A Preschool Nutrition Primer for RDs

Pediatric Nutritional Assessment

NutriSTEP®

Nutrition Screening Tool
for Every Preschooler
Évaluation de l'alimentation
des enfants d'âge préscolaire

NUTRITION
RESOURCE
CENTRE

CENTRE DE
RESSOURCES
EN NUTRITION

Learning Objectives

- Identify possible causes of abnormal nutrition status.
- Collect information to develop an appropriate nutrition care plan.
- Evaluate the effectiveness of the nutrition care plan.

Presentation Outline

- Medical History
- Labs
- Medications
- Anthropometrics – Brief Overview
- Assessing Anthropometrics – Brief Overview
- Estimating Requirements
- Diet History
- Overall Assessment
- Nutrition Care Plan
- References and Resources

Medical History

- Reason for current referral/diagnosis
- Previous illnesses/diagnoses
- Family illnesses/diagnoses (acute or chronic)
- Growth history
  - Assess how the client is growing
  - Identify growth issues (current and/or previous)
  - Calculate BMI and IBW

Lab work

- CBC
- Electrolytes
- Glucose
- BUN & Creatinine
- Albumin
- Calcium, phosphorus, magnesium
- Ferritin
- Other pertinent tests/investigations (e.g. sweat Chloride)

Medications

- Pertinent medications
  - vitamin/mineral supplements
  - antisecretory
  - antiemetic/upper GI motility
  - Antibiotics
  - diuretics

  Etc……

Anthropometrics

- Weight
- Standing Height
- Others
  - Head Circumference (< 36 mths)
  - Skin-folds

Weight

- Index of acute nutritional status.
- One time measurement versus serial measurements.
- Toddlers and older children/teens should be weighed with minimal clothing on a standing scale to 0.1 kg.
- Special needs-may need a lift scale or wheelchair scale.

