

Breastfeeding Survey of Washington State Pediatricians

Arlene Ritzen, MD, JD, MPH, Donna Johnson, RD, PhD, Betty Bekemeier, RN, MPH, PhD, MaryAnn O'Hara, MD, MPH, MSt

© 2009 Washington State Journal of Public Health Practice. All Rights Reserved.

Keywords: Exclusive breastfeeding, Breastfeeding recommendations, Breastfeeding training, Breastfeeding

Background: The American Academy of Pediatrics (AAP) recommends that infants breastfeed exclusively for six months based on clear evidence that prolonged and exclusive breastfeeding benefits infants and their mothers. Even though the benefits of breastfeeding are widely accepted, United States' (US) breastfeeding rates are lower than other industrialized countries.

Objective: This descriptive, cross-sectional study was designed to identify characteristics associated with Washington State AAP member pediatricians' breastfeeding knowledge, beliefs and practices.

Method: In 2008, 992 pediatricians were invited to participate anonymously in a web-based survey.

Results: 289 of the 992 participated for a response rate of 29%. Of respondents, 57% were female, 85% were primary care physicians, 73% desired future breastfeeding training and the mean age was 48 + 12. The 76% of respondents who knew the definition of exclusive breastfeeding were more likely to be younger ($P=.048$), have read about breastfeeding ($P=.029$), desire future breastfeeding training ($P=.002$) and recommend exclusive breastfeeding for six months ($P=.007$). The 56% of respondents who recommend exclusive breastfeeding for six months were more likely to be primary care providers ($P=.008$), desire future breastfeeding education ($P=.015$), lack access to breastfeeding "hotlines" ($P=.020$) and have access to breastfeeding support groups ($P=.019$) or rental equipment ($P<.001$).

Conclusion: Capitalizing on pediatricians' desire for breastfeeding training, targeting this training on developing their exclusive breastfeeding knowledge and improving access to lactation services might lead to increases in pediatricians' recommendations for exclusive breastfeeding.

Introduction

The American Academy of Pediatrics (AAP) recommends exclusive breastfeeding without formula, juice, water or other food supplementation for the first six months of life (AAP, 2005). Clear evidence that prolonged and exclusive breastfeeding has multiple health benefits for infants and their mothers provides the basis for this recommendation (Horwood, Darlow, Mogridge, 2001), (Oddy, Peat, de Klerk,

2002). Studies also indicate that annual costs to the United States (US) health system from women not breastfeeding are several million dollars (Cahill & Wagber, 2002), (Chandran & Gelfer, 2006).

Even though the benefits of breastfeeding are widely accepted, rates of initiation and duration of exclusive breastfeeding are below national goals (Cahill & Wagber, 2002), (Chandran & Gelfer, 2006). In the US in 2004, 74% of mothers initiated breastfeeding after giving birth, 41%

were breastfeeding any amount at 6 months, 21% were breastfeeding any amount at 12 months, 30% were breastfeeding exclusively at 3 months and 11% were breastfeeding exclusively at 6 months (National immunization survey, 2004). The US Public Health Service's Healthy People 2010 objectives aim to increase the proportion of mothers who breastfeed their infants at birth to 75%, at 6 months to 50%, at 12 months to 25%, exclusively for 3 months to 40% and exclusively for 6 months to 17% (Cahill & Wagber, 2002), (Chandran & Gelfer, 2006), (National immunization survey, 2004).

According to the 2005 Centers for Disease Control Guide to Breastfeeding Interventions evidence-based interventions that improve breastfeeding initiation and duration include evidence-based interventions that improve breastfeeding initiation and duration include maternity care practices, maternal education, workplace support for breastfeeding, peer support, health professional support and media and social marketing (Shealy, Li, Benton-Davis, & Grummer-Strawn, 2005). Although professional education or hotlines and other information resources alone have not been shown to promote breastfeeding and the role of public acceptance in promoting breastfeeding is untested, these may be important adjuncts to other lactation services (Shealy, et al., 2005).

