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US National Breastfeeding Monitoring and Surveillance: Current Status and Recommendations

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Abstract

Eleven federally-funded datasets assessing breastfeeding behaviors in the US (Early Childhood Longitudinal Survey, Infant Feeding Practices Survey II, National Health and Nutrition Examination Survey, National Immunization Survey, National Survey of Children's Health, National Survey of Early Childhood Health, National Survey of Family Growth, Pediatric Nutrition Surveillance System, Pregnancy Nutrition Surveillance System, Pregnancy Risk Assessment Survey, and WIC Participant and Program Characteristics) were reviewed to evaluate the breastfeeding variables (initiation, duration and exclusivity) and determine if relevant breastfeeding determinants were collected to evaluate breastfeeding practices from a health disparities perspective. The datasets utilized inconsistent breastfeeding definitions, limited ethnic descriptors, and varied regarding availability of relevant determinants. Multiple datasets collect breastfeeding data, but a coordinated US breastfeeding monitoring and surveillance system does not exist. Suggestions to improve this system include: standardizing breastfeeding definitions, expanding ethnic/racial descriptors, collecting additional relevant variables, and reducing recall periods.

Introduction

In the United States, breastfeeding rates are typically lower than national goals, particularly among certain subgroups, including women who are WIC (Special Supplemental Nutrition Program for Women, Infants and Children) recipients, low-income, less educated, and US-born [1-3]. Often, specific ethnic/racial groups are noted to have poor breastfeeding outcomes. The categorization of ethnic/racial groups with broad descriptors such as Black or Hispanic does not provide a useful analysis of breastfeeding behaviors [3], as these labels may mask differences in breastfeeding practices among ethnic/racial subgroups. For example, although US blacks typically have low breastfeeding rates [4], Black women living in the US, but born in the Caribbean, have better breastfeeding outcomes than US born white women [1]. The level of acculturation may negatively impact breastfeeding initiation and duration among foreign born women.

In order to improve breastfeeding practices, culturally sensitive breastfeeding interventions need to be developed, implemented, and assessed. National surveillance and monitoring of

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breastfeeding behavior are essential for the planning, implementation and evaluation of these public health interventions. Thus, the objectives of this study are to identify federally-funded sources of US national breastfeeding data, determine if these datasets contain sufficient information to assess breastfeeding practices from a health disparities perspective, and make recommendations to improve our national breastfeeding monitoring and surveillance.

Methods

In order to assess the adequacy of the US national breastfeeding monitoring and surveillance from a health disparities perspective, we evaluated the data quality from federally-funded national data sets assessing breastfeeding behaviors. To identify these datasets, we reviewed the websites of the Centers for Disease Control and Prevention (CDC) [5] and the National Center for Health Statistics [6], and contacted CDC staff. Included datasets were required to: a) be federally-funded and collect national data on the breastfeeding behaviors of individuals between 2000 and the present; or evaluate federally-funded national programs promoting breastfeeding between 2000 and the present; b) contain, at a minimum, information on breastfeeding initiation or duration; and c) provide the text of questions used to assess breastfeeding practices or definitions for breastfeeding variables. Similar to the National Nutrition Monitoring and Related Research Program[7], the selected datasets could include periodic surveys, one-time surveys, and evaluation systems for federally funded programs. Eligible surveys and datasets were downloaded from their respective websites [8-17]. Each was evaluated to determine if it collected data on: breastfeeding initiation, duration of any and exclusive breastfeeding, and variables associated with health disparities including race/ethnicity, acculturation, maternal birthplace, income and household size (used to calculate poverty index ratio) and whether or not data were collected in US territories. Although breastfeeding practices can be evaluated in a more comprehensive human ecology model [18], the analyses of each dataset were limited to determine if data were collected on relevant breastfeeding determinants (age, education level, parity, previous breastfeeding experience, body mass index, delivery method, and WIC participation). Descriptive tables were developed to summarize results. This study was not subject to Institutional Review Board approval, since no private, identifiable information were obtained from individuals for the analyses presented in this manuscript.

