

# Breastfeeding: What Do We Know, and Where Do We Go From Here?

Lydia Furman, MD

Exclusive breastfeeding through age 6 months with continued breastfeeding to 12 months and beyond is the optimal infant feeding method because of its lifesaving benefits for children and mothers worldwide.<sup>1,2</sup> Breastfeeding reduces all-cause and infection-related child mortality, sudden infant death syndrome–related mortality, and maternal breast cancer and cardiovascular risk; the effect of breast milk is dose-dependent, with exclusivity and longer duration increasing benefits.<sup>3–5</sup> With this background, Dr Lisa-Christine Girard and colleagues have conducted a unique and thoughtful study to examine the impact of breastfeeding on language, problem behaviors, and cognition in Irish children at ages 3 and 5 years.<sup>6</sup>

In their sample of >8000 children, the breastfed and not-breastfed groups were clinically and statistically different. This difference is especially important because there may be differences between mothers who do and do not breastfeed that are not known to the researchers (or anyone else) that either directly affect the outcome being studied or affect the outcome indirectly via another social or environmental factor (ie, as a mediator). Even randomization does not ensure perfect distribution of unknown variables between study groups, but it is the optimal study design. Indeed, the main challenge facing researchers who seek to examine the impact of breastfeeding on child outcomes is an inability to randomly assign individual mothers to breastfeed or not. Dr Girard and colleagues tackled this problem in 2

ways. Without the ability to randomly assign mothers to feeding choice, the authors chose to use propensity score matching to approximate randomization by matching for suspected confounders, and they used structural equation modeling to use their full data set and examine for mediator and moderator effects. One challenge of propensity score matching is that it causes data loss because not everyone can be matched; structural equation modeling thus served as a strong complementary analytical method.

The data set of Dr Girard et al has some limitations that should be acknowledged. Although most infants in the breastfeeding cohort were exclusively breastfed at  $\leq 31$  days, <5% were fully breastfed at >180 days, which limits the ability to examine optimal breastfeeding. Duration of breastfeeding was captured in broad time bands ( $\leq 31$  days, 32–180 days, >180 days), which combines infants with very different feeding experiences and may dilute the impact of longer durations of breast milk receipt, depending on when exclusivity ends. Both exclusivity and duration are important, because dose response is well established for breast milk benefits.<sup>3–5</sup> Maternal IQ was not measured, as the authors appropriately note; ideally we need this information to consider child cognitive ability. Understanding these study limitations still does not diminish the value of the study, which is a thoughtful contribution to the breastfeeding literature.

FREE

Department of Pediatrics, University Hospitals Rainbow Babies and Children's Hospital and Case Western Reserve University School of Medicine, Cleveland, Ohio

Opinions expressed in these commentaries are those of the author and not necessarily those of the American Academy of Pediatrics or its Committees.

**DOI:** 10.1542/peds.2017-0150

Accepted for publication Jan 17, 2017

Address correspondence to Lydia Furman, MD, Division of General Pediatrics and Adolescent Medicine, Room 784, MS 6019, Department of Pediatrics, Rainbow Babies and Children's Hospital, 11100 Euclid Ave, Cleveland, OH 44016. E-mail: lydia.furman@uhhospitals.org

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

Copyright © 2017 by the American Academy of Pediatrics

**FINANCIAL DISCLOSURE:** The author has indicated she has no financial relationships relevant to this article to disclose.

**FUNDING:** No external funding.

**POTENTIAL CONFLICT OF INTEREST:** The author has indicated she has no potential conflicts of interest to disclose.

**COMPANION PAPER:** A companion to this article can be found online at [www.pediatrics.org/cgi/doi/10.1542/peds.2016-1848](http://www.pediatrics.org/cgi/doi/10.1542/peds.2016-1848).

