

Clinical Practice Guideline Title:
Nutritional management of Pediatric patients with Malnutrition

Ownership:
 Nutrition Department MOHAP

Effective Date:
 2016

Code:

Revision Due Date:
 2019

Applies to:

☒ Hospitals
 ☒ Primary Healthcare Centers
 ☒ Specialized Centers
 ☐ Others (Specify):

Clinical criteria:

1.1 Introduction:

The protocol is designed to meet the following objectives:

- (i) To standardize the nutrition management and care in clinical practice of managing Pediatric patients with malnutrition.
- (ii) To provide a ready reckoner of updated evidence based guidelines for the dietitians and those involved in the nutritional management of Pediatric patients with malnutrition.
- (iii) To enhance the quality of life of the patients with effective nutrition care.
- (iv) To improve the quality of nutritional care provided in the hospitals and primary health care facilities under the Ministry of Health and Prevention,

1.2 Inclusion Criteria

Pediatric patients with Malnutrition.

1.3 Exclusion Criteria

Normal pediatric ,adult and geriatric patients.

2. Protocol

Malnutrition is a group of conditions in children and adults generally related to poor quality or insufficient quantity of nutrient intake, absorption, or utilization.

There are two major types of malnutrition:

- Protein-energy malnutrition - resulting from deficiencies in any or all nutrients
- Micronutrient deficiency diseases - resulting from a deficiency of specific micronutrients

2.1 Protein-energy malnutrition

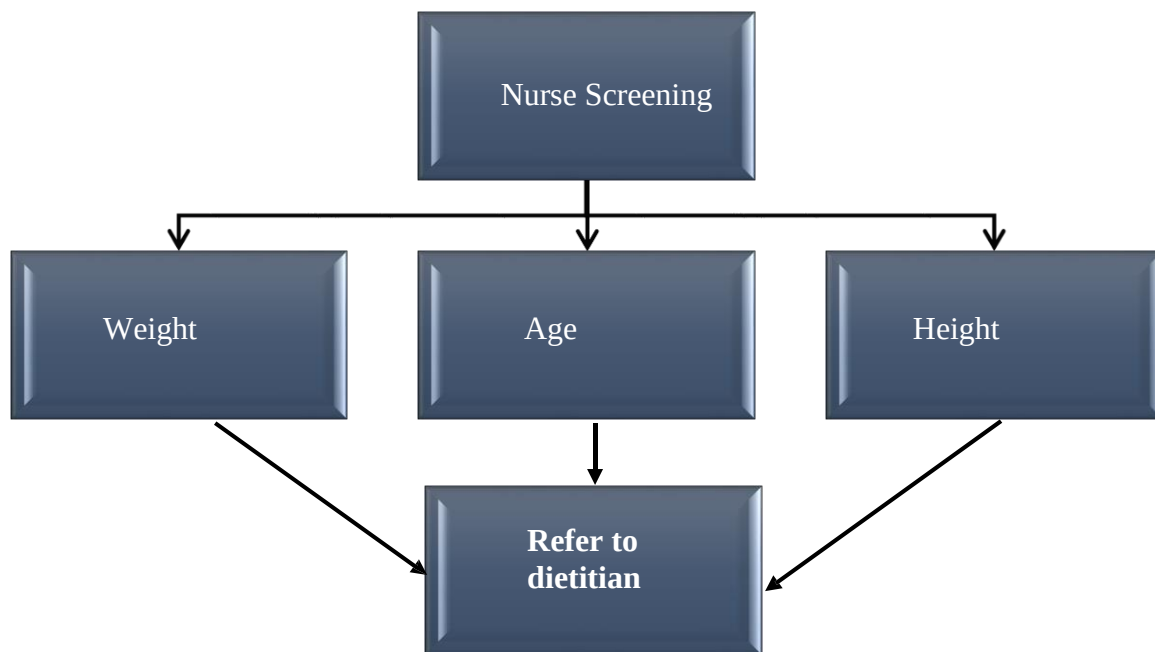
There are three types of protein-energy malnutrition in children:

Type	Appearance	Cause
Acute malnutrition	Wasting or thinness	Acute inadequate nutrition leading to rapid weight loss or failure to gain weight normally
Chronic malnutrition	Stunting or shortness	Inadequate nutrition over long period of time leading to failure of linear growth
Acute and chronic malnutrition	Underweight	A combination measure, therefore, it could occur as a result of wasting, stunting, or both

Wasting and stunting are very different forms of malnutrition. Stunting is chronic and its causative factors are poorly understood. Stunting usually does not pose an immediate threat to life and is relatively common in many populations in less-developed countries. This is not to say that it is unimportant, just less important than wasting in humanitarian emergencies. Wasting results from an acute shortage of food, is reversible with refeeding, and has a relatively high mortality rate. For these reasons, wasting is the highest priority form of malnutrition in humanitarian emergencies

Step 1: Screening

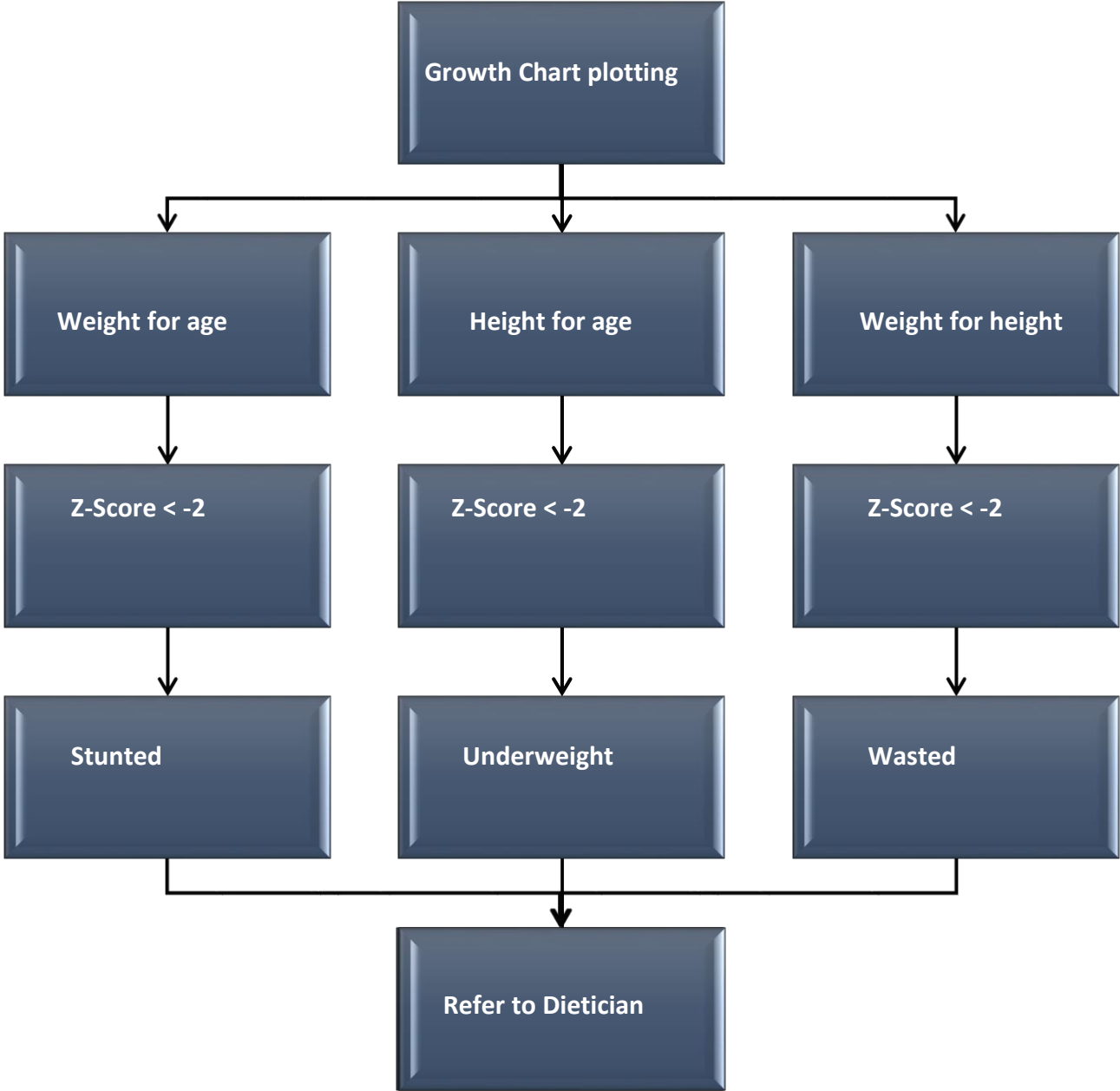
Children from 1-10 years arrives to Hospital or Primary Health Care Centre



First step for the child to be screened by the nurse for the Weight, Age and Height, then to be referred to the pediatrician.



Step 2: Physician.