The AAP recommends "physicians work to promote support for breastfeeding at the department, hospital and community levels" (Behavioral interventions, 2003). Even though health care professionals substantially influence women's decisions to initiate and continue breastfeeding, a lack of support from health care professionals is a major barrier to breastfeeding (AAP, 2005), (DiGirolama, Grummer-Strawn, & Fein, 2003). Studies suggest that the low rate of exclusive breastfeeding through the first six months of life is due to multiple social and clinical impediments including clinicians' lack of understanding and acceptance of the AAP recommendations.

According to the CDC, "relatively few health professionals are adequately trained and experienced in providing breastfeeding support" and that "some believe that breastfeeding provides only modest benefits and that infant formula is not a significantly inferior choice" (Shealy, et al., 2005). Additional impediments include clinicians' lack of time and lactation services available to promote successful breastfeeding, lack of confidence in their abilities to support breastfeeding and lack of understanding of the breastfeeding recommendations (Schanler, O'Connor, & Lawrence, 1999), (Freed, et al., 1995), (American Academy of Pediatrics, et al., 1997).

In addition, the US Preventive Services Task Force reports that "structured programs combining breastfeeding education with behavioral counseling promote the initiation and continuation of breastfeeding" and that an effective role of the primary care provider is to refer women to these structured programs (Behavioral interventions, 2003). Although these programs promote breastfeeding, there is little known about the practical clinical application of this recommendation such as the timely availability of these services to mothers (Freed, et al., 1995), (Powers, 1999).

Washington State's 2004 exclusive breastfeeding rates of 50% through 3 months and 23% through 6 months exceed the national rates and Healthy People 2010 goals (Healthy people 2010, 2000), (Department of Health and Human Services). The Washington State rates, however, are considerably lower than breastfeeding rates in other industrialized countries such as Sweden that had an exclusive breastfeeding rate at 6 months of 42% in 1997 (Breastfeeding, 2000). The purpose of this study was to determine whether training, practice setting, practice location, available lactation services, age, gender and primary care practice are associated with Washington State AAP member pediatricians' knowledge, beliefs and practices regarding

breastfeeding. Study findings will be used to guide breastfeeding promotion across the state.

Methods

Research Design

This was a descriptive, cross-sectional study of Washington State pediatricians' breastfeeding knowledge, practices and beliefs. Participants were Washington State members of the AAP with e-mail addresses listed in their AAP profiles.

Sample

The AAP is the nation's leading association for pediatricians (American Academy of Pediatrics & Division of Health Services Research, 2004). Given that the population size of the Washington State AAP members is 1104, to achieve a 95% confidence interval with a 5% margin of error and a 50% response distribution 286 responses were needed (Raosoft On-line Technologies).

Survey Instrument

With permission from the national AAP, the survey for this Washington State study was developed using a subset of questions taken from the AAP's Section on Breastfeeding's, Pediatricians' Attitudes and Practices Regarding Breastfeeding 2004 national survey and slightly modified (American Academy of Pediatrics & Division of Health Services Research, 2004). The 2004 national survey question asking whether "Lack of direct reimbursement for breastfeeding counseling has limited the extent to which I provide these services" was changed in the Washington State survey to "Lack of time for breastfeeding counseling has limited the extent to which I provide these services" (American Academy of Pediatrics & Division of Health Services Research, 2004). The national survey two answer options of "Continue as long as the baby wants" and "Continue as long as the mother wants" were combined in the Washington State survey as answer option "As long as mother and

baby want" (American Academy of Pediatrics & Division of Health Services Research, 2004). This Washington State study used the AAP's national survey ordinal and Likert scales (American Academy of Pediatrics & Division of Health Services Research, 2004).

