

La valutazione  
della bassa statura  
in Pediatria Preventiva

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# Obiettivi del monitoraggio della crescita

Diagnosi di malnutrizione

*Diagnosi di obesità nei paesi occidentali*

Diagnosi precoce della bassa statura  
quale segno di malattia per una  
precoce diagnosi eziologica

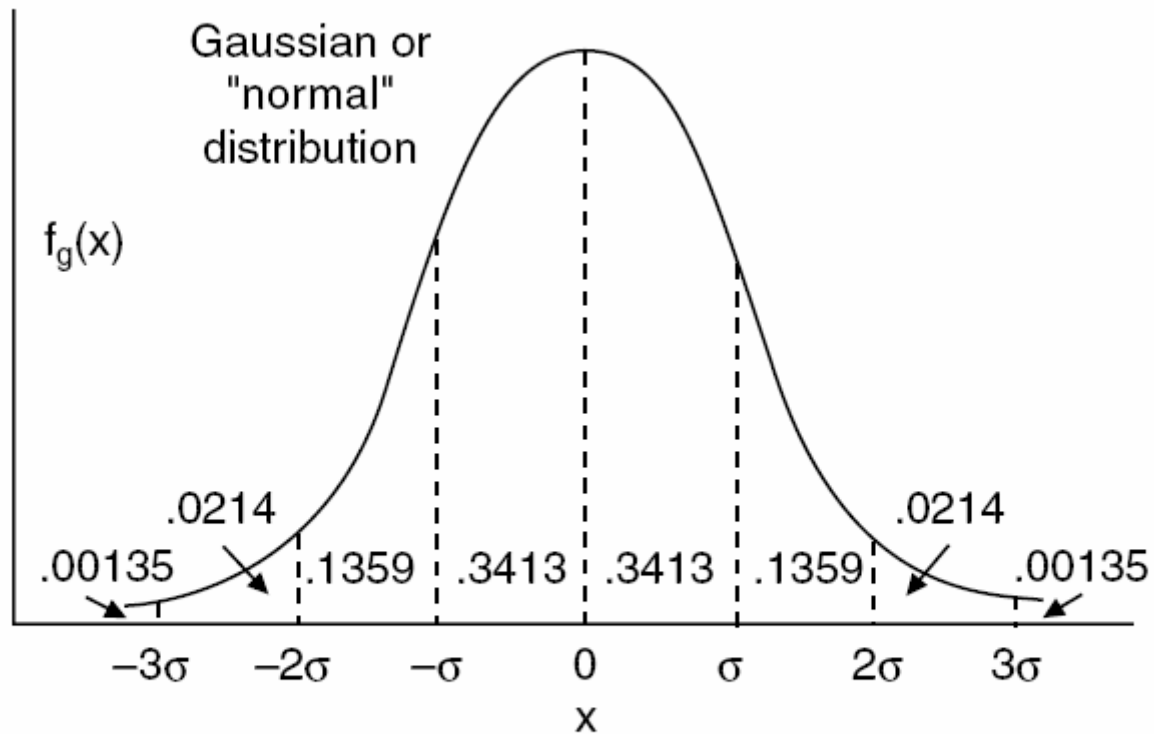


Fig. 1. The bell-shaped curve of Gaussian, or "normal", distribution. Numbers indicate the fraction of the population outside of the standard deviation score indicated.

# La Bassa Statura

- Altezza (o lunghezza) al di sotto di  $-2DS$ :
- Concetto “statico”, poco significativo da solo
- E' importante la relazione nel tempo con il gruppo di riferimento, cioè la costanza del “canale” di crescita= velocità di crescita e con l'altezza dei genitori

# Cosa è la bassa statura ?

- **Segno di malattia**, quando associata a bassa velocità di crescita ( *concetto classico* )
- **Disagio sociale** ( *concetto rafforzato negli ultimi 15-20 anni* )

# Osservazione quotidiana

- Varianti della norma
- Patologie croniche ( malattia celiaca)
- Sindrome di Turner
- Deficit di ormone della crescita
- IUGR

