Chapter 10 :Toddler and Preschooler Nutrition

Introduction

- Growth during this period is slower than in infancy but steady.
- This slowing of ***growth velocity*** **is reflected in a decreased appetite;**
- **But they still need adequate calories and nutrients to meet their nutritional needs**

Introduction

- The development of new skills
- increasing independence
- Learning about and accepting new foods
- developing feeding skills
- **establishing** healthy food preferences and eating habits

The life period

Toddlers	1-3 years
Preschool-age children	3-5 years

Importance of Nutrition

- to achieve full growth and developmental potential

- **Under-nutrition** during these years impairs children's cognitive development as well as their ability to explore their environments

Normal Growth and Development

- Growth velocity slows until the adolescent growth spurt

- Parents need to be reassured that a decrease in appetite is part of normal growth and development for children in this age group

Measuring Growth

- Weighing at periodic intervals
- Toddlers less than 2 years of age
  - should be weighed without clothing or a diaper
- Preschool-age children
  - should be weighed and measured without shoes and in lightweight clothing

Recumbent length

- Measured for toddlers
  - (<24 months of age and those between 24 and 36 months who are unable to stand unassisted)

Stature

- Standing height (for preschoolers)

Illustration 10.2 Young child being weighed.

Illustration 10.3 Measuring the stature of a preschool-age child.

- Then → weight and height be plotted on the appropriate growth charts, such as the 2000 CDC Growth Charts

CDC Growth Charts

- Are based on data from cycles 2 and 3 of the National Health and Examination Survey (NHES) and the National Health and Nutrition Examination Surveys (NHANES) I, II, and III

- they provide a reference for how children in the United States are growing

CDC Growth Charts

- Weight for- age
- length- or stature-for age,
- head circumference-for-age
- weight-for-length
- weight-for-stature
- BMI-for-age

CDC Growth Charts

- It is the **pattern of growth** that is important to assess rather than any one single measurement.

Body mass index

- is predictive of body fat for children over 2 years of age
  - BMI normative values are not available for children less than 2 years of age.
- BMI fluctuates throughout childhood.
  - BMI increases in infancy;
  - it decreases during preschool years
- the only way to know if a child's BMI is within a normal range is to plot BMI-for-age on the appropriate growth curve

BMI to assess under and overweight in children

- Predictive of body fat for children >2yrs *(not available for children <2yrs)*
  - BMI for age: ≥85th-<95th percentile→ ***overweight***
  - BMI for age: ≥95th percentile→ ***obese***

Weight-for-length (children <2yrs) >95th→ ***overweight***

Weight- for- length or BMI for age< 5th percentile → ***underweight***

Stature-for-age<5th percentile → ***short stature***

WHO Growth Standards

- for children from birth to 5 years
- Based on data from six different countries

Physiological and Cognitive Development : Toddlers

- An explosion in the development of new skills occurs
- become increasingly mobile and independent with improvements in gross motor skills.
- Social development
- Dramatic development of language skills

Development of Feeding Skills in Toddlers

- The time for weaning process.
- their solid food intake increases, and they learn to drink from a cup
- Gross and fine motor development during the toddler years enhances children's ability to chew foods of different textures and to self-feed
- Toddlers can now handle chopped or soft table food.

Feeding Behaviors of Toddlers

- New foods are better accepted if they are served when the child is hungry and if he sees other members of the family eating these foods.

- Toddlers are great imitators, which includes imitating the eating behavior of others.

- Family mealtime provides an opportunity for parents and caretakers to model healthy eating behaviors for the young child.

Appetite and Food Intake of Toddlers

- Parents need to be reminded that toddlers naturally have a decreased interest in food because of slowing growth, and a corresponding decrease in appetite.

- Toddlers need **toddler-sized portions**.
- One rule of thumb for serving size is 1 tablespoon of food per year of age.
-

  It is better to give the child a small portion and allow him to ask for more than to serve large portions.

- Parents often overestimate portion sizes needed by their young child, which may contribute to labeling the child as a “picky” eater

Appetite and Food Intake of Toddlers

- Because toddlers can't eat a large amount of food at one time, **snacks** are vital in meeting the child's nutritional needs

- toddlers not be allowed to "graze" throughout the day on sweetened beverages and foods such as cookies and chips.
  - These foods can "kill" their limited appetite for basic foods at meal and snack times

- It is important that toddlers be allowed to control the amount of food eaten by hunger rather than by parental pressure to eat more

Physiological and Cognitive Development : Preschoolers

- Control is a central issue for preschool children.

- They will test their parents' limits and still resort to temper tantrums to get their way.

- Temper tantrums generally peak between the ages of 2 and 4 years

Development of Feeding Skills in Preschool-Age Children

- can use a fork and a spoon and uses a cup well
- Children should be seated comfortably at the table for all meals and snacks

- Foods that cause choking in young children should be modified to make them safer, such as cutting (grapes , hotdogs)

Feeding Behaviors of Preschool-Age Children

- Reinsure parents about variable appetite
- Growth occurs in "**spurts**" during childhood.

- **Appetite and food intake increase in advance of a growth spurt**, causing children to add some weight that will be used for the upcoming spurt in height

Feeding Behaviors of Preschool-Age Children

Table 10.2 Meal preparation activities for young children[11]

Let children select and help prepare a whole-grain side dish.

Let children help shop for, clean, peel, or cut up vegetables and fruits, depending on their age.

Let children decide on the dinner vegetable or what goes into salads.

Innate Ability to Control Energy Intake

- If allowed to decide when to eat and when to stop eating without outside interference, children eat as much as they need

- "clean her plate" or using "food as a reward"
  - → are asking the child to overeat or under-eat.