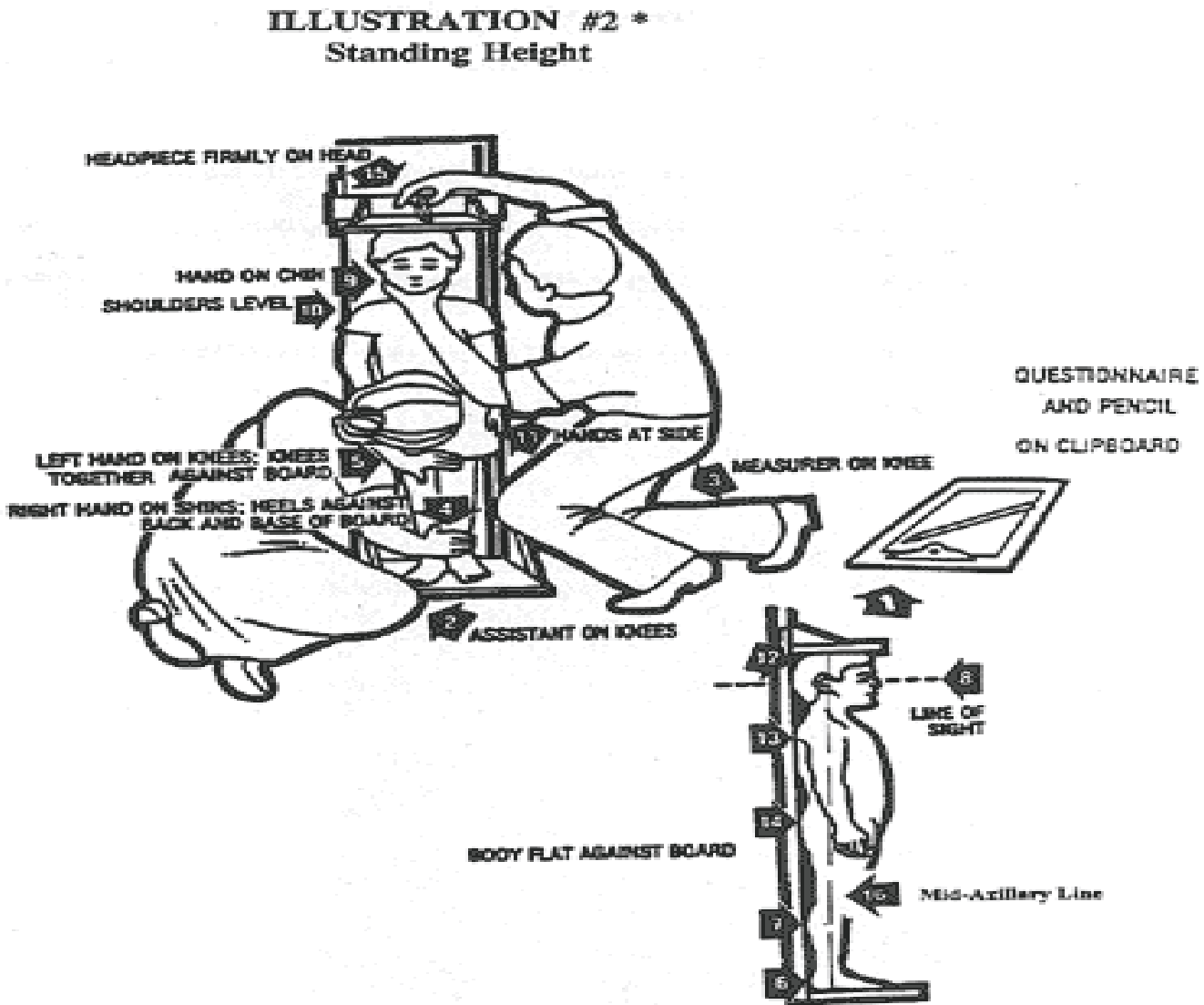
Weight Velocity

- Regain birth weight by 10-14 days old.
- Doubles by 4-6 months.
- Triples by 12 months.
- Infancy is the most rapid period of weight gain (0 – 12 months).
- Adolescence is the second most rapid period of weight gain.
- Preschool and school age is a period of static and steady growth.

Standing Height

- Use when over age 2.
- If unable to stand, use recumbent length or knee height.
- Use calibrated stadiometer.
- Measure to 0.1 cm.
- Consider parental height.
- Consider chronic illness or special health care needs.

Standing Height



Stadiometer

Assessing Anthropometrics

1. Know growth chart options-age and sex appropriate, CDC vs WHO.
2. Determine and calculate child's age in years and months.
3. Choose appropriate growth chart.
4. Plot all indices + wt for length or BMI.
5. Classify stunting and wasting.
6. Classify overweight or obesity.

Growth Chart Options

- 2000 CDC charts (3rd – 97th percentile)
- Approved for use in Canada in 2004
  - www.cdc.gov/growthcharts
- National Growth Monitoring Position
  - www.dietitians.ca
- Special charts
  - Down's Syndrome
  - Other
- WHO growth references
  - New as of April 2006
  - Consideration as the NEW standard – collaborative statement available on the Dietitians of Canada site.

WHO Growth Charts

- New global *Child Growth Standards* for infants and children up to the age of five.
- Standards based on 8,440 breastfed children internationally as the norm for growth and development.
- Shows how children ***should*** grow.
- Detects children or populations not growing properly or under/overweight and may require specific medical or public health responses.

Determine and Calculate Age

- Age to nearest $^1/_4$ year or Decimal Age (> 2yrs old)

  Decimal Age =

  today's decimal date – birth decimal date

- Converts annual age into a decimal for precision in plotting.
- For children > 2 years old.
- Need decimal age table.

