



South to South



Growth and Nutrition in the HIV infected Child



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Learning Objectives

- To understand the importance of monitoring growth in the HIV-exposed and infected child
- To be confident with monitoring growth in children by measuring, plotting and interpreting growth parameters
- Identify an approach to the management of growth failure in a child

Why should we monitor growth in a child?

Growth is the 'work' of the child

- Growth is the best general indicator of the health of any child
- Proper nutrition is needed for normal growth and development
 - Macronutrients (protein, fat, carbohydrates, fluids)
 - Micronutrients (vitamins, trace elements, minerals)
- Regular growth measurements helps with early detection of malnutrition, failure to thrive and other illnesses when the treatment intervention is simpler

Growth in the HIV infected child

Growth failure can occur throughout the disease course:

- Can be the **primary manifestation of HIV disease** in the HIV-exposed infant
- Is a very sensitive indicator of **HIV disease progression** in children
 - Poor growth has been shown to precede CD4 decline and the development of Opportunistic Infections
 - It can warrant the need to **initiate ART**
 - Unexplained malnutrition is a WHO Stage 3 or 4 clinical indicator
- It can be an indication of HAART **treatment failure**

Risk factors for malnutrition

A 'thinking' approach:

- Inadequate macro/micronutrient intake
- Excessive losses
- Malabsorption
- Increased metabolic requirement

Risk factors for developing malnutrition in HIV infected children

A. Inadequate macro/micronutrient intake

- Food scarcity, psychosocial issues
- Physical factors: anorexia, mouth sores, nausea,
- Psycho-social factors: depression, illness or death of caregiver, family stressors
- Poor care and feeding practices
- ARV side effect or food-drug interaction

B. Excessive losses

- Diarrhoea, vomiting

C. Malabsorption (changes in the integrity of the intestinal mucosal membrane leads to malabsorption of macro- and micro-nutrients)

- Lactose intolerance

D. Increased metabolic requirement:

- Resting energy expenditure is increased by
 - 10% in asymptomatic HIV-infected children
 - 20-30% during inter-current infection
 - 50-100% when symptomatic or severely malnourished

HIV infected children are at increased risk of developing malnutrition

- HIV infected children are exposed to a combination of any or all of the above risk factors

Added

- Malnutrition influences the already compromised immune system
 - Chronic protein energy malnutrition harms T-cell number and function and new primary antibody responses
 - Vitamin and mineral deficiencies affect cell-mediated immunity
 - Micronutrient deficiencies (low serum levels of zinc, selenium, vitamins A, E, B6, B12 and C) affect cell-mediated immunity
 - Leads to opportunistic infections and predisposes to more infections and malnutrition

Growth Monitoring

- Taking the same growth measurements (indicators of growth) over time and observe change
 - A single measurement only indicates the child's size at that moment and doesn't give an indication of progress
 - Weight is the first to decline or slow, followed by length, then head circumference (the body will protect brain growth)
- Growth measurements
 - **Weight:** very sensitive indicator of acute growth abnormalities
 - **Length:** indication of growth over longer period ie chronic malnutrition
 - **Head circumference:** <3yrs – indicator of brain growth

- Growth measurements are age and gender specific

Growth chart as tool for monitoring growth

- Growth charts are standardized tools for collecting and recording growth monitoring data
 - Growth curves provide an easy and systematic way to follow changes in growth over time for an individual child and are the only way to assess growth rates
 - The child acts as his/her own 'control'
 - Gender specific
- Provides a visual engagement between the caretaker and point of discussion
- **Note:** Follow up over time using the same chart for an individual child is more important than the choice of growth chart

How do we monitor growth?

Step 1: Accurate measurement

- Weight, length and head circumference

Step 2: Use appropriate growth chart to plot measurements

- That the child has gained weight since the last visit is not enough, growth charts assess the rate of growth
- The rate of growth slows as the child ages

Step 3: Evaluate growth

- Is the child growing well, growing slowly, or experiencing failure-to-thrive?
- If not, why, what does it mean?
- Should we intervene?