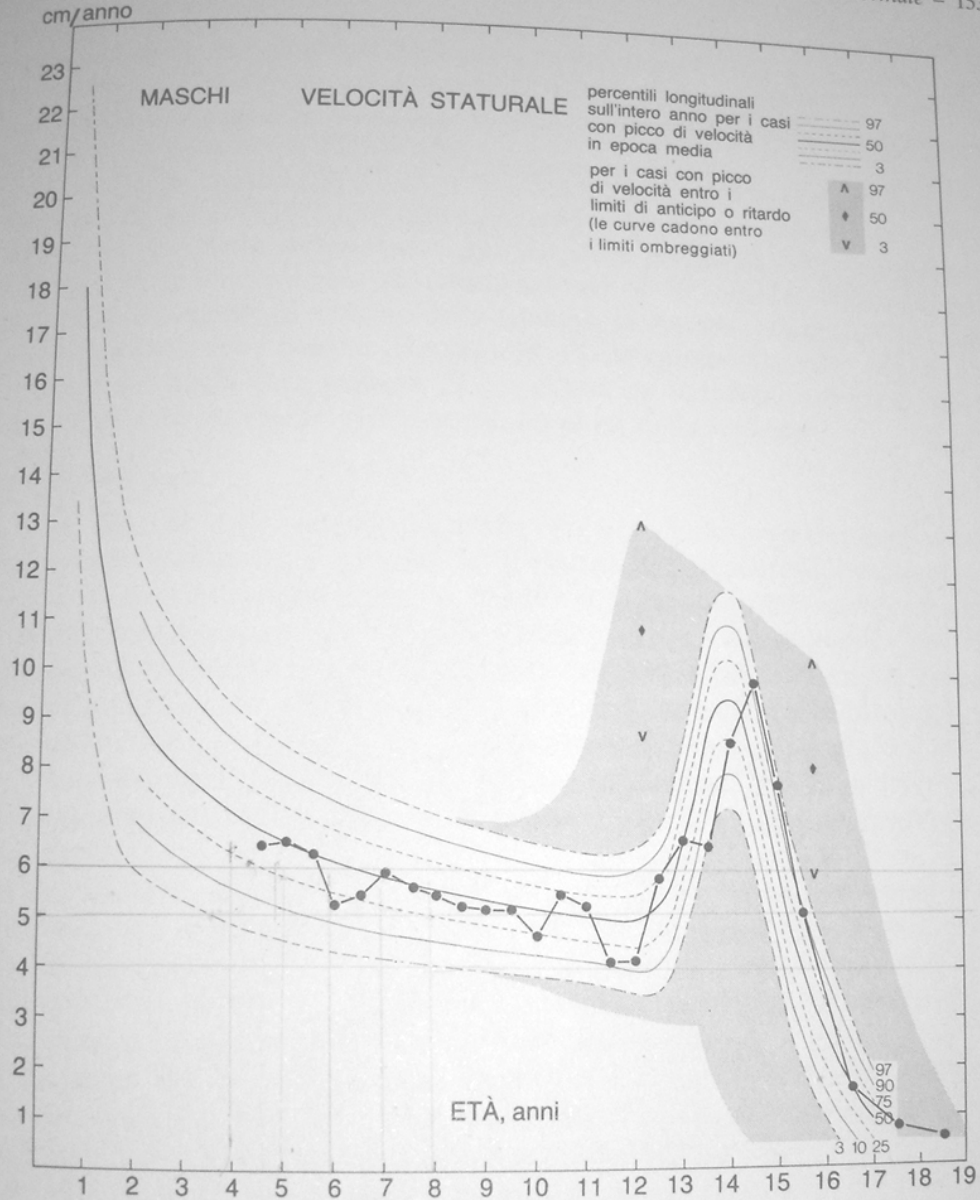


Fig. 59. Standard della velocità staturale nei maschi. Vi è riportato il maschio normale della fig. 55, considerato per periodi di un anno intero; ogni nuovo periodo comincia ogni 6 mesi. (Da Tanner e Whitehouse, 1976).

