

# GROWTH & NUTRITIONAL STATUS OF INDIAN PRE-SCHOOL CHILDREN



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# INTERVENTIONS TO IMPROVE NUTRITIONAL STATUS

India recognised the importance of human resources as the engines powering national development and gave high priority to improvement of the health and nutritional status of the population especially the vulnerable groups like pre-school children and women

India initiated interventions to improve Household Food Security:

- 🌍 Improve purchasing power: employment programme
- 🌍 Access to subsidized food grains through PDS.

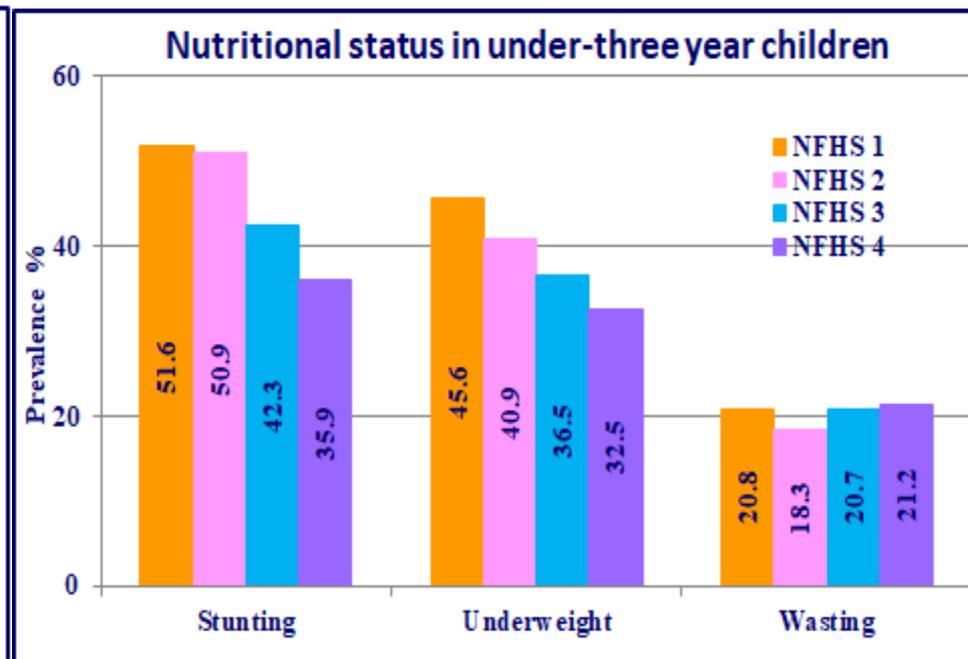
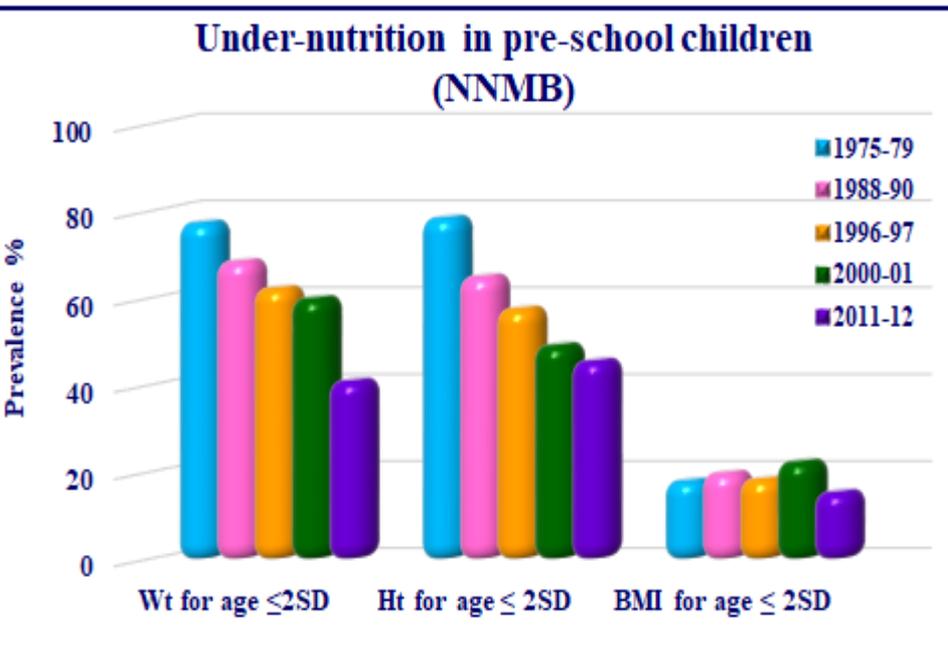
To improve dietary intake of vulnerable groups:

- 🌍 Food supplementation programmes for children and mothers.

To monitor progress in efforts to improve food security and nutritional status, independent national surveys were established.

Data from these provide excellent insights into ongoing nutrition transition in the country.

# TIME TRENDS IN UNDERNUTRITION RATES (NNMB, NFHS)



India has been food secure for five decades

Access to ICDS food supplementation programme and essential primary health care for pre-school children is nearly universal.

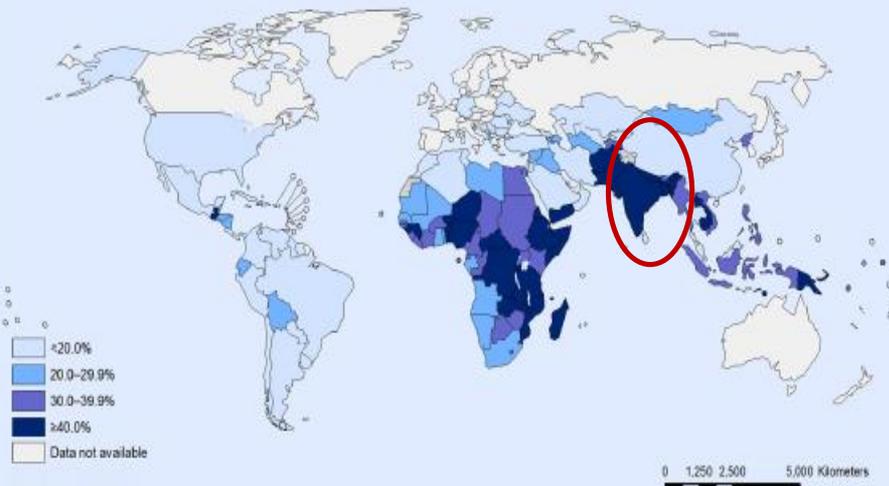
There has been substantial decline both in the prevalence of under-nutrition and under-five mortality in India in the last four decades

India witnessed the steepest fall in the prevalence of under-nutrition and reduction in IMR and U5 MR between 1990 & 2015

