

## Breastfeeding and Health Outcomes

David Meyers

I HAVE THE GOOD FORTUNE to work at the Agency for Health Care Research and Quality (AHRQ), where I have the opportunity to help translate numbers and evidence into meaningful action to improve health and health care. In my work I am privileged to support the U.S. Preventive Services Task Force and collaborate with and fund researchers in primary care. The mission of the Agency is to improve the quality, safety, effectiveness, and efficiency of health care for all Americans. Today, I'm going to talk about the effects of breastfeeding on the health of women and children.

When we deconstruct breastfeeding to identify its effects on individual healthcare outcomes, we lose the bigger picture. Breastfeeding is a dynamic, complex, living practice—a multidimensional, relational system involving not only a mother and child, but their entire environment. I generally approach breastfeeding as a means of optimizing a child's chances for reaching his or her full potential. This sometimes creates conflict, because breastfeeding is not the magic guarantee for well-being that physicians and policy makers sometimes want. It is also important to remember that an individual family, making a decision about helping the development of a child, has a perspective on breastfeeding that is very different from the viewpoint of the population at large and of the policy makers who monitor public concerns.

To set a foundation for this summit, I am pleased to be able to summarize a report published in 2007 on outcomes of breastfeeding on maternal and infant health in developed countries that was prepared for AHRQ by the Evidence-Based Practice Center (EPC) of the Tufts–New England Medical Center, Boston, MA.

The EPC program was established by AHRQ in 1997 to review all relevant scientific literature on clinical, behavioral, and organization and financing topics to produce evidence reports and technology assessments. EPC evidence reports are based on rigorous, comprehensive syntheses and analyses of the scientific literature. There are currently 14 centers around the United States and Canada that are commissioned to systematically review the evidence surrounding a particular practice. The methodology used by the EPC is very

explicit; its documentation is very detailed. The EPCs collaborate broadly with experts around the world in various fields to produce reports on aspects of healthcare practice and outcomes that policy makers as well as clinicians use to guide health care.

The EPC's 2007 report on breastfeeding in maternal and infant health summarized evidence through May 2006 from different types of studies in the English-language literature, including randomized controlled trials and controlled observational studies. Over 9,000 articles were considered for this report. Given the breath of literature, the EPC relied on previously conducted systematic reviews and meta-analysis and at times conducted new and updated meta-analysis as well. Every study was examined and graded for its methodologic quality, and some studies of poorer quality were discarded.

The 2007 EPC report concluded that breastfeeding provided short-term benefits for infants in terms of a lower frequency of common illnesses, including ear infections and vomiting and diarrhea. The evidence suggests that for every six children who are breastfed exclusively for the first 6 months of life, one of them will not have an ear infection that he or she would otherwise have had. That means that of the approximately 4 million infants born in the United States every year, 2 million would be expected to have an ear infection in the first 6 months of life. If breastfeeding rates in America were increased to 80% of children, there would be 300,000 fewer ear infections than there now are. Among formula-fed infants the incidence of vomiting and diarrhea is nearly 100% in the first year of life, as compared with such illness in fewer than half of breastfed children.

The report found that the benefits are not only for common illnesses that occur in infancy, but also for rarer but serious illnesses. The rates of hospitalizations for pneumonia and severe lower respiratory tract infection are lower among breastfed infants than among those not breastfed. A meta-analysis found a significant inverse association between breastfeeding and sudden infant death syndrome (SIDS).

The benefits of breastfeeding are not limited to infancy; they extend into childhood and even into adulthood. A history

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The opinions expressed during this presentation are those of the presenter and do not reflect the views of the Agency for Healthcare Research and Quality or the U.S. Department of Health and Human Services.

*Editor's note:* Breastfeeding and health outcomes were discussed by Dr. David Meyers of the Agency for Health Care Research and Quality (AHRQ) at the meeting. He has also made available for publication in this supplement an updated version of the official AHRQ document edited by Dr. Stanley Ip and his colleagues that follows. We have included some of Dr. Meyers' eloquent discussion of the real meaning of the AHRQ report. He explains it so we mortals can put the science into perspective in everyday life.—Ruth A. Lawrence, MD.

of breastfeeding is clearly associated with decreased rates of common conditions, including eczema and obesity, and decreased rates of serious diseases, including type 2 diabetes and childhood leukemias.

When considering the benefits of breastfeeding, or more accurately the risks of not breastfeeding, I think it is helpful to put the numbers into context. [Note that slides presented along with this talk included odds ratios taken from the 2007 EPC report.]

To help provide this context, I want to introduce the concept of the “number needed to treat,” which refers to the number of people to whom a treatment or technique must be applied in order for it to make an effective difference in health.