- Eating between meals → kills their appetite

Appetite and Food Intake of Preschoolers

- Parents describe their children's appetite by calling the child "a picky eater."
  - Because familiar foods may be comforting to the child
- Solutions :
  - serving child-sized portions
  - serving the food in an attractive way

Appetite and Food Intake of Preschoolers

- Young children often do not like their foods to touch or to be mixed together, such as in casseroles or salads

- do not like strongly flavored vegetables and other foods, or spicy foods

- Children naturally prefer sweet and slightly salty tastes and reject sour and bitter tastes

Appetite and Food Intake of Preschoolers

- Children tend to reject new foods but may learn to accept a new food with repeated exposure to it.

- It may, however, take eight to ten exposures to a new food before it is accepted

Temperament differences

Temperament is defined as the behavioral style of the child

3 clusters defined:

1. Easy child: ~40% of children
2. Slow-to- warm-up child: 15%
3. Difficult child: 10%

→Remainder: intermediate-low, intermediate- high: mixture of behaviors

Temperament: affects feeding time and mealtime behavior

- **Easy child:** regular in function, adapts easily to regular schedules, and tries and accepts new foods readily
- **Slow-to-warm-up:** child exhibits slow adaptability &-ve responses to many new foods with mild intensity. With repeated exposure to new foods→ child learns to accept them with limited complaining
- **Difficult child:** characterized by irregularity in function and slow adaptability; more reluctant to accept new foods and can be negative about them

The "goodness of fit" between the temperaments of the child and caretaker can influence feeding and eating experiences: a mismatch can result in conflict over eating and food

TABLE 10.3 ▸ Practical applications of child-feeding research[19]

- Parents should respond appropriately to children's hunger and satiety signals.
- Parents should focus on the long-term goal of developing healthy self-controls of eating in children and should look beyond their concerns regarding composition and quantity of foods children consume or fears that children may eat too much and become overweight.
- Parents should not attempt to control children's food intakes by attaching contingencies ("No dessert until you finish your rutabagas") and coercive practices ("Clean your plate, children in Bangladesh are starving").
- Parents should be cautioned not to severely restrict "junk foods," foods high in fat and sugar, as that may make these foods even more desirable to the child.
- Parental influence should be positively focused on the child developing food preferences and selection patterns of a variety of foods consistent with a healthy diet. Parental modeling of eating a varied diet at family mealtime will have a strong influence on children.
- Children have an unlearned preference for sweet and slightly salty tastes; they tend to dislike bitter, sour, and spicy foods.
- Children tend to be wary of new foods and tastes, and it may take repeated exposures to new foods before these are accepted.
- Children need to be served appropriate child-sized servings of food.
- Child feeding experiences should take place in secure, happy, and positive environments with adult supervision.
- Children should never be forced to eat anything.

Media influence

- The ads associated the advertised product with fun and/or excitement and energy.
- Fast food ads seemed to focus on building brand recognition through the use of licensed characters, logos, and slogans and were less likely to show food during the ads

Energy and nutrient intake

Dietary Reference Intakes (DRIs) available for females and males aged:

- 0-0.5 yr
- 0.5-1 yr
- 1-3 yrs
- 4-8 yrs
- 9-13 yrs

Energy needs

Estimated Energy Requirements (EER) for children ages 13–36 months:

- (89 × weight of child [kg] – 100) + 20 (kcal for energy deposition)

Beginning at 3yrs DRI equations are based on child's gender, age, ht, wt and PAL

Table 10.4 Estimated energy requirements (in kcals) for reference boys and girls at selected ages and varying physical activity levels (PAL)[31]

Age/Gender	Reference Weight (kg [lbs])	Reference Height (m [in])	Sedentary PAL (Kcal/d)	Low Active PAL (Kcal/d)	Active PAL (Kcal/d)	Very Active PAL (Kcal/d)
3-year-old boy	14.3 (31.5)	0.95 (37.4)	1162	1324	1485	1683
4-year-old boy	16.2 (35.7)	1.02 (40.2)	1215	1390	1566	1783
5-year-old boy	18.4 (40.5)	1.09 (42.9)	1275	1466	1658	1894
3-year-old girl	13.9 (30.6)	0.94 (37.0)	1080	1243	1395	1649
4-year-old girl	15.8 (34.8)	1.01 (39.8)	1133	1310	1475	1750
5-year-old girl	17.9 (39.4)	1.08 (42.5)	1189	1379	1557	1854

Protein

Adequate E intake- ***protein sparring effect***: used for growth and tissue repair rather than for E

- Consumption of high quality protein e.g., milk and animal products, lowers amount of total protein needed to provide EAA

Table 10.5 Dietary Reference Intakes for protein[31]

Age	RDA* g/kg/d
1–3 years	1.1 g/kg/d or 13 g/day*
4–8 years	0.95 g/kg/d or 19 g/day*

Vitamins and minerals

Most children meet all micronutrient needs **except for Fe, Ca, and Zn**

Table 10.6 Dietary Reference Intakes for key nutrients for toddlers and preschoolers[32,33]

Age	Recommended Dietary Allowances		Adequate Intake
	Iron (mg/d)	Zinc (mg/d)	Calcium (mg/d)
1–3 years	7	3	500
4–8 years	10	5	800

Common nutrition problems

Iron deficiency anemia (IDA)