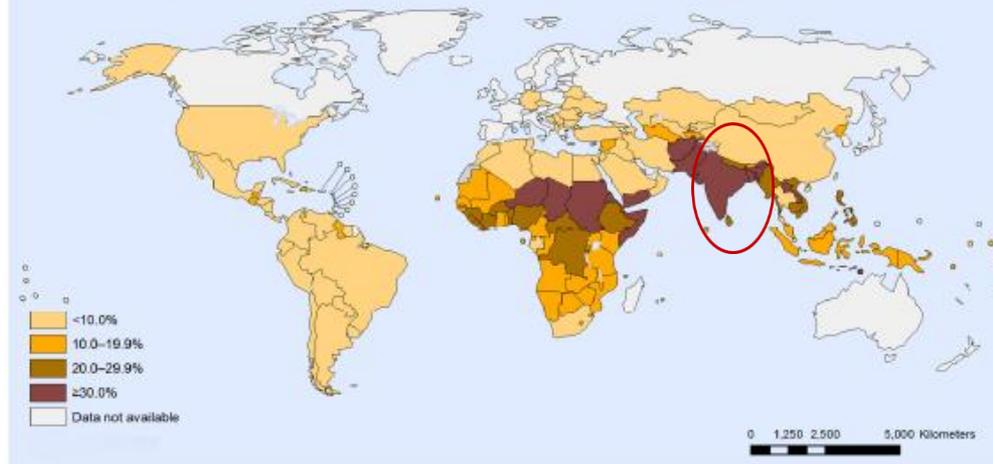
India achieved MDG targets for IMR reduction despite high under-nutrition rates.

# UNDER-NUTRITION RATES IN INDIA

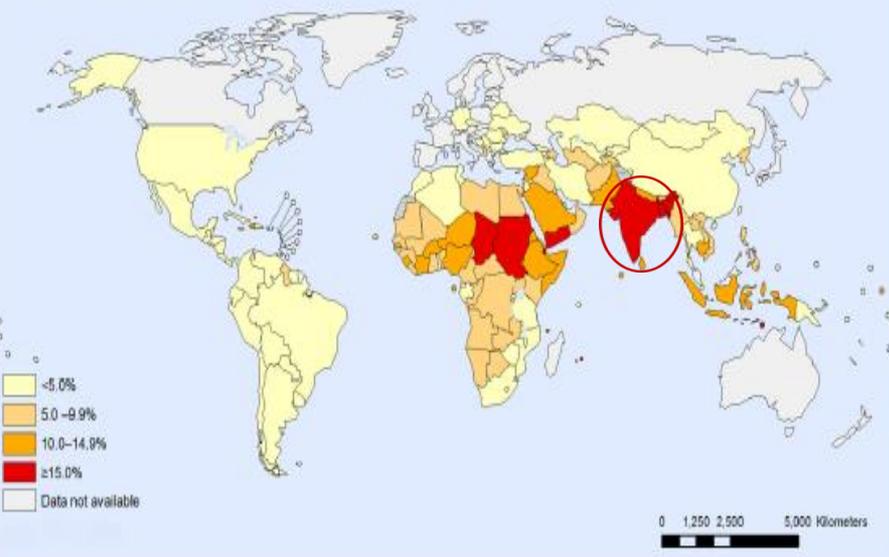
## STUNTING



## UNDERWEIGHT



## WASTING



**BUT** even now stunting, underweight and wasting (BMI-for-age) rates in Indian pre-school children are the highest in the world. This results in India's low global ranking in food security.

Since 2013 FAO and WHO recognise that high under-nutrition rates in U5 in India is not due to household food insecurity Lower growth trajectory was mainly due to low birth weight and poor IYCF.

# **WHO /SDG TARGETS FOR COMBATING UNDER-NUTRITION**

**Four WHO global nutrition targets to be achieved by 2025 are:**

- 30% reduction in low birth weight (LBW);**
- 40% reduction in the number of under-five children who are stunted;**
- childhood wasting to be brought down & maintained at <5%.**
- prevention of rise in child over-nutrition**

**India is a signatory and is striving to achieve targets in the time frame**

**AHS CAB and DLHS 4 conducted in 2012-2014 are the largest surveys of nutritional status of under-five children in the world**

**Annual Health Survey (AHS) was conducted by the RGI and District Level Household Survey was conducted by IIPS**

**For AHS, NFI and NIHFV were involved in the development of the protocol, development of training modules, selection and accuracy testing of the instruments used in the survey, conducting TOT for state officers, training of survey personnel in some major states and quality assurance procedures to be used during the survey.**

**These surveys provide the baseline information for monitoring progress towards the SDG targets for nutrition in India**

**NFI undertook analysis of the raw data pertaining to pre-school children from these two surveys to document**

- growth pattern of children,**
- prevalence of stunting, underweight and wasting**
- changes in stunting, underweight & wasting rates in relation to age**

# **CHILDREN IN SURVEYED HOUSEHOLDS**

## **DLHS 4**

<b>Age</b>	<b>Ht &amp; wt Measured</b>	<b>Absent</b>	<b>Refused</b>	<b>Others</b>	<b>Total</b>
<b>0-4 yrs</b>	<b>74,398</b>	<b>98</b>	<b>91</b>	<b>130</b>	<b>74,717</b>