Results

Federally funded surveys

Eleven federally funded, nationwide surveys collecting breastfeeding data were selected for our analyses, including two longitudinal surveys, Early Childhood Longitudinal Survey-Birth Cohort (ECLS:B) and the Infant Feeding Practices Survey II (IFPSII); seven cross-sectional surveys (National Health and Nutrition Examination Survey 2007 (NHANES), National Immunization Survey 2006 (NIS), National Survey of Children's Health 2007 (NSCH), National Survey of Early Childhood Health (NSECH), National Survey of Family Growth (NSFG), Pregnancy Risk Assessment Monitoring Survey (PRAMS), WIC Program and Participant Characteristics 2006 (WPPC)); and two program-based surveillance systems (PedNSS and PNSS). The Pediatric Nutrition Surveillance System (PedNSS), Pregnancy Nutrition Surveillance System (PNSS) and Pregnancy Risk Assessment Monitoring System (PRAMS) were included, although participation is voluntary at the state level. Table 1 summarizes relevant background information of each survey.

Breastfeeding Initiation

Breastfeeding initiation data were collected in all 11 datasets. The exact wording of the breastfeeding questions is presented in Table 2. Five datasets (NIS, NHANES, NSCH, PNSS

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and PedNSS) assessed breastfeeding initiation using identical wording. These surveys inquire about the provision of breastmilk to the infant either directly (via nursing at the breast) or indirectly (via alternate means of feeding expressed breastmilk). PRAMS and WPPC used similar wording to assess the direct and indirect provision of breastmilk. The remaining 4 surveys ask if the child had ever been breastfed, each using slightly different language. The IFPSII specifically asks if the child was ever breastfed or if the mother attempted to breastfeed on the neonatal survey, with a slightly different question on subsequent surveys. In total, these 11 datasets use seven different questions to assess breastfeeding initiation.

Breastfeeding Duration/Current Status

Ten of the 11 datasets collected data on breastfeeding duration or current status. Breastfeeding duration was not measured by the PNSS, which focused primarily on pregnancy. The questions used to assess breastfeeding duration are listed in Table 2. NSCH, NIS ,NHANES and PedNSS utilized identical wording, asking when the baby, “completely stopped breastfeeding or being fed breastmilk”. The IFPSII and PRAMS surveys measure the period of time in which a mother breastfed or pumped breastmilk for her infant. The wording of the breastfeeding duration questions in the NSFG, ECLS:B and NSECH surveys does not mention the possibility of feeding breastmilk via alternate means, and simply asks the child's age when breastfeeding stopped. The WPPC quantifies the time period in which the infant received breastmilk. In total, seven questions are used to assess breastfeeding duration in these ten datasets.

One important difference in these surveys is the time frame in which respondents were asked to recall breastfeeding duration. Research indicates that most women accurately recall breastfeeding duration when the recall period is short (≤ 3 years)[19], However, the issues of recall bias, data “heaping”, and giving socially desirably responses exist. Of the surveys we assessed, the most reliable method for assessing breastfeeding duration was utilized in the IFPSII survey. In this longitudinal study, women were surveyed monthly through the first 7 months post-partum (pp), and then at months 9, 10 and 12. Thus, the potential for recall bias was minimized. The recall periods used in these surveys ranged from 0 days (currently breastfeeding) to 18 years. For infants or toddlers who are currently breastfeeding, the “duration data” reflect current status, rather than actual breastfeeding duration. These data are useful in determining the percent of infants being breastfed at a specified age. The maximum recall period for each survey is shown in Table 2.

Exclusive breastfeeding duration

All of the datasets except three (NSECH, PNSS and WPPC) collected data on exclusive breastfeeding duration. However, the definitions of exclusive breastfeeding were not consistent. The wording of 5 of these (NIS, NSCH, NSFG, PedNSS, PRAMS) assessed exclusive breastfeeding status in accordance with the World Health Organization (WHO) definition [20], which does not allow exclusively breastfed infants to receive water. The NSFG and PedNSS ask when the infant first received non-breastmilk substances, but did not prompt for specific food or drink items. PRAMS, NIS and IFPSII provide a prompt which lists non-breast milk foods and drinks. However, PRAMS and NIS are the only ones that specifically assess water intake beyond the first week of life.

The IFPSII, NIS and NSCH surveys use multiple questions to determine exclusive breastfeeding status. The NIS and NSCH determine exclusive breastfeeding duration using an identical series of questions. The first assesses the infant's age when he or she first received formula, followed by a question asking the age of introduction of anything other than breastmilk or formula. The IFPSII uses a series of 4 questions to ascertain EBF status during the past 7 days. These questions ask about: a) water, formula and sugar water use in the hospital; b) age when first fed formula; c) consumption of formula, cow's milk or other milks, fruit and

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vegetable juices, sweet drinks, baby cereal and other solid foods in the past 7 days; and d) use of herbal/botanical preparations in the past week. IFPSII specifically asks about the provision of water in the neonatal survey, but did not include water in the list of foods, which may have been introduced in the subsequent surveys.

