

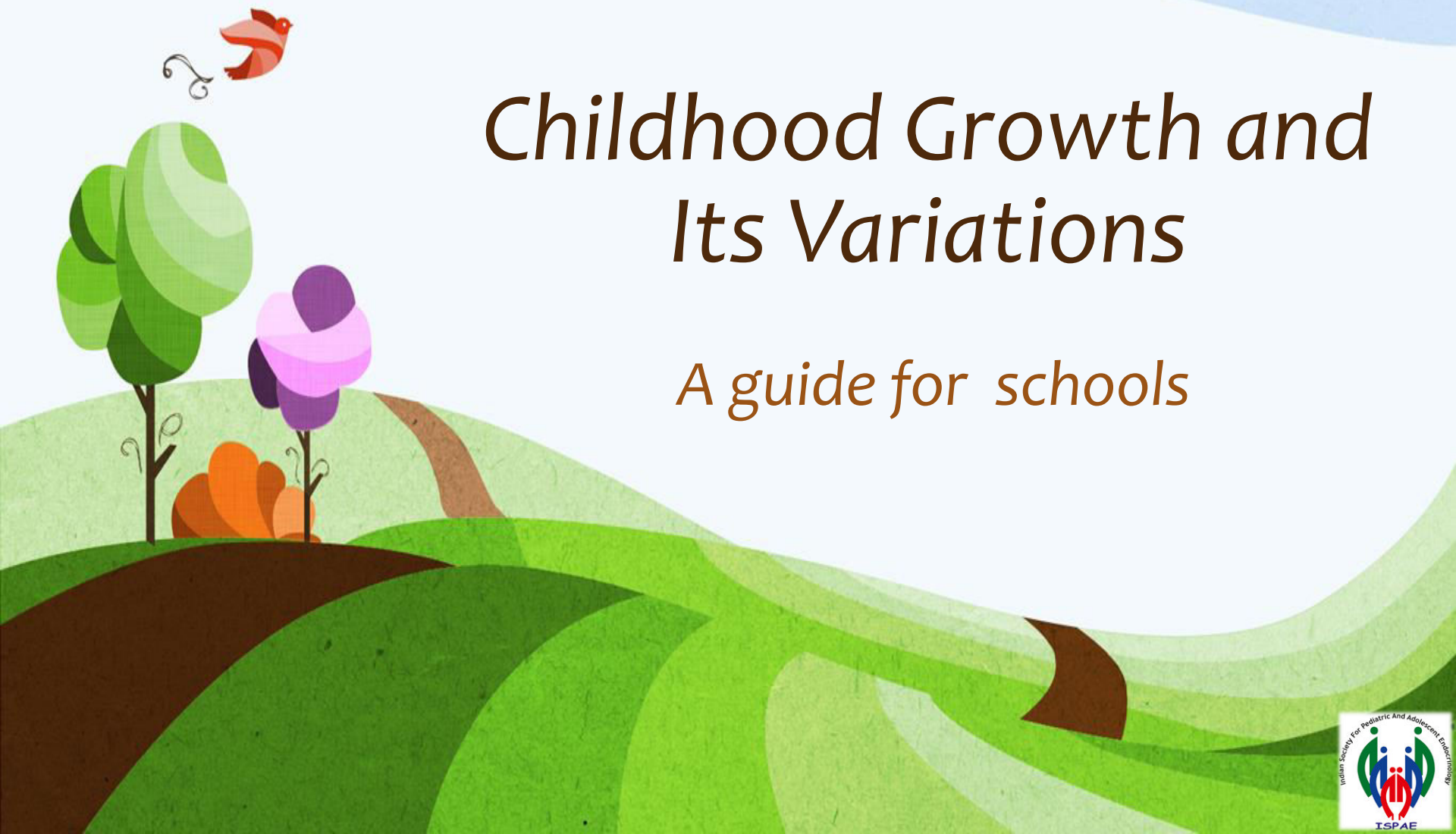


ISPAE

Indian Society for Pediatric and Adolescent  
Endocrinology

# *Childhood Growth and Its Variations*

*A guide for schools*



*This educational material is prepared*  
*for*  
**the Indian Society for Pediatric and Adolescent  
Endocrinology (ISPAE)**

