**BREASTFEEDING INTENTION AMONG TWO HOME VISITING PROGRAMS IN ALLEGHENY COUNTY**

by

**Johnna Ann Perrino**

BS, Ohio University, 2012

Submitted to the Graduate Faculty of

Behavioral and Community Health Sciences

Graduate School of Public Health in partial fulfillment

of the requirements for the degree of

Master of Public Health

University of Pittsburgh

2018

UNIVERSITY OF PITTSBURGH

GRADUATE SCHOOL OF PUBLIC HEALTH

This essay is submitted

by

Johnna Perrino

on

December 13, 2018

Essay Advisor:

Thistle Elias, DrPH, MPA

Assistant Professor

Behavioral and Community Health Sciences

Graduate School of Public Health

University of Pittsburgh

Essay Reader:

Dara Mendez, PhD, MPH

Assistant Professor

Epidemiology

Graduate School of Public Health

University of Pittsburgh

Essay Reader:

Lynda Jones, MPH

Epidemiologist

Allegheny County Health Department

Pittsburgh, Pennsylvania

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Thistle Elias, DrPH, MPA

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**ABSTRACT**

Breastfeeding is the preferred feeding method among health organizations and physicians with a long-standing public health significance for its lasting health benefits in infants and mothers. The decision to breastfeed is influenced by many factors including, but not limited to, marital status and the support system of a pregnant woman, her race, education level, and smoking status.

 Home visiting is a free and voluntary service associated with improving birth outcomes when women are enrolled early in pregnancy. Home visiting is delivered by trained professionals to provide education and support during pregnancy and after delivery. Home visiting is significant to public health because it is one way that a pregnant woman and family can receive support and education on breastfeeding. The history and context in which home visiting evolved are outlined. One current gap in data is breastfeeding intention rates by race, marital status, education, and smoking status.

This project looks at how the contributing factors of race, marital status and support, education, and smoking status affects breastfeeding *intention* in two home visiting programs at a Southwest Pennsylvania health department. These contributing factors were chosen to provide an initial report of mothers in two home visiting programs who intended and did not intend to breastfeed. The findings reflect the challenges and complex dynamics of pregnant and parenting families’ life circumstances and available resources.

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# Introduction

 Breastfeeding, a gold standard in infant nutrition, is hailed by many organizations and health professionals for its immense benefits. The American Academy of Pediatrics considers infant nutrition a public health issue.[1] Exclusive breastfeeding is recommended for the first six months of life, followed by introducing complementary foods while still breastfeeding, up to age two years old and beyond.[2] Exclusive breastfeeding is defined by the World Health Organization and the Center for Disease Control as infants only receiving breastmilk, no other foods or liquids except for medications and vitamin and mineral supplements.[2, 3] Breastfeeding duration is the total length of time that an infant receives breastmilk. Breastfeeding intention is whether or not a woman will breastfeed.

The health impact for breastfeeding mothers and breastfed infants are sizeable. For breastfed infants, there are lower rates of infections of the respiratory tract, ear, and gastrointestinal tract.[1, 4, 5] Breastfed infants have lower disease rates for necrotizing enterocolitis, inflammatory bowel disease (IBD), allergy diseases, and celiac disease.[1, 4, 5] Breastfed infants also have lower rates of Sudden Infant Death Syndrome (SIDS), infant mortality, obesity, diabetes, and childhood leukemia and lymphoma.[1, 4] Infants have better neurodevelopment outcomes when they are breastfed.[1]

There are many short and long-term maternal health outcomes for breastfeeding. Breastfeeding can increase child spacing and help decrease postpartum blood loss, rheumatoid arthritis, hypertension, diabetes, ovarian cancer and breast cancer.[1, 6-10] A cumulative breastfeeding duration of more than 12 months can decrease breast and ovarian cancer up to 28%.[1, 8, 10] There is a 4.3% reduction in breast cancer for each year of breastfeeding.[1, 7, 9]

One study estimates 900 infant lives could be saved in the United States if there is exclusive breastfeeding for six months among 90% of mothers.[1] This same study suggests up to a 30% reduction in type 1 diabetes is achievable for infants exclusively breastfed for at least three months.

A German-based population-based case control study was conducted between 1992-1995 with 760 children under five who were diagnosed with type 1 diabetes.[53] Breastfeeding duration and introduction of breastmilk substitutes were assessed to find that delaying breastmilk substitutes to exclusively breastfeeding protects against type 1 diabetes. This study is important for informing future feeding practices in the United States and for supporting the WHO breastfeeding recommendations.

The Healthy People 2020 objectives include several related to breastfeeding. Objectives include increasing the proportion of infants who are ever breastfeed (74% to 81.9%), breastfed at six months (43.5% to 60.6%) and 1 year (22.7% to 34.1%), and exclusively breastfed through three months (33.6% to 46.2%) and 6 months (14.1% to 25.5%).[11] All baseline data is from infants born in 2006 and reported 2007-2009.

The Allegheny County Plan for a Healthier Allegheny (PHA) has five priority areas with Maternal and Child Health being one.[12] The PHA aims to, “Reduce morbidity and mortality, by improving the health and quality of life of women, infants, children, caretakers, and their families, especially in vulnerable communities.” The PHA objective is to, “Increase the proportion of mothers with intent to breastfeed when leaving the hospital and reduce the disparity between White and Black populations.” Specifically, the PHA aims to decrease the disparity between White and Black mothers by 10%, leaving a 7.7% disparity. Currently there is a 17.7% disparity between Black and White women with intent to breastfeed with 79.4% of White mothers intending to breastfeed and 61.7% of Black mothers intending to breastfeed in Allegheny County.

The 2013 United States breastfeeding rate for women who initiated breastfeeding was 81.1%. At six months, 51.8% of women were breastfeeding, and 30.77% were breastfeeding at 12 months. At three months 44.4% of infants were exclusively breastfed and 22.3% were exclusively breastfed at six months.[13] Table 1 shows the these rates by race.