Rapid growth rate

Frequent inadequate intake

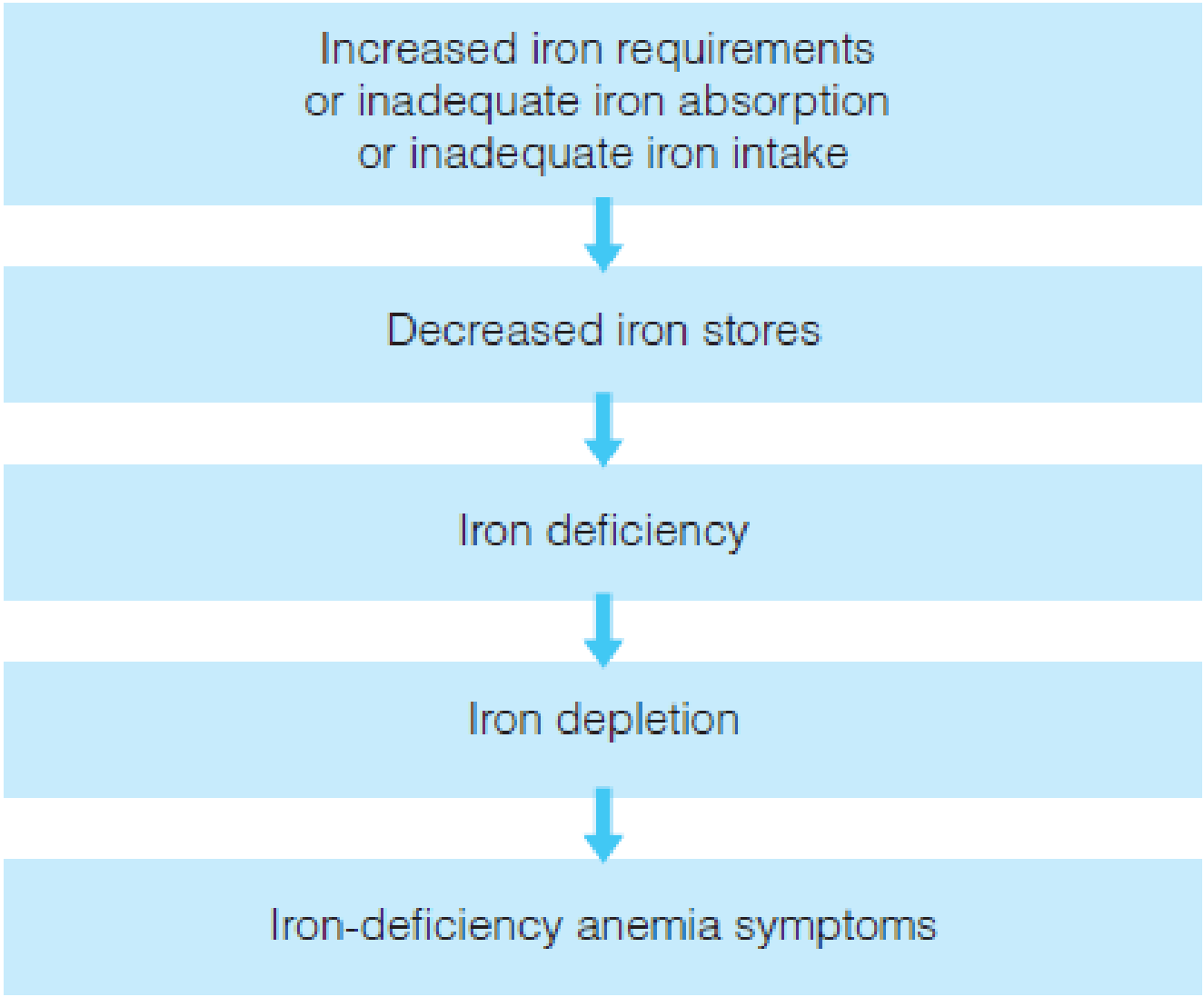
Toddlers 9-18mos: highest risk for ID

IDA in young children appears to cause long-term delays in cognitive development and behavioral disturbances

Iron deficiency defined as:

- Absent bone marrow Fe stores
- Abnormal serum ferritin [ ]- storage form
- Increase in hemoglobin [ ] of<1.0g/dl after treatment with Fe

Table 10.7 Progression of iron deficiency



IDA:

- <5th percentile of the distribution of hemoglobin or hematocrit [ ] in a healthy reference population

Children:

- 1-2yrs: hemoglobin [ ] <11.0g/dl and hematocrit<32.9%: **anemia**
- 2-5 yrs: hemoglobin [ ] <11.1g/dl and hematocrit<33.0%: **IDA**

Preventing iron deficiency:

- Children 1-5yrs should drink no more than ~700ml of cow's milk, goat's milk or soy milk→ low iron content in these and may displace other iron-rich foods

- For detection of deficiency, test high risk groups between ages 9-12mos
  - Low income, refugees, migrant grps, special needs- inborn error of metabolism

Nutrition intervention for IDA

Supplementation with Fe drops: dose 3mg/kg/day

Food diversification

Parental counseling

Dental caries

1 in 5 children aged 2-4yrs has a decay in primary or permanent teeth

Main cause: use of bottles with milk or fruit juice at bed time or during the day

Main type of bacteria (*Streptococcus mutans)* cause tooth decay, by using carbs for food- bacteria releases acid that causes tooth decay

Rinse mouth with water/ brush teeth

Fluoride:

- Fluoridated water and fluoridated toothpaste
- If water supply is low in F→ supplement is required

Children:

- Ages 6mos- 3yrs: need 0.25mg F/day if local water supply has<0.3ppm of F
- Ages 3-6yrs: need 0.5mg F/ day if water supply is<0.3ppm; 0.25mg F/day is water supply has 0.3-0.6ppm

Fluorosis: permanent white or brownish staining of the enamel of teeth caused by excessive ingestion of fluoride before teeth have erupted- fluoridated water in beverages and food preparations

FLOUROSIS

Constipation

"Stool holding": child does not completely empty the rectum- chronic overdistention- large fecal mass

- *Bowel movement becomes painful- stool holding- cycle*

Management:

- Diet with **adequate** fiber
  - Wholegrains, cereals, legumes, fruits and veggies
- Too much fiber
  - Diarrhea, displacement of other energy-dense foods, may decrease bioavailability of some minerals including Fe and Ca

Elevated blood lead (Pb) levels

Major sources of exposure:

- Lead-based paint and chips- taste sweet
  - Hands into mouth
- Lead-soldered water pipes
- Contaminated water supply
- Parental occupation- remove clothes and wash separately

Damage caused by Pb exposure may begin during pregnancy-transported across the placenta to fetus

High blood Pb affects function of brain, blood, and kidneys

Low-level exposure: decreases in IQ, impaired motor, behavioral, and physical abilities

Elevated blood Pb- may decrease growth in young children

Levels< 10mcg/dl- require action

When indicated, screening should be obtained at:

- 9-12mons of age and again around 24months of age when blood lead levels peak

Food security

FI more likely to occur in:

- Minorities
- HH with children esp headed by single woman
- Low-income level HH

FS important for children *(vulnerable population)*: high nutrient needs/ growth and development phase

Children who are hungry and have multiple experiences with food insufficiency→ *more likely to exhibit behavioral, emotional, and academic problems as compared to other children who do not experience hunger repeatedly*

Food safety

Young children- vulnerable to food borne illnesses- become ill at lower doses

Salmonella: consumption of food containing undercooked or raw eggs/ undercooked meat & poultry

Campylobacter: transmitted by handling raw poultry, eating undercooked poultry, drinking raw milk

E.coli: ingestion of contaminated, undercooked hamburger meat, unpasteurized juice and unpasteurized milk

- Can cause bloody diarrhea and **hemolytic uremic syndrome**: characterized by renal failure, hemolytic anemia, severe decrease in platelet count; primarily in children< 10yrs

Proper food preparation and storage techniques

Risk reduction and controls can be targeted at various steps in food processing

Fight BAC's four food-safety practice messages:

- ***Clean:*** Wash hands and surfaces often
- ***Separate***: Don't cross-contaminate
- ***Cook:*** Cook to proper temperatures
- ***Chill***: Refrigerate promptly

Prevention of nutrition-related disorders

Overweight, obesity, CVD- public health problem

Major contributors: intake of high E, high fat, and sedentary lifestyle

Food habits, preferences, and behaviors- determine those in later stages/ health status

Overweight and obesity in toddlers and preschoolers

Multifaceted problem- difficult to treat→ *prevention is the preferred approach*

Assessment of OW and obesity

BMI- for-age percentile as a screening tool

- BMI-for-age ≥ 85th to <95th: ***overweight***
- BMI-for-age ≥95th: ***obese***
- BMI normative values are not available for children<2yrs
  - Weight-for-length >95th percentile is considered to be overweight

During preschool yrs- normal decrease in BMI

- Lowest point at 4-6yrs
  - Gradual increase after: **"adiposity rebound or BMI rebound":** normal increase in BMI that occurs after BMI declines and reaches its lowest point

Other essential components of the assessment:

- Evaluation of the child's medical risk, including parental obesity, family medical history, and evaluation of wt-related problems such as sleep and respiratory problems
- Behavior risk assessment, including dietary and PA behaviors
- Evaluation of the child's and/or family's attitudes toward and capacity to change some behaviors

Prevention

* All children should be targets for prevention of OW and obesity from birth by instituting lifestyle behaviors that prevent obesity

Target behaviors

- Limit sugar-sweetened beverages
- Encourage consumption of recommended amounts of fruits and veggies
- Limit TV screen time by allowing a max of 2hrs/d
- Eat breakfast every day
- Limit eating out at restaurants esp fast food restaurants
- Limit portion sizes
- Eat a diet rich in calcium
- Eat a diet high in fiber
- Eat a diet that follows the DRIs for macronutrients
- Promote moderate to vigorous PA for at least 60 mins/d
- Limit E-dense foods

Treatment

Goal: improve long-term physical health through permanent healthy lifestyle habits and behavior modification

Improvement measured by decrease in BMI-for-age→ *difficult to see in the short-term*

- Regular wt measurement can be used to assess progress in short-term

Maintenance of wt while gaining ht→best treatment for obese children between ages 2-5yrs

Wt loss should not exceed 0.45/ month in children this age, whether they fall into the OW or obese category

Stage approach

Summary of Interventions

Healthy lifestyle behaviors
- Encourage fruit and vegetable intake
- Minimize sugar-sweetened beverages
- Limit screen time; encourage physical activity
- Provide healthy food guidance
- Involve entire family in change

Stage 1 behaviors plus additional eating and activity goals as needed
- Planned/structured meals and snacks
- Planned/supervised physical activity or active play 60 min/day
- Use of logs and reinforcement tools

Use same eating and activity goals as stage 2, along with
- Behavior-modification program with parental involvement
- Assessment and treatment of comorbidities

Structured diet and activity counseling for severely obese youth that may include
- Meal replacements
- Very-low-calorie diets
- Medications
- Bariatric surgery

Stage 1 "Prevention Plus"

Focus on behaviors for prevention

Identify **dietary and PA behaviors** in the child & family that would be appropriate to target

use motivational interviewing techniques to assist the family in making appropriate changes

Follow-up- based on needs

Stage 2 "Structure Weight Management- SWM"

Requires more frequent follow ups- monthly visits are recommended

Planned diet- work with RD

Further reduction of screen time to <1hr/ day

Planned PA- 60 mins/day

Motivational interviewing

Counselor may need to be involved – to address parental skills and help resolve family issues that may be barriers to healthy lifestyle behaviors

Stage 3 "Comprehensive Multidisciplinary Intervention-CMI"