*by*

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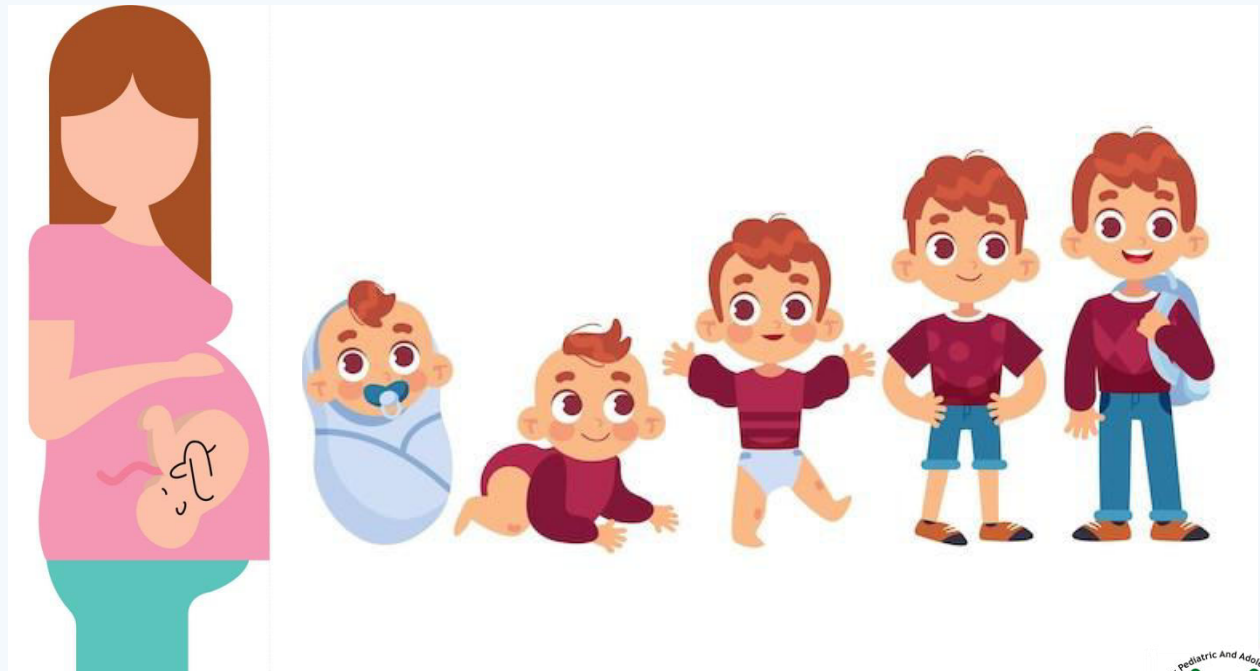
# *Outline of the module*

- 1. What is growth?
- 2. Factors affecting growth
- 3. How to measure height, weight, BMI? How often to measure?
- 4. Common causes of poor growth
- 5. What are growth charts ?
- 6. Who needs evaluation for growth problems?

# What is growth ?

- Dynamic period beginning in the womb ending with completion of adolescence
- Phases:

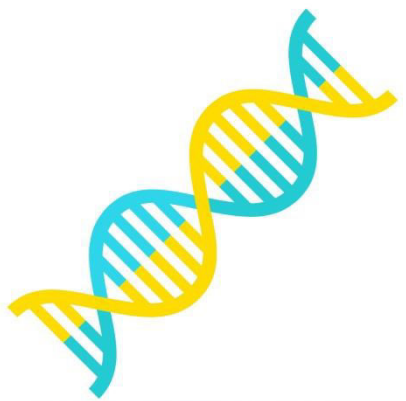
- Prenatal
- Infancy
- Childhood
- Puberty





