Breast milk as the gold standard for protective nutrients.

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In this introductory overview, I explore the observation that breast milk is the gold standard for protective nutrients fed to newborn infants and present clinical evidence of its strong protective effect against age-related infectious gastroenteritis. The composition of breast milk changes according to the newborn infant's needs for passive protection. In addition, substances in breast milk can actively stimulate development of the newborn's host defenses to provide continued mucosal protection after breastfeeding is terminated. Later I present several specific examples of the development of intestinal host defenses due to breastfeeding. An important function of early breastfeeding is its anti-inflammatory effect on the immature, excessive inflammatory response in newborns. Several components of breast milk can reduce the inflammatory response to stimuli in the newborn intestine. These include transforming growth factor (TGF)-beta, interleukin (IL)-10, erythropoietin, and lactoferrin. These components of breast milk can act individually or in concert to contain the neonatal immature anti-inflammatory response. Copyright 2010. Published by Mosby, Inc.

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Cytokines in human milk.

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Epidemiologic studies conducted in the past 30 years to investigate the protective functions of human milk strongly support the notion that breastfeeding prevents infantile infections, particularly those affecting the gastrointestinal and respiratory tracts. However, more recent clinical and experimental observations also suggest that human milk not only provides passive protection, but also can directly modulate the immunological development of the recipient infant. The study of this remarkable defense system in human milk has been difficult because of its
biochemical complexity, the small concentration of certain bioactive components, the 
compartmentalization of some of these agents, the dynamic quantitative and qualitative changes 
of milk during lactation, and the lack of specific reagents to quantify these agents. However, a 
host of bioactive substances, including hormones, growth factors, and immunological factors 
such as cytokines, have been identified in human milk. Cytokines are pluripotent polypeptides 
that act in autocrine/paracrine fashions by binding to specific cellular receptors. They operate in 
networks and orchestrate the development and functions of immune system. Several different 
cytokines and chemokines have been discovered in human milk in the past years, and the list is 
growing very rapidly. This article will review the current knowledge about the increasingly 
complex network of chemoattractants, activators, and anti-inflammatory cytokines present in 
human milk and their potential role in compensating for the developmental delay of the neonate 
immune system. Copyright 2010. Published by Mosby, Inc.

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Breastfeeding reduces the severity of respiratory syncytial virus infection among young infants: a multi-center prospective study.

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BACKGROUND: The objective of this study was to evaluate the effects of breastfeeding on the 
severity of respiratory syncytial virus infection in early infancy. METHODS: A rapid test for 
respiratory syncytial virus (RSV) was administered by 16 general pediatricians from May 2002 
to April 2005 in infants undergoing medical checkups for the common cold, all of whom were 
100 days old or younger and had birthweights of more than 2500 g without underlying disease. 
Infants were divided into three groups: the Full breastfeeding group, the Partial group, and the 
Token group. RSV-positive cases were followed up for 10 days after the initial diagnosis and the 
following three points were investigated: (i) the incidence of hospitalization; (ii) the duration of 
hospitalization; and (iii) the incidence of requiring oxygen therapy. RESULTS: RSV antigen was 
detected in 203 of the total of 892 cases, and these were diagnosed as cases of RSV infectious 
disease. Although there were no significant differences in the hospitalization rate among the
three groups, there were significant differences in the duration of hospitalization and the rate of requiring oxygen therapy. Multivariate logistic regression revealed that the requirement of oxygen therapy was significantly lower in the Full breastfeeding group \( (P=0.032; \text{odds ratio, } 0.256; 95\% \text{ confidence interval, } 0.074-0.892)\). CONCLUSIONS: Breastfeeding reduces the severity of respiratory syncytial virus infection in early infancy.

PMID: 19419530 [PubMed - in process]


The risks of not breastfeeding for mothers and infants.

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Health outcomes in developed countries differ substantially for mothers and infants who formula feed compared with those who breastfeed. For infants, not being breastfed is associated with an increased incidence of infectious morbidity, as well as elevated risks of childhood obesity, type 1 and type 2 diabetes, leukemia, and sudden infant death syndrome. For mothers, failure to breastfeed is associated with an increased incidence of premenopausal breast cancer, ovarian cancer, retained gestational weight gain, type 2 diabetes, myocardial infarction, and the metabolic syndrome. Obstetricians are uniquely positioned to counsel mothers about the health impact of breastfeeding and to ensure that mothers and infants receive appropriate, evidence-based care, starting at birth.

PMID: 20111658 [PubMed - in process]


Breastfeeding protects against infectious diseases during infancy in industrialized countries. A systematic review.

Duijts L, Ramadhani MK, Moll HA.
Firstly, this review was performed to assess the effect of breastfeeding on infections during infancy in industrialized countries. Secondly, the effect of duration and exclusiveness of breastfeeding were explored. Studies were identified using Medline, Cochrane Library, Science Citation Index and by a manual search from bibliographies of articles from August 1986 to January 2008. Follow-up, case-control and randomized controlled trial (RCT) studies performed in an industrialized country, published in English, with breastfeeding as a determinant, with overall infections, gastrointestinal or respiratory tract infections as a major outcome, and at least 40 participants in the study were included. Using Bauchner's criteria published in a review in 1986, two reviewers and a peer reviewer assessed the internal validity of those studies. Twenty-one studies that met the inclusion and internal validity criteria were included. These included 16 follow-up and four case-control studies and one RCT. Four out of five studies observed decreased effects on overall infections in breastfed infants. With regard to gastrointestinal infections, six out of eight studies suggested that breastfeeding had a protective effect. Thirteen out of 16 studies concluded that breastfeeding protects infants against respiratory tract infections. Five studies combined duration and exclusiveness of breastfeeding. All studies observed a protective dose/duration-response effect on gastrointestinal or respiratory tract infections. These studies strongly suggest that breastfeeding protects infants against overall infections, gastrointestinal and respiratory tract infections in industrialized countries. The optimal duration of exclusive breastfeeding for protection against infectious diseases needs to be studied in more detail.

PMID: 19531047 [PubMed - in process]


Association between infant feeding patterns and diarrhoeal and respiratory illness: a cohort study in Chittagong, Bangladesh.

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BACKGROUND: In developing countries, infectious diseases such as diarrhoea and acute respiratory infections are the main cause of mortality and morbidity in infants aged less than one year. The importance of exclusive breastfeeding in the prevention of infectious diseases during infancy is well known. Although breastfeeding is almost universal in Bangladesh, the rates of exclusive breastfeeding remain low. This cohort study was designed to compare the prevalence
of diarrhoea and acute respiratory infection (ARI) in infants according to their breastfeeding status in a prospective cohort of infants from birth to six months of age. METHODS: A total of 351 pregnant women were recruited in the Anowara subdistrict of Chittagong. Breastfeeding practices and the 7-day prevalence of diarrhoea and ARI were recorded at monthly home visits. Prevalences were compared using chi-squared tests and logistic regression. RESULTS: A total of 272 mother-infant pairs completed the study to six months. Infants who were exclusively breastfed for six months had a significantly lower 7-day prevalence of diarrhoea [AOR for lack of EBF = 2.50 (95%CI 1.10, 5.69), p = 0.03] and a significantly lower 7-day prevalence of ARI [AOR for lack of EBF = 2.31 (95%CI 1.33, 4.00), p < 0.01] than infants who were not exclusively breastfed. However, when the association between patterns of infant feeding (exclusive, predominant and partial breastfeeding) and illness was investigated in more detail, there was no significant difference in the prevalence of diarrhoea between exclusively [6.6% (95% CI 2.8, 10.4)] and predominantly breastfed infants [3.7% (95% CI 0.9, 18.3), (p = 0.56)]. Partially breastfed infants had a higher prevalence of diarrhoea than the others [19.2% (95% CI 10.4, 27.9), (p = 0.01)]. Similarly, although there was a large difference in prevalence in acute respiratory illness between exclusively [54.2% (95% CI 46.6, 61.8)] and predominantly breastfed infants [70.4% (95% CI 53.2, 87.6)] there was no significant difference in the prevalence (p = 0.17). CONCLUSION: The findings suggest that exclusive or predominant breastfeeding can reduce rates of morbidity significantly in this region of rural Bangladesh.

PMID: 19025613 [PubMed]


Hospitalization and mortality among primarily nonbreastfed children during a large outbreak of diarrhea and malnutrition in Botswana, 2006.


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BACKGROUND: In 2006, a pediatric diarrhea outbreak occurred in Botswana, coinciding with heavy rains. Surveillance recorded a 3 times increase in cases and a 25 fold increase in deaths between January and March. Botswana has high HIV prevalence among pregnant women (33.4% in 2005), and an estimated 35% of all infants under the age of 6 months are not breastfed.
METHODS: We followed all children <5 years old with diarrhea in the country's second largest referral hospital at the peak of the outbreak by chart review, interviewed mothers, and conducted laboratory testing for HIV and enteric pathogens. RESULTS: Of 153 hospitalized children with diarrhea, 97% were <2 years old; 88% of these were not breastfeeding. HIV was diagnosed in 18% of children and 64% of mothers. Cryptosporidium and enteropathogenic Escherichia coli were common; many children had multiple pathogens. Severe acute malnutrition (kwashiorkor or marasmus) developed in 38 (25%) patients, and 33 (22%) died. Kwashiorkor increased risk for death (relative risk 2.0; P = 0.05); only one breastfeeding child died. Many children who died had been undersupplied with formula. CONCLUSIONS: Most of the severe morbidity and mortality in this outbreak occurred in children who were HIV negative and not breastfed. Feeding and nutritional factors were the most important determinants of severe illness and death. Breastfeeding is critical to infant survival in the developing world, and support for breastfeeding among HIV-negative women, and HIV-positive women who cannot formula feed safely, may prevent further high-mortality outbreaks.