Step 1: Accurate measurement

- Birth measurements are the basis for assessing further progress
- Measurements should be documented on RTHC and in the Medical Record
 - Weight (kg)
 - Height (cm)
 - Head circumference (cm)



Weight

- Weights should be taken with the child minimally clothed
- A functional scale that is well-maintained should be used
- The child should be weighed on the same scale at each visit as variations between scales of up as much as a kilogram have been observed



Measuring length in children < 2 years of age- supine



Head circumference (HC)

- Head circumference measures brain growth which continues until age 3
- In a child who is failing to thrive, weight is lost first, followed by linear growth (height).
- Head circumference is preserved for as long as possible, and a fall in HC growth usually denotes a marked degree of growth failure.
- HC abnormalities in the absence of problems with weight or length usually point to a problem which is in the central nervous system (infection, anatomic, trauma)
 - **Note:** a fall in HC is the earliest indicator of HIV encephalopathy

Head circumference

- Should always be taken from midway between the eyebrows and the hairline at the front of the head and the occipital prominence at the back
- Appropriate thin metal or plastic measuring tape should be used



Step 2:

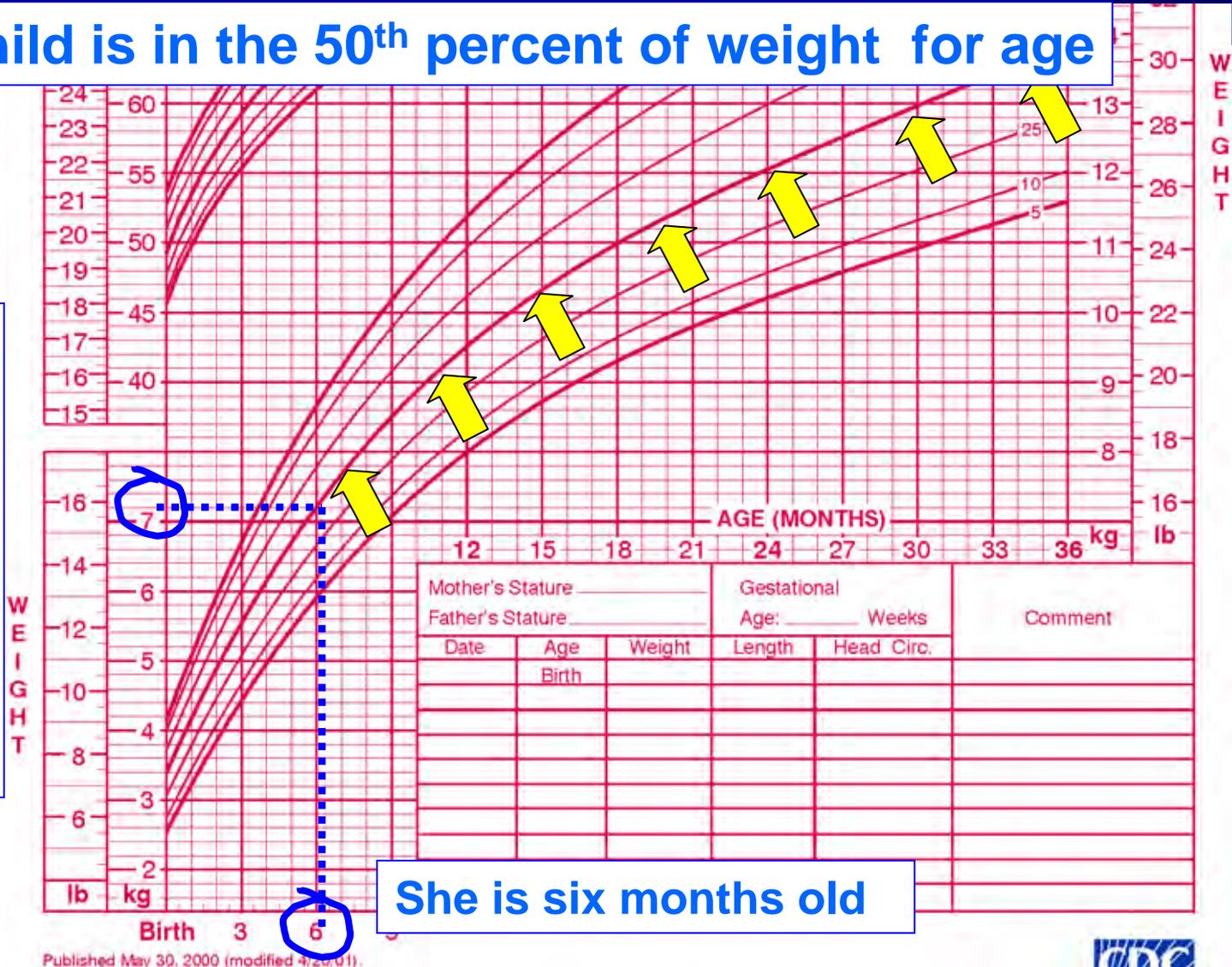
Use growth charts to plot measurements

- Use age and gender appropriate charts, plot measurement (weight, height, head circumference) on the vertical axis against age on the horizontal axis.
- Compare growth points with previous points
