

Breastfeeding as the Foundation for Health

Healthy People 2010 is a rich resource for health improvement in the US. Within its 28 focus areas are 467 specific objectives that serve as a roadmap for progress under two overarching goals:

- Increased quality and years of healthy life
- Eliminate health disparities

There is a simple, low cost health behavior that impacts and can improve at least 10% of these health objectives—breastfeeding. It is extremely important that health planners, policy makers, health care providers, funding agencies, third party payers, administrators, and congressional members are aware of the impact breastfeeding makes on the quality of life through the reduction of acute and chronic disease throughout the lifespan. This document provides an overview of the focus areas and health objectives that can be improved through breastfeeding. Selected references are provided under each focus area to illustrate the supporting evidence. Breastfeeding is a health behavior and an intervention that keeps millions of health care dollars from being spent on preventable conditions. Breastfeeding is the foundation of health and should provide the cornerstone of health planning in this country. Breastfeeding advocates may wish to distribute this document in situations and to entities that utilize HP2010 objectives in funding requests, health improvement projects, or quality of care measurements.

1 Access to Quality Health Services

1-7 (developmental objective) Increase the proportion of schools of medicine, schools of nursing, and other health professional training schools whose basic curriculum for health care providers includes core competencies in health promotion and disease prevention

1-9 reduce hospitalization rates for three ambulatory-care-sensitive conditions, pediatric asthma, uncontrolled diabetes, and immunization-preventable pneumonia and influenza in older adults

Freed G, et al. National assessment of physician's breastfeeding knowledge, attitudes, training, and experience. JAMA 1995; 273:472-476

Freed G, et al. Methods and outcomes of breastfeeding instruction for nursing students. J Hum Lact 1996; 12:105-110

2 Arthritis, Osteoporosis & Chronic Back Conditions

2-9 reduce the overall number of cases of osteoporosis

2-10 reduce the proportion of adults who are hospitalized for vertebral fractures associated with osteoporosis

Hreshchysn MM, et al. Association of parity, breastfeeding, and birth control pills with lumbar spine and femoral neck bone densities.

Am J Obstet Gynecol 1988; 159:318-322

Kalkworf HJ, Specker BL. Bone mineral loss during lactation and recovery after weaning. Obstet Gynecol 1995; 86:26

Kalkworf HJ, et al. Intestinal calcium absorption of women during lactation and after weaning. Am J Clin Nutr 1996; 63:526

3 Cancer

- 3-1 reduce the overall cancer death rates
- 3-3 reduce the breast cancer death rate
- 3-4 reduce the death rate from cancer of the cervix

Davis MK, et al. *Infant feeding and childhood cancer. Lancet* 1988; 2:365-368

Davis MK. *Review of the evidence for an association between infant feeding and childhood cancer. Intl J Cancer Suppl* 1998; 11:29-33

Freudenheim JL, et al. *Exposure to breast milk in infancy and the risk of breast cancer. Epidemiology* 1994; 5:324-331

Furberg H, et al. *Lactation and breast cancer risk. Intl J Epidemiol* 1999; 28:396-402

Infante-Rivard C, et al. *Markers of infection, breastfeeding, and childhood acute lymphoblastic leukemia. Br J Cancer* 2000; 83:1559-1564

Shu XO, et al. *Breastfeeding and the risk of childhood acute leukemia. J Nat Cancer Instit* 1999; 91:1765-1772

Zheng T, et al. *Lactation reduces breast cancer risk in Shandong Province, China. Am J Epidemiol* 2000; 152:1129-1135

4 Chronic Kidney Disease

- 4-7 reduce kidney failure due to diabetes
- 4-8 (developmental) increase the proportion of persons with type 1 or type 2 diabetes and proteinuria who receive recommended medical therapy to reduce progression to chronic renal insufficiency