Survey Administration

Before the survey invitation was sent to potential participants, the University of Washington's IRB granted an exemption for the study. In March of 2008, Washington State AAP members with e-mail addresses were invited by the investigator through e-mail request to participate anonymously in the web-based survey via the University of Washington's catalyst webQ system. An automatic reminder was sent two weeks after the invitation.

Data Analyses

Study data were anonymously and automatically collected and managed using the University of Washington's catalyst webQ system and analyzed using SPSS 14.0 (SPSS Inc, Chicago, IL). First, frequency distributions for all survey questions were calculated. Respondents reported their birth year for age and mean age and standard deviation were calculated.

Second, data were transformed to allow for evaluation of associations. After mean age was calculated, age was split into two categories of less than the mean age and greater than or equal to mean age. Defining exclusive breastfeeding responses were split into two categories of the correct answer of "baby receives no food or drink other than breastmilk, vitamins, iron or medications" and all other answers. Recommendations for exclusive breastfeeding responses were split into the answer of "6 months" and all other answers. Recommendations for any breastfeeding responses were split into two categories of the answers "1 year," "2 years" or "as long as mother and baby want" and all other answers. Confident ("4") and very confident("5") responses were

combined, neutral("3") remained its own category and the two responses indicating lack of confidence ("1" and "2") were combined. For lactation services, the responses of "no" and "not available in my community" were combined. "Self-employed solo practice" and "two physician practice" were combined.

Finally, the chi-square or, where appropriate, the Fisher's exact test was performed for comparisons of the independent and dependent categorical variables. A P-value of $< .05$ was considered indicative of statistical significance.

Results

In the national AAP member's directory, 992 of the 1104 directory listings for Washington State AAP members contained e-mail addresses. Of the initial 992 AAP members who were e-mailed an invitation and link to the survey, 54 e-mails were returned as undeliverable, 649 recipients did not respond and 289 responded. The yield on overall response rate was 29%. Not all respondents answered every question. Respondents were predominantly primary care physicians from urban settings in pediatric group practices. Mean age was $48 + 12$, and 166 (57%) of respondents were female. A slight majority of respondents reported receiving breastfeeding training during residency and 73% reported having interest in receiving further education that focuses on the management of breastfeeding. Most respondents reported access to lactation services such as lactation consultants, breastfeeding support groups, hospital-based lactation centers or rental equipment/supplies, but only 23% reported access to breastfeeding hotlines.

Factors Associated with Breastfeeding Knowledge

Respondents who were aware of the AAP definition of exclusive breastfeeding were also more likely to be younger than the mean age ($P=.048$), have read on the subject in the past three

years ($P=.029$), desire future education on breastfeeding ($P=.002$), recommend exclusive breastfeeding for 6 months ($P=.007$), recommend any breastfeeding for one year or longer ($P<.001$), agree pediatricians should encourage mothers to breastfeed ($P=.004$) and disagree that formula is better ($P=.003$) or that they have little influence on breastfeeding ($P=.002$). There were no statistically significant associations with practice location or setting.

Factors Associated with Breastfeeding Attitudes

Respondents who believed that pediatricians should actively encourage all mothers in their practice to try breastfeeding were also more likely to have read on the subject in the past three years ($P=.024$). Respondents who disagreed that formula feeding is more reliable and easier for both the mother and the baby were more likely to be younger than the mean age ($P=.012$), female ($P=.001$) and to have had breastfeeding training during residency ($P=.023$), have read on the subject in the past three years ($P=.017$) and desire future education on breastfeeding ($P=.002$). Respondents who disagreed that pediatricians have little influence on whether mothers initiate breastfeeding were more likely to be younger than the mean age ($P=.001$), female ($P=.002$), to have access to breastfeeding support groups ($P=.002$), have had breastfeeding training during residency ($P<.001$), have read on the subject in the past three years ($P=.003$) and desire future education on breastfeeding ($P=.032$). Respondents who agreed that almost any mother could be successful at breastfeeding were more likely to be in primary care practice ($P=.032$). Respondents who disagreed that the lack of time for breastfeeding counseling had limited the extent to which they provided these services were more likely to be older ($P<.001$), to have read on the subject in the past three years ($P=.010$), lack access to breastfeeding "hotlines" ($P=.012$), have access to breastfeeding rental equipment/supplies ($P=.008$) and less likely to have attended

Table 1. Characteristics of the 289 Washington survey respondents.