# Factors affecting growth

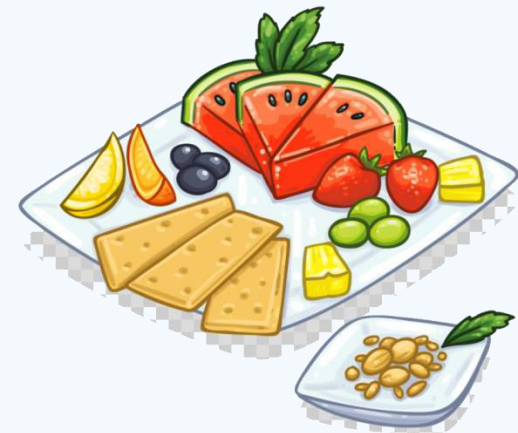
Genetics



Hygiene



Nutrition



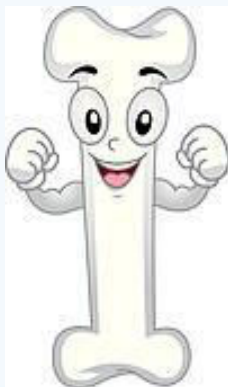
Prevent infections



Hormones



Healthy bones



# Phases of growth

Infancy -  
Nutrition



Prenatal -  
Most rapid  
growth

Healthy nutrition needed  
at all phases of growth

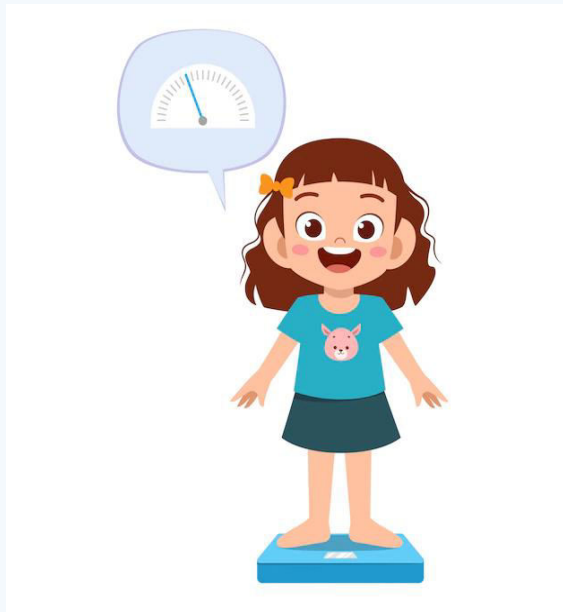


Childhood -  
GH, thyroid  
hormone

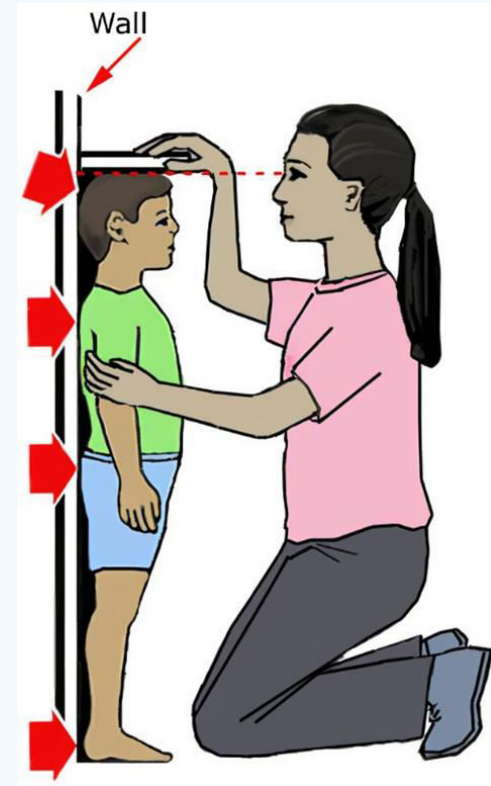


Puberty - Sex  
hormones

# What all needs to be measured ?



Weight  
Height  
BMI  
(Body mass Index)



Twice a year



# Measuring weight





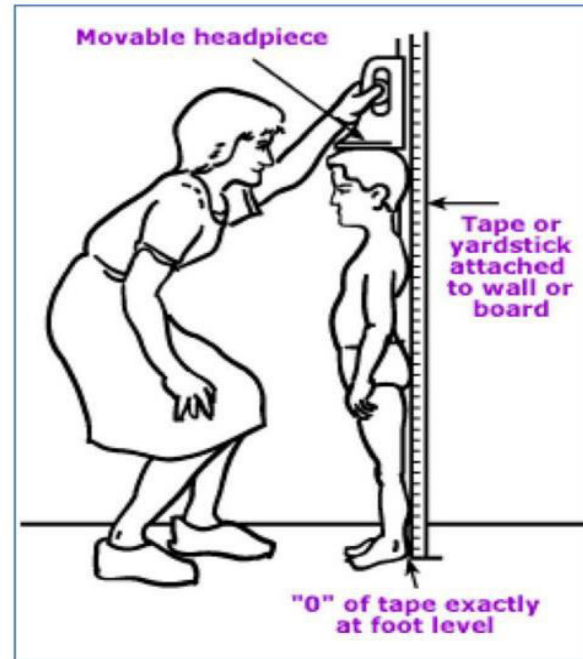
Both underweight and overweight are worrisome !



