

Childhood Energy and Protein Needs:

<u>Age (yrs.)</u>	<u>Kcal/Kg</u>	<u>Gram protein/Kg</u>
1-3	100	1.2
4-6	90	1.2
7-10	70	1.0

Can also use Kcal/cm for children who are short, under or over wt.

<u>Age (yrs.)</u>	<u>Kcal/cm</u>	<u>Gram protein/cm</u>
1-3	15	0.18
4-6	16	0.21
7-10	15	0.21

General Rule: 16% kcal from protein.

Iron: growth & cognition (evidence exists.)

- Most common nutritional deficiency in US & in world.
- More common in African American than in whites.
- More common in children living below the poverty line.
- Non-heme - absorption is enhanced with Vit C.

Fiber:

- Laxative effect.
- Prevention of chronic diseases late in life.
CVD (cardiovascular), DMII (diabetes mellitus) some cancers.

May limit intake in some children (fills them up.)

Most children in U.S. do not eat enough fiber Why? (Fast food & junk food, Capt'n Crunch syndrome.)

**Recommendation is (after 2 yrs. of age): 5 grams + yrs of age
(Ex. 4 yr. old needs 9 gm)**

How to increase fiber in child's diet? Table 9-6., p. 288.

(More fruit, whole wheat instead of white bread, wheaties, dried fruit, vegetables, oatmeal & oatmeal cookies.)

Breakfast

- Effects of short term fast studies (see text).
- Up to 50% of school children skip breakfast.
- Moderate increase in blood glucose improves cognitive function.
- Better attendance, behavior, attention, less depression.
- Better math grades, less time in principal's office.

Children who skip breakfast are less efficient in problem solving, have reduced recall of newly acquired information, and have decreased verbal fluency and creativity. When breakfast is skipped, the nutrients usually consumed at the breakfast meal are not recovered from intake during the remainder of the day. A significant difference was found in the average daily vitamin and mineral intake pattern based on ready-to-eat cereal consumption patterns. Children who ate cereal were found to have significantly higher mean daily intakes of vitamin A, B6, thiamin, niacin, riboflavin, B12, D, folate, and iron.

Lead Poisoning in Children

1

Lead poisoning, or plumbism:

- Significant health hazard, despite mandated removal of lead from gasoline and paint.
- CDC: blood levels in children have decreased approx. 80% since the late 1970s. However, lead poisoning (blood lead level equal to or greater than 10 $\mu\text{g}/\text{dL}$ of blood) affects > 4% of preschool-aged children.
- Prevalence of lead poisoning decreased from 10.5% in 1996 to 7.6% in 1998 in children <6 yrs.
- Lead poisoning continues to be problematic. In some states, blood levels indicative of lead poisoning in 14.9% of children studied. It is significantly more prevalent in African-American children, low-income families, urban areas, and older housing.

Lead Poisoning in Children

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- Elevated lead levels are associated with damage to the CNS, kidneys, and blood production system and also with a decrease in IQ test scores. It is insidious because minute amounts of lead can impair a child's growth and cause irreversible damage to the nervous system.
- Unfortunately for many children, the physical symptoms of lead poisoning may be vague or absent until the lead accumulation reaches dangerously high levels.
- Children are especially vulnerable because they absorb lead more readily than do adults. Children are also at risk because of behaviors such as playing in lead-contaminated soil, chewing on lead-painted windowsills, or engaging in other hand-to-mouth activities with lead-contaminated items.

Lead Poisoning in Children

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- Prevention is the most important strategy for combating lead poisoning. A significant reduction in blood lead levels was noted with the removal of lead from gasoline and paint.
- Secondary prevention focuses on removing or preventing lead already in the environment from being consumed or absorbed. This includes interior dust abatement, use of high-efficiency particulate air (HEPA) vacuums,, soil abatement, and residential paint remediation.
- Family education that focuses on a safe water supply, avoiding use of lead-contaminated pottery and crystal, avoiding use of lead-contaminated medicines or natural remedies, and washing hands before eating is also important. Families are also counseled on the importance of an adequate diet w/sufficient amounts of Ca, Fe, & Zn.