# Età pediatriche “auxologiche”

**Periodo fetale**, della grande influenza materna

**Prima infanzia**, epoca della “canalizzazione”

**Fanciullezza**, età della velocità  
tendenzialmente costante

**Epoca della accelerazione puberale**, *con  
variabilità del tempo di crescita*

# Velocità di crescita

Nella **fanciullezza** ( 2° e 3° infanzia) è patologica quando è al di sotto del 25° centile per almeno un anno

## LIMITI:

- Nella prima infanzia, primi 18-24 mesi, fenomeno della “**canalizzazione**”
- In adolescenza, variabilità del **tempo di crescita**

Research article

Open Access

## Referral patterns of children with poor growth in primary health care

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**Table 1: Auxological referral criteria taken from the Dutch Consensus Guideline [3]**

Description rule	Criteria	Rule nr.
Absolute height	HSDS* < -2.5 (P0.6)	1
Clinical symptoms	HSDS* < -1.3 (P10) AND (dysmorphic features OR disproportions)	2
Persistent short stature after born SGA**	SGA** AND HSDS* < -1.88 (P3) after the age of 2 years	3
HSDS <sub>cor</sub> †	♂: < 10 yr and > 13.4 yr; ♀: < 9 yr and > 12.3 yr	4
	Pubertal age*: ♂: 10 – 13.4 yr; ♀: 9 – 12.3 yr	5
Deflection‡	♂: < 10 yr and > 13.4 yr; ♀: < 9 yr and > 12.3 yr	6a
	Pubertal age*: ♂: 10 – 13.4 yr; ♀: 9 – 12.3 yr	7a
	With pubertal signs	7b

\* HSDS = Height Standard Deviation Score

\*\*SGA = Small for Gestational Age

§ THSDS = Target Height Standard Deviation Score

† HSDS<sub>cor</sub> = HSDS corrected for parental height

‡ Deflection: Deflection is divided into a deflection per time interval (6a and 7a) and an absolute deflection (7b) The deflection per time interval represents a downward movement of HSDS (HSDS2-HSDS1) over time (T2-T1), while the absolute deflection is defined by a decrease of HSDS over an unspecified time period. In the categories 3–10 and 10–18, T1 > = 3 years, in the other categories T1 > 0.

▪ Pubertal age: If a child does not show any pubertal signs (♂: genitals > = Tanner stage 2 OR testis volume > = 4 ml; ♀: breast > = Tanner stage 2) at this age referral is not necessary.

**Table 4: Estimated percentage of referrals according to the UKCG, the WHO guideline, and a parental height deflection rule**

<i>Description rule</i>	<i>Criteria</i>	<i>% referrals 0–3 years</i>	<i>% referrals 3–10 years</i>	<i>% referrals 10–18 years</i>	<i>% referrals 0–18 years</i>
UKCG	HSDS <sup>§</sup> < -2.67 (P0.4) at age 5	n.a.	0.3	n.a.	0.3
Low height for age (HSDS) <sup>‡</sup>	HSDS <sup>§</sup> < -2 (P2.3)	7.3	3.6	3.2	9.2
Low weight for age (WSDS) <sup>‡</sup>	WSDS <sup>**</sup> < -2 (P2.3)	10.0	2.5	3.2	10.5
Parental height deflection rule (0.5 SDS)	(HSDS2 <sup>§</sup> - HSDS1 <sup>§</sup> ) < -0.5, AND   HSDS2 <sup>§</sup> - TH SDS <sup>†</sup>   >   HSDS1 <sup>§</sup> - TH SDS <sup>†</sup>	58.8	18.3	28.7	62.0
Parental height deflection rule (1 SDS)	(HSDS2 <sup>§</sup> - HSDS1 <sup>§</sup> ) < -1, AND   HSDS2 <sup>§</sup> - TH SDS <sup>†</sup>   >   HSDS1 <sup>§</sup> - TH SDS <sup>†</sup>	30.0	3.9	11.6	41.1

**UKCG**

HSDS = Height Standard Deviation Score

<sup>‡</sup>WSDS = Weight Standard deviation score

<sup>†</sup>THSDS = Target Height Standard Deviation Score

Rules described by WHO Global database on Child growth and malnutrition.

n.a. = not applicable

**Table 3: Estimated percentage of referrals according to the DCG**

<i>Description rule</i>	<i>Rule nr.</i>	<i>% referrals 0–3 years N = 330</i>	<i>% referrals 3–10 year N = 361</i>	<i>% referrals 10–18 year N = 345</i>	<i>% referrals 0–18 years N = 392</i>
Absolute height	1	1.8	0.8	1.4	3.3
Clinical symptoms	2	2.4	1.1	0.9	2.3
Persistent short stature after born SGA	3	0.0	0.0	0.0	0.0
HSDS <sub>cor</sub>	♂: < 10 yr and > 13.4 yr; ♀: < 9 yr and > 12.3 yr	15.2	5.0	4.9	16.8
	♂: 10 – 13.4 yr; ♀: 9 – 12.3 yr	n.a.	n.a.	2.0 (2.0)*	2.0 (2.0)*
Deflection*	♂: < 10 yr and > 13.4 yr; ♀: < 9 yr and > 12.3 yr	34.2	6.4	15.4	50.5
	♂: 10 – 13.4 yr; ♀: 9 – 12.3 yr	n.a.	n.a.	3.8 (1.4)*	4.6 (1.3)
		n.a.	n.a.	22.6 (5.5)	23.0 (4.8)
Total percentage of referrals		73.9	26.0	39.1	79.6