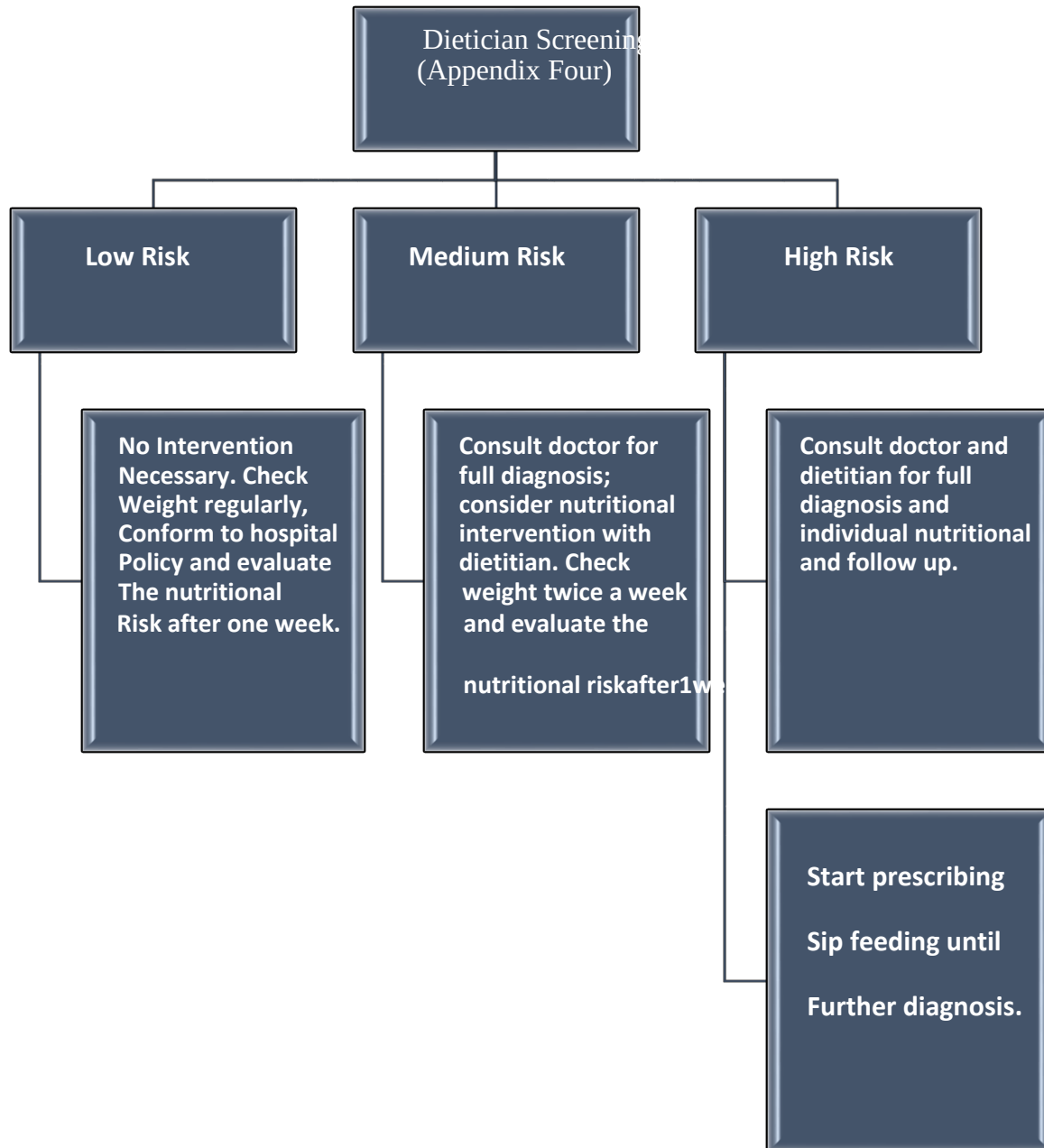
Second step is done by the Paediatrician, which is the growth chart plotting for three points:

- 1. Height for age: if the child Z-Score is lower than (-2) so the child is Stunted.**
- 2. Weight for Age: if the child Z-Score is lower than (-2) so the child is Under Weight.**
- 3. Weight for Height: if the child Z-Score is lower than (-2) so the child is Wasted.**

If the Child have been found to be Stunted, Wasted or Under Weight, the Physician will refer to a Dietician.



Step 3: Dietician





Third step is done by the Dietician, which will be screening

Screening tool for risk of nutritional status and growth

1. Subjective clinical assessment (1 point)

a. Is the patient in a poor nutritional status judged by subjective clinical assessment (diminished subcutaneous fat and/or muscle mass and/or hollow face)?

2. High-risk disease (2 points)

a. Is there an underlying illness with a risk of malnutrition or expected major surgery?

3. Nutritional intake and losses (1 point)

- a. Are there any of the following items present?
- b. Excessive diarrhoea (greater than or equal to 5 per day) and/or vomiting (>3 times/day) the last few days?
- c. Reduced food intake during the last few days before admission (not including fasting for an elective procedure or surgery)?
- d. Pre-existing dietetically advised nutritional intervention?
- e. Inability to consume adequate intake because of pain?

4. Weight loss or poor weight gain? (1 point)

a. Is there weight loss or no weight gain (infants <1 year) during the last few weeks/months?

Score	Risk	Intervention
4–5	High	Consult doctor and dietitian for full diagnosis and individual nutritional advice and follow-up
		Start prescribing sip feeds until further diagnosis
1–3	Medium	Consult doctor for full diagnosis; consider nutritional intervention with dietitian. Check weight twice a week and evaluate the nutritional risk after 1 week
0	Low	No intervention necessary. Check weight regularly, conform to hospital policy and evaluate the nutritional risk after 1 week



2.2 DIETARY MANAGEMENT

The role of a dietician or nutritionist is critical in these children. The dietician will analyse the specificities of the composition of the diet, including quality, quantity, nutritional content and type. Nutritional management of an eating behaviour disorder plays a major role in determining health outcome. The determinants of a successful nutritional intervention revolve around three main concepts:

1. A systematic method of nutritional assessment (gathering objective data)
2. A thorough evaluation of nutritional intake
3. A solid, structured (nutritional counselling) plan

GATHERING OBJECTIVE DATA

Anthropometric assessment is important in assessing nutritional status of children. Weight and height should be measured using standardized methods and the evaluation of these parameters

Should be plotted on appropriate curves. In addition, results from objective measurements (serum, bone density, etc.) can be used to further complete the assessment.

EVALUATING NUTRITIONAL INTAKE

Several methods are available to assess dietary intake. At the initial visit a 24-hour recall is noted. This is followed by a 3-day to 1-week food prospective diary (which should include a weekend day) for further assessment.

Food logs or 24-hour food recalls are important for dieticians to collate and must include

- a. All food groups
- b. Well defined meal times
- c. Food textures at each meal
- d. Certain behaviours during meal-time such as gagging or spitting out food should also be noted.



2.3 Nutritional Assessment

Energy Requirements for Infants and Young Children

EER = Total energy expenditure + Energy deposition

Age	EER (kcal/day)
0-3mths	$[89 \times \text{wt (kg)} - 100] + 175$
4-6mths	$[89 \times \text{wt (kg)} - 100] + 56$
7-12mths	$[89 \times \text{wt (kg)} - 100] + 22$
13-35mths	$[89 \times \text{wt (kg)} - 100] + 20$

(Reference: Dietary Reference Intake for Energy, Carbohydrates, Fat, Protein and Amino Acids (Macronutrients), Washington DC: National Academy Press, 2002, pp93-206)

EER x disease factor (DF) if required

Energy Requirements for Children

Estimated Energy Requirements = BMR x PAL x DF

BMR = basal metabolic rate (in kilojoules)

To convert to kilocalories multiply by 1000 and divide by 4.2

PAL = Physical Activity Level

DF = disease factor



<3 yrs Male	$BMR = 0.249wt - 0.127$
Female	$BMR = 0.244wt - 0.130$
3-10yrs Male	$BMR = 0.095wt + 2.110$
Female	$BMR = 0.085wt + 2.033$
10-18 yr Male	$BMR = 0.074wt + 2.754$
Female	$BMR = 0.056wt + 2.898$

(Reference:Schofield et al 1985)

Energy Requirements for Children

Activity Factor

Activity Level	Male & Female
Bed Rest	1.2
Very Sedentary	1.4
Light	1.6
Moderate	1.8
Heavy	2.0
Light Vigorous	2.2
If ventilated	use activity factor of 1.0

Disease Factors

- Burns 1.5 -2.0
- Cardiac 1.2
- Cystic Fibrosis 1.2-1.5
- Liver Disease 1.3
- Malabsorption 1.2-1.5



- Minor surgery 1.2
- (acute influence only)
- Neurology 1.1-1.3
- Oncology 1.3
- Respiratory -acute 1.5 , chronic 1.2 -1.5
- Sepsis <1.5
- Skeletal Trauma 1.35

Protein Requirements

Use current weight

Be cautious when advising on high protein intakes

As a guide: it is best not to exceed 4gprotein/kg body weight

NRV's 2005	Age (years)	Grams/kg/day	Grams/day
Infants	0-0.5	1.43	10
	0.5-1.0	1.60	14
Children	1-3	1.08	14
	4-8	0.91	20
Boys	9-13	0.94	40
	14-18	0.99	65
Girls	9-13	0.87	35
	14-18	0.77	45

Fluid Requirements

Age	Millilitre/kg/day
First week	80-100
Second week	125-150
Three months	140-160



Four to six months	130-155
Six to nine months	125-145
Nine to twelve months	120-135
One to two years	115-125
Children	1000mL-1500mL/day

Assessment -Diet History

- Breast or bottle fed
- Introduction of solids
- Feeding stage
- Types of food
- Quantities of formula, foods, breast feeds (how often)
- How much food is offered, how much is eaten
- Other fluids
- Restrictions on intake (culture, religion, other beliefs)
- Length of meal times
- General atmosphere at meal times
- Appropriate use of cup or bottle
- Use of supplements

Assessment -Diet History

- From diet history calculate intake
 - energy
 - protein
 - fluid
 - major micronutrients
- Compare to requirements

2.4 Dietary Intervention

- (i) If underlying medical condition provide appropriate dietary advice e.g. gluten free diet for coeliac disease.



(ii) If behavioural problem offer behavioural advice and refer to psychology /social work.

(iii) If inadequate nutrition, provide advice to improve quality of diet

Exclusively Breast Fed Infants

- Growth charts are not designed for BF babies
- Increase number of breast feeds
- Add human milk fortifier (if EHM)
- Add polyjoule/calogen (if expressing)
- Refer to lactation nurse
- Supplement with polyjoule syrup
- Complementary formula feeds (last resort)
- If severe, enteral or parenteral nutrition

After Six Months of Age

In addition to previous advice

- Introduce solids
- Encourage energy/protein dense solids
- Add fats and polyjoule to solids
- if severe, enteral or parenteral nutrition

After Twelve Months of Age

- High energy/protein solids
- Can continue with formula
- Can have cow's milk with added calories
- Behavioural advice
- If severe; enteral or parenteral nutrition

2.5 NUTRITIONAL COUNSELING AND SUPPLEMENTATION

The mode of administration of nutritional support is important to consider, especially when intervention is likely to be needed long term. The first-line treatment is dietary counselling; however, if no improvement is seen after an appropriate interval, it should be followed by a trial of oral nutritional supplementation. In some cases, oral nutritional

supplements are useful to improve the dietary intake of children who are unable to meet their nutritional requirements with normal foods alone, in whom soft food or liquids are easier to take.