Two surveys did not assess the provision of water to infants, and thus cannot measure exclusive breastfeeding as described by the WHO [20]. The NHANES question on breastfeeding exclusivity asks when the child was "…first fed something other than breastmilk or water", and is clearly not in compliance with the WHO definition. The ECLS:B asks 4 questions regarding the age when the child was first fed formula, cow's milk, solid foods and finger foods, but does not specifically ask about water.

Maternal recall of the duration of exclusive breastfeeding has been shown to be less accurate than recall of breastfeeding duration [19]. Thus, prospective, longitudinal surveys with a short interval between infant feeding assessments would yield the most valid data for this indicator. As with breastfeeding duration, the duration of exclusive breastfeeding cannot be determined for infants currently being exclusively breastfed in a cross-sectional survey.

Ethnic/racial descriptors

The choice of ethnic categories available to describe the respondent varied widely (Table 3). Each dataset asked respondents if their race was White, Black/African American, Asian (or Pacific Islander), or Other, and if their ethnicity was Hispanic/Latino. The IFPSII did not include the uniquely American category of American Indian/Alaska Native and 3 datasets (IFPSII, PedNSS and PNSS) did not include Native Hawaiian. Individual contributors (states, tribes, territories) to PNSS and PedNSS are able to further define ethnic subgroups.

Only 6 surveys (ECLS:B, IFPSII, NHANES, NIS, NSECH, and NSFG) asked additional questions regarding Hispanic origins. Each of these surveys included questions to determine if participants were of Mexican, Puerto Rican, Cuban or Other Hispanic origins. Additional choices (Central American, South American, and/or Other Spanish/Caribbean) were available in NHANES, NIS, and NSECH.

There were very limited opportunities to identify other ethnic or racial subgroups. Only ECLS:B offers the option of specifying one of 10 countries of Asian origin. Although each dataset listed Black or African American as a category, none documents the origins (i.e. North Africa, sub-Saharan Africa, and Caribbean) of Black respondents.

Relevant Breastfeeding Determinants

Table 4 summarizes the availability of data on relevant breastfeeding determinants in each dataset. All 11 datasets collected data on income, household size and WIC participation. Ten (all except PedNSS) assessed maternal education and 9 (all except NSCH and PedNSS) documented maternal age. Parity (at least primiparous vs multiparous) was assessed in all datasets, except for three which focused on children (ECLS:B, NSCH and NSECH). Maternal prepregnant weight and height were assessed in 7 of the 11 surveys (ECLS:B, IFPSII, NHANES, NSFG, PNSS, PRAMS and WPPC). Previous breastfeeding status was assessed in four surveys.

Delivery mode, which has been shown to impact breastfeeding outcomes and the timing of lactogenesis II [21, 22], was comprehensively assessed in the IFPSII (induced vaginal, not induced vaginal, planned Cesarean, or unplanned/emergency Cesarean delivery). The PRAMS survey includes delivery mode in the "standard" questions (vaginal, Cesarean section, unscheduled Cesarean). Delivery mode may also be accessible through the linked birth certificate data in

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the states participating in PRAMS. Four surveys (NHANES, NSFG, PRAMS, and NSCH) recorded maternal birthplace.

Acculturation was assessed in 5 surveys (ECLS:B, NHANES, NSCH, NSFG, and PRAMS). The surveys which did assess acculturation asked questions on either, nativity, years in the US, or languages spoken or read. None of these surveys had a comprehensive assessment of acculturation, such as that developed by Cuellar et al [23]. Data collection in US territories was limited. Of the datasets reviewed, PedNSS, PNSS and WPPC were the only ones to collect data from participants living in US territories.

Discussion

This review of the current status of US national breastfeeding surveillance and monitoring efforts indicates that, while multiple surveys and datasets assess breastfeeding outcomes, these data systems are not optimal for the evaluation of breastfeeding practices from a health disparities perspective. Opportunities for improvement were identified including: eliminating inconsistent breastfeeding definitions, expanding limited ethnic descriptors, collecting additional relevant variables, modifying suboptimal recall periods, and improving links between breastfeeding databases. Despite these limitations, it is essential to recognize the substantial progress made since the last report of US national surveillance of breastfeeding behavior [24] in 2000. Since that time, breastfeeding questions have been added to the NIS, which now serve as the data source for the Healthy People 2010 breastfeeding objectives [25], and the IFPSII has been conducted.