\* Data on stage of puberty were frequently missing. Therefore we assumed children with missing data were in puberty at the reference pubertal age-period. The number between brackets however represents the exact percentage of referrals in the pubertal age-period, without the assumption.

† n.a = not applicable

# LIMITI DEI CRITERI “OLANDESI” e della “WHO”

ECCESSIVO NUMERO DI BAMBINI  
INVIATI AI Centri di riferimento (referrals)  
specie *nei primi tre anni di vita per la  
deflessione del canale di crescita*

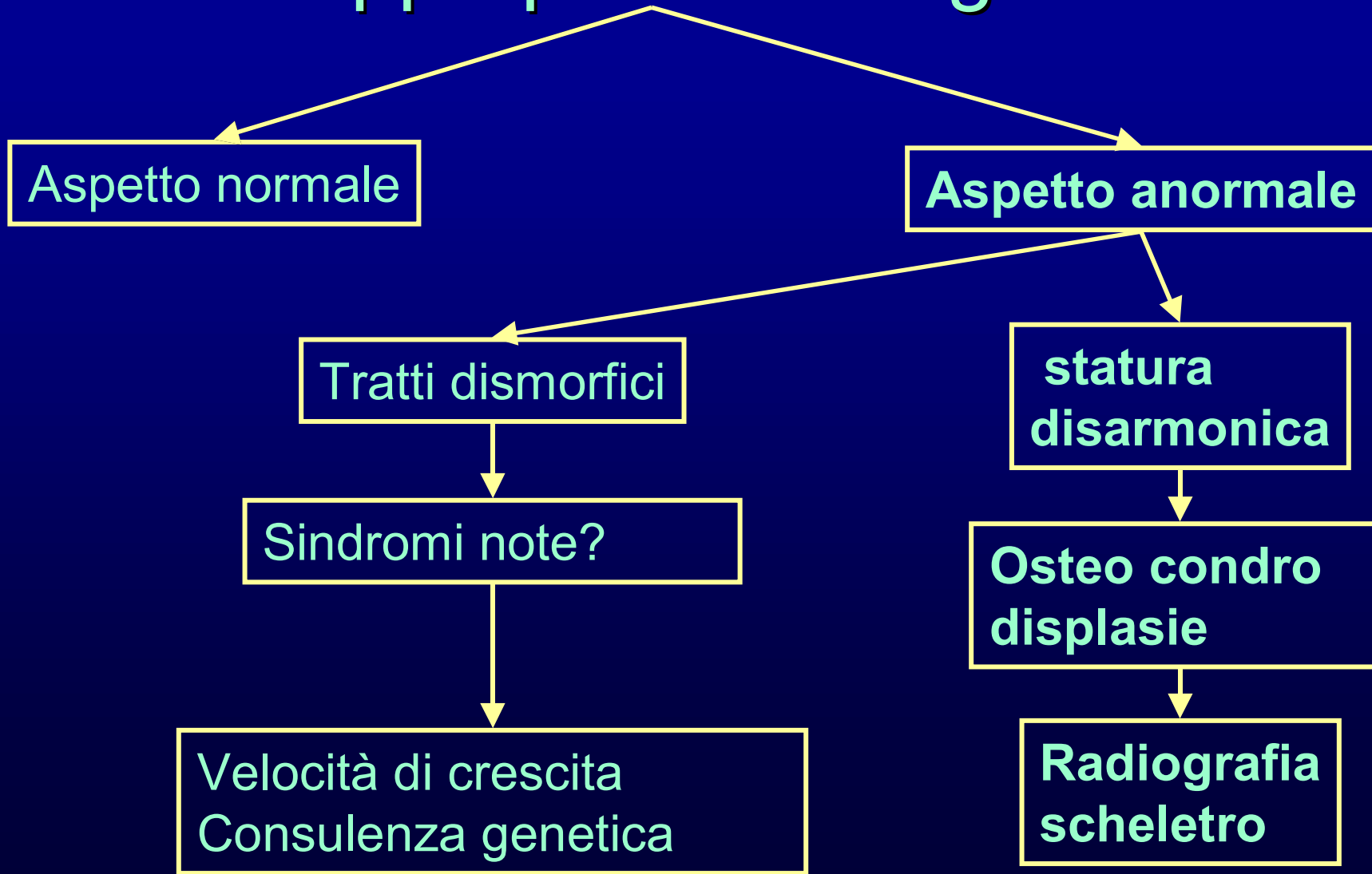
# LIMITI DEI CRITERI “inglesi”