Intensity of behavioral change is increased

Multidisciplinary team: RD, exercise specialist, a behavioral counselor, & the primary care provider→ maximize support for behavior change

Weekly visits for a min of 8-12 wks

Structured program: food monitoring, short-term diet resulting in a -ve E balance, PA goal setting

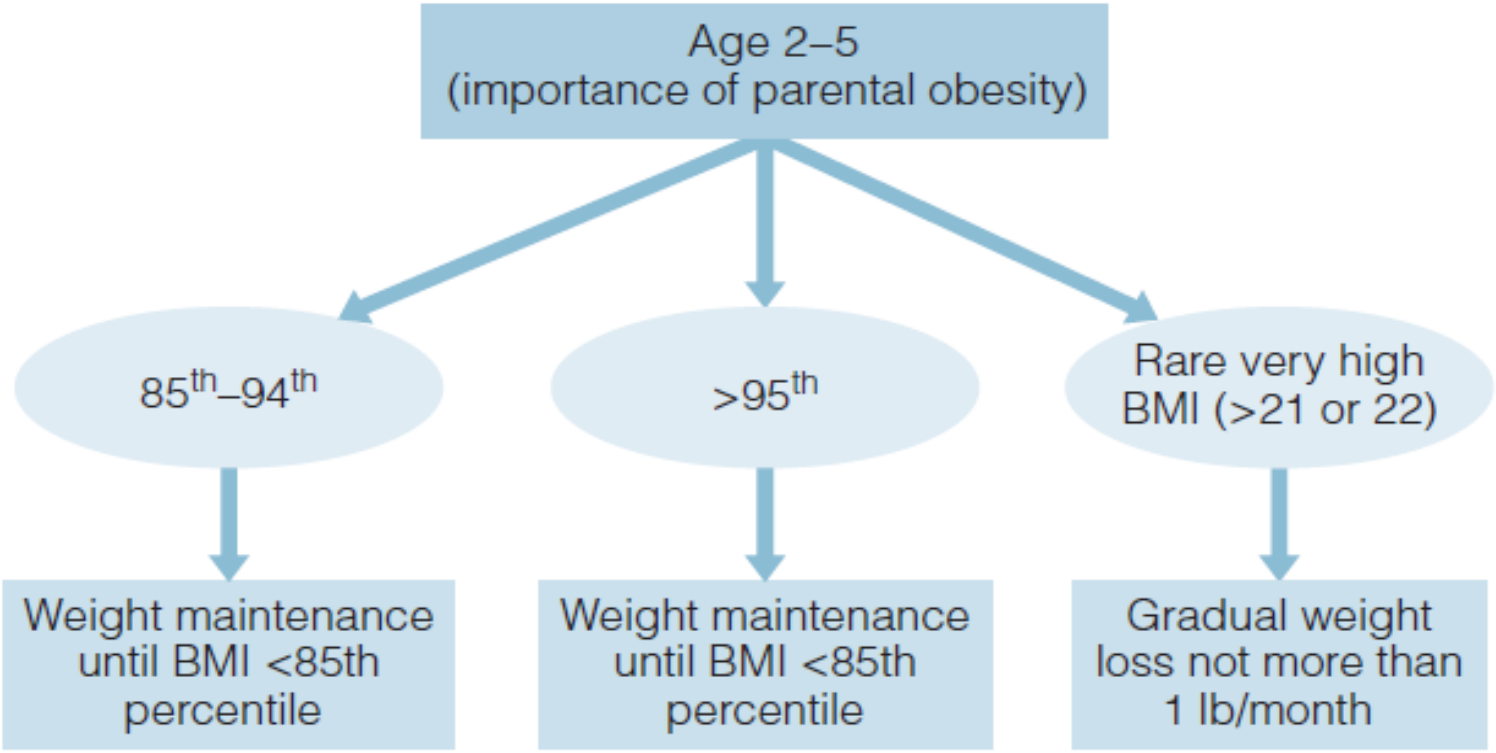
Parents are involved in behavior modification

Systematic evaluation of body measurements, diet, and PA at specific time intervals

Stage 4 "Tertiary Care Intervention"