Counseling is :

- a. Developing a meal-time routine
- b. Planning three main meals and 2-3 snacks avoiding food fillers
- c. Encouraging new foods (remembering that it may take up to 15 offerings before a child can be confidently determined to be refusing that food and giving up)
- d. Considering nutritional supplementation.

General educational strategies for children with malnutrition	
• Be a good role model	• Practice healthy mealtime behavior
• Create a healthy home environment	– Meet nutritional requirements
– Healthy meals and snacks only	– Encourage developmental feeding skills
– Eat together at the table	– Set a routine
– No television while eating	– Appetite manipulation
• Limit fast foods	– Comfortable, calm environment
• Establish healthy diet and physical activity patterns in early childhood	– Parent-child communication

Behavioural Feeding Problems

- Refer to the Experts (Psychology/social work)
- Avoid Force Feeding
- Try to create a pleasant atmosphere
- Reinforce Positive Behaviours
- Ignore Unwanted Behaviours
- Eat as a family (allow the child to model his behaviour on parents)



Summary of recommendations that the dietitian can provide to caregivers to follow in order to promote good childhood eating behavior.

Do

- Provide repeated exposures to new foods
- Establish a routine and structure for mealtimes
- Purchase healthy foods
- Create a calm, relaxed environment for eating
- Be a healthy role model; eat fruits, vegetables, and healthy snacks
- Provide age-appropriate food portions
- Pack lunches
- Plan physical activities
- Drink water in place of juices
- Use supplements as prescribed or recommended by an HCP, but always provide a balanced meal first

Don't

- Keep unhealthy snacks and sweetened beverages in the house
- Allow grazing between meals
- Restrict access to foods in the house
- Use food to manage behavior (child will emotionalize food and eat in response to emotions)
- Use food as a reward (child will learn to value the reward food)
- Force, trick, bribe, or negotiate to get a child to eat a certain food
- Insist that the child finish the meal
- Offer a substitute if a meal is missed
- Have the television on during mealtime
- Use supplements as a replacement for food

3. Other Healthcare provider Role

- 3.1 Nurses:**
Identify pediatric patients and assess nutritional Risk score by performing Nutritional screening and refer the patients with Malnutrition.
- 3.2 Physicians:**
Identify the pediatric patients at risk for malnutrition and place referral for diet consultation and indicating the reason for referral.
- 3.3 Pharmacist:**
Monitors for drugs allergy, side effects and interactions.
- 3.4 Sociologist /psychologist**
Counseling for psychosocial problems for the children and caretakers referred by the doctors and dietitians.

4 .Participant Role

- Follow dietary advices
- Take prescribed drugs regularly

5 .Patient Reassessment Criteria

- As per patient needs and doctors referral

6 .Definitions

- 6.1 Under nutrition** is a “catch-all” term for a deficiency of any of the essential nutrients (protein, essential fatty acids, electrolytes, minerals and vitamins) or energy. It not only encompasses stunting, wasting (type II deficiency) but also clinical illness brought about by deficiencies of any of the specific essential nutrients which may not be associated with any anthropometric change (and can occur in obese people). Different forms of under nutrition are not necessarily exclusive and often co-exist within the same individual.
- 6.2 Stunting or Chronic malnutrition** Stunting is a retardation of growth and is indicated by a low height-for-age. It can occur when a child suffers from chronic (long-term) nutrient deficiencies.
- 6.3 Wasting:** Acute Malnutrition Wasting occurs when a person has lost weight and become excessively thin; it is indicated by a low weight for height or MUAC. This form of acute malnutrition is either moderate (MAM) or severe (SAM) depending upon how severe the wasting becomes.
- 6.4 Kwashiorkor:** Acute malnutrition This is a clinical syndrome characterised by bilateral oedema. It is often also associated with lesions of the skin, fatty liver, atrophy of the organs and mental changes. The exact cause is unknown but it is thought to be due to deficiency of antioxidant nutrients.
- 6.5 Marasmus**
Marasmus is a form of severe malnutrition characterized by energy deficiency. A child with marasmus looks emaciated. Body weight is reduced to less than 60% of the normal (expected) body weight for the age.[1] Marasmus occurrence increases prior to **age 1,**

whereas kwashiorkor occurrence increases after 18 months. It can be distinguished from kwashiorkor in that kwashiorkor is protein deficiency with adequate energy intake whereas marasmus is inadequate energy intake in all forms, including protein. Protein wasting in kwashiorkor may lead to edema.

6.6 Nutrition Care Process (NCP) is a systematic approach to providing high quality nutrition care. The NCP consists of four distinct, interrelated steps:

1. Nutrition Assessment
2. Nutrition Diagnosis
3. Nutrition Intervention
4. Nutrition Monitoring and Evaluation

1 Nutrition Assessment

The Dietitian collects and documents information such as food or nutrition-related history; biochemical data, medical tests and procedures; anthropometric measurements, nutrition-focused physical findings and client history. Usual types of data gathered for the nutrition assessment include food and nutrition-related history, anthropometric measurements, biochemical data, medical tests and procedures, nutrition-focused physical examination findings and inpatient or outpatient history. Other sources include, but not limited to, the following

- 1.1. Referral and Screening Forms (refer to Appendix)
- 1.2. Inpatient or outpatient interview (refer to Appendix)
- 1.3. Observation
- 1.4. Medical or health records
- 1.5. Consultation with other caregivers, including family members
- 1.6. Community-based surveys and focus groups

2 . Nutrition Diagnosis

Data collected during the nutrition assessment guides the Dietitian in selection of the appropriate nutrition diagnosis (i.e., naming the specific problem). To diagnose a nutritional problem, the Dietitian organizes the assessment data, clusters nutrition signs and symptoms, and compares them with the defining characteristics of suspected nutrition diagnoses. The nutrition diagnosis is then expressed using standardized nutrition diagnostic terms and the etiologies, signs, and symptoms describing each potential diagnosis. There are three distinct parts to a nutrition diagnostic statement, also called a PES Statement (refer to Appendix):

(A) P: Problem

The nutrition diagnosis describes alterations in the status of the patient. A diagnostic label may be accompanied by a descriptor such as “altered,” “excessive,” or “inadequate”.

(B) E: Etiology

Etiology contributes to the existence or maintenance of pathophysiological, psychosocial, situational, developmental, cultural or environmental problems. Major and minor etiologist may result from medical, genetic or environmental factors. The etiology is preceded by the words “related to”. Identifying the etiology will lead to the selection of a nutrition intervention aimed at resolving the underlying cause of the nutrition problem, whenever possible.

(C) S: Signs and symptoms

The defining characteristics are typical clusters of signs and symptoms that provide evidence that a nutrition diagnosis exists. Signs are the observations of a trained clinician. Symptoms are changes reported by the patient. In the PES statement, the signs and symptoms are preceded by the words “as evidenced by”.

A well-written nutrition diagnostic statement should have the following characteristics: clear and concise,

specific to a patient, limited to a single patient problem, accurately related to one etiology, based on signs and symptoms from the assessment data, and measurable.

3. Nutrition Intervention

The Dietitian then selects the nutrition intervention that will be directed to the root cause (or etiology) of the nutrition problem and aimed at alleviating the signs and symptoms of the diagnosis. This step involves purposefully planned action(s) designed with the intent of changing a nutrition-related behavior, risk factor, environmental condition or aspect of health status (refer to Appendix).

Sources of data and tools for nutrition intervention include, but are not limited to, the following:

- (1.1) Evidence-Based Nutrition Practice Guidelines or guidelines from other professional organizations
- (1.2) Evidence Analysis Library or other secondary evidence sources
- (1.3) Current research literature
- (1.4) Results of outcome-management studies or quality improvement projects

Nutrition intervention consists of two interrelated processes, planning and implementing described as follows:

(1) Planning

The planning phase includes formulating and determining a plan of action. In this step, the Dietitian may identify nutrition diagnoses for immediate treatment and nutrition diagnoses for which treatment should be delayed until a more favorable environment is available or more resources exist. The Dietitian makes nutrition recommendations based on the inpatient or outpatient individualized recommended dietary intake of energy and/or selected foods or nutrients based on current reference standards and dietary guidelines; health condition and nutrition diagnosis. The Dietitian collaborates with the patient throughout the planning step, defining an intervention plan and strategies (time and frequency of care, duration and follow-up) that are focused on the etiology of the problem and are known to be effective based on the best current knowledge and evidence.

(2.) Implementation

The implementation phase is considered the action phase of the NCP.

During implementation, the Dietitian is responsible for collaborating with the patient and other caregivers to carry out the nutrition plan of care, communicating and modifying the nutrition care plan as needed, ensuring and verifying the plan of care is being implemented

The Dietitian uses critical thinking skills to set goals and prioritize them, to define the nutrition prescription or basic plan of care, to make interdisciplinary connections, and to match intervention strategies with the patient's need, preferences, values, and nutrition diagnoses. The Dietitian supervises and revises strategies based on changes in condition or response to intervention goals.

6.7 Nutrition Monitoring and Evaluation

The final step of the process is monitoring and evaluation, which the Dietitian uses to determine if the patient has achieved, or is making progress toward the planned goals. Data sources and tools to measure the outcomes for nutrition monitoring and evaluation include, but are not limited to, the following:

(1.1) Self-monitoring data or data from other records, including but not limited to forms, spreadsheets, and computer programs

(1.2) Anthropometric measurements, biochemical data, medical tests, and procedures

(1.3) Nutrition-related history, including food and nutrient intake

(1.4) Nutrition-related physical signs and/or symptoms

(1.5) Patient surveys, pre-tests, post-tests, and/or questionnaires; and

(1.6) Mail or telephone follow-up

(8) There are three distinct and interrelated processes to the monitoring and evaluation step of the NCP.