All children should be measured regularly

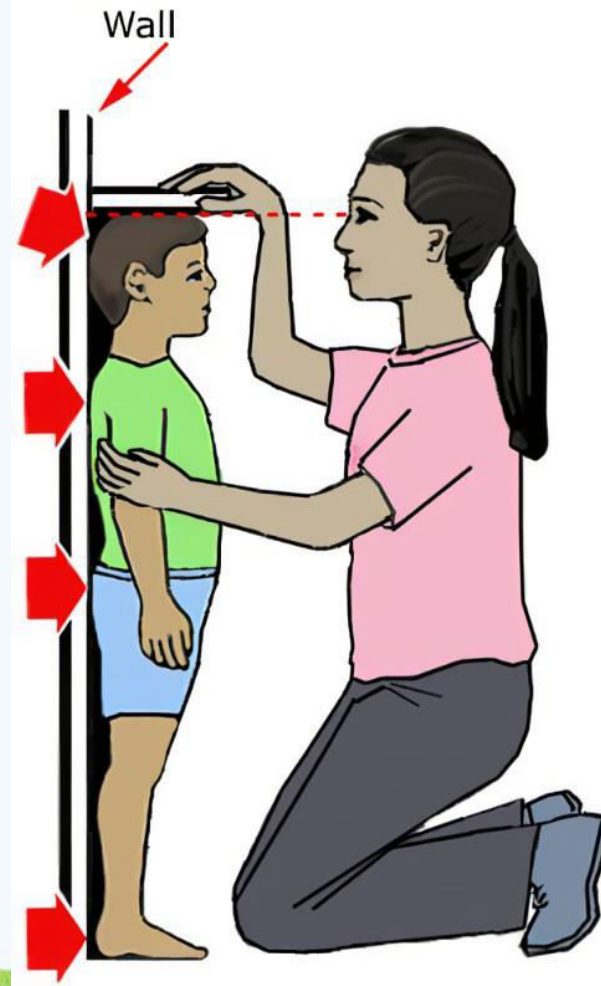


Supine upto 2 years



Standing above 2 years

*Height measurement should be made accurately using proper equipment*



# What is Height velocity ?

- How much a child grows in a year is growth velocity
- Normal growth velocity between 3-12 years is 5-6 cm/year
- During puberty a child can grow between 8-12cm/year, more for boys



