

Dr. Gong and Dr. Kenton prepared the following responses to questions that were submitted during the Grand Rounds presentation but were not answered at that time due to running out of time.

Q1: Are there any therapies involving human breastmilk being researched for older children and/or adults who were not breastfed as infants?

Dr. Gong:

I believe that there is a host of research of using different oligosaccharides as well as some of the glycans and glycoconjugates that are found in human milk. Some are being studied as therapies for Crohn's disease or ulcerative colitis. A recent symposium was held that address some of the issues. See journal articles in American Journal of Clinical Nutrition - <http://ajcn.nutrition.org/content/98/2/519S.full.pdf>

There are internet sites as well as people expounding the use of human milk to treat autoimmune disease of the GI tract but no evidence thus far.

Dr. Kenton:

There are also a number of research papers on probiotics and specifically on bifidobacterium which apparently modify the GI tract and thus the immune system. Bifidobacterium are bacteria which are naturally found in human milk and have a positive effect on gastrointestinal and immune function.

- Isolauri E, Sütas Y, Kankaanpää P, Arvilommi H, Salminen S. Am J Clin Nutr. Probiotics: effects on immunity. 2001;73(2 Suppl):444S-450S.
- Saavedra JM. Use of probiotics in pediatrics: rationale, mechanisms of action, and practical aspects. Nutr Clin Pract 2007;22(3):351-65.
- Gueimonde M, Laitinen K, Salminen S, Isolauri E. Breast milk: a source of bifidobacteria for infant gut development and maturation? Neonatology 2007;92:64-6.

Q2: Can you please recap the studies that have been done related to IQ and breastfeeding?

Dr. Gong:

Alan Lucas first noted a difference in IQ between babies who received some human milk versus those who only got formula, there was an 8 point IQ advantage for those who got 4 weeks of human milk in NICU. His group also explored brain growth of those same babies as adolescents and found that the % of mother's milk correlated significantly with Verbal IQ; in boys, with all IQ scores, Total Brain volume and White Matter Volume using MRI – <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2939272/pdf/nihms-198797.pdf>.

Betty Vohr looked at doses of human milk and that is covered in the slides.

Dr. Kenton:

One can see effects up to 8 years of age...

Horwood LJ, Darlow BA, Mogridge N. Breast milk feeding and cognitive ability at 7-8 years. Arch Dis Child Fetal Neonatal Ed. 2001 Jan;84(1):F23-7.

Note from DSHS State Breastfeeding Coordinator: See also: Victora CG, Horta BL, Loret de Mola C, Quevedo L, Pinheiro RT, Gigante DP, Gonçalves H, Barros FC. Association between breastfeeding and intelligence, educational attainment, and income at 30 years of age: a prospective birth cohort study from Brazil. Lancet Glob Health. 2015 Apr;3(4):e199-205. <http://www.ncbi.nlm.nih.gov/pubmed/25794674>

Q3: Are the protective factors associated with human milk active throughout a person's life? Will they actually impact the health of a 50 year old person?

Dr. Gong:

From the studies of long effects, yes, breastfed babies have lower blood pressures and are less obese so those factors persist. In addition from the social science literature, breastfeeding confers good attachment and thus better adaption to society.

Dr. Kenton:

In addition, there are studies demonstrating a lesser incidence of eczema, leukemia, lymphoma, Coeliac Disease, and Ulcerative colitis in those individuals who are breastfed.

Q4: Can you please recap the controversy that occurred in California regarding if human milk should be classified as tissue or a food product?

Dr. Gong:

I'm not sure of your question. California has some of the most protective laws for breastfeeding. This is what I found in California statute regarding human milk and hospitals:

Exempts from Tissue Bank Licensure those hospitals storing mother's milk for her own baby. California Health and Safety Code § 1648. 2006 Chapt 480 (SB 246); SB 246 Signed by the Governor 9/26/06.

<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=hsc&group=01001-02000&file=1647-1648>

(a) A hospital that collects, processes, stores, or distributes human milk collected from a mother exclusively for her own child shall comply with the most current standards established for the collection, processing, storage, or distribution of human milk by the Human Milk Banking Association of North America until or unless the department approves alternative standards.

(b) A hospital shall be exempt from the requirements of Chapter 4.1 (commencing with Section 1635) for the purpose of collecting, processing, storing, or distributing human milk collected from a mother exclusively for her own child.

(c) Notwithstanding any other provision of law, no screening tests shall be required to be performed on human milk collected from a mother exclusively for her own child.

(d) The department shall assess hospital processes for collecting, processing, storing, or distributing human milk pursuant to its current practice, as required by Chapter 2 (commencing with Section 1250).

(e) This section does not apply to any hospital that collects, processes, stores, or distributes milk from human milk banks or other outside sources.

Note from DSHS State Breastfeeding Coordinator: Human milk appears to be classified as a human tissue in California and donor human milk is regulated as other tissue banks are. See:

<http://www.cdph.ca.gov/programs/lfs/Pages/Tissuebank.aspx>

Q5: I have seen colostrum supplement offered for sale on the web, targeted for adult consumption to improve immunity, fight obesity, and many other chronic conditions. Is colostrum regulated by the FDA?

Note from DSHS State Breastfeeding Coordinator: There are colostrum supplements offered for sale on the web that contain bovine (from cows) colostrum.

