

# Picky Eaters: Nutritional Needs in Childhood

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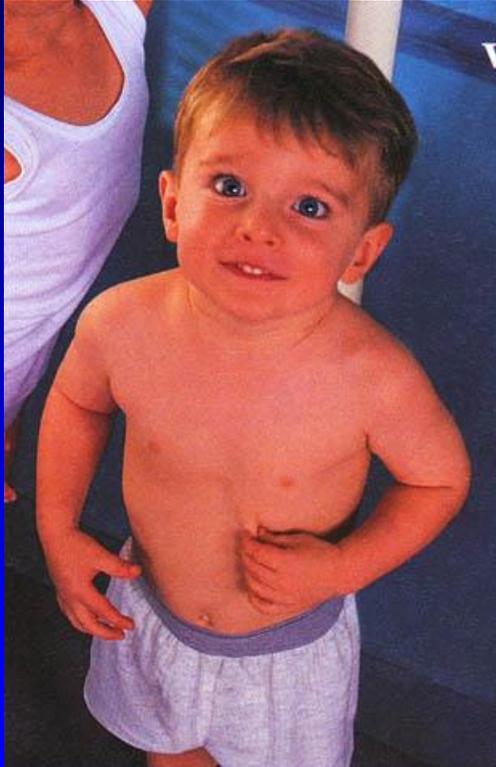
# Conflict of Interest

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- ↖ I have no relevant financial relationships with the manufacturer(s) of any commercial product(s) and/or provider(s) of commercial services discussed in this presentation.
- ↖ I do not intend to discuss unapproved or investigative use of a commercial product or device in my presentation.

# Objectives

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- ↖ To recognize the characteristics of picky eaters in childhood
- ↖ To review common nutritional deficits in children who have picky eating habits
- ↖ To provide anticipatory guidance for dietary energy, calcium, and vitamin D in children with picky eating habits

# Case

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- ↗ 4-1/2 y old female referred for poor weight gain
- ↗ Height and weight <5<sup>th</sup> %ile, BMI 5<sup>th</sup> %ile
- ↗ H/O Prematurity, gestational age 7-1/2 mo
- ↗ Eats chicken and beef, no eggs; likes fruit; does not like vegetables, only eats corn; does not drink milk, eats yogurt twice weekly
- ↗ No multivitamin supplement
- ↗ Swallows liquids and solids without choking
- ↗ No nausea or vomiting
- ↗ Bowel movement daily, soft stool, no blood
- ↗ No allergies
- ↗ No family history of GI disorders

# Case

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- ↖ Physical exam: small petite child, slender body; abdominal exam benign
- ↖ Screening labs CBC, CRP, Chem 20, lipase, TTG/IgA, TSH, urinalysis, stool elastase, calprotectin normal
- ↖ Impression: constitutionally small, former premature child, with picky eating habits
- ↖ Plan: Restart formula and multivitamin supplementation, monitor weight gain and linear growth, consider appetite stimulant medication

# Definition of Picky Eater

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↖ No recognized definition

↖ Common terms

❑ Refusal to eat familiar foods

❑ Selective eating

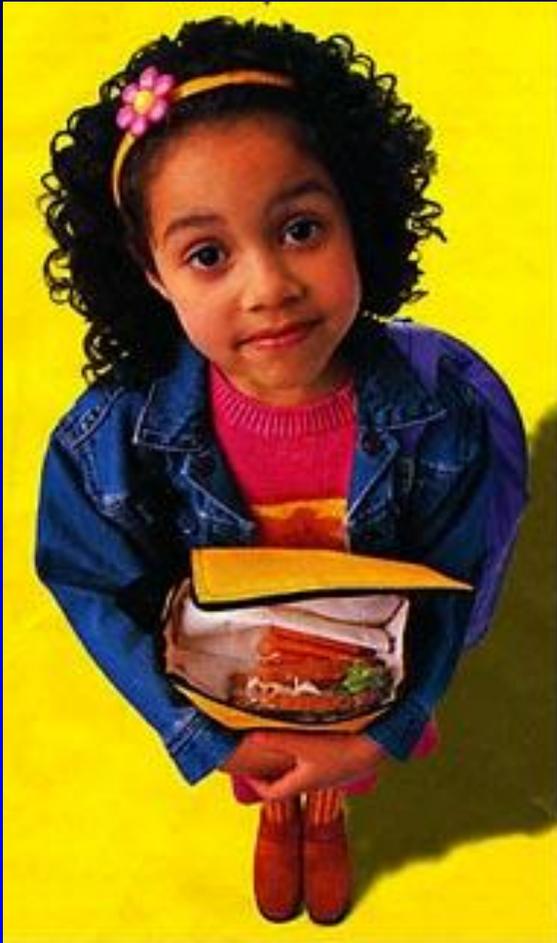
❑ Refusal to eat novel foods (neophobia)