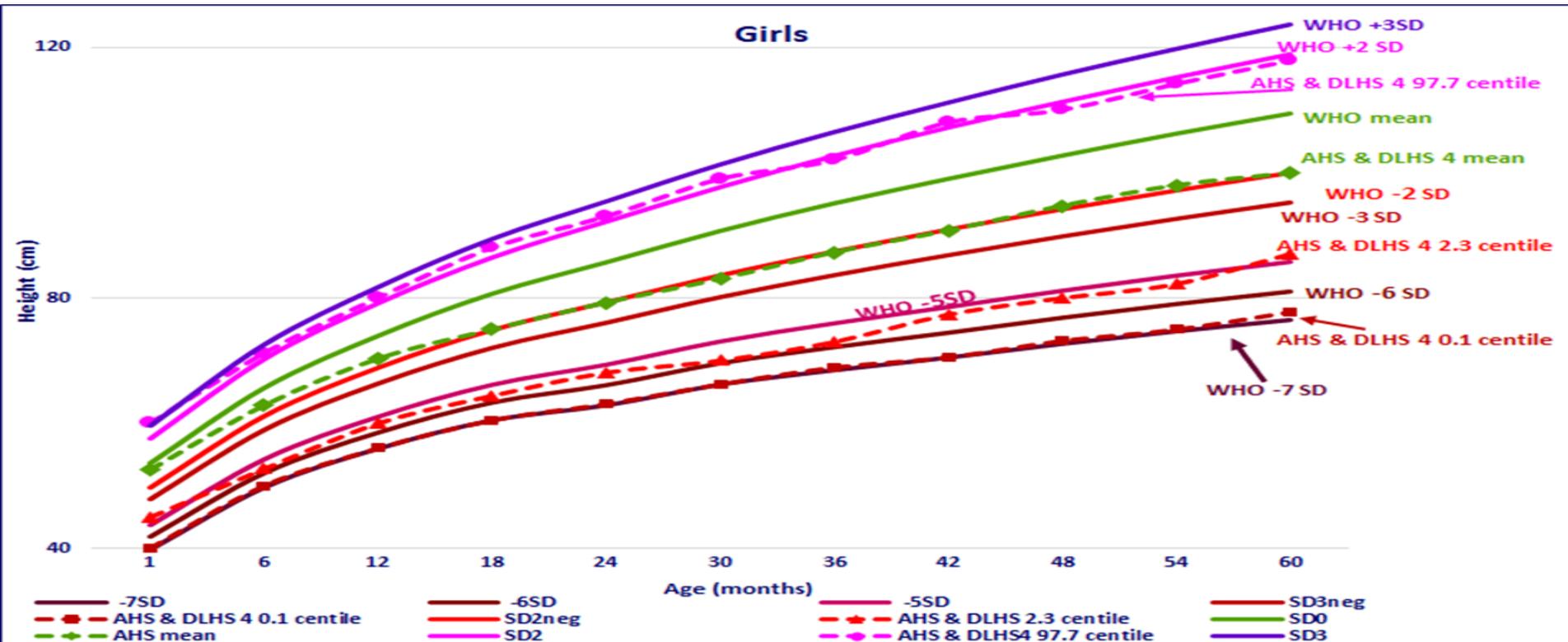
## **AHS CAB**

<b>0-4 yrs</b>	<b>1,30,606</b>	<b>7535</b>	<b>858</b>	<b>158</b>	<b>1,39,157</b>
<b>Total</b>	<b>2,05,004</b>	<b>7633</b>	<b>949</b>	<b>288</b>	<b>2,13,874</b>

**Over two hundred thousand children were surveyed from selected families.**

**The non-response rates for height and weight measurement were very low.**

# LENGTH/HEIGHT IN GIRLS 0-60 MONTHS

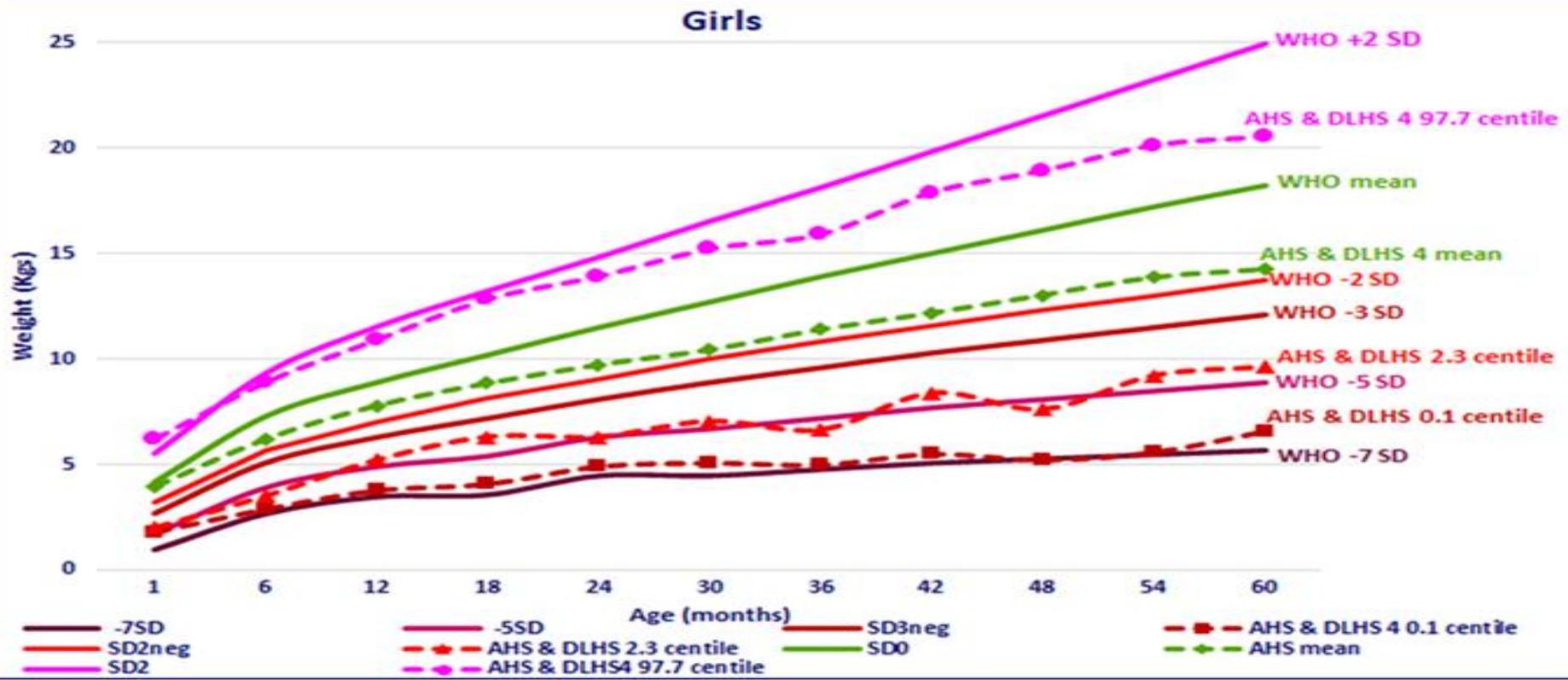


The mean length of Indian children was between -1SD and - 2SD of the WHO standards between 1-12 month and at - 2D of the WHO growth standards in 18 and 60 month.

The 2.3 centile of length of Indian children was near -5SD of the WHO growth chart in 0-6 months, between -5SD and -6SD in 6-30 months, at -6SD in 30-36 months and at -5 SD at 60 months. The 0.1 centile was coinciding with WHO -7SD.

The 97.7 centile of the Indian children were between +2SD and +3SD in 0-36 months and thereafter around +2SD of the WHO standards

# WEIGHT FOR AGE GIRLS 0-60 MONTHS



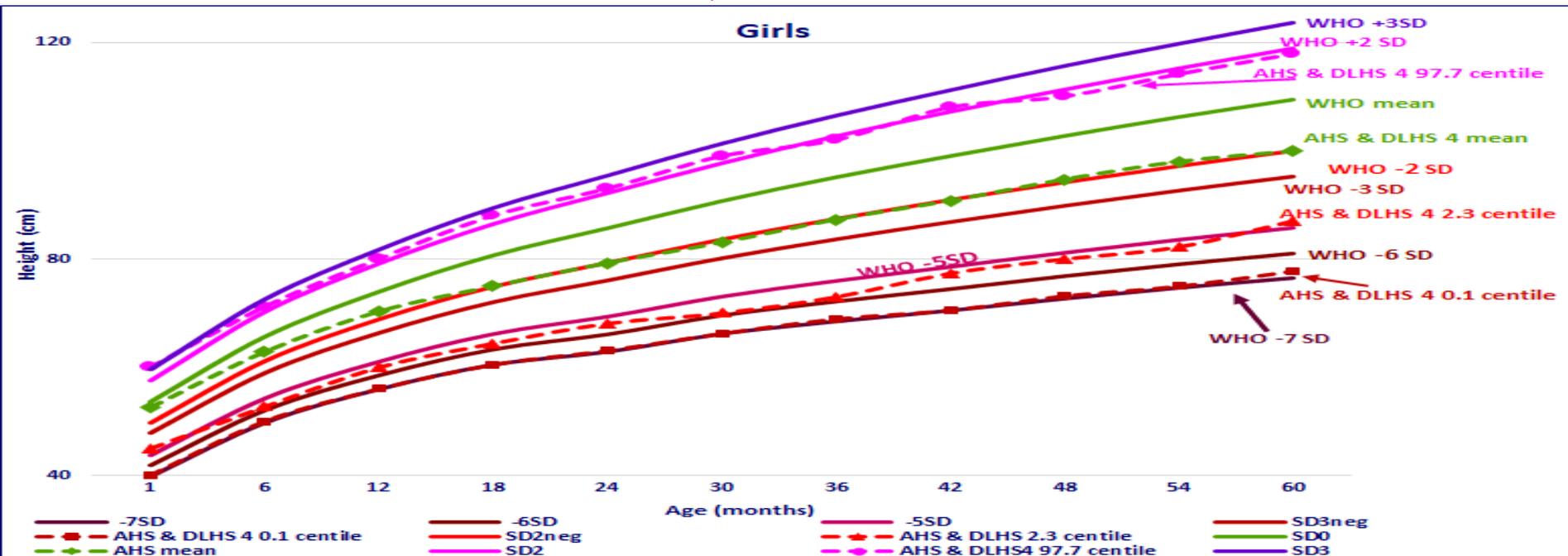
The mean weight of Indian children in the 6-60 month remained just above the -2 SD of the WHO standards.