Characteristic	Number (Percentage) of Responses
Gender, female	166 (58%)
Primary care practice	245 (85%)
Residency currently	17 (6%)
Practice location	
Urban	136 (44%)
Suburban	113 (39%)
Rural	35 (12%)
Other	15 (5%)
Practice setting	
Solo or two physician practice	13 (5%)
Pediatric group practice	106 (37%)
Multispecialty group	47 (6%)
Health Maintenance Organization	14 (5%)
Medical school	30 (10%)
Non-governmental hospital	15 (5%)
Non-profit community health center	11 (4%)
City/county/state government hospital or clinic	12 (4%)
US government hospital or clinic	12 (4%)
Other	28 (10%)
Lactation services available	
Lactation consultant	266 (9%)
Breastfeeding support group	136 (47%)
Breastfeeding "hotline"	66 (23%)
Hospital-based lactation center	243 (84%)
Rental of equipment/supplies	240 (83%)
Breastfeeding education	
Received training in residency	148 (51%)
Attended training in past 3 years	71 (25%)
Read on subject in past 3 years	204 (71%)
Desire future training	210 (73%)

courses on breastfeeding in the past three years ($P=.007$) or desire future education on breastfeeding ($P<.001$). There were no statistically significant associations between breastfeeding attitudes and practice setting or location. The 83% of respondents who reported having

confidence managing breastfeeding problems were more likely to be female ($P=.001$), have read on the subject in the past three years ($P<.001$), desire future education on breastfeeding ($P=.006$), agree that mothers can succeed at breastfeeding with trying ($P=.007$) and lack access to

Table 2. Responses to the Washington State Survey Questions about Knowledge, Attitudes and Practices on Breastfeeding (BF).

	Number (Percentage) of Responses
Knowledge	
Correct definition of exclusive BF	219 (76%)
Attitudes	
Pediatricians should actively encourage BF	282 (98%)
Pediatricians have little influence on BF	37 (13%)
Almost any mother can BF with trying	212 (73%)
Mothers should continue BF after returning to work	286 (99%)
Formula feeding is more reliable than BF	264 (91%)
Lack of time limits services BF counseling	154 (53%)
Practice	
Recommends exclusive BF for 6 months	162 (56%)
Recommends any BF for at least 1 year or as long as mother and baby want	261 (90.3)

breastfeeding “hotlines” ($P=.016$). Of the 73% of respondents who reported having confidence in addressing breastfeeding questions, there were no statistically significant associations found between this response and any of the participant characteristics.

Factors Associated with Breastfeeding Practices

Respondents who recommend six months for exclusive breastfeeding were significantly more likely to be primary care providers ($P=.008$), desire future education on breastfeeding ($P=.015$), lack access to breastfeeding “hotlines” ($P=.020$), have access to breastfeeding support groups ($P=.019$) and have access to breastfeeding rental equipment/supplies ($P<.001$). Respondents who recommend any breastfeeding for one year or longer (1 year, 2 years or as long as mother and baby want) were more likely to be female ($P=.004$), have read on the subject in past three years ($P=.001$), desire future education on breastfeeding ($P=.010$), agree pediatricians should encourage mothers to breastfeed ($P=.032$), disagree that they have little influence on breastfeeding ($P=.001$) and disagree that formula is better ($P<.001$). There were no statistically significant associations

between breastfeeding recommendations and practice setting or location.