Table 1. United States Breastfeeding Rates by Race, 2013

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Location | Ever Breastfed/Initiated % | Breastfeeding at 6 months % | Breastfeeding at 12 months % | Exclusive breastfeeding at 3 months % | Exclusive breastfeeding at 6 months % |
| **U.S. National** | 81 | 52 | 31 | 44 | 22 |
| Black | 66 | 39 | 19 | 29 | 15 |
| Multirace | 79 | 51 | 30 | 44 | 20 |
| Asian | 84 | 64 | 39 | 42 | 21 |
| White | 84 | 58 | 36 | 52 | 27 |

##### Data Source: **National Immunization Survey, United States, 2011–2015[14]**

## Breastfeeding Support in aLLEGHNY COUNTY

The Allegheny County Health Department offers a breastfeeding help line Monday through Friday from 8:30AM-4:30PM that is open to the public. The help line calls are answered by one of twelve Certified Lactation Counselors (CLC) or the International Board-Certified Lactation Counselor (IBCLC). Certified Lactation Counselor is a certification for those who have demonstrated skills, knowledge, and attitudes needed for clinical breastfeeding counselling.[15] CLCs are able to support families who are thinking about breastfeeding or need support while they are breastfeeding.[15] This support may be provided in person or over the phone depending on the organization in which the CLC is employed. An International Board-Certified Lactation Consultant is a worldwide certification and the most advanced lactation certification one can achieve.[16]

Calls are received by the main information line of the Allegheny County Health Department. A message is taken with the caller’s name and contact information. The message is passed on to the Maternal and Child Health program and a CLC or IBCLC returns the call generally the same day. If the question or problem cannot be resolved on the phone, the caller is given information on other providers to contact for follow up. If the caller is a home visiting client with the Allegheny County Health Department and needs in person support, the IBCLC may visit the client in their home.

There are additional breastfeeding supports in Allegheny County through other home visiting organizations and health providers. Delivering hospitals such as Magee and West Penn staff IBCLC to provide support after delivery. Kids Plus Pediatrics and Breastfeeding Center of Pittsburgh staff medical providers and support staff that are trained as IBCLCs. The Center for Urban Breastfeeding, ran by the Healthy Start home visiting program, offers support to African American women in the community as well as The Pittsburgh Black Breastfeeding Circle. La Leche League is a long-standing support for breastfeeding women in the community to interact via phone, Facebook, and in group support settings. The Allegheny County Health Department housed the Allegheny County Breastfeeding Coalition which aims to normalize and celebrate breastfeeding in every community in Allegheny County.

## Home Visiting

Home Visiting is a long-standing service offered across the country that has been shown to increase breastfeeding rates, among other health indicators. There have been many different home visiting programs since they began in the 1880’s.[5] With the overall goal of improving maternal and child health, preparing children for kindergarten, and helping immigrant communities, the overall goal of home visiting has not changed through the years but how it is defined has some variations. The definition of home visiting varies based on what a program chooses to highlight. A program may choose to highlight their efforts with preventing Adverse Childhood experiences [6] or improving birth and child development outcomes, parenting behavior, and child maltreatment.[7] The overarching goal for all programs is improved outcomes for a child, mother, and family wellbeing. The American Academy of Pediatrics comprehensively defines home visiting as,

“An evidence-based strategy in which a professional or paraprofessional renders a service in a community or private home setting. Home visiting also refers to the variety of programs that employ home visitors as a central component of a comprehensive service plan. ‍Early childhood home-visiting programs may be focused on young children, children with special health care needs, parents of young children, or the relationship between children and parents, and they can use a 2-generational strategy to simultaneously address parental and family social and economic challenges.‍”[17]

### HOME VISITING IN ALLEGHENY COUNTY

 There are over 20 home visiting programs in Allegheny County offering support to families from pregnancy through age six. Programs are ran by a variety of organizations including the Allegheny County Health Department, University of Pittsburgh Medical Center, and 501 C 3 (non-profit organizations). Each program has unique offerings depending on their target population.

Three of the home visiting programs in Allegheny County are house by the Allegheny County Health Department: Healthy Families America (HFA), Nurse-Family Partnership (NFP), and We C.A.R.E. Participants must live in Allegheny County, Pennsylvania to be eligible.[18] Participants in the HFA program enter prenatally or before the baby is two weeks old. In the We C.A.R.E. program, participants can enroll at any time. The NFP program focuses on first time mothers and participants need to enroll before 28 weeks of pregnancy. The programs are voluntary and participants can leave the program at any time. Table 2 shows the focus of the programs, service time frame, and curriculum.

Table 2. Allegheny County Health Department Home Visiting Programs

|  |  |  |  |
| --- | --- | --- | --- |
| Program | Focus | Service Timeframe | Curriculum |
| Healthy Families America | Families residing in Braddock, McKeesport, Clairton, or Homestead who are single parents, low income, childhood history of abuse and other adverse child experiences, and current or previous issues related to substance abuse, mental health issues, and/or domestic violence. | Pregnancy through age 3 | Healthy Families America |
| We C.A.R.E. | Any pregnant and parenting mothers including children with special healthcare needs. | Pregnancy through age 2 | Partners for a Healthy Baby |
| Nurse Family Partnership | First time mothers. | Pregnancy through age 2. Must enroll before 28 weeks of pregnancy. | Nurse Family Partnership |

 Curricula across programs varies. The Healthy Families America program utilizes the standard HFA curriculum. The curriculum focuses on promoting positive parent-child relationships and healthy attachments by using strength-based approaches that are family centered. This program has the option of serving families until the child is age five. The ACHD program serves HFA clients until the child is age three.

The We C.A.R.E. home visiting program utilizes the research-based Florida State University Partners for a Healthy Baby curriculum. The evidence-based strategies put together for this curriculum address prenatal health, birth outcomes, bonding and attachment, positive parenting, child health and development, infant mental health, self-sufficiency, and family stability. This curriculum has been shown to have positive outcomes for low birth weight, repeat pregnancies, abuse and neglect, immunizations, child development, reading to children, maternal depression, and breastfeeding.[19]

The NFP home visiting program uses a breastfeeding curriculum provided by the Nurse Family Partnership program. NFP will not be included in this review.

### PROJECT OBJECTIVE

The project objective is to explore breastfeeding intention of clients enrolled in the Healthy Families America and We C.A.R.E. home visiting programs between 2015-2017. Variables that will be explored in relation to breastfeeding intention are marital status and support, smoking, race, and education. The purpose of studying these variables is to inform the home visiting programs about the breastfeeding intentions of participants being served and to contribute to the body of knowledge on breastfeeding intention since limited data is available.