Given the major relevance of breastfeeding for maternal and child health, it is important to develop a truly comprehensive and well-integrated breastfeeding monitoring and surveillance system in the US. Breastfeeding is associated with decreased incidence of several conditions, including post neonatal death, diabetes, necrotizing enterocolitis, obesity, otitis media, and premenopausal breast cancer. Many of the populations that are least likely to breastfeed also bear a disproportionate share of the burden of morbidity and mortality in this country. For example, the high rate of infant mortality among Black infants has been partially attributed to the poor breastfeeding practices of Black women [26]. The development and evaluation of culturally-sensitive breastfeeding interventions targeting those with the poor breastfeeding outcomes has the potential to reduce the incidence of several medical conditions where health disparities exist. A comprehensive breastfeeding monitoring and surveillance system could be used to evaluate the effectiveness of national or state-specific breastfeeding interventions.

Based on our findings, we have developed recommendations to improve breastfeeding monitoring and surveillance in the US. These recommendations seek to: a) improve the quality of the data that is currently being collected; b) add new, relevant variables; and c) integrate existing surveys and datasets into a comprehensive monitoring and surveillance system.

We recommend that federally-funded datasets assessing breastfeeding use standardized questions. This recommendation was first proposed in 2000 [24], but has not been fully implemented. Currently, subtle variations in the wording of the questions assessing breastfeeding initiation, duration and exclusivity could cause a respondent to provide different answers for the same breastfeeding outcome, depending on the survey applied to her. This is particularly problematic in the case of exclusive breastfeeding, where conflicting definitions of exclusive breastfeeding (i.e. excluding vs. permitting water) are implied by the questions. Slight variations in wording of the breastfeeding duration questions can result in different estimates of breastfeeding duration, especially among infants receiving predominantly expressed breastmilk or donor breastmilk. For example, duration may be assessed by asking how long the child was breastfed, how long the woman breastfed or pumped, or the age when

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the child stopped receiving breastmilk. Women whose infant received expressed or donor milk would likely respond to these questions with different answers.

Several key variables, which are essential for assessing breastfeeding from a health disparities perspective, were missing from multiple surveys. The limited number of Hispanic and Asian ethnic categories used in these surveys is concerning and the complete absence of subgroups for Black respondents represents a major omission. It has been recognized for many years that Black women display ethnic heterogeneity regarding maternal health risk behaviors [27], yet continued reliance on the federal Office of Management and Budget's generic category for Black individuals negatively impacts breastfeeding research [3]. While US Black women have the lowest breastfeeding rates in this country [26], research has shown that Black women with Caribbean origins have better breastfeeding outcomes than US born Caucasian women [1]. We recommend the collection of more detailed ethnic descriptors, in combination with oversampling of minority groups known to have poor breastfeeding outcomes, in order to better monitor trends in their breastfeeding practices. Because foreign-born women are more likely to breastfeed than US born women [28, 29], maternal birthplace is a useful variable to collect. Since acculturation has been shown to be inversely associated with breastfeeding rates[30], and immigrants have been shown to have better breastfeeding rates than US born women [1], acculturation should be further assessed. Of the 5 surveys assessing acculturation, all used proxy indicators that focused on nativity, or languages spoken or read. Whenever possible, a more in-depth assessment of acculturation as developed by Cuellar [23] is recommended.

One unexpected finding was the very limited breastfeeding surveillance (3/11 datasets) conducted in US territories and commonwealths. Given that WIC participation is a risk factor for poor breastfeeding outcomes and that the WIC program is available in the US mainland, Puerto Rico, American Samoa, Guam, the US Virgin Islands and the Commonwealth Islands of the Northern Marianas[31], it is important to assess breastfeeding outcomes in all US states, territories, and commonwealths.

The majority of datasets assessed relevant demographic and biomedical variables; however, two biomedical factors which may impact breastfeeding success merit further discussion. Seven surveys collected maternal height and prepregnancy weight, which are needed to calculate body mass index. The datasets which did not collect these variables (NIS, NSCH, NSECH and PedNSS) are primarily focused on child health outcomes. Obese women experience delayed lactogenesis II [21, 22] and poor breastfeeding outcomes [32-34]. Given the growing body of scientific literature documenting the poor breastfeeding outcomes of women with excess weight, coupled with the US obesity epidemic, we recommend that the NIS add maternal height and weight as variables. These data would be a particularly useful addition to the NIS, as it is used for monitoring progress towards Healthy People 2010 goals. While self reported height and weight could not be verified in phone-based surveys, maternal report of these parameters is generally sufficient to identify the majority of those who are obese [35, 36].