Discussion

Comparisons of Washington State and National Findings

Washington State is unique with its 2004 breastfeeding rates exceeding the national rates and the US Public Health Service’s Healthy People 2010 goals (Healthy people 2010, 2000). Given Washington’s relatively high breastfeeding rates in comparison to the rest of the US, generalization of study findings could be limited because Washington State results possibly will not reflect patterns in other states. This possibility is borne out in comparisons between Washington State and national findings on breastfeeding attitudes, practices and knowledge.

To increase instrument reliability, questions for the Washington State survey came from the 2004 AAP national survey designed to assess pediatricians’ practices regarding counseling on breastfeeding and attitudes surrounding breastfeeding management and education.³⁶ Although the questions for the Washington State survey came from the 2004 AAP national survey,

there were some differences between the national and Washington State surveys. The 2004 AAP national survey received an overall response rate of 53%, excluded retired pediatricians and only primary care providers responded to questions on breastfeeding counseling (American Academy of Pediatrics & Division of Health Services Research, 2004). In contrast, the Washington State survey received a lower overall response rate of 29%, included retired pediatricians and asked the same questions of primary care and non-primary care providers (American Academy of Pediatrics & Division of Health Services Research, 2004). In comparing the Washington State survey results and the 2004 national AAP survey results, fewer Washington State respondents reported having residency training (51% Washington, 63% national) or desiring future training on breastfeeding (73% Washington, 79% national) (American Academy of Pediatrics & Division of Health Services Research, 2004). A higher percentage of Washington State survey respondents, however, knew the AAP definition of exclusive breastfeeding (76% Washington, 65% national), recommended exclusive breastfeeding for six months (56% Washington, 37% national), recommended any breastfeeding for at least one year or as long as mother and baby want (90% Washington, 74% national), disagreed that pediatricians have little influence on mothers' breastfeeding practices (87% Washington, 80% national) and believed that mothers should continue breastfeeding upon returning to work (99% Washington, 96% national) (American Academy of Pediatrics & Division of Health Services Research, 2004).

Limitations of the Washington State Study

While multiple medical providers have opportunities to influence mothers' breastfeeding decisions, this study included only Washington State pediatricians with working e-mail addresses listed in their AAP profiles. Regarding data quality issues, threats to the validity of this study included response and non-response bias and the

reliability and validity of the questionnaire used in the study. To minimize the influence of response bias the survey invitation emphasized the study's public health focus and assured respondents of their anonymity and that no individual responses would be reported. To minimize the influence of non-response bias, the survey invitation encouraged participation and the University of Washington's catalyst webQ system sent reminders automatically and anonymously to all potential participants two weeks after the initial e-mail survey invitation. With these invitations and reminders to participate in the survey, the overall response rate was 29% and does not represent the majority of Washington State pediatricians. In addition to limitations on generalizing the Washington State study findings to US states with lower breastfeeding rates, those who responded to the survey might have strong opinions about breastfeeding and bias the results.

Washington State Survey Findings

Even with Washington's higher than national breastfeeding rates and the possibility that those responding to the investigator's breastfeeding survey could be biased in favor of breastfeeding promotion, some responses indicated lack of universal understanding or acceptance of the AAP breastfeeding recommendations and negative attitudes about breastfeeding and the pediatrician's role in promoting breastfeeding. Of the survey respondents, 24% incorrectly defined exclusive breastfeeding and 19% recommended exclusive breastfeeding for less than 6 months. For breastfeeding attitudes, 12% agreed that pediatricians have little influence on mothers breastfeeding, 26% disagreed that almost any mother could succeed at breastfeeding with trying, 8% agreed that formula was better than breastmilk and 46% agreed that they lack time to counsel on breastfeeding. Regarding confidence, 5% indicated they lack confidence in addressing parents' breastfeeding questions and 9% indicated

they lack confidence in competently managing common breastfeeding problems.