The 2.3 centile of weight of Indian children was either just above or just below -5SD of the WHO standards in 1-60 months.

The 0.1 centile of the weight of Indian children was near -7 SD of the WHO growth standards.

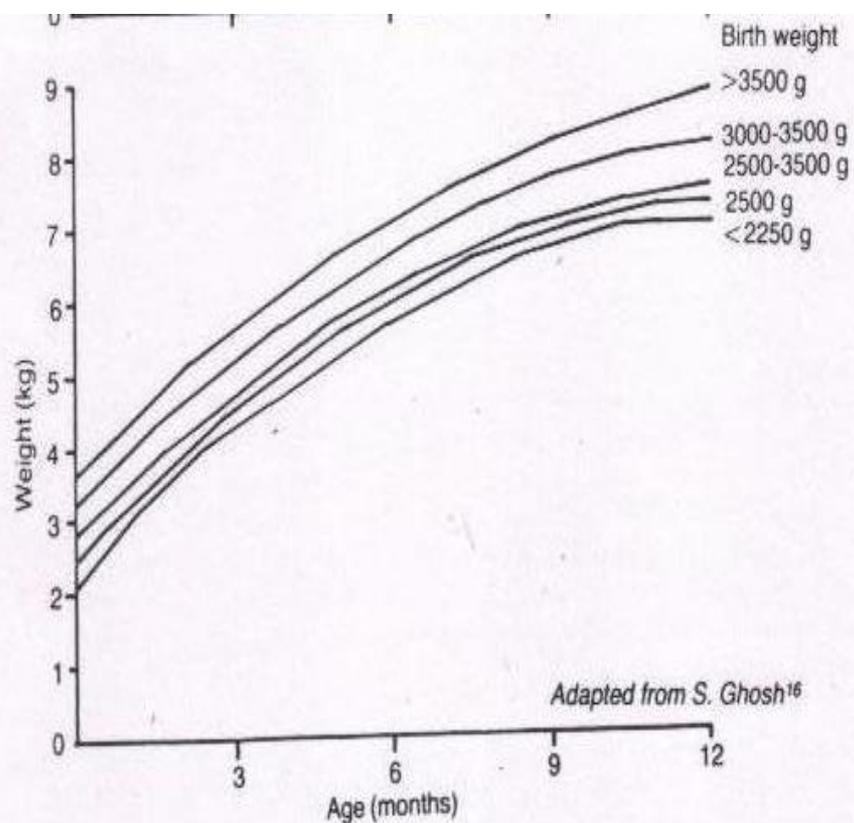
The 97.7 centile of Indian girls were just above +2SD of WHO standards at 1 month, just below +2 SD in 6-36 months and thereafter around +1SD

# BMI IN GIRLS 0-60 MONTHS



The mean BMI of Indian children in 1-12 months was just below WHO mean; at 18 months it was at the WHO mean, in the 18-42 months just below WHO mean and subsequently below the mean of WHO standards. The 2.3 centile of BMI of Indian children was near -5SD in 1-6 months, and just below -5SD of the WHO growth standards in the 6-60 months. The 0.1 centile of the Indian girls was near -7 SD of WHO growth standards.

The 97.7 centile of Indian children was above +3SD at 1 month, at +3 SD at 6 months, between +2SD & +3SD from 12 months to 30 months and just below +2SD from 48-60 months.



**Indian children begin their life with a lower height, weight and BMI. They are mature, and do not have any functional deficits.**