Delivery mode has been associated with breastfeeding outcomes, but is only collected on 2 of the datasets we reviewed (IFPSII and PRAMS). Women who undergo stressful deliveries (unscheduled Cesarean deliveries, vaginal deliveries with long stage II labor) are more likely to have delayed lactogenesis and suboptimal infant breastfeeding behaviors [21, 22]. Obese women are also at greater risk for a Cesarean delivery [36], thus compounding their risk for breastfeeding difficulties. Although costs restrict the number of questions in any given instrument, investing in the addition of delivery mode questions in key national surveys, such as NIS, will likely yield meaningful results.

The data sources we reviewed have some inherent limitations. Some of the data sets focus on children and therefore do not collect all of the relevant maternal variables. With the exception

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of the IFPSII, none of the surveys/data sets was designed with the main purpose of evaluating breastfeeding practices. Thus, some of the variation in the wording of the breastfeeding questions is to be expected. Each survey or surveillance system should not be expected to include all variables potentially related to breastfeeding. These limitations highlight the need for a well integrated and coordinated national breastfeeding monitoring system in the US.

Ideally, a single, nationally representative, longitudinal survey focused on breastfeeding behaviors, knowledge and attitudes and health outcomes should be designed and implemented. While this is unlikely to happen soon, modifications to the existing surveys can be made. The IFPSII is the existing survey that best fits this recommendation. Unfortunately, this survey is not nationally representative. Respondents to this 12-month longitudinal survey, were a subgroup of individuals participating in a consumer opinion survey, and were predominantly Caucasian (5% Black, 6% Hispanic), well-educated women (22% with highschool or less education)[37]. The application of selected IFPSII questions on a nationally representative sample may provide more useful information.

The NIS, which serves as a data source for the Healthy People 2010 objectives, has a fairly long recall period (19-35 months pp). Given that the vast majority of states report that less than half of their infants are breastfed at 6 months, it would be useful to begin assessing breastfeeding practices earlier, thus minimizing recall bias, which is especially important when measuring the duration of exclusive breastfeeding. One suggestion to reduce the recall period is to combine some of the IFPSII and NIS breastfeeding questions in a cross-sectional survey, which is administered at 6 months pp, with follow-up contact of women who are still breastfeeding.

Because of the link with state birth certificate data, modification of PRAMS holds great potential for improving breastfeeding surveillance. Currently, PRAMS contacts women 2-6 months pp, thus there is minimal recall bias for the timing of introduction of non-breastmilk substances. Linking PRAMS with the Standard Certificate of Live Birth (SCLB) would provide a very useful data set, given the wealth of data on the SCLB (delivery mode, breastfeeding initiation, ethnic descriptors, maternal and paternal education, maternal BMI, WIC participation). Widespread adoption of the SCLB by states should be encouraged. Follow-up contact with women still breastfeeding is recommended. Currently the WHO recommends breastfeeding for at least 2 years [38], but only 6 of the 11 datasets allow for a measure of breastfeeding duration beyond the first year (NHANES, NIS, NHANES, NSCH, NSECH, NSFG and PedNSS).

Our vision for a comprehensive breastfeeding monitoring and surveillance system builds upon current efforts and can be conceptualized as a breastfeeding-specific version of the US National Nutrition Monitoring and Related Research Program (NNMRRP). Eventually, we envision that this system will produce a centralized internet site where the user can easily generate summaries and analyze breastfeeding trends in the US by key population characteristics. This would involve enhancement of the currently existing CDC website of breastfeeding data (http://www.cdc.gov/breastfeeding/data/index.htm), providing links to relevant current and completed breastfeeding surveys/datasets and including state-specific results where available. These links would connect the user to the text of the breastfeeding questions, summarized tables by state or territory, and any published analyses. This approach is similar to the one used by the USAID-funded Demographic and Health Surveys (http://www.measuredhs.com).

The application of management information system technology to link data bases is essential. Currently, 37 states participate in PRAMS, with some of the remaining states having a “PRAMS-like” database, which is not linked to PRAMS. Similarly, adoption of the breastfeeding questions on the SCLB is gaining momentum. While states should be encouraged to participate in the SCLB and PRAMS, PNSS and PedNSS, as previously recommended [24],

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we recommend that state-specific data from similar surveys should be linked for analysis at the national level.