Lead Poisoning in Children

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Role of Diet

- The body handles lead by making use of existing metal nutrient transport systems. consequently some nutrients may influence an individual's handling of lead, although exposure to excess lead results in high blood levels regardless of the adequacy of the diet.
- Lead toxicity is more common in infants and children who are at nutritional risk, such as urban, economically disadvantaged, and nonwhite children.
- Lead uptake is greatly enhanced in the fasting state.
- Deficiencies of Ca, Phosphorus, Fe, Zn, or Vit C may make children more susceptible to lead intoxication.
- Studies show inverse relationships between the absorption and distribution of dietary Ca and levels of lead in the blood. It is thought that phosphorus and Ca may reduce lead toxicity.
- Iron def. anemia & high blood lead levels often occur in same child.

Lead Poisoning in Children

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- At first it was assumed that lead caused microcytic anemia by impairing iron utilization. It is now recognized that iron deficiency and excess lead both impair hemoglobin synthesis. Iron deficiency may enhance lead poisoning because decreased iron in the intestine can allow absorption of a larger portion of ingested lead.
- Children with elevated blood levels should be screened for iron deficiency and treated properly.
- CDC recommends universal screening in areas where at least 27% of houses were built before 1950 and in populations in which 12% or more of 1-2 year old children have elevated blood lead levels.
- In other areas, CDC recommends a screening questionnaire be given.
- Special attention s/b given to adopted foreign-born children who may have ingested significant amounts of lead before obtaining residence in the US.

Lead Poisoning in Children

6

- When a child is found to have significantly elevated blood lead levels, generally > 25 mg/dL, medical intervention is necessary.
- Chelation therapy is the use of various pharmaceutical agents that can be given orally, intramuscularly, or intravenously. They act to bind with lead and then the lead is excreted in the urine or in bile. For this therapy to be effective, special attention is concurrently given to reducing lead exposure.

Lead Poisoning in Children

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Lead (P. 291)

- Major environmental contaminant **READ BOOK!**

Interaction with other nutrients - increases susceptibility to toxicity.

- Calcium (Under-nourishment
- Iron in these increases
- Zinc susceptibility to toxicity.)

- Children with elevated levels of lead should also be screened for IDA (Iron Deficiency Anemia - IDA may enhance lead poisoning.)

Children at nutritional risk:

Poverty

Diet composition/patterns

Education level & knowledge of parents

Veganism

- Protein, iron, zinc, Ca, riboflavin, Vit B6, B12, & D.
- Increased fiber intake can result in decrease kcal intake.

HOW? (fills them up.)

CHOICES, CONSISTENCY, CONSEQUENCES

Factors affecting children's diets. HOW? (culture, availability of food, hiding food, control)

Family

Peers

******* Media**

Poverty (plentiful & cheap usually not nutritious.)

Nutrition knowledge & education (education can be integrated in other subjects.)

Division of Responsibility

	Infant	Toddler & Older
Parent	What	What When Where
Child	How Much	How Much Whether

DO:

- **Offer a variety of healthy foods (increases chance child will eat something.)**
 - **Keep portions child-sized.**
 - **Make family meals pleasant.**
 - **Encourage appropriate behavior at the table.**
 - **Allow your child to be more involved in food preparation in the kitchen and/or garden.**
- But keep it fun.**

DON'T:

- **Short order cook (i.e., cook 1 meal for everyone; not special orders for each.)**
- **Allow begging for food between meal and snack times.**
- **Pressure your child to eat something.**
- **Bribe your child to eat something. (This gives them power to manipulate you.)**
- **Eat in front of the television.**
- **Allow your child to be disruptive at the table.**
- **Use food as reward, bribe, or punishment.**

Got Calcium?

1

- 44MM Americans (> half population >50) suffer from osteoporosis. It could hit 61MM by 2020 if today's preteens and teenagers don't adjust their diets. A key step: ditching soda for milk or calcium-fortified drinks.
- Adolescents can't see investing in a "bone bank" that pays such distant dividends.
- Teens need Ca more than any other age group. 90% of bone mass is established by age 17; it peaks at 21 before eroding.
- Girls are at greater risk (overtraining or eating disorders can halt menstruation, reducing the estrogen needed to build bones.)
- These are make it or break it years.
- Teen diets are dangerously deficient. Only 2 in 10 girls and 5 in 10 boys get the recommended 1300 mg/da of Ca. Most take in just 800.