A height velocity of <math>< 5\text{cm/year}</math> from 3-12 years is abnormal



# How to see height velocity at home ?

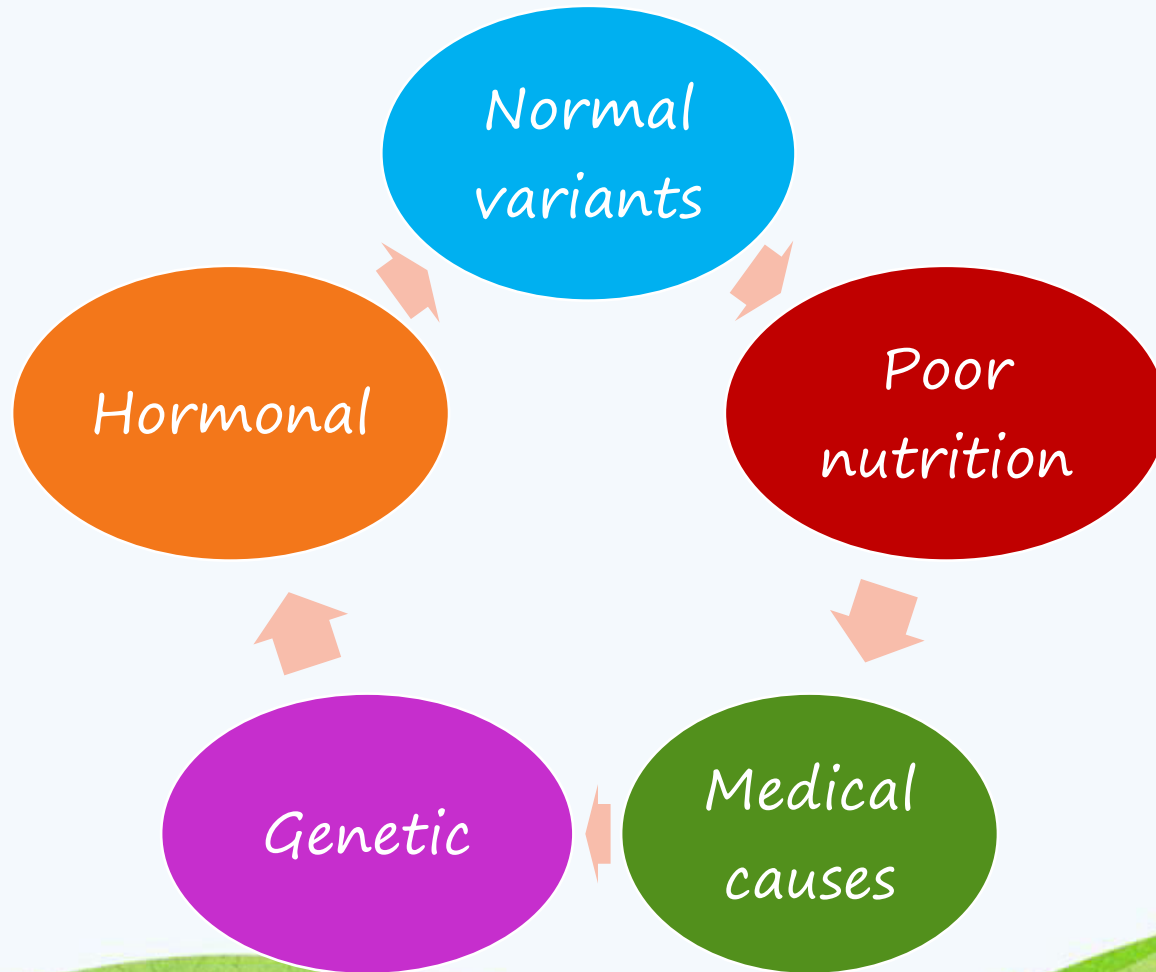




*How  
common is  
short  
stature ?*

*Seen in 2.5%  
of children*

# Common causes of poor growth



# Normal variants

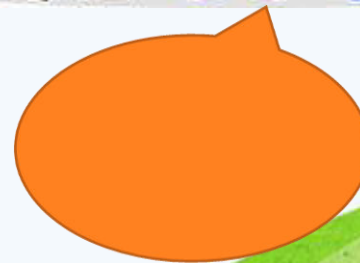
**Familial short stature**

Child of “short parents”



**Constitutional delay**

“The late bloomers”





## *Approach - Is the child really short or underweight ?*

- The weight and height is measured at least twice a year
- The Pediatrician will plot the data on the growth charts
- Height velocity calculated



*The genetic potential for height can be assessed by Mid-parental height*

**Mid Parental Height (TARGET HEIGHT) -Genetic potential or anticipated adult height calculated –Plotted at 18 years**

**Boys :** mother's ht + father's ht +13

2

**Girls :** mother's ht +father's ht – 13

2



# Growth Charts

# What are growth charts ?

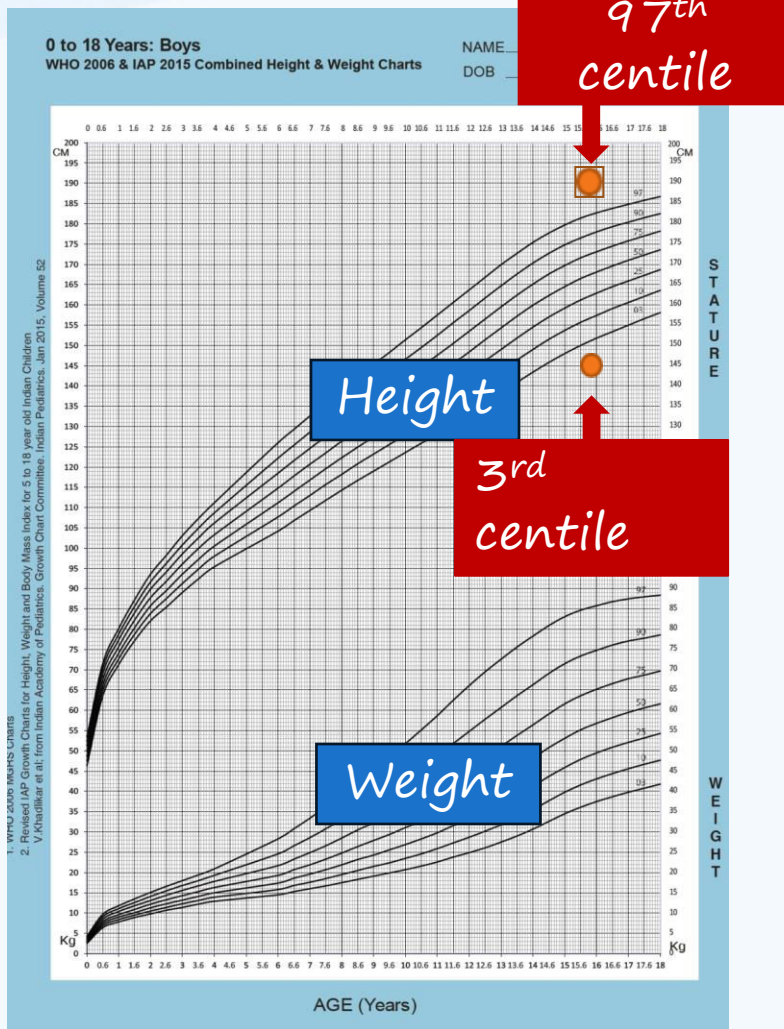
- Percentile curves prepared from population based studies collected from a large number of children
- **IAP growth charts** – Recommended for Indian children
- 7 centile lines 3<sup>rd</sup>, 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, 90<sup>th</sup>, 97<sup>th</sup>
- Pink charts - girls and blue charts - boys.
- X axis is usually divided into 12 equal parts (months) for each year.