In conclusion, we strongly recommend that the US government enhance current breastfeeding monitoring efforts. We recommend that datasets standardize their breastfeeding outcome indicators. Whenever possible, we recommend that existing data systems use more detailed ethnic descriptors, and assess acculturation and other key variables known to be associated with breastfeeding outcomes (such as maternal BMI and delivery mode). It is important to develop a monitoring and surveillance system that integrates all currently collected national and state breastfeeding data into a comprehensive breastfeeding information system which would be an enhanced, breastfeeding-specific version of the National Nutrition Monitoring and Related Research Program. Efforts should be made to collect nationally representative breastfeeding data from all US states, territories and commonwealths. The timing of surveys should be modified to shorten the recall period, while allowing follow-up with women still breastfeeding at the time of the initial survey. These changes would allow for a comprehensive assessment of US breastfeeding practices from a health disparities perspective.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Biography

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Table 1

Summary of federally funded datasets assessing breastfeeding outcomes of individuals

	Methods	Format	Timing Of Data Collection	Languages Conducted	Year Last Conducted	Frequency	Nationally Representative
ECLS:B	Longitudinal study with cross-sectional assessement of breastfeeding status	In-person computer assisted interviews + self administered questionnaires	BF questions on 9 mo pp survey	English, Spanish, others if translator available	Ongoing with children born in 2001	Not previously conducted	Yes
IFPSII	Longitudinal	One brief telephone interview, multiple mailed questionnaires	Data collected prenatally, just after birth, 3 weeks pp, 2,3,4,5,6,7,9,10, 12 months pp	English	2007	Previously conducted in 1993/1994	No, consumer opinion panel
NHANES	Cross-sectional	In-person	Variable, asked for each child ≤6 years	English, Spanish and translator used for other languages	Ongoing	Biennial	Yes
NIS	Cross-sectional	Telephone interview for parents, mailed survey to MDs	19-35 months pp	English, Spanish, others (1.7%) via AT&T language line	Ongoing	Annual	Yes
NSCH	Cross-sectional	Telephone	≤6 years	English, Spanish, others via AT&T language line	2007	Every 4 years	Yes
NSECH	Cross-sectional	Telephone Interview	4-35 months pp	English and Spanish	2000	One time survey	Yes
NSFG	Cross-Sectional	In-person	Variable, asked for each child ≤18yrs	English	Ongoing	Annual	Yes
PedNSS*	Program-based surveillance	Utilized predominantly (86%) WIC data	Variable, assesses BF practices through 24 months	English, Spanish, other languages spoken in WIC offices	Ongoing	Annual	No, reflects predominantly WIC participants from PedNSS contributors (approx 40 states, Wash DC, Puerto Rico, and 5 tribal governments)
PNSS*	Program-based surveillance	Utilizes predominantly (99%) WIC program data	2-5 months pp	English, Spanish, other languages spoken in WIC offices	Ongoing	Annual	No, reflects WIC participants from PNSS contributors (approx 26 states, 5 tribal governments, 1 US territory)
PRAMS	Cross-sectional	Predominantly mail, telephone	Surveyed approx. 2-6 months pp	English and Spanish	Ongoing	Annual	Random sample in 37 participating

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	Methods	Format	Timing Of Data Collection	Languages Conducted	Year Last Conducted	Frequency	Nationally Representative
		follow-up of nonresponders					states
WPPC	Cross-sectional	Utilizes WIC program data	6-13 months pp	English, Spanish and other languages spoken in WIC offices	2006[a]	Biennial	No, reflects WIC population

ECLS:B: Early Childhood Longitudinal Survey, Birth Cohort; IFPSII: Infant Feeding Practices Survey II; NHANES: National Health and Nutrition Examination Survey 2007; NIS: National Immunization Survey 2006; NSCH: National Survey of Children's Health 2007; NSECH: National Survey of Early Childhood Health; NSFG: National Survey of Family Growth; PedNSS: Pediatric Nutrition Surveillance System; PNSS: Pregnancy Nutrition Surveillance System; PRAMS: Pregnancy Risk Assessment Monitoring System; WPPC: WIC Participant and Program Characteristics 2006

PP= postpartum

[*] Breastfeeding data collection optional in PNSS and PedNSS.