Got Calcium?

2

- Parents can make a difference by serving Ca at every meal; the body absorbs only 500 mg of Ca (2 slices of cheese pizza -- at a time).
- Milk alternatives: calcium-fortified OJ or apple juice, fortified soy or rice milk and cereals like Total. Ca-laced candies are OK. Vegetables like broccoli have Ca, but it can take pounds to equal a cup of milk.
- Recognizing a Ca gap is key to closing it.

Children have their own ways of eating.

Adults	Children
Eat food even if it doesn't taste the best, because it's good for them and they paid for it.	Eat what tastes good. And what tastes good to them today might not taste good tomorrow.
Usually eat some of everything that is put before them.	Eat only one or two foods. They ignore everything else.
It doesn't work to try to get children to eat like adults.	When forced to eat, they lose interest in food and eat poorly.

Nutritional needs during adolescence

Energy & protein needs are related to growth rate & activity

Best predictor of energy needs & protein needs - based on cm.

Age	Male <u>Kcal/cm</u>	Male <u>g. protein/cm</u>	Female <u>Kcal/cm</u>	Female <u>g. protein/cm</u>
11-14	15.9	0.29	14	0.29
15-18	17.0	0.34	13.5	0.27
19-24	16.4	0.33	13.4	0.28

RDA: Use Chronological Age

Male 11-14 yr.	Female 11-14	Male 15-18	Female 15-18 yr.
2500	2000	3000	2200
45	46	59	44

Indicators of Nutritional Status

Head circumference-for-age < 5th percentile
> 95th percentile

Stunting / Shortness

length or stature-for-age < 5th percentile

Underweight

weight-for-length

BMI-for-age < 5th percentile

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7-10	15		0.21	
	Male	Female	Male	Female
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Age	kcal/day		g. protein/day	
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Childhood Growth & Development

Characterized by slow & steady growth.

Spurts of growth & periods of no growth.

Two developmental periods.

1. Preschool: 2-6 yrs.

Toddlers: 1-2 yrs.

2. School yrs.

Girls: 8-10 yrs.

Boys: 6-12 yrs.

Latent growth period.

- slow & steady rate preceding prepubertal growth spurt (beer belly).

Childhood Growth & Development

Pattern of Growth

- Infancy (kcal/kg highest at this age.)
 - 9 inches & triple birth weight.
- Preschool
 - Age 2-3: 5 in/yr & 5-6 lb/yr.
 - Age 3-4/5 3 in/yr & 4.5 lb/yr.
- School Age 2-3 in/yr & 7 lb/yr.

Factors influencing Food behavior.

Psychological

Self concept

Emotional development

Emotional use of food

Denial of hunger

Stress/anxiety eating

Body image

Social

- Culture

- National, ethnic, religious backgrounds

- Geographic, social, economic environments

Factors influencing Food behavior (continued).

- Financial status
- Time pressures (huge effect on families today.)
- Family
 - Direct - what food is available.
 - Indirect - development of food attitudes, preferences, patterns. Emotional components (love, approval, reward.)
- Peers
- **Mass Media**
- Nutrition knowledge.
 - Not a major determinant of food choice. (Yes for younger kids; no for adol.)
 - Lack of time, discipline, sense of urgency.

What influences food behavior?

- Parents provide food, child chooses.
- Modeling
 - Children's food behavior is similar to the adults.
 - If as a parent you eat well, child will too.
- Food experience: teen focus groups.
 - EASY** **FAMILIAR** **APPETIZING**
- Control:
 - Lower caloric intake if child is allowed control.

Trends in Society

- **Working parents**
 - **Less meal supervision.**
 - **Fewer meals as a family.**
- **Exercise**
 - **Academics not exercise.**
 - **Safety**
 - **sports not exercise.**
- **Body image: boys and girls**
 - boys are now having eating disorders.**

What can be done to influence food choices & health behaviors in teens?

Parents,peers, society, school?

1. Improve overall diet quality.
2. consumption of high fat snacks that aren't nutrient dense.
3. Limited time for shopping & food preparation.
4. Excess or increasing body wt.
5. Improving overall level of fitness.