5 Diabetes

- 5-2 prevent diabetes
- 5-3 reduce the overall rate of diabetes that is clinically diagnosed
- 5-5 reduce the diabetes death rate
- 5-6 reduce diabetes-related deaths among persons with diabetes
- 5-7 reduce the deaths from cardiovascular disease in persons with diabetes
- 5-8 (developmental) decrease the proportion of pregnant women with gestational diabetes
- 5-9 (developmental) reduce the frequency of foot ulcers in persons with diabetes
- 5-10 reduce the rate of lower extremity amputations in persons with diabetes

Mayer EJ, et al. *Reduced risk of IDDM among breastfed children. Diabetes* 1988; 37:1625-1632

Vaarala O, et al. *Cow's milk formula feeding induces primary immunization to insulin in infants at genetic risk for Type 1 diabetes. Diabetes* 1999; 48:1389-1394

Johnston CS, Monte WC. *Infant formula ingestion is associated with the development of diabetes in the BB/WOR rat. Life Sciences* 2000; 66:1501-1507

McKinney PA, Parslow R, Gurney KA, Law GR, Bodansky HJ, Williams R. *Perinatal and neonatal determinants of childhood type 1 diabetes. A case-control study in Yorkshire, U.K. Diabetes Care* 1999 Jun;22(6):928-32

7 Educational and Community-Based Programs

- 7-1 increase high school completion

Horwood LJ, et al. *Breastfeeding and later cognitive and academic outcomes. Pediatrics* 1998; 101(1) p.e9
<http://www.pediatrics.org/cgi/content/full/101/1/e9>

8 Environmental Health

- 8-5 increase the proportion of persons served by community water systems who receive a supply of drinking water that meets the regulations of the Safe Drinking Water Act

- 8-11 eliminate elevated blood lead levels in children
- 8-13 reduce pesticide exposures that result in visits to a health care facility
- 8-25 (developmental) reduce exposure of the population to pesticides, heavy metals, and other toxic chemicals, as measured by blood and urine concentrations of the substances and their metabolites (arsenic, cadmium, lead, manganese, etc)

Dusdieker LB, et al. Nitrates and babies: a dangerous combination. *Contemporary Pediatrics* 1996; 13:91-102

Houlihan J, et al. *Into the mouths of babes: bottle-fed infants at risk from atrazine in tap water.* Washington, DC: Environmental Working Group, 1999 <http://www.ewg.org>

Shannon MW, et al. Lead intoxication in infancy. *Pediatrics* 1992; 89:87-90

9 Family Planning

- 9-2 reduce the proportion of births occurring with 24 months of a previous birth

Kennedy KI, et al. Policy considerations for the introduction and promotion of the lactational amenorrhea method: advantages and disadvantages of LAM. *J Hum Lact* 1998; 14:191-203

12 Heart Disease and Stroke

- 12-1 reduce coronary heart disease deaths
- 12-13 reduce the mean total blood cholesterol levels among adults
- 12-14 reduce the proportion of adults with high total blood cholesterol levels

Fall CH, et al. Relation of infant feeding to adult serum cholesterol concentration and death from ischemic heart disease. *Br Med J* 1992; 304(6830):801-805

Plancoulaines S, et al. Infant feeding patterns are related to blood cholesterol concentration in prepubertal children aged 5-11 y: the Fleurbaix-Laventie Ville Sante study. *Eur J Clin Nutr* 2000; 54:114-119

Ravelli AC, van der Meulen JH, Osmond C, Barker DJ, Bleker OP. Infant feeding and adult glucose tolerance, lipid profile, blood pressure, and obesity. *Arch Dis Child* 2000 Mar;82(3):248-52

14 Immunization and Infectious Diseases

- 14-1 reduce or eliminate indigenous cases of vaccine-preventable disease
- 14-4 reduce bacterial meningitis in young children
- 14-5 reduce invasive pneumococcal infections
- 14-18 reduce the number of courses of antibiotics for ear infections for young children
- 14-22 achieve and maintain effective vaccination coverage levels for universally recommended vaccines among young children

Hahn-Zoric M, et al. Antibody responses to parenteral and oral vaccines are impaired by conventional and low protein formulas as compared to breastfeeding. *Acta Paediatr Scand* 1990; 79:1137-1142