PMID: 19801943 [PubMed - indexed for MEDLINE]


Breast feeding: A time to craft new policies.

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New studies of breastfeeding have discovered or confirmed the benefits to mother and child. They reinforce an emphasis on exclusive breastfeeding - no other food or fluids - during the first 6 months. Studies include findings from across the world, in well-resourced and poorly resourced settings. They also emphasize longer duration of breastfeeding, into the second year of life, and gradual rather than abrupt weaning. For HIV-infected mothers, the dangers of non-exclusive feeding in the first half year of life have been well documented in recent publications. Other studies open up the possibilities for antiretroviral treatment to accompany breastfeeding, whether given to the mother, or child, or both. To be effective, implementation of any recommendations must consider individual, family, and community resources.

PMID: 19806071 [PubMed - indexed for MEDLINE]

Breast-feeding: A commentary by the ESPGHAN Committee on Nutrition.


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This medical position article by the European Society for Paediatric Gastroenterology, Hepatology, and Nutrition summarises the current status of breast-feeding practice, the present knowledge on the composition of human milk, advisable duration of exclusive and partial breast-feeding, growth of the breast-fed infant, health benefits associated with breast-feeding, nutritional supplementation for breast-fed infants, and contraindications to breast-feeding. This article emphasises the important role of paediatricians in the implementation of health policies devised to promote breast-feeding. The European Society for Paediatric Gastroenterology, Hepatology, and Nutrition Committee on Nutrition recognises breast-feeding as the natural and advisable way of supporting the healthy growth and development of young children. This article delineates the health benefits of breast-feeding, reduced risk of infectious diarrhoea and acute otitis media being the best documented. Exclusive breast-feeding for around 6 months is a desirable goal, but partial breast-feeding as well as breast-feeding for shorter periods of time are also valuable. Continuation of breast-feeding after the introduction of complementary feeding is encouraged as long as mutually desired by mother and child. The role of health care workers, including paediatricians, is to protect, promote, and support breast-feeding. Health care workers should be trained in breast-feeding issues and counselling, and they should encourage practices that do not undermine breast-feeding. Societal standards and legal regulations that facilitate breast-feeding should be promoted, such as providing maternity leave for at least 6 months and protecting working mothers.

PMID: 19502997 [PubMed - indexed for MEDLINE]


Environmental tobacco smoke exposure as a risk factor for infections in infancy.

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AIM: This prospective observational study investigated the effect of environmental tobacco smoke (ETS) on frequency and severity of common infantile infections. METHODS: In a representative sample of 926 infants, parental smoking was recorded at months 1 and 9 postpartum, and all infantile infectious episodes were recorded at 1, 3, 6, 9 and 12 months postpartum. RESULTS: Both parents were regular smokers all through the first year in 107 (11.6%), at least one smoked regularly or occasionally in 492 (53.1%), and parents did not smoke at all in 327 (35.3%) families. Among mothers, 168 (18.1%) smoked perinatally. Infantile ETS exposure was associated with increased frequency of total infectious episodes (p = 0.025) and hospitalizations for infection (p = 0.007). In ETS exposed infants, birth in autumn and presence of siblings contributed to increased frequency of most infections and of hospital admissions for infection. By contrast, exclusive breastfeeding protected against the effect of ETS on total infantile infections (OR 0.982, 95% CI 0.965-0.999; p = 0.036), hospital admissions for infection (OR 0.980, 95% CI 0.961-0.999; p = 0.036) and thrush (OR 0.973, 95% CI 0.951-0.996; p = 0.022). CONCLUSION: Our findings point to harmful effect of ETS on infantile health and further suggest that this effect may be enhanced or diminished by other factors. ETS should be regarded as a preventable risk factor for infections in infancy.

PMID: 19302093 [PubMed - indexed for MEDLINE]


Breastfeeding is an essential complement to vaccination.

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AIM: This article explores the role of breastfeeding in different aspects of vaccination in the first 6 months when infants are still developing: (1) pain management; (2) immunomodulation of infants' vaccine responses; (3) metabolism of thimerosal. METHODS: Major databases were searched for studies that addressed outcomes of related issues. RESULTS: Studies reveal that breastfeeding can: (1) help mothers and infants to cope with the stressful situations that accompany parenteral vaccines; (2) improve response to vaccines in the still maturing immunologic and enterohepatic systems of infants; (3) influence physiologic parameters that can change metabolism of ethylmercury derived from some vaccines. CONCLUSION: Health promotion that supports vaccinations should also emphasize early initiation and maintenance of exclusive breastfeeding up until 6 months for maximum protection of the infants with a possible beneficial effect on the vaccine response. Paediatric professionals should inform mothers of the proven benefits of breastfeeding and its importance in complementing vaccination and lowering stress and the risk of untoward reactions on susceptible infants.
Breast-feeding and a subsequent diagnosis of measles.

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BACKGROUND: Breast-feeding protects against many infectious diseases and may also influence immunization outcomes. AIM: This study investigated if breast-feeding protects against clinical measles and if it modified the effect of immunization. METHODS: We used logistic regression with data for 10 207 individuals from the 1970 British Cohort study (BCS70). Breast-feeding data were collected at five years of age, and information on clinical measles infection, as well as socio-economic measures was collected at the age of ten years. Breast feeding was categorized as: breast-fed <1 month (n = 1611), breast-fed for 1-3 months (n = 1016), breast-fed for more than three months (n = 1108), breast-feeding of uncertain duration (n = 21) and never breast-fed (n = 6451). RESULTS: Breast-feeding for more than three months was negatively associated with a diagnosis of clinical measles infection after adjustment for crowding, social class, measles vaccination, parity and sex with an odds ratio (95% confidence interval) of 0.69 (0.60-0.81) compared with those who never breast-fed. Measles vaccination was highly associated with low risk for measles with: 0.14 (0.13-0.16). Age at acute measles infection was not associated with breastfeeding. Breast-feeding did not notably alter measles immunization efficacy. CONCLUSION: Immunization against measles provides effective protection against the disease. A more modest reduction in the risk of a measles diagnosis is associated with breast-feeding. The associations with a diagnosis of measles for breast-feeding and measles immunization are independent of each other.
Preventive measures in infancy to reduce under-five mortality: a case-control study in The Gambia.

Rutherford ME, Dockerty JD, Jasseh M, Howie SR, Herbison P, Jeffries DJ, Mulholland K, Adegbola RA, Hill PC.

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OBJECTIVE: To investigate the relationship between child mortality and common preventive interventions: vaccination, trained birthing attendants, tetanus toxoid during pregnancy, breastfeeding and vitamin A supplementation. METHODS: Case-control study in a population under demographic surveillance. Cases (n = 141) were children under five who died. Each was age and sex-matched to five controls (n = 705). Information was gathered by interviewing primary caregivers. RESULTS: All but one of the interventions - whether the mother had received tetanus toxoid during pregnancy - were protective against child mortality after multivariate analysis. Having a trained person assisting at child birth (OR 0.2 95% CI 0.1-0.4), receiving all vaccinations by 9 months of age (OR 0.1; 95% CI 0.01-0.3), being breastfed for more than 12 months (Children breastfed between 13 and 24 months OR 0.1 95% CI 0.03-0.3, more than 25 months OR 0.1 95% CI 0.01-0.5) and receiving vitamin A supplementation at or after 6 months of age (OR 0.05; 95% CI 0.01-0.2) were protective against child death. CONCLUSIONS: This study confirms the value of at least four available interventions in the prevention of under-five death in The Gambia. It is now important to identify those who are not receiving them and why, and to intervene to improve coverage across the population.

PMID: 19171012 [PubMed - indexed for MEDLINE]

Orvostort Kozl. 2008;54(1-4):5-29.


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Maternal tolerance achieved during pregnancy is transferred to the offspring via breast milk and persistently protects the offspring from allergic asthma.

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BACKGROUND: Maternal, more than paternal, asthma is a risk factor for the development of asthma in children. Recently, epidemiologic studies have shown that environmental exposures during pregnancy might influence the development of childhood asthma and allergies.

OBJECTIVE: The aim of the present study was to investigate whether the induction of tolerance against a specific antigen during pregnancy prevents in the offspring the development of allergic asthma in response to this antigen.

METHODS: Balb/c mice were orally tolerized with ovalbumin (OVA) during pregnancy. The offspring of tolerized and naïve mothers were immunized with OVA at 6 weeks and 4 months of age and analysed in our murine asthma model.