- Note percentiles
 - A percentile is a value on a scale of one hundred that indicates the percent of a distribution that is equal or below it
 - This means if an infant weight plots at 25%, he is as heavy or heavier than 25% of children and weighs less than the remaining 75% of infants with the same age

Example - Weight for Age

The child is in the 50th percent of weight for age

The child weighs 7.2 kg



She is six months old

Step 3: Evaluate growth

Is the child growing well or do you have concerns?

Definitions of Growth Failure:

- Weight less than 3rd (some charts use 5th) centile for more than 2 months
- Downward crossing of 2 major weight percentile lines
 - For example, a patient who falls from the 25th percentile to below the 5th percentile has crossed two percentile lines
 - lines indicate 97%, 95%, 75%, 50%, 25%, 10%, 5%, 3%
- Failure to follow along his/her own upward curve
- Note: *Some children may experience severe growth failure not by losing weight but by not gaining weight appropriately*

Different Classification systems for describing growth failure

'Wellcome' Classification

	60-80% of *expected weight	< 60% of *expected weight
No Oedema	UNDER WEIGHT	**MARASMUS
Oedema	KWASHIORKOR	MARASMIC-KWASHIORKOR

* 'Expected weight' is the 50th percentile for age

** Marasmus is more common than Kwashiorkor in HIV infected children

Different Classification systems for describing growth failure

'Waterlow' classification

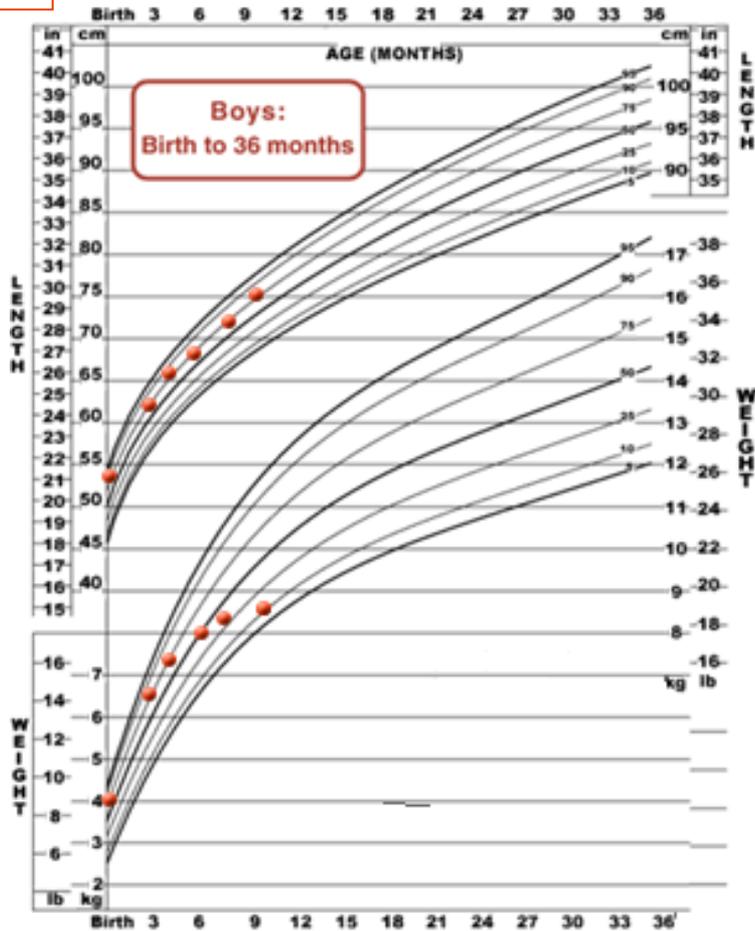
		Weight for age	
		> 80%	< 80%
Length for age	>90%	NORMAL	WASTED
	<90%	STUNTED	WASTED & STUNTED