Calculation of Decimal Age

Example: August 28, 2006

Decimal Age

= today's decimal date – birth decimal date

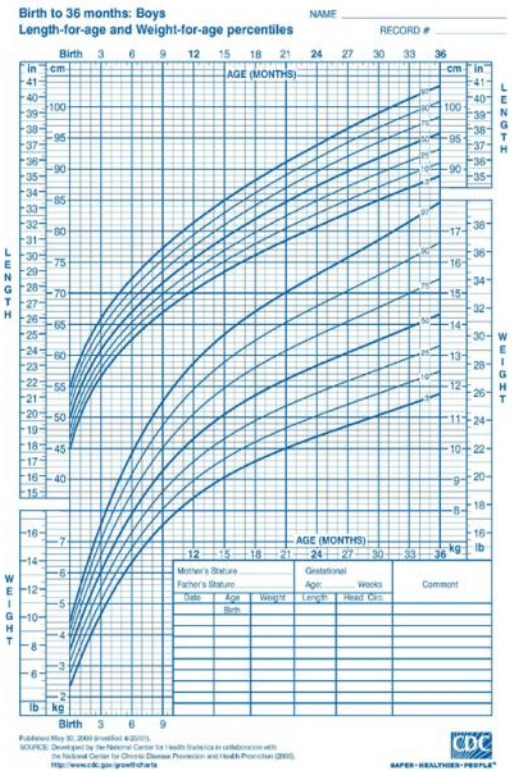
= 2009.Feb 28 – 2006.Aug 28

= 2009.159 – 2006.655

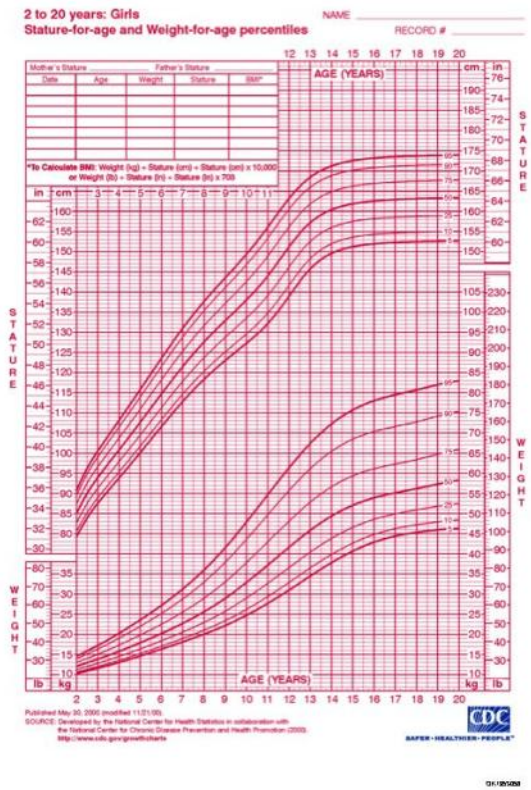
= 2.504 years old = 2.5

Choose Appropriate Growth Chart

0 – 36 months



2 – 20 years



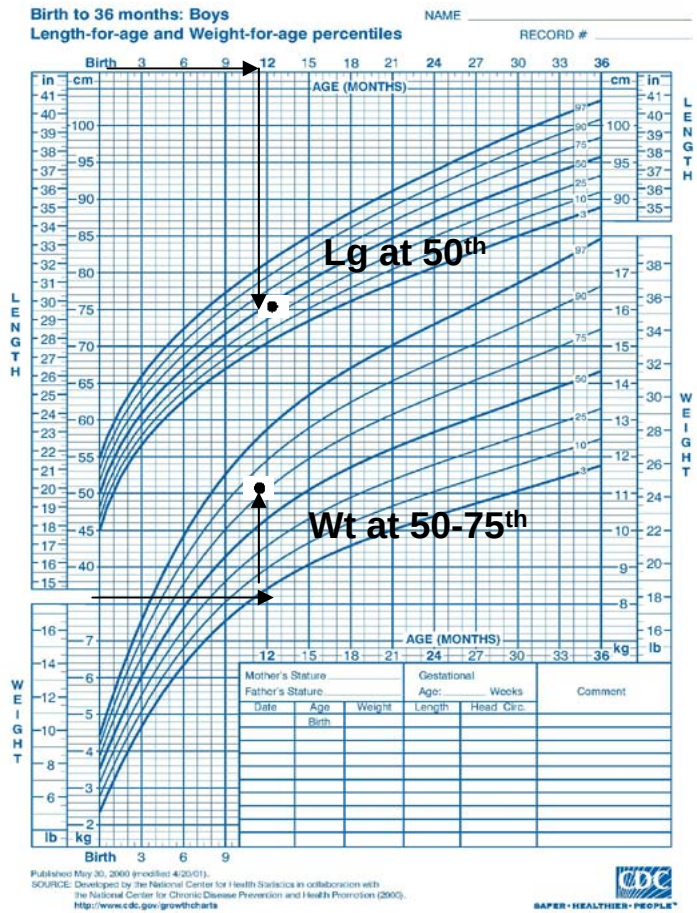
Plot All Indices

0 – 36 months

- Weight
- Length
- Head circumference
- Weight for length

2 – 20 years

- Weight
- Height
- BMI

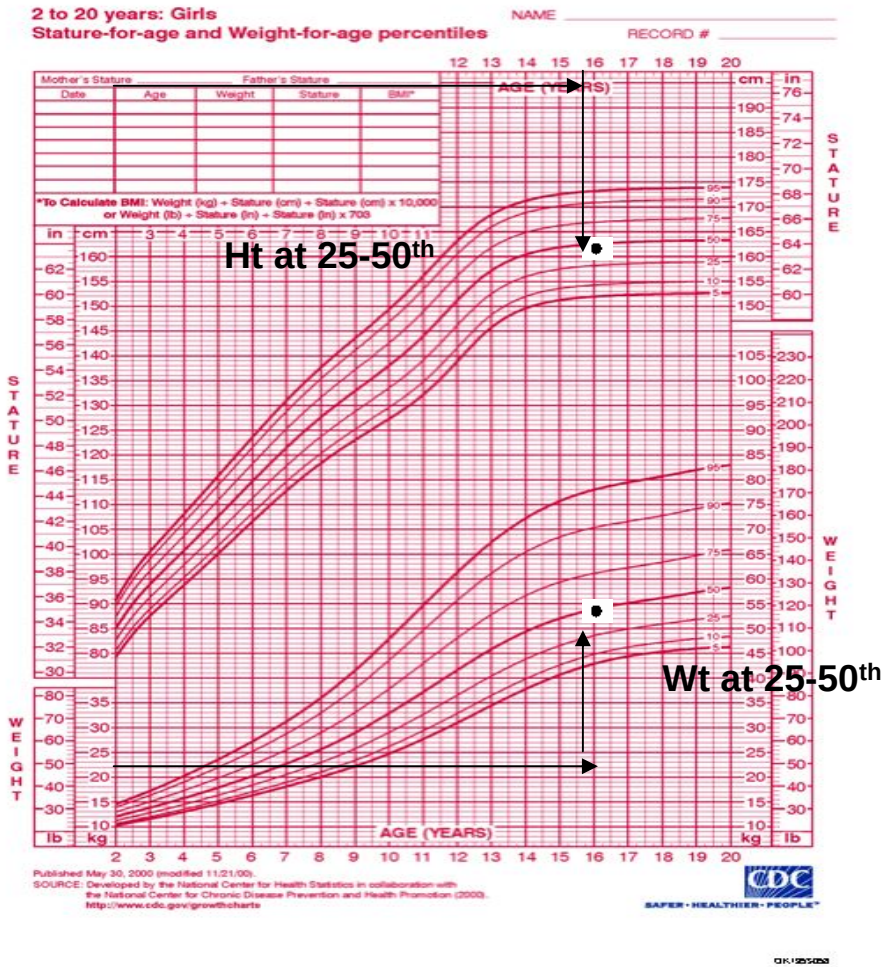


12 mo old

Wt = 11.0 kg

Lg = 75.0 cm

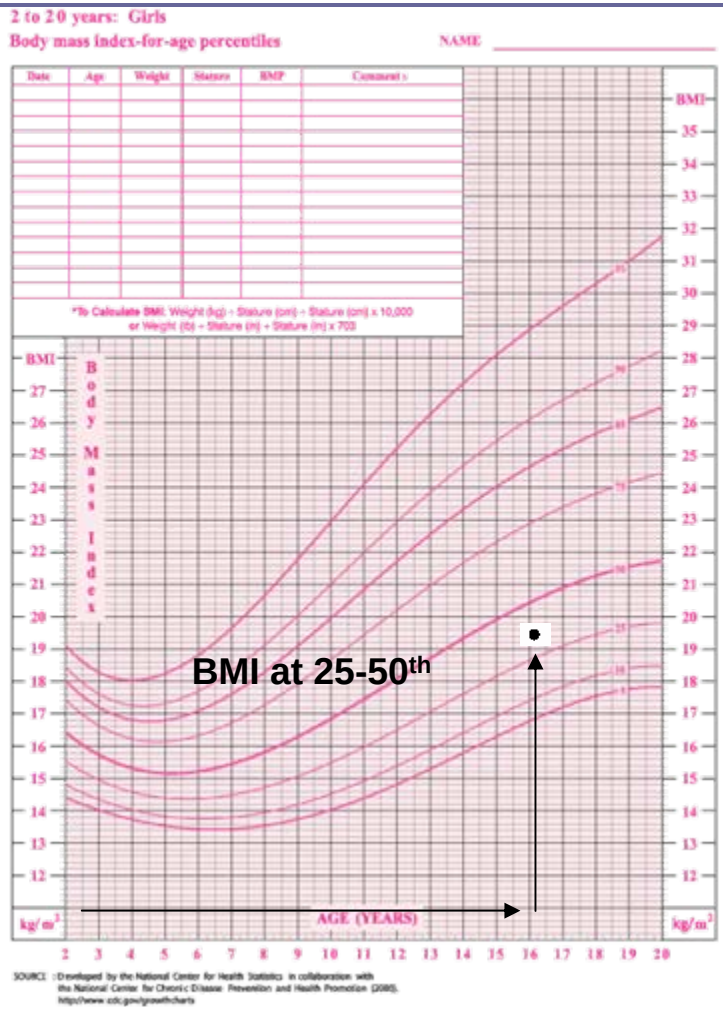
HC = 48.0 cm



16 year old

Wt = 50.0 kg

Ht = 160 cm



16 year old

BMI = 19.5

Classify

- Normal
- Stunting and/or wasting/underweight
- Overweight or obesity

CDC Classifications

NUTRITIONAL INDICATOR	ANTHROPOMETRIC CUT-OFF VALUES
Stunting	< 3rd length/height for age
Underweight or Wasting	< 3rd weight for length < 90% IBW < 5th BMI for age
Overweight	85-95th BMI for age
Obesity	> 97th wt for length > 95th BMI for age
Head Circumference	< 3rd or > 97th for age

Ideal Body Weight

- Many methods can be used.
- Weight at the same percentile as the child's height percentile (Moore Method).
- Wt for length at 50th percentile.
- BMI at 50th percentile.
- "Standard Weight" or McLaren Method (weight at 50th percentile for height age).
- % IBW = $\frac{\textit{actual weight}}{\textit{IBW}}$ *x100*