RESULTS: While the offspring of naïve mice developed increased AHR, eosinophilic airway inflammation, T-helper type 2 cytokine production and high serum IgE levels in response to OVA sensitization, the offspring of tolerized mice were almost completely protected from asthma, even when immunized as late as 4 months after birth. Breastfeeding was crucial for protection because tolerance was only observed when the offspring were nursed by their own mothers and not when nursed by naïve wet-nurses. Allergen-specific IgG(1) antibodies were exclusively increased in the breast milk of tolerant mothers and serum of protected pups, indirectly supporting its important role in tolerance transfer from the mother to the offspring. Sensitization of the F1 generation from OVA-tolerized mothers with a heterologous allergen enhanced the immune response to this antigen.

CONCLUSION: Our results demonstrate that mucosal allergen contact during pregnancy modifies the asthma and allergy risk of the offspring mediated via breast milk. This observation may suggest that the time window for primary prevention strategies starts even before early childhood during pregnancy.
Strategies for preventing respiratory syncytial virus.

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PURPOSE: Prevention of respiratory syncytial virus (RSV) infection-crucial for decreasing the burden associated with this disease-is discussed. SUMMARY: Predictable outbreaks of RSV occur annually throughout the U.S. During these outbreaks, RSV infection spreads readily among children through close contact with infected individuals or contact with contaminated surfaces or objects. RSV is the leading cause of infant hospitalization and is associated with life-changing and life-threatening complications. Prevention is important for reducing the associated morbidity and mortality. The American Academy of Pediatrics (AAP) has outlined ways to prevent RSV transmission. According to the AAP, frequent hand washing is the most important strategy for reducing the burden of RSV disease. Other methods for controlling nosocomial spread of RSV include the use of gloves, frequent glove changes, and isolating or cohorting patients. General prevention measures that can be undertaken by family members include smoking cessation, breastfeeding, and avoiding situations, whenever possible, where exposure to RSV cannot be controlled. Passive immunoprophylaxis with palivizumab, the only agent approved by the FDA, reduces hospitalization in high-risk children. Palivizumab is currently the only agent approved by the FDA for the prevention of RSV infections in high-risk children. Not every child is equally at risk for serious RSV disease, and immunoprophylaxis is indicated only for certain high-risk children. The AAP has issued specific guidelines for RSV immunoprophylaxis with palivizumab. Other therapies are emerging for the prevention of RSV, including a new, enhanced-potency, humanized RSV monoclonal antibody and several different types of vaccines. CONCLUSION: RSV causes an annual, predictable epidemic. Treatment remains exclusively supportive. Prevention remains the cornerstone of disease management. The AAP has issued guidelines to protect those at high risk.

PMID: 19020197 [PubMed - indexed for MEDLINE]
Prevalence of allergic symptoms among children with diabetes mellitus type 1 of different socioeconomic status.


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The aim of the study was to assess the possible associations between allergies and type 1 diabetes mellitus (DM1), stratified by social class. We studied 127 children with DM1 with a median age of 10.8 yr and 150 controls of comparable age and sex distribution. The parents completed questionnaires on their education and occupation and on their children's history of allergic symptoms, breast-feeding, viral infections, and measles-mumps-rubella (MMR) vaccination. Lower family's social class was more frequently encountered among the DM1 families than in the controls (OR = 0.56, 95% CI: 0.35-0.92). The occurrence of any allergic symptoms among children with DM1 (35.45%) was not significantly different from the controls (38.78%), neither in the total group (OR = 0.87, 95% CI: 0.52-1.45) nor in the stratified analysis by social class. Similar findings were observed regarding the different types of allergic symptoms. In the univariate analysis, breast-feeding, the experience of viral infections, and MMR vaccination were found to be protective of DM1 presentation in both upper and lower social classes. In the multiple logistic regression analysis, the experience of more than 2 infections/yr (OR = 0.12, 95% CI: 0.04-0.34), the origin from middle and upper social classes (OR = 0.42, 95% CI: 0.22-0.80) and breast-feeding (OR = 0.58, 95% CI: 0.31-1.07) were protective of DM1 occurrence. In children with DM1, the presence of allergic symptoms was not associated with the development of DM1. Among the environmental factors, the origin from middle or upper social classes, breast-feeding, the experience of viral infections, and MMR vaccination were found to have a protective effect on DM1 presentation.

PMID: 18774999 [PubMed - indexed for MEDLINE]

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Antiinfective properties of human milk.

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The unfavorable effects of neonatal immunodeficiency are limited by some naturally occurring compensatory mechanisms, such as the introduction of protective and immunological components of human milk in the infant. Breast-feeding maintains the maternal-fetal immunological link after birth, may favor the transmission of immunocompetence from the mother to her infant, and is considered an important contributory factor to the neonatal immune defense system during a delicate and crucial period for immune development. Several studies have reported that breast-feeding, because of the antimicrobial activity against several viruses, bacteria, and protozoa, may reduce the incidence of infection in infants. The protection from infections may be ensured either passively by factors with antiinfective, hormonal, enzymatic, trophic, and bioactive activity present in breast milk, or through a modulator effect on the neonatal immune system exerted by cells, cytokines, and other immune agents in human milk.

PMID: 18716190 [PubMed - indexed for MEDLINE]


**Opportunities for improving the health and nutrition of the human infant by probiotics.**

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The newborn is first colonized by microbes at birth. The colonizing bacteria originate mainly from the mother's gut, vaginal tract and skin. The origin of the microbiota and its development depend on genetics, mode of delivery, early feeding strategies and the hygienic conditions around the child. The indigenous microbiota of an infant's gastrointestinal tract is modulated through contact and interaction with the microbiota of the parents and the infant's immediate environment. After delivery breastfeeding continues to enhance the original inoculum by specific lactic acid bacteria and bifidobacteria and bacteria from the mother's skin enabling the infant gut microbiota to be dominated by bifidobacteria. These bacteria set the basis for gut microbiota development and modulation along with breastfeeding and the environmental exposures such as antibiotic administration. Modifying this exposure can take place by probiotic bacteria when breastfeeding is not possible. Thus, incorporating specific probiotics selected for the development of the infant's gut microbiota may form a beneficial possibility for future infant feeding purposes. Many current probiotics have documented strain-specific health-promoting effects, and most of the effects that have been demonstrated in infants and children. The target in infants is to modify the gut microbiota to resemble that of the healthy breastfed infant and to counteract deviations or aberrancies present in infants at risk of specific diseases. Thus, providing specific selected probiotics to the mother to balance the intestinal microbiota during pregnancy and to the infant after birth. As the disturbed succession during early infancy has been linked to the risk of developing infectious, inflammatory and allergic diseases later in life, it is
still of great interest to further characterize both the composition and succession of microbiota during infancy. With new methodologies we have been able to identify more specific aberrancies in microbiota prior to or during different disease states.

PMID: 18626203 [PubMed - indexed for MEDLINE]


The impact of early lifestyle factors on wheezing and asthma in Austrian preschool children.

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AIM: This study investigated the influence of early lifestyle factors on the prevalence of asthma and wheezing in preschool children in Tyrol, Austria. METHODS: A cross-sectional questionnaire survey was performed in 1761 preschool children to obtain information on wheezing and asthma in the light of early lifestyle factors. RESULTS: Factors independently associated with an increased risk for wheezing in the past 12 months included high parental education (OR: 1.5, 95% CI: 1.1-2.1) and parental hay fever (OR: 1.5, 95%CI: 1.1-2.2). Risk factors for doctor-diagnosed asthma (DDA) were early pet contact (OR: 2.2, 95% CI: 1.1-4.8) and parental asthma (OR: 3.0, 95%CI: 1.0-9.1), whereas breastfeeding decreased the risk (OR: 0.5, 95% CI: 0.2-1.0). Boiling the pacifier/sucker daily increased the risk for wheezing in the past 12 months (OR: 1.4, 95%CI: 1.0-2.0) and revealed a tendency towards DDA (OR: 1.9, 95% CI: 0.9-4.0). CONCLUSION: In preschool children, we established an independent association between wheezing in the past 12 months, DDA and boiling frequency of the pacifier/bottle sucker during infancy. The impact of pacifier boiling frequency on atopic diseases on the basis of the hygiene hypothesis needs further investigation.

PMID: 18241290 [PubMed - indexed for MEDLINE]

Environmental risk factors in prediction of childhood prediabetes.

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OBJECTIVE: The damage of beta cells occurs during the asymptomatic prodromal period called prediabetes before onset of diabetes mellitus. It is characterized by the presence of islet cell autoantibodies (ICAs). The aim of this study was to find out what environmental factors predict ICA seroconversion in healthy schoolchildren in Lithuania. MATERIAL AND METHODS: Sera from 3053 nondiabetic schoolchildren living in Lithuania were investigated for ICAs. ICAs were measured in undiluted sera by indirect immunofluorescence method. All ICA-positive and randomly selected ICA-negative children were invited to participate in the study. Response rate in the families of ICA-positive children was 100% and in ICA-negative-76.5%. Data from 13 ICA-positive and 199 ICA-negative schoolchildren were included in the analysis. Information on the environmental factors was collected via questionnaires. RESULTS: Proportions of breastfed children were similar in ICA-positive and ICA-negative schoolchildren. Full cow's milk was introduced at one month of age or earlier more often in ICA-positive than ICA-negative schoolchildren (8.3% and 1.1%, respectively; P=0.05). Cereal before 3 months of age was introduced more often in ICA-positive than ICA-negative schoolchildren (7.7% and 0.5%, respectively; P=0.01). The mothers of cases took medicine during pregnancy more often than mothers of controls did (61.5% and 14.1%, respectively; P<0.001). More than half (53.8%) of ICA-positive children lived in homes where family members were smoking indoors, while this was recorded only for 26.6% of controls (P=0.04). CONCLUSIONS: Early introduction of cow's milk and cereal, the intake of medicine during pregnancy, and indoor smoking of family members are risk factors that predict the development of prediabetes among Lithuanian children.