Examining what happens between the time a woman intends to breastfeed and after giving birth is important for understanding breastfeeding outcomes of initiation and duration. Also, understanding why women do and do not intend to breastfeed will help inform those working to increase initiation and duration about what happens between the prenatal and postpartum period in regard to a woman’s decision to breastfeed. Breastfeeding initiation can be affected by factors outside a mother’s control after delivery such as infant birth weight, gestational age, and an infant’s ability to suck.[20] There are also maternal factors such as medications and cesarean births that may affect breastfeeding initiation.[20] These circumstances can negate a woman’s *intention* to breastfeed and lead to lower breastfeeding *initiation* numbers.

A note on race terminology used. The literature that was reviewed reports race differently across studies. The terminology used to identify the race of individuals or groups of people will be used how it is presented in the literature and data.

# Background Information

## breastfeeding rates: State and County

There are eleven federally-funded datasets with information on initiation, duration, and exclusive breastfeeding including 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.[21] Intention to breastfeed has been captured in multiple studies across the United States, but state and national intention data are not included in the federal data sets.

The National Immunization Survey (NIS) reports the following demographic data in table 2 for children born 2010-2013. Number of respondents and data is in ranges due to the number of responses varying by indicator. For race, this is the race of the child as reported by the respondent. Some indicators were removed from original version due project relevancy.

The data shows a disparity based on race/ethnicity and level of mother’s education. Black, non-Hispanic children have the lowest breastfeeding initiation at 64.3% while White, non-Hispanic children (81.5%) and Hispanic children (81.9%) have initiation rates that differ by only 0.4% for one another. Black, non-Hispanic children also have the lowest rates for being breastfed exclusively through six months (14.0%) and any breastfeeding at 12 months (17.1%). The gap widens for White, non-Hispanic children (22.5%, 30.8%) and Hispanic children (18.2%, 26.3%) for breastfed exclusively through six months (by 4.3%) and any breastfeeding at 12 months (by 4.5%).

For mother’s education, the percentage of those who initiated breastfeeding and those who exclusively breastfed through six months consistently increases with higher levels of education. There is a change in the data for breastfed at 12 months. Those with less than a high school diploma or GED (21.8%) have a higher rate of breastfeeding by 2.1% compared to those with a high school diploma or GED (19.7%).

Regardless of race/ethnicity and mother’s education, there is a low percentage of infants *exclusively* breastfed at six months, but a higher percentage of *any* breastfeeding at 12 months. This may be due to the introduction of solid foods between three months and six months of age [22], which would not qualify a child as being exclusively breastfed at six months but count at 12 months if they were still breastfeeding.

Table 3 shows how Pennsylvania compares to the U.S. National rates for multiple breastfeeding indicators in 2013. Pennsylvania comes ahead in breastfeeding at 12 months compared to the U.S. National by 1.2%. The greatest difference is seen between ‘ever breastfed’ with a 7.8% difference.

Table 3. National Prevalence of Breastfeeding Initiation, Exclusive Breastfeeding through Age 6 Months, and Duration of Breastfeeding at Age 12 Months Among Children Aged 19-35 Months, by Selected Demographic Characteristics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Characteristic** | **No. of respondents** | **Initiated breastfeeding % (95% CI)** | **Breastfed exclusively through 6 months % (95% CI)** | **Breastfed at 12 months % (95% CI)** |
| **Total** | 88,436–90,692 | 79.2 (78.7–79.7) | 20.0 (19.5–20.5) | 27.8 (27.2–28.4) |
| **Child’s race/ethnicity** |
| White, non-Hispanic | 49,868–51,359 | 81.5 (80.9–82.1) | 22.5 (21.9–23.1) | 30.8 (30.1–31.5) |
| Black, non-Hispanic | 9,091–9,255 | 64.3 (62.7–65.9) | 14.0 (12.7–15.3) | 17.1 (15.8–18.4) |
| Hispanic | 17,775–18,075 | 81.9 (80.8–83.0) | 18.2 (17.0–19.4) | 26.3 (24.9–27.7) |
| **Mother’s education** |
| Less than high school diploma or GED | 9,329–9,496 | 68.8 (67.2–70.4) | 14.5 (13.1–15.9) | 21.8 (20.2–23.4) |
| High school diploma or GED | 16,317–16,651 | 69.7 (68.5–70.9) | 16.0 (15.0–17.0) | 19.7 (18.6–20.8) |
| Some college | 23,230–23,809 | 80.5 (79.6–81.4) | 17.8 (16.8–18.8) | 23.4 (22.3–24.5) |
| College graduate | 39,560–40,736 | 91.1 (90.7–91.5) | 27.7 (26.9–28.5) | 40.3 (39.4–41.2) |

##### Data Source: **National Immunization Survey, United States, 2011–2015[14]**

Table 4 shows select data from the National Immunization Survey data for Pennsylvania children born between 2010-2013 shown by race. There is a disparity between all indicators for White, non-Hispanic and Black, non-Hispanic.

Table 4. U.S. National and Pennsylvania State Breastfeeding Rates by Race, 2013\*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Location | Ever Breastfed/Initiated % | Breastfeeding at 6 months % | Breastfeeding at 12 months % | Exclusive breastfeeding at 3 months % | Exclusive breastfeeding at 6 months % |
| **U.S. National** | 81 | 52 | 31 | 44 | 22 |
| Black | 66 | 39 | 19 | 29 | 15 |
| Multirace | 79 | 51 | 30 | 44 | 20 |
| Asian | 84 | 64 | 39 | 42 | 21 |
| White | 84 | 58 | 36 | 52 | 27 |
| **Pennsylvania**  | 73.3 | 48 | 32 | 41 | 21 |
| Black | 66 | x | x | x | x |
| Multirace | 74 | x | x | x | x |
| Asian | 88 | x | x | x | x |
| White | 77 | x | x | x | x |

##### Data Source: **National Immunization Survey, United States, 2011–2015[14]**

\*x signifies data is not available.