Zoppi G, et al. Diet and antibody response to vaccinations in healthy infants. *Lancet* 1983; II:11-14

15 Injury and Violence Prevention

- 15-37 reduce physical assaults

Acheson L. Family violence and formula feeding. *Arch Fam Med* 1995; 4:650-652

Masters RD et al. *Environmental pollution, neurotoxicity, and criminal violence.* In Rose J (ed). *Environmental toxicology.* London & New York: Gordon and Breach Publishers, 1998

16 Maternal, Infant, and Child Health

16-1 reduce fetal, infant, and child deaths

16-1h reduce deaths from SIDS

16-19 increase the proportion of mothers who breastfeed their babies

American Academy of Pediatrics, Workgroup on breastfeeding. Breastfeeding and the use of human milk. *Pediatrics* 1997; 100:1035-1039

Fredrickson DD, et al. Relationship between sudden infant death syndrome and breastfeeding intensity and duration. *Am J Dis Child* 1993; 147:460

Rogan WK. Cancer from PCBs in breast milk? A risk benefit analysis. Abstract #612 *Pediatr Res* 1989; 25:105A

Saadi AT, Gordon AE, MacKenzie DA, James VS, Elton RA, Weir DM, Busuttill A, Blackwell CC. The protective effect of breast feeding in relation to sudden infant death syndrome (SIDS): I. The effect of human milk and infant formula preparations on binding of toxigenic *Staphylococcus aureus* to epithelial cells. *FEMS Immunol Med Microbiol* 1999 Aug 1;25(1-2):155-65

Gordon AE, Saadi AT, MacKenzie DA, James VS, Elton RA, Weir DM, Busuttill A, Blackwell CC. The protective effect of breast feeding in relation to sudden infant death syndrome (SIDS): II. The effect of human milk and infant formula preparations on binding of *Clostridium perfringens* to epithelial cells. *FEMS Immunol Med Microbiol* 1999 Aug 1;25(1-2):167-73

Gordon AE, Saadi AT, MacKenzie DA, Molony N, James VS, Weir DM, Busuttill A, Blackwell CC. The protective effect of breast feeding in relation to sudden infant death syndrome (SIDS): III. Detection of IgA antibodies in human milk that bind to bacterial toxins implicated in SIDS. *FEMS Immunol Med Microbiol* 1999 Aug 1;25(1-2):175-82

18 Mental Health and Mental Disorders

18-4 increase the proportion of persons with serious mental illness who are employed

Anderson JW, et al. Breastfeeding and cognitive development: a meta-analysis. *Am J Clin Nutr* 1999; 70:525-535

McCreadie RG. The Nithsdale Schizophrenia Surveys 16. Breastfeeding and schizophrenia: preliminary results and hypotheses. *Br J Psychiatry* 1997; 170:334-337

19 Nutrition and Overweight

19-1 increase the proportion of adults who are at a healthy weight

19-2 reduce the proportion of adults who are obese

19-3 reduce the proportion of children and adolescents who are overweight or obese

19-4 reduce growth retardation among low income children under age 5 years

19-18 increase food security among US households and in so doing reduce hunger

Gillman MW, et al. Risk of overweight among adolescents who were breastfed as infants. *JAMA* 2001; 285:2461-2467

Scaglioni S, et al. Early macronutrient intake and overweight at five years of age. *Intl J Obes Relat Metab Disord* 2000; 24:777-781

Tulldahl J, et al. Mode of infant feeding and achieved growth in adolescence: early feeding patterns in relation to growth and body composition in adolescence. *Obesity Research* 1999; 7:431-437

von Kries R, et al. Breastfeeding and obesity: cross sectional study. *Br Med J* 1999; 319:147-150

Von Kries R, et al. Does breastfeeding protect against childhood obesity? *Adv Exp Med Biol* 2000; 478:29-39

