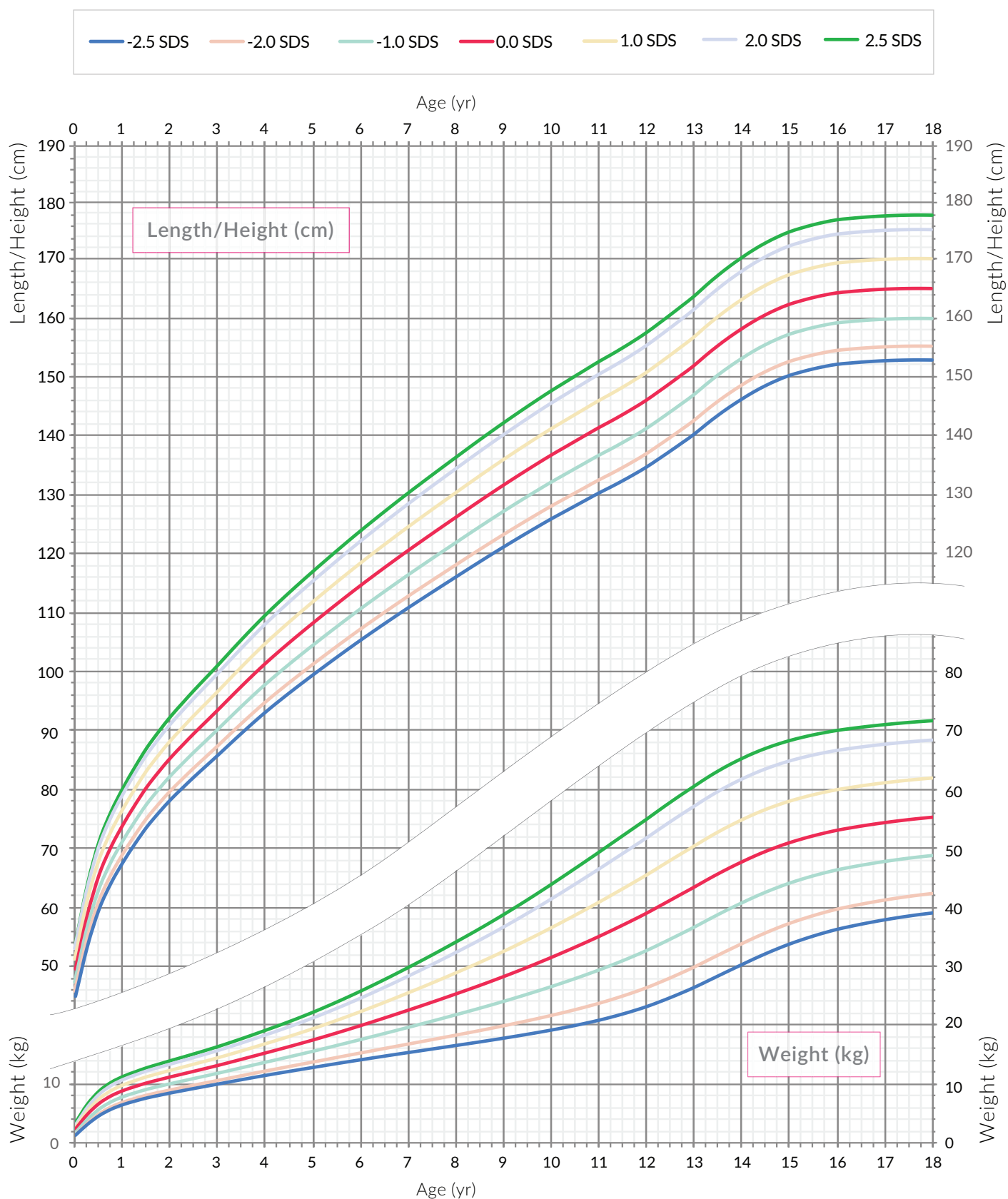
Girls. Height and Weight. Z-scores (SDS)

Very-late maturers (n = 102)

Birthdate:/...../.....

Name:

.....





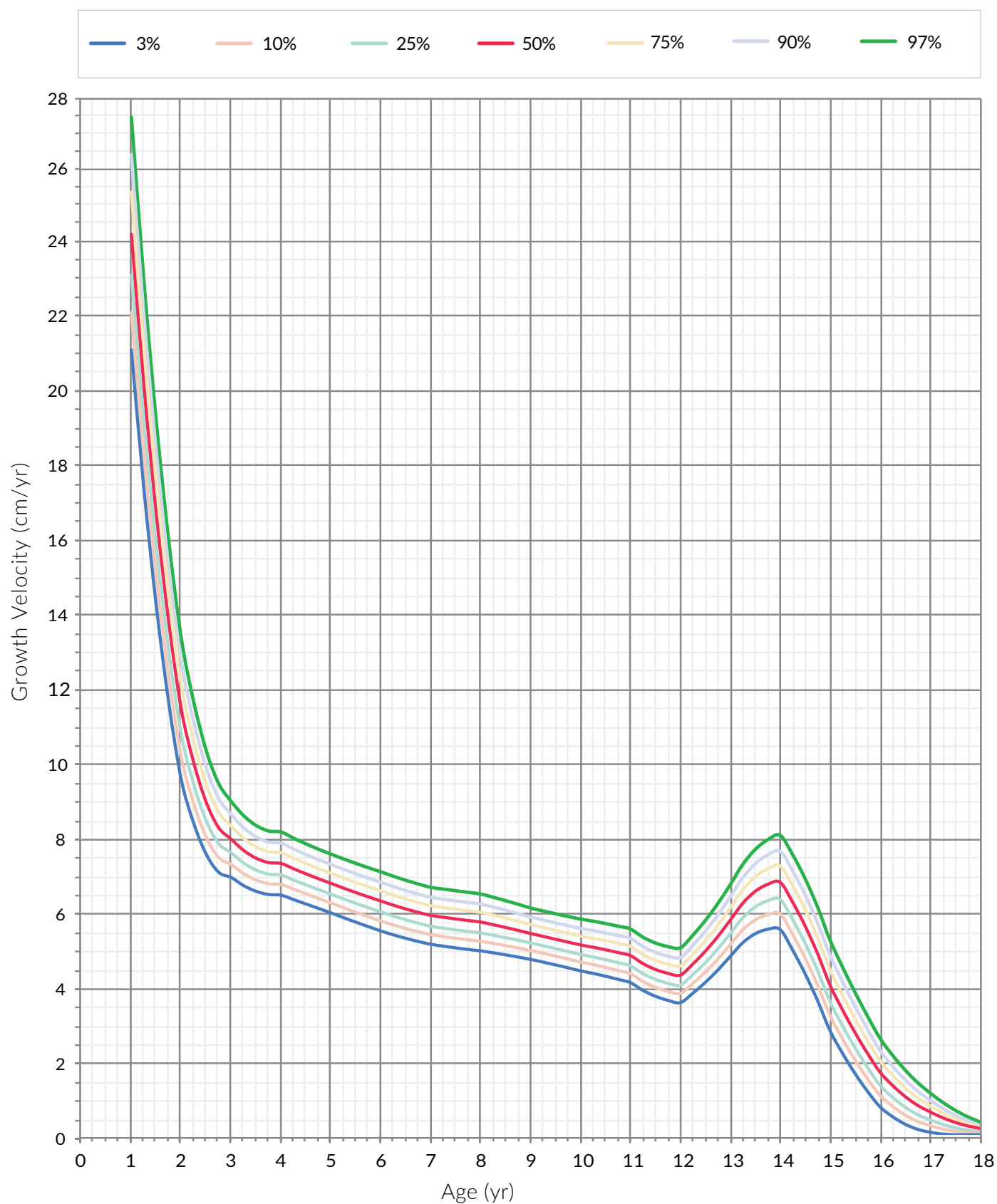
Girls. Growth velocity. Centiles

Very-late maturers (n = 102)

Birthdate:/...../.....

Name:

.....





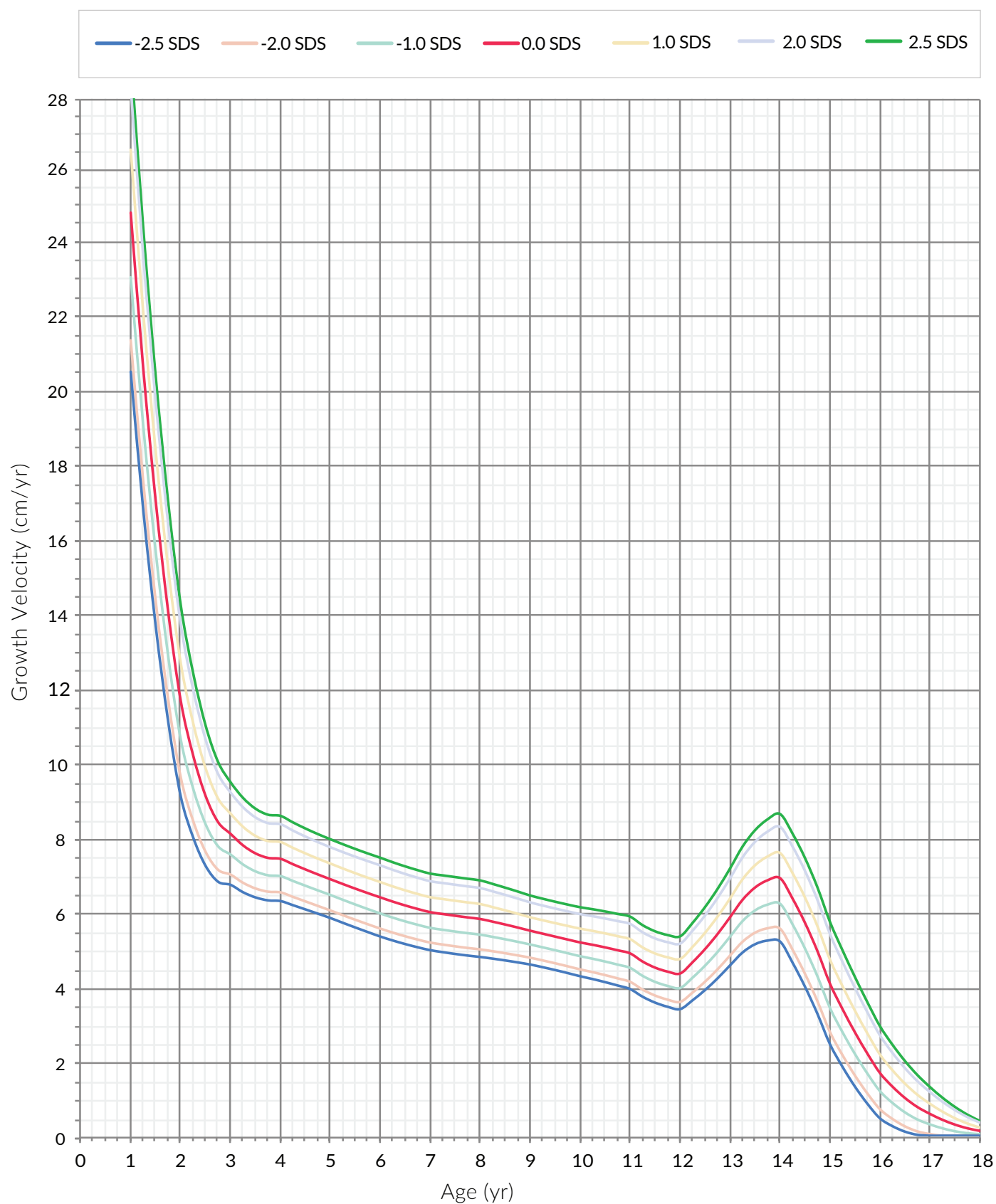
Girls. Growth velocity, Z-scores (SDS)

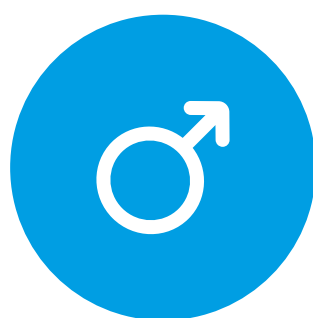
Very-late maturers (n = 102)

Birthdate:/...../.....

Name:

.....





BOYS

TABLES

PUBERTAL MATURITY GROUPS

Boys. Height for age. Pubertal maturity groups

Height for age (cm) in boys for each of the five pubertal maturity groups and for whole population (mean $\pm$ SD)						
Age (years)	Very-early n = 110	Early n = 139	Intermediate n = 225	Late n = 133	Very-late n = 103	Whole population n = 710
0	50.2 $\pm$ 0.9	50.3 $\pm$ 1.1	50.0 $\pm$ 1.0	50.0 $\pm$ 1.1	49.8 $\pm$ 1.2	50.0 $\pm$ 1.1
1	76.4 $\pm$ 2.0	75.7 $\pm$ 2.9	75.3 $\pm$ 1.9	75.2 $\pm$ 2.2	75.1 $\pm$ 2.2	75.4 $\pm$ 2.2
2	88.8 $\pm$ 2.5	87.9 $\pm$ 3.3	86.9 $\pm$ 2.4	87.1 $\pm$ 2.7	86.9 $\pm$ 2.4	87.3 $\pm$ 2.7
3	97.9 $\pm$ 2.5	96.8 $\pm$ 3.6	95.6 $\pm$ 2.9	95.6 $\pm$ 2.9	95.3 $\pm$ 2.7	96.0 $\pm$ 3.0
4	105.4 $\pm$ 4.1	104.4 $\pm$ 4.2	103.5 $\pm$ 3.5	103.1 $\pm$ 4.0	102.7 $\pm$ 3.4	103.8 $\pm$ 3.9
5	112.6 $\pm$ 4.4	111.4 $\pm$ 4.5	110.4 $\pm$ 3.7	109.9 $\pm$ 4.2	109.6 $\pm$ 3.5	110.7 $\pm$ 4.1
6	119.3 $\pm$ 4.8	118.2 $\pm$ 4.7	116.8 $\pm$ 4.0	116.3 $\pm$ 4.5	116.0 $\pm$ 3.7	117.2 $\pm$ 4.4
7	125.7 $\pm$ 5.1	124.5 $\pm$ 4.9	123.0 $\pm$ 4.2	122.4 $\pm$ 4.7	122.1 $\pm$ 3.9	123.5 $\pm$ 4.6
8	131.9 $\pm$ 5.4	130.7 $\pm$ 5.2	128.9 $\pm$ 4.4	128.2 $\pm$ 5.0	127.9 $\pm$ 4.2	129.4 $\pm$ 4.9
9	137.8 $\pm$ 5.7	136.5 $\pm$ 5.4	134.5 $\pm$ 4.7	133.7 $\pm$ 5.1	133.2 $\pm$ 4.4	135.1 $\pm$ 5.2
10	143.3 $\pm$ 6.0	141.9 $\pm$ 5.6	139.8 $\pm$ 4.9	138.9 $\pm$ 5.3	138.3 $\pm$ 4.6	140.4 $\pm$ 5.4
11	150.2 $\pm$ 6.2	147.0 $\pm$ 5.8	144.9 $\pm$ 5.1	143.9 $\pm$ 5.5	143.1 $\pm$ 4.8	145.7 $\pm$ 5.8
12	160.0 $\pm$ 6.4	153.8 $\pm$ 5.9	149.7 $\pm$ 5.3	148.8 $\pm$ 5.6	147.6 $\pm$ 5.1	151.6 $\pm$ 6.9
13	167.5 $\pm$ 6.4	163.0 $\pm$ 6.2	156.4 $\pm$ 5.6	153.4 $\pm$ 5.8	152.1 $\pm$ 5.3	158.2 $\pm$ 7.9
14	172.9 $\pm$ 6.4	170.3 $\pm$ 6.3	165.2 $\pm$ 5.9	160.1 $\pm$ 5.8	156.3 $\pm$ 5.5	165.1 $\pm$ 8.1
15	175.7 $\pm$ 6.3	174.5 $\pm$ 6.3	171.9 $\pm$ 5.9	168.4 $\pm$ 5.9	162.7 $\pm$ 5.6	171.0 $\pm$ 7.2
16	177.1 $\pm$ 6.3	176.8 $\pm$ 6.3	175.4 $\pm$ 5.8	173.7 $\pm$ 6.0	170.1 $\pm$ 5.5	174.9 $\pm$ 6.3
17	177.7 $\pm$ 6.3	177.7 $\pm$ 6.4	176.8 $\pm$ 5.8	176.4 $\pm$ 6.2	174.8 $\pm$ 5.4	176.7 $\pm$ 6.0
18	177.9 $\pm$ 6.3	178.0 $\pm$ 6.4	177.3 $\pm$ 5.7	177.3 $\pm$ 6.2	177.1 $\pm$ 5.4	177.5 $\pm$ 5.9
19	177.9 $\pm$ 6.3	178.1 $\pm$ 6.4	177.5 $\pm$ 5.7	177.5 $\pm$ 6.2	177.5 $\pm$ 5.4	177.7 $\pm$ 5.9
Bold: height for age at pubertal growth spurt onset. SD: standard deviation.						

Boys. Growth velocity . Pubertal maturity groups

Growth velocity (cm/year) of boys for each of the five pubertal maturity groups and for the whole population (mean $\pm$ SD)						
Age (years)	Very-early n = 110	Early n = 139	Intermediate n = 225	Late n = 133	Very-late n = 103	Whole population n = 710
0-1	26.2 $\pm$ 1.9	25.5 $\pm$ 2.2	25.2 $\pm$ 1.5	25.2 $\pm$ 1.8	25.3 $\pm$ 2.1	25.4 $\pm$ 1.9
1-2	12.3 $\pm$ 0.8	12.1 $\pm$ 0.9	11.6 $\pm$ 1.1	11.9 $\pm$ 1.1	11.7 $\pm$ 0.8	11.9 $\pm$ 1.0
2-3	9.1 $\pm$ 0.5	9.0 $\pm$ 0.5	8.7 $\pm$ 0.8	8.4 $\pm$ 0.7	8.4 $\pm$ 0.4	8.7 $\pm$ 0.7
3-4	7.7 $\pm$ 0.6	7.5 $\pm$ 0.6	7.5 $\pm$ 0.6	7.4 $\pm$ 0.5	7.5 $\pm$ 0.3	7.5 $\pm$ 0.5
4-5	7.1 $\pm$ 0.5	7.1 $\pm$ 0.6	6.9 $\pm$ 0.5	6.8 $\pm$ 0.5	6.8 $\pm$ 0.5	6.9 $\pm$ 0.5
5-6	6.7 $\pm$ 0.5	6.7 $\pm$ 0.6	6.5 $\pm$ 0.5	6.4 $\pm$ 0.5	6.4 $\pm$ 0.4	6.5 $\pm$ 0.5
6-7	6.4 $\pm$ 0.5	6.3 $\pm$ 0.5	6.2 $\pm$ 0.5	6.1 $\pm$ 0.4	6.2 $\pm$ 0.4	6.2 $\pm$ 0.5
7-8	6.2 $\pm$ 0.5	6.2 $\pm$ 0.5	5.9 $\pm$ 0.5	5.9 $\pm$ 0.6	5.8 $\pm$ 0.5	6.0 $\pm$ 0.5
8-9	5.9 $\pm$ 0.6	5.8 $\pm$ 0.5	5.6 $\pm$ 0.5	5.5 $\pm$ 0.5	5.3 $\pm$ 0.4	5.6 $\pm$ 0.5
9-10	5.5 $\pm$ 0.6	5.5 $\pm$ 0.5	5.3 $\pm$ 0.4	5.2 $\pm$ 0.5	5.1 $\pm$ 0.4	5.3 $\pm$ 0.5
10-11	7.0 $\pm$ 0.7	5.1 $\pm$ 0.5	5.1 $\pm$ 0.5	5.0 $\pm$ 0.5	4.8 $\pm$ 0.4	5.3 $\pm$ 0.9
11-12	9.7 $\pm$ 1.0	6.7 $\pm$ 0.7	4.8 $\pm$ 0.6	4.8 $\pm$ 0.5	4.5 $\pm$ 0.5	5.9 $\pm$ 1.9
12-13	7.6 $\pm$ 0.7	9.2 $\pm$ 1.0	6.7 $\pm$ 0.8	4.6 $\pm$ 0.6	4.5 $\pm$ 0.4	6.6 $\pm$ 1.9
13-14	5.4 $\pm$ 0.7	7.3 $\pm$ 0.9	8.8 $\pm$ 0.9	6.7 $\pm$ 0.7	4.2 $\pm$ 0.5	6.9 $\pm$ 1.8
14-15	2.8 $\pm$ 0.8	4.2 $\pm$ 0.7	6.7 $\pm$ 0.8	8.3 $\pm$ 0.8	6.5 $\pm$ 0.6	5.9 $\pm$ 2.0
15-16	1.4 $\pm$ 0.5	2.3 $\pm$ 0.5	3.4 $\pm$ 0.6	5.4 $\pm$ 0.9	7.4 $\pm$ 0.5	3.8 $\pm$ 2.0
16-17	0.6 $\pm$ 0.3	0.8 $\pm$ 0.3	1.4 $\pm$ 0.5	2.7 $\pm$ 0.6	4.7 $\pm$ 0.5	1.9 $\pm$ 1.4
17-18	0.2 $\pm$ 0.1	0.3 $\pm$ 0.2	0.6 $\pm$ 0.3	0.9 $\pm$ 0.3	2.3 $\pm$ 0.4	0.8 $\pm$ 0.7
18-19	0.0 $\pm$ 0.0	0.1 $\pm$ 0.1	0.1 $\pm$ 0.1	0.2 $\pm$ 0.2	0.3 $\pm$ 0.3	0.1 $\pm$ 0.2
Bold: growth velocity at the pubertal growth spurt. SD: standard deviation.						