(8.1) Monitoring progress

It includes checking the understanding and compliance of patient with the nutrition plan of care, determining if the intervention is being implemented as prescribed, providing evidence that the plan or intervention strategy is or is not changing behavior or status of the patient, identifying other positive or negative outcomes, gathering information, indicating reasons for lack of progress, and supporting conclusions with evidence.

(8.2) Measuring outcomes

The Dietitian determines outcome indicators that are relevant to the nutrition diagnosis or signs or symptoms, nutrition goals, medical diagnosis, and outcomes and quality management goals. Nutrition outcomes and progress toward resolution of the nutrition diagnosis should be included within the Dietitian's follow-up documentation with one of the following



descriptors:

- Resolved (nutrition problem no longer exists)
- Improvement shown (nutrition problem still exists)
- Unresolved (no improvement shown), or
- No longer appropriate (change in condition)
- Evaluating outcomes

Evaluating outcomes encompasses comparing current findings with previous status, intervention goals, and/or reference standards.

7. Tools/Attachments Forms:

Attachment forms can be found in the appendices.

Appendix 7.1- Referral form for Dietician by Physician

Inpatient and Outpatient Referral Forms for the Physicians

Patients (inpatient and outpatients) who need nutrition intervention for treatment should be referred by a physician to the dietitian. Documentation of referral is required to be completed by the physician to initiate nutritional assessment by the dietitian that should include the following data:

Personal information

Date of Examination, Hospital/Health Centre, Medical Record No., Name, Date of Birth, Age, Sex

Anthropometric measurements

- Height and weight
- Head Circumference

Medical History

- Medical diagnosis
- Treatment (pharmaceutical and/or surgical)
- Allergies/Food intolerance
- Family medical history

Clinical examination

- Signs and symptoms of the disease(s)
Gastrointestinal problems
- Problems relating to intake, e.g. chewing, swallowing



Biochemical Data

- CBC
- Hemoglobin
- Blood glucose
- HbA1C
- Lipid profile
- Serum protein
- Serum albumin
- Kidney Function Tests (KFT)
- Liver Function Tests (LFT)

- Others, as applicable

The above information should be documented on the electronic system (if available at the health facility) and/or in the patient file.

In addition, nutritional screening for Inpatients should be performed by the staff nurse using WHO Growth chart standards.



Appendix 7.2- Pediatric Nutritional assessment form

Pediatric Nutrition Assessment

Hospital/ Clinic

Adm. Medical Diagnosis ----- Date Assessed ----- number of visit ----- Ward / OPD -----

File ----- Name ----- Sex ----- Age: -----

Diagnosis ----- Family history : ----- Medication: -----

Anthropometrics:

Measured Height :	Measured Weight:	Waist:
Estimated Height :	Estimated weight:	Head circumference:
WHO Growth chart Classification (Z-score):		
Title	Classification	
Weight-for-length/height		
BMI-for-age		
Head circumference-for-age		

Social history

Education:		Sleep/Rest:	hr.	Exercise :	hr.
Smoking/Passive smoking:		Alcohol:		Housing:	
Intake/Digestive problems:			Physical & mental status		Metabolic stressors
◦ Anorexia ◦ Difficulty Chewing ◦ Constipation ◦ Nausea ◦ Food allergy/Into ◦ Food like ◦ Herbal Supplement ◦ Nutr. Supplement	◦ Decreased Appetite ◦ Difficulty swallowing ◦ Diarrhea ◦ Vomiting ◦ Urine change color ◦ NPO ◦ Aspiration ◦ Food dis like ◦ Special Diet at home ◦ Tube feed	◦ Hearing impaired ◦ Limited vision ◦ Dementia ◦ Language barrier		◦ Pre/post-surgery ◦ Fever/Infection ◦ Wound/Burns ◦ Trauma/fracture ◦ Sepsis ◦ Depleted Protein Store ◦ Cancer ◦ Current condition ◦ Age ◦ Pregnant ◦ Lactation	
		Vital signs			
		◦ Bp. ◦ Temperature ◦ Pulse ◦ Respiration ◦ Urine out put			

24 Hrs. Recall (0-2 years)

Type of feeding:

- Breast fed**
Number of feedings _____ length of time at the breast _____ supplemental feeding _____
- Formula fed**
Type _____ Number of feedings _____ Method of preparation _____
- Combination**
Type _____ Number of feedings _____

Introduction of complimentary feed

Age of introduction _____ Timing _____ Variety _____ Texture: Liquid/Soft/semi-solid/Solid
Quantity in Serving size _____

Number of wet diapers _____

Type and amount of fluid consumed

Water _____ml Milk _____ml Juice _____ml Other beverages _____ml

Appendix 7.3- Interview Outline

Tips for Effective Patient Assessment and Interview

- Introduce yourself.
- Make eye contact and use a receptive posture.
- Explain what you will be doing.
- Assess prior learning.
- Gear information to the individual's knowledge and education.
- Ask open-ended questions without leading responses.
- Utilize food models or other references to enhance accuracy of patient responses.
- Acknowledge patient responses.
- Limit the time spent and the volume of information given at each session.
- Give written material to reinforce verbal instructions.
- Identify and use patient-specific motivational factors.
- Encourage the patient to participate in his or her own nutritional care and to ask questions.

Practical Steps to Nutrition Assessment in Patients

1. Review the medical history (concurrent diseases, drug/nutrient interactions, hospitalizations, weight changes, comparison of current weight to usual and standard, conditions that interfere with Ingestion/absorption/mastication/elimination).
2. Diet history including "normal" for the patient and changes in appetite or intake, food intolerances, pica behaviour, religious diet restrictions, past diet modifications and instruction, patient understands of diet and disease, educational level, patient's perspective of weight changes, food preferences, use of salt and sugar, food allergies, typical meal pattern/food frequency record, use of supplements, urine output, physical/economic/psychological problems, family/other support, activity level, and sleep patterns.
3. Anthropometric measurements/physical examination: measured height, frame size, weight, subjective global, Assessment, arm anthropometrics (triceps skin fold, mid-arm muscle circumference and general appearance).
4. Review of chemistries look for values that identify areas of concern (nutrition/immune status, state of uremia, bone status, electrolyte status, iron status, vitamin/mineral status, hydration status, glycemic control).
5. Assess current intake kcalories, carbohydrate, protein, fat, Na⁺, K⁺, Ca⁺⁺, P, fluid, vitamins, minerals.
6. Assess/develop nutrition problem list with prioritized interventions.
7. Develop individualized diet prescription/meal pattern with appropriate diet modifications for nutrition problems and individual preferences. Be as liberal as possible to promote adequate intake and good nutrition status.
8. Instruct patient/other; provide written materials at predetermined level of education/understanding.
9. Follow-up within one to three months to assess appropriateness of diet modification as well as patient satisfaction and understanding. Modify plan as appropriate.
10. Re-evaluate on a regular basis whenever the patient has a change in status such as significant weight change, extended hospitalization, or acute illness.



Appendix 7.4- WHO classification of nutrition condition

Table 1: WHO Classification of nutrition conditions in children and adolescents based on anthropometry

Classification	Condition	Age: Birth to 60 months ^{1,3} Indicator and cut-off	Age: 61 months to 19 years ^{2,3} Indicator and cut-off
Based on body mass index (BMI)	Possible risk of overweight	BMI-for-age (or weight-for-height) > 1SD	
	Overweight	BMI-for-age (or weight-for-height) > 2SD	BMI-for-age >1SD(equivalent to BMI 25 kg/m ² at 19 y)
	Obese	BMI-for-age (or weight-for-height) > 3SD	BMI-for-age >2SD (equivalent to BMI 30 kg/m ² at 19 y)
	Thin		BMI-for-age < -2 to -3 SD
	Severely thin		BMI-for-age <-3 SD
Based on weight and height	Stunted	Height-for-age <-2SD to -3SD	Height-for-age <-2SD to -3SD
	Severely stunted	Height-for-age <-3SD	Height-for-age <-3SD
	Underweight	Weight-for-age <-2SD to -3SD	Weight-for-age (up to 10y) <-2SD to -3SD
	Severely underweight	Weight-for-age <-3SD	Weight-for-age (up to 10 y) <-3SD
	Wasted	Weight-for-height <-2SD to -3SD	
	Severely wasted	Weight-for-height <-3SD	

WHO Child Growth Standards: <http://www.who.int/childgrowth/en/index.html>

WHO Growth Reference for school-aged children and adolescents: <http://www.who.int/growthref/en/>

Z-score and percentile equivalence:

-3 = 0.1

-2 = 2.3



-1 = 15.9

+1 = 84.1

+2 = 97.7

+3 = 99.9



Appendix 7.5 – Behavioural -Environmental

BEHAVIORAL- ENVIRONMENTAL

Defined as “nutritional findings/problems identified that relate to knowledge, attitudes/beliefs, physical environment, access to food, or food safety”

Knowledge and Beliefs

Defined as “actual knowledge and beliefs as related, observed, or documented”

- ☐ Food- and nutrition-related knowledge deficit
- ☐ Harmful beliefs/attitudes about food- or nutrition-related topics (use with caution)
- ☐ Not ready for diet/lifestyle change
- ☐ Self-monitoring deficit
- ☐ Disordered eating pattern
- ☐ Limited adherence to nutrition-related recommendations
- ☐ Undesirable food choices

Physical Activity and Function

Defined as “actual physical activity, self-care, and quality-of-life problems as reported, observed, or documented”

- ☐ Physical inactivity
- ☐ Excessive physical activity
- ☐ Inability or lack of desire to manage self-care
- ☐ Impaired ability to
- ☐ Prepare foods/meals
- ☐ Poor nutrition quality of life
- ☐ Self-feeding difficulty

Food Safety and Access

Defined as “actual problems with food safety or access to food, water, or nutrition-related supplies”

- ❑ Intake of unsafe food
- ❑ Limited access to food or water
- ❑ Limited access to nutrition-related supplies

Appendix 7.6

Daily Estimated Calories and Recommended Servings for Grains, Fruits, Vegetables, and Milk/Dairy by Age and Gender

	1 Year	2–3 Years	4–8 Years	9–13 Years	14–18 Years
Calories[†]	900 kcal	1000 kcal			
Female			1200 kcal	1600 kcal	1800 kcal
Male			1400 kcal	1800 kcal	2200 kcal
Fat	30%–40% kcal	30%–35% kcal	25%–35% kcal	25%–35% kcal	25%–35% kcal
Milk/dairy[‡]	2 cups [¶]	2 cups	2 cups	3 cups	3 cups
Lean meat/beans	1.5 oz	2 oz		5 oz	
Female			3 oz		5 oz
Male			4 oz		6 oz
Fruits[§]	1 cup	1 cup	1.5 cups	1.5 cups	
Female					1.5 cups
Male					2 cups
Vegetables[§]	3/4 cup	1 cup			
Female			1 cup	2 cups	2.5 cups
Male			1.5 cup	2.5 cups	3 cups
Grains[¶]	2 oz	3 oz			
Female			4 oz	5 oz	6 oz
Male			5oz	6 oz	7 oz

Calorie estimates are based on a sedentary lifestyle. Increased physical activity will require additional calories: by 0–200 kcal/d if moderately physically active; and by 200–400 kcal/d if very physically active.