The Allegheny County breastfeeding intention rate in 2015 among women at discharge from hospital was 76.7%, with 79.4% for White mothers and 61.7% for Black mothers.[12] Figure one shows breastfeeding *intention* among different races in Allegheny County. There are similarities in the Allegheny County breastfeeding *intention* rates and Pennsylvania breastfeeding *initiation* rates in table five and figure one for White and Asian mothers. For Black and Multirace people the 2013-2015 breastfeeding *intention* rate for Allegheny County is lower than the Pennsylvania breastfeeding *initiation* rate. Comparing *intention* rates with *initiation* rates shows how well breastfeeding *intention* turns into *initiating* breastfeeding. If the *intention* rate and *initiation* rates are not similar, there is an opportunity to explore what may be impacting mothers’ lives such that they may not breastfeed despite intentions. Since the state of Pennsylvania only reports *initiation* and Allegheny County only reports *intention*, these are the only two variables available to compare. The Pennsylvania Department of Health and Allegheny County use birth certificate data to collect breastfeeding *intention* and *initiation*.



Figure 1. Percent Who Intend to Breastfeed by Race in Allegheny County, 2003-2015

Data Source: Allegheny County Health Department, *Health Equity Brief Maternal and Child Health in Allegheny County* [18]

The Pennsylvania Department of Health reports the following information in Table 5 for 2013-2016 Allegheny County breastfeeding initiation rates by race and ethnic groups. Data was obtained from birth certificates.[24] The 2013 Allegheny County breastfeeding initiation rate was 74.4%.[25] Looking at the years 2015-2016, the breastfeeding initiation rates were 78.1% and 79.9% respectively.[25]

Table 5. Pennsylvania Breastfeeding Initiation Rate by Race/Ethnic Groups, 2013-2016



Data Source: Pennsylvania Department of Health, Pennsylvania Breastfeeding Initiation Rate by Race/Ethnic Groups, 2013-2016[24]

## Select DETERMINING FACTORS of breastfeeding: Marital Status/support, Smoking, Race, and education

 There are many factors that determine whether a woman will initiate (at any time after birth) breastfeeding her child and how long she will breastfeed (duration). Demographic factors including socioeconomic status, education, parity, maternal age, maternal smoking, ethnicity, culture, supportive environment, and receiving breastfeeding education influence the intention to breastfeed.[20] Other factors include maternal obesity, multiparity, previous breastfeeding experience, self-efficacy, the hospital’s approach to promoting breastfeeding, and environmental cultural norms regarding breastfeeding.[26] This project focuses on marital status and support, smoking, race, and education based on available data from the home visiting programs.

Marital status and support are two factors that can influence a woman’s intention to breastfeed. Marital status plays a role in the type of support you have from your spouse or partner and their family in addition to the woman’s friends and peers. Nationally and in Pennsylvania, 8% of children under 18 years old lived with a cohabitating domestic partner (not married) in 2016.[27] Thirty-five percent of children under 18 years old were living in single parent households nationally and in Pennsylvania in 2016. Data on marital status of home visiting clients nationally is unavailable. In an evaluation of the Ohio Healthy Families America program, of the 485 primary caregivers who participated in the evaluation, 47% were single and never married, 20% were married, 12% were with a partner, 5% were divorced and less than 1% were widowed.

The following studies demonstrate that support from a partner, clinician, or home visitor can have a positive influence on a pregnant woman’s *intention* to breastfeed and lead to breastfeeding *initiation* after birth.[22] If a partner wants an infant to be breastfed, one study showed there is fifteen times greater odds for the infant to be breastfed. The support from a partner is also greater if the partner was a breastfed infant. Clinician support could lead to a 1.95 times greater likelihood of a woman to initiate breastfeeding. The support from a home visitor may lead to a 4.5 times likelihood of breastfeeding. The positive outcomes reported by these studies are promising for future interventions that want to target one or more support variables.

A study of 296 young (14-21) year old women and their male partners analyzed breastfeeding intentions between July 2007 and February 2011 in four Connecticut hospitals.[29] Female participants were 39.5% Black and 16.9% White while the male participants were 48.6% Black and 10.5% White. The pregnant participants had a 73% breastfeeding intention rate while 80% of their male partners wanted the baby to be breastfed and 67% of partners both agreed on breastfeeding with 14% both agreeing not to. Those who had been in a relationship for less than the mean relationship duration of 27 months or experienced Intimate Partner Violence were less likely to breastfeed. A partner wanting the baby to be breastfed resulted in fifteen-time greater odds of breastfeeding intention.

A study that analyzed the Infant Feeding Practices II study data looked at how prenatal exposure to breastfeeding information including family and clinician support along with peers breastfeeding practices impacts breastfeeding. This longitudinal study by the US Food and Drug Administration and the CDC from May 2005 until June 2007 had 3,033 women-infant dyads with breastfeeding initiation (any breastfeeding after during the study) data after birth and 2,546 women with breastfeeding data at two months post birth.[30] Findings showed that women who had families that preferred exclusive breastfeeding during the prenatal period were more likely to initiate breastfeeding and continue breastfeeding compared to women in families who supported only formula or a combination of formula and breastfeeding. The strongest influence on breastfeeding initiation was the clinicians’ opinion on exclusive breastfeeding with 1.95 times greater likelihood of women to initiate breastfeeding compared to women with clinicians who recommended only formula or both formula and breastfeeding. There were increased odds of breastfeeding initiation, exclusive breastfeeding, or any amount of breastfeeding at two months after birth if the woman’s partner was breastfed. The more friends a woman had that did not breastfeed, the more likely she was not to breastfeed her infant.

Participating in home visiting can lead to better breastfeeding outcomes and is another form of support and information to mothers and families when deciding on breastfeeding their babies. A Virginia study looked at birth outcomes of home visiting participants between 2007-2008 and found an association between home visiting participation and increased breastfeeding initiation.[31] Women were 4.5 times more likely to initiate breastfeeding compared to the control group who had no home visiting. This likelihood considered WIC participation, maternal education, race, smoking status, singleton, parity, income, vitamin use, and pregnancy preparedness, women who had a visit by a health care worker or nurse to their home.