Boys. Pubertal growth. Pubertal maturity groups

Pubertal growth in boys						
Pubertal maturity group	Number of subjects	Age at onset of pubertal growth spurt (years)	Height at the beginning of pubertal growth spurt (cm)	Peak pubertal growth velocity (cm/year)	Total pubertal gain of height (cm)	Adult height (cm)
Very-early	110	10-11	143.3 ± 6.0	9.7 ± 1.0	34.6 ± 2.3	177.9 ± 6.3
Early	139	11-12	147.0 ± 5.8	9.2 ± 1.0	31.1 ± 2.5	178.1 ± 6.4
Intermediate	225	12-13	149.7 ± 5.3	8.8 ± 0.9	27.8 ± 2.0	177.5 ± 5.7
Late	133	13-14	153.4 ± 5.8	8.3 ± 0.8	24.1 ± 2.2	177.5 ± 6.2
Very-late	103	14-15	156.3 ± 5.5	7.4 ± 0.5	21.2 ± 1.3	177.5 ± 5.4
Whole population	710	10-15	-	-	-	177.7 ± 5.9
Mean ± standard deviation.						

Boys. Weight for age. Pubertal maturity groups

Weight for age (kg) in boys for each of the five pubertal maturity groups and for whole population (mean $\pm$ SD)						
Age (years)	Very-early n = 110	Early n = 139	Intermediate n = 225	Late n = 133	Very-late n = 103	Whole population n = 710
0	3.4 $\pm$ 0.3	3.4 $\pm$ 0.4	3.3 $\pm$ 0.4	3.4 $\pm$ 0.3	3.3 $\pm$ 0.4	3.4 $\pm$ 0.4
1	10.5 $\pm$ 0.9	10.3 $\pm$ 1.0	10.2 $\pm$ 0.9	10.2 $\pm$ 0.8	10.0 $\pm$ 0.8	10.2 $\pm$ 0.9
2	13.2 $\pm$ 1.3	13.0 $\pm$ 1.3	12.8 $\pm$ 1.2	12.7 $\pm$ 1.0	12.4 $\pm$ 1.2	12.7 $\pm$ 1.2
3	15.7 $\pm$ 1.5	15.3 $\pm$ 1.8	15.1 $\pm$ 1.6	14.7 $\pm$ 1.2	14.5 $\pm$ 1.4	15.0 $\pm$ 1.5
4	17.7 $\pm$ 1.9	17.4 $\pm$ 2.1	17.0 $\pm$ 1.7	16.8 $\pm$ 1.8	16.7 $\pm$ 1.8	17.1 $\pm$ 1.9
5	20.1 $\pm$ 2.4	19.8 $\pm$ 2.8	19.2 $\pm$ 2.1	19.0 $\pm$ 2.1	18.8 $\pm$ 1.9	19.3 $\pm$ 2.3
6	23.0 $\pm$ 3.0	22.5 $\pm$ 3.4	21.7 $\pm$ 2.7	21.4 $\pm$ 2.6	21.2 $\pm$ 2.4	21.9 $\pm$ 2.9
7	26.2 $\pm$ 3.8	25.5 $\pm$ 3.9	24.5 $\pm$ 3.2	24.2 $\pm$ 3.2	24.0 $\pm$ 3.0	24.8 $\pm$ 3.5
8	29.7 $\pm$ 4.5	28.7 $\pm$ 4.6	27.7 $\pm$ 3.8	27.3 $\pm$ 3.9	27.1 $\pm$ 3.6	28.0 $\pm$ 4.2
9	33.9 $\pm$ 5.5	32.5 $\pm$ 5.4	31.1 $\pm$ 4.6	30.6 $\pm$ 4.7	30.4 $\pm$ 4.3	31.6 $\pm$ 5.0
10	38.3 $\pm$ 6.3	36.4 $\pm$ 6.2	34.7 $\pm$ 5.3	34.0 $\pm$ 5.3	33.9 $\pm$ 4.9	35.3 $\pm$ 5.8
11	43.3 $\pm$ 7.1	40.3 $\pm$ 7.2	38.4 $\pm$ 6.0	37.6 $\pm$ 6.0	37.3 $\pm$ 5.7	39.2 $\pm$ 6.7
12	49.1 $\pm$ 7.9	45.2 $\pm$ 7.6	42.3 $\pm$ 6.6	41.4 $\pm$ 6.9	41.0 $\pm$ 6.4	43.6 $\pm$ 7.5
13	55.1 $\pm$ 8.4	51.3 $\pm$ 8.2	47.5 $\pm$ 7.3	45.6 $\pm$ 8.0	45.1 $\pm$ 7.2	48.7 $\pm$ 8.5
14	60.6 $\pm$ 8.6	57.7 $\pm$ 8.7	54.3 $\pm$ 8.0	50.9 $\pm$ 8.4	49.2 $\pm$ 7.6	54.6 $\pm$ 9.0
15	64.4 $\pm$ 8.6	62.1 $\pm$ 8.9	59.7 $\pm$ 7.8	57.1 $\pm$ 8.7	54.4 $\pm$ 7.5	59.6 $\pm$ 8.8
16	66.6 $\pm$ 8.5	65.1 $\pm$ 8.5	63.5 $\pm$ 7.8	61.8 $\pm$ 8.5	60.1 $\pm$ 7.5	63.5 $\pm$ 8.4
17	68.2 $\pm$ 8.2	67.1 $\pm$ 8.5	65.8 $\pm$ 7.7	64.8 $\pm$ 8.4	64.2 $\pm$ 7.6	66.0 $\pm$ 8.1
18	69.3 $\pm$ 7.9	68.2 $\pm$ 8.4	66.9 $\pm$ 7.4	66.3 $\pm$ 8.3	66.7 $\pm$ 7.5	67.4 $\pm$ 7.9
19	70.0 $\pm$ 7.7	69.0 $\pm$ 8.3	67.8 $\pm$ 7.3	67.2 $\pm$ 8.2	68.3 $\pm$ 7.6	68.3 $\pm$ 7.8
Bold: weight values at the onset of pubertal growth spurt. SD: standard deviation.						

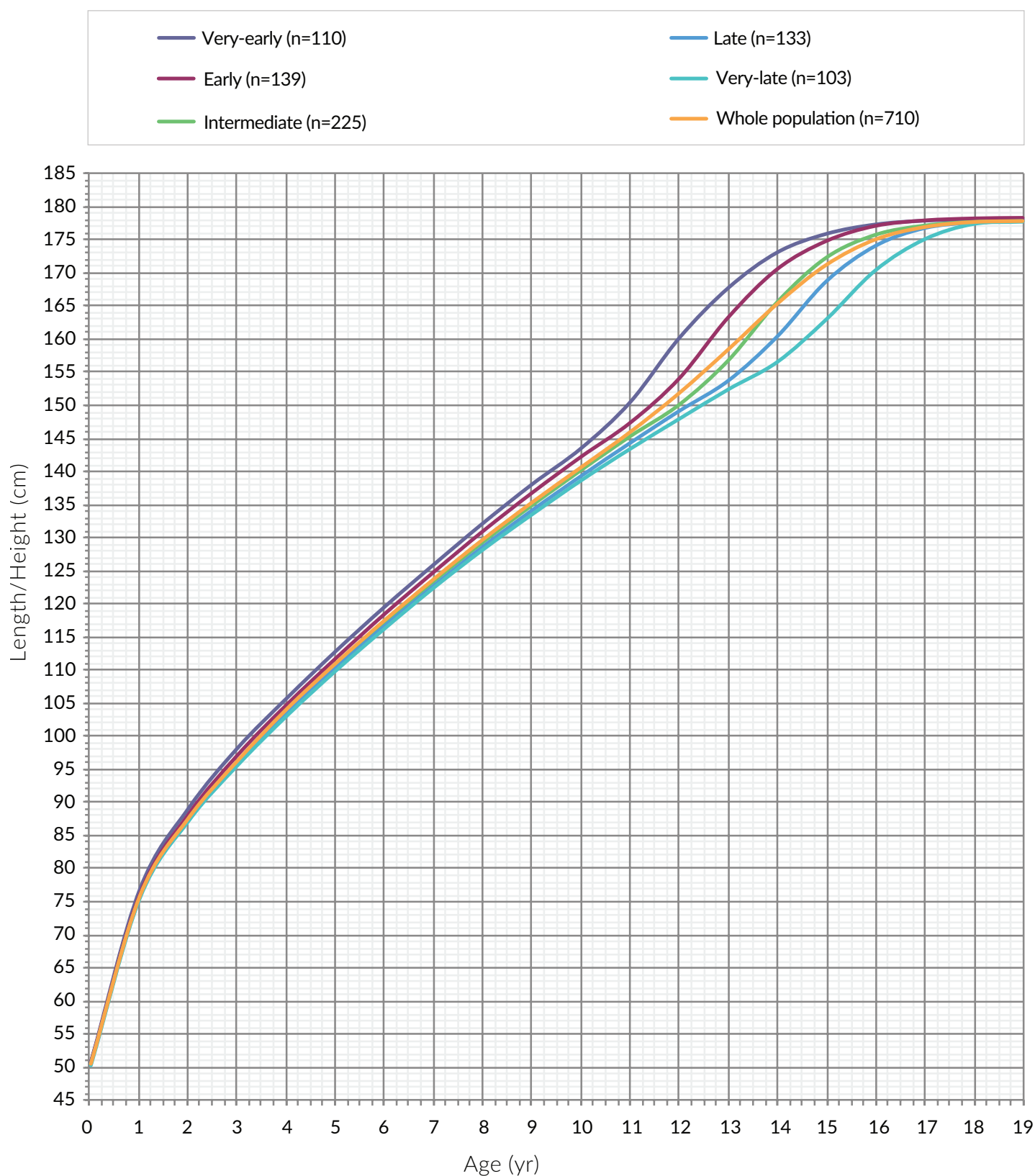
Boys. BMI and TMI.

Body Mass Index (BMI) for age and Tri-ponderal Mass Index (TMI) for age in boys (mean $\pm$ SD)		
Age (years)	BMI n = 710	TMI n = 710
0	13.4 $\pm$ 1.2	26.8 $\pm$ 2.3
1	17.9 $\pm$ 1.1	23.7 $\pm$ 1.6
2	16.7 $\pm$ 1.1	19.2 $\pm$ 1.4
3	16.2 $\pm$ 1.1	16.9 $\pm$ 1.2
4	15.9 $\pm$ 1.2	15.3 $\pm$ 1.3
5	15.8 $\pm$ 1.3	14.2 $\pm$ 1.2
6	15.9 $\pm$ 1.5	13.6 $\pm$ 1.3
7	16.2 $\pm$ 1.6	13.1 $\pm$ 1.3
8	16.7 $\pm$ 1.8	12.9 $\pm$ 1.4
9	17.3 $\pm$ 2.0	12.8 $\pm$ 1.5
10	17.9 $\pm$ 2.2	12.7 $\pm$ 1.5
11	18.4 $\pm$ 2.4	12.6 $\pm$ 1.6
12	18.9 $\pm$ 2.5	12.5 $\pm$ 1.6
13	19.4 $\pm$ 2.5	12.3 $\pm$ 1.6
14	19.9 $\pm$ 2.5	12.1 $\pm$ 1.6
15	20.3 $\pm$ 2.3	11.9 $\pm$ 1.4
16	20.7 $\pm$ 2.2	11.9 $\pm$ 1.3
17	21.1 $\pm$ 2.1	12.0 $\pm$ 1.2
18	21.4 $\pm$ 2.0	12.1 $\pm$ 1.2
19	21.6 $\pm$ 2.0	12.2 $\pm$ 1.2
SD: standard deviation.		

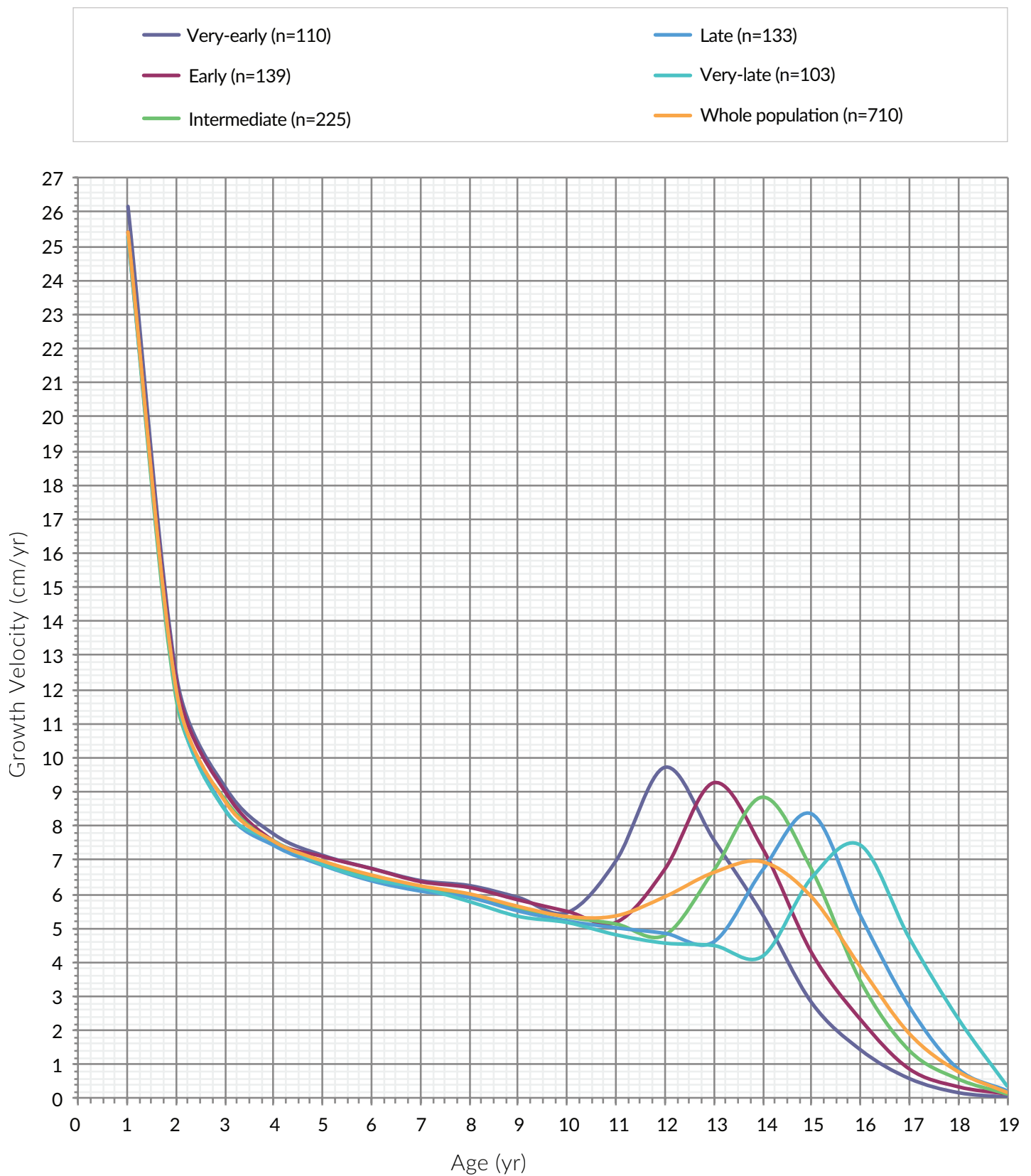
FIGURES

PUBERTAL MATURITY GROUPS

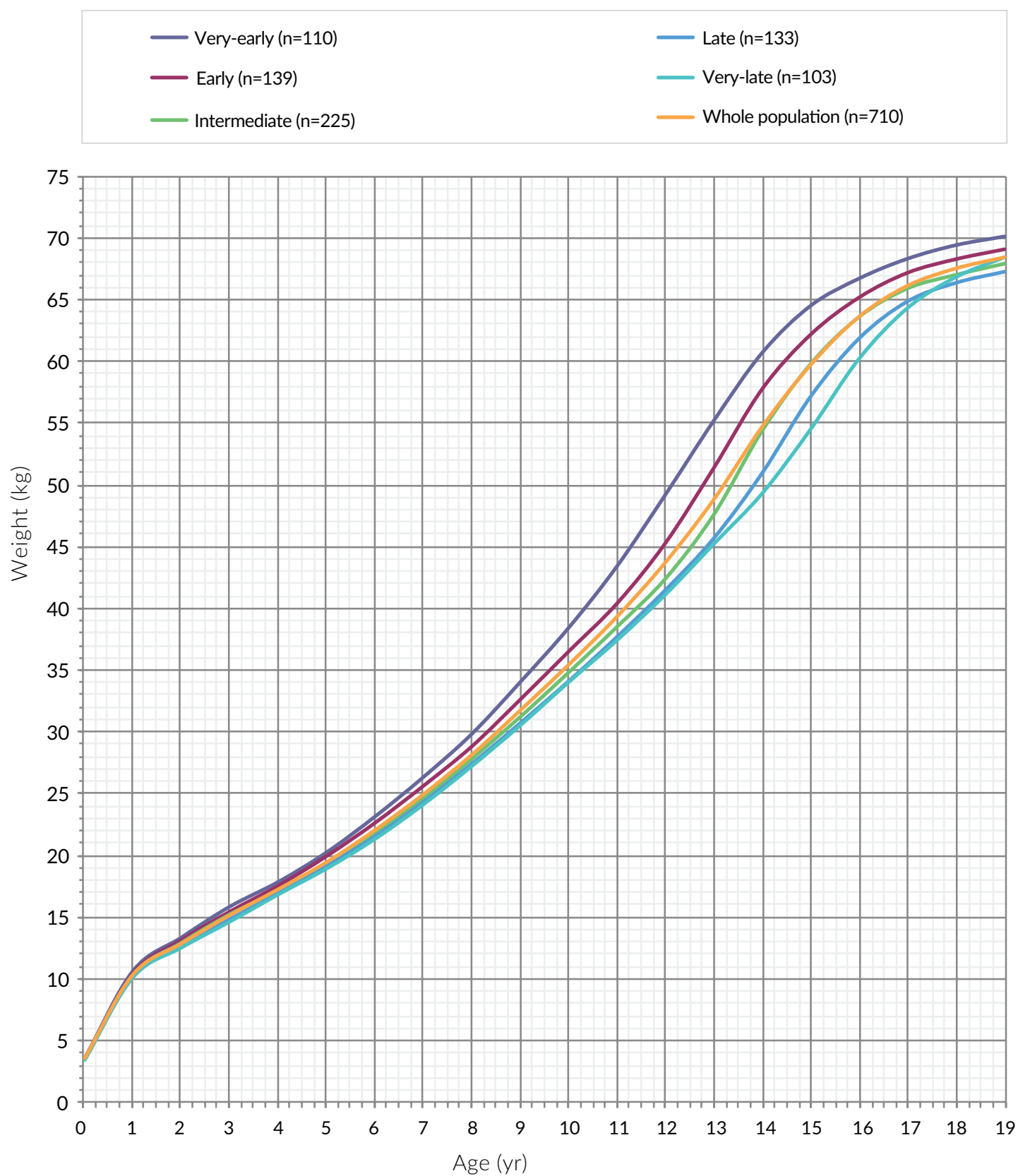
Boys. Length/Height. Median values. Pubertal maturity groups