In examining statistically significant associations, some breastfeeding attitudes and beliefs were associated with training. Breastfeeding training during residency, training or reading in the past three years or desire for future training was associated with pediatricians who agreed that they should encourage breastfeeding, disagreed that they have little influence on breastfeeding, disagreed that formula is better and disagreed that they lack time to counsel on breastfeeding. Given that non-primary care providers might have less exposure to the mother-infant breastfeeding dyad, it was not surprising that practicing primary care was associated with agreeing that mothers could succeed at breastfeeding with trying.

Associations were also found between those who have access to breastfeeding rental equipment and believing that they had enough time to counsel on breastfeeding indicating that access to this equipment could potentially save time for practitioners and parents. Those who had access to breastfeeding support groups also tended to disagree that pediatricians' have little influence on breastfeeding indicating that access to support groups may enhance pediatricians' messages or vice versa. Being female or younger than mean age was also associated with disagreeing that formula is superior to breastmilk. This deserves further study particularly since receiving training during residency was also associated with this response and younger residents now may receive more training on the subject than in the past possibly accounting for this finding.

Confidence managing common breastfeeding problems was also associated with training such as reading on the subject in the past three years and desire for future education. In addition to believing that mothers could succeed at breastfeeding with trying, respondents who indicated confidence in managing breastfeeding problems were more likely to be female. The associations between lacking access to

breastfeeding "hotlines" and pediatricians' recommending exclusive breastfeeding for six months, disagreeing that they lack time to counsel on breastfeeding and having confidence in managing common breastfeeding problems is unclear.

While there were no significant associations between breastfeeding attitudes, knowledge and practice and practice setting or location possibly due to the low numbers of responses, a larger study might yield significant associations. Practice setting and location and their association with breastfeeding should be further explored as these factors could play roles in available lactation services that are associated with exclusive breastfeeding recommendation practices and attitudes about pediatricians' influence on breastfeeding and time available to counsel on breastfeeding.

Respondents with knowledge of the AAP's definition of exclusive breastfeeding were more likely to recommend exclusive breastfeeding for six months and believe breastfeeding and breastmilk were superior to formula. This indicates that efforts to improve pediatricians' knowledge of the definition of exclusive breastfeeding might be associated with pediatricians' attitudes and practices on breastfeeding promotion. While it was not surprising that primary care providers who are the pediatricians that deal with breastfeeding issues in practice were associated with following the AAP's recommendations of exclusive breastfeeding for six months, training and availability of lactation services were also associated with making this recommendation. In addition to reading in the past three years and desiring future education on breastfeeding, the attitudes that formula is not superior to breastmilk and that pediatricians can influence or should encourage breastfeeding were associated with recommending breastfeeding for one year or longer.

Given that the AAP recommends that infants breastfeed exclusively for the first six months of

life, it is important to understand the factors associated with pediatricians making this recommendation. The Washington State study revealed that the availability of lactation services and knowledge of the definition of exclusive breastfeeding were associated with this recommendation and that this knowledge was associated with younger age, having and desiring training and positive attitudes about breastfeeding. Determining ways of improving exclusive breastfeeding knowledge, lactation services and training may play important roles in increasing pediatrician recommendations for exclusive breastfeeding for six months.

CONCLUSION

Since the AAP recommends that infants exclusively breastfeed for six months, identifying

the factors associated with pediatricians making this recommendation is essential. In the Washington State survey, recommending exclusive breastfeeding for six months was associated with desiring breastfeeding training, having access to lactation services and knowing the definition of exclusive breastfeeding. This knowledge of exclusive breastfeeding was associated with training. Capitalizing on pediatricians' desire for breastfeeding training, targeting this training on developing their exclusive breastfeeding knowledge and improving access to lactation services might lead to increases in pediatricians' recommendations for exclusive breastfeeding.