PMID: 18277090 [PubMed - indexed for MEDLINE]

Comment: Although not stated here, the implication is that breast milk is not a risk factor, and may well be protective.


New information about pediatric foodborne infections: the view from FoodNet.
Diarrheal illness is a significant burden to children and their parents. Recent studies describing the etiologic agents that cause diarrheal illness and examining the risk factors for the most common bacterial enteric pathogens are presented. RECENT FINDINGS: The most common bacterial causes of diarrheal illness among children are Campylobacter spp., Salmonella spp., Shigella spp. and Shiga toxin-producing Escherichia coli. The highest incidence of both Campylobacter and Salmonella is among infants. Risk factors for campylobacteriosis in this group include traveling outside the US, having a pet in the home with diarrhea and visiting or living on a farm. Risk factors for salmonellosis include traveling outside the US, exposure to reptiles and attending day-care with another child with diarrhea. Breastfeeding is a factor that protects against infection. SUMMARY: Despite a limited diet, infants are at risk of acquiring enteric pathogens that are commonly associated with consumption of contaminated food. Exposure to these pathogens may be through cross-contamination in the home or the environment. Educational measures that focus on improving prevention of exposure to infectious agents and an emphasis on eliminating cross-contamination are needed for parents and caretakers of this vulnerable population.

PMID: 18197044 [PubMed - indexed for MEDLINE]

On the role of breastfeeding in health promotion and the prevention of allergic diseases.

Based on animal models, we specify the major role of different bioactive milk components known to participate significantly in neonatal health promotion and in protection against a large number of infectious diseases and the development of allergies and asthma.

PMID: 18183942 [PubMed - indexed for MEDLINE]
Nutritional status, breastfeeding, and evolution of Infants with acute viral bronchiolitis.

Dornelles CT, Piva JP, Marostica PJ.

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Acute viral bronchiolitis is a common respiratory infectious disease of infancy. A prospective study was carried out with 175 infants aged up to six months to evaluate their nutritional and breastfeeding status as possible risk factors for unfavourable evolution of previously-healthy infants from a care hospital. Immunofluorescence test for virus and anthropometric assessment were performed. Outcomes were length of oxygen-use, length of hospital stay, and type of hospital unit needed. Seventy-three percent of the infants were well-nourished, 6% undernourished, 8.6% at a nutritional risk, 10.9% overweight, and 1.7% obese. Eighty-one percent of the undernourished and nutritionally at-risk infants and 72% of the well-nourished, overweight, and obese infants did not receive exclusive breastfeeding. The median length of hospital stay was four days and of oxygen-use was 60 hours. The nutritional status did not affect the clinical course of previously-healthy infants with acute viral bronchiolitis. The duration of exclusive breastfeeding, but not type of breastfeeding, was inversely related to the length of oxygen-use and the length of hospital stay. Shorter exclusive breastfeeding was observed in infants who were assigned to a paediatric ward or to an intensive care unit. In conclusion, longer duration of breastfeeding was associated with better clinical outcomes.

PMID: 18330067 [PubMed - indexed for MEDLINE]
OBJECTIVE: To compare the frequency of hospitalization during the first six months of life between breast-fed and bottle-fed infants. METHOD: A descriptive cross-sectional study was conducted over twelve months, in hospital-based outpatient clinics. Mother-infant pairs, seen at the clinics during the study period, were enrolled. Infants were between the ages of 6-24 months and had been brought for routine check-ups, vaccinations or common childhood ailments. Subjects were recruited from babies with no congenital anomalies or chronic illnesses. Study team recorded necessary information about feeding practices, previous illnesses and hospitalizations on a structured questionnaire. Hospitalization rates in 3 groups of infants with different feeding methods i.e. predominant breastfeeding, partial breast-feeding, and bottle-feeding were compared. Results were analyzed using SPSS software, ANOVA was used for comparison of means between groups, and a p-value <0.05 was regarded as significant.

RESULTS: A total of 606 mother-infant dyads were enrolled, of which 73% infants were on predominant breastfeeding at 6 months of age. The rate of all-cause hospitalization before six months of age was: 6.3%, 22.2% and 27.2% in infants with predominant breast-feeding, partial breast-feeding and bottle-feeding, respectively, (p < 0.001). Figures for admission due to infectious cause were 6%, 17.6% and 25.6%, respectively, (p < 0.001). Adjusted Odds ratio between bottle-fed and breast-fed babies was 5.3 for all-cause hospitalization, and 6.1 for hospitalization due to infectious illnesses. CONCLUSION: Our findings show that protective effect of breast-feeding is not limited to developing countries; it extends to young infants living in urbanized environments equipped with adequate sanitation and clean water supply.

PMID: 18173043 [PubMed - indexed for MEDLINE]


The immune system in human milk and the developing infant.

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The concept of the immune system in human milk emerged in the 1970s from clinical and laboratory observations made between the late 18th through the mid-20th centuries. The discovery of living leukocytes in human milk in 1970 was the final link to the chain of evidence that culminated in the concept. The concept was later expanded to include not only antimicrobial but also anti-inflammatory and immunoregulatory agents. These agents evolved to compensate for developmental delays in the immune system during infancy. Indeed, that explains the defense by human milk against common infectious diseases in infancy, necrotizing enterocolitis in preterm infants, and immune-mediated disorders such as Crohn's disease in later childhood. These diverse evolutionary outcomes underscore the superiority of human milk for the nutrition


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The objective of this study was to investigate the association between the prevalence of exclusive breastfeeding and morbidity (diarrhoeal diseases and acute respiratory infection) in infants aged 0-3 month(s) using the Multiple Indicator Cluster Survey (MICS) 2003 data from Bangladesh. The study population included 1633 infants aged 0-3 month(s). The prevalence of diarrhoea and acute respiratory infection was compared using the chi-square tests between infants aged 0-3 month(s) who were exclusively breastfed and infants who were not exclusively breastfed. Logistic regression was used to adjust for confounders and for calculating adjusted odds ratios. To adjust for cluster sampling and reduced variability, the adjusted chi-square value was divided by the design effect, and a re-estimated p value was calculated. The prevalence of diarrhoea and acute respiratory infection in this sample of 0-3-month old infants in Bangladesh was 14.3% and 31.2% respectively. The prevalence of both illnesses was significantly associated with lack of exclusive breastfeeding. The adjusted odds ratio for diarrhoea was 0.69 (95% confidence interval [CI] 0.49-0.98, p = 0.039), and the adjusted odds ratio for acute respiratory infection was also 0.69 (95% CI 0.54-0.88, p = 0.003). Only 192 infants (11.7% of total sample) were exclusively breastfed at the time of interview, and 823 infants (50.3%) were never exclusively breastfed. The prevalence of prelacteal feeding was 66.6%. The results confirmed a protective effect of exclusive breastfeeding against infectious diseases-related morbidity in infancy and showed that frequently-collected cross-sectional datasets could be used for estimating effects. The low prevalence of exclusive breastfeeding in Bangladesh needs to be improved to decrease child morbidity.
Effect of early infant feeding practices on infection-specific neonatal mortality: an investigation of the causal links with observational data from rural Ghana.

Edmond KM, Kirkwood BR, Amenga-Etego S, Owusu-Agyei S, Hurt LS.

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BACKGROUND: Strong associations between delayed initiation of breastfeeding and increased neonatal mortality (2-28 d) were recently reported in rural Ghana. Investigation into the biological plausibility of this relation and potential causal pathways is needed. OBJECTIVE: The objective was to assess the effect of early infant feeding practices (delayed initiation, prelacteal feeding, established neonatal breastfeeding) on infection-specific neonatal mortality in breastfed neonates aged 2-28 d. DESIGN: This prospective observational cohort study was based on 10 942 breastfed singleton neonates born between 1 July 2003 and 30 June 2004, who survived to day 2, and whose mothers were visited in the neonatal period. Verbal autopsies were used to ascertain the cause of death. RESULTS: One hundred forty neonates died from day 2 to day 28; 93 died of infection and 47 of noninfectious causes. The risk of death as a result of infection increased with increasing delay in initiation of breastfeeding from 1 h to day 7; overall late initiation (after day 1) was associated with a 2.6-fold risk [adjusted odds ratio (adj OR): 2.61; 95% CI: 1.68, 4.04]. Partial breastfeeding was associated with a 5.7-fold adjusted risk of death as a result of infectious disease (adj OR: 5.73; 95% CI: 2.75, 11.91). No obvious associations were observed between these feeding practices and noninfection-specific mortality. Prelacteal feeding was not associated with infection (adj OR: 1.11; 95% CI: 0.66, 1.86) or noninfection-specific (adj OR: 1.33; 95% CI: 0.55, 3.22) mortality. CONCLUSIONS: This study provides the first epidemiologic evidence of a causal association between early breastfeeding and reduced infection-specific neonatal mortality in young human infants.