21 Oral Health

- 21-1 reduce the proportion of children and adolescents who have dental caries experience in their primary or permanent teeth
- 21-15 increase the number of states and the District of Columbia that have a system for recording and referring craniofacial anomalies to craniofacial anomaly rehabilitation teams

Bowen WH, et al. *Assessing the cariogenic potential of some infant formulas, milk and sugar solutions. J Am Dent Assoc* 1997; 128:865-871

Erickson PR, et al. *Investigation of the role of human breast milk in caries development. Pediatr Dent* 1999; 21:86-90

Erickson PR, et al. *Estimation of the caries-related risk associated with infant formula. Pediatr Dent* 1998; 20:395-403

Ollila P, et al. *Prolonged pacifier sucking and the use of a nursing bottle at night: possible risk factors for dental caries in children. Acta Odontol Scand* 1998; 56:233-237

Pendrys DG. *Risk of enamel fluorosis in nonfluoridated and optimally fluoridated populations. J Am Dental Assoc* 2000; 131:746-755

Sheikh C, et al. *Evaluation of plaque pH changes following oral rinse with eight infant formulas. Pediatr Dent* 1996; 18:200-204

Van Winkle S, et al. *Water and formula fluoride concentrations: significance for infants fed formula. Pediatric Dentistry* 1995; 17:305-310

24 Respiratory Disease

- 24-1 reduce asthma deaths
- 24-2 reduce hospitalizations for asthma
- 24-3 reduce hospital emergency department visits for asthma
- 24-5 (developmental) reduce the number of school or work days missed by persons with asthma

Haby MM, et al. *Asthma in preschool children: prevalence and risk factors. Thorax* 2001; 56:589-595

Oddy W, et al. *Association between breastfeeding and asthma in 6 year old children: findings of a prospective birth cohort study. Br Med J* 1999; 319:815-819

Saarinen UM, et al. *Breastfeeding as prophylaxis against atopic disease: prospective follow up study until 17 years old. Lancet* 1995; 346:1065-1069

Scariati PD, et al. *A longitudinal analysis of infant morbidity and the extent of breastfeeding in the United States. Pediatrics* 1997; 99: p. e5

<http://www.pediatrics.org/cgi/content/full/99/6/e5>

Wilson AC, et al. *Relation of infant diet to childhood health: seven year follow up of cohort of children in Dundee infant feeding study. Br Med J* 1998; 316:21-25

28 Vision and Hearing

- 28-4 reduce blindness and visual impairment in children and adolescents aged 17 years and under
- 28-5 (developmental) reduce visual impairment due to diabetic retinopathy
- 28-11 increase the proportion of newborns who are screened for hearing loss by age 1 month, have audiologic evaluation by age 3 months, and are enrolled in appropriate intervention services by age 6 months
- 28-12 reduce otitis media in children and adolescents
- 28-17 (developmental) reduce noise-induced hearing loss in children and adolescents under age 17 years

American Academy of Pediatrics Committee on Environmental Health. Noise: a hazard for the fetus and newborn. Pediatrics 1997; 100:724-727

Birch E, et al. Breastfeeding and optimal visual development. J Pediatr Ophthalmol Strabismus 1993; 30:30-38

Brown CE, Magnuson B. On the physics of the infant feeding bottle and middle ear sequela: ear disease in infants can be associated with bottle feeding. Intl J Pediatr Otorhinolaryngol 2000; 54:13-20

Hanson LA. Human milk and host defense: immediate and long-term effects. Acta Paediatr Suppl 1999 Aug;88(430):42-6

Keefe MR. Comparison of neonatal nighttime sleep-wake patterns in nursery versus rooming-in environment. Nurs Res 1987; 36:140-144

Uauy RD, et al. Effect of dietary omega-3 fatty acids on retinal function of very low birth weight neonates. Pediatr Res 1990; 28:485-492

Williams C, et al. Stereoacuity at age 3.5 y in children born full term is associated with prenatal and postnatal dietary factors: a report from a population-based cohort study. Am J Clin Nutr 2001; 73:316-322