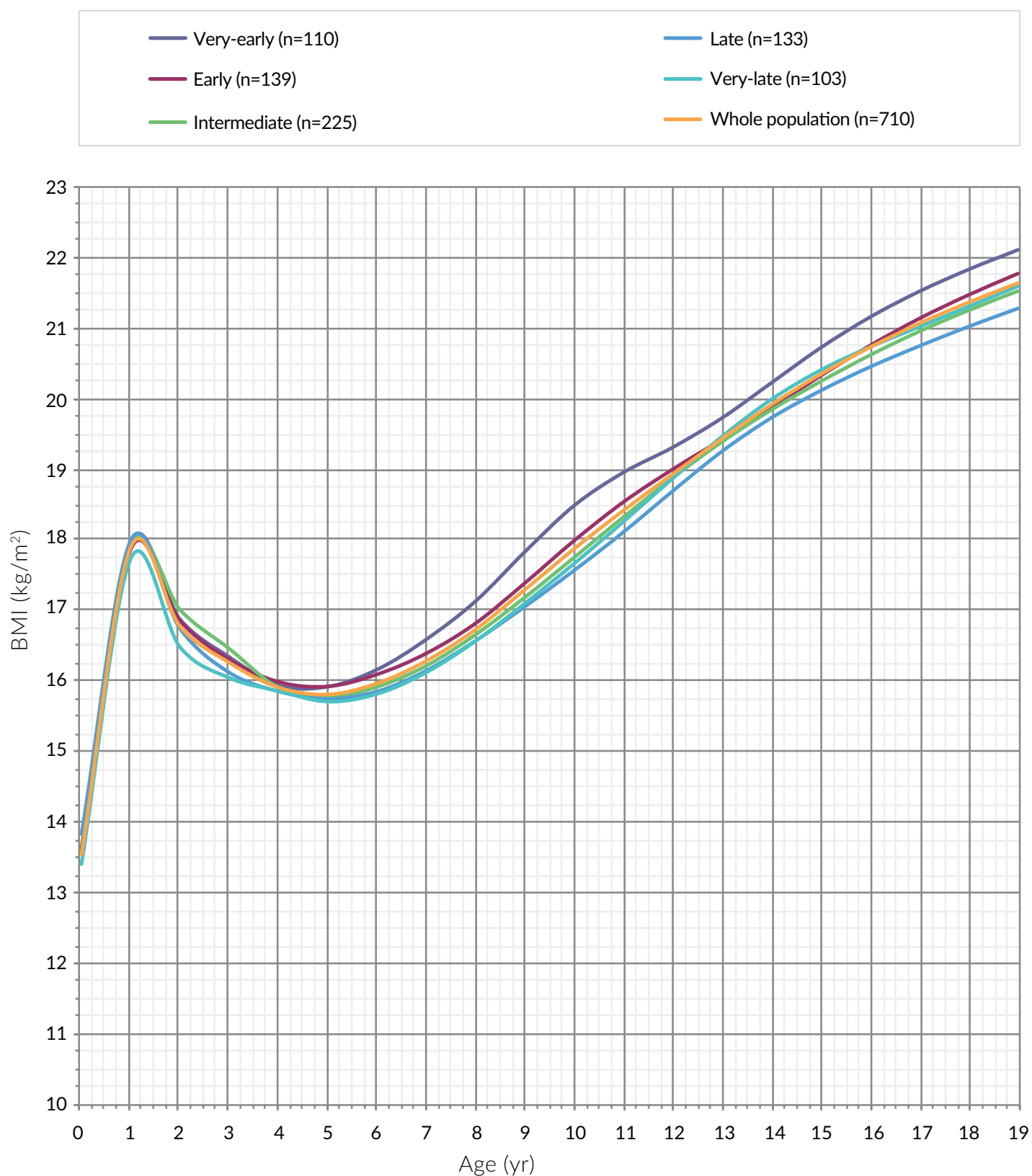
Boys. Growth velocity. Median values. Pubertal maturity groups



Boys. Weight. Median values. Pubertal maturity groups



Boys. BMI. Median values. Pubertal maturity groups



GROWTH CHARTS WHOLE POPULATION



Boys. Height and Weight. Centiles

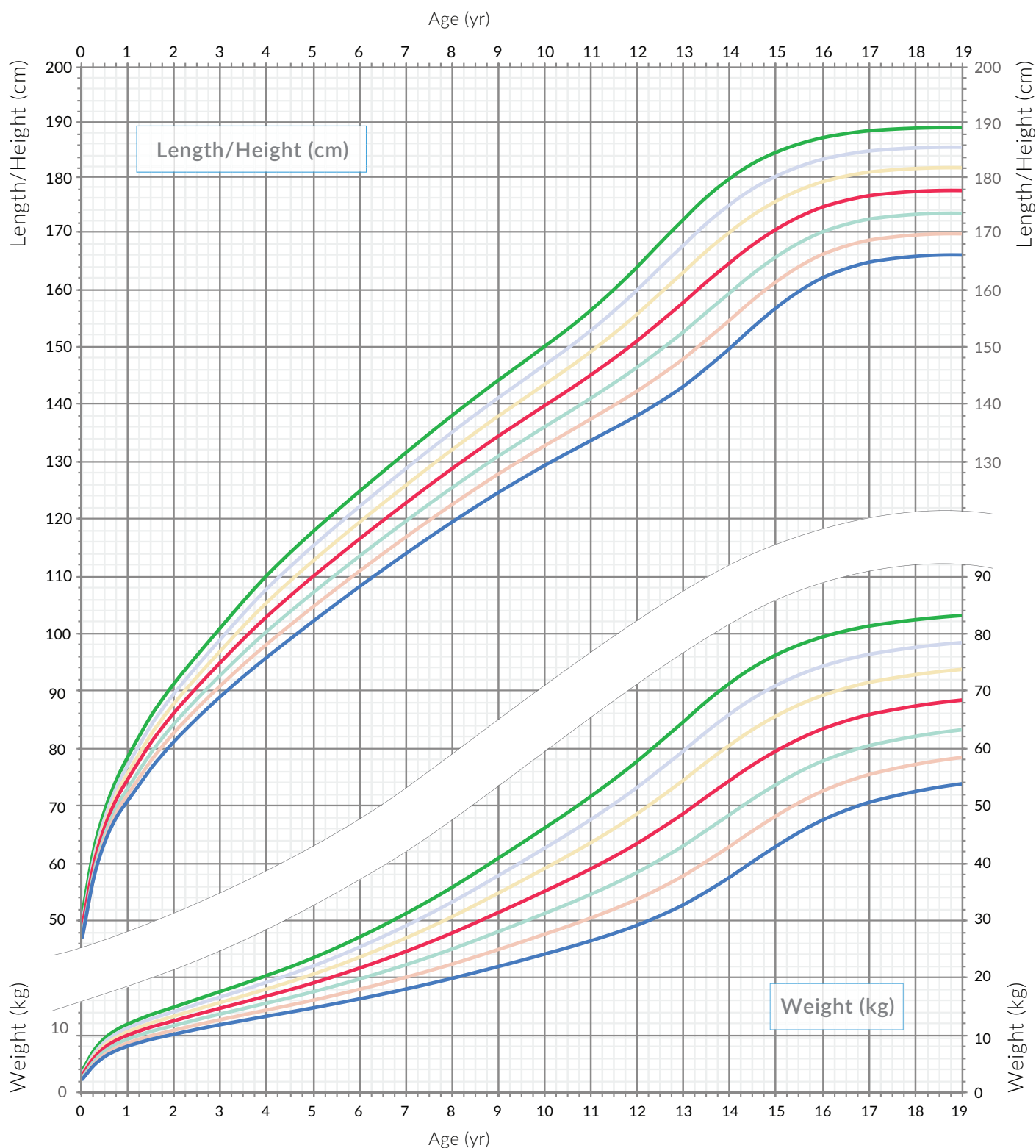
Whole population (n = 710)

Birthdate:/...../.....

Name:

.....

3% 10% 25% 50% 75% 90% 97%





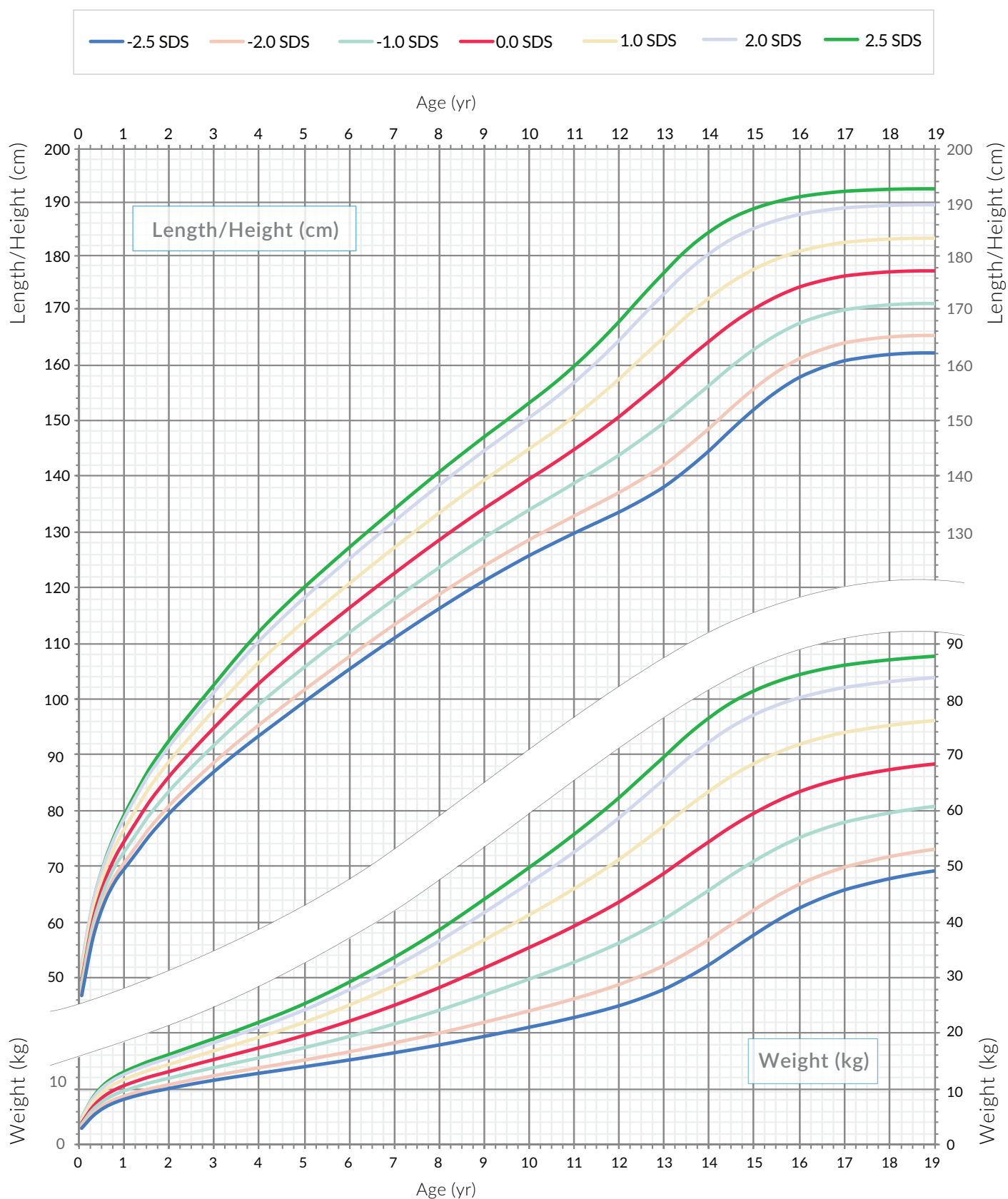
Boys. Height and Weight. Z-scores (SDS)

Whole population (n = 710)

Birthdate:/...../.....

Name:

.....





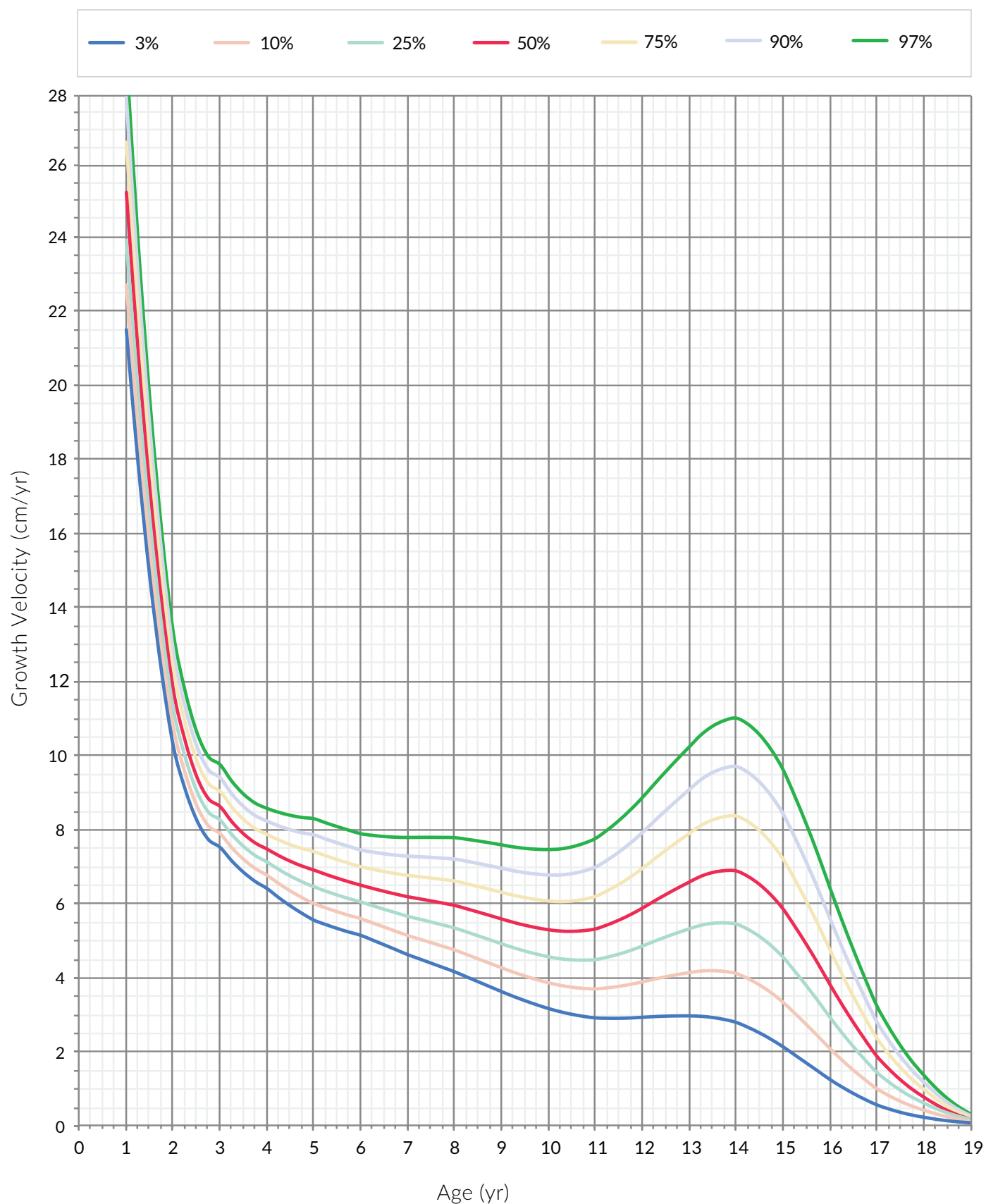
Boys. Growth velocity. Centiles

Whole population (n = 710)

Birthdate:/...../.....

Name:

.....





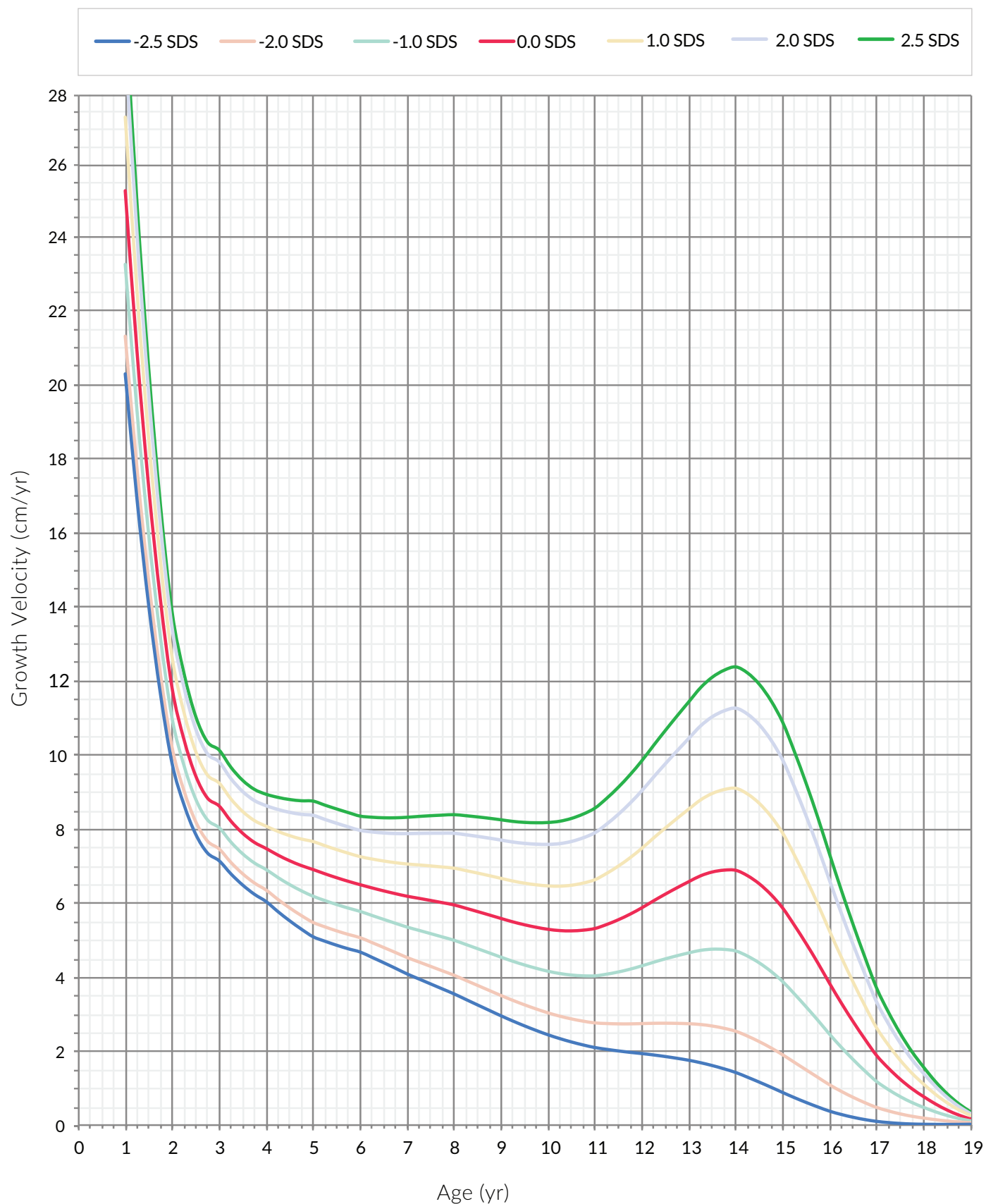
Boys. Growth velocity. Z-scores (SDS)

Whole population (n = 710)

Birthdate:/...../.....