References

- AAP Section on Breastfeeding Policy Statement. (2005). Breastfeeding and the use of human milk. *Pediatrics*. 115, 496-506.
- American Academy of Pediatrics, Committee on Fetus and Newborn, & American College of Obstetricians and Gynecologists. (1997). *Guidelines for perinatal care*. 4th ed. Washington, D. C.: American College of Obstetricians and Gynecologists, American Academy of Pediatrics.
- American Academy of Pediatrics & Division of Health Services Research. (2004). *Periodic Survey No. 57*.
- Authur, C. R., Saenz, R. B., & Replogle, W. H. (2003). The employment-related breastfeeding decisions of physician mothers. *Journal of Mississippi State Medical Association*, 44, 383-387.
- Behavioral interventions to promote breastfeeding: Recommendations and rationale*. (2003). Rockville, MD: Agency for Healthcare Research and Quality; US Preventive Services Task Force.
- Breastfeeding*. (2000). The National Board of Health and Welfare Centre for Epidemiology. Official Statistics of Sweden.
- Cahill J. B., & Wagber C. L. (2002). Challenges in breastfeeding. *Contemporary Pediatrics*, 19, 94-138.

- Cattaneo, A., & Buzzetti, R. (2001). Quality improvement report: effect on rates of breast-feeding training for the baby friendly hospital initiative. *British Medical Journal*, 323, 1358-1362.
- Chandran L., & Gelfer, P. (2006). Breastfeeding: the essential principles. *Pediatrics in Review*, 27, 409-416.
- Chezem, J., Friesen, C., & Boettcher, J. (2003). Breastfeeding knowledge, breastfeeding confidence and infant feeding plans: effects on actual feeding practices. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 32, (1), 40-47.
- Department of Health and Human Services. *Breastfeeding among US children born 1999-2005, centers for disease control national immunization survey*. Retrieved from <http://www.cdc.gov/breastfeeding/data/NIS>.
- DiGirolama, A. M., Grummer-Strawn, L. M., & Fein, S. B. (2003). Do perceived attitudes of physicians and hospital staff affect breastfeeding decisions. *Birth*, 30, (2), 94-100.
- Freed, G. L., Clark, S. J., Cefalo, R. C., & Sorenson, J. R. (1995). Breast-feeding education obstetrics-gynecology residents and practitioners. *American Journal of Obstetrics and Gynecology*, 173, 1607-1613.
- Freed, G. L., Clark, S. J., Curtis, P., & Sorenson, J. R. (1995). Breast-feeding education and practice in family medicine. *Journal of Family Practice*, 40, 263-269.
- Freed, G. L., Clark, S. K., Sorenson, J., Lohr, J. A., Cefalo, R., & Curtis, P. (1995). National assessment of physicians' breast-feeding knowledge, attitudes, training and experience. *Journal of the American Medical Association*, 273, 472-476.
- Freed, G. L., Clark, S. J., Lohr, J. A., & Sorenson, J. R. (1995). Pediatrician involvement breast-feeding promotion: a national study of residents and practitioners. *Pediatrics*, 96, 440-449.
- Frerichs, L., Andsager, J. L., Campo, S., Aquilino, M., & Stewart Dyer, C. 2006. Framing breastfeeding and formula-feeding messages in popular US magazines. *Women Health*, 44, (1), 95-118.
- Guisse, J. M., Palda, V., Westhoff, C., Chan, B. K. S., Helfand, M., & Lieu, T. (2003). Evidence review and meta-analysis: effectiveness of primary care-based interventions to promote breastfeeding. *Annals of Family Medicine*, 1, (2), 70-78.
- Healthy people 2010, 2nd ed., with understanding and improving health and objectives for improving health*. (2000). Washington, D. C.: US Department of Health and Human Services Government Printing Office.
- Horwood L. J., Darlow B. A., & Mogridge N. (2001). Breast milk feeding and cognitive ability at 7-8 years. *Archives of Disease in Childhood; Fetal Neonatal Ed.*, 84, F23-7.