**When provided with essential child care they survive**

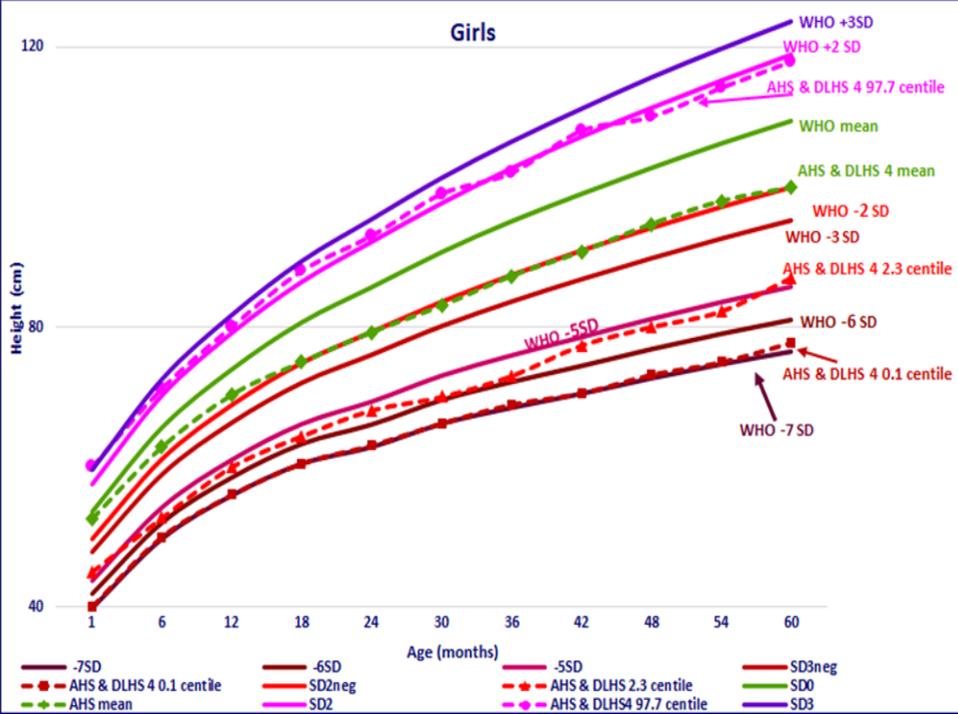
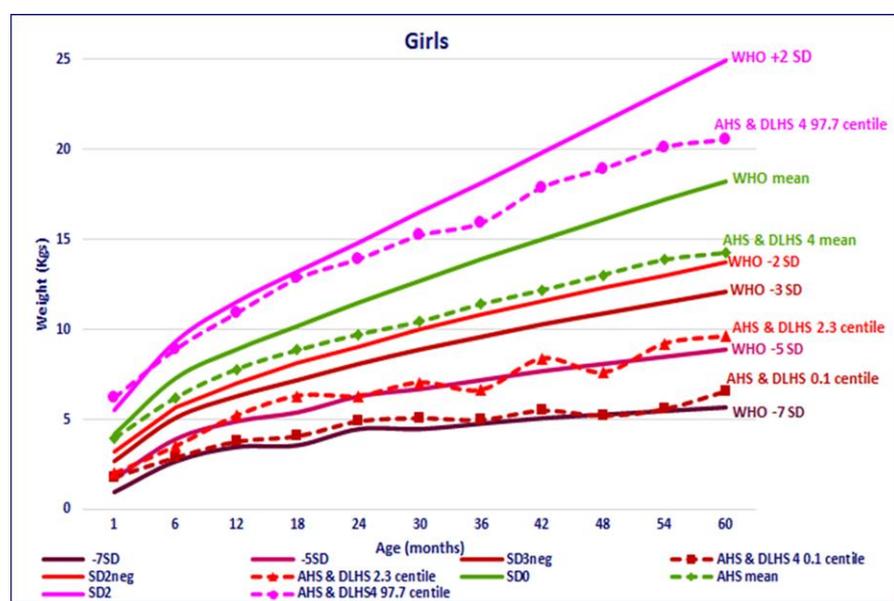
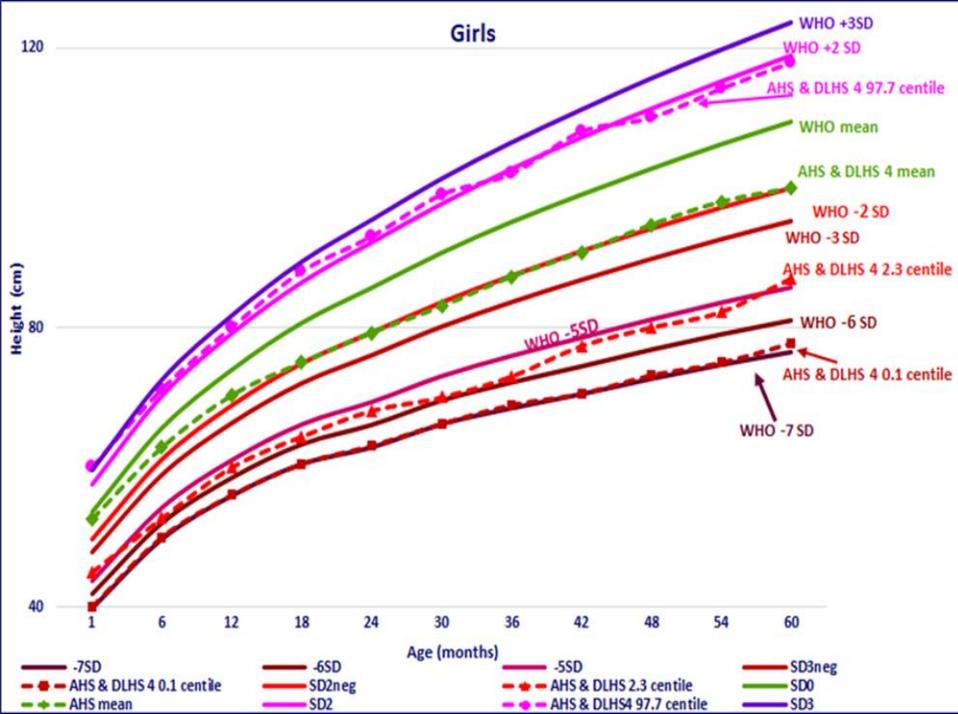
**About a third are born with low birthweight, about one fourth have low length and a third low BMI.**

**Studies from 1960s have documented that birthweight is the major determinant of growth and the small Indian infants grow along the lower trajectory.**

**Data analysis from AHS and DLHS4 show that the Indian children grow along a lower trajectory of height, weight and BMI as compared the trajectory of growth of the WHO MRGS children.**

**When the data from AHS and DLHS were analysed separately it showed the trajectory of growth of children from AHS was lower as compared to DLHS4.**

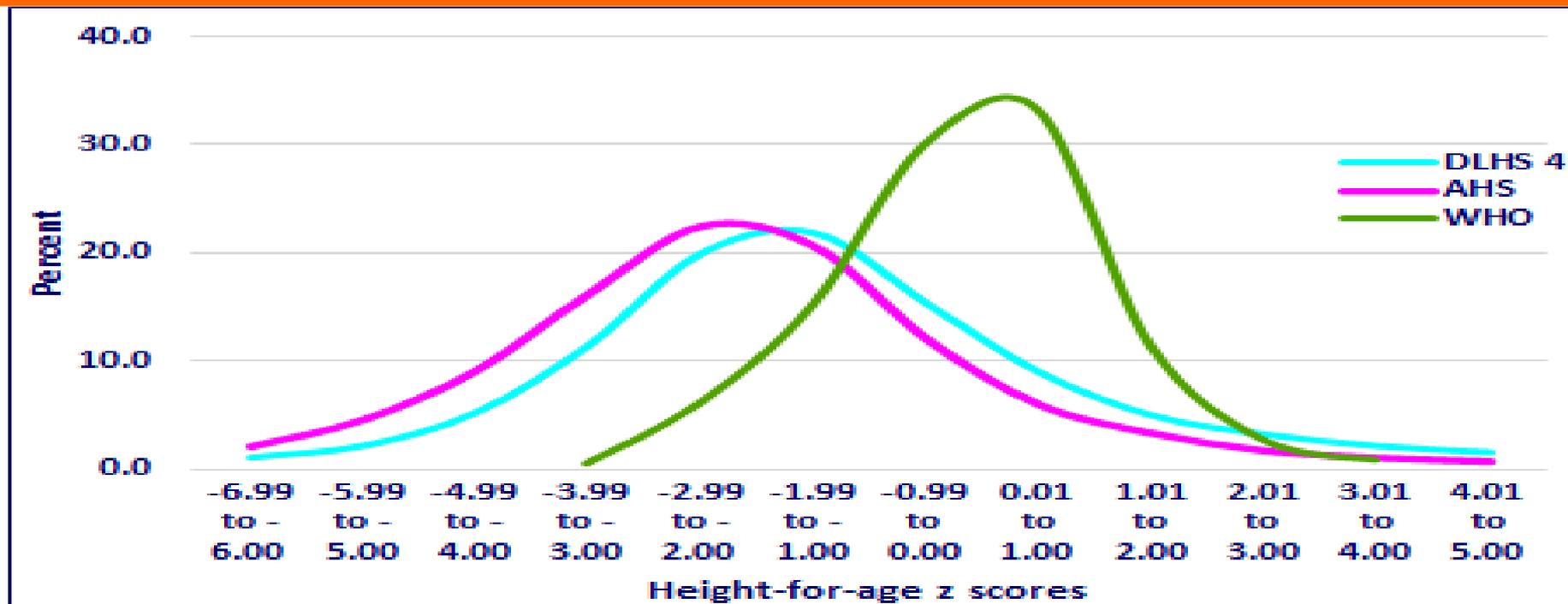
**The WHO chart provides the template for the trajectory of growth across 0-60 months to children from all countries, regions, states, socio-economic groups and could be used to assess trajectory of normal growth in children irrespective of their initial size.**



Children with HAZ, WAZ and BAZ <-2 (WHO <-5), as well as children with HAZ, WAZ and BAZ <-3 (WHO < -7) seem to be growing along their trajectory.