❑ Sensory food aversion

❑ Faddy or fussy eating

# Epidemiology

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- ↖ Picky eating common problem during childhood
- ↖ Prevalence 18% (range 13-22% from 3 – 11 y of age [Jacobi 2008, Mascola 2010])
- ↖ Rates stable over 2 y period during early childhood [Dubois 2007]
- ↖ No gender, ethnicity, household differences [Carruth 2014, Mascola 2010]
- ↖ Two-thirds of children recover within 3 y [Cano 2015, Mascola 2010]

# Associations with Picky Eating

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- ↖ Low birth weight, prematurity (missed window of opportunity) [Stern 2006, Cero 2002]
- ↖ Breastfeeding < 6 months (lack of exposure to maternal foods) [Galloway 2003]
- ↖ Dysfunctional family dynamics (parent-child relationship, child's temperament) [Kintner 1981]

# Characteristics of Picky Eaters

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- ↖ Eat limited variety of foods
  - ↖ Eat limited amount of food
  - ↖ Reject certain textures or flavors
  - ↖ Unwilling to try new foods
  - ↖ Strong likes/dislikes in food preferences
- [Mascola 2010]

# Characteristics of Parents

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- ↖ Frequent struggles over food
- ↖ Focus of struggle on type rather than amount of food
- ↖ Argue about child's poor eating habits
- ↖ More likely to comment negatively about child's poor eating habits
- ↖ More likely to prepare separate meals from family meals
- ↖ More likely to offer rewards or bribes to encourage eating [Mascola 2010]

# Long-term Health Consequences

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- ↖ Lower weight in early childhood [Dubois 2007]
- ↖ Lower dietary energy (fat) intake [Dubois 2007]
- ↖ Increased risk for anorexia nervosa, but not dieting or binge eating, in adolescence [Marchi 1990, Jacobi 2008]
- ↖ More likely to exhibit problem behaviors (tantrums, withdrawal, anxiety, somatic complaints, depression, aggressive or oppositional-defiant behaviors) [Jacobi 2008]
- ↖ Negative impact on family relationships [Dubois 2007, Goh 2012, Jacobi 2007, Masola 2012, Bryant-Waugh 2010, Marchi 1990]

# Nutrient Patterns of Picky Eaters



- ↗ No clear evidence that nutrient intakes differ between picky/nonpicky eaters [Caruth 2000, 2004]
- ↗ Reported food group differences
  - ❑ Lower vegetable and fruit intake [Dovey 2008, Cooke 2004, Jacobi 2004, Van der Horst 2016]
  - ❑ Lower meat, egg, fish intake [Cooke 2003, Dubois 2007, Van der Horst 2016]
  - ❑ Inconsistent sweets, sugar intake [Calloway 2005]
  - ❑ Unknown milk and dairy product consumption
- ↗ Reported food texture differences
  - ❑ Refuse mushy foods [Boquin 2014]
  - ❑ Refuse tough (chew) foods [Russell 2013]
  - ❑ Refuse raw foods [Nederkoorn 2015]