An analysis of 130 infants in a study on home intervention by nurse midwives and birth outcomes used a standardized protocol designed to decrease preterm birth that was compared to a control group that received standard prenatal care.[32] All women in the study had birthed children in the past and had a history of preterm birth. For this study, all women had to have delivered at least at 35-week gestation. Of the 63% of mothers who breastfed in the past, 85% intended to breastfeed again. Overall, 92% of the intervention group intended to breastfeed compared to 77% in the control group. There were 8 out of 50 women who had no breastfeeding history in the intervention group who were breastfeeding at 48 hours after delivery compared to the 2 out of 34 women who were breasting after delivery in the control group. For all women who had a breastfeeding history, 42 out of 50 women in the intervention group were breastfeeding after delivery, compared to the 30 out of 34 women in the control group who were breastfeeding after delivery.

Smoking is a modifiable factor that influences breastfeeding intention. Nationally, around 10% of women report smoking during the last three months of pregnancy.[33] The number of births to women who used tobacco during pregnancy in 2015 in Pennsylvania was 12.5% or 17,292 women.[27] For 2015 in Allegheny County there were 10.6% or 1,393 births to women who used tobacco during pregnancy. The Pennsylvania state and Allegheny County percent of births to women who used tobacco during pregnancy has decreased over the last ten years. It was the highest in 2006 at 17.6% for the state of Pennsylvania and 17.7% in Allegheny County.

The following studies are examples of how intervening with smoking cessation before a woman is pregnant or before she delivers may increase the likelihood of breastfeeding. It is evident that smoking can influence a woman’s decision not to breastfeed.[30] Those who do quit and stay quit for more than a month may have higher initiation rates.[29]

A study of Philadelphia WIC participants looked at sociodemographic and behavioral factors on breastfeeding initiation of maternal smokers.[34] Findings were that women who have previously been successful at staying smoke free after quitting may have an increased likelihood of initiating breastfeeding. Specifically, with more than one month’s duration of smoking abstinence, women are more likely to initiate breastfeeding than those with less than one-month smoking abstinence. This is due to the ability to maintain being smoke free after delivery because of the success of previous quit attempts. This ties into the number of previous quit attempts increasing future cessation success due to increased confidence or withdrawal and urge management skills.

A study of 300 women who quit smoking once pregnant and participated in a relapse prevention program were asked about breastfeeding intention before delivery.[35] Sixty eight percent intended to breastfeed and 69% reported smoking did not influence whether to breastfeed. Eighty three percent of women said that smoking influenced their decision to breastfeed and they stopped or decreased smoking to breastfeed. Women were also followed after delivery to track smoking status. Seventeen percent did not breastfeed or stopped breastfeeding to smoke. More than half of participants (54%) had above a high school education, 54% overall were Black, and 61% overall intended to breastfeed.

Race is an important determining factor of breastfeeding intention but is only one of many factors contributing to breastfeeding intention. The following studies show consistencies with previous studies on the highest breastfeeding *intention* and *initiation* rates are among those with more supports and resources.

A study analyzing data from the Community and Child Health Network Study looked at intention to breastfeed among 1,636 mothers across races.[36] Data came from Baltimore, Maryland, Washington, DC, and Lake County, Illinois from 2008-2010. There was a 77% breastfeeding *intention* rate, a 78% breastfeeding *initiatio*n rate, a higher likelihood to have a college degree, and to be married for the 310 White mothers, compared to the 907 Black mothers who had a 57% *intention* rate, 61% *initiation* rate, were less likely to have a college degree, and less likely to be married.

Researchers conducted a retrospective cohort study on breastfeeding *intention* and *initiation* of 578 women with infants born July-September 2010 at Albert Einstein Medical Center in Philadelphia, Pennsylvania.[37] The women were 61% were African American, 12% White, 18% Latina, and 10% Other with a mean age of 25.3 and an average hospital stay of 2.3 days. Before delivery in the labor and delivery suite, women were asked their feeding plans. Regardless of race, 12% (69) of women intended to breastfeed and use formula while 48% (279) planned to breastfeed exclusively, and 40% (230) intended to use only formula. Overall at discharge, 75% of women who intended to breastfeed were doing so at discharge. Forty percent of women exclusively breastfed at discharge. Also, 11% of women who intended to formula feed were breastfeeding at discharge with 3% (6) exclusively breastfeeding and 8% (19) using formula and breastfeeding.

A study of 532 pregnant, first time mothers in Sacramento California examined ethnic disparities of formula feeding.[38] The study was comprised of 41% white, non-Hispanic women, 27% Hispanic women, 14% African-American women, 12% Asian women, and 6% who identified as more than one ethnicity. Most participants intended to try breastfeeding and education level was associated with breastfeeding intention. Comfort with formula feeding was the highest amongst African-American women and participants with less education.

A secondary analysis of data examining breastfeeding intention of 109 Black low-income pregnant women attending WIC clinics in the Inland Empire area of California from found that those who attended peer group support sessions had higher intentions to breastfeed than those who only attended regular WIC visits.[39] Those who attended the support groups were twice as likely to intend to breastfeed compared to those who did not attend the support groups. The demographics of the 109 women show no significant difference between those who intended to exclusively breastfeed or combination feed (with both breastmilk and formula) for marital status and education.

An infant feeding decision and support influence study among African American mothers having their first child studied 14 pregnant women and 8 support people between March 2013 and June 2014.[40] Six women had a high school education, 2 had some high school, 4 had some college, and 2 had some graduate school. Thirteen of the pregnant women intended to breastfeed. The decision to breastfeed was influenced by social networks and was consistent with what their social supports desired.

Education level of pregnant women is an important determining factor for breastfeeding intention.[41] Many of the previous mentioned studies have reported the relationship between education levels and breastfeeding. The higher the education level that a woman has, the higher the rates are for breastfeeding *intention* and *initiation*. The studies consistently show the relationship between higher education and better breastfeeding outcomes. Having a higher level of education may give someone more opportunities to learn about healthy infant feeding choices. Education may give someone the curiosity and skills needed to research topics such as breastfeeding and make an informed decision.