Offered to severely obese adolescents who have failed other interventions

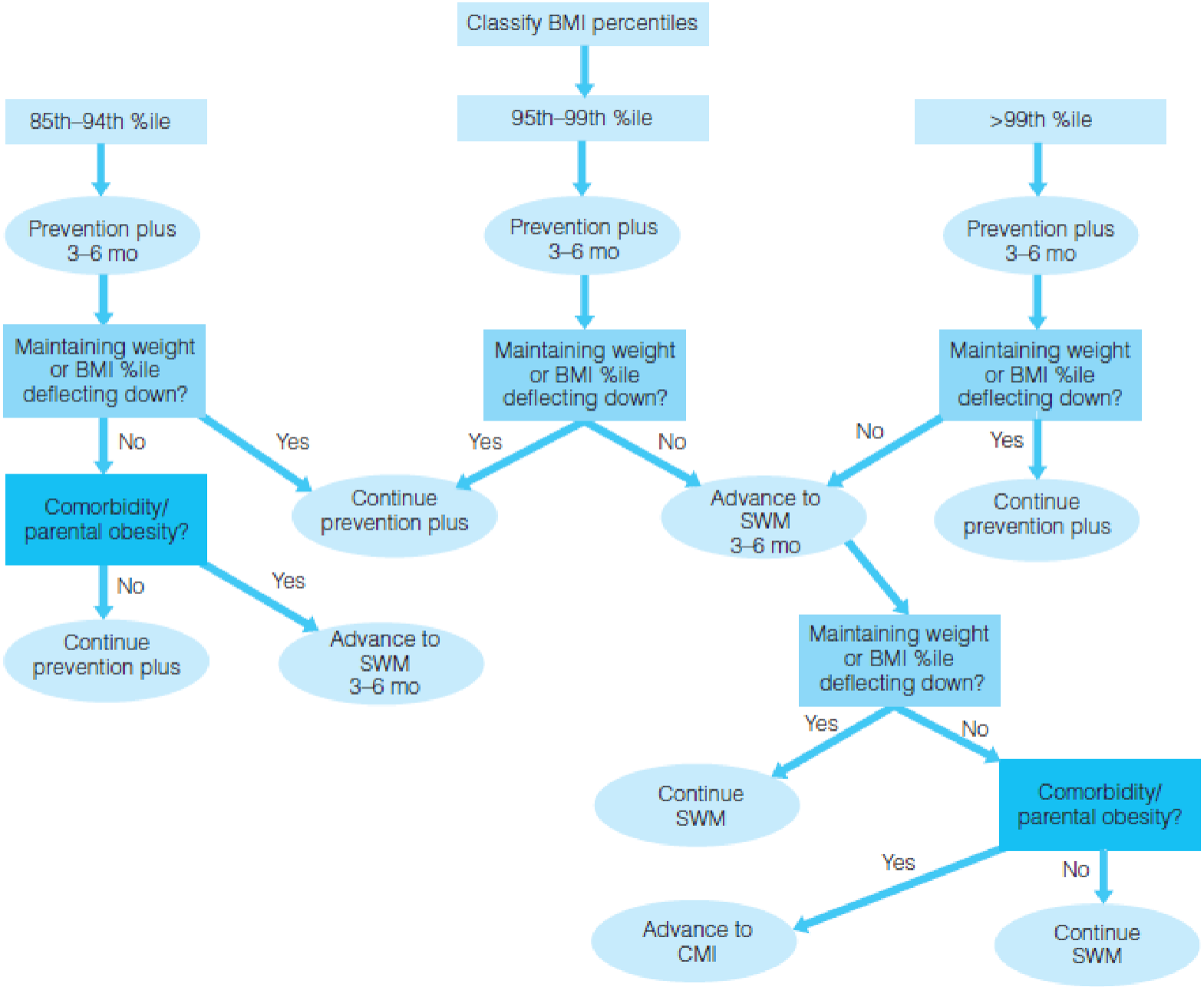
Not appropriate for obese toddler or preschool- age child



Note: In the short term (<3 mos), in general, weight changes may be easier parameter to measure

ILLUSTRATION 10.8 ▸ Suggested weight changes in staged treatment of pediatric obesity.

Illustration 10.7 Suggested staged treatment for overweight and obesity for 2- to 5-year old children.



Nutrition and prevention of CVD

Heart disease risk factors (RF)

- Elevated LDL-C
- Familial hyperlipidemia: condition that runs in the family- have high level of serum cholesterol and other lipids
- High intake of SF and trans fat- elevate LDL-C
- High TG
- Overweight/obesity
- Fatty streaks- fat deposits in blood vessels- represent initiation of atherosclerosis and CVD

AHA guidelines for primary prevention of atherosclerotic CV disease beginning in childhood:

All children should be screened for risk factors of developing CV disease

Healthy eating pattern?

- Children 1-3yrs: 30-40% of total calories from fat
- Children ≥ 4-18yrs: 25-35% of total calories from fat
- Trans fats <1%

Appropriate BW

Desirable lipid profile and BP Avoid

smoking (and second hand

smoking)

Daily PA

American Academy of Pediatrics (AAP) guidelines

Screen children (after 2 yrs of age and no later than 10yrs)

- With positive family history of dyslipidemia or premature CVD
- With an unknown history
- Who have other CV risk factors including overweight/ obesity, HTN, or diabetes mellitus

Children who are at risk of developing premature CVD or are found to have high lipid levels have different dietary recommendations

- Periodic screening for blood cholesterol levels and close follow-up
- If LDL-C levels are high
  - Restrict total caloric intake from SF to <7%
  - Cholesterol ≤200mg/d

Vitamin and mineral supplements

Varied diet- can meet all micronutrient needs

AAP: recommends supplementation for children at risk of deficiency or already have one or more nutrient deficiencies

Children at risk:

- With anorexia or an inadequate appetite or who follow fad diets
- With chronic disease
- From deprived families or who suffer from parental neglect or abuse
- Who participate in a dietary program for managing obesity
- Who consume a vegetarian diet without adequate intake of dairy products
- With FTT

Dietary and PA recommendations

Two sets of guidelines:

- Dietary guidelines for Americans
- Food guide plate (previously the food guide pyramid)

Dietary Guidelines for Americans

Focus on food variety

- Grains: half of which should be whole grains
- Fruits and vegetables
- Fat- free or low-fat dairy products
  - 2 cups/d of milk or dairy products
- Reduce amount of added sugar
- Fat % as mentioned before- source of calories, EFA, and fat-soluble vitamins
  - MUFAs and PUFAs- fish, nuts, & vegetable oils
  - Fish- pay attention to mercury levels