*ridottissimo numero di consulenze richieste ma alto rischio di falsi negativi, con non riconoscimento della sindrome di Turner*

# valutazione della bassa statura

- Aspetto sui generis?
- Disarmonia tra tronco e arti?
- Obesità, ipogenitalismo, ritardo mentale?
- Ipoglicemia ?

# Bassa statura grave o altezza inappropriata al target





# Velocità di crescita

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- In adolescenza, variabilità del **tempo di crescita**

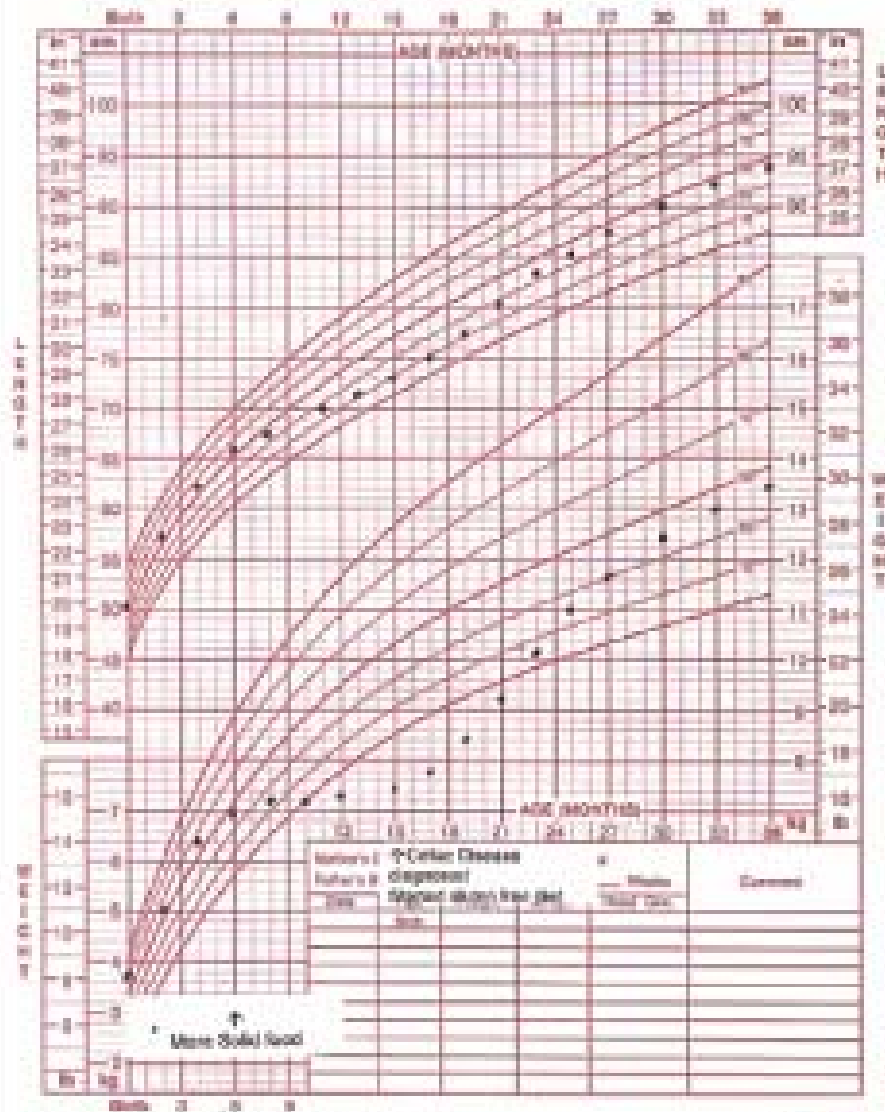
Smith DW, Truog W, Rogers JE, et al. Shifting linear growth during infancy: illustration of genetic factors in growth from fetal life through infancy. *J Pediatr.* 1976;89:225–230

Birth to 36 months: Girls

NAME: A. B.