PMID: 17921392 [PubMed - indexed for MEDLINE]
The role of breastfeeding and passive smoking on the development of severe bronchiolitis in infants.


Department of Pediatrics, University Hospital, Democritus University of Thrace, Medical School, Alexandroupolis, Greece.

AIM: Bronchiolitis is an acute infectious disease of the lower respiratory tract which causes the obstruction of bronchioles in children younger than 2 years. The aim of this study was to investigate the effect of passive smoking alone and in conjunction with breastfeeding on the severity of acute bronchiolitis in infancy and the duration of hospitalisation. METHODS: We studied 240 consecutive infants aged from 6 to 24 months (137 boys and 103 girls) median age 14 months, who required hospital admission for acute bronchiolitis at the Paediatric Department of Democritus University Hospital, Alexandroupolis, Greece. The outcomes of interest were the severity of bronchiolitis and the duration of hospitalisation. RESULTS: Among the entire cohort, 122 (50.8%) children presented a severe attack of bronchiolitis. In multivariate regression analysis adjusting for confounding factors, breastfeeding for less than four months (aOR=6.1, 95% CI=3.4-10.7), exposure to environmental tobacco smoke (aOR=2.2, 95% CI=1.1-3.6) and their combination (aOR=16.2, 95% CI=6.0-34.3) showed significant association with severe bronchiolitis and prolonged hospitalisation. Passive smoking did not increase the risk of severe bronchiolitis, when infants breastfed for more than four months (aOR=1.9, 95% CI=0.8-5.1).

CONCLUSION: In conclusion, exposure to environmental tobacco smoke worsens the symptoms and the prognosis of bronchiolitis, while breastfeeding seems to have a protective effect even in children exposed to environmental tobacco smoke.

PMID: 17519864 [PubMed - indexed for MEDLINE]


Surveillance of multidrug-resistant gram-negative bacilli in a neonatal intensive care unit: prominent role of cross transmission.

BACKGROUND: Multidrug-resistant gram-negative bacilli (MDRGN) are an important cause of nosocomial infections in neonatal intensive care units (NICUs). We conducted a 1-year prospective surveillance study in an NICU to assess the epidemiology of MDRGN among newborns and the relative importance of acquisition routes. METHODS: Neonates admitted at the NICU of the Dipartimento Materno-Infantile, University Hospital, Palermo, Italy, from January 7, 2003, to January 6, 2004, were included in the study. Colonization of patients with MDRGN was assessed by cultures of rectal swabs sampled twice a week. Pulsed-field gel electrophoresis was used to determine relatedness among MDRGN isolates. Extended-spectrum beta-lactamases (ESBL) and metallo-beta-lactamases (MBL) production was investigated. The association between risk factors at admission and during the NICU stay was analyzed by multivariate logistic regression analysis. RESULTS: During the 12-month period January 7, 2003, through January 6, 2004, 1021 rectal swabs were cultured from 210 infants. One hundred sixteen infants (55.2%) were colonized by MDRGN. The monthly incidence of acquisition of MDRGN ranged between 12 and 53 cases per 1000 patient-days. Eighty-four (72.4%) of the 116 patients were cross colonized. Exclusive feeding by formula was significantly associated with cross transmission (RR=1.8, P=.02). Fifty-seven (49.1%) of the 116 infants were colonized by ESBL-producing Enterobacteriaceae. Feeding by formula was significantly associated with colonization by ESBL-producing Enterobacteriaceae (RR=1.6, P=.007), whereas breastfeeding proved to be protective (RR=0.5, P=.001). Ninety-two (43.8%) of the 210 infants received antibiotics during the NICU stay, but exposure to those most frequently administered, ampicillin-sulbactam and gentamicin, was not significantly associated with MDRGN colonization. CONCLUSION: The emerging picture of this study is that spread of MDRGN in an NICU may be the result of diffuse cross transmission and, consequently, of poor infection control procedures.

PMID: 17482993 [PubMed - indexed for MEDLINE]


Major childhood infectious diseases and other determinants associated with type 1 diabetes: a case-control study.


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The objective of the study was to evaluate the association between infectious diseases and other events pertaining to childhood medical history and type 1 diabetes. A case-control study was carried out, taking as cases 159 type 1 diabetic patients (0-29 years) recorded from 1988 to 2000 within the population registry of the Pavia province (North Italy). As controls 318 non-diabetic subjects were matched by age and sex. A questionnaire was administered by standardised interviewers. Data were analysed by conditional logistic regression. Viral childhood diseases (OR 4.29; 95%CI 1.57-11.74) and bottle feeding (OR 1.83; 95%CI 1.08-3.09) were directly correlated to type 1 diabetes; an inverse correlation was found for vitamin D administration during lactation (0-14 years) (OR 0.31; 95%CI 0.11-0.86) and for history of scarlet fever in both sexes and age groups (OR 0.19; 95%CI 0.08-0.46). Most associations of the studied variables confirm already known findings. The significant inverse correlation of type 1 diabetes with scarlet fever history is a peculiar finding, the meaning of which is still obscure, although it has been recently described that streptococcal A infections are regulated by HLA class II alleles.

PMID: 17357880 [PubMed - indexed for MEDLINE]

Comment: Presumably the implication is that breastfeeding would be inversely correlated.

J Nutr. 2007 Feb;137(2):503S-510S.

Advances in our understanding of the biology of human milk and its effects on the offspring.

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There is an intense interest in the effects of breast-feeding on the offspring and in understanding the mechanisms behind these effects. More than 50 papers are published monthly on topics such as the influence of breast-feeding on aspects of growth, immune-related effects, mental development, and noncommunicable diseases. Most breast-feeding data are observational; confounding can be difficult to rule out because some maternal factors are associated with both breast-feeding and infant outcomes (e.g., obesity and mental development). The most important short-term immunological benefit of breast-feeding is the protection against infectious diseases. There is also some evidence of lower prevalence of inflammatory bowel diseases, childhood cancers, and type I diabetes in breast-fed infants, suggesting that breast-feeding influences the development of the infant's own immune system. One of the most consistent findings of breast-feeding is a positive effect on later intelligence tests with a few test points advantage for breast-fed infants. In the last few years, several systematic reviews and meta-analyses have examined...
the effect of breast-feeding on noncommunicable diseases. There seems to be a small protective effect against later overweight and obesity. Blood pressure and blood cholesterol seem to be slightly lower in breast-fed infants; however, the few studies examining breast-feeding and the risk of coronary heart disease in later life did not find an association. Recent data have suggested that breast-feeding can program the insulin-like growth factor-I axis, as 3 studies found that breast-fed infants are taller as adults.

PMID: 17237337 [PubMed - indexed for MEDLINE]


**Human breast milk: current concepts of immunology and infectious diseases.**

Lawrence RM, Pane CA.

University of Florida Department of Pediatrics, Division of Pediatric Immunology and Infectious Diseases, Gainesville, FL, USA.

PMID: 17157245 [PubMed - indexed for MEDLINE]

Comment: Wish there was an abstract!


**Human breast milk: current concepts of immunology and infectious diseases. Foreword.**

Dumont-Driscoll M.

PMID: 17157244 [PubMed - indexed for MEDLINE]

Comment: Ditto!
Breast feeding has been shown to enhance the development of the immune system of the newborn as well as provide protection against enteric and respiratory infections. **It has been suggested that implementation of breast feeding programs has the potential to save hundreds of thousands of lives worldwide.** Human milk is a bodily fluid which, apart from being an excellent nutritional source for the growing infant, also contains a variety of immune components such as antibodies, growth factors, cytokines, antimicrobial compounds, and specific immune cells. These help to support the immature immune system of the newborn baby, and protect it against infectious risks during the postnatal period while its own immune system matures. This article reviews some of the factors in human breast milk that give it these important properties.

PMID: 17269587 [PubMed - indexed for MEDLINE]

 Many factors are involved in infants' health; one of the most important of them may be the kind of early feeding. **Recent evidences suggest that breastfeeding, in addition to its well-established beneficial effects during lactation period, provides also beneficial long-term effects, like the protection against infectious and immune-related diseases, a better cognitive development, a decreased risk of metabolic syndrome and of obesity.** It has been reported that the early feeding mode affects growth and body composition and it could be considered a critical factor for metabolic development. Human milk is a source of different nutrients and bioactive factors, especially hormones and growth factors like leptin, ghrelin, insulin, insulin-like growth factor
(IGF-I) playing a role in food intake regulation, metabolism and body composition. In particular breast milk leptin may provide a physiological explanation for a number of advantages seen in reaching proper growth and energy balance in breast-fed infants compared with formula fed ones. Etiopathogenesis and therapeutic approach in common minor gastrointestinal diseases in infants are important subject of study for pediatricians. Colic, constipation and regurgitation can be considered feeding problems and they might benefit from dietary treatment. Regarding infantile colic, dietary modifications seem to be more suitable than pharmacological treatment in resolving symptoms; also prebiotics and probiotics are useful for this aim. The occurrence of constipation is related to the kind of feeding and it is lower in breastfed infants. Moreover formulas with probiotics and beta-palmitic acid could promote a regression of symptoms. A dietary approach may be useful also in regurgitation. Anyway we have to remember that breastfeeding require a supplementation of vitamin D and K for some months and a correct weaning program is needed from the 5th-6th months of life to prevent iron deficiency.