Beans, lean meat, and poultry

Limits foods high in fat and sugar- cookies, candy, and cakes

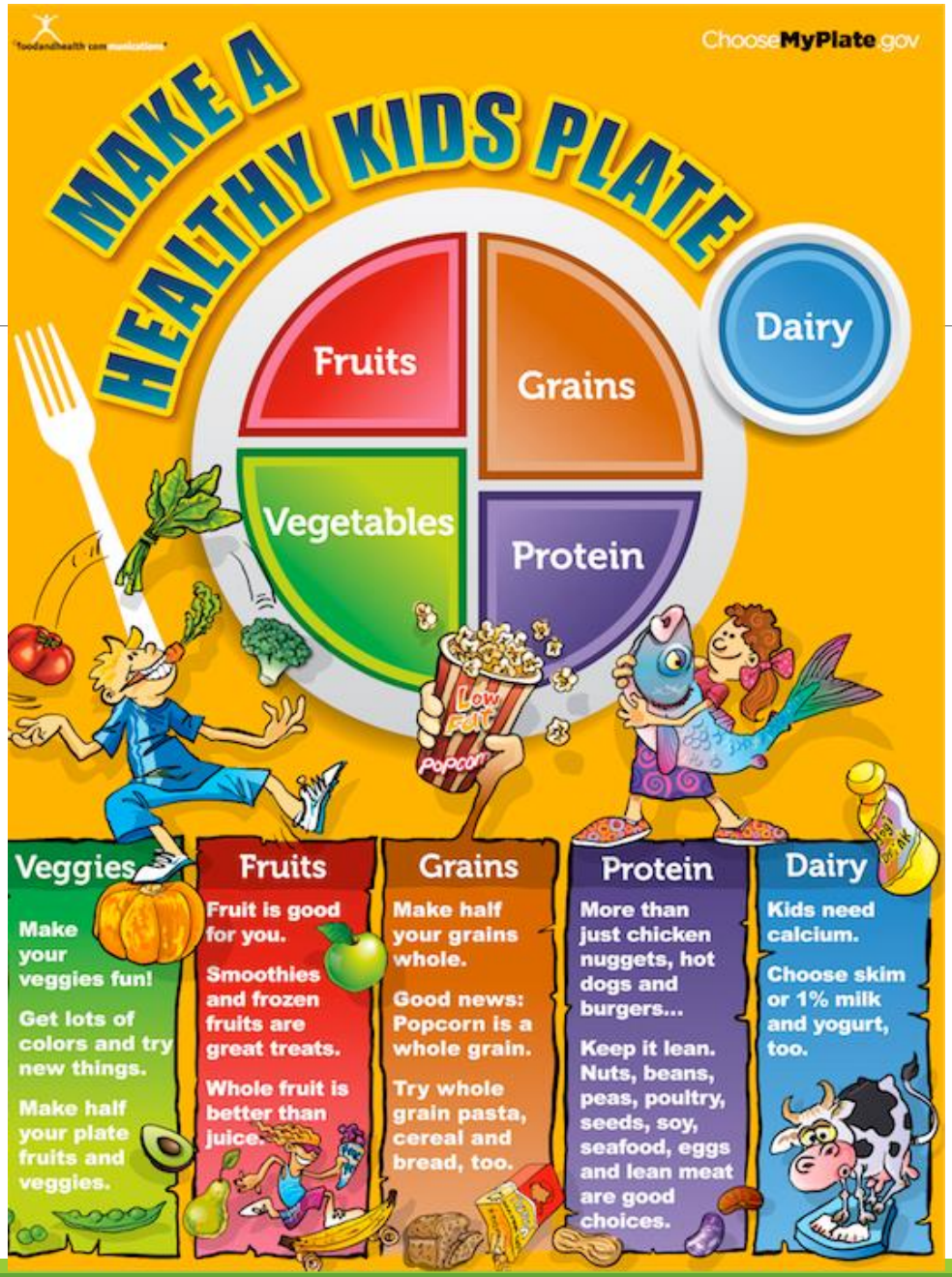
PA: 60mins on most or all days/ week

Limit sedentary activities including watching TV and playing computer games

Parents should set a good example

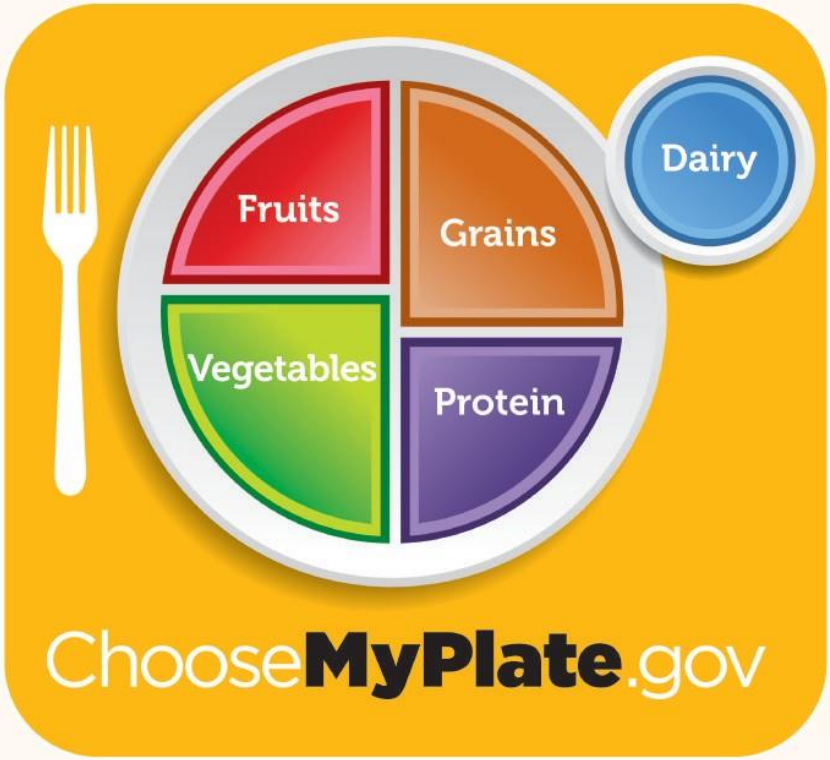
MyPlate

Developed by USDA, as an educational tool for consumers to employ dietary guidelines


ChooseMyPlate.gov
MAKE A HEALTHY KIDS PLATE
Fruits
Grains
Dairy
Vegetables
Protein
Low Fat
Popcorn
Veggies
Make your veggies fun!
Get lots of colors and try new things.
Make half your plate fruits and veggies.
Fruits
Fruit is good for you.
Smoothies and frozen fruits are great treats.
Whole fruit is better than juice.
Grains
Make half your grains whole.
Good news: Popcorn is a whole grain.
Try whole grain pasta, cereal and bread, too.
Protein
More than just chicken nuggets, hot dogs and burgers...
Keep it lean. Nuts, beans, peas, poultry, seeds, soy, seafood, eggs and lean meat are good choices.
Dairy
Kids need calcium.
Choose skim or 1% milk and yogurt, too.