Example (weight):

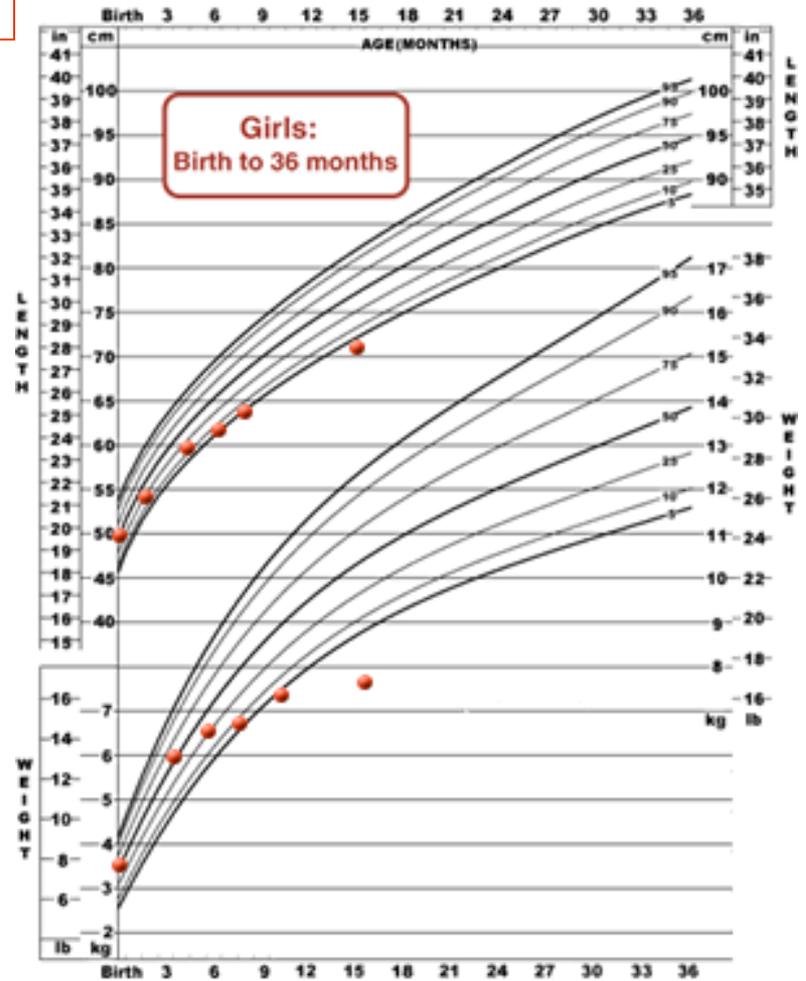
1. Plot the weight of the child on the growth chart as per age
2. Look what the weight would have been on the 50th centile for that age (expected weight)
3. Divide the real weight with the expected weight and multiply with 100 (which will give you a percentage)
4. If the percentage is less than 80%, the child is wasted

Examples of Growth Failure in Infants

boy



girl



The Nutritional Assessment

The nutritional assessment includes:

1. History
 2. Clinical nutritional assessment as part of physical examination
 3. Laboratory evaluation
- Ideally, growth measurements (Wt, Ht, HC) should be taken and plotted on the growth charts prior to the physical examination
 - If growth problems are noted, the clinician can then ask more detailed questions to address these findings and tailor the physical examination and investigations accordingly

Nutritional Assessment cont.