PMID: 17263042 [PubMed - indexed for MEDLINE]


**Risk factors for shigellosis in Thailand.**

Chompook P, Todd J, Wheeler JG, von Seidlein L, Clemens J, Chaicumpa W.

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OBJECTIVES: To assess the potential risk factors for shigellosis including housefly density.

METHODS: A matched case-control study to investigate potential risk factors for shigellosis was conducted in a semi-urban area, Kaengkhoi District, Saraburi Province, central Thailand. Shigella cases were ascertained from a two-year population-based surveillance study detecting diarrhea and shigellosis in the area. The study evaluated a wide range of exposures, which were assessed by odds ratios (OR) adjusted for proxy markers of socioeconomic status: family income, and type of residence, using conditional logistic regression analysis.

RESULTS: Hygiene behaviors such as regular hand washing (<0.05), a clean environment surrounding the household (<0.001), and the availability of water to flush the toilet (<0.08) were associated with a reduced risk for shigellosis in the multivariate model. In contrast factors indicating a lower than average socioeconomic status, such as having to rent instead of owning one's housing (<0.001) and a low family income (<0.01) were associated with an increased risk for shigellosis. For children, breastfeeding showed a strong protective effect in reducing the risk of shigellosis (<0.01). Prior to adjustment for environmental factors, fly density in the kitchen area was associated with an increased risk of shigellosis (<0.01). CONCLUSIONS: We found a correlation between socioeconomic status and the risk for shigellosis. To reduce shigellosis in this setting, we recommend interventions focused on three aspects: improved water supply and
sanitation (especially latrines and garbage disposal) including fly control, health education on hand washing, and the promotion of breastfeeding.

PMID: 16997593 [PubMed - indexed for MEDLINE]


Breastfeeding can reduce infant infections and health care costs.

Grainger M.

PMID: 17042397 [PubMed - indexed for MEDLINE]

Comment: No abstract.


Deaths and years of life lost due to suboptimal breast-feeding among children in the developing world: a global ecological risk assessment.

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Comment in:


OBJECTIVE: We estimate attributable fractions, deaths and years of life lost among infants and children < or = 2 years of age due to suboptimal breast-feeding in developing countries.

DESIGN: We compare actual practices to a minimum exposure pattern consisting of exclusive breast-feeding for infants < or = 6 months of age and continued breast-feeding for older infants
and children < or = 2 years of age. For infants, we consider deaths due to diarrhoeal disease and lower respiratory tract infections, and deaths due to all causes are considered in the second year of life. Outcome measures are attributable fractions, deaths, years of life lost and offsetting deaths potentially caused by mother-to-child transmission of HIV through breast-feeding.

**SETTING:** Developing countries. **SUBJECTS:** Infants and children < or = 2 years of age.

**RESULTS:** Attributable fractions for deaths due to diarrhoeal disease and lower respiratory tract infections are 55% and 53%, respectively, for the first six months of infancy, 20% and 18% for the second six months, and are 20% for all-cause deaths in the second year of life. **Globally, as many as 1.45 million lives (117 million years of life) are lost due to suboptimal breast-feeding in developing countries.** Offsetting deaths caused by mother-to-child transmission of HIV through breast-feeding could be as high as 242,000 (18.8 million years of life lost) if relevant World Health Organization recommendations are not followed. **CONCLUSIONS:** The size of the gap between current practice and recommendations is striking when one considers breast-feeding involves no out-of-pocket costs, that there exists universal consensus on best practices, and that implementing current international recommendations could potentially save 1.45 million children's lives each year.

PMID: 16925871 [PubMed - indexed for MEDLINE]


**Divergent risk of multiple sclerosis in two anabaptist communities in America.**

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A lowered risk of multiple sclerosis (MS) has been reported in the Hutterite community residing mainly in southern Canada. In another anabaptist community, the Old Colony Mennonites (OCM), settled in Canada and spread to Latin America, only a large pedigree with an increased risk of autoimmune diseases, including type I diabetes and three cases of MS, was reported. The prevalence of MS in the pedigree (3,158 per 100,000), even when observing its confidence interval, seems rather high, and the MS prevalence in the Mennonite general population is assumed at least to be equal to the Canadian rates. Based upon an extended study of the literature, the hypothesis that smoking and curing with nitrate/nitrite plays any role, by interaction with inflammatory intestinal changes in childhood infections, is supported. In addition, tobacco smoking and short-term breast-feeding as possible risk factors are also in line with a higher MS risk in OCM, whereas insecticides and herbicides can be excluded as risk factors in MS.

PMID: 16759820 [PubMed - indexed for MEDLINE]
Comment: I am assuming that long-term breast-feeding is not associated with an increased risk and may be protective.


**Full breastfeeding and hospitalization as a result of infections in the first year of life.**

Paricio Talayero JM, Lizán-García M, Otero Puime A, Benlloch Muncharaz MJ, Beseler Soto B, Sánchez-Palomares M, Santos Serrano L, Rivera LL.

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OBJECTIVE: Our objective was to assess the effect of breastfeeding on the probability of hospitalization as a result of infectious processes during the first year of life. METHODS: We followed 1385 infants from birth to age 1 year between 1996 and 1999. Recruitment and data collection were done at the 6-month well-infant visit under the National Child Health Program. Full breastfeeding, hospital admission, and other relevant variables related to the delivery, infant, mother, health services system, and sociologic aspects were recorded. The statistical analysis included Kaplan-Meier test, Cox regression to obtain the hazard ratio, and the adjusted attributable risk. RESULTS: Full breastfeeding at discharge after delivery and at 3, 4, and 6 months of age were 85%, 52%, 41%, and 15%, respectively; 78 hospital admissions as a result of infections were recorded (38 respiratory tract, 16 gastrointestinal tract). Mean age at admission was 4.1 months. After estimating the attributable risk, it was found that 30% of hospital admissions would have been avoided for each additional month of full breastfeeding. Seemingly, 100% of full breastfeeding among 4-month-old infants would avoid 56% of hospital admissions in infants who are younger than 1 year. CONCLUSIONS: On the basis of the present data, we conclude that full breastfeeding would lower the risk for hospital admission as a result of infections among infants who are younger than 1 year within an industrialized country.

PMID: 16818542 [PubMed - indexed for MEDLINE]


**Breastfeeding, the immune response, and long-term health.**
Breastfeeding provides unsurpassed natural nutrition to the newborn and infant. Human breast milk also contains numerous protective factors against infectious disease and may influence immune system development, as noted in previous studies of infant response to vaccination and thymus gland development. If immune system development is significantly improved with the introduction of components of breast milk, then prematurely discontinued breastfeeding may facilitate pathogenesis of many chronic diseases later in life (eg, autoimmune disorders). The authors summarize the reported effects of breastfeeding on the development of the suckling infant's immune system and discuss possible consequences to immunologic health when breastfeeding is discontinued prematurely.

PMID: 16627775 [PubMed - indexed for MEDLINE]


Nguyen BV, Nguyen KG, Phung CD, Kremp O, Kalach N, Dupont C, Raymond J, Vidal-Trecan G.

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The study aimed at evaluating the seroprevalence of and sociodemographic, health, lifestyle, and environmental hygiene conditions associated with Helicobacter pylori infection in Vietnamese children. Data from 824 children, aged from 6 months to 15 years and gastrointestinal symptom free when consulted, admitted to a university hospital, were collected using a structured questionnaire and ELISA test for H. pylori infection. The data were examined using univariate and multivariate analyses. H. pylori seroprevalence was 34.0%. Age groups from 3 to 6 years and older than 6, and number of offspring were positively and independently associated with H. pylori seropositivity [adjusted OR (95% CI): 2.9 (1.5-5.5); 1.9 (1.1-3.1) and 1.8 (1.1-2.6), respectively]. Breastfeeding more than 6 months was negatively and independently associated...
with H. pylori seropositivity [adjusted OR (95% CI): 0.5 (0.3-0.9)]. Mother's age, history of allergy, gastro-duodenal disease history in the past, initiating collective life before 6 years, sharing bed with parents and time of bed sharing with parents > 24 months were positively but not independently associated with H. pylori seropositivity. None of the other environmental or lifestyle conditions examined was associated with H. pylori infection. Our results support person-to-person transmission and the role of sociodemographic factors in H. pylori infection.

PMID: 16606980 [PubMed - indexed for MEDLINE]


How protective is breast feeding against diarrhoeal disease in infants in 1990s England? A case-control study.