Pack Smart!

Help your kids stay healthy and focused in school—pack them a nutritious lunch. Each lunch should be about ½ **Fruits** and **Vegetables**, ¼ **Grain**, and ¼ **Protein** with one serving of **Dairy**.



Encourage children to eat vegetables and fruits by making it fun. Provide healthy ingredients like the ones below and **let kids help with preparation**!

Fruits

Go easy on juice and make sure it's 100%.

Apple
Orange
Pear
Peaches
Grapes
Melon
Dried Fruit

Vegetables

Use dark green and orange veggies.

Broccoli
Carrots
Cauliflower
Red Peppers
Zucchini
Broccoli
Cucumber

Grains

Make half of the grains whole grain.

Whole Wheat Bread
Pita Bread
Brown Rice
Cereal
Pasta Salad
Sunflower Seeds

Protein

Use low-sodium, lean or lowfat meats.

Chicken
Turkey
Fish
Nuts
Seeds
Peas
Beans

Dairy

Choose lowfat or fat-free dairy.

Yogurt
Milk
Cheese

TIP Mix yogurt with cinnamon or garlic to make a delicious dip for fruits or veggies!

Source: U. S. Department of Agriculture

Recommendations for iron intake

Adequate intake is necessary to prevent iron deficiency

Sources:

- Meat: ground or chopped
- Fortified breakfast cereal
- Dried beans and peas
- Iron- fortified formulas

Recommendation for fiber

Fiber intake in children helps prevent constipation

Too much fiber should be avoided.. Reasons?

Adequate intake of total fiber for children

- 1-3yrs of age: 19g/day
- 4-8 yrs of age: 25g/day

** Children with adequate fiber intake tend to have lower intakes of fat and cholesterol, and higher intakes of dietary fiber, vitamins A and E, folate, Mg, and Fe, than do those children who have low dietary fiber intakes

Recommendation for fat

Appropriate amount is necessary to meet needs of child

- EFA: peanuts, canola, corn and vegetable oils, flaxseeds…
- Fat-soluble vitamins:
  - Vitamin A: whole eggs and dairy products
  - Vitamin D: exposure to sunlight and vitamin D- fortified milk
    - Daily intake: 400IU
  - Vitamin E: corn, soybean, safflower oils
  - Vitamin K: animal and plant sources

Recommendation for calcium

Adequate intake affects peak bone mass

- High peak bone mass- protective against osteoporosis and fractures late in life

Children 1-3yrs: 500mg/d

Children 4-8yrs: 800mg/d

Sources: dairy products, dark green leafy veggies, Ca- fortified foods, fish- sardines

Fluid needs

Through food and beverages

Requirements increase with fever, diarrhea, vomiting, hot, dry, or humid environments

Consumption of sweetened and carbonated beverages are on the rise- detrimental affect on overall health- children who consume those are found to consume more calories

Focus on water

Vegetarian diets

Rich in fruits, vegetables, and wholegrains

Young children need some E- dense foods to reduce total amount of food required

** To meet nutritional needs, young children would need to eat more food than they can→ they need to eat several times a day because their stomachs cannot hold a lot of food at one time

Children who are fed ***vegan and macrobiotic diets*** tend to have lower rates of growth, although still within normal ranges, during the first 5yrs of life compared to children given a mixed diet

- Macrobiotic diet: falls between semi-vegetarian and vegan diets; includes foods such as brown rice, fish, dried beans, spices, fruits and vegetables

Vegan diet- allows plants only

- May be deficient in which micronutrients?
- Protein needs are met if variety of food is consumed with adequate E
- Phytates and high fiber interfere with micronutrient bioavailability
- Supplements are necessary for some children
- Those who receive B12 supplements; should be monitored on regular basis- to avoid vitamin B12 deficiency anemia
- IDA: infrequent in children consuming a vegetarian diet

Guidelines recommended for vegetarian diets for young children:

- Child should eat several times/d i.e., 3 meals and 2-3 snacks
- Avoid serving bran and an excessive amount of bulky foods, such as bran muffins and raw fruits and veggies
- Include in the diet some sources of E-dense foods such as cheese and avocado
- Include enough fat (at least 30% of total calories) and a source of omega-3 fatty acids e.g., canola or soybean oils
- Include sources of B12, vit D, and Ca in the diet, or supplement if required

PA recommendations

60mins on most or all days

Taking a nature walk

Riding a tricycle or bicycle

Walking, skipping, or running

No TV viewing is recommended for children <2rs of age

Screen time should be limited to <2hrs/d for all other age groups

Parents should set a good example

Public food and nutrition programs

Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)

Eligibility criteria:

- Low-income HH, ≤185% of the federal poverty level
- Child being at "nutrition risk":
  - IDA
  - Underweight
  - Overweight
  - Consumption of inadequate diet
  - Chronic illness: e.g., cystic fibrosis

Children receive nutrition assistance, education, and follow-upservices by specially trained RDs andnutritionists

Vouchers for food items such as milk, juice, eggs, cheese, peanut butter, and fortified cereals are given to eligible families