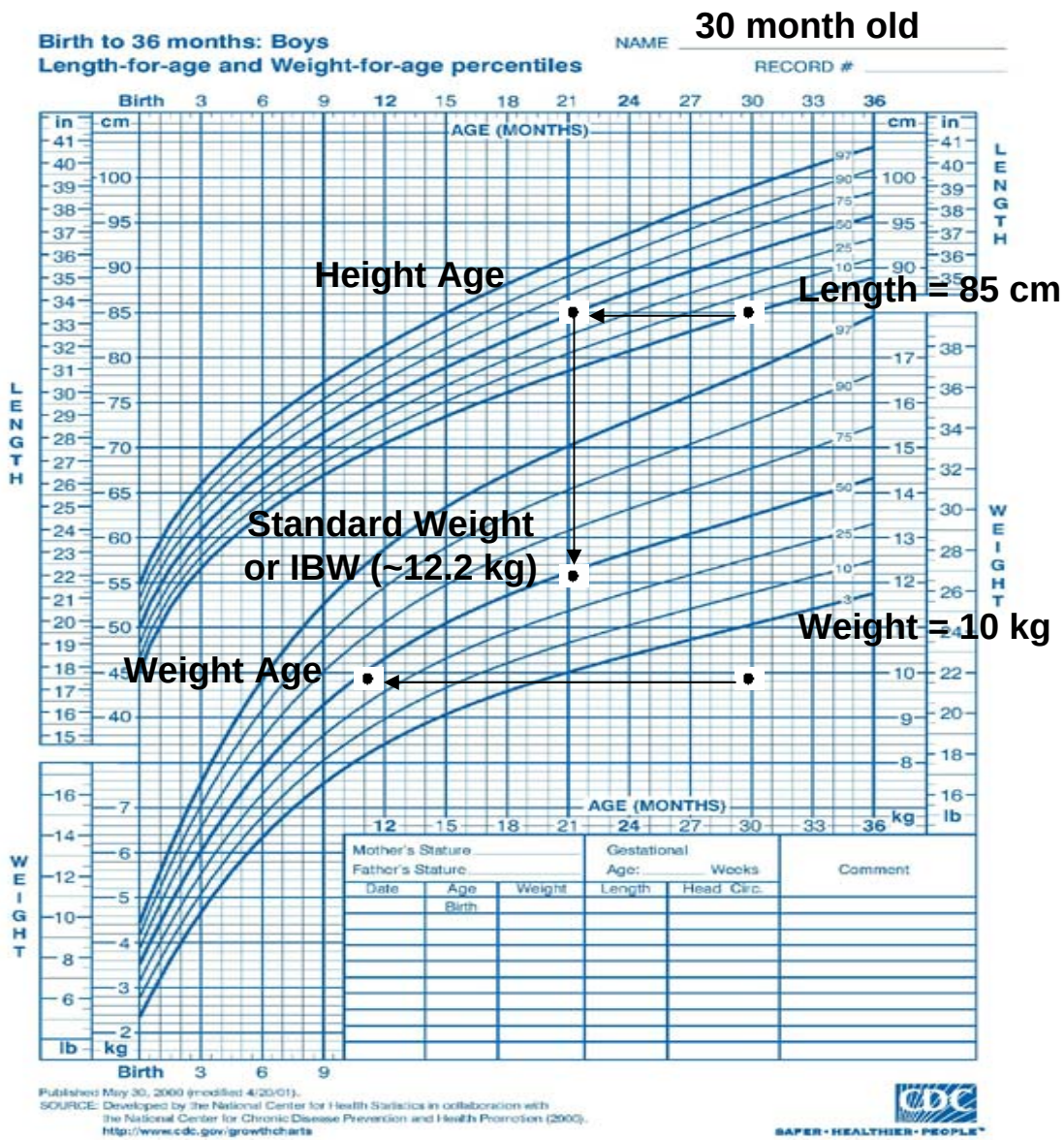
Weight Age and Height Age

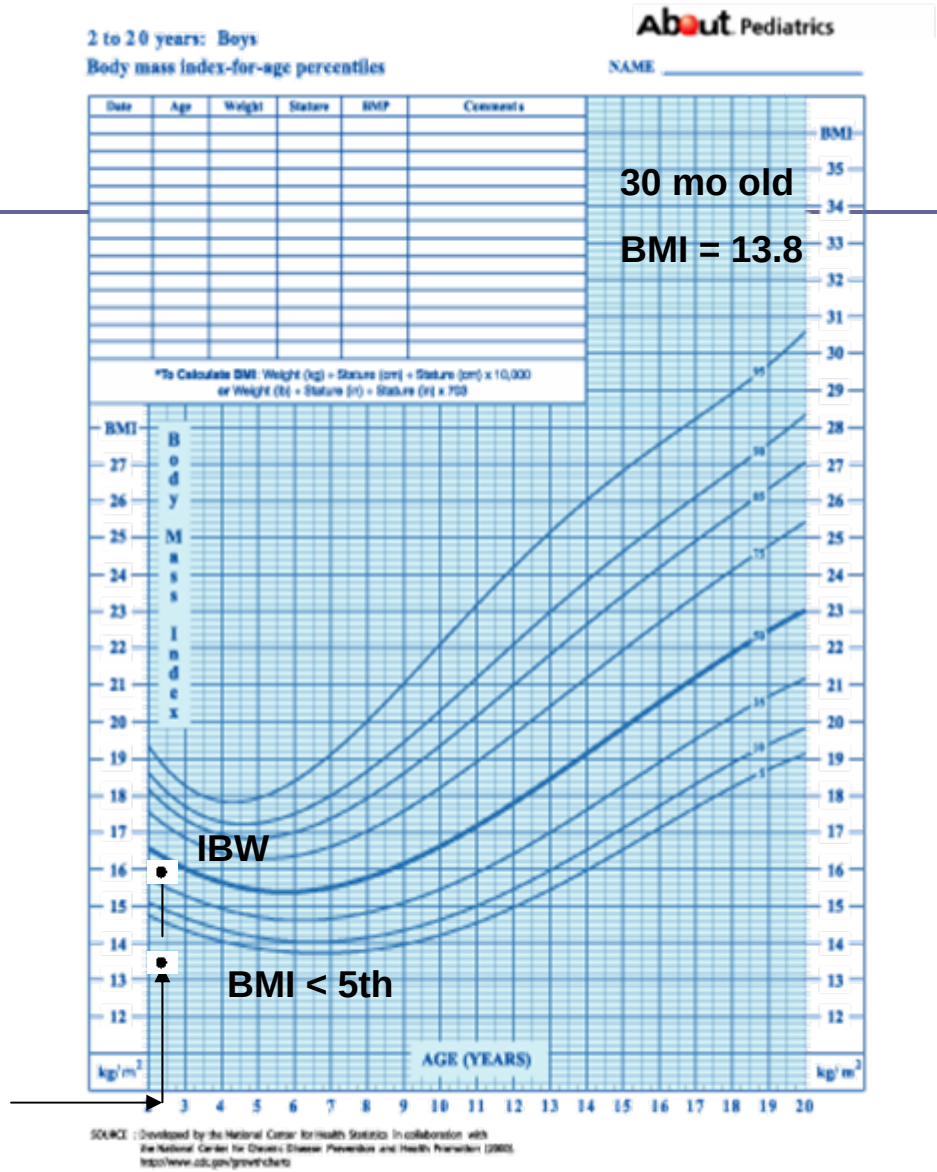
Weight Age =

the age at which the current weight hits the 50th percentile

Height Age =

the age at which the current height hits the 50th percentile


30 month old
Birth to 36 months: Boys
Length-for-age and Weight-for-age percentiles
NAME
RECORD #
AGE (MONTHS)
LENGTH
WEIGHT
Height Age
Length = 85 cm
Standard Weight
or IBW (~12.2 kg)
Weight = 10 kg
Weight Age
Mother's Stature
Father's Stature
Gestational
Age: Weeks
Date
Age
Weight
Length
Head Circ.
Comment
Birth
Published May 30, 2000 (modified 4/20/01).
SOURCE: Developed by the National Center for Health Statistics in collaboration with
the National Center for Chronic Disease Prevention and Health Promotion (2000).
http://www.cdc.gov/growthcharts
SAFER · HEALTHIER · PEOPLE™


About Pediatrics
2 to 20 years: Boys
Body mass index-for-age percentiles
NAME
Date
Age
Weight
Stature
BMI
Comments
*To Calculate BMI: Weight (kg) ÷ Stature (cm) ÷ Stature (cm) x 10,000
or Weight (lb) ÷ Stature (in) ÷ Stature (in) x 703
BMI
Body Mass Index
95
90