Dr. Kenton:

The growth factors and immune properties in human colostrum are specifically designed to mature the human gut. A bovine gut only handles grass. Thus the bovine colostrum will have growth factors to specifically mature the bovine gut into a gut which can digest and manage grass.

Dr. Gong:

A search on Pub Med revealed some studies of bovine colostrum in animal models. I'm sure that pharmaceuticals are interested in ways to harness the power of colostrum and bovine is more available. I came across [this advance publication](#) which appears to be a review:

Bagwe S, Tharappel LJ, Kaur G, Buttar HS. Bovine colostrum: an emerging nutraceutical. J Complement Integr Med. 2015 Mar 12. pii: /j/jcim.ahead-of-print/jcim-2014-0039/jcim-2014-0039.xml. doi: 10.1515/jcim-2014-0039. [Epub ahead of print]

Q6: Does breastmilk have any impact on babies exposed to drugs in utero?

Dr. Gong:

Breastmilk has many benefits. In utero drug exposure (I'm assuming you mean narcotic exposure as there are many exposures, some good, some bad) causes problems with withdrawal. For our mothers who are intent on changing their lifestyle by getting off illicit drugs and moving on to a healthier life style, we encourage them to be in programs that are designed to help them succeed. Consequently if they have made that choice and are on drugs to help them withdraw from street drugs, we encourage them to breastfeed. The breastfeeding act is helpful and small quantities of the drug that comes across in the breastmilk may help the baby with withdrawal symptoms. We definitely discourage all mothers who are breastfeeding from consuming anything that might be harmful to the newborn and his/her developing nervous system—that includes some non-illegal substances such as nicotine and alcohol.

Q7: Does human milk have any impact on ADHD or ADD?

Note from DSHS State Breastfeeding Coordinator:

A PubMed search shows some literature about association of suboptimal breastfeeding and ADHD:

- Mimouni-Bloch A, Kachevanskaya A, Mimouni FB, Shuper A, Raveh E, Linder N. Breastfeeding may protect from developing attention-deficit/hyperactivity disorder. *Breastfeed Med.* 2013;8(4):363-7. <http://www.ncbi.nlm.nih.gov/pubmed/23560473>
- Park S, Kim BN, Kim JW, Shin MS, Yoo HJ, Cho SC. Protective effect of breastfeeding with regard to children's behavioral and cognitive problems. *Nutr J.* 2014 Nov 29;13(1):111. <http://www.ncbi.nlm.nih.gov/pubmed/25433771>
- Sabuncuoglu O, Oregul C, Bikmazer A, Kaynar SY. Breastfeeding and parafunctional oral habits in children with and without attention-deficit/hyperactivity disorder. *Breastfeed Med.* 2014;9(5):244-50. <http://www.ncbi.nlm.nih.gov/pubmed/24841034>

*Some researchers are looking at the associations of bottle feeding and/or suboptimal breastfeeding, apnea and psycho-cognitive issues in children. See, for example: Beebe DW, Rausch J, Byars KC, Lanphear B, Yolton K. Persistent snoring in preschool children: predictors and behavioral and developmental correlates. *Pediatrics.* 2012;130(3):382-9. Some studies suggest an association between bottle feeding (which, according to [Brian Palmer, D.D.S.](#) and others, alters oral cavity development resulting in higher palate/narrower arch and decreased nasal space) and disordered breathing, including sleep apnea:*

- Montgomery-Downs HE, Crabtree VM, Sans Capdevila O, Gozal D. Infant-feeding methods and childhood sleep-disordered breathing. *Pediatrics.* 2007;120(5):1030-5. <http://www.ncbi.nlm.nih.gov/pubmed/17974740>
- Brew BK, Marks GB, Almqvist C, Cistulli PA, Webb K, Marshall NS. Breastfeeding and snoring: a birth cohort study. *PLoS One.* 2014;9(1):e84956. <http://www.ncbi.nlm.nih.gov/pubmed/24416321>
Sleep apnea may, in turn, be associated with behavioral outcomes including ADD/ADHD. See, for example:
- Karimzadeh P. Psycho-cognitive behavioral problems in sleep disordered children. *Neural Regen Res.* 2012;7(8):635-9. <http://www.ncbi.nlm.nih.gov/pubmed/25745456>
- Hvolby A. Associations of sleep disturbance with ADHD: implications for treatment. *Atten Defic Hyperact Disord.* 2015; 7(1):1-18. <http://www.ncbi.nlm.nih.gov/pubmed/25127644>
- Bonuck K, Freeman K, Chervin RD, Xu L. Sleep-disordered breathing in a population-based cohort: behavioral outcomes at 4 and 7 years. *Pediatrics.* 2012;129(4):e857-65. <http://www.ncbi.nlm.nih.gov/pubmed/22392181>

Dr. Gong:

In addition to this, the closeness and bonding that occurs with breastfeeding might be helpful to keep babies calm. I'm not aware of any studies.

There is evidence that breastfeeding protects against child abuse and neglect. For example:
Strathearn L, Mamun AA, Najman JM, O'Callaghan MJ. Does breastfeeding protect against substantiated child abuse and neglect? A 15-year cohort study. *Pediatrics*. 2009;123(2):483-93.
<http://www.ncbi.nlm.nih.gov/pubmed/19171613>