[a] Most recent report

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Table 2

Wording of breastfeeding questions used on federally-funded datasets

	BF Initiation Assessed	Wording of Breastfeeding Initiation Question	Duration of any BF Assessed?	Maximum Recall Period	Wording of Breastfeeding Duration Question	Duration of EBF Assessed	Wording of exclusive breastfeeding duration question
ECLS-B	Yes	Did {you/{child/twin}'s mother} ever breastfeed {child/twin}?	Yes*	9 months	For how many months did {you/{child/twin}'s mother breast-feed {him/her}?	Partially**	**a.** How old was {child/twin} in months when you began feeding {him/her} formula? **b.** How old was {child/twin} in months when you began feeding {him/her} cow's milk? **c.** How old was {child/twin} in months when solid food was first introduced? Solid foods include cereal and baby food in jars, but not finger foods. **d.** How old was {child/twin} in months when {he/she} was first given finger foods, such as Cheerios, teething biscuits, crackers, bread, noodles, rice, grits, tortillas, or potatoes?
IFPSII	Yes	Did you ever breastfeed or try to breastfeed your baby, either in the hospital or birth center, or after you went home?[a] Did you ever breastfeed this baby (or feed this baby your pumped milk)?[b]	Yes*	2 months	How old was your baby when you completely stopped breastfeeding and pumping milk? (Days/weeks)	Partially**	**a.** How old was your baby when he or she was first fed formula? **b.** While you were in the hospital or birth center, was your baby fed water, formula, or sugar water at any time? (yes/no/don't know for each). **c.** In the past 7 days, how often was your baby fed each food listed below? (listing includes breastmilk, formula, water#, sugar water#, cow's milk or any other milk (rice, soy, goat or other), 100% fruit or 100% vegetable juice, sweet drinks (juice drinks, soft drinks, soda, sweet tea, Kool-Aid, etc), baby cereal, and 10 other food categories+. **d.** Was your baby given any herbal or botanical preparation or any kind of tea in the past 2 weeks?
NHANES	Yes	Was __ ever breastfed or fed breast milk?	Yes*	6 years	How old was __ when {he/she} completely stopped breastfeeding or being fed breastmilk?	Yes&	How old was __ when {he/she} was first fed something other than breastmilk or water?
NIS	Yes	Was __ ever breastfed or fed breast milk?	Yes*	35 months	How old was (child) when (child) completely stopped breastfeeding or being fed breastmilk?	Yes	**a.** How old was (child) when (he/she) was first fed formula? **b.** This next question is about the first thing that (child) was given other than breastmilk or formula. Please include juice, cow's milk, sugar water, baby food, or anything else that (child) might have been given, even water. How old was (child) when (he/she) was first fed anything other than breastmilk or formula?
NSCH	Yes	Was __ ever breastfed or fed breastmilk?	Yes*	6 years	How old was he/she when he/she completely stopped breastfeeding or being fed breastmilk?	Yes**	**a.** How old was __ when he/she was first fed formula? **b.** This next question is about the first thing that __ was given other than breastmilk or formula. Please include juice, cow's milk, sugar water, baby food, or anything else that__ might have been given, even water. How old was __ when he/she was first fed anything other than breastmilk or formula?
NSECH	Yes	Was (child) breastfed for any length of time?	Yes*	35 months	How many days, weeks, or months was (child) breastfed?	No	Not assessed
NSFG	Yes	When __ was an infant, (Have/did) you breastfeed (him/her) at all?	Yes*	18 years	How old was (she/he) when you stopped breastfeeding (her/him) altogether?	Yes	How old was (she/he) when you first fed (her/him) something other than breastmilk?
PedNSS	Yes	Was this child ever	Yes*	24 months	How old was this child	Yes	How old was this child when he/she

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	BF Initiation Assessed	Wording of Breastfeeding Initiation Question	Duration of any BF Assessed?	Maximum Recall Period	Wording of Breastfeeding Duration Question	Duration of EBF Assessed	Wording of exclusive breastfeeding duration question
		breastfed or fed breast milk?			when he/she completely stopped breastfeeding or being fed breastmilk?		was first fed something other than breastmilk?
PNSS	Yes	Was this child ever breastfed or fed breast milk?	No	5 months	Not collected	No	Not collected
PRAMS	Yes	Did you ever breastfeed or pump breast milk to feed your new baby after delivery?	Yes*	Approximately 6 months	How many weeks or months did you breastfeed or pump breastmilk to feed your baby?	Yes	How old was your baby the first time you fed him or her anything besides breastmilk? Include formula, baby food, juice, cow's milk, water, sugar water, or anything else you fed your baby.
WPPC	Yes	Definition used: Whether or not the participant ever received breastmilk	Yes	13 months	Definition used: The number of weeks the participant received breastmilk	No	Not collected

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*Measures current status, if still breastfeeding,
Breastfeeding data collection optional in PNSS and PedNSS.