85
75
50
25
10
5
30 mo old
BMI = 13.8
IBW
BMI < 5th
AGE (YEARS)
kg/m²
SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).

Example Classification

Index	Measurement	Plotting	Classification
Weight	10.0 kg	< 3rd	-
Length	85.0 cm	3rd	Normal
Head Circ	48.0 cm	10-25th	Normal
Wt for Lg	-	< 3rd	Underweight/ wasting
BMI	13.8	< 5th	Underweight/ wasting
IBW	~ 12.2 kg	82% IBW	Underweight/ wasting

Risks of Malnutrition

- Wasting/underweight
  - Impairment of cognitive development (verbal, spatial and scholastic ability)
  - Aggressive, hyperactive
  - Externalizing problems, conduct disorders
  - Excessive motor activity
- Overweight and obesity
  - Weight related chronic diseases-CVD, DM
  - Respiratory and joint problems
  - Self-esteem, body image concerns

Estimating Requirements

- Energy
- Protein
- Fluid
- Micronutrients

Energy Requirements

- Many different ways !!!!
- RNI's
- WHO
- BMR
- Kcal/cm
- CUG (Catch-up growth)
- The BEST way…
  - Take regular measurements of growth and energy intake.

RNI's

- Based on age and gender (after age 7).
- Expressed as kcal/kg.