Length-for-age and Weight-for-age percentiles

RECORD # \_\_\_\_\_



Approved by the WHO Expert Committee  
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 See National Center for Health Statistics website and growth standards page  
 (http://www.cdc.gov/nchs)



Figure 1 Growth chart for All

**Shifts in Percentiles of Growth During Early Childhood: Analysis of  
Longitudinal Data From the California Child Health and Development Study**  
Zuguo Mei, Laurence M. Grummer-Strawn, Diane Thompson and William H. Dietz  
*Pediatrics* 2004;113:e617-e627  
DOI: 10.1542/peds.113.6.e617

The online version of this article, along with updated information and services, is  
located on the World Wide Web at:

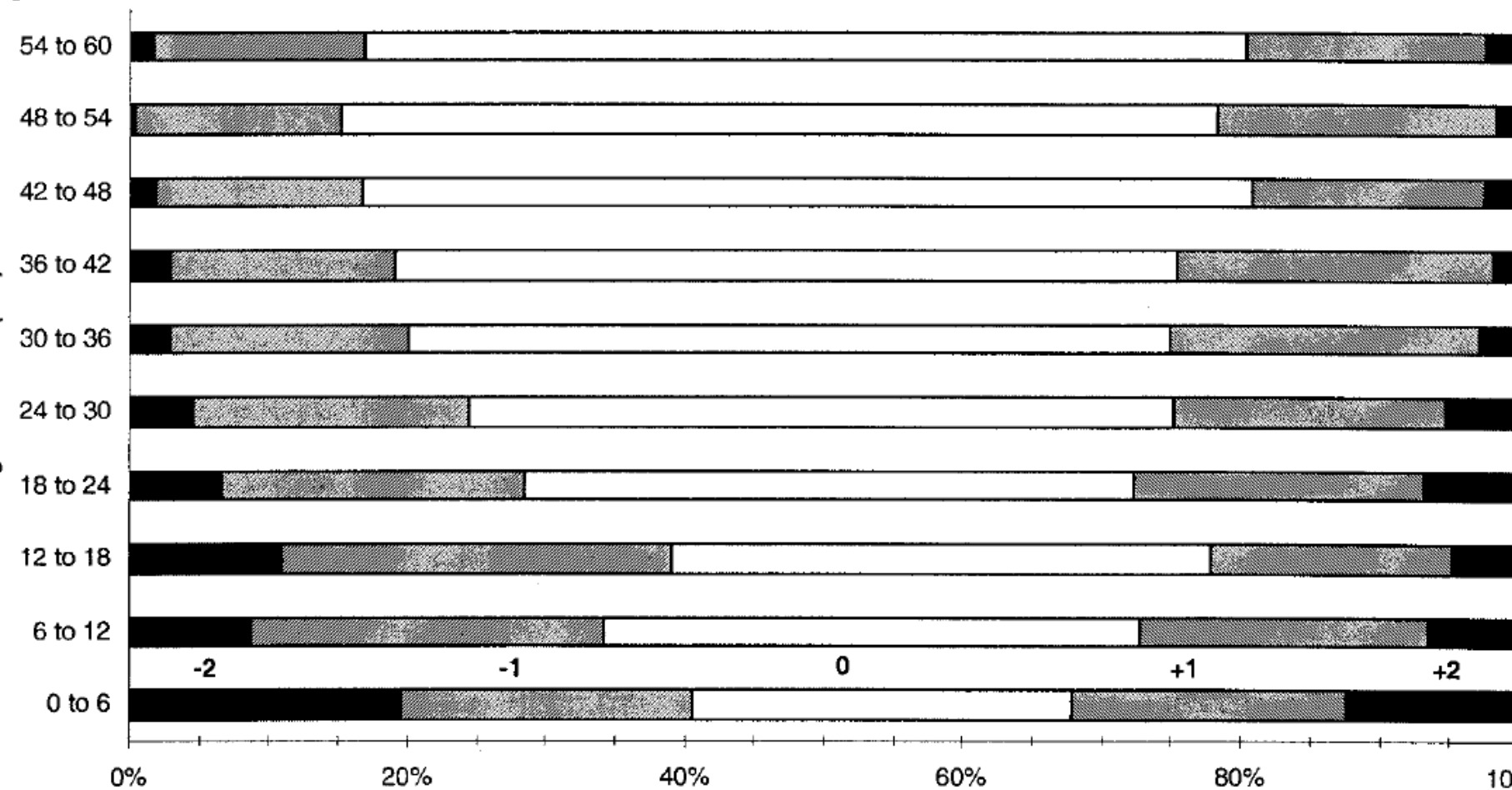
<http://www.pediatrics.org/cgi/content/full/113/6/e617>