1. History

Identify risk factors for malnutrition

- Dietary history and feeding practices: mode of feeding (breastfeeding, mixed, other foods), frequency and amount
- Supplemental foods
- Nutrition-related problems: appetite, chewing, swallowing, intolerance or aversion, food taboos
- Intercurrent infections
- Gastrointestinal symptoms
- Psychosocial: food scarcity, death or illness of caregiver, depression

Nutritional Assessment cont.

2. Physical Exam

Look for signs of malnutrition

- Decreased subcutaneous tissue and fat (skin fold thickness)
- Decreased Muscle bulk (mid upper arm circumference)
- Edema (Kwashiorkor)
- Anaemia

Look for possible underlying causes of malnutrition

- Signs of HIV-disease or clinical progression
- Systemic pathology ie encephalopathy
- Systemic intercurrent infections ie pneumonia / diarrhoea
- Opportunistic infections ie oral thrush / TB

Nutritional Assessment cont.

3. Laboratory investigations

This will be guided by your history and clinical findings and is not indicated in all cases

- FBC (Haemoglobin)
- Assessment for TB
- Stool MCS if diarrhea
- Urine dip stick and/or assessment of renal function if oedema
- Albumin, U+E, cholesterol, clotting, glucose if severe malnutrition
- Consider HIV test in exposed infant
- Consider CD4 in HIV-infected child (?eligible for HAART)

Management of growth failure

- Prevention most important
 - Identify children at risk
 - Monitor growth at each visit
- Treat underlying infections and opportunistic infections
- Counseling and Support
 - Infant feeding
 - Food safety/hygiene and food borne illnesses
 - Teach family/ caregivers how to maximize local nutritious foods in the child's diet
- Nutrition Supplementation/Therapy
 - Provide micro- and macronutrients according to national policy`
- Assess for ART eligibility

Summary

- HIV infected children at high risk of malnutrition and growth failure
- Nutritional assessment have to be done at each clinic visit
- With little time and resource investment, growth monitoring can strengthen HIV care and treatment programs/services and it can be completed by health care workers with all skill levels

Case discussion

- You receive a clinic letter that reads as follows:

'Thank you for seeing this 1 yr old girl who presented to us with pneumonia. ELISA positive. Regards. Sr Monge'