# Normal Development

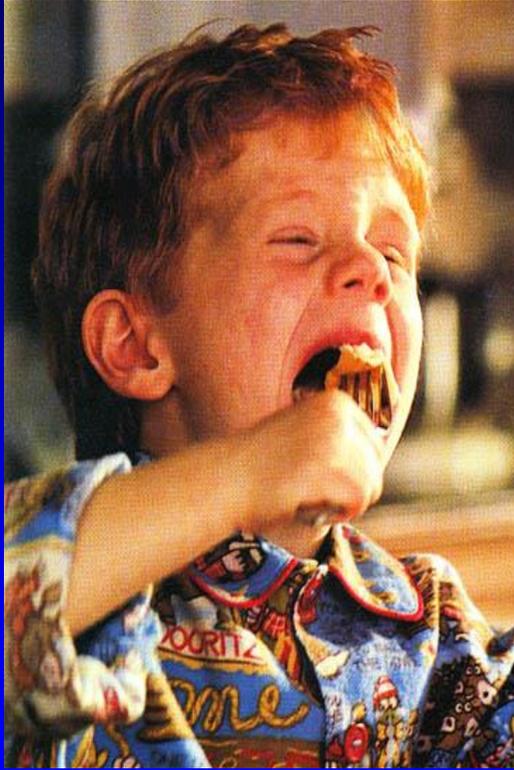
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- ↖ At beginning of complementary feeding, exposure to variety of foods important for acceptance of new foods [Remy 2013]
- ↖ At beginning of complementary feeding, repeated exposure (maximum 10 times) enhances acceptance of vegetables [Remy 2013]
  - Flavor additive less effective
  - Learning effect persists
- ↖ At age 2 y, children reject foods initially accepted; place higher importance on physical properties of food (color, texture) [Williams, 2013]

# Normal Development

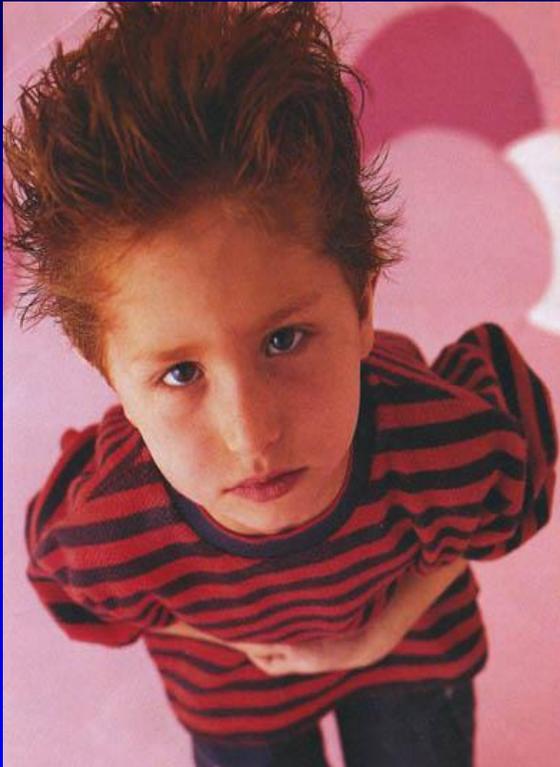
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- ↖ At age 2-3 y, children choose animal products, starchy foods; avoid vegetables [Nicklaus 2005]
- ↖ At age 3 y, total daily energy intake increases, but variety of foods remains limited [Nicklaus 2005]
- ↖ By age 4 y, acquisition of food repertoire influenced by previous food exposure and food choice behaviors [Nicklaus 2005]
- ↖ Thereafter, food variety seeking behaviors track into early adult life [Nicklaus 2005]

# Evaluation of Picky Eater

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- ↖ Identify red flags suggestive of organic disease that may require referral to a specialist
- ↖ In absence of worrisome signs or symptoms, “normal” growth curves may allay parental and physician concerns