**Duration can be determined based on response to multiple questions

[a]Question asked on Neonatal Survey only

[b]Question asked on from 2- 12 months of age

[#]Water and sugar water listed on the neonatal survey only.

[+]Additional food categories on surveys covering months 2-12 include: Other cereals and starches (breakfast cereals, teething biscuits, crackers, breads, pasta, rice, etc), Fruit, Vegetables, French fries, Meat, chicken, combination dinners; Fish or shellfish, Peanut butter, other peanut foods or nuts; Eggs, Sweet foods (candy, cookies, cake, etc); Other.

[&]In this survey, EBF allowed water.

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Table 3

Racial/ethnic descriptors used in federally funded datasets assessing breastfeeding outcomes

	ECLS:B	IFPSII	NHANES	NIS	NSCH	NSECH	NSFG	PedNSS	PNSS	PRAMS*	WPPC
White	X	X	X	X	X	X	X	X	X	X	X
Black/African American	X	X	X	X	X	X	X	X	X	X	X
Asian		X[a]	X	X	X	X	X	X	X	X	X
American Indian/Native American or Alaska Native	X		X	X[b]	X[b]	X[b]	X	X	X	X	X
Native Hawaiian or Pacific Islander	X[c]		X	X[c]	X[c]	X[c]	X	X	X	X	X
Other	X	X	X	X	X	X		X	X	X	X
Hispanic Subcategories											
Hispanic/Latino (yes/no)	X	X	X	X	X	X	X	X	X	X	X
Mexican/Mexican American/Chicano	X	X	X	X		X	X				
Puerto Rican	X	X	X	X		X	X				
Cuban/Cuban American	X	X	X	X		X	X				
Dominican			X								
Other Spanish/Hispanic/Latino	X	X	X	X		X	X				
Central American			X	X		X					
South American				X		X					
Other Spanish/Caribbean						X					
Asian Subcategories											
Asian Indian	X										
Chinese	X										
Filipino	X										
Japanese	X										
Korean	X										
Vietnamese	X										
Samoan	X										
Guamanian or Chamorro	X										
Other Pacific Islander	X										
Other Asian	X										
Black/African American Subcategories											
North African											
Sub-Saharan African											
Caribbean											
Other Black											

X indicates the survey collected data on this variable.

ECLS:B: Early Childhood Longitudinal Survey, Birth Cohort; IFPSII: Infant Feeding Practices Survey II; NHANES: National Health and Nutrition Examination Survey 2007; NIS: National Immunization Survey, 2006; NSCH: National Survey of Children's Health 2007; NSECH: National Survey of Early Childhood Health; NSFG: National Survey of Family Growth; PedNSS: Pediatric Nutrition Surveillance System; PNSS: Pregnancy Nutrition Surveillance System; PRAMS: Pregnancy Risk Assessment Monitoring System; WPPC: WIC Participant and Program Characteristics 2006

[a] Combines Asian and Pacific Islander into a single category

[b] Separate listings for American Indian/Native American and Alaska Native

[c] Separate listings for Native Hawaiian and Pacific Islander

* PRAMS is linked to the state birth certificate, so racial/ethnic categories vary by state. Categories marked as X are PRAMS state-specific questions. Breastfeeding data collection optional in PNSS and PedNSS.

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Table 4

Relevant breastfeeding determinants assessed in federally funded datasets assessing breastfeeding outcomes

	ECLS:B	IFPSII	NHANES	NIS	NSCH	NSECH	NSFG	PedNSS	PNSS	PRAMS	WPPC
Income	X	X	X	X	X	X	X	X	X	X	X
Household size	X	X	X	X	X	X	X	X	X	X	X
WIC participation	X	X	X	X	X	X	X	X	X	X	X
Maternal education	X	X	X	X	X	X	X		X	X	X*
Maternal age	X	X	X	X		X	X		X	X	X
Prepregnancy weight	X	X	X				X		X	X	X*
Height	X	X	X				X		X	X	X
Maternal Birthplace			X		X		X			X	
Acculturation	X		X		X		X			X	
Data collected in US territory								X^	X^		X+
Delivery method		X								X	
Parity		X	X	X			X	X	X	X	X
Previous BF experience		X	X	X			X				

X indicates data were collected on this variable.

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* indicates variables collected on the WPPC Supplexmental Data Set. All other WPPC variables marked as X were from the Minimum Data Set.

^ indicates data collected in Puerto Rico

+ indicates data collected in American Samoa, Guam, Puerto Rico and US Virgin Islands