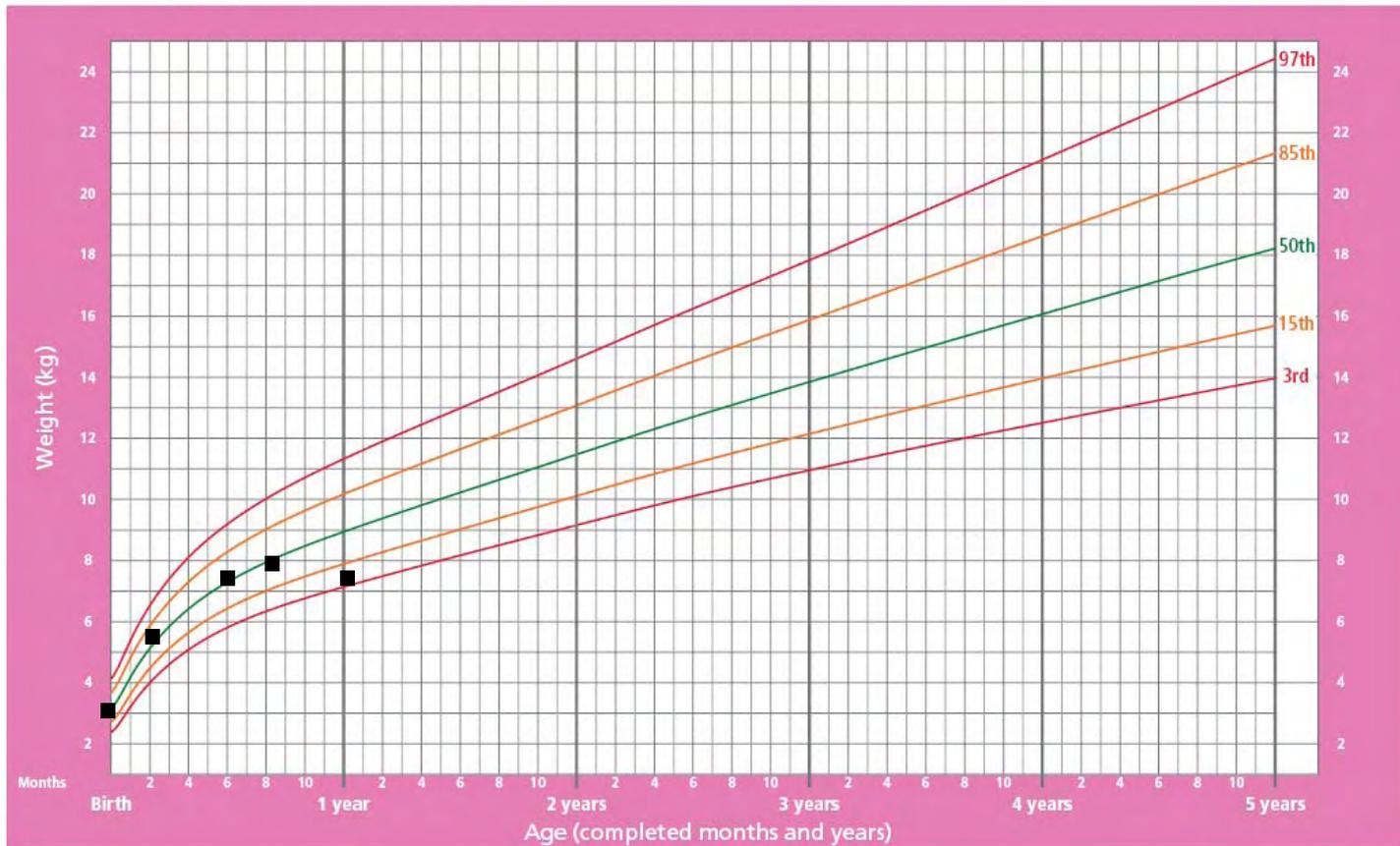
Case cont.

- Mother has brought her Road to Health Chart along
- These are the previous growth measurements:
 - Birth: wt 3kg, length 50cm
 - 2 months: wt 5kg
 - 6 months: wt 6.5kg
 - 8 months: wt 7kg, length 66 cm
 - 1 yr: wt 7,2kg
- Please plot these measurements on the growth chart provided