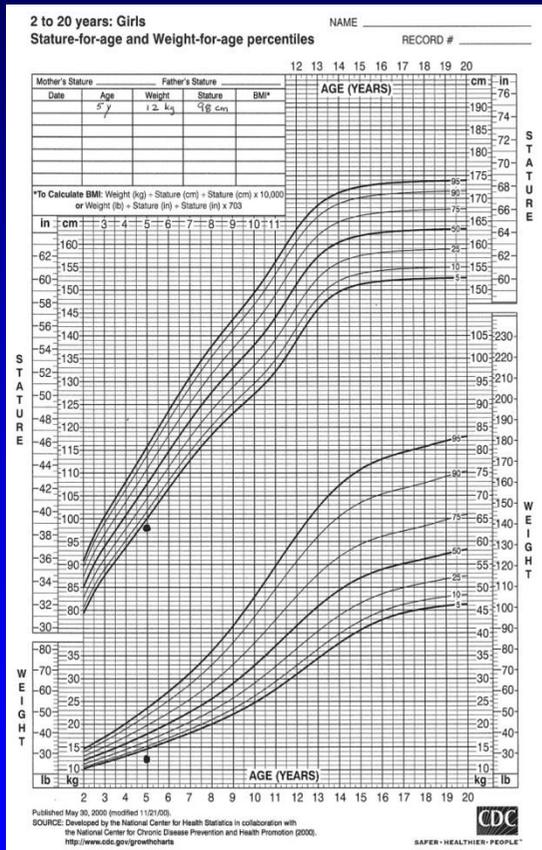
# Red Flags

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- ↖ Chewing or swallowing dysfunction (dysphagia)
- ↖ Coughing, choking, gagging when drinking liquids or eating solids
- ↖ Recurrent aspiration pneumonia
- ↖ Feeding interrupted by crying (suggests pain)
- ↖ Vomiting and/or diarrhea
- ↖ Atopic conditions (eczema)
- ↖ Developmental problems (prematurity, congenital anomalies, autism)

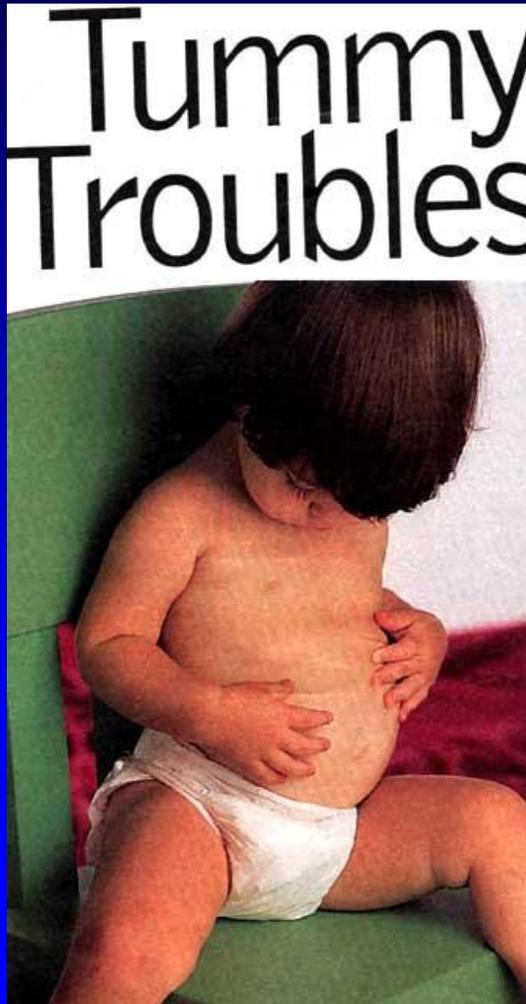
# Red Flags - Growth Charts



- ↖ Measurements more than 2 SD below mean (<5<sup>th</sup> %ile)
- ↖ Measurements that decrease more than two major percentile lines
- ↖ Children growing slightly under 5<sup>th</sup> %ile and have short parents may be normal
- ↖ Calculate mid-parent height
  - Boys:  $[\text{Height}_{\text{Mom}} (\text{cm}) + 13] + \text{Height}_{\text{Dad}} (\text{cm}) / 2$
  - Girls:  $[\text{Height}_{\text{Dad}} (\text{cm}) - 13] + \text{Height}_{\text{Mom}} (\text{cm}) / 2$
  - Determine child's projected height at 18 y based on current height-for-age %ile
  - Normal: Mid-parent height – projected height at 18 y  $\leq 8.5$  cm