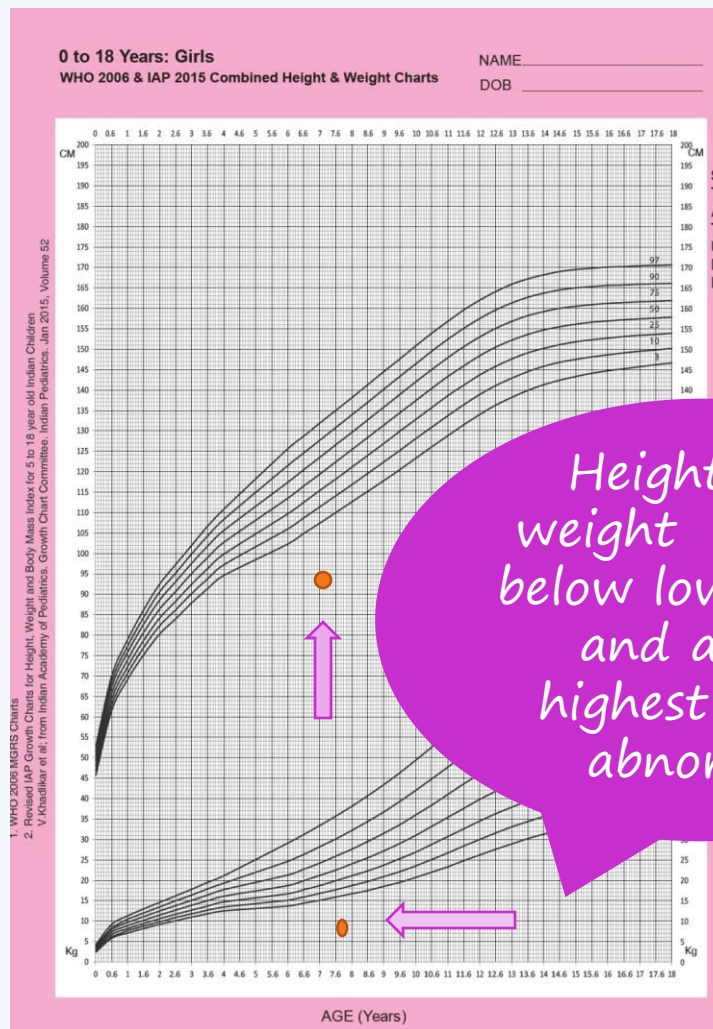


# Combined WHO and IAP Charts

## Boys



## Girls



## *Who should be evaluated?*

- When the child's height is less than 3<sup>rd</sup> (lowest) centile on the growth chart
- The child is short, way below the mid-parental height target centile
- A child who is the shortest in the class.
- A child who is not growing out of his clothes/shoes.