This study demonstrates the breastfeeding intention is multifaceted and cannot be determined by one variable alone. A study on breastfeeding intention and attitudes among Black college students surveyed 174 Black men and 174 Black women, all of whom did not have children and were never pregnant.[41] There were positive attitudes about formula feeding, including 45% of participants who thought formula was more convenient than breastfeeding, 43% who thought that formula is better for mothers who work outside the home, and 46% who that women should not breastfeed in public. Breastmilk was also supported by participants including 70% who thought it was the ideal food, 77% who thought that it increases bonding between mother and child, and 41% that one of the joys of motherhood is missed by women who formula feed. Breastfeeding intention among participants was high with 163 women indicating a high probability of 81%-100% intention of breastfeeding future children. There were 14 participants who reported no chance of breastfeeding future children. There was a correlation with breastfeeding intention and education level, being breastfed as an infant, and knowing someone who breastfeed.

The following study analyzed multiple variables to find higher intentions to breastfeed among those who were living with a partner, had a college education or higher, and support from family and peers.[42] A survey study of 100 pregnant women from an inner-city hospital were asked about breastfeeding intention. There were 86 Black women, 13 mixed, and 1 White woman. The breastfeeding intention rate was 70.1%, 76.9%, and 100% respectively. Thirty-four were married or living with a partner and 82.3% intended to breastfeed, while of the 66 who were single or separated 77.3% intended to breastfeed. The highest intention rates were seen among the 14 who had a college graduate education or higher with 100% intention and 83.1% intention among the 59 with a high school education, and 59.3% of the 27 who were not high school graduates. For support from a partner and family/peer, 69 had support from a partner and 92.7% intended to breastfeed compared to the 38.5% of the 26 who did not have partner support. For family/per support, 83.9% of the 87 who had family/peer support intended to breastfeed while 46.2% of the 13 who did not have family/peer support intended to breastfeed.

## Home Visiting Past

Home visiting has a long history of public health significance and has been endorsed by physicians and used in statewide systems with some even adopting legislations to protect home visiting programs. The three goals of home visiting programs when they started in the United States were to encourage universal kindergarten, improve maternal and child health, and support poor immigrant communities.[5]

Home Visiting in the United States began in the 1880’s and was modeled after British home visiting programs.[17] During World War II, home visiting funding decreased. After World War II, home visiting had a renewed interest due to anti-poverty efforts and the Civil Rights Movement.[17] In the 1960’s, home visiting was a part of the government’s War on Poverty. In the 1970’s some home visiting programs expanded its work to include case management to help families become self-sufficient and link to other support resources. From 1975 through the end of the 20th century, home visiting was used for the prevention of child abuse and neglect, promoting child development, and increasing parenting abilities.

At multiple points in history, notable pediatricians have expressed the importance of home visiting. The Abraham Jacobi Award is awarded annually to a pediatrician who has made a notable contribution to teaching, patient care and/or clinical research.[17, 43] Two award recipients are home visiting supporters. C. Henry Kempe, MD, during his 1978 Abraham Jacobi Memorial Reward speech, said that every pregnant mother and preschool age child should have a home visitor. Another award recipient, Cal Sia, MD echoed Kempe’s sentiments during his 1992 award speech.

### HOME VISITING PRESENT

Today, all fifty states, and five United States territories have home visiting programs with goals of school readiness, intervening with poverty, decreasing environmental safety hazards, and increasing population-based health.[17] Current sustainability of home visiting programs is due to funding from the American Recovery and Reinvestment Act which allotted $2.1 billion in 2009 to expand Head Start and Early Head Start. The Patient Protection and Affordable Care Act in 2010 earmarked $1.5 million over five years for the Maternal, Infant, and Early Childhood Home Visiting Program (MIECHV). With federal grants through MIECHV, each state has at least one evidence-based home visiting program. To meet the needs of high-risk communities, the program must improve outcomes for a family’s self-sufficiency, improve health indicators of target populations, and school readiness. Additional program outcomes were added in 2013 to reduce family violence, juvenile delinquency, and child maltreatment.

The US Department of Health and Human Services has a Home Visiting Evidence of Effectiveness Review that currently has nineteen home visiting program models meeting the review criteria, one of which is Healthy Families America.

For 2015, a national profile of families served through home visiting in all fifty states and the District of Columbia, shows that of the 269,206 families served, 59% were White, 20% Black, 10% multiple races, 4% American Indian/Alaskan Native, 2% Asian, 1% Native Hawaiian/Pacific Islander, and 4% Other while 26% identified as Hispanic or Latino.[44] Twenty six percent of caregivers had no high school diploma.[44]

A 2016 state profile for Pennsylvania shows that 15,918 families were served through evidence-based home visiting.[45] Of the families served, 58% identified as White, 23% Black, 11% multiple races, 2% Asian, <1% American Indian/Alaskan Native, <1% Native Hawaiian/Pacific Islander, and 4% Other while 13% identified as Hispanic or Latino. Twenty five percent of caregivers had no high school diploma.

### HEALTHY FAMILIES AMERICA

Healthy Families America is a program of Prevent Child Abuse America and started in 1992.[46] The program is geared towards single parents, low income, childhood history of abuse and other adverse child experiences, and current or previous issues related to substance abuse, mental health issues, and/or domestic violence.[47] The aims of the program include reduce child maltreatment, improving parent-child interactions and social-emotional well-being, increasing school readiness and access to primary care and community services, promote physical health and development in children, positive parenting, family self-sufficiency, and decrease childhood injuries.

Currently, HFA serves almost 100,000 families per year in thirty-five states, the District of Columbia, Canada and six U.S. Territories (American Samoa, Guam, the Northern Mariana Islands, Puerto Rico, the US Virgin Islands).[48] The HFA program has proven impacts on children, parents and families, and the community. One measured impact on children is school readiness and adjustment. When compared to a control group, HFA participants have improved first grade performance with 3.5% not able to move on to second grade compared to 7.1% in the control group. When looking at three first grade learning behaviors (works and plays cooperatively, follows oral directions and rules, and completes work on time), 7.7% of HFA first graders excel on all three compared to 3.2% in the control group.

The impacts on parents and families show improved family functioning through decreased alcohol use among mothers and increased education among mothers compared to the control group.[49] Alcohol use was reported by 12% of mothers enrolled in HFA compared to 20.5% in the control group. Over thirty five percent of HFA mothers advance their education compared to 6.8% of mothers in a control group. Other family impacts include delayed subsequent pregnancies which also improves financial security and the health of mothers and babies.