†For youth 2 years and older; adopted from Table 2, Table 3, and Appendix A-2 of the *Dietary Guidelines for Americans* (2005)¹⁴; <http://www.healthierus.gov/dietaryguidelines>. Nutrient and energy contributions from each group are calculated according to the nutrient-dense forms of food in each group (eg, lean meats and fat-free milk).

‡Milk listed is fat-free (except for children under the age of 2 years). If 1%, 2%, or whole-fat milk is substituted, this will utilize, for each cup, 19, 39, or 63 kcal of discretionary calories and add 2.6, 5.1, or 9.0 g of total fat, of which 1.3, 2.6, or 4.6 g are saturated fat.

§Serving sizes are 1/4 cup for 1 year of age, 1/3 cup for 2 to 3 years of age, and 1/2 cup for ≥4 years of age. A variety of vegetables should be selected from each subgroup over the week.

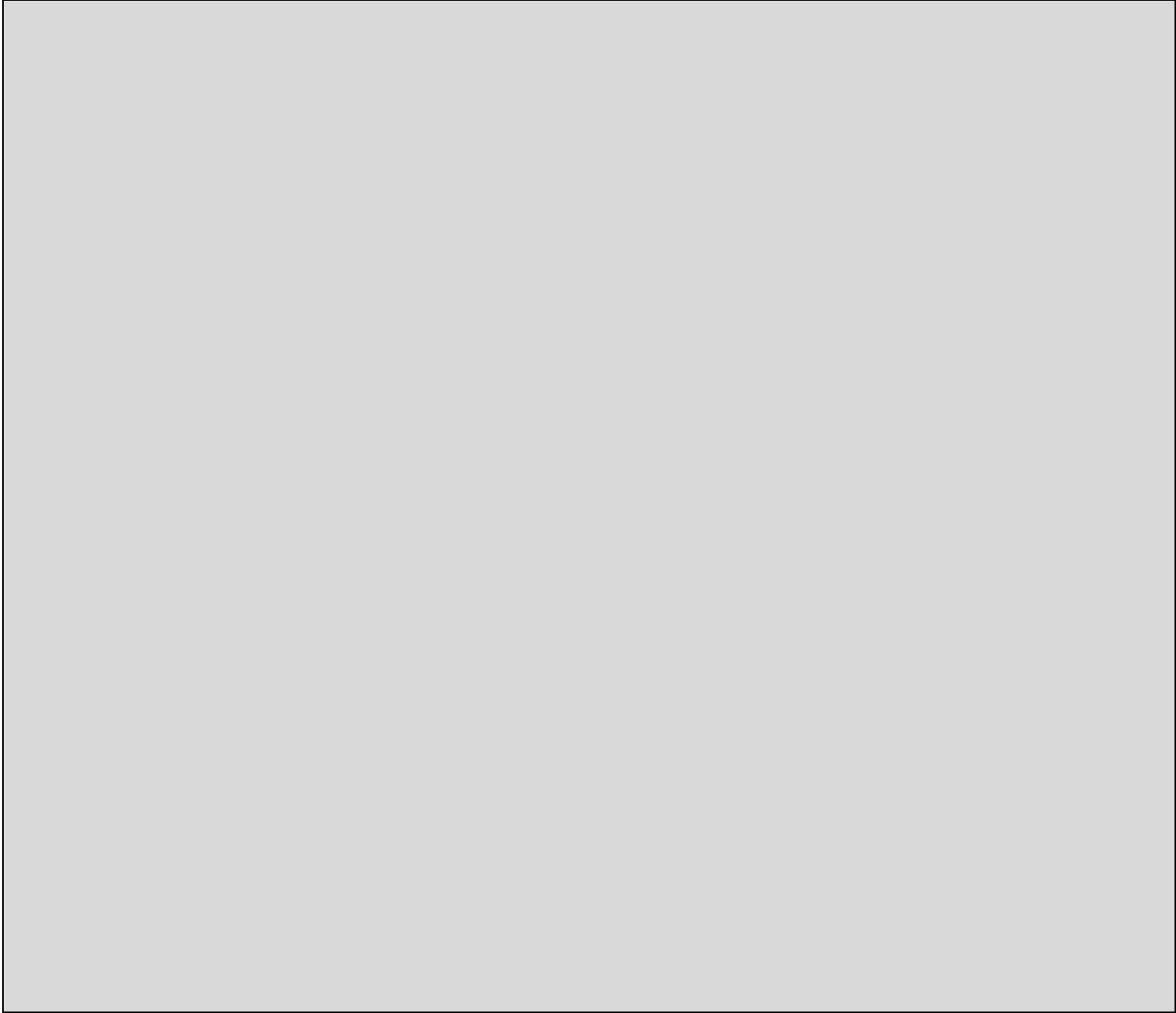
||Half of all grains should be whole grains.

¶For 1-year-old children, calculations are based on 2% fat milk. If 2 cups of whole milk are substituted, 48 kcal of discretionary calories will be utilized. The American Academy of Pediatrics recommends that low-fat/reduced fat milk not be started before 2 years of age.

Daily Recommended Intakes of Fiber, Sodium, and Potassium by Age and Gender

Gender/Age	Fiber, g*	Sodium, mg	Potassium, mg
*			
1–3 y	19	<1500	3000
4–8 y			
Female	25	<1900	3800
Male	25	<1900	3800
9–13 y			
Female	26	<2200	4500
Male	31	<2200	4500
14–18 y			
Female	29	<2300	4700
Male	38	<2300	4700

Total fiber preferred minimum 14 g/1000 kcal. Read labels to determine amounts on all packaged foods. Adapted from the report of the 2005 Dietary Guideline Advisory Committee on *Dietary Guidelines for Americans*.¹⁸





Pediatric Nutrition Guidelines (Birth to Six Years) for Health Professionals

This document outlines evidence-based nutrition and feeding guidelines and red flags for healthy, full-term infants and children up to six years of age. Further investigation, including possible referral to a registered dietitian (RD) for nutrition assessment and ongoing follow-up, may be warranted for infants and children who do not meet guidelines or present with red flags.

Definitions

Milestones - Marker or point in development related to feeding. Milestones for pre-term children are based on corrected age¹

Guidelines - Evidence-based recommendations for nutrition and feeding. Guidelines for pre-term children are based on corrected age¹

Red Flags - Findings that may require additional action, investigation and/or referral

Birth to 6 Months

MILESTONES

By 2 months:

- Has a different cry for hunger²

By 4 months:

- Holds head steady when supported in a sitting position²

By 6 months:

- Has better head control⁵
- Can sit up and lean forward⁵
- Can let caregiver know when they are full (e.g., turns head away)⁵
- Can pick up food and try to put it in their mouth⁵

See Additional Information – Parent influences on eating habits on page 8

GUIDELINES

Fluids:

- Breastfeed exclusively for the first 6 months^{4,5,6}
- When feeding at the breast is not possible, offer mother's own expressed breastmilk⁵
- Feed based on infant's cues, referred to as 'infant-led' or 'on-cue' feeding (feed on demand, day and night)⁵
- Give vitamin D supplement of 400 IU daily to infants who are breastfed or receiving breastmilk⁵
- Avoid additional water unless medically indicated⁵
- Avoid juice or other liquids⁵

Food:

- Introduction of solid foods should be led by infant's signs of developmental readiness and may be a few weeks before or just after the 6th month. Refer to the 6 to 9 Months section for more information on solid foods and signs of readiness.⁵ See Additional Information – Food allergies on page 7
- First foods should be iron-rich (meat, meat alternatives, iron-fortified infant cereals).⁵ See Additional Information – Iron on page 7
- Avoid honey until 1 year of age, including pasteurized or cooked, as it may cause infant botulism⁵

*If parent/caregiver has made the informed decision to formula feed, see Additional Information – Infant formula on page 6

RED FLAGS

- Has < 6 wet diapers each day after 5 days of age³
- Loses > 10% of birth weight within the first 2 weeks.³ Or by 2 weeks, does not regain birth weight⁵ or does not gain ≥ 20 g per day³. See Additional Information – Growth monitoring on page 5
- Consumes cow's or goat's milk, soy or rice beverage, or homemade, evaporated milk formula⁵
- Consumes water, juice, herbal teas or other liquids⁵
- Consumes infant cereal or other pureed foods < 4 months⁸, including added cereal or other pureed foods in a bottle⁹
- Without medical indication, consumes formula thickened with infant cereal⁵
- Uses a propped bottle⁵ or is not supervised during feeding⁵
- Feeding is forced or restricted⁵