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AIMS: To assess the effect of several measures of infant feeding on diarrhoeal disease, and whether these effects vary according to markers of social deprivation. METHODS: Case-control study of diarrhoeal disease cases presenting to 34 general practices in England. Controls were stratified on age group, area deprivation index for the practice, and whether or not the practice was in London. Data were available on 304 infants (167 cases and 137 controls). RESULTS: After adjustment for confounders, breast feeding was associated with significantly less diarrhoeal disease. Associations were striking even in infants aged ≥ 6 months. They did not vary by social class, but were greater in those living in rented council accommodation and in more crowded households. The effect of receiving no breast milk was stronger in more deprived areas than in less deprived areas. The effect of not receiving exclusive breast milk was stronger in more deprived areas than in less deprived areas. In formula fed infants, there was significantly more diarrhoeal disease in those not sterilising bottles/teats with steam or chemicals. The protective effect of breast feeding did not persist beyond two months after breast feeding had stopped. CONCLUSIONS: Breast feeding protects against diarrhoeal disease in infants in England although the degree of protection may vary across infants and wear off after breast feeding cessation. Education about the benefits of breast feeding and the risks of inadequate sterilisation should be targeted at carers in deprived areas or households.

PMID: 16308409 [PubMed - indexed for MEDLINE]
Investigation of human colostrum Helicobacter pylori IgA content in lactating women.

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OBJECTIVE: The objective was to investigate the colostral H. pylori-specific IgA content in a sample of the female population in Turkey where a high endemicity for H. pylori has always been reported. MATERIALS AND METHODS: One hundred and sixty-one pregnant women with positive serum H. pylori IgG antibody at the time of the last trimester were enrolled into the study. During the initial postpartum 24h, we obtained colostrum samples from each mother to test the presence and concentration of H. pylori-specific IgA. Breast milk antibody concentrations of H. pylori were measured by commercial ELISA tests. Sample absorbance/cut-off absorbance (s/c) ratio was used for semiquantitative interpretation. Ratios >1.1 were considered positive, ratios < or =1.1 negative. The statistical significance was tested by the Mann-Whitney U-test, and p < 0.05 was regarded as statistically significant. RESULTS: At least 2 ml of colostrum was obtained and analyzed (mean volume 2.5+/-.45 ml). The results indicated the absence of H. pylori-specific IgA in 64 colostral samples (39.8%). However, the rest of the women (n = 97; 60.2%) had a mean H. pylori-specific IgA s/c ratio of 4.31+/-.2.51 (range 1.2-10.3) in their colostral milk samples. The mean gestational age at the time of delivery was 38 weeks and 5 days, and the mean birth weight was 3, 224+/-.433 g (range 4, 300-1, 940 g). Gestational age at birth and mode of delivery were not correlated with the colostral-specific IgA levels. CONCLUSIONS: Most of the lactating women (60.2%), who were seropositive for H. pylori, had some IgA in their colostral milk. Colostral milk theoretically can decrease H. pylori and perhaps many other enteric infections, whether or not it contains H. pylori-specific IgA. Therefore, breastfeeding is of utmost importance for neonates and should be encouraged. The H. pylori-specific IgA antibody concentration of colostral milk should be investigated in large-scale prospective studies for its effectiveness in the protection against neonatal transmission of this infection.

PMID: 16051420 [PubMed - indexed for MEDLINE]

Breast feeding: A time to craft new policies.
New studies of breastfeeding have discovered or confirmed the benefits to mother and child. They reinforce an emphasis on exclusive breastfeeding - no other food or fluids - during the first 6 months. Studies include findings from across the world, in well-resourced and poorly resourced settings. They also emphasize longer duration of breastfeeding, into the second year of life, and gradual rather than abrupt weaning. For HIV-infected mothers, the dangers of non-exclusive feeding in the first half year of life have been well documented in recent publications. Other studies open up the possibilities for antiretroviral treatment to accompany breastfeeding, whether given to the mother, or child, or both. To be effective, implementation of any recommendations must consider individual, family, and community resources.

PMID: 19806071 [PubMed - indexed for MEDLINE]


[Risk factors for neuroblastoma]. [Review] [59 refs]
[Spanish]
Ferris i Tortajada J. Ortega Garcia JA. Garcia i Castell J. Lopez Andreu JA. Berbel Tornero O. Crehua Gaudiza E.
UI: 15989872

AB INTRODUCTION: NB is the most frequent pediatric cancer arising in the sympathetic nervous system and represents a serious healthcare challenge because: 1) it is the most frequent neoplasm in the first decades of life; 2) it biological behavior is unpredictable (spontaneous regression, maturation to ganglioneuroma, and localized and metastasized variants); and 3) little is known about most of the risk factors involved in its etiopathogenesis. The objective of this study was to disseminate knowledge of constitutional and environmental (physical, chemical, biological and social) risk factors linked to the development of neuroblastoma (NB), with various levels of scientific evidence. To seek collaboration among pediatricians in the research project "Environment and Pediatric Cancer". MATERIAL AND METHODS: We performed a systematic review of the literature published in the previous 25 years on risk factors for NB diagnosed in the first two decades of life, using Medline, the Science Citation Index and Embase. Search profiles were: "neuroblastoma/childhood sympathetic nervous system neoplasms and risk factors/etiology/epidemiology". The most interesting articles and the most relevant references contained therein were selected. RESULTS: With greater or lesser scientific evidence, the following risk factors increase the risk of developing NB: genetic factors; geographic factors; ethnic factors; socioeconomic factors; infectious factors; physical factors; parental occupational
Human-milk glycans that inhibit pathogen binding protect breast-feeding infants against infectious diarrhea.

Morrow AL, Ruiz-Palacios GM, Jiang X, Newburg DS.

Breast-feeding is a highly effective strategy for preventing morbidity and mortality in infancy. The human-milk glycans, which include oligosaccharides in their free and conjugated forms, constitute a major and an innate immunologic mechanism by which human milk protects breast-fed infants against infections. The glycans found in human milk function as soluble receptors that inhibit pathogens from adhering to their target receptors on the mucosal surface of the host gastrointestinal tract. The alpha1,2-linked fucosylated glycans, which require the secretor gene for expression in human milk, are the dominant glycan structure found in the milk of secretor mothers, who constitute the majority (approximately 80%) of mothers worldwide. In vitro and in vivo binding studies have demonstrated that alpha1,2-linked fucosylated glycans inhibit binding by campylobacter, stable toxin of enterotoxigenic Escherichia coli, and major strains of caliciviruses to their target host cell receptors. Consistent with these findings, recently published epidemiologic data demonstrate that higher relative concentrations of alpha1,2-linked fucosylated glycans in human milk are associated with protection of breast-fed infants against diarrhea caused by campylobacter, caliciviruses, and stable toxin of enterotoxigenic E. coli, and moderate-to-severe diarrhea of all causes. These novel data open the potential for translational research to develop the human-milk glycans as a new class of antimicrobial agents that prevent infection by acting as pathogen anti-adhesion agents.

PMID: 15867329 [PubMed - indexed for MEDLINE]
Transfer of antibody via mother's milk.

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Abstract

Differing from humans, IgG from breast milk in many animal species (rodents, bovines, cats, ferrets, etc.) are transported across the intestinal epithelium into the neonatal circulation. This transport is located at the duodenal and jejunal level where enterocytes express a surface membrane receptor able to bind Fc of IgG and to facilitate transcytosis of these immunoglobulins. Fcgamma-R, which is very similar to the placenta receptor responsible for active transplacental transfer of IgG in humans, binds IgG but not other isotypes. Maternal milk antibodies represent an important part of circulating IgG in these animals, as they are involved in the negative feedback of endogenous IgG synthesis. This phenomenon stops abruptly as soon as weaning takes place. Neonatal calves that have a defect in such transfer of maternal immunoglobulins are at high risk of systemic infectious diseases. In humans, in whom gut closure occurs precociously, breast milk antibodies do not enter neonatal/infant circulation. A large part of immunoglobulins excreted in milk are IgA that protect mainly against enteric infections. The specificity of maternal milk IgA is driven by an entero-mammary cell circulation. Human milk also contains anti-idiotypic antibodies capable of enhancing infant antibody response. Maternal milk antibodies coat infant mucosal surfaces and some have a clear protective role. This has been studied extensively in infectious disease models such as rotavirus, E. coli, poliovirus, and retroviruses. In the rotavirus model, antirotaviral IgA can be detected in stools of breast-fed but not bottle-fed neonates. In a large cohort of lactating women infected with HIV-1 in Rwanda, anti-HIV milk antibodies of the IgG isotype were more frequently detected followed by secretory IgM. Surprisingly, anti-HIV-1 SIgA were less frequently found. The presence of milk SIgA at 15 days as well as the persistence of a SIgM response during the whole lactation period was associated with lower risk of HIV transmission from the mother to the infant. Recently, HIV-1 antibodies from maternal milk have been shown to block transcytosis in vitro in a monolayer enterocyte model. Among these antibodies, those directed against the ELDKWA epitope had higher neutralising activity than serum antibodies. In humans, milk excreted antibodies play a major role in protecting infants from infection by pathogens having a mucosal portal of entry.

PMID: 12850343 [PubMed - indexed for MEDLINE]
Acute respiratory disease survey in Tripura in case of children below five years of age.

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Department of Paediatrics, IGM Hospital, Agartala.