A study on the impact of HFA in communities showed that in Hampton Virginia there was improvement in the rates of child maltreatment, child maltreatment fatalities, and infant mortality when compared to similar cities along with cost savings for these improved outcomes.[50]

The HFA program has been implemented since 2015. Between 2015 and 2017 the program has served 114 families. There is not a breastfeeding curriculum provided by Healthy Families America. Nurses who have clients who are interested in breastfeeding use information from the Partners for a Healthy Baby Curriculum. Between 2015-2017 there were no HFA home visitors who were Certified Lactation Counselors.

### We C.A.R.E.

We C.A.R.E. is funded through the Title V Maternal and Child Health Services Block Grant Program. This funding allows for organizations to choose an evidence-based model to implement in their community. The goals of the Title V program funding include,

“Access to quality health care for mothers and children, especially for people with low incomes and/or limited availability of care; health promotion efforts that seek to reduce infant mortality and the incidence of preventable diseases, and to increase the number of children appropriately immunized against disease; access to comprehensive prenatal and postnatal care for women, especially low-income and/or at-risk pregnant women; an increase in health assessments and follow-up diagnostic and treatment services, especially for low-income children; access to preventive and child care services as well as rehabilitative services for children in need of specialized medical services; family-centered, community-based systems of coordinated care for children with special healthcare needs; toll-free hotlines and assistance in applying for services to pregnant women with infants and children who are eligible for Title XIX (Medicaid).”[51]

Breastfeeding education in the We C.A.R.E. program is taught with the Partners for a Healthy Baby curriculum. The Partners for a Healthy Baby curriculum introduces the topic of breastfeeding in month four of pregnancy.[52] Breastfeeding is also addressed in month six through nine prenatally and after baby is born. Smoking and breastfeeding is also addressed in month six prenatally. The curriculum directs the home visitor what to ask the mother and how to respond based on the conversation with the mother. There is also supplementary handouts that can be left with mother. The nurse home visitor tailors the information and content with each mother’s needs when they need it. A mother may want information before month four of pregnancy when the curriculum says to cover it. Also, a mother may not enter the program early her pregnancy and is enrolled at a time before delivery when other information to prepare for labor and delivery is more critical to know. If the curriculum does not meet the needs of a pregnant mother, the home visitor may turn to other credible sources to provide information. During the 2015-2017 time period, there was one home visitor who was a Certified Lactation Counselor. Clients who have the home visitor that is also a Certified Lactation Counselor will have access to additional advanced knowledge and support.

# Methodology

For a study of local breastfeeding factors among two home visiting program populations, data was accessed via partnership with the local health department. Client data was extracted from the client documentation system, Go Beyond, into several Excel files and merged with breastfeeding and demographic files by the child ID variable, thereby excluding records with missing child IDs. SAS statistical software was used to import, merge, and analyze client data. Data includes all clients enrolled and had a child in 2015 and excludes a small number of women who enrolled in 2014 and had a child in 2015. Data from 2015-2017 was chosen to analyze since the current Go Beyond system was implemented in 2015 and access to the prior system is not possible.

Breastfeeding intention data is collected by a member of the enrollment team before a client begins one of the home visiting programs. Every pregnant client is asked, “Do you intend to breastfeed?” and the yes or no response is recorded.

The sample size includes 557 live births between January 1, 2015 and December 31, 2017 of women enrolled in the home visiting programs. This data does not account for any women who birthed multiples.

The analysis plan includes categorizing the number of HFA and We C.A.R.E. home visiting clients by number and percent that intend to breastfeed and by number of births, marital status, smoking, race, and education. A chi-square test will be used to show the association between demographic factors of marital status and support, smoking, race, education among home visiting participants and breastfeeding intention.

## Results

Table 6 shows the characteristics of the We C.A.R.E. and HFA home visiting program. The findings are consistent with the literature that shows the individual characteristics of being a non-smoker, married, and higher education are associated with higher breastfeeding *intention* and *initiation* rates. The breastfeeding rates reported for the home visiting programs is lower than what is reported in the literature and lower than the reported intention rates for Allegheny County. The Chi Square test shows a statistically significant association for race, education, marital status, and smoking status and breastfeeding intention. Since n is low, repeating this test again when more data is available for an increased n is recommended.

Table 6. Breastfeeding Intent of Home Visiting Clients Who Enrolled and Delivered a Child, 2015-2017

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Characteristic** | **Number Intend to Breastfeed** | **Total Number of Births** | **% Intend to Breastfeed** | **p-value** |
| **Race** |  |  |  |  |
| White  | 67 | 143 | 47% |  |
| Black | 159 | 271 | 59% |  |
| Asian | 47 | 66 | 71% |  |
| Other | 38 | 58 | 66% | p <.0001 |
| **Education** |  |  |  |  |
| High School or Less (including GED) | 190 | 359 | 53% |  |
| College/Post-Grad | 105 | 155 | 68% | p <.0001 |
| **Marital Status** |  |  |  |  |
| Married | 114 | 153 | 75% |  |
| Single | 155 | 313 | 50% |  |
| Other\* | 33 | 61 | 54% | p <.0001 |
| **Smoking Status** |  |  |  |  |
| Smoker | 73 | 167 | 44% |  |
| Non-Smoker | 244 | 369 | 66% | p <.0001 |
| **Program** |  |  |  |  |
| HFA | 20 | 29 | 69 |  |
| We C.A.R.E. | 301 | 528 | 57 | p=0.4 |
|  |  |  |  |  |
| Note: Breastfeeding Intent includes all ACHD HV clients enrolled and had a child between January 1st, 2015 and December 31st, 2017\*Other does not include divorced or widowed in which there were two divorced clients, one who intended to breastfeed and one who did not. There was one widowed client who did not intend to breastfeed. |

Table 7 shows an increase in breastfeeding intention among home visiting clients each year between 2015-2017. It is unknown if the rates among clients have truly increased. The increase could be due to improved reporting processes, changes in staff nurses with greater breastfeeding knowledge, and/or the highest need clients are dropping out.