**TABLE 3.** Summary of Percentages of Children Who Crossed 2 Major Percentiles in Height-for-Age, Weight-for-Age, Weight-for-Height, and BMI-for-Age from the California CHDS Data for Children 0 to 60 Months of Age

Age Interval (mo)	Children Who Crossed 2 Major Percentiles (%)			
	Height-for-Age	Weight-for-Age	Weight-for-Height	BMI-for-Age
0–6	31.9	38.8	61.8	
6–12	15.3	14.8	26.7	
12–18	15.9	6.6	21.1	
18–24	13.5	6.4	20.8	
24–30	10.0	5.1	15.2	14.5
30–36	5.9	3.3	10.9	14.7
36–42	4.8	3.5	10.4	11.6
42–48	4.5	0.6	6.0	10.6
48–54	2.2	1.2	6.8	9.3
54–60	4.4	2.1	7.7	8.4

# Percentuale di bambini che “incrociano” 2 linee di percentile

Età in MESI	lunghezza per età	Peso/lunghezza
0 – 6	31,9	61,8
6 – 12	15,3	26
12 – 18	15,9	21
18 – 24	13,5	20,8
24 - 30	10	15,2

**A**

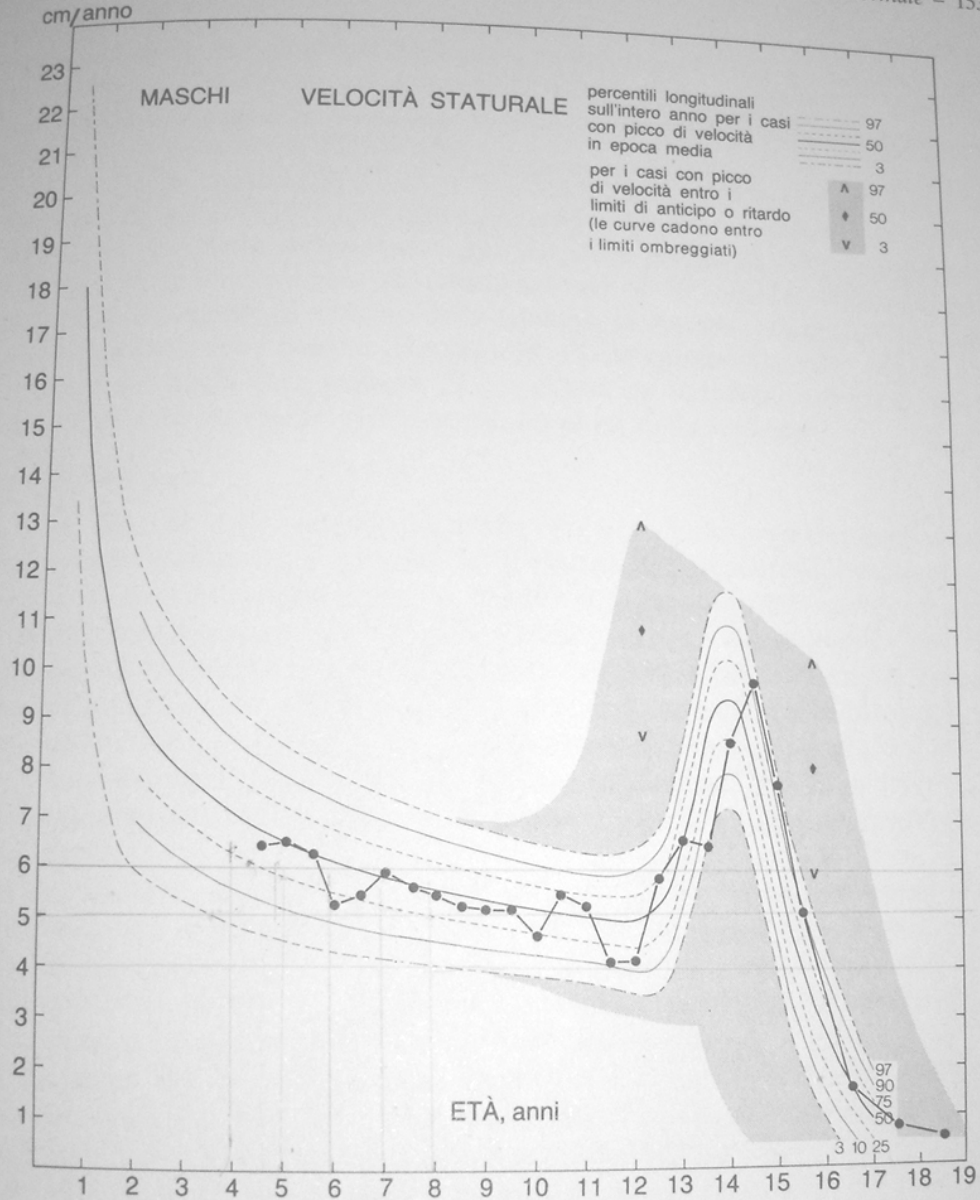
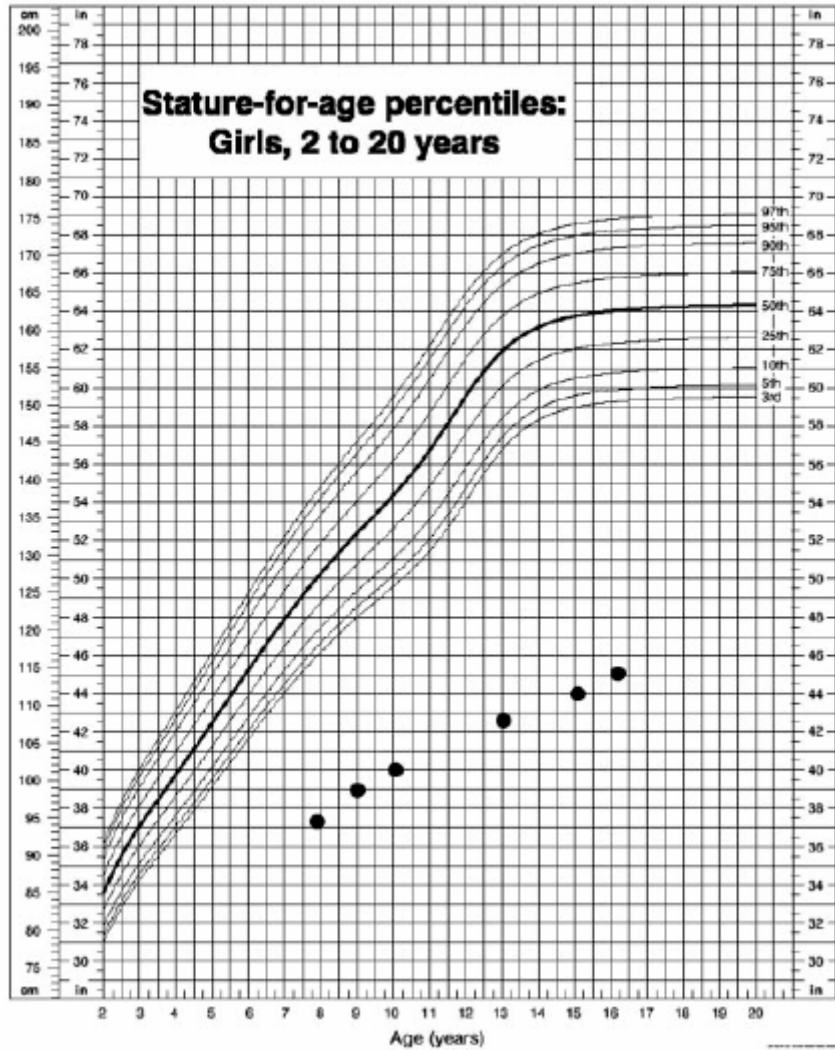


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**A**



# Criteri “classici” per valutazione della crescita

1. Posizione sulle curve di distanza
2. Differenza tra altezza del bambino e quella “corretta” dei genitori, in SDS
3. Deflessione attraverso le linee dei percentili ( velocità di crescita)