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6 to 9 Months	
MILESTONES Signs of developmental readiness for solid foods: - Has better head control⁵ - Can sit up and lean forward⁵ - Lets caregiver know when they are full (e.g., turns head away)⁵ - Can pick up food and try to put it in their mouth⁵ - Has vertical jaw movement (munching)¹⁰ - Has some tongue protrusion when beginning to eat solid foods which decreases with experience¹⁰ - May still have early gag reflex until around 7 months³ See Additional Information – Parent influences on eating habits on page 8	GUIDELINES Fluids: - Continue to breastfeed^{6*} - Continue to give a vitamin D supplement of 400 IU daily to infants who are breastfed or receiving breastmilk⁸ - Delay fluid cow's milk until 9-12 months due to its low iron content and risk of iron deficiency with early introduction⁸ - Limit or avoid juice. If given, offer only as part of a meal or snack, and provide it in an open cup, not a bottle or a sippy cup. 125-175 mL (4-6 oz) per day of 100% fruit juice (not fruit drink) is the maximum⁸ - Can offer water from an open cup⁸ Foods: - Introduce solid foods when the signs of developmental readiness appear, which may be a few weeks before or just after the 6th month.^{5,8} Beyond 6 months, further delay in introducing solid foods increases the risk of iron deficiency.^{5,8} - Can give either breastmilk or solid foods first at any meal⁸ - Provide lumpy, soft-cooked, finely minced, pureed, mashed and ground textures from 6 months to match skills of the infant⁸ - Offer finger foods as early as 6 months to encourage self-feeding from the start (soft, cut-up family foods such as pieces of cooked vegetables; ripe fruit such as banana or pear; finely minced, ground or mashed cooked meat, deboned fish, and poultry; grated cheese and bread crusts or toast)⁸ - Offer iron-rich foods first and continue to offer them 2 or more times a day.^{4,8} See Additional Information - Iron on page 7 - Introduce a variety of vegetables, fruit, grains and full-fat milk products (except fluid milk) in any sequence after iron-rich foods⁸ - New foods can be introduced every day for most foods (vegetables, fruit, meat, most grains)⁸ - New foods that are common food allergens (eggs, milk, mustard, peanuts, seafood, sesame, soy, tree nuts, wheat) can be introduced 1 at a time with a wait of 2 days before introducing other common food allergens, regardless of family history of allergy.^{5,8} Once introduced with no allergic reaction, offer these foods regularly to maintain tolerance.^{6,26,27} - Offer a quantity of food based on the principles of responsive feeding (e.g., sensitive to the hunger and satiety cues)⁸ - Provide 2-3 larger feedings (meals) and 1-2 smaller feedings (snacks) per day, depending on the child's appetite⁸ - Avoid honey until 1 year of age, including pasteurized or cooked, as it may cause infant botulism⁸ *If parent/caregiver has made the informed decision to formula feed, see Additional Information – Infant formula on page 6 RED FLAGS - Growth concerns. See Additional Information – Growth monitoring on page 5 - Does not consume iron-rich foods daily⁸ - Consumes cow's or goat's milk, vegetarian beverages (e.g., soy, rice, almond), or homemade formula as milk source⁸ - Consumes fruit drinks/punch, sports drinks, pop or beverages containing artificial sweeteners or caffeine (e.g., coffee, tea, hot chocolate)⁸ - Consumes > 175 mL (6 oz) juice per day⁸ - Not supervised during feeding⁸ - Feeding is forced or restricted⁸



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9-12 Months

MILESTONES

- Between 8-12 months, lateral movements of the tongue are developed allowing food to be moved to the teeth (enables biting and chewing of chopped foods and a greater variety of finger foods)⁶
- Uses jaw and tongue to bite and mash a variety of textures³
- Tries to use a spoon and may demand to spoon-feed self¹¹
- Feeds self by holding small foods between thumb and forefinger^{2,3}

See Additional Information – Parent influences on eating habits on page 8

GUIDELINES

Fluids:

- Continue to breastfeed^{6*}
- Give vitamin D supplement of 400 IU daily for infants who are breastfed or receiving breastmilk⁶
- At 9-12 months and when a child is eating a variety of iron-rich foods, homogenized (3.25%) cow's milk can be introduced⁶
- For the non-breastfed infant, homogenized (3.25% M.F.) cow's milk can replace formula at this time. 500 mL (16 oz) per day should be offered. Intake should not exceed 750 mL (24 oz) per day.⁶ Pasteurized, full-fat goat's milk, with added folic acid and vitamin D, may be given as an alternative to cow's milk⁶
- Limit or avoid juice. If given, offer only as part of a meal or snack, and provide it in an open cup, not a bottle or a sippy cup. 125-175 mL (4-6 oz) per day of 100% fruit juice (not fruit drink) is the maximum⁶
- Can offer water from an open cup⁶
- Transition from bottle feeding to an open cup by about 12 months⁶

Foods:

- By 12 months, children should be eating a variety of family foods with various textures. Safe finger foods include: pieces of soft-cooked vegetables and fruit; soft, ripe fruit such as banana or pear; finely minced, ground or mashed cooked meat, deboned fish, and poultry; grated cheese and bread crusts or toast⁶
- Offer iron-containing foods 2 or more times a day.⁶ See Additional Information – Iron on page 7
- Introduce a variety of vegetables, fruit, grains and full-fat milk products in any sequence after iron-rich foods have been given⁶
- New foods can be offered every day for most foods (vegetables, fruit, meats, most grains)⁶
- New foods that are common food allergens (eggs, milk, mustard, peanuts, seafood, sesame, soy, tree nuts, wheat) can be introduced 1 at a time with a wait of 2 days before introducing other common food allergens, regardless of family history of allergy.^{5,6} Once introduced with no allergic reaction, offer these foods regularly to maintain tolerance^{6,26,27}
- Offer an amount of food based on the principles of responsive feeding (e.g., sensitive to child's hunger and satiety cues)⁶
- Provide up to 3 larger feedings (meals) and 1-2 smaller feedings (snacks) per day, depending on the child's appetite⁶
- Avoid honey until 1 year of age, including pasteurized or cooked⁶

*If parent/caregiver has made the informed decision to formula feed, see Additional Information – Selecting infant formula on page 6

RED FLAGS

- Growth concerns. See Additional Information – Growth monitoring on page 5
- Does not consume iron-rich foods daily⁶
- By 9 months, lumpy textures have not been introduced or consumed⁶
- Consumes > 750 mL (24 oz) of cow's or goat's milk a day and/or > 175 mL (6 oz) of juice a day⁶
- Consumes skim or low-fat cow's or goat's milk as main milk source⁶
- Consumes vegetarian beverages (e.g., soy, rice, almond) or homemade formula as main milk source⁶
- Consumes fruit drinks/punch, sports drinks, pop or beverages containing artificial sweeteners or caffeine (e.g., coffee, tea, hot chocolate)⁶
- Not supervised during feeding⁶
- Feeding is forced or restricted⁶



Pediatric Nutrition Guidelines (Birth to Six Years) for Health Professionals

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12-24 Months	
MILESTONES	GUIDELINES
- Growth slows compared with the first year resulting in decreased appetite and erratic and unpredictable food intake³ - Unfamiliar foods are often rejected the first time³ 12-18 months: - Acquires full chewing movements⁶ By 24 months: - Eats most foods without coughing and choking² - Eats most of the same foods as the rest of the family with some extra preparation to prevent choking³ - Eats with a utensil with little spilling² Around 24 months: - May only consume 4 or 5 well-accepted foods³ See Additional Information – Parent influences on eating habits on page 8	Fluids: - Continue to breastfeed^{6*} - Give a vitamin D supplement of 400 IU daily for children who are breastfed or receiving breastmilk.⁶ - If not breastfed, offer 500 mL (16 oz) pasteurized, homogenized (3.25% M.F.) cow's milk each day.⁶ Pasteurized, full-fat goat's milk, with added folic acid and vitamin D, may be given as an alternative to cow's milk⁶ - If not breastfed and not offered cow's milk for cultural, religious or health reasons such as galactosemia, provide soy-based commercial infant formula⁶ 2% or 1% milk is not routinely recommended. If it is given, ensure child is growing well and eating an adequate variety and quantity of nutritious foods⁶ - Offer water when child is thirsty⁶ - Limit or avoid juice. If given, offer only as part of a meal or snack, and provide it in a cup, not a bottle. 125-175 mL (4-6 oz) per day of 100% fruit juice (not fruit drink) is the maximum⁶ - Transition from bottle-feeding to an open cup for all fluids should be completed no later than 18 months⁶ Foods: - Offer a variety of family foods, such as ground, mashed or chopped foods, with a tender consistency, including finger foods⁶ - Offer iron-rich foods at each meal.⁶ See Additional Information – Iron on page 7 - Portion sizes should be roughly ¼-½ of a Canada's Food Guide serving size⁶ - Beginning at 12 months, have a schedule of 3 small meals and 2-3 nutrient-dense snacks per day, generally follow the advice in Canada's Food Guide.^{6,12} Eat together as a family as often as possible⁶ - Pediatric vitamin or mineral supplements can be used if child is not growing well, has a specific diagnosed health condition that requires it, and/or the diet is nutritionally incomplete^{3,6,12} - At the Ontario Enhanced 18-Month Well-Baby Visit, use NutriSTEP[®] to identify children at nutritional risk and to guide discussion with parents around feeding. See Additional Information - NutriSTEP[®] on page 8 RED FLAGS - Growth concerns. See Additional Information – Growth Monitoring on page 5 - Not eating a variety of textures and family foods including iron-rich foods each day⁶ - Dietary fat intake is restricted⁶ - Consumes mostly breastmilk and little solid food^{12,15,16} - By 18 months, has not transitioned from bottle to an open cup⁶ - Consumes skim or low-fat cow's or goat's milk as main milk source⁶ - Consumes vegetarian beverages (e.g. soy, rice, almond) or homemade formula as main milk source⁶ - Consumes > 750 mL (24 oz) cow's or goat's milk a day and/or > 175 mL (6 oz) of juice a day⁶ - Consumes fruit drinks/punch, sports drinks, pop or beverages containing artificial sweeteners or caffeine (e.g., coffee, tea, hot chocolate)⁶ - Not supervised during feeding⁶ - Feeding is forced or restricted⁶ - At 24 months, often coughs and chokes when eating² - Scores "high nutrition risk" on Toddler NutriSTEP[®] nutrition screen. See Additional Information - NutriSTEP[®] on page 8