# Differential Diagnosis

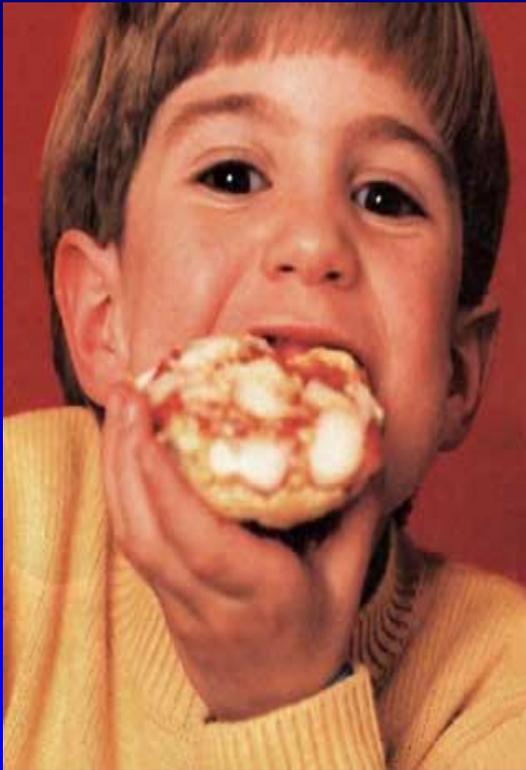
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- ↖ Intake (dietary)
  - Anorexia
  - Chew/swallow dysfunction
- ↖ Internal (metabolic)
  - Hepatic
  - Endocrine
  - Renal
- ↖ Output (GI loss)
  - Malabsorption
  - Inflammatory
  - Infectious
  - Allergy

# Nutritional Strategy

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- ↖ Confirm organic disease unlikely
- ↖ Assess common nutritional deficits
  - Energy
    - Inadequate amount of food consumed
  - Calcium, Vitamin D
    - Minimal milk and dairy product consumption
    - Limited sunlight exposure

# Energy Metabolism

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Energy balance = Energy intake (kcal/d) – Energy expenditure (kcal/d)



Maintain body composition



Basal metabolic rate 60%

Physical activity 30%

Energy cost of growth 4%

Age (y)	<u>Basal Metabolic Rate (kcal/d)</u>		Physical Activity
	Girls	Boys	
2 – 3	1000	1050	1.4
4 – 8	1200	1300	1.5
9 – 13	1350	1700	1.6 [DRI 2005]

# Catch-up Growth

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Energy cost of catch-up growth (kcal/d) =

Ideal body weight (kg) \* Dietary reference intake (kcal/d)

Actual body weight (kg)

OR

Rule of thumb = 120% - 150% DRI for age for energy (kcal/d)

# MyPlate Serving Size



Age (y)	Veggie (c/d)	Fruit (c/d)	Grain (oz/d)	Protein (oz/d)	Milk (c/d)
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2 – 3	1	1	3	2	2
4 – 8	1½	1½	5	4	3
9 – 13	2	1½	5	5	4

\*Grain (1 oz) = 1 sl bread, ½ c oatmeal, 1 pancake, ½ c rice, macaroni

\*Protein (1 oz) = 1 oz meat, fish poultry, 1 egg, 1 Tbsp peanut butter, ¼ c cooked beans

# Calcium

- ↖ Calcium required for bone formation
- ↖ DRI-for-age for Ca
  - $<4 \text{ y} = 700 \text{ mg/d}$
  - $4\text{-}8 \text{ y} = 1000 \text{ mg/d}$
  - $9\text{-}18 \text{ y} = 1300 \text{ mg/d}$
  - $>18 \text{ y} = 1000 \text{ mg/d}$
- ↖ Milk, dairy products good Ca source
  - 8 oz milk = 300 mg
  - 1 c ↓ fat, plain yogurt = 415 mg
  - 1 oz American cheese = 175 mg
- ↖ Ca supplement
  - 200 mg elemental Ca per tablet  
(regular strength) [DRI 2011]