Name:

.....





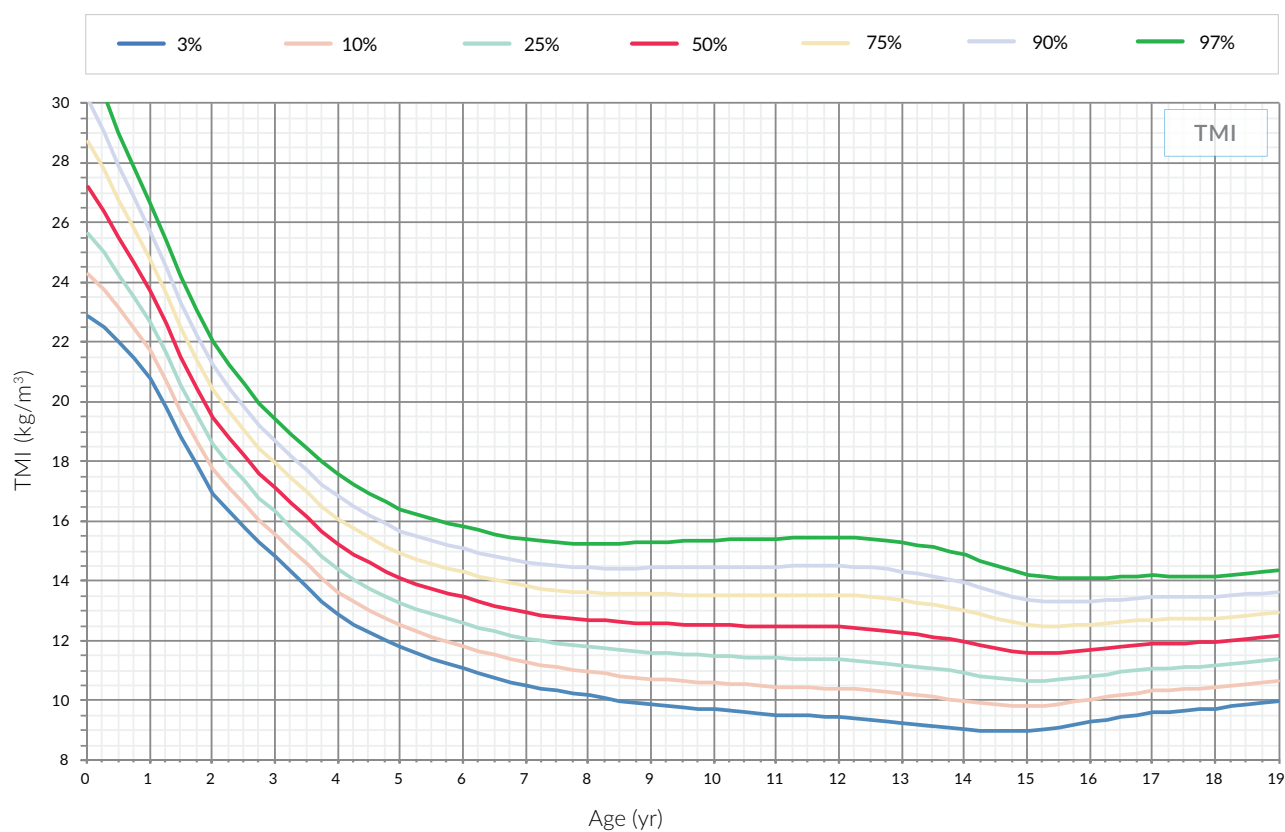
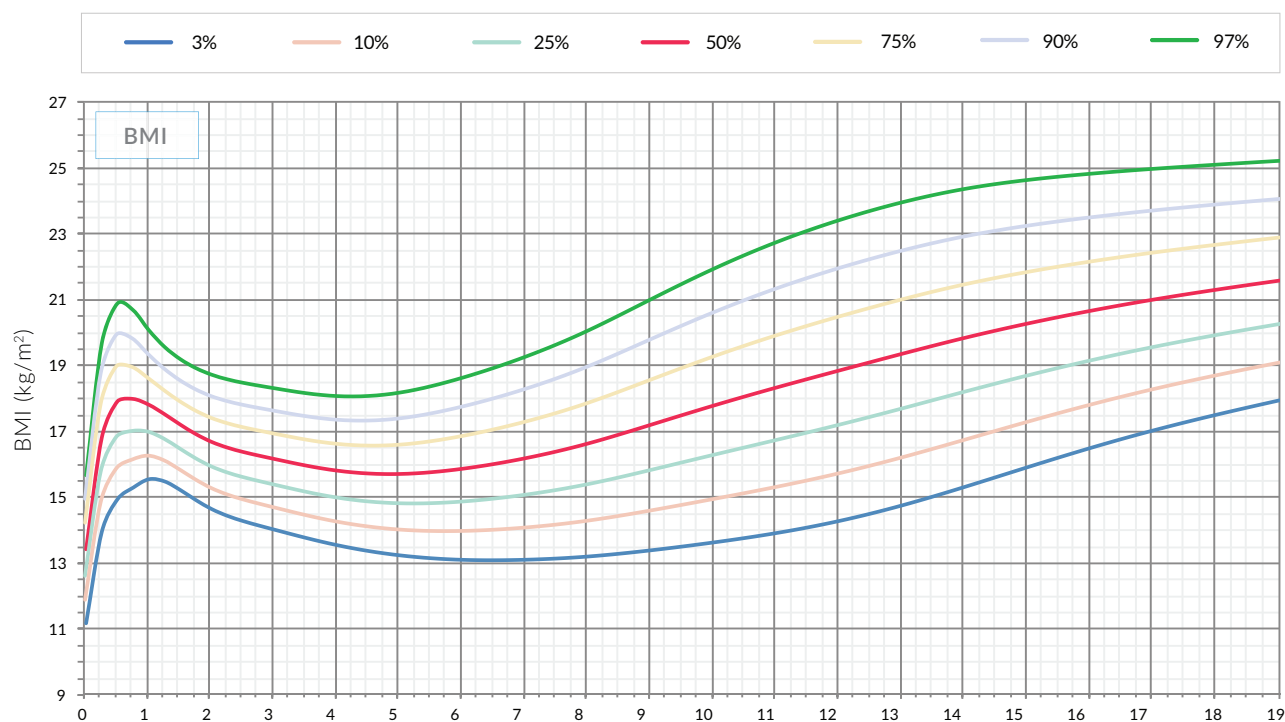
Boys. BMI and TMI. Centiles

Whole population (n = 710)

Birthdate:/...../.....

Name:

.....





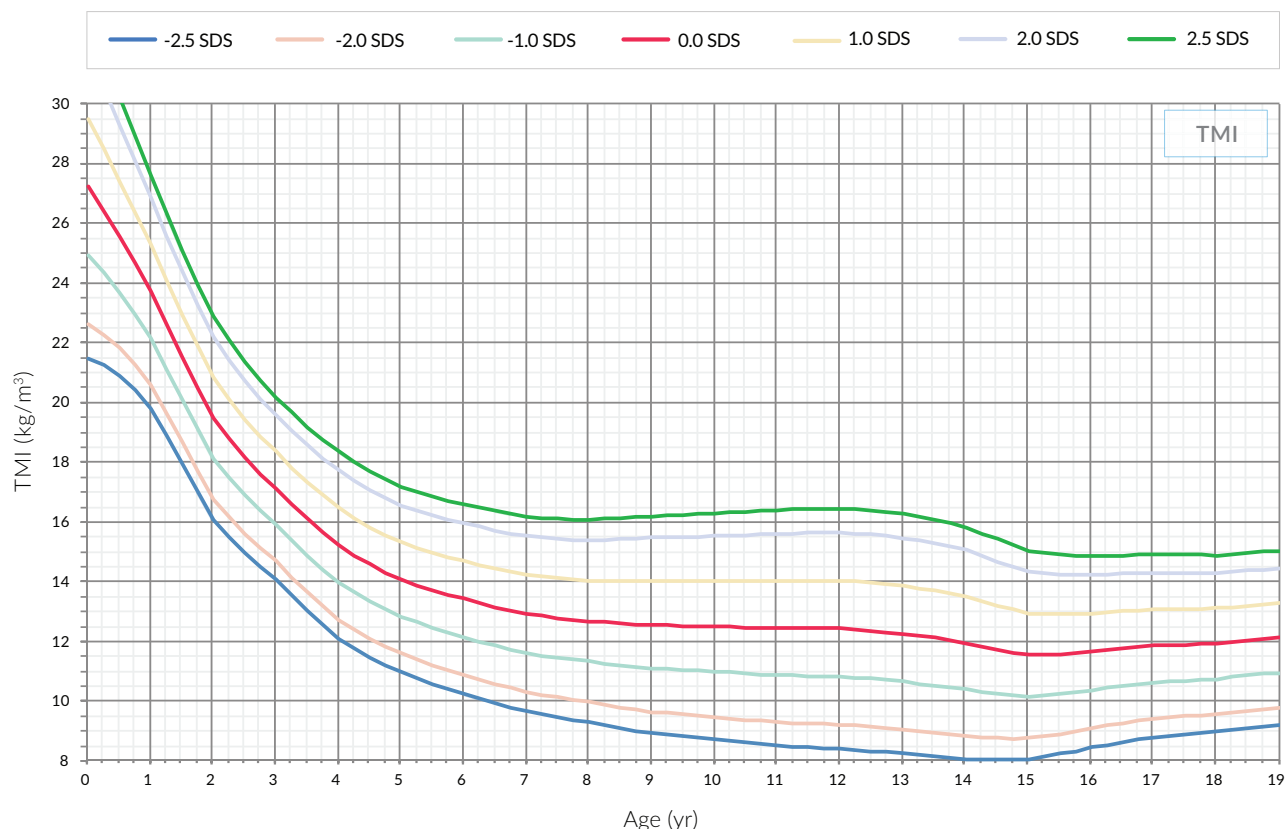
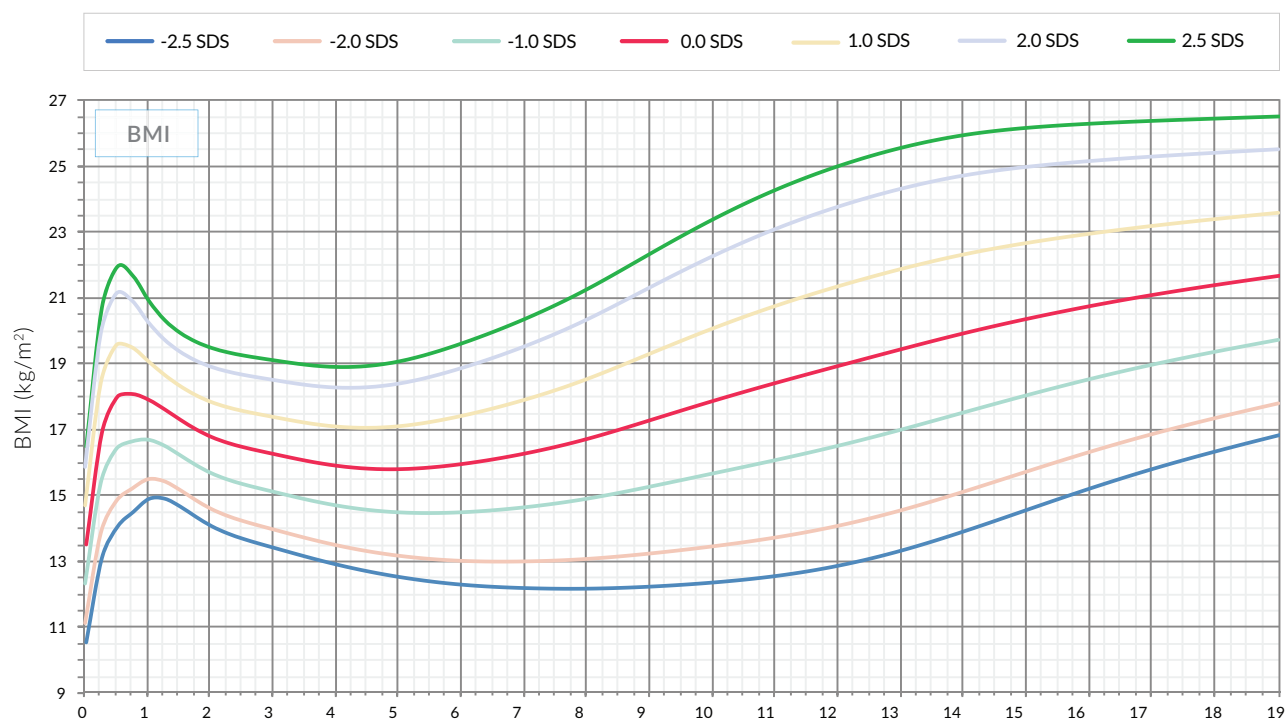
Boys. BMI and TMI. Z-scores (SDS)

Whole population (n = 710)

Birthdate:/...../.....

Name:

.....



GROWTH CHARTS VERY-EARLY MATURERS



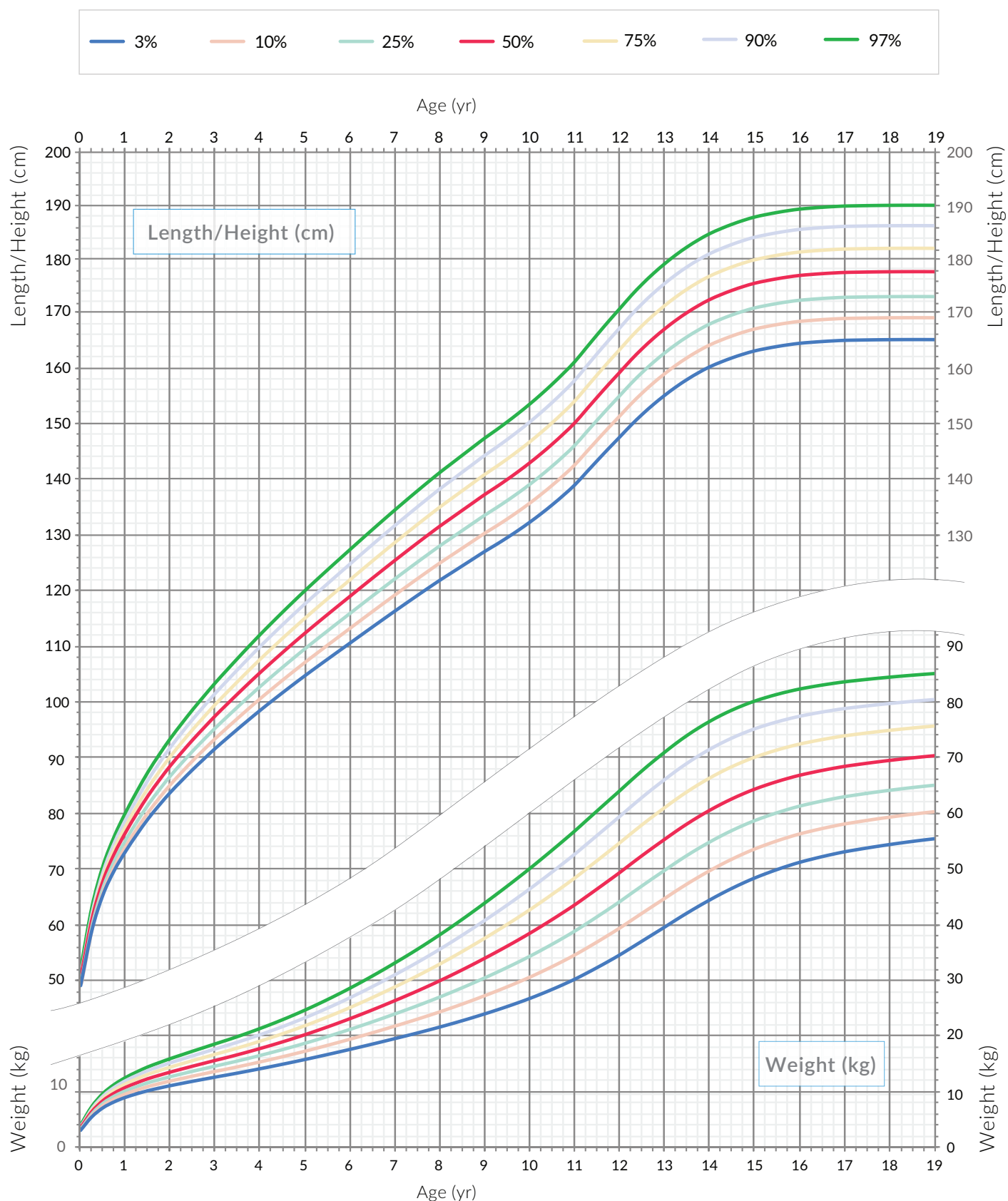
Boys. Height and Weight. Centiles

Very-early maturers (n = 110)

Birthdate:/...../.....

Name:

.....





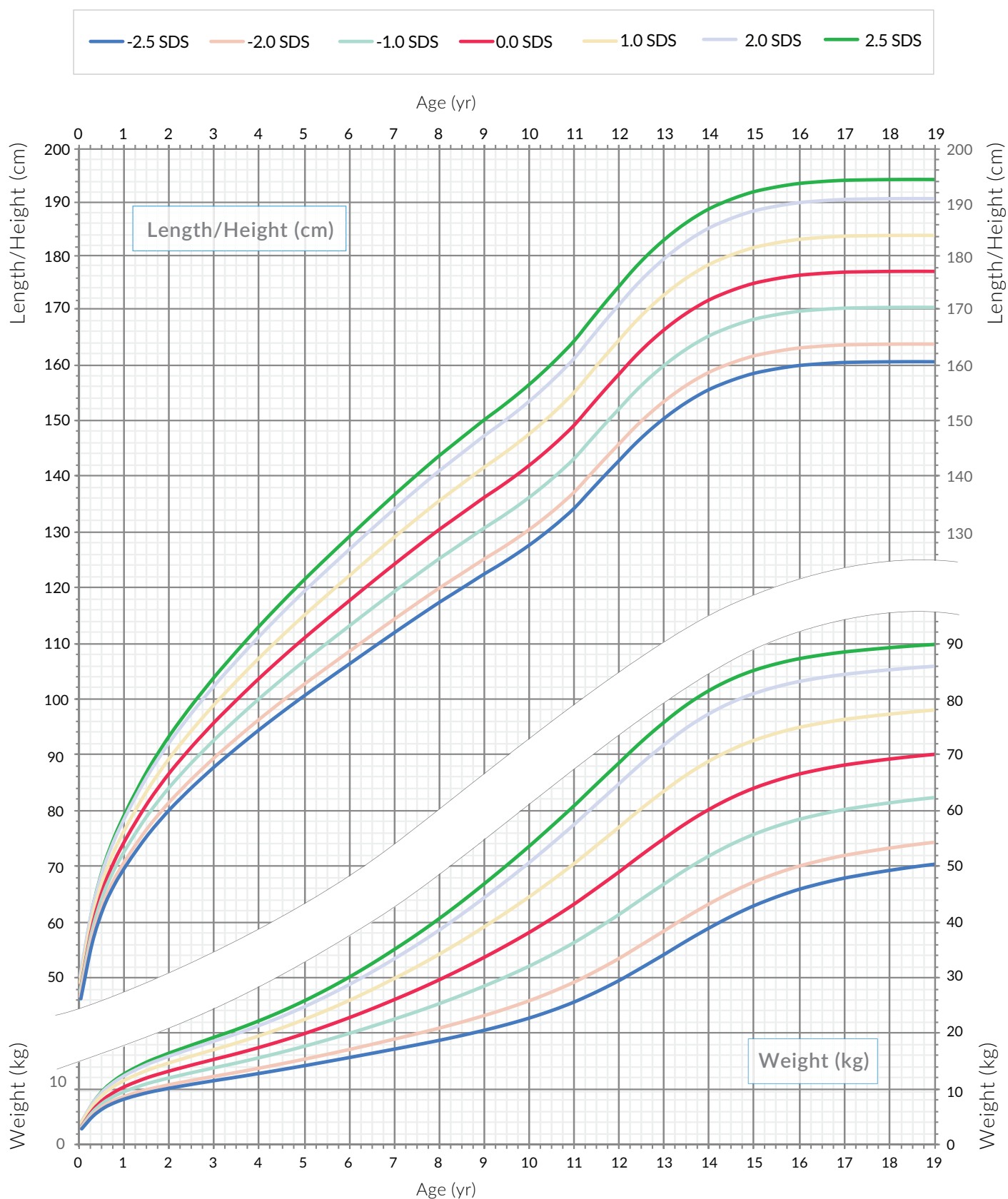
Boys. Height and Weight. Z-scores (SDS)

Very-early maturers (n = 110)

Birthdate:/...../.....