- Assumes normal activity and no extra stressors.
- If < 90% IBW: use IBW in calculation or use CUG
- If 90 – 110 % IBW: use actual weight
- If >110 % IBW: use IBW in calculation

EER = weight x RNI (kcal for age and gender)

RNI's

Age (term infants)	Energy (kcal/kg/d)
0-2 months	100-120
3-5 months	95-100
6-8 months	95-97
9-11 months	97-99
1 year	101
2-3 years	94

Samour P, Helm K and Lang CE. Handbook of Pediatric Nutrition, 2nd ed., p.100. ASPEN Publishers, 1999.

BMR

- For > 1 year old.
- Use when metabolic demands are increased (e.g. trauma, respiratory, surgery, etc…).
- Use when activity level is increased or decreased.
- May be used in children with developmental disabilities.
- WHO equations are similar.

BMR (1-20 years)

Age	Females (kcal/kg/day)	Males (kcal/kg/day)
1	56.4	57.0
2	54.3	53.4
5	50.9	48.4
10	37.1	38.3
15	26.0	29.5
20	24.2	26.4

BMR Factors

Activity	Factor	Stress	Factor
Paralyzed/ Coma	0.8–1.0	Surgery	1.2
Bed Rest	1.2	Head Injury	1.3-1.75
Sedentary	1.5	Hyperkinesis	1.2
Normal	1.7	Sepsis	1.6
Athlete	2.0	Trauma	1.35

Kcal / cm

- Used for children with special needs.
- For 5 – 12 years old.