U5 mortality in India is relatively low and small children survive till 5 years of age without major interventions. Does this imply they do not have serious functional deficits? Indian children with HAZ, WAZ and BAZ of +2 are between +1 and +2 of the WHO values. This suggests that a small segment of Indian children have the potential for growth comparable to the WHO standards

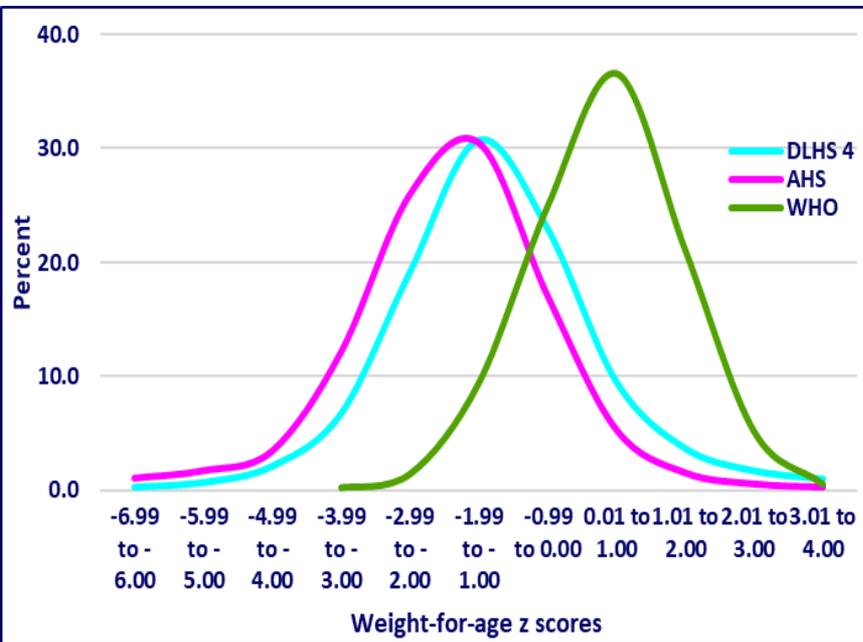
# FREQUENCY DISTRIBUTION OF HEIGHT-FOR-AGE Z SCORES AHS, DLHS 4 & WHO MGRS



The frequency distribution of the z scores for height in children in AHS and DLHS4 were to the left of the WHO standards & cover range of HAZ from -7 to +5.

The mean HAZ in Indian children is about -2 HAZ of children in the WHO standards

Indian children are substantially shorter as compared to the WHO standards. But there is no evidence that shorter Indians children have any functional or cognitive impairment



As compared to the WHO standards, the weight for age frequency distribution of Indian children is shifted to the left. The range of WAZ is from -6 to +4.

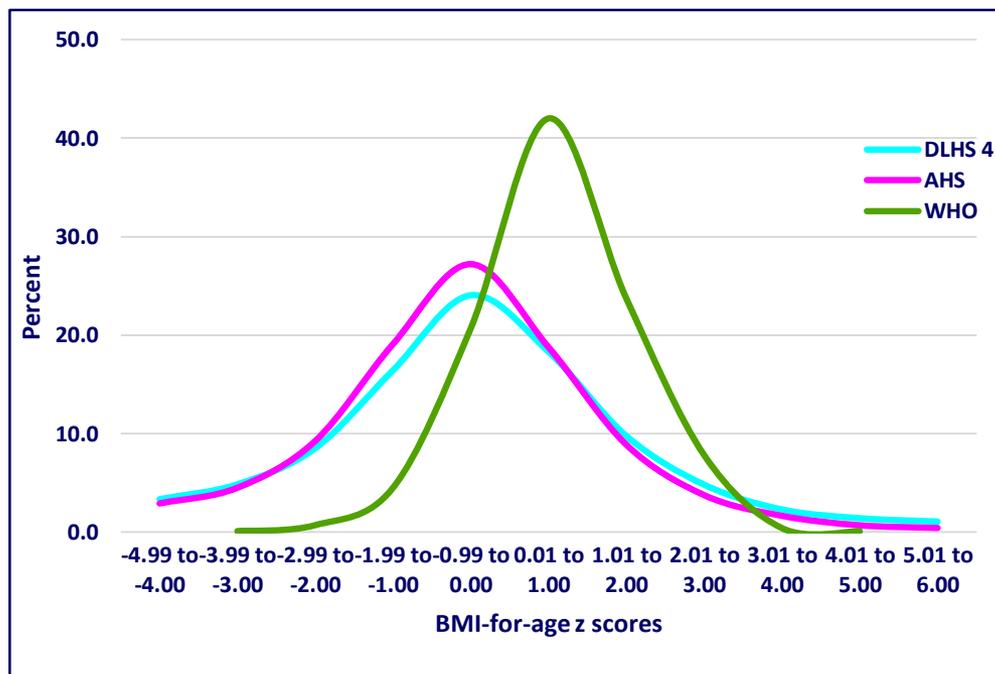
The mean WAZ in Indian under-five children is about -2 WAZ of children in the WHO standards.

The low weight is mainly due to short stature of the Indian children

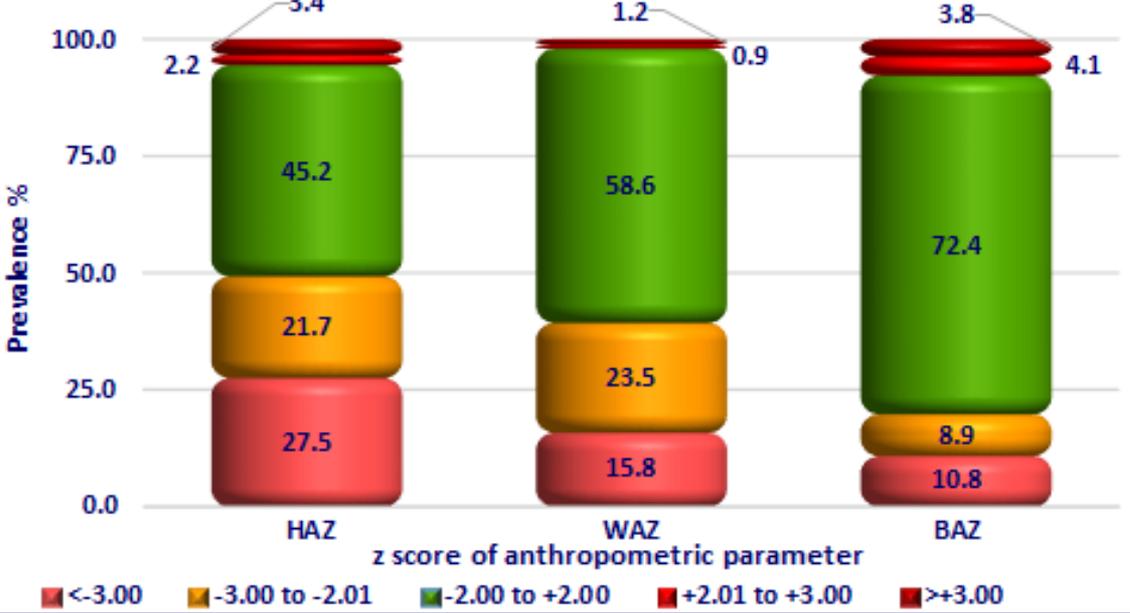
As compared to the WHO standards, the BMI-for-age frequency distribution of Indian children is shifted to the left.