Name:

.....





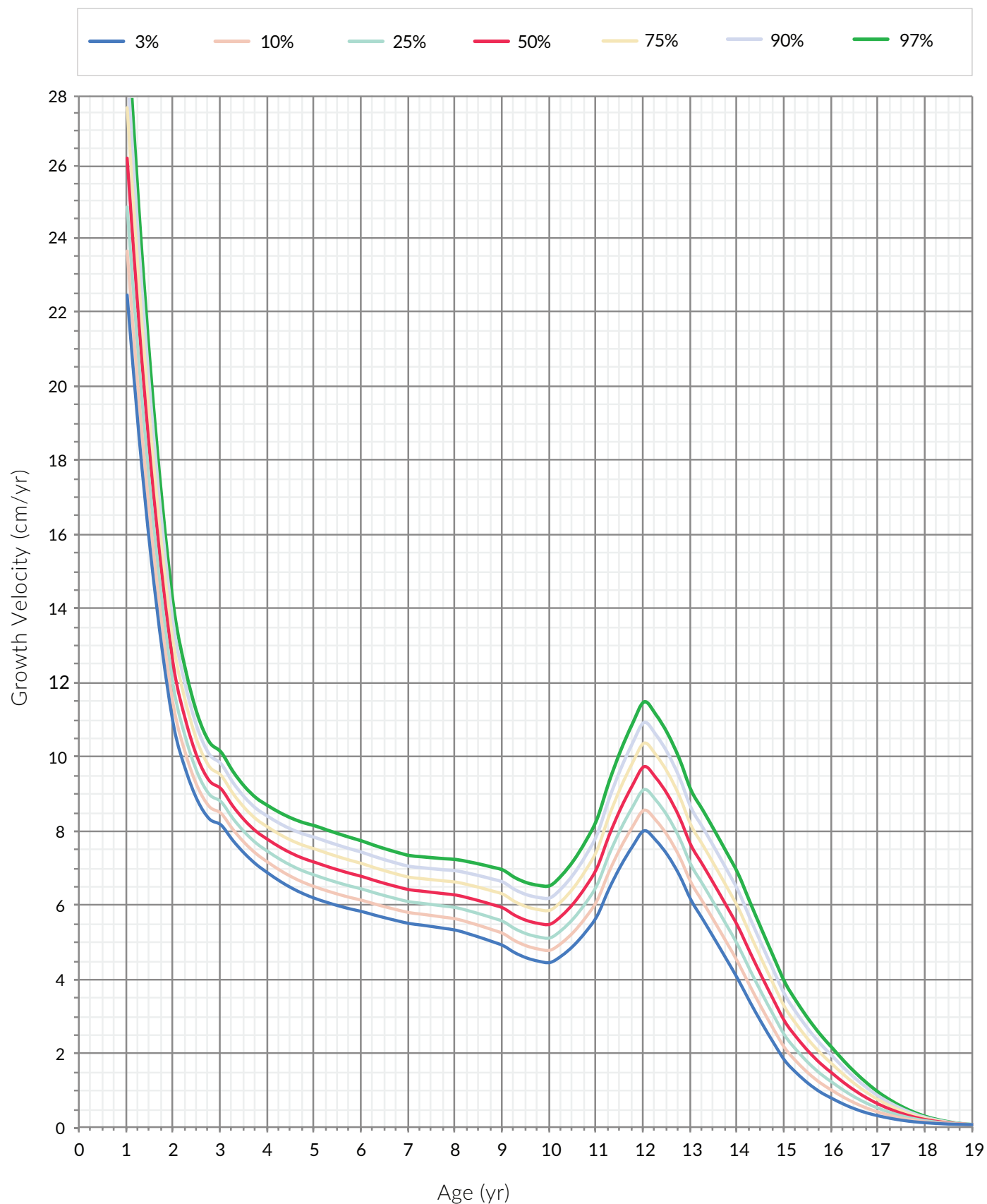
Boys. Growth velocity. Centiles

Very-early maturers (n = 110)

Birthdate:/...../.....

Name:

.....





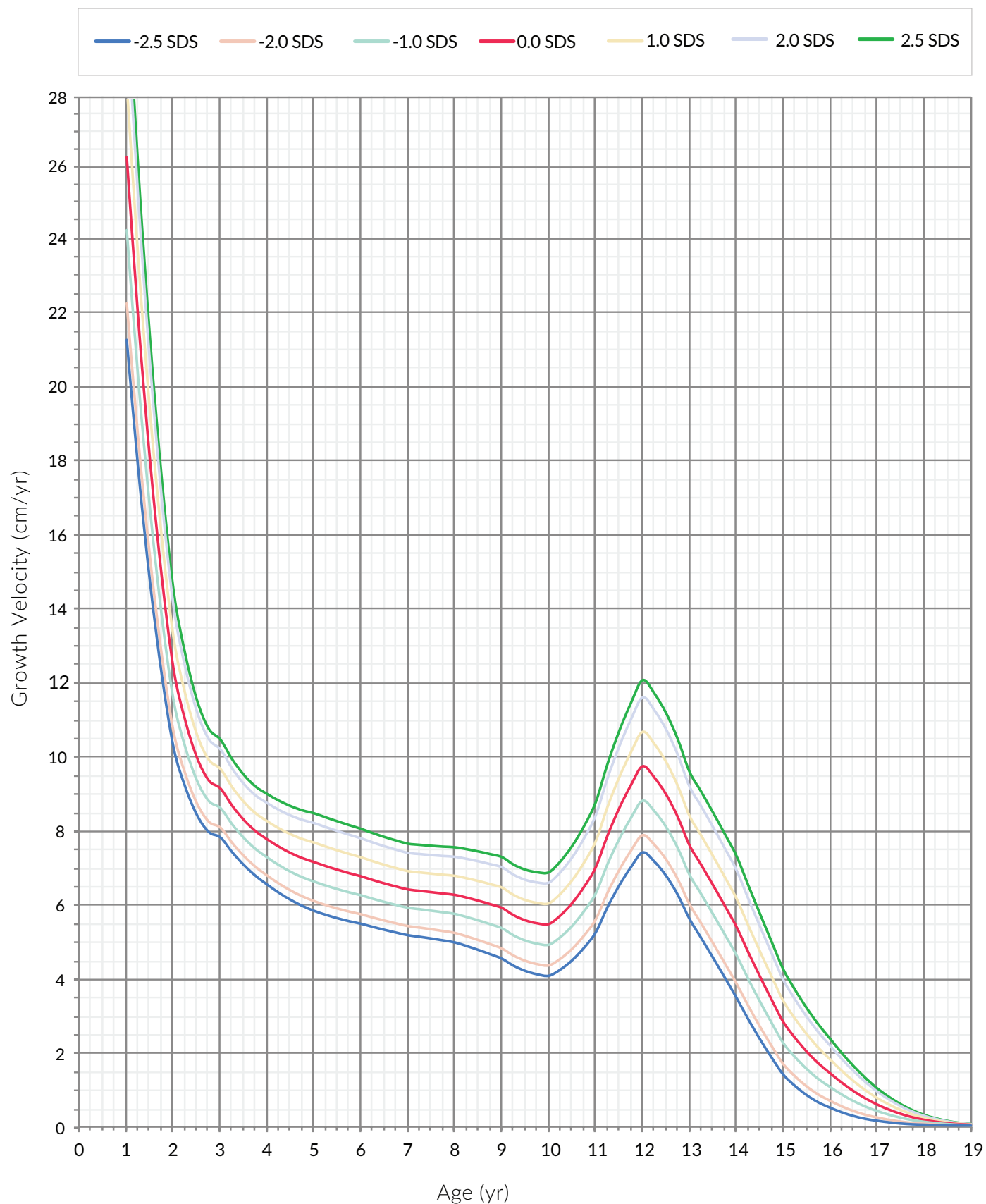
Boys. Growth velocity. Z-scores (SDS)

Very-early maturers (n = 110)

Birthdate:/...../.....

Name:

.....



GROWTH CHARTS EARLY MATURERS



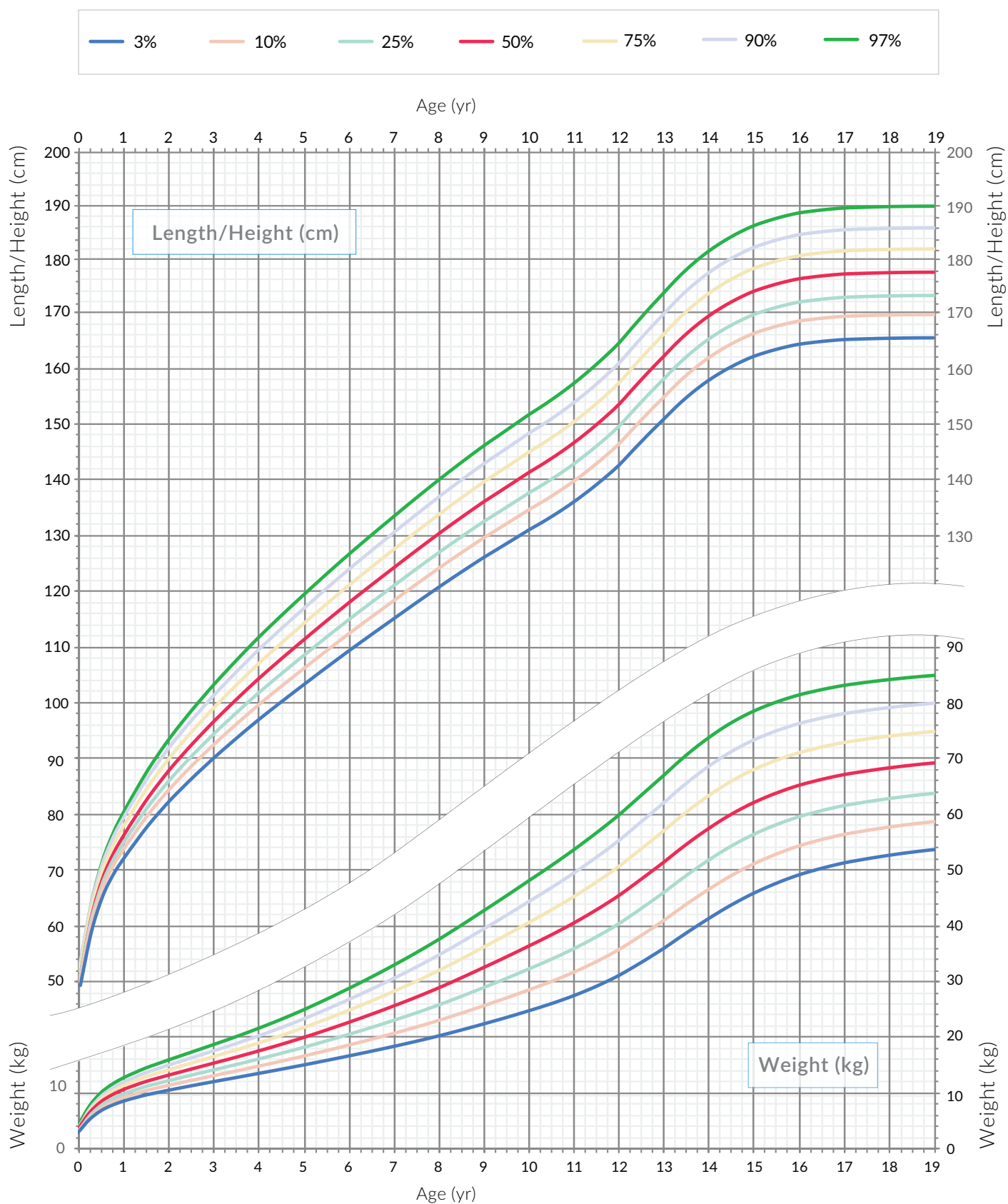
Boys. Height and Weight. Centiles

Early maturers (n = 139)

Birthdate:/...../.....

Name:

.....





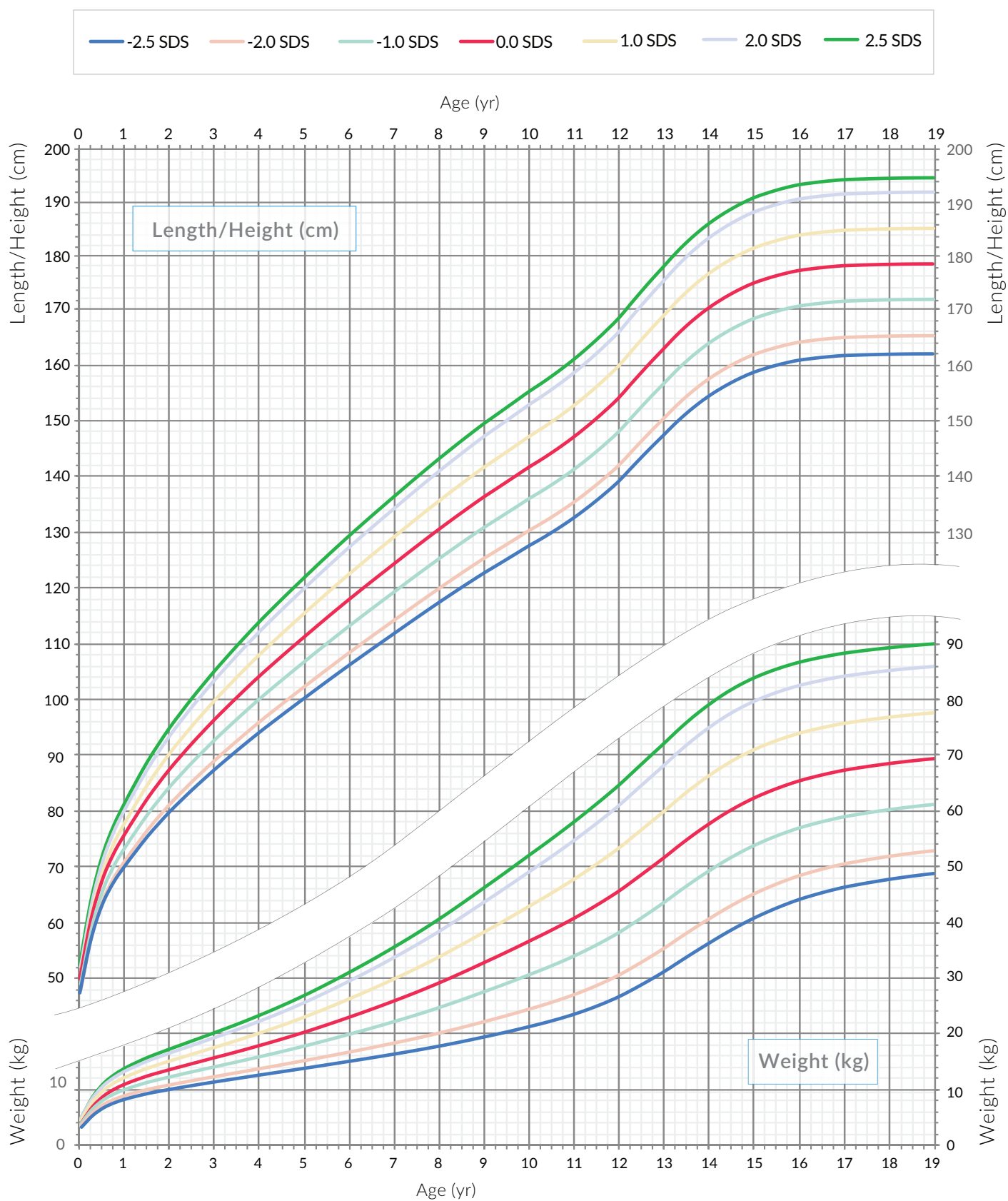
Boys. Height and Weight. Z-scores (SDS)

Early maturers (n = 139)

Birthdate:/...../.....

Name:

.....





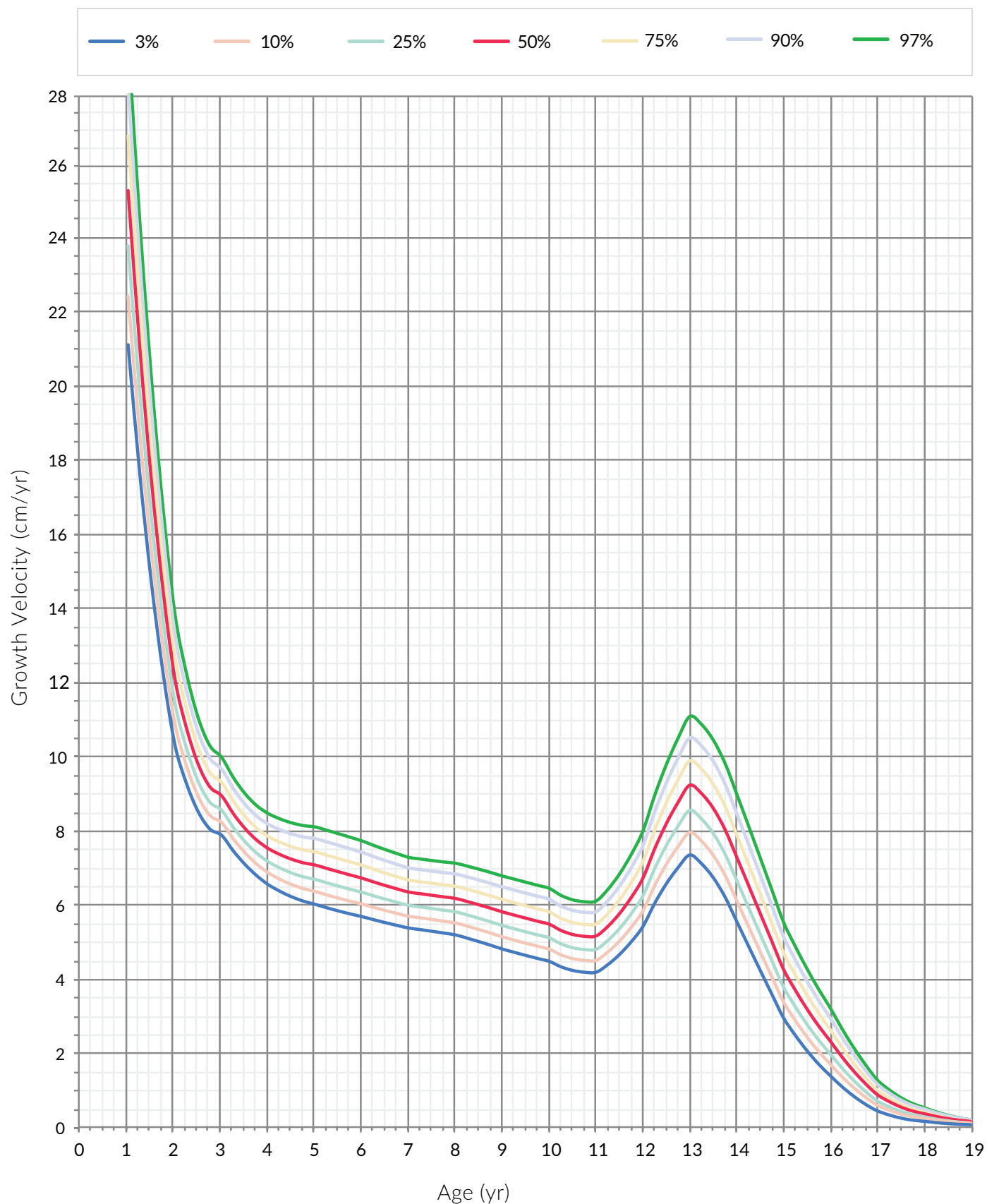
Boys. Growth velocity. Centiles

Early maturers (n = 139)

Birthdate:/...../.....