Pediatric Nutrition Guidelines (Birth to Six Years) for Health Professionals

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2-6 Years	
MILESTONES - Food consumption moderates to match a slower rate of growth¹² - Eats most foods without coughing and choking² - May have periods of disinterest in food¹² - May be resistant to new foods¹² - Progressing to adult eating pattern but needs adult modelling^{3,12} - Basic nutrition education concepts can be learned^{3,13} See Additional Information – Parent influences on eating habits on page 8	GUIDELINES Fluids: - Continue to breastfeed as long as child and mother want⁶ - Offer 500 mL (16 oz) pasteurized, 2%, 1% or skim cow's milk or fortified soy beverage daily^{3,14} - Offer water when child is thirsty⁶ - Limit or avoid juice. If given, offer only as part of a meal or snack, and provide it in an open cup, not a bottle. 125-175 mL (4-6 oz) per day of 100% fruit juice (not fruit drink) is the maximum⁶ Foods: - Have a regular schedule of 3 small meals and 2-3 nutrient-dense snacks per day⁶ - Follow the advice in Canada's Food Guide. Portion sizes can be divided into smaller amounts of food served throughout the day¹⁴ - Eat together as a family as often as possible^{12,13} RED FLAGS - Growth concerns. See Additional Information – Growth monitoring on page 5 - Does not eat a variety of foods from the 4 food groups^{13,14} - Consumes large amounts of fluids and little solid food^{3,13} (> 750 mL or 24 oz milk a day^{12,13} or > 175 mL or 6 oz juice a day)¹³ - Consumes mostly breastmilk and little solid food^{12,15,16} - Consumes most of their milk and other beverages from a bottle or sippy cup¹⁷ - Consumes fruit drinks/punch, sports drinks, pop or beverages containing artificial sweeteners or caffeine (e.g., coffee, tea, hot chocolate)^{6,13} - Feeding is forced or restricted.^{3,12,13,18} For more on "picky eating" see Additional Information - Parent influences on eating habits on page 8 - Rarely or never eats meals with their family^{12,18} - Depends on vitamin/mineral supplement vs. variety of foods offered^{12,13} - Scores "high nutrition risk" on Toddler or Preschooler NutriSTEP® nutrition screen. See Additional Information - NutriSTEP® on page 8

Additional Information

Growth monitoring

- Use the WHO Growth Charts for Canada when assessing growth.⁷ Available at: www.dietitians.ca/growthcharts
- Serial measures are more useful than unique measures and are ideal for assessing and monitoring growth patterns.⁷
- Weight-for-age, length-for-age or weight-for-length < 3rd percentile are recommended cut-off criteria for underweight, stunting (shortness), and wasting (thinness) that could be used to identify need for investigation/intervention/referral. Weight-for-length measures > 85th percentile indicate risk of overweight.⁷
- A red flag is if growth measurements plot < 3rd or > 85th percentile OR there is a sharp incline or decline in growth in serial growth measures, or a growth-line that remains flat, on the WHO Growth Charts for Canada.⁷
- Use Body Mass Index (BMI) when assessing body weight status relative to height in children ≥ 2 years old. Use age and gender-specific growth charts to determine the BMI-for-age percentile. A child's actual BMI value will not correspond to the adult cutoffs or ranges for underweight, healthy weight, overweight and obesity. The percentile will allow for assessment of growth status, < 3rd percentile indicates wasting, while > 85th percentile indicates risk of overweight.⁷
- The overall trajectory of weight-for-age, length-for-age and weight-for-length (under 2 years) or BMI-for-age (over 2 years) will determine whether a child is tracking along the growth curves or is crossing centiles downwards or upwards. The direction of serial measurements on the curve is more important than the actual percentile.⁷
- The Fenton growth charts are recommended for preterm infants and have been revised to accommodate the WHO Growth Standard and reflect actual age instead of completed weeks.¹⁹ Fenton growth charts are available at: <http://www.ualgary.ca/fenton/2013chart>



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Infant formula

- For infants who are not exclusively fed breastmilk and whose parents have made the informed decision to provide infant formula, select a commercial infant formula based on the infant's medical and family's cultural/religious needs.^{5,6}
- Since it is difficult to reverse the decision to stop breastfeeding, offer breastfeeding supports as needed (e.g., local health unit or local breastfeeding clinics).⁵
- There is no established superiority for commercial follow-up infant formulas for infants older than 6 months.⁵
- For most children, 12 months and older, there is no indication for the use of commercial infant formulas beyond 12 months.⁶

Infant formula type	Indications for use	Notes
Cow's milk-based	Standard breastmilk substitute for healthy-term infants⁵	- Iron in infant formula ranges from 0.4-1.3 mg per 100 mL⁵ - Choose the higher iron range for those infants at high risk for iron deficiency⁵
Partially hydrolyzed cow's milk-based	None⁵	- Contraindicated for infants with cow's milk protein allergy⁵ - No advantage over standard cow's milk-based infant formulas on the digestive system⁵ - Potential benefit for reduced risk of allergic reaction to cow's milk protein only if infant formula is made from 100% partially hydrolyzed proteins⁵
Lactose-free	None⁵	- Contraindicated for infants with galactosemia, congenital lactase deficiency and cow's milk allergy⁵ - No advantage over cow's milk-based infant formulas, even in the case of acute gastroenteritis⁵ - Ineffective for the dietary treatment of colic⁵
Soy-based	- Galactosemia⁵ - Congenital lactase deficiency⁵ - Cultural or religious reasons⁵	- May consider for cow's milk protein allergy if diagnosis for non-IgE-mediated cow's milk protein allergy can be ruled out⁵ - No evidence that soy isoflavones adversely affect development⁵
Hypoallergenic	Physician-confirmed food allergies or malabsorption syndromes that cannot tolerate formula based on intact cow's milk protein or soy protein⁵	- Hypoallergenic formulas are based on extensively hydrolyzed protein⁵ - For infants experiencing allergic reactions on extensively hydrolyzed proteins, an amino acid-based infant formula may be recommended⁵

Preparing infant formula

- Liquid infant formulas (liquid concentrate and ready-to-feed) are sterile and are the safest choice for higher-risk infants who are formula fed.⁵ Powdered infant formula can be used if prepared properly.⁵
- Up to 6 months, all feeding equipment should be washed with soap and warm water, then boiled in clean water for 2 minutes.⁵ Beyond 6 months, refer to manufacturer's instructions.⁶
- Safe water sources include fluoridated municipal tap water or commercial bottled spring or tap water (avoid carbonated, mineral or distilled water).⁵ Well water that is regularly tested for safety is also optional.⁵ If water is naturally high in fluoride (higher than the guideline of 1.5 mg/L), another water source is recommended.⁵ Up to 6 months, all water sources used for infant formula preparation should be made safe by boiling it for 2 minutes.⁵ Beyond 6 months, refer to manufacturer's instructions.⁶
 - Ready-to-feed** - No additional water required.²⁰
 - Liquid concentrate** - Mix with previously boiled water.⁵ Follow the manufacturer's instructions on preparation.⁵
 - Powdered** - If the powdered infant formula will be fed immediately after preparation, it is safe to mix with previously boiled water that has been cooled to room temperature.⁵ If preparing more than one bottle in advance, mix with very hot water (boiled and cooled to no less than 70°C) to kill any harmful bacteria.⁵
- Any prepared formula can be stored in the refrigerator for up to 24 hours.²⁰
- Any type of formula should be used within 2 hours from the start of a feeding and any leftovers should be discarded.⁵





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Food allergies

- The incidence of food allergy has increased dramatically over the years, affecting 1% to 10% of children worldwide. There is no evidence that delaying the introduction of any specific food beyond 6 months of age helps to prevent allergy. Observational research appears to suggest that early introduction of potentially allergenic foods (at 4 to 6 months of age) in infants at high risk for developing allergic conditions might provide a form of protection and help prevent allergy, but more research is needed.^{26,27} For infants with a family history of food allergy, approach each case on an individual basis.⁶

Vitamin D

- Give infants or children, less than 24 months of age who are breastfed or receiving breastmilk, a vitamin D supplement of 400 IU daily until the infant's diet includes ≥ 400 IU per day of vitamin D from dietary sources.^{5,6} It is recommended that children 2 years of age and older consume 500 mL (2 cups) of cow's milk and follow an eating pattern based on Canada's Food Guide.⁶
- Food sources of vitamin D include: fortified infant formula - 100 IU in 250 mL (1 cup); cow's milk - 100 IU in 250 mL (1 cup); salmon - 103 IU in 30 g (1 oz); egg yolk - 25 IU in one yolk; fortified margarine - 25 IU in 5 mL (1 tsp).²¹

Iron

- The risk of iron deficiency can be reduced with regular consumption of iron-rich foods such as meat and meat alternatives and iron-fortified cereal.^{5,6} Pallor, poor appetite, irritability, and slowed growth and development are later signs of iron deficiency.⁶
- The iron from meat sources (heme) is better absorbed than iron from non-meat sources (non-heme). Overall iron absorption is greater when heme and non-heme sources are eaten together. Daily consumption of foods rich in vitamin C, such as fruits and vegetables, can also help enhance absorption of iron from non-heme sources.⁶
 - Heme iron – beef, chicken, turkey, pork, fish
 - Non-heme iron – beans, lentils, chickpeas, tofu, eggs, fortified grains

Choking prevention

- Children younger than 4 years of age are at higher risk of choking. Parents and caregivers can reduce the risk of choking by: being aware of child's ability to chew and swallow, supervising eating, and knowing how to respond if choking occurs.⁶
- Gagging is a natural reflex that helps older infants to avoid choking. Occasionally, food sticks to the back of the tongue or falls over the back of the mouth before the swallow is triggered, resulting in the protective action of a gag or cough.⁶
- As long as an infant or child is attentive, sitting upright and is free from distractions, the risk of choking is the same as for an adult.⁶
- Some food shapes and textures should not be offered to children younger than 4 years, including, hard candies or cough drops, gum, popcorn, marshmallows, whole nuts, seeds, fish with bones and snacks using toothpicks or skewers.⁶
- To reduce the risk of choking, dice or cut lengthwise hot dogs or sausages, grate raw carrots or hard fruits such as apples, remove pits from fruits, chop grapes, thinly spread nut butters on crackers or toast, and finely chop foods that are fibrous or stringy in texture such as celery, pineapple or oranges.⁶