- Howie, P. W. (2002). Protective effect of breastfeeding against infection in the first and second six months of life. *Advances in Experimental Medicine and Biology*, 503, 141-147.
- Johnston, M. L., & Esposito, N. 2007. Barriers and facilitators for breastfeeding among working women in the United States. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 36, 9-20.
- Kong, S. K., & Lee, D. T. (2004). Factors influencing decision to breastfeed. *Journal of Advanced Nursing*, 46, (4), 369-379.
- Labarer, J., Gelbert-Baudino, N., Ayral, A. S., Duc, C., Berchotteau, M., Bouchon, N., Schelstraete, C., Vittoz, J. P., Francois, P., & Pons, J. C. (2005). Efficacy of breastfeeding support provided by trained clinicians during an early, routine, preventive visits: a prospective, randomized, open trial of 226 mother-infant pairs. *Pediatrics*, 115, 139-146.
- Li, R., Ogden, C., Ballew, C., Gillespie, C., & Grummer-Strawn, L. (2002). Prevalence of exclusive breastfeeding in among US infants: the third national health and nutrition survey (Phase II, 1991-1994). *American Journal of Public Health*, 92, 1107-1110.
- Merten, S., Dratva, J., & Ackermann-Liebrich, U. (2005). Do baby-friendly hospitals influence breastfeeding duration on a national level? *Pediatrics*, 116, 702-708.
- National immunization survey, 2004 births.* (2004). CDC, US Department of Health and Human Services.
- Oddy W. H., Peat J. K., & de Klerk N.H. (2002). Maternal asthma, infant feeding and the risk of asthma in childhood. *Journal of Allergy and Clinical Immunology*, 110, 65-67.
- Powers, N. G. (2001). How to assess slow growth in the breastfed infant. Birth to three months. *Pediatric Clinics of North America*, 48, 345-363.
- Powers, N. G. (1999). Slow weight gain and low milk supply in the breastfeeding dyad. *Clinical Perinatology*, 26, 399-430.
- Raosoft On-line Technologies. *Statistical calculator*. Retrieved from www.raosoft.com/samplesize.html.
- Ryan, A. S., Zhou, W., & Arensberg, M. B. (2006). The effect of employment status on breastfeeding in the United States. *Womens Health Issues*, 16, (5), 243-251.
- Schanler, R. J., O'Connor, K. G., & Lawrence, R. A. (1999). Pediatricians' practices and attitudes regarding breastfeeding promotion. *Pediatrics*, 103, (3).
- Shealy, K. R., Li, R., Benton-Davis, S., & Grummer-Strawn, L. M. (2005). *The CDC guide to breastfeeding interventions*. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

Taveras, E. M., Li, R., Grummer-Strawn, L. M., Richardson, M., Marshall, R., Rego, V. H., Miroshink, I., & Lieu, T. A. (2004). Opinions and practices of clinicians associated with continuation of exclusive breastfeeding. *Pediatrics*, *113*, 283-290.

Taveras, E. M., Capra, A. M., Braveman, P. A., Jensvold, N. G., Escobar, G. J., & Lieu, T. A. (2003). Clinician support and psychosocial risk factors associated with breastfeeding discontinuation. *Pediatrics*, *112*, 108-115.

Wright, A., Rice, S., & Wells, S. (1996) Changing hospital practices to increase the duration of breastfeeding. *Pediatrics*, *97*, 669-675.

Author Information

Arlene Ritzen, MD, JD, MPH
HealthPoint formerly Community Health Centers
of King County
aejrh@u.washington.edu

Donna Johnson, RD, PhD
Associate Professor, Health Services; Associate
Director, Center for Public Health Nutrition,
Nutritional Sciences Program, University of
Washington
djohn@u.washington.edu

Betty Bekemeier, RN, MPH, PhD
Assistant Professor, Psychosocial and Community
Health, School of Nursing, University of
Washington
bettybek@u.washington.edu

MaryAnn O'Hara, MD, MPH, MSt
Director, Seattle Breastfeeding Medicine, Clinical
Assistant Professor of Family Medicine,
University of Washington Family Medicine
Residency Network
maryanno@u.washington.edu