Name:

.....





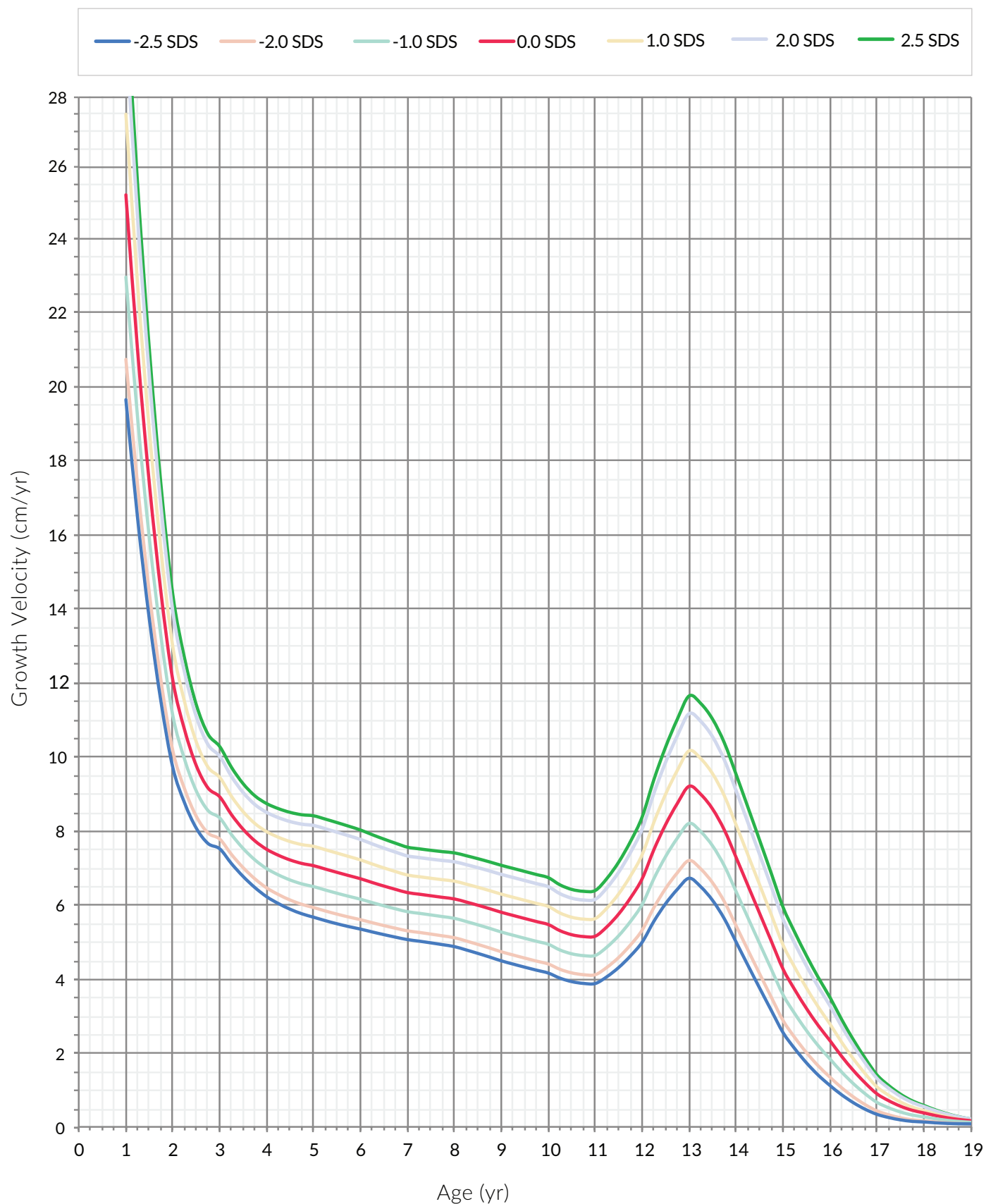
Boys. Growth velocity. Z-scores (SDS)

Early maturers (n = 139)

Birthdate:/...../.....

Name:

.....



GROWTH CHARTS INTERMEDIATE MATURERS



Boys. Height and Weight. Centiles

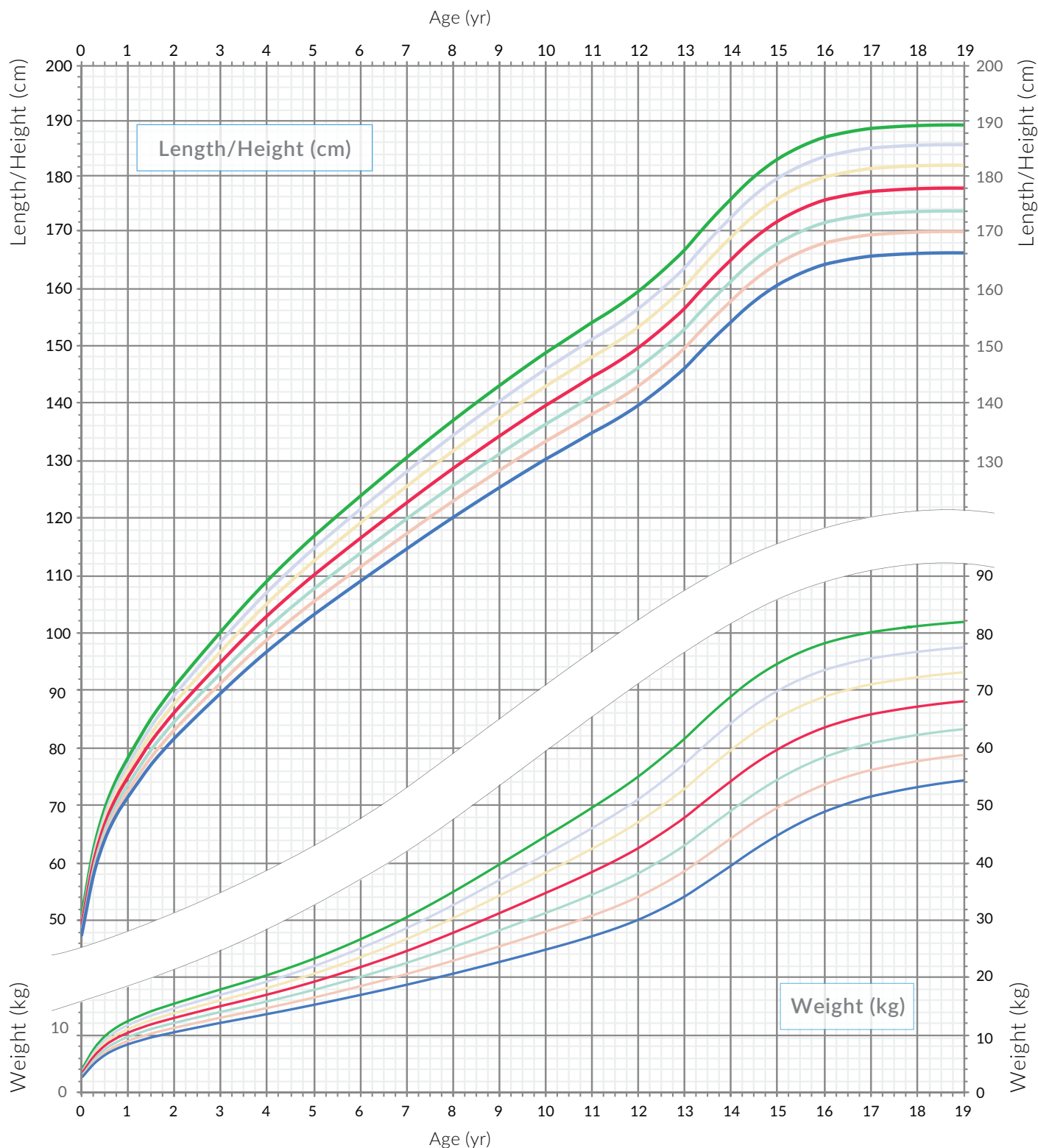
Intermediate maturers (n = 225)

Birthdate:/...../.....

Name:

.....

3% 10% 25% 50% 75% 90% 97%





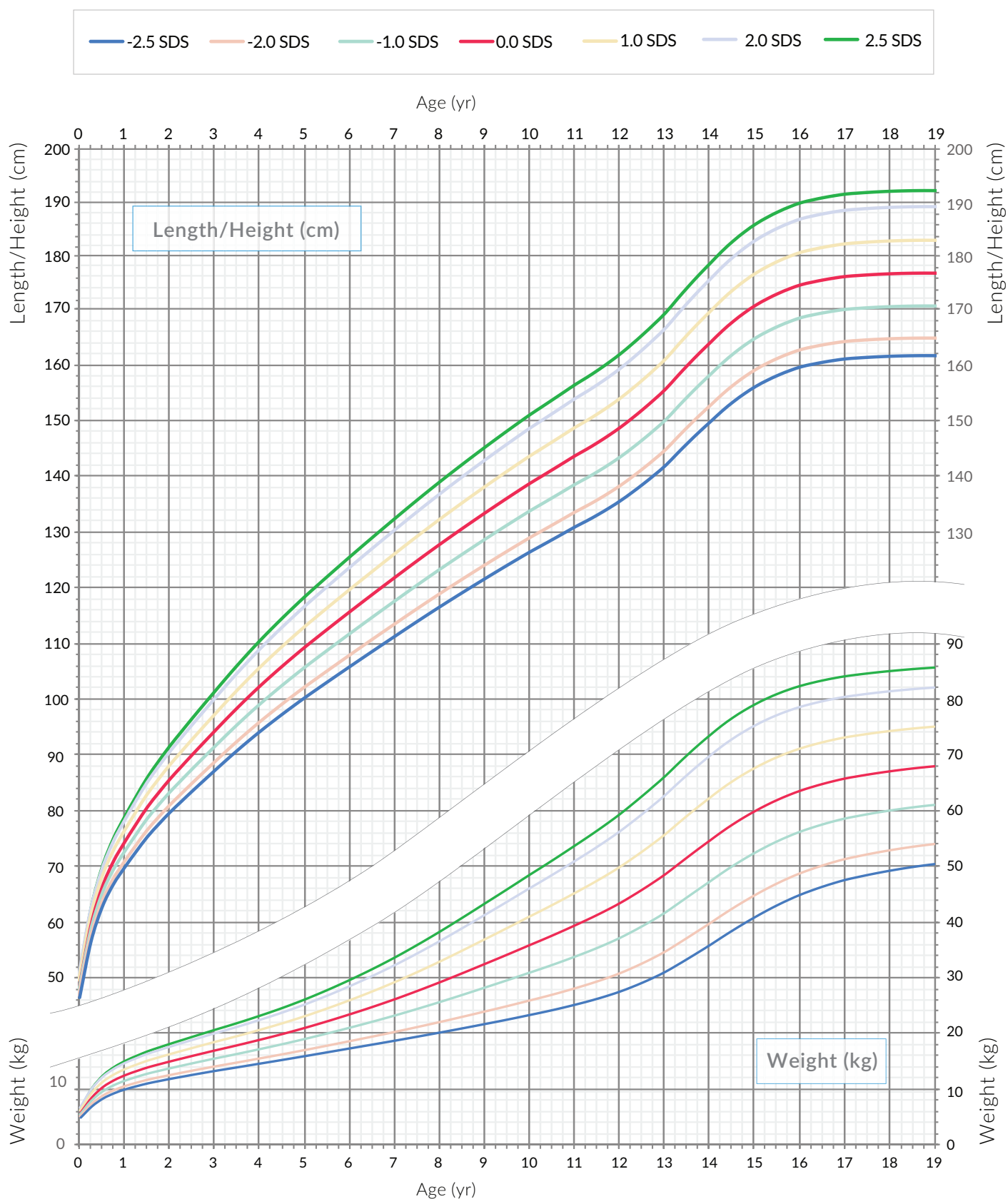
Boys. Height and Weight. Z-scores (SDS)

Intermediate maturers (n = 225)

Birthdate:/...../.....

Name:

.....



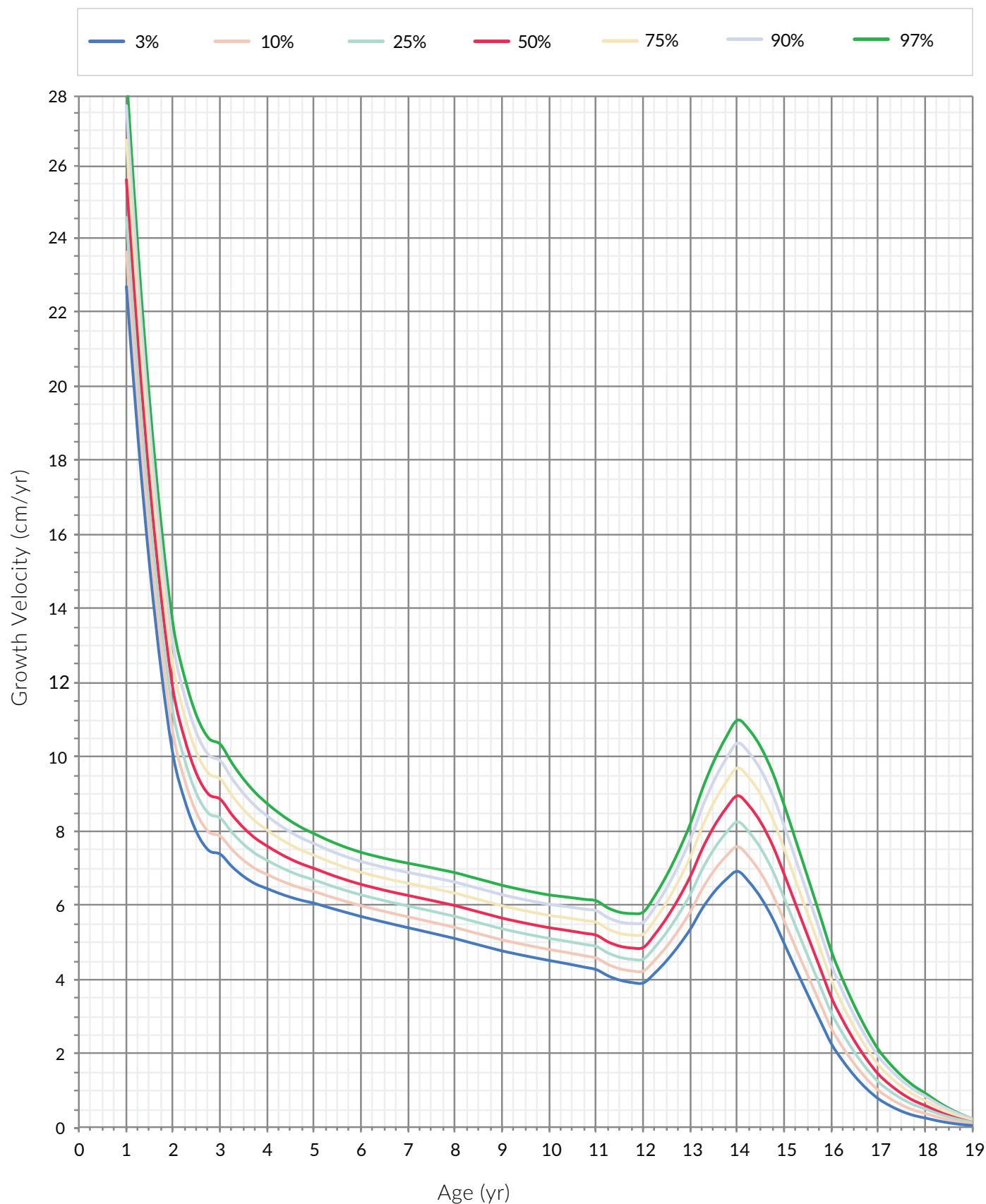


Boys. Growth velocity. Centiles
Intermediate maturers (n = 225)

Birthdate:/...../.....

Name:

.....





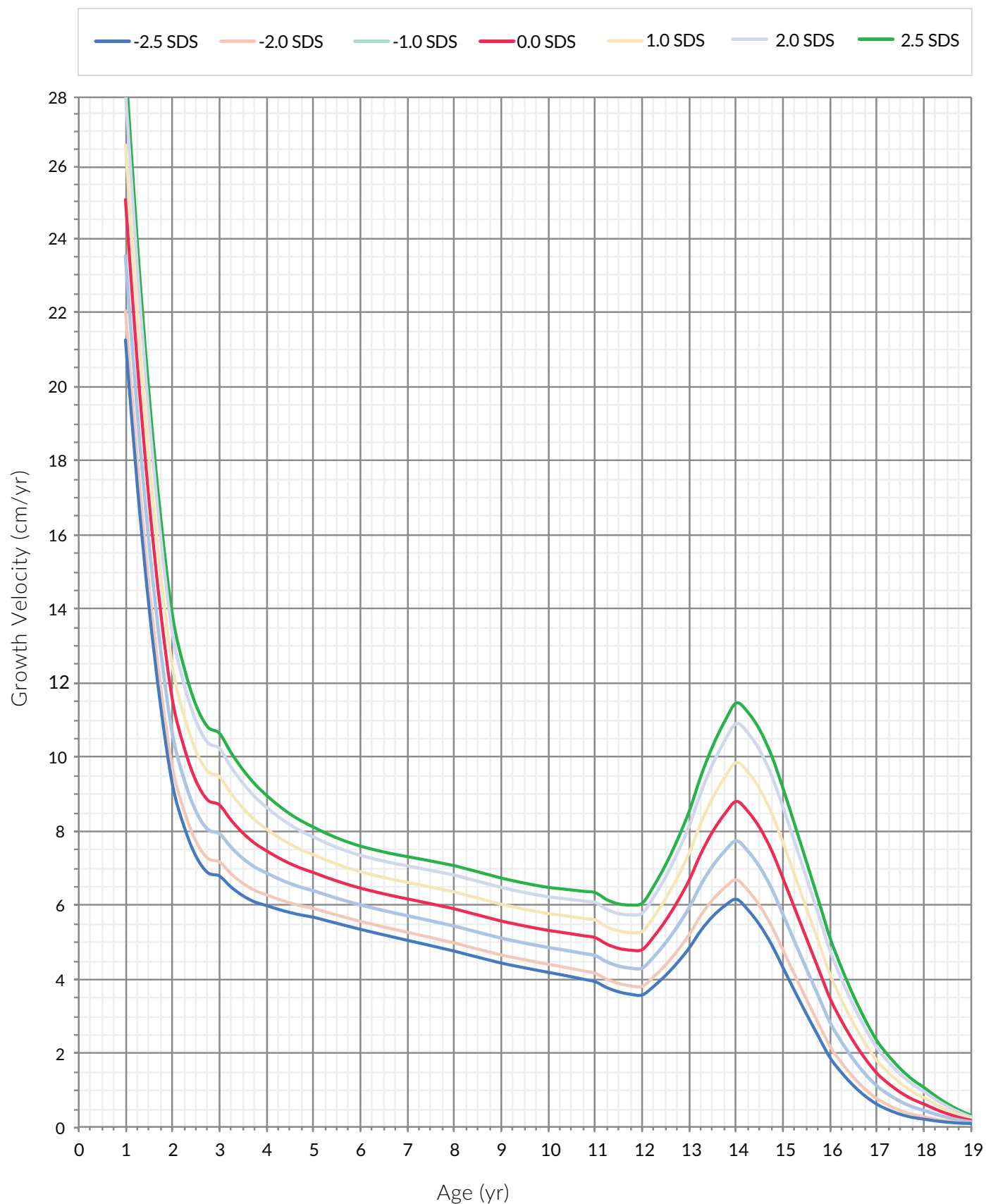
Boys. Growth velocity. Z-scores (SDS)

Intermediate maturers (n = 225)

Birthdate:/...../.....