# *Who should be evaluated?*

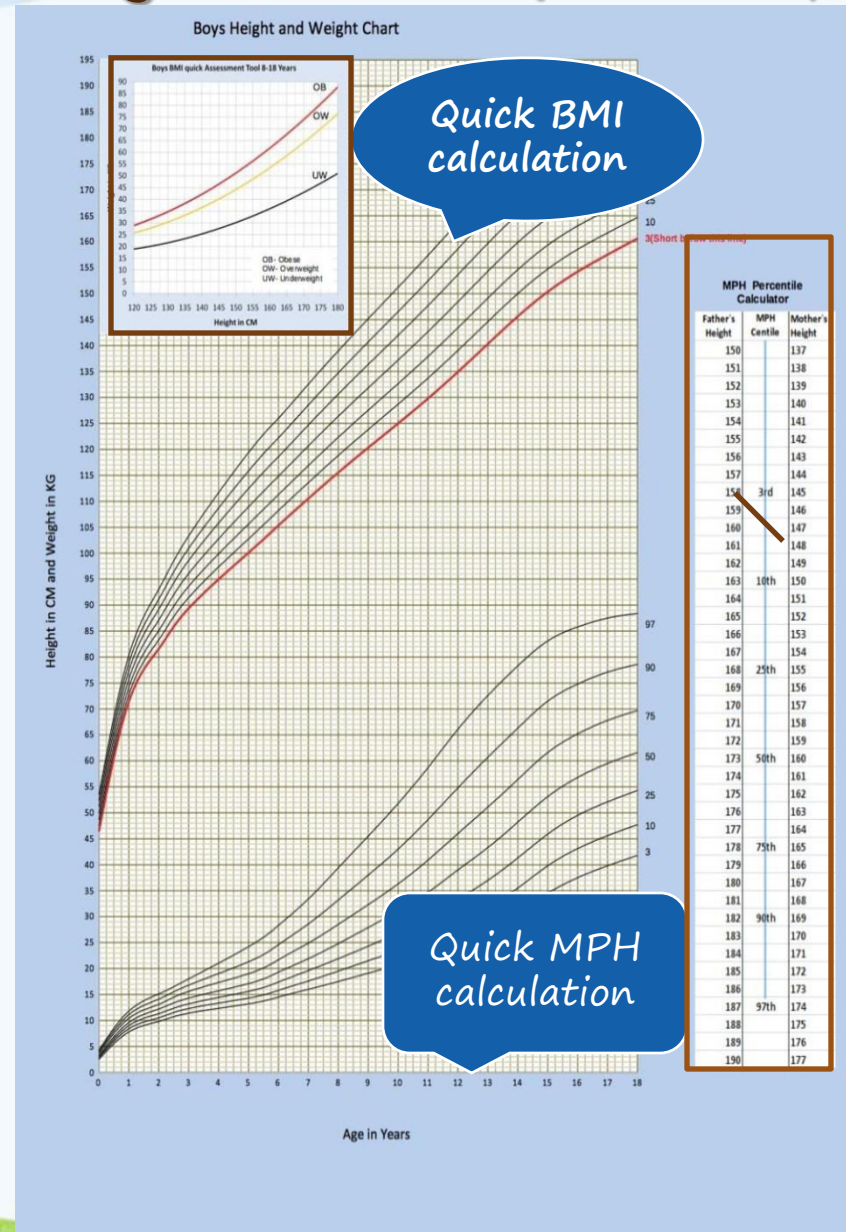
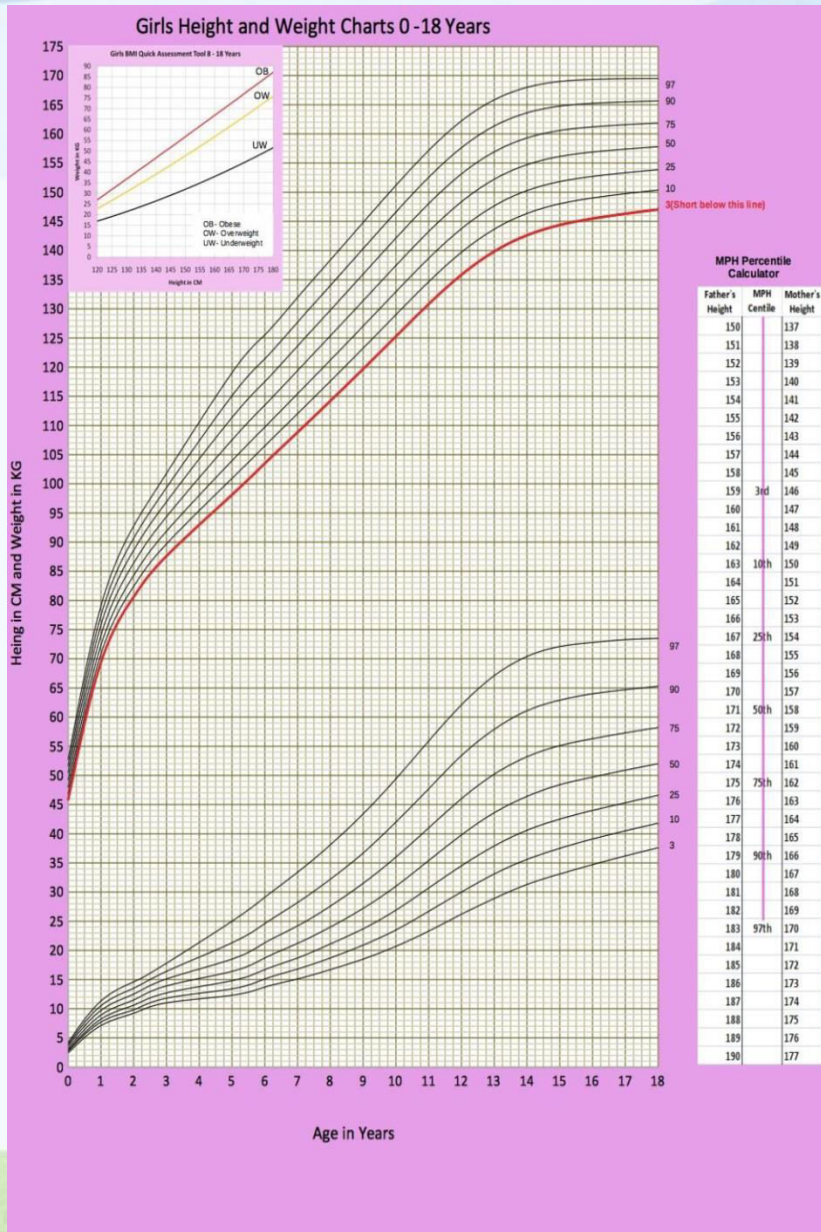
- A child who is growing less than 5cm in a year.
- A child is severely underweight
- Overweight or Obese child
- A child with early or late puberty

