HUMAN MILK AND HUMAN HEALTH

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Just beginning to understand the role of:
• Oligosaccharides in human milk
• Importance of the human microbiome
Formula-fed babies are sick more often and sick more seriously than breastfed babies.
CURRENT AAP GUIDELINES

- Breastfeed exclusively for 6 months (no other food, not even water during this time)
- Continue to breastfeed for at least 1 year (WHO recommends at least 2 years) as other foods are introduced
- Continue breastfeeding after 1 year “for as long as desired by mother and baby”
2016 U.S. BREASTFEEDING RATES

- **Initiation Rate** 81.1%
- **Duration Rate** at 12 months: 30.7%
3 months after birth---47.4% of mothers still exclusively breastfeeding (55.6% have introduced formula)

Only 22.3% of American mothers exclusively breastfeed for the recommended 6 months (77.7% of mothers do not)
WHAT DOES “BREASTFEEDING” MEAN

- Breastfeeding initiation
- Exclusive breastfeeding
- Breastfeeding duration
WHY IS A SPECIFIC DEFINITION IMPORTANT?

- Human milk and human health have a dose/response relationship
BREASTFEEDING AND OBESITY

- Babies breastfed two months or less are almost four times more likely than babies breastfed more than a year to be obese when they enter elementary school.
- Study of sibling pairs.
WHY?

• Human milk contains factors that inhibit the production of chemicals associated with fat deposits
• Human milk is lower in protein than formula
• Human milk contains leptin
• Other hormones in human milk
WHY?

- Breastfed babies self-regulate food intake
- As older children, breastfed babies eat a wider variety of foods
- Doubling of birth weight in first 4-6 months
- Crucial period for the establishment of weight regulation
• Having been breastfed longer than 12 months is a significant predictor of diabetic status

• Researchers conclude that prolonged breastfeeding should be promoted to prevent the disease
BREASTFEEDING AND TYPE 1 DIABETES

- Exposure to cows’ milk in infancy seems to play a role in the development of Type 1 diabetes in predisposed children.
WHY?

• Bovine insulin similar (but not identical) in structure to human insulin; susceptible infants sometimes manufacture antibodies

• 10 percent of formula-fed children form the antibodies associated with diabetes
MORE WHY?

- Permeability of the intestinal epithelium is increased in Type 1 diabetics, possibly facilitating contact with food antigens
- Breastfed infants maintain a healthy gut epithelium
BREASTFEEDING AND HEART DISEASE

• Breastfeeding associated with lower levels of total cholesterol and low-density lipoprotein in adulthood
BREASTFEEDING AND HEART DISEASE

• For each 3-month period of breastfeeding, systolic pressure falls by 0.2 mm Hg at 7.5 years of age

• A 1% reduction in population systolic blood pressure levels translates to a 1.5% reduction in all-cause mortality, equivalent to 8,000 fewer premature deaths a year in the United States
Four factors associated with the development of asthma:

- Gestational age less than 37 weeks
- Household smoking
- Birth by cesarean surgery
- Introduction of formula before four months of age
Longer duration of breastfeeding appears to be protective against the development of asthma and wheeze in children. Mothers should breastfeed for at least 10 months to assure the protective effect.
WHY?

• Higher BMI is a risk factor for asthma
• Early respiratory infections increase childhood asthma risk
• Aberrant colonization of the newborn gut affects maturation and differentiation of the immune system
BREASTFEEDING AND CHILDHOOD CANCER

- Babies breastfed for 6 months or less are almost three times more likely to contract a lymphoid malignancy than babies breastfed longer than 6 months.
WHY?

• **Experiments at Lund University:** Every type of cancer cell tested in the lab killed by human milk

• **Theory:** The errant cells that give rise to malignancies show up in infancy. Alpha-lactalbumin roots out these potentially malignant cells.

• Human milk’s epidermal growth factors
The more babies breastfed through 9 months of age, the higher they scored on intelligence tests in their late teens and 20s.

Breastfed children have significantly higher IQ scores at 7-8 years of age after adjustment for differences in maternal education and class.

Pre-term studies.
WHY?

• The human brain grows faster than that of any other mammal in the 12 months after birth
• It makes evolutionary and biological sense that human milk would somehow enhance brain development
WHY?

• The cholesterol, taurine, and DHA found in human milk, and not formula, enhance brain development

• Human milk promotes white matter growth
• Women who breastfeed each of their children for more than two years have a 50% decreased risk of breast cancer compared with women who breastfeed for only one to six months.
WHY?

• Theory: Lactation suppresses ovulation
• Lifetime exposure to estrogen is a risk factor for breast cancer
• The longer a woman breastfeeds, the lower her lifetime exposure to estrogen
• Postmenopausal women who have breastfed have less hypertension, less diabetes, less hyperlipidemia, and less cardiovascular disease than women who have never breastfed
WHY?

- Lactation increases metabolic expenditure.
- Lactating women lose more weight in the postpartum period.
- Active lactation improves glucose tolerance, lipid metabolism, and C-reactive protein.
• The risk of hip fracture after menopause is reduced by 13% for every additional 6 months of breastfeeding per child after the initial 6 months of breastfeeding
BREASTFEEDING AND OSTEOPOROSIS

• This explains why hip fractures are more common in men than in women in China, where prolonged breastfeeding is common.

• Breastfeeding is beneficial for bone health in a population with low calcium consumption.
WHY?

• Lactation decalcifies bones
• After weaning, a mother’s bones re-calcify so that her bones are stronger than before lactation began
• Mechanism of action unknown
BREASTFEEDING AND MS

• Mothers who breastfeed for at least a cumulative 15 months have a 50% lower chance of getting MS than mothers who breastfeed 4 months or less.
WHY?

• Hormonal component suspected
If you care about preventive medicine, you care about breastfeeding.