Name:

.....



GROWTH CHARTS LATE MATURERS



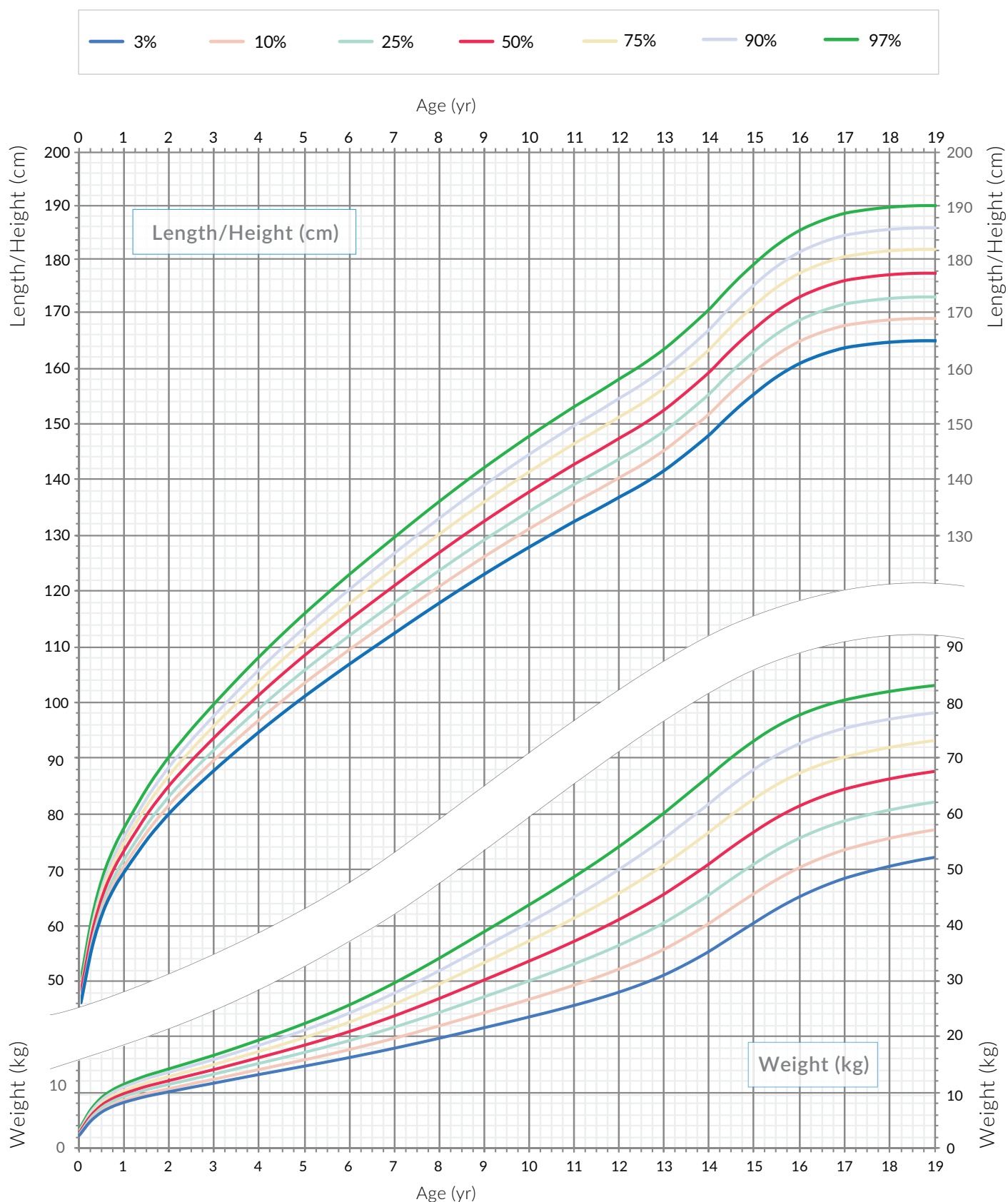
Boys. Height and Weight. Centiles

Late maturers (n = 133)

Birthdate:/...../.....

Name:

.....





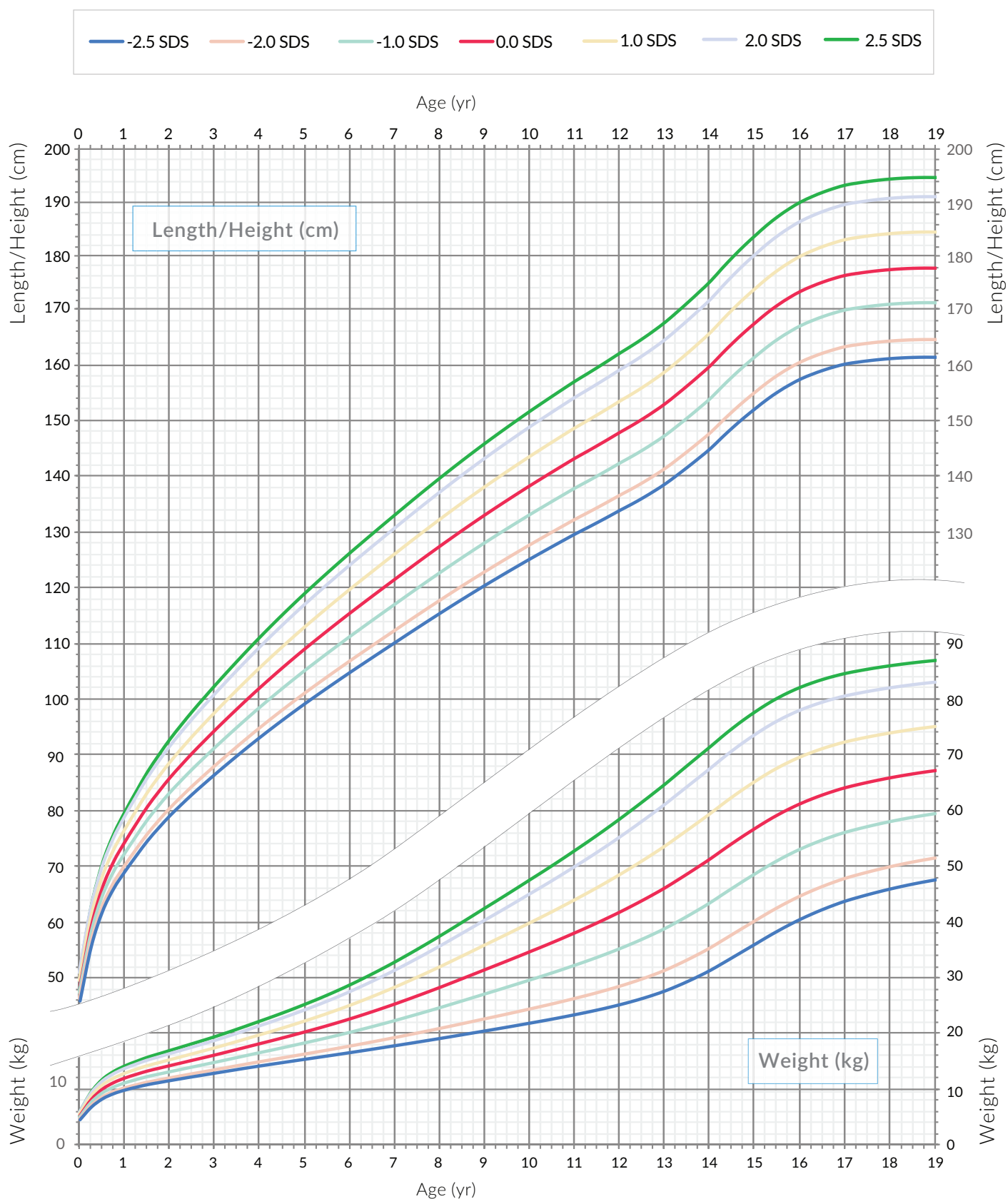
Boys. Height and Weight. Z-scores (SDS)

Late maturers (n = 133)

Birthdate:/...../.....

Name:

.....





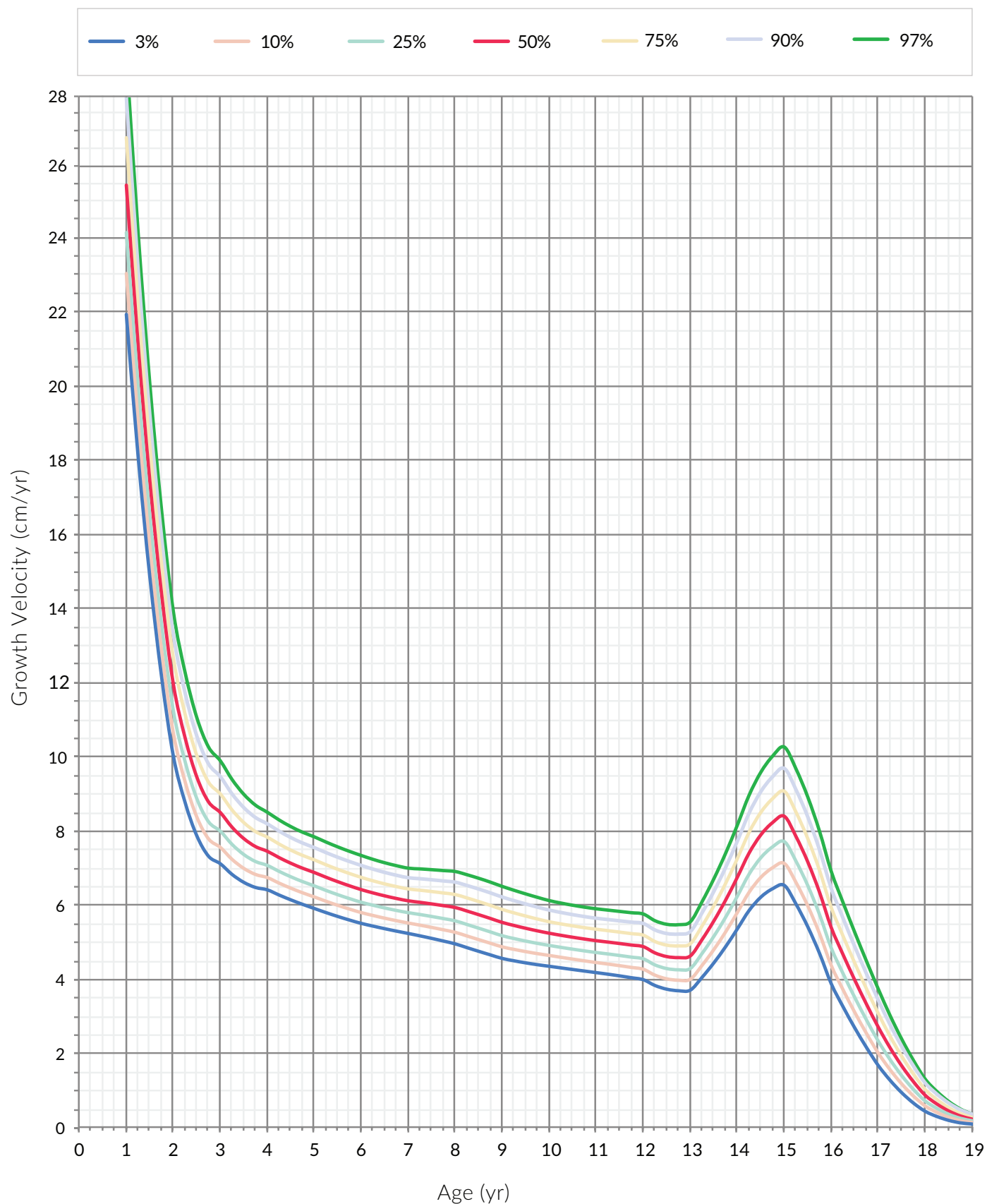
Boys. Growth velocity. Centiles

Late maturers (n = 133)

Birthdate:/...../.....

Name:

.....





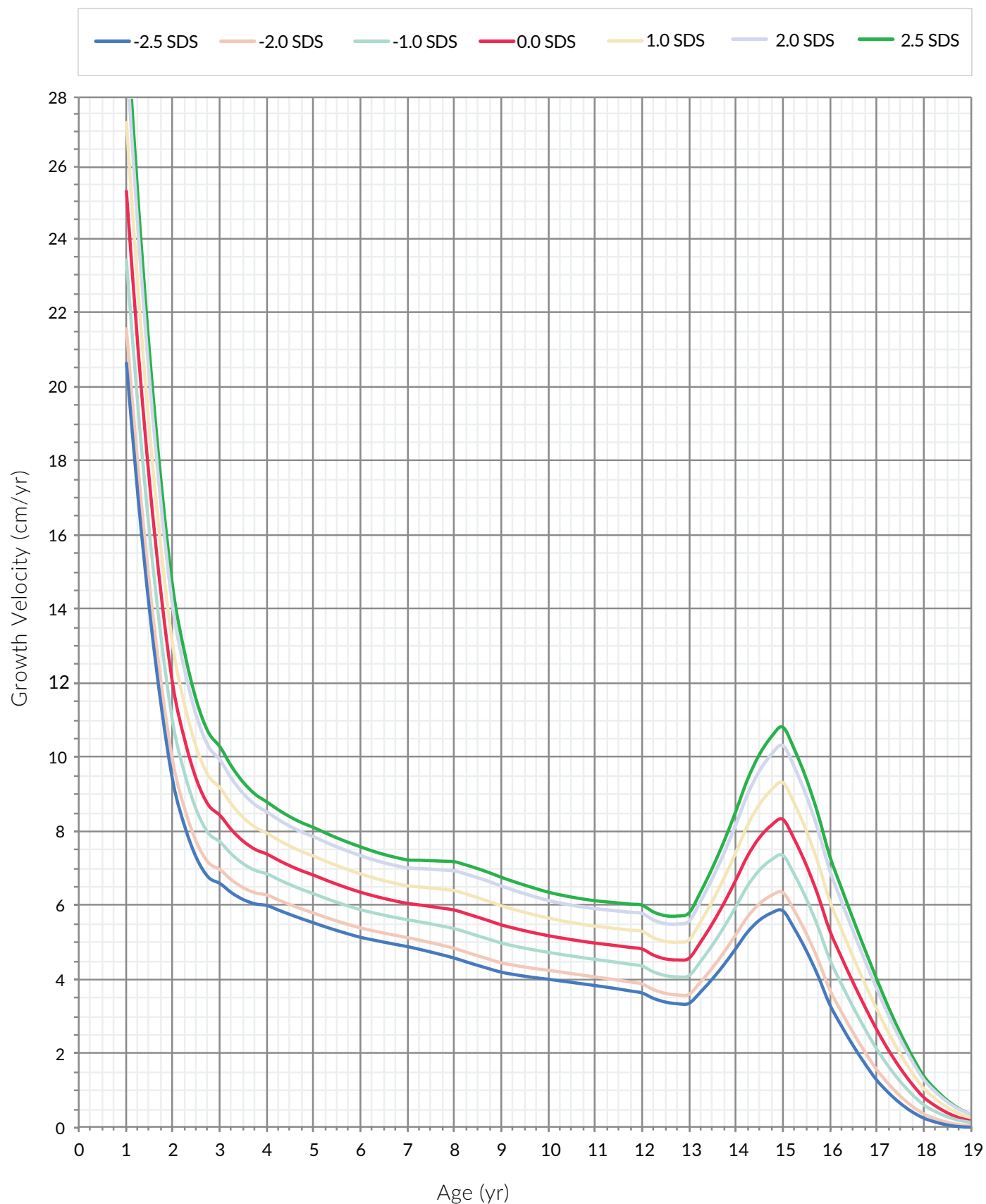
Boys. Growth velocity. Z-scores (SDS)

Late maturers (n = 133)

Birthdate:/...../.....

Name:

.....



GROWTH CHARTS VERY-LATE MATURERS



Boys. Height and Weight. Centiles

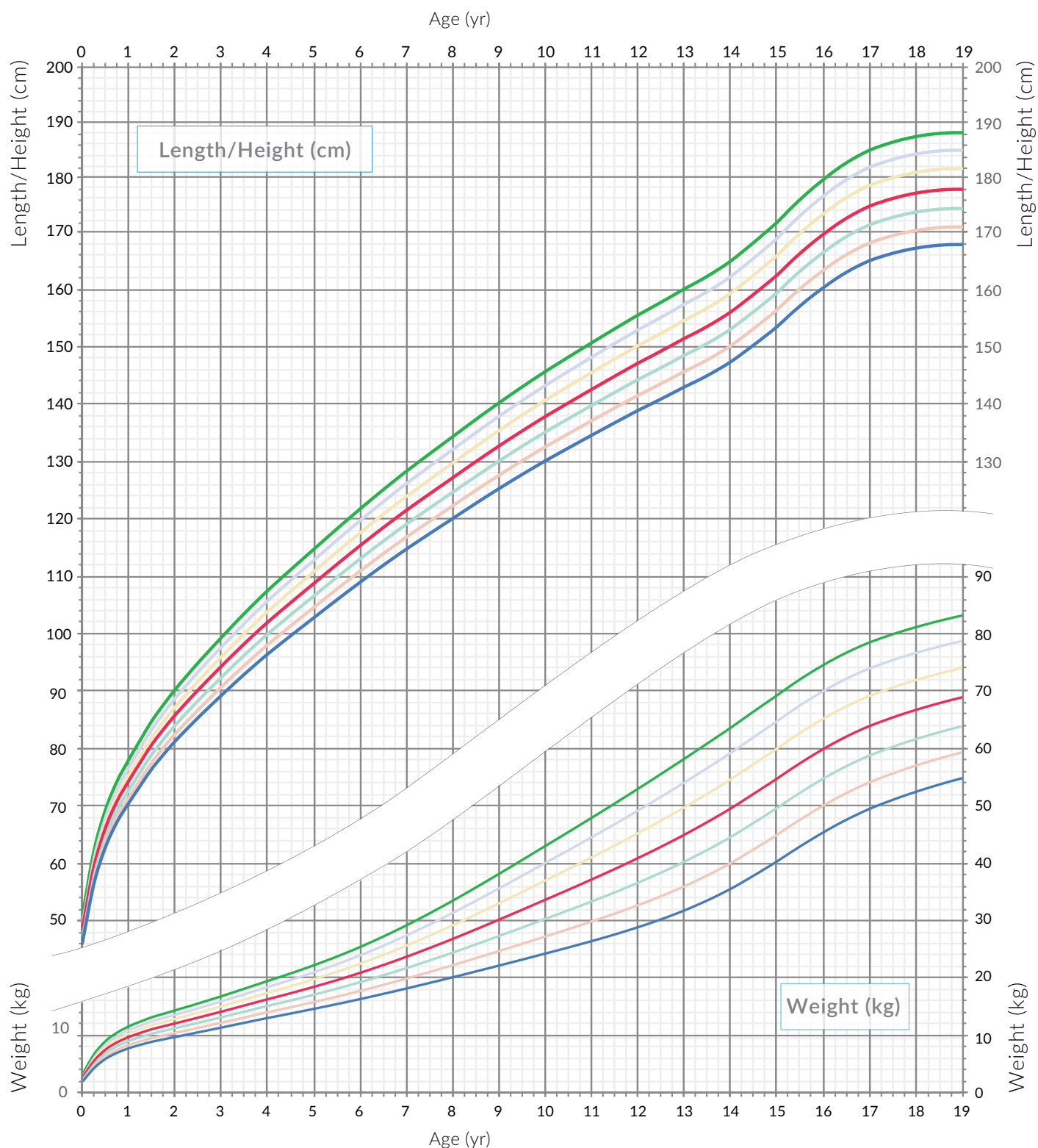
Very-late maturers (n = 103)

Birthdate:/...../.....