**To cite:** Furman L. Breastfeeding: What Do We Know, and Where Do We Go From Here?. *Pediatrics*. 2017;139(4):e20170150

We can place the study of Girard et al in context by examining childhood outcomes from the PROBIT study, in which 31 Belarus hospitals were prospectively cluster randomized to a breastfeeding intervention based on the World Health Organization Baby-Friendly Hospital Initiative versus regular care, with significantly increased exclusive breastfeeding at 3 and 6 months and beyond among intervention hospital infants.<sup>7</sup> This large trial examined similar behavioral outcomes and is in agreement with Girard and colleagues; among the 13 889 children (81.5%) followed up at age 6.5 years, there was no effect of duration or exclusivity of breastfeeding on several validated measures of child behavior or on maternal relationship measures.<sup>8</sup> Finally, although Girard et al found no effect of breastfeeding on cognitive ability, the PROBIT study reported a mean IQ increase of 7.5 points (95% confidence interval, 0.8–14.3) at age 6.5 years in children from intervention hospitals.<sup>9</sup> Although the topic is controversial, and a recent systematic review identified heterogeneity between studies, among the 4 studies with the least bias (each >500 subjects, controlled for maternal IQ, breastfeeding recall duration <3 years) breastfeeding improved performance on IQ testing by 1.76 points (95% confidence interval, 0.25–3.26), suggesting a small but durable impact of breastfeeding on intelligence.<sup>10</sup>

But on what breastfeeding outcomes should we now focus? At this point, we know well that breastfeeding has an array of life-saving maternal, child, and societal benefits, even if childhood behavioral outcomes are not affected. The many known benefits of breastfeeding are neither fully realized nor equitably distributed, however, at least in part because not all women and their partners receive the preconception, prenatal, and postnatal education and support

needed to initiate and continue breastfeeding as recommended.<sup>11–14</sup> Younger, unmarried, poor, and less educated women of racial and ethnic minorities are less likely to breastfeed, as we witness in the study of Girard et al (Table 1) and in national and international data alike.<sup>6,14,15</sup> How can we change the landscape so that all mothers can have opportunity and resources to have the chance to choose to breastfeed and to succeed if they so choose? This is the much-needed breastfeeding research that we hope to read about before the next breastfeeding commentary is published in *Pediatrics*.

## REFERENCES

1. American Academy of Pediatrics, Section on Breastfeeding. Breastfeeding and the use of human milk. *Pediatrics*. 2012;129(3). Available at: [www.pediatrics.org/cgi/content/full/129/3/e827](http://www.pediatrics.org/cgi/content/full/129/3/e827)
2. World Health Organization. Infant and young child nutrition: global strategy for infant and young child feeding. April 16, 2002. Geneva, Switzerland: World Health Organization. Available at: [http://apps.who.int/gb/archive/pdf\\_files/WHA55/ea5515.pdf?ua=1](http://apps.who.int/gb/archive/pdf_files/WHA55/ea5515.pdf?ua=1). Accessed November 11, 2015
3. Sankar MJ, Sinha B, Chowdhury R, et al. Optimal breastfeeding practices and infant and child mortality: a systematic review and meta-analysis. *Acta Paediatr*. 2015;104(467):3–13
4. Hauck FR, Thompson JM, Tanabe KO, Moon RY, Vennemann MM. Breastfeeding and reduced risk of sudden infant death syndrome: a meta-analysis. *Pediatrics*. 2011;128(1):103–110
5. Chowdhury R, Sinha B, Sankar MJ, et al. Breastfeeding and maternal health outcomes: a systematic review and meta-analysis. *Acta Paediatr*. 2015;104(467):96–113
6. Girard LC, Doyle O, Tremblay RE. Breastfeeding, cognitive and noncognitive development in early childhood: a population study. *Pediatrics*. 2017;139(4):e20161848
7. Kramer MS, Chalmers B, Hodnett ED, et al; PROBIT Study Group (Promotion of Breastfeeding Intervention Trial). Promotion of Breastfeeding Intervention Trial (PROBIT): a randomized trial in the Republic of Belarus. *JAMA*. 2001;285(4):413–420
8. Kramer MS, Fombonne E, Igumnov S, et al; Promotion of Breastfeeding Intervention Trial (PROBIT) Study Group. Effects of prolonged and exclusive breastfeeding on child behavior and maternal adjustment: evidence from a large, randomized trial. *Pediatrics*. 2008;121(3). Available at: [www.pediatrics.org/cgi/content/full/121/3/e435](http://www.pediatrics.org/cgi/content/full/121/3/e435)
9. Kramer MS, Aboud F, Mironova E, et al; Promotion of Breastfeeding Intervention Trial (PROBIT) Study Group. Breastfeeding and child cognitive development: new evidence from a large randomized trial. *Arch Gen Psychiatry*. 2008;65(5):578–584
10. Horta BL, Loret de Mola C, Victora CG. Breastfeeding and intelligence: a systematic review and meta-analysis. *Acta Paediatr*. 2015;104(467):14–19
11. Bartick MC, Stuebe AM, Schwarz EB, Luongo C, Reinhold AG, Foster EM. Cost analysis of maternal disease associated with suboptimal breastfeeding. *Obstet Gynecol*. 2013;122(1):111–119
12. McKinney CO, Hahn-Holbrook J, Chase-Lansdale PL, et al; Community Child Health Research Network. Racial and ethnic differences in breastfeeding. *Pediatrics*. 2016;138(2):e20152388
13. Logan C, Zittel T, Striebel S, et al. Changing societal and lifestyle factors and breastfeeding patterns over time. *Pediatrics*. 2016;137(5):e20154473
14. Roberts TJ, Carnahan E, Gakidou E. Can breastfeeding promote child health equity? A comprehensive analysis of breastfeeding patterns across the developing world and what we can learn from them. *BMC Med*. 2013;11:254
15. Centers for Disease Control and Prevention. Breastfeeding among US children born 2001–2013, CDC National Immunization Survey. Available at: [https://www.cdc.gov/breastfeeding/data/nis\\_data/rates-any-exclusive-bf-socio-dem-2013.htm](https://www.cdc.gov/breastfeeding/data/nis_data/rates-any-exclusive-bf-socio-dem-2013.htm). Accessed January 4, 2017