# Vitamin D

- ↖ Vitamin D deficiency in 14% of American children [Saintonge 2009]
- ↖ Vitamin D promotes Ca absorption
- ↖ Risk factors for deficiency
  - Inherently dark skin, ↓sun exposure, anticonvulsant use
- ↖ Sunlight, milk, MVI vitamin D sources
- ↖ DRI-for-age for Vitamin D
  - 1-70 y = 600 IU/d [DRI 2011]
- ↖ AAP recommends four 8-oz glasses of milk daily (vitamin D = 400 IU/d)
- ↖ If 25-hydroxyvitamin D <20 ng/mL, supplement (1000-2000 IU/d x 3 mo) [Harel 2013]



# Final Comments



- ↖ Children with smaller body size may have lower food requirements
- ↖ Children have a physiological decrease in appetite between 1-5 y of age
- ↖ Although children have variable intakes at meals, their total daily energy intake remains fairly constant
- ↖ As children develop a sense of autonomy, they prefer self-feeding and become selective in food choices
- ↖ If pressured to eat, children may resist

[Leung 1994; Birch 1991; Cerro 2002; Sarter 1995]

# Final Comments

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- ↖ Excessive intake of beverages and sweet may reduce a child's appetite for food and lead to failure to thrive
- ↖ Food refusal may be an attention seeking device because of difficulty in the parent-child relationship
- ↖ Refusal to eat may result from inappropriate feeding techniques that include scolding or punishing
- ↖ Family and peer group modeling are effective means to encourage children to eat
- ↖ Insistence on table manners inappropriate for age may interfere with the child's eating

[Sarter 1995; Cerro 2002; Skuse 1993; Sarter 1990]

# Anticipatory Guidance

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- ↖ Parents should choose nutritious food of appropriate texture and taste for child's age, provide structured meals and snacks, but allow child to decide how much and what to eat
- ↖ Parents initially may provide small portions of each food (1 Tbsp/y of age) and serve more based on child's appetite
- ↖ Snacks work best mid-way between meals and should not include excessive sweetened beverages
- ↖ Children should not be coerced to eat or punished for not eating

# Anticipatory Guidance

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- ↖ Table time should be limited to 20-30 min/meal; food should be offered again only at the next planned meal or snack
- ↖ Distractions such as toys or television should not be permitted at the table during mealtimes
- ↖ Parents should only insist on table manners appropriate for the child's age and stage of development
- ↖ Eating with the family should provide a pleasurable social experience and the opportunity to learn by imitation

# Anticipatory Guidance

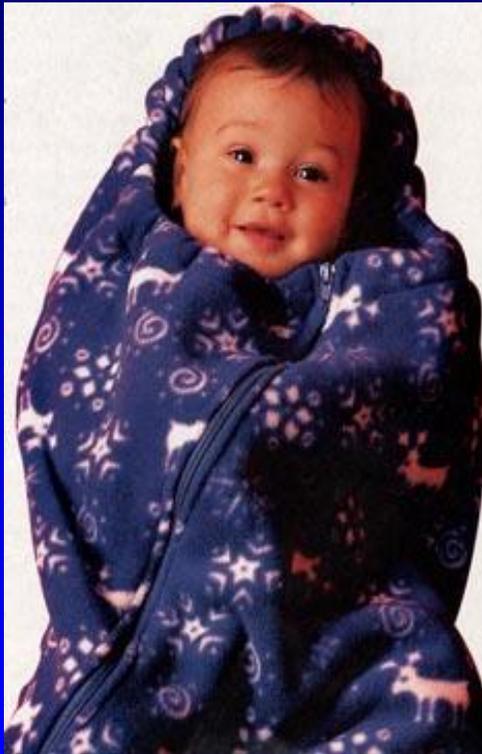
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- ↖ Despite variable intakes at meals, total daily energy intake remains fairly constant to support basal metabolic rates, physical activity, and growth in the constitutionally small child
- ↖ Milk and dairy products should be a mainstay of daily food choices to assure adequacy of dietary calcium and vitamin D intakes
- ↖ Multivitamin and mineral supplements may be used if the quality of the diet is questionable
- ↖ Nutritional supplements may be used to support catch-up growth if growth deficits prevail
- ↖ Appetite stimulants may be considered when eating behaviors fall outside the norm

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