Fish consumption and methylmercury

- Fatty fish is a good source of the omega-3 fats EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid). While the optimal amount of EPA and DHA for infants and young children has not been determined, offer fish, as a good food source, and work up to 2 servings per week as a general guideline by 24 months of age.⁶
- Certain types of fish should be avoided, or at least limited to no more than 75 grams per month, because of the risk of overexposure to mercury. These fish include fresh or frozen tuna, shark, swordfish, marlin, orange roughy and escolar.⁶
- Limit consumption of the following high mercury containing fish - fresh/frozen tuna, shark, swordfish, escolar, marlin, orange roughy, and canned albacore (white) tuna as follows:²²
 - < 1 year of age - 40 g per month of these fresh/frozen types of fish or 40 g per week of canned albacore tuna
 - 1 to 4 years of age - 75 g per month of these fresh/frozen types of fish or 75 g per week of canned albacore tuna
 - 5 to 11 years of age - 125 g per month of these fresh/frozen types of fish or 150 g per week of canned albacore tuna



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Pediatric Nutrition Guidelines (Birth to Six Years) for Health Professionals

This document outlines evidence-based nutrition and feeding guidelines and red flags for healthy, full-term infants and children up to six years of age. Further investigation, including possible referral to a registered dietitian (RD) for nutrition assessment and ongoing follow-up, may be warranted for infants and children who do not meet guidelines or present with red flags.

NutriSTEP® - Nutrition Screening Tool for Toddlers and Preschoolers

- Toddler NutriSTEP® and Preschooler NutriSTEP® are validated Canadian nutrition risk screening questionnaires for toddlers 18-35 months and preschoolers 3-5 years.
- Screens children for food and fluid intake, factors affecting eating behaviour (e.g., Does the parent allow the child to decide how much to eat? Can the parents afford to buy sufficient food?), physical growth (e.g., parent's comfort level with how the child is growing), physical activity and sedentary behaviour.
- Takes parents less than 10 minutes to complete.
- Use NutriSTEP® to identify children at nutritional risk and to initiate a discussion and educate parents around feeding.
- Toddler NutriSTEP® is available in English and French. Preschooler NutriSTEP® is available in English, French, Simplified Chinese, Traditional Chinese, Punjabi, Vietnamese, Tamil and Spanish.
- The screens are available for free in Ontario through local health units who hold a license or you can obtain a license through Flintbox Technologies at www.flintbox.com
- Alternately, you can direct parents to access Nutri-eSTEP at www.nutritionscreen.ca to complete the screen on their own.
- Dietitian support for parents in Ontario completing NutriSTEP® is through EatRight Ontario at 1-877-510-510-2 or www.EatRightOntario.ca

Parent influences on eating habits

Early childhood food experiences are critical to the development of healthy eating habits later in life.²³ The early childhood years are a time to discover new foods and to develop an appreciation for healthy eating. Parents and caregivers play a role in a child's acceptance of a wider variety of foods.⁶ The following discussion points can be especially effective when counselling parents of picky eaters:

- The development of healthy eating skills is a shared responsibility.^{6,24}
 - **Birth to 6 months** - Parents decide what milk source to provide. The infant, with infant-led or on-cue feeding, decides *when*, *where* and *how much* they are fed.⁶
 - **6 months and older** - Parents provide a selection of nutritious foods and milk source, and begin to become responsible for *when* and *where* the child is fed. By 12 months, parents take over the responsibility for *when* and *where* the child is fed by providing regular meals and snacks. Parents and caregivers need to trust the child's ability to decide how much to eat and whether to eat.⁶
- In a non-controlling, non-coercive environment, healthy children have the ability to self-regulate the amount of food and energy consumed.²⁵ Children will compensate for eating less on some days or at a particular meal by eating more at other meals.⁶ Avoid distractions such as toys, books or screens during mealtimes.^{12,13}
- Pressuring babies and children to eat through prodding, scolding, punishment, pleading, bribing, or coercing (e.g., "clean your plate")¹² or using excessive verbal encouragement (e.g., "come on, you've tried it before") may lead to negative attitudes about eating and poor eating habits, as well as excessive feeding and excess weight gain.⁶
- Restricting higher-fat, energy-dense foods due to concern about overeating may adversely affect self-regulation and actually increase the amount of foods the child consumes.^{6,23}
- Children should be offered small portions of foods initially, along with the opportunity to ask for more.⁶
- Children should be provided with opportunities and support for mastering self-feeding skills with the understanding that messy mealtimes are part of the learning process.⁶
- 15-20 minutes is an appropriate length of time for toddlers and preschoolers to stay at the table.³ When mealtime is over, the food should be removed.¹²
- It is common to offer a new food more than 10 times before a child will accept it. Reassure parents and caregivers that this behaviour is normal. Advise them to keep offering these foods and wait for the child to try it on their own.⁶
- Children should not drink an excessive amount of milk or juice or eat or drink between meals and snacks, except water. Both practices lead to eating less at mealtime.^{3,12}
- Eating with the family provides the child with a pleasurable, social experience and the opportunity to develop healthy eating habits and learn skills through imitation. Children are more likely to try and enjoy a variety of foods when they are offered the same foods the rest of the family are eating.^{6,12}
- If a child generally seems happy and healthy and their growth is normal, picky eating behaviours and temporary changes in appetite should not cause concern.¹² Discuss normal growth and development with families. Reassure them that each child has their own pattern of growth. Regular measurements of the child's growth over time will help show whether they are consuming adequate amounts of food.⁶



8. History

New Guideline	
Remarks (if any)	

Revised Guideline	Date of Revision:
Date of 1st Edition:	Revision Number:

Clinical Practice Guidelines Status	Change	Reference Section

9. Performance Indicator

Not applicable till the warred system implementation in all the hospitals.

10. Search words (Selected key words from this document to facilitate easy identification of information and access to this guideline) :

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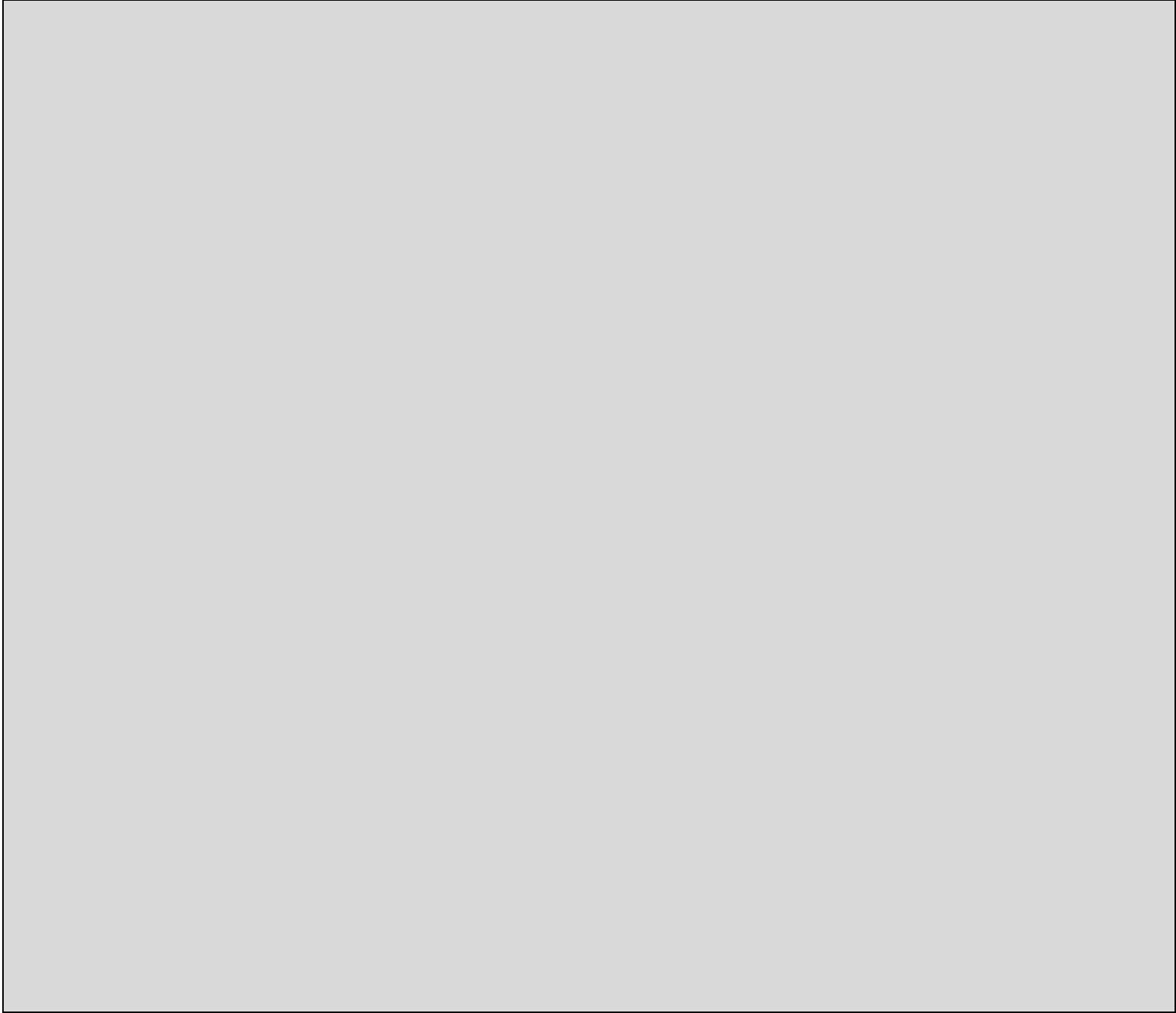
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