*The parents should be informed if the growth is found abnormal*



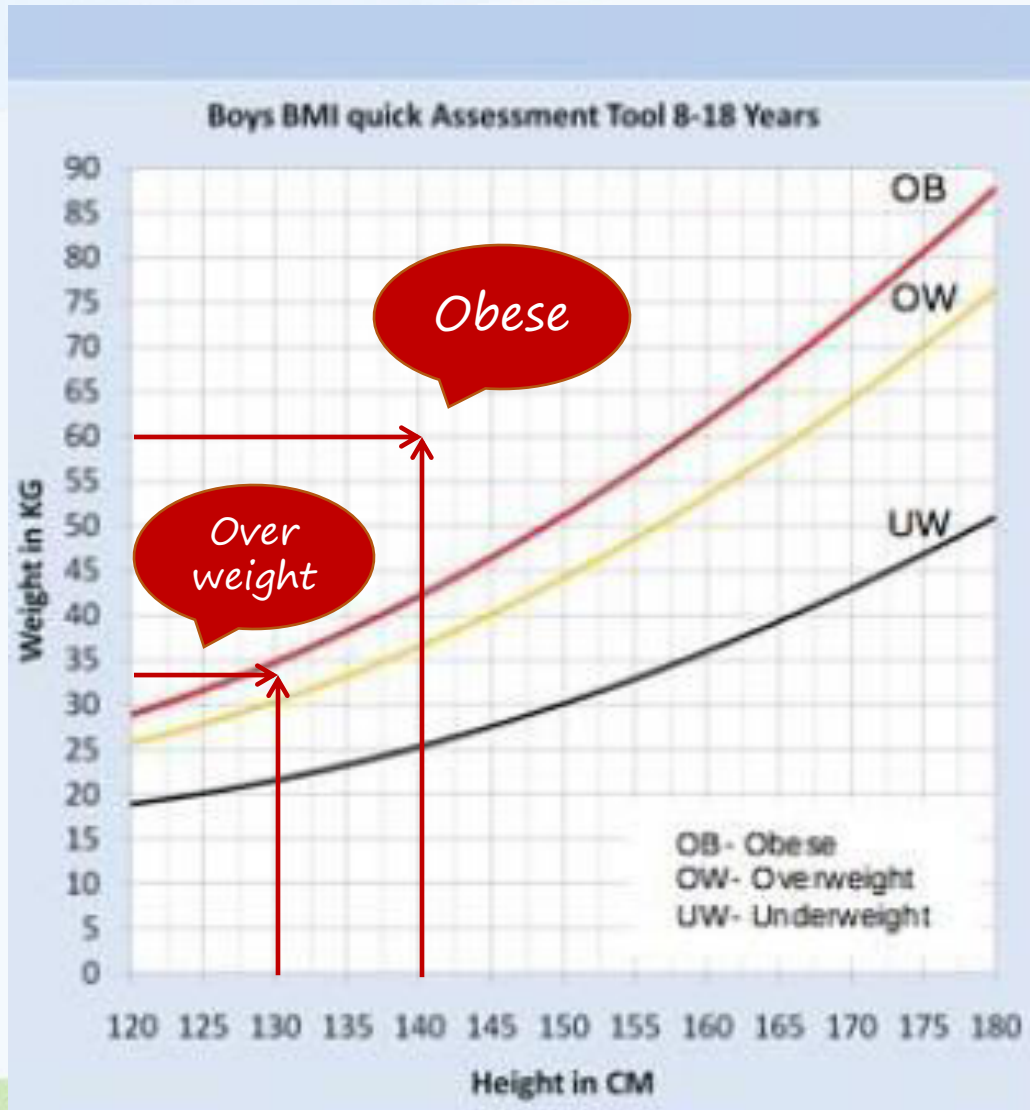


# Pediatrician friendly Charts (2020)





## Quick BMI Assessment Tool (IAP)



Join the measured weight and height and see the point of intersection

Above the yellow line is **overweight**

Above the red line - **Obese**

Below the black line - **Underweight**

# Summary

- Growth problems are common in children
- Every child should be measured at regular intervals
- A child with poor growth should be evaluated early and the cause identified and treated
- Normal variants of short stature like familial cause and late bloomers are very common
- A balanced diet, hygiene and regular exercise are the keys to good health



Thank you