## Breastfeeding: What Do We Know, and Where Do We Go From Here?

Lydia Furman

*Pediatrics* 2017;139;

DOI: 10.1542/peds.2017-0150 originally published online March 27, 2017;

### Updated Information & Services

including high resolution figures, can be found at:  
<http://pediatrics.aappublications.org/content/139/4/e20170150>

### References

This article cites 10 articles, 3 of which you can access for free at:  
<http://pediatrics.aappublications.org/content/139/4/e20170150.full#ref-list-1>

### Subspecialty Collections

This article, along with others on similar topics, appears in the following collection(s):  
**Developmental/Behavioral Pediatrics**  
[http://classic.pediatrics.aappublications.org/cgi/collection/development:behavioral\\_issues\\_sub](http://classic.pediatrics.aappublications.org/cgi/collection/development:behavioral_issues_sub)  
**Cognition/Language/Learning Disorders**  
[http://classic.pediatrics.aappublications.org/cgi/collection/cognition:language:learning\\_disorders\\_sub](http://classic.pediatrics.aappublications.org/cgi/collection/cognition:language:learning_disorders_sub)  
**Nutrition**  
[http://classic.pediatrics.aappublications.org/cgi/collection/nutrition\\_sub](http://classic.pediatrics.aappublications.org/cgi/collection/nutrition_sub)  
**Breastfeeding**  
[http://classic.pediatrics.aappublications.org/cgi/collection/breastfeeding\\_sub](http://classic.pediatrics.aappublications.org/cgi/collection/breastfeeding_sub)

### Permissions & Licensing

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:  
<https://shop.aap.org/licensing-permissions/>

### Reprints

Information about ordering reprints can be found online:  
<http://classic.pediatrics.aappublications.org/content/reprints>

Pediatrics is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since . Pediatrics is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2017 by the American Academy of Pediatrics. All rights reserved. Print ISSN:

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



# PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

## **Breastfeeding: What Do We Know, and Where Do We Go From Here?**

Lydia Furman

*Pediatrics* 2017;139;

DOI: 10.1542/peds.2017-0150 originally published online March 27, 2017;

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://pediatrics.aappublications.org/content/139/4/e20170150>

Pediatrics is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since . Pediatrics is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2017 by the American Academy of Pediatrics. All rights reserved. Print ISSN:

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