The range of BAZ is narrower as compared to HAZ and WAZ from -5 to +5.

The mean BAZ in Indian under-five children is about -1 BAZ of children in the WHO standards.



### Nutritional status of under-five children



Nearly half the children were stunted, 40% underweight and 20% wasted.

Over half of the stunted children had severe stunting

Over one third of the underweight children were severely under-nourished.

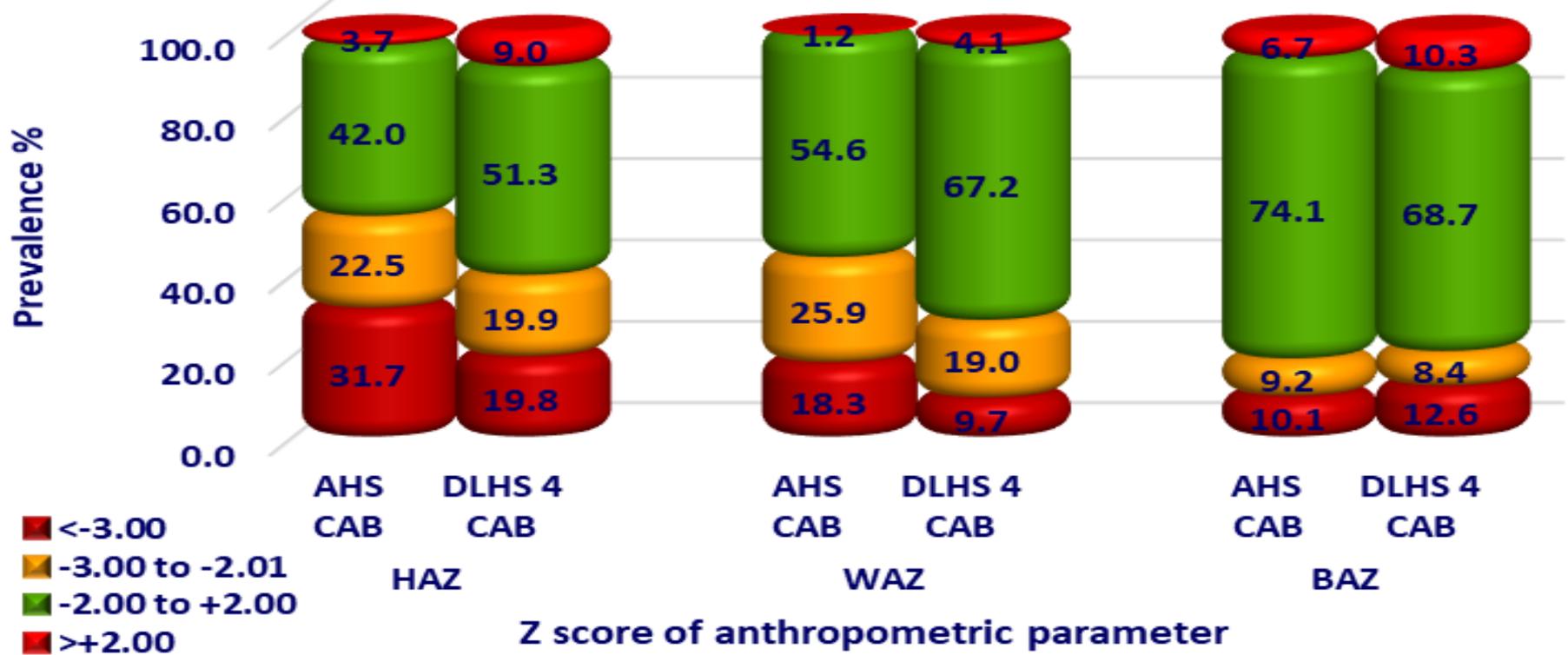
Over half of the wasted children were severely wasted

It is possible that in India majority of children who are classified as severely underweight and wasted are either small Indian children growing along their low growth trajectory or small statured children who are in addition chronically under-nourished.

They are classified as severely under-nourished as per WHO standards; but if their WAZ and BAZ were computed from Indian data they will fall only <-2 of the Indian data (moderate under-nutrition). They may not have functional deficits: a situation akin to the low birthweight children in India.

Studies have to be taken up to explore this possibility, especially in view of the enormous difference it may bring about in the management of severe under-nutrition in pre-school children.

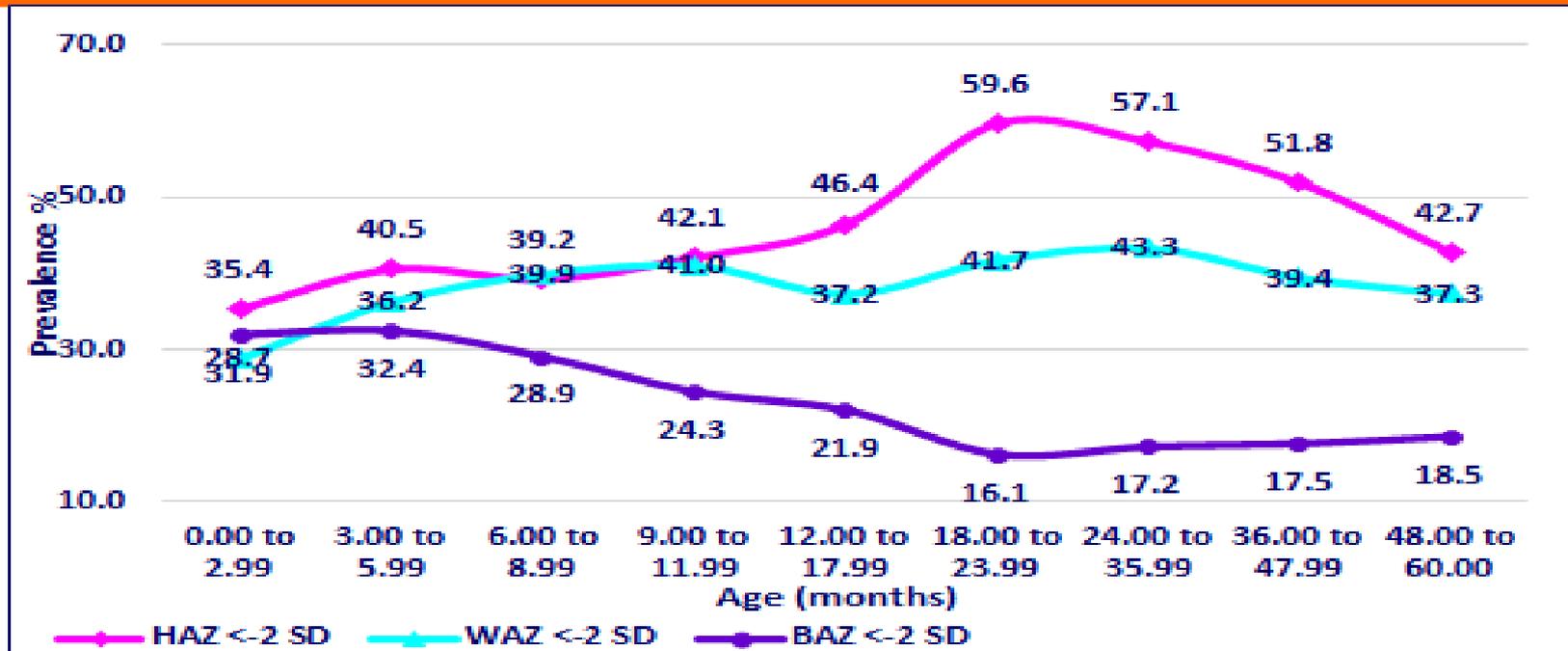
## Nutritional status of U5 children (AHS & DLHS4)