Weight for age measurements

Weight-for-age GIRLS

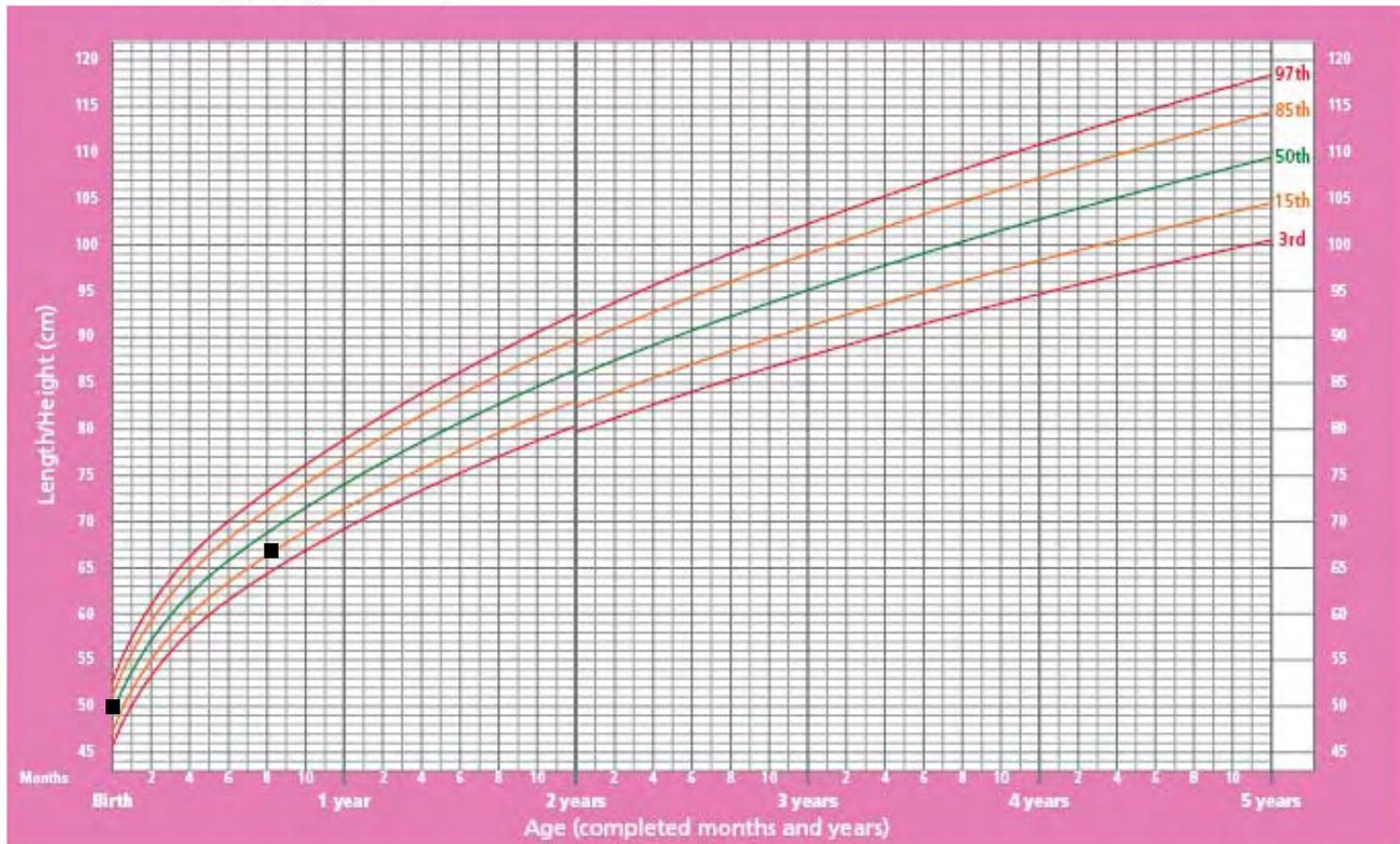
Birth to 5 years (percentiles)



Length for age measurements

Length/height-for-age GIRLS

Birth to 5 years (percentiles)



Case cont.

- How would you interpret the growth of the child?

Case cont.

- What would be your next step in managing this child?

History

- Mother tells you that she has exclusively breastfed her baby till 6 months of age where after she has started rapid weaning
- She feeds her baby mostly porridge 3 times a day with cows milk. Occasional vegetables. No money for meat.
- She has a good appetite and always seems hungry even after her meals.
- No diarrhoea or vomiting
- She has been coughing for the last 4 weeks. The uncle staying with them is also coughing and losing weight
- Mother has 2 older siblings. She is staying with her husband's family. All adults are unemployed and depend on casual jobs for income

Physical Examination

- She does not appear acutely ill
- You find reduced muscle bulk and subcutaneous fat, normal hydration and no oedema
- She appears mildly anaemic
- No generalised lymphadenopathy
- Rest of physical examination is unremarkable with no hepatosplenomegaly.
- Normal developmental milestones

Case cont.

- What is your differential diagnosis and what will be the next step in managing this infant?