Suppose a patient comes into my office with a sprained ankle, and I decide to prescribe a nonsteroidal anti-inflammatory drug (NSAID) such as naproxen or ibuprofen to ease the patient’s pain. Most of us assume that if we take a pain killer we are almost certainly going to get good pain relief. If you look at the evidence for this treatment, however, you find that NSAIDs provide effective relief for only one of every two people; 50% of the people for whom it is used do not get significant relief. We say therefore that on average we need to treat two people for one person to get good relief. NSAIDs for pain relief from sprains has a number-needed-to-treat of 2.

The effects of antibiotics on ear infections are likewise surprising, with only one in seven children in the United States having a clinically significant benefit from treatment. Similarly, treatment of a high cholesterol level with statin medications prevents a heart attack in only one of about 70 people. Yet I am a strong proponent of treating high cholesterol levels with statins because from the viewpoint of population health, it is one of the most effective things we can do to help people live longer and healthier lives.

When we move from treatment to prevention, the numbers of people who must be screened in order to produce a benefit are staggering. Screening for colon cancer is one of the most important screening tests we can do in America, yet as many as 1,500 people must undergo colonoscopy to stop one person from dying of colon cancer. For mammography, that ratio rises to a conservative number of 2,300 women who must be screened to prevent one death from breast cancer, with some data suggesting that the ratio is closer to 5,000 to 1. We should keep these numbers in mind in considering the evidence for breastfeeding.

I did some back of the envelope calculations about the number needed to breastfeed to avoid a couple of specific conditions. I freely admit that skilled biostatisticians and my colleagues at AHRQ would have concerns about my methods, and I ask you not to take these numbers as exact truths. I think they are good enough, however, to get us in the right ballpark and give us some perspective on the health benefits of breastfeeding.

To prevent one case of acute otitis media in an infant less than 6 months of age, approximately six children would need to be exclusively breastfed for the first 6 months. To prevent one case of vomiting and diarrhea, the number needing to breastfeed is 2.5.

Clearly, decisions about infant feeding are influenced by more than the potential health benefits for the infant. It is good to know, however, that when compared to other common

treatments and preventive health choices we make, breastfeeding is very impressive. And, of course, the act of breastfeeding provides all of these benefits, not simply protection for ear infections or reducing the chances of having diabetes or preventing SIDS or preventing asthma. We need to remind ourselves not to fall into the reductionist trap when considering the health effects of breastfeeding. Breastfeeding optimizes a child’s chances of reaching his or her full potential.

The review of evidence in preparing the EPC’s 2007 report did not focus on children born prematurely, but on full-term infants. However, it did find a 5% absolute risk reduction for necrotizing enterocolitis among premature infants who received breastmilk.

Looking more deeply into the report, it also showed an inverse association between breastfeeding and the incidences of asthma and type 1 diabetes, but added that more evidence was needed to be conclusive about this. The report also concluded that the available evidence suggests that breastfeeding is not associated with cognitive development in full-term infants and children, although this is a very difficult area because differences in cognition can be relatively subtle, and huge numbers of children would need to be followed to find small but important effects.

Turning to the other side of the breastfeeding partnership, health benefits accrue to the mother as well as to the infant. Clear evidence was found for an inverse association of breastfeeding with breast cancer, and a strong inverse association was also found for breastfeeding and both ovarian cancer and type 2 diabetes, exclusive of gestational diabetes during pregnancy.

Although I have not had time to completely update the 2007 report for the 1,200 studies that have come out since it was published, a study that was reported in the July 2009 issue of the *Journal of Obstetrics and Gynecology* and that applied multivariate modeling to a large data set obtained from American women found that women who breastfed for 12 or more months across their lifetimes had lower rates of high blood pressure, hypercholesterolemia, diabetes, and known cardiovascular disease than did women who didn’t breastfeed. More data and evidence are needed about this and other maternal outcomes of breastfeeding.

The team of investigators at the EPC who prepared the 2007 report had no preconceived ideas about the effects of breastfeeding. They were not advocates for or against either breastfeeding or formula feeding, and in my opinion they were conservative in their methods and their conclusions in the body of the report and a bit liberal in their writing of the executive summary.

What does the evidence say about exclusive breastfeeding? Because of changes in the way clinical studies have been done, we are getting better definitions of breastfeeding and more identification of exclusive breastfeeding as opposed to partial breastfeeding and formula feeding. And, in general, exclusive breastfeeding has produced better health outcomes than mixed feeding, which in turn has produced better health outcomes than formula feeding. When such data have been available, the benefits appear to keep increasing past 1 year of age and into the 18-month range.

On the basis of the 2007 EPC report, the U.S. Preventive Services Task Force conducted a second systematic review of the evidence about breastfeeding promotion and support in

developed countries. It concluded that the actions of the healthcare system in relation to breastfeeding do matter. The Task Force recommends primary care clinicians get involved and support women in breastfeeding. It concluded that what physicians and the health system do before and around the time of delivery makes a difference in the initiation, exclusivity, and duration of breastfeeding. It also matters what we do when women and their infants leave the formal healthcare system after birth and return to the community.

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