Prevalence of moderate as well as severe stunting, underweight and wasting was higher in children from AHS states compared to children from DLHS 4 states. With improvement in access to nutrition and health services, it might be possible to improve coverage content and quality of ongoing intervention programmes in AHS states.

This will enable the states to achieve substantial improvement in nutritional status & reduce the gap in normally nourished children in AHS and DLHS 4 states.

# PREVALENCE OF STUNTING UNDERWEIGHT AND WASTING IN RELATION TO AGE IN PRE-SCHOOL CHILDREN



Stunting, underweight and wasting are three indicators used for assessment of nutritional status in pre-school children.

Prevalence of under-nutrition as assessed by these three indicators are plotted against age of the children in the graph above.

Under-nutrition as assessed by stunting rate increases from 40% to 60% between 9 -23 months; during this period wasting rates decreases from 32% to 16% while underweight rate remains relatively unaltered.

How do we interpret this data?

When do we intervene?

# NUTRITIONAL STATUS IN RELATION TO AGE



There is small increase in the underweight rates between 3 and 12 months.

This should be prevented by appropriate nutrition and health interventions.

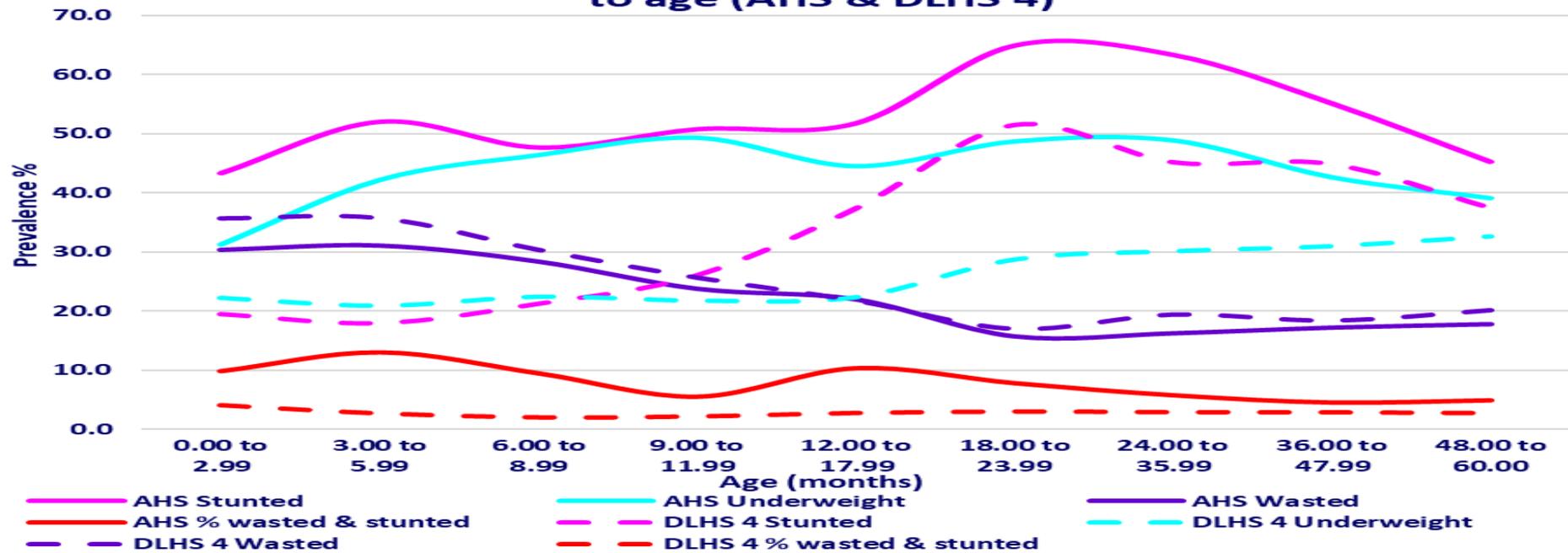
Such an intervention may reduce the increase in stunting rates in 12-23 months.

There is an increase in stunting rates between 12-23 months. The reason for this is still not clearly understood

There was a progressive reduction in wasting rates between 12 and 24 months; this is due to increase in stunting rates. This should not be interpreted as improvement in nutritional status.

In view of the substantial differences in trends of changes in undernutrition as assessed by HAZ, WAZ and BAZ with the age of the child, information on height-for-age, weight-for-age and BMI-for-age should be considered together to assess nutritional status in children.

**Prevalence of stunting underweight & wasting in relation to age (AHS & DLHS 4)**



As compared to children from DLHS states stunting, underweight and wasting rates are higher in children from all age groups in AHS states.

Comparison between children from AHS states and DLHS4 states showed that difference in stunting rates were the higher as compared to the differences in underweight rates at all age groups; the difference in wasting rates were small.

Prevalence of stunting and wasting (short lean children) was lower in children from DLHS states as compared to children from AHS states perhaps because of substantially lower stunting rates in DLHS 4 states.

With improvement in access to and utilisation of nutrition and health services in AHS states the difference in nutritional status between AHS and DLHS4 states may reduce. This should be viewed as an opportunity

# **POLICY AND PROGRAMME IMPLICATIONS**

As the WHO chart provides the growth trajectories across children of varying size, it can be used to assess deviation from trajectory of normal growth in children irrespective of their initial size.

Therefore it can be used to assess deviation of growth from trajectory in children from all countries, regions, states, socio-economic groups.

Weighing is feasible & accurate method of monitoring growth in infants and young children.

Monitoring growth trajectory is a very good method to assess deviation from normal growth even before under- or over-nutrition sets in.

It is possible to plot available data on weight for age from repeated weighing and assess any deviation from normal growth trajectory even if monthly weighing is not done.

There is no need to wait for three consecutive measurement of weight to assess growth faltering because WHO chart provides the template for the trajectory of growth across 0-60 months to children.

In view of the substantial differences in trends of changes in under-nutrition as assessed by HAZ, WAZ and BAZ, information on height-for-age, weight-for-age and BMI-for-age should be considered together to assess nutritional status in children.

**THANK YOU!**