Investigations

- Confirm HIV diagnosis
- TB investigations, CXR
- Hb, MCV

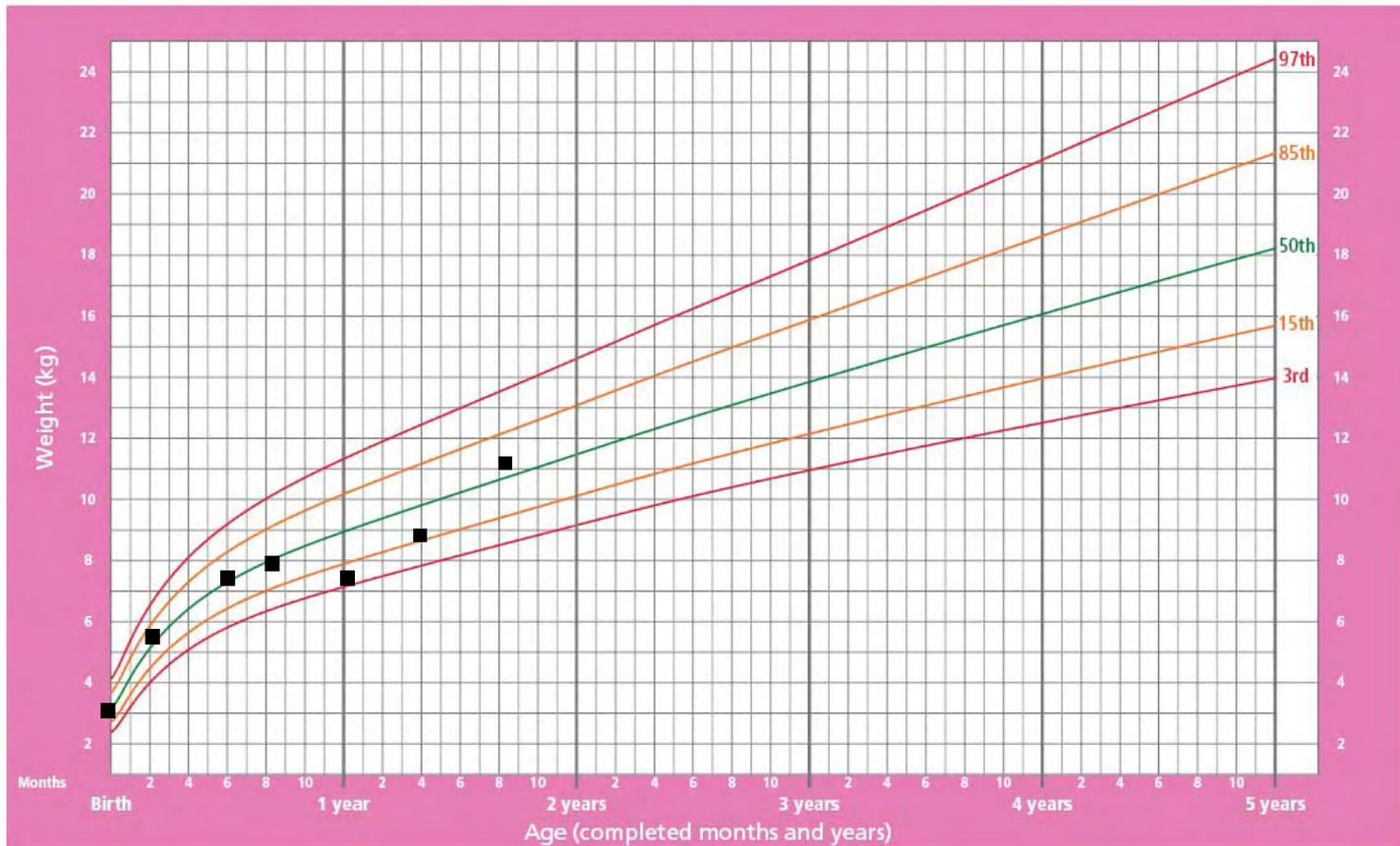
Outcome

- HIV? NO
 - PCR negative
- TB? YES
 - Uncle smear+ for TB
 - Mantoux: 16mm
 - CXR: hilar lymphadenopathy
 - Started on TB treatment
 - Gastric aspirate cultures positive for MTB after 4 weeks
- Food scarcity? YES
 - Referred for nutritional support to clinic and dietician
 - Arrange for child support grant

Weight for age measurements

Weight-for-age GIRLS

Birth to 5 years (percentiles)





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