Abstract

This epidemiological study has been carried out in urban and rural areas of West Tripura district, to determine the incidence, causes, risk factors, morbidity and mortality associated with acute respiratory infection (ARI) and impact of simple case management in children under 5 years of age. The annual attack rate (episode) per child was more in urban area than in rural area. Monthly incidence of ARI was 23% in urban area, 17.65% in rural area. The overall incidence of ARI was 20%. The incidence of pneumonia was 16 per 1000 children in urban area and 5 per 1000 in rural area. The incidence of pneumonia was found to be the highest in infant group; 3% of ARI cases in rural area and 7% in urban area developed pneumonia. Malnourishment in urban area was 54% and in rural area 65%. Malnourished children have higher likelihood for developing respiratory infection. The relative risk (RR) of developing pneumonia was 2.3 in malnourished children. Most children (59%) had been immunised with measles and diphtheria, pertussis and tetanus (DPT) vaccine earlier. The immunisation had a protective role in pneumonia. The RR was 2.7 in non-immunised group. Air pollution of the urban area had stronger relation for bronchial asthma than pneumonia. Breastfeeding had protective role in pneumonia and severe disease. Bottlefeeding had greater risk of developing pneumonia. Lower socio-economic status had the greater risk of ARI episodes. ARI was decreased as the per capita income increased. An increase in magnitude of ARI was observed with the decrease of literacy rate. Administration of co-trimoxazole for pneumonia case by trained health worker using simple case management strategies can reduce deaths from pneumonia significantly. Health education can change health care seeking behaviours and attitude of parents and other family members to take care of the ARI child in the home itself for preventing pneumonia death.

PIP: 800 children aged 0-5 years were involved in an epidemiological study conducted in urban and rural areas of West Tripura district, India, to determine the incidence, causes, risk factors, morbidity, and mortality associated with acute respiratory infection (ARI) and the impact of simple case management in children under age 5 years. The incidence of ARI was 23% in the urban area and 17.65% in the rural area, an overall mean incidence of 20.32%. The incidence of pneumonia was 16/1000 children and 5/1000 children in the urban and rural areas, respectively, with the incidence of pneumonia highest among infants. 54% of urban and 65% of rural children were malnourished; malnourished children had a relatively higher risk of acquiring respiratory infection (RR = 2.3). 59% of children had previously been immunized against measles, diphtheria, pertussis, and tetanus, and that immunization played a protective role against pneumonia. Urban pollution was more related to bronchial asthma than to pneumonia, breast-
feeding played a protective role against pneumonia and severe disease, and bottle-feeding was linked to a greater risk of developing pneumonia. Children of lower socioeconomic status were at higher risk of ARI episodes, with ARI decreasing as per capita income increased. Co-trimoxazole treatment and health education can help reduce the level of ARI-related mortality.

PMID: 9844332 [PubMed - indexed for MEDLINE]


**Breast feeding and acute lower respiratory infection.**


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**Abstract**

The association between breast feeding and acute lower respiratory infection (ALRI) was studied in a case-control study in southern Italy. Two groups of children were studied: the first group comprised 73 infants, aged 0-6 months, whose diagnosis was pneumonia or bronchiolitis; the second group included 88 infants less than 12 months of age with a diagnosis of pertussis-like illness. Control infants were two groups of infants admitted to the same ward. Compared with controls, infants in the first group were less likely to have been breast fed (odds ratio 0.42, 95% CI 0.19-0.90). The protection conferred by breast feeding was stronger among infants who were receiving human milk at the time of admission (odds ratio 0.22, 95% CI 0.09-0.55) and was absent among those infants who had stopped breast feeding for two or more weeks before admission. Among infants who were severely ill, breast feeding was less likely than among those with milder illnesses. There was evidence in the stratified analysis of effect modification by the presence of other children in the family. Among the infants with pertussis-like illness, the incidence and duration of breast feeding were not different compared with controls. The results suggest that breast feeding has a strong protective effect against ALRI in industrialized countries also. No protection seems to be conferred by human milk against pertussis-like illness.

PMID: 7949800 [PubMed - indexed for MEDLINE]

Breast feeding as a determinant of severity in shigellosis. Evidence for protection throughout the first three years of life in Bangladeshi children.

Clemens JD, Stanton B, Stoll B, Shahid NS, Banu H, Chowdhury AK.

Abstract

Little is known about the effect of breast feeding upon the severity of illness due to specific diarrheal pathogens. Using a systematically sampled and evaluated population of children aged less than 3 years, who attended a diarrheal disease hospital in Bangladesh, the authors performed a case-control study that assessed whether breast feeding reduces the severity of illness in shigellosis. From 540 children presenting with shigellosis between 1980-1982, they created a group of cases (n = 53) with severe illness and controls (n = 487) with non-severe illness. Overall, the odds ratio relating breast feeding to the severity of shigellosis (0.49, p = 0.01) suggested a substantial mitigating effect of breast feeding upon clinical severity. The high degree of protection against severe shigellosis was evident for breast-fed children up to 35 months of age, as well as for children at high risk for death because of severe malnutrition or measles. Because shigellosis continues to account for substantial morbidity and mortality in children in developing countries, the results support prolonged breast feeding in these settings.

PIP: The influence of breastfeeding on the severity of illness in shigellosis was assessed in a case-control study involving 540 children presenting with shigellosis to a Bangladesh diarrheal disease hospital in 1980-82. The 53 cases were children under 3 years of age with severe illness (i.e., rectal temperature above 102 F, severe neurologic manifestations, or severe dehydration), while the 487 age-matched controls had non-severe shigellosis. 42% of the cases compared with 59% of controls were breastfed, yielding an odds ratio of 0.49 (95% confidence interval, 0.28-0.86). This finding suggests that breastfeeding substantially shifts the spectrum of severity in Shigella infections from severe to non-severe illness. The high degree of protection against severe shigellosis was also seen in malnourished children and in children reporting a recent history of measles. The protective effect of breastfeeding persisted even when the analysis was corrected for the confounding effects of age, nutritional status, and earlier receipt of medication. These results are consistent with data from both developed and developing countries indicating that breastfeeding reduces the severity of illness in childhood diarrhea. In Bangladesh, about 1/3 of mothers breastfeed for 3 years. In other areas of the developing world, however, breastfeeding beyond infancy is relatively uncommon. Because shigellosis accounts for substantial morbidity and mortality in developing countries, prolonged breastfeeding is recommended.

PMID: 3953549 [PubMed - indexed for MEDLINE]
Protective factors in milk and the development of the immune system.

Hanson LA, Ahlstedt S, Andersson B, Carlsson B, Fällström SP, Mellander L, Porras O, Söderström T, Edén CS.

Abstract

The neonate is immature in certain immunologic functions. The slow development of secretory immunoglobulin A (IgA) seems to be compensated by selective transfer of secretory IgM into exocrine secretions on mucous membranes during the first few months of life. Secretory IgA and secretory IgM antibodies against Escherichia coli and poliovirus are already found in the neonate, possibly in response to the maternal anti-idiotypic IgG antibodies transplacentally exposing the fetus. Via such a mechanism, food antibodies could occur before direct food exposure in the infant. Human milk provides large amounts of antibodies (as a crude comparison, about 50 times the amount of antibodies given to a patient with hypogammaglobulinemia). The milk antibodies, dominated by secretory IgA, protect especially against intestinal infections. The milk also contains oligosaccharide analogues to epithelial receptors for bacteria. They, as well as a number of milk components such as lactoferrin and lysozyme, may contribute to host defense. The food antibodies in human milk may influence the infant's immune response to foreign food proteins introduced during weaning.

PMID: 3880886 [PubMed - indexed for MEDLINE]

The immune response of the mammary gland and its significance for the neonate.

Hanson LA, Ahlstedt S, Andersson B, Cruz JR, Dahlgren U, Fällström SP, Porras O, Svanborg-Edén C, Söderström T, Wettergren B.

Abstract

The immune response of the mammary gland is dominated by local production of secretory IgA antibodies (SIgA). These milk antibodies, amounting to about 0.5-1 g/day throughout lactation, are directed against food proteins and microorganisms often present in the intestine. This is presumably explained by the enteromammaric link: after antigenic exposure in the Peyer's...
patches of lymphoid cells they home to various exocrine glands, including the mammary gland. Similarly, lymphoid cells from the bronchial mucosa, may contribute to the antibody-producing cell population in the mammary gland. SIgA antibodies against common foods like cow's milk and soy proteins are regularly found in milk if such proteins are part of the mother's diet. It is possible, but unproven, that milk antibodies can decrease the exposure of the infant's intestinal mucosa to foreign food proteins introduced during continued breast-feeding. Milk SIgA antibodies do not prevent intestinal colonization by microorganisms, against which the milk antibodies are directed. The SIgA antibodies are thought to exert protection primarily by preventing contact between the microorganisms and the mucosal membranes. In this manner, human milk blocks attachment of otitis media-causing strains of pneumococci and H. influenzae to retropharyngeal cells, possibly explaining why breast-feeding may prevent otitis media. Milk antibodies have anti-attachment capacity, but there is also low molecular weight material in the milk with this capacity. It probably consists of analogues to the oligosaccharide receptor for pneumococci on the retropharyngeal cells.(ABSTRACT TRUNCATED AT 250 WORDS)

PMID: 6391286 [PubMed - indexed for MEDLINE]