Name:

.....

3% 10% 25% 50% 75% 90% 97%





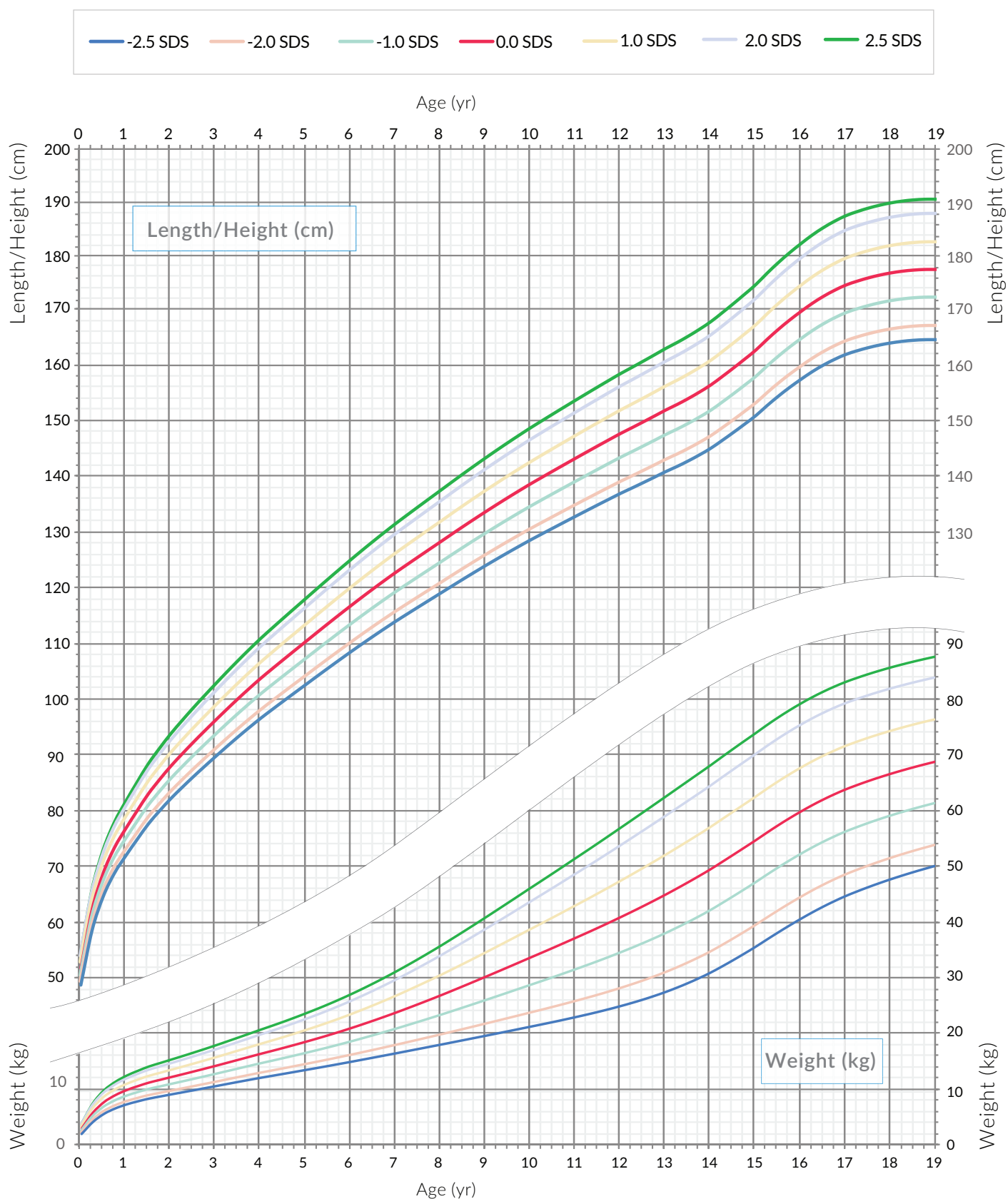
Boys. Height and Weight. Z-scores (SDS)

Very-late maturers (n = 103)

Birthdate:/...../.....

Name:

.....





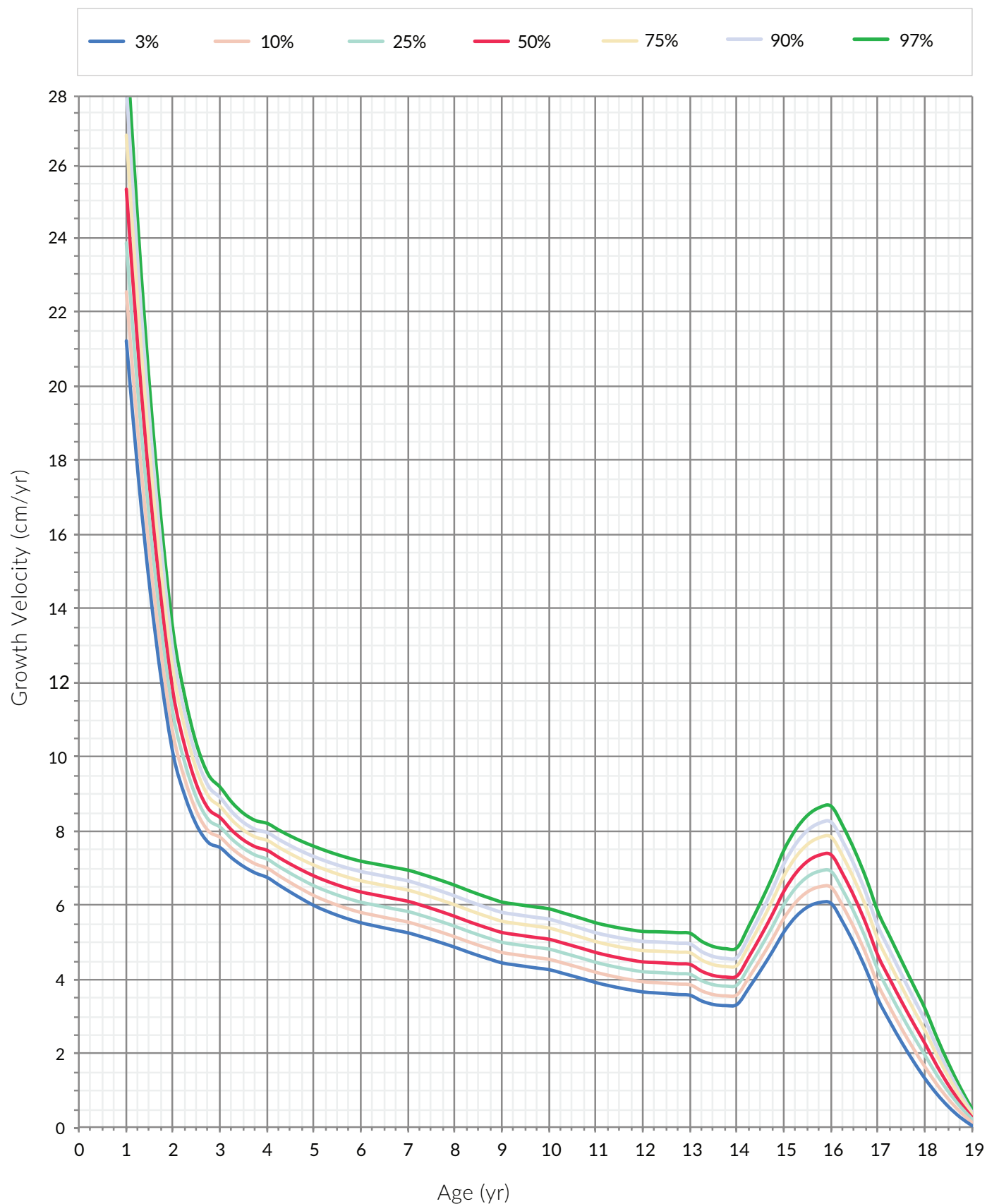
Boys. Growth velocity. Centiles

Very-late maturers (n = 103)

Birthdate:/...../.....

Name:

.....





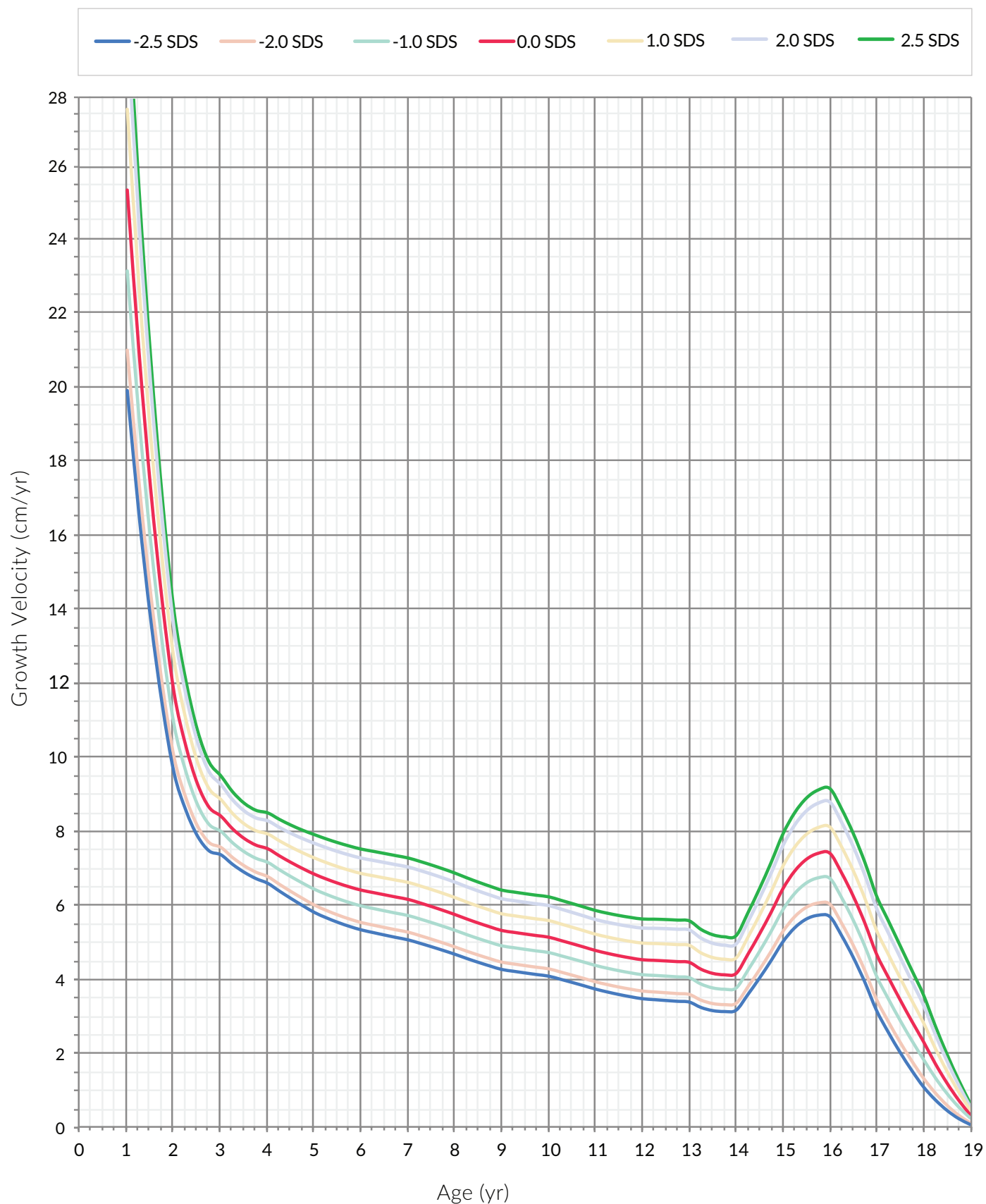
Boys. Growth velocity. Z-scores (SDS)

Very-late maturers (n = 103)

Birthdate:/...../.....

Name:

.....



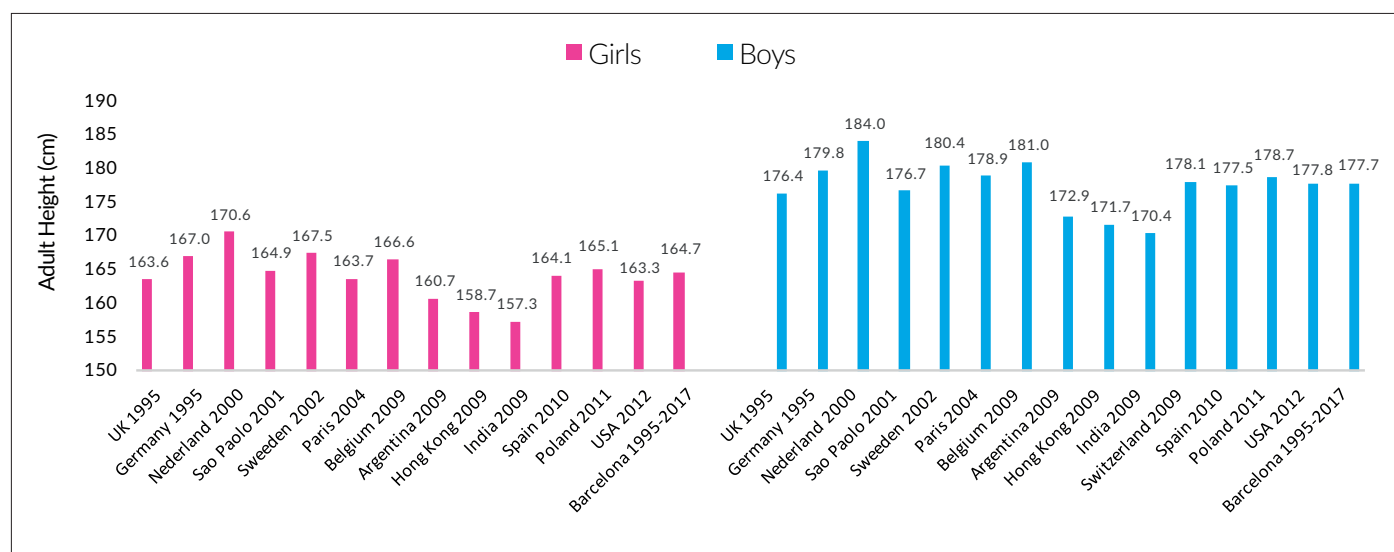
Adult height and BMI at adult height in recent cross-sectional growth studies.

Comparison with the present study

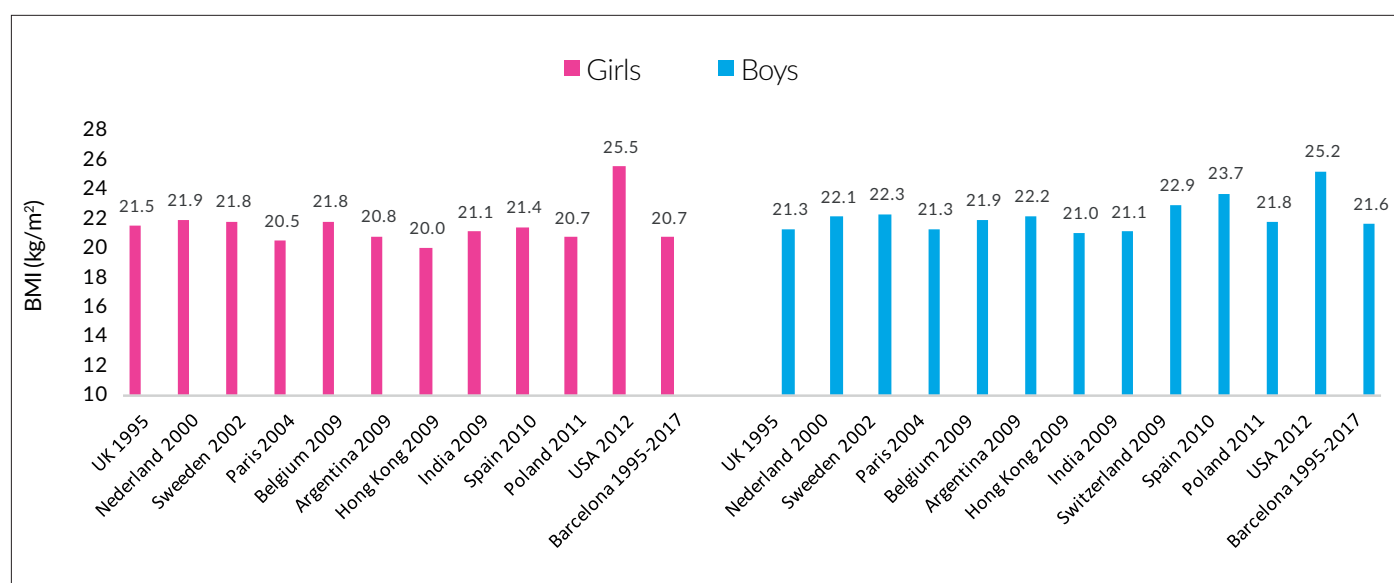
Adult height and body mass index (BMI) at adult height. Recent studies						
Study	Boys			Girls		
	Sample size (n)	Height (cm)	BMI (kg/m ²)	Sample size (n)	Height (cm)	BMI (kg/m ²)
UK 1995	409	176.4 ^a	21.3 ^a	284	163.6 ^a	21.5 ^a
Germany 1995	-	179.8	-	-	167	-
Nederland 2000	226	184.0 ± 7.1	22.1	226	170.6 ± 6.5	21.9
Sao Paulo 2001	83	176.7 ± 6.2	-	44	164.9 ± 5.0	-
Sweeden 2002	1 849	180.4 ± 6.5	22.3	1 801	167.5 ± 6.0	21.8
Paris 2004	42	178.9 ± 5.3	21.3 ± 3.6	33	163.7 ± 8.2	20.5 ± 2.6
Belgium 2009	501	181.0 ^a	21.9 ± 1.9	609	166.6 ^a	21.8 ± 2.3
Argentina 2009	709	172.9 ^a	22.2 ^a	762	160.7 ^a	20.8 ^a
Hong Kong 2009	468	171.7 ^a	21.0 ± 3.3	453	158.7 ^a	20.0 ± 2.8
India 2009	10 496	170.4 ^a	21.1 ^a	8 170	157.3 ^a	21.1 ^a
Switzerland 2009	28 512	178.1 ± 6.5	22.9 ± 3.5	-	-	-
Spain 2010	1 551	177.5 ± 6.4	23.7 ± 3.3	1 619	164.1 ± 5.9	21.4 ± 2.8
Poland 2011	846	178.7 ^a	21.8 ^a	1 126	165.1 ^a	20.7 ^a
USA 2012	179	177.8 ± 0.8 ^b	25.2 ± 0.5 ^b	118	163.3 ± 0.7 ^b	25.5 ± 0.7 ^b
Barcelona 1995-2017	710	177.7 ± 5.9	21.6 ± 2.0	743	164.7 ± 5.4	20.7 ± 2.0

a: 50% centile; b: standard error of the mean; otherwise: mean ± standard deviation values.

Mean adult height. Recent studies



Mean body mass index (BMI) at adult height. Recent studies



web: <http://www.millennialsgrowth.com>

In the web 'Millennials's Growth' we developed <http://www.millennialsgrowth.com>, you will find:

-  Design, Objectives and Results of the Study.
-  Summary of the Study.
-  Growth charts for length/height; growth velocity, weight, BMI and TMI from birth to adult height in both sexes, expressed as centiles and SDS calculated according to Cole's LMS method.
-  Millennials' growth App for Android devices: download from Google Play.
-  Millennials' growth App for iOS (Apple Inc.): download from Apple Store.
-  Millennials' growth anthropometric program for PC Windows. A download option for professional's health care exclusive use, after registration.
-  Weight and length data of premature and at term newborns 26-42 weeks of gestation. Data also available at <http://www.estudiosdecrecimiento.es>.
-  Cross-sectional data of prepubertal children born from mothers of Africa and Latin America, recently evaluated in Catalonia (Spain).

All these options are free of charge.

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