Catch-Up Growth (CUG)

- May be used when < 90% IBW (wasting/underweight).
- Want 1.5 – 2.0x normal rate of weight gain.

$$= \frac{\textit{RNI/kg/d for wt age x IBW for age}}{\textit{Actual weight}}$$

Protein Requirements

- Required for synthesis of new body tissue during periods of growth.
- As such, high needs per kg during infancy, childhood and adolescence.
- Additional protein is not needed for CUG.
- Based on ***actual*** weight.
- Use Dietary Reference Intakes (DRIs):
  - 1-3 years: 1.05 g/kg/day
  - 4-8 years: 0.9 g/kg/day

Fluid Requirements *(Maintenance)*

Body Weight (kg)	Fluid Requirements
1 – 10 kg	100 ml/kg/day
11 – 20 kg	1000 ml + 50 ml/kg for each kg above 10 kg
> 20 kg	1500ml + 20 ml/kg for each kg above 20kg

Micronutrient Requirements

- Requirements are based on age and gender.
- Use Dietary Reference Intake (DRI) tables.
- Recommended that infants/children receive micronutrients from foods.
- Supplement only when:
  - Poor oral intake
  - Clinical deficiencies e.g. iron
  - Increased losses (e.g. Cystic Fibrosis)
  - Restrictive diets (e.g. Vegan)

Diet History

- Purpose is to estimate total energy and protein intake, and identify ***anything*** lacking, excessive or abnormal.
- Need to be familiar with normal pediatric nutrition including:
  - Health Canada Nutrition For Healthy Term Infants, Jan 2006.
  - Eating Well with Canada's Food Guide.
  - DC Healthy Start for Life.
- Use 24 hr recall/3 day intake records.

Diet History – Key Questions

- Depends on age and presenting problem.
- Feeding history from birth:
  - Breast vs bottle feeding
  - Introduction to solids
  - Any feeding aversions/difficulties
- Feeding milestones.
- Look at the full 24 hr day (intake during the night? e.g. bottle feeding).
- Eating routine/schedule.
- Allergies, intolerances, avoidances.

Diet History – More Key Questions

- Stools (frequency, color, texture)
- Urine Output (frequency)
- Emesis
- Children/Adolescents
  - Body image
  - Substance abuse
  - Lifestyle/activities
  - Eating routines/habits

Diet History – Social Questions

- What time do they eat, where, with whom?
- Family eating habits, routine.
- Daycare or other caregivers.
- Behaviors at meals.
- Food security.

Overall Assessment

- Summarize:
  - Pertinent points from medical history, medications and lab work.
  - State findings of anthropometric assessment (e.g. stunting, wasting, obesity).
  - State estimate of nutrient requirements.
  - Describe pertinent findings from diet history (e.g. meeting CFG or energy/protein/fluid needs).
  - Describe any social issues related to nutrition.
  - May include assigning a ***level of nutrition risk***.

Nutrition Care Plan

- Developed with parent involvement (and child if appropriate).
- Set nutrition goals.
- Make recommendations to meet goals
  - Oral/enteral/parenteral nutrition
  - Vitamin/mineral supplements
- May request further testing (e.g. lab work, swallow/feeding study).
- Plan to reassess, re-evaluate and revise.

Follow-Up Plan

- Reassess anthropometrics.
- Document changes in nutrition care plan.
- Were recommendations followed?
- Collection of 3-day food record (if suggested from previous visit).
- Reassess and continue with previous plan or implement new nutrition care plan.

Professional/Parent Resources

- Dietitians of Canada “Healthy Start for Life”: www.dietitians.ca/healthystart.
- Nutrition Resource Centre: www.nutritionrc.ca
  - NutriSTEP Program and resources.
  - Caregiver Resources e.g. Eat Right Be Active.
- Winnipeg Regional Health Authority Child Health Pediatric Enteral and Parenteral Nutrition Handbook, 2nd ed, Dec 2008. Info: Department of Nutrition and Food Services 204-787-1447 or cginter@hsc.mb.ca.

Acknowledgements

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- Content revisions by Jane Lac, RD. Consultant. Janelac.work@gmail.com