Table 7. Breastfeeding Intent of Home Visiting Clients by Year, 2015-2017

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Number Intended to Breastfeed** | **Total Number of Births** | **% Intend to Breastfeed** |
| 2015 | 103 | 199 | 52 |
| 2016 | 83 |  158 | 53 |
| 2017 | 135 | 198 | 68 |

There is a sizeable difference when comparing the overall Allegheny County breastfeeding intention rates at hospital discharge and intention rates of home visiting clients at enrollment into the program. Table 8 shows the overall breastfeeding intention rate for the We C.A.R.E. and HFA home visiting clients at enrollment into the program is 57% while the Allegheny County breastfeeding intention rate at hospital discharge is 76%. There is also a difference across races with a 47% breastfeeding intention rate at home visiting enrollment for White home visiting clients and 79% Allegheny County breastfeeding intention rate at hospital discharge. For Black home visiting clients, there is a 59% breastfeeding intention rate at time of home visiting enrollment and 61% Allegheny County intention rate at hospital discharge.

When comparing home visiting client breastfeeding intention with the Pennsylvania initiation rates by race for 2016 there is an overall Pennsylvania initiation rate of 82% for White mothers and 75% for Black mothers with a home visiting intention rate of 59% for Black mothers and a 47% intention rate for White mothers. The Allegheny County *initiation* rate is highest for White mothers but White mothers in the home visiting program have a lower breastfeeding *intention* rate than Black mothers.

Table 8. Breastfeeding Intention of We C.A.R.E., HFA, and Allegheny County, 2016

|  |  |
| --- | --- |
| **Location** | **Intention Rate** |
| **We C.A.R.E.** | 58% |
| **HFA** | 69% |
| We C.A.R.E./HFA White | 47% |
| We C.A.R.E./HFABlack | 59% |
| We C.A.R.E./HFAAsian | 71% |
| **Allegheny County** | 77% |
| White  | 79% |
| Black | 62% |
| Asian | 93% |

## Discussion

The key finding from the data is that the We C.A.R.E. and HFA breastfeeding intention rates are lower than the overall breastfeeding intention rates in Allegheny County for White, Black, and Asian mothers. The Virginia home visiting study shows those who participate in home visiting are 4.5 times more likely to breastfeed.[31] However since the We C.A.R.E. and HFA breastfeeding intention data was not compared with a control group of women in Allegheny County who did not participate in home visiting, the impact of home visiting on breastfeeding intention for We C.A.R.E. and HFA mothers is not known.

A second finding is that the breastfeeding intention rate for HFA mothers (69%) is 11% higher than the breastfeeding intention rate for We C.A.R.E. mothers (58%). This is an unexpected finding since the focus of the HFA program is on parents who are single, low-income, with childhood history of adverse experiences, and issues related to substance abuse, mental health issues, and/or domestic violence. One may think that women who experience adverse life events would have low breastfeeding rates since the literature shows low breastfeeding rates for single parents and low-income mothers. However, that does not appear to be true for participants in some breastfeeding-focused programs such as HFA. In addition, there is evidence that for sexual abuse survivors, they may have a higher *intention* and *initiation* rateof breastfeeding due in part to the healing and affirming nature of breastfeeding.[54-55]

A third finding is that the demographic variables of education, marital status, and smoking status for home visiting clients is consistent with the literature that shows those with higher education, more support, and non-smokers have higher breastfeeding rates.[22,29-32,36,38,41-42] Mothers who enroll in We C.A.R.E. and HFA may be attracted to the program because they need support in one or more areas of their lives, including furthering their education, and smoking cessation. When woman are supported to improve their lives, the skills and empowerment from past successes can help build capacity to accomplish current and future goals, including breastfeeding.

To fully understand why women intend to breastfeed, but do not initiate will require further research. Interviewing women to understand why they did not initiate will inform future efforts to increase breastfeeding initiation. As documentation of client information improves, including data on women who enroll in home visiting who do not intend to breastfeed but initiate after birth should be included. Asking women about breastfeeding *intention* during program enrollment (if pregnant) and asking breastfeeding *intention* at delivery will better show the impact of home visiting on breastfeeding *intention* and *initiation*.

Breastfeeding intention is important because those who intend to breastfeed before delivery will likely try breastfeeding; whereas, those who do not intend to breastfeed after birth will likely not try breastfeeding at all. Providing women with the support and knowledge they need early in pregnancy to prepare for breastfeeding will lead to better *intention* and *initiation* outcomes.

### LIMITATIONS

Ideally, in addition to breastfeeding *intention*, breastfeeding *initiation* and duration of We C.A.R.E. and HFA home visiting clients would have been analyzed. Because of poor documentation in Go Beyond for initiation and duration, the raw data that was cleaned for missing information resulted in a small number of complete cases that would not provide enough significant information to be included in this project. The findings are intended for the home visiting programs to use for quality improvement. Since Go Beyond was launched in 2015, this may account for some incomplete data as the department learned the new system.

Because the HFA program has been around the least amount of time, and factoring in missing data, there is not enough data to stratify each of the characteristics by program; therefore, it cannot be determined if the program in which a client is enrolled has an impact. Between 2015-2017 HFA only served families residing in Braddock, McKeesport, Clairton, or Homestead. In 2018 HFA began serving anyone in Allegheny County who qualifies, which will lead to more data to stratify by program.

Another contributor to limited data on breastfeeding outcomes is clients who are lost to follow up. Clients that are lost to follow up are ones who the home visitor is unable to contact, and the feeding plan is unknown. This contributes to a low n for statistical tests. In the future, using birth certificate and hospital records to complete information on home visiting clients and their breastfeeding outcomes will increase the quality of data.

There are some limitations to the demographic data presented. Education, marital status, and smoking status are asked when a client is enrolled and may not be updated if the status of these variables change. This can lead to under and over reporting.

Ideas to consider moving forward include continuously monitoring data to ensure collection methods match what the organization wants to measure. Updating modifiable variables such as education, marital status, and smoking status when they change will increase data quality. Developing a system to code notes in the charts related to breastfeeding will help inform future research on breastfeeding intentions and outcomes for home visiting clients.

In 2018, there were two home visitors who attended Certified Lactation Counselor training. Analyzing the client breastfeeding *intention* and *initiation* rates from before and after the home visitors attended the CLC training would be an additional way to measure the impact of home visiting on breastfeeding rates.

### CONCLUSION

This project aimed to explore breastfeeding intention of the We C.A.R.E. and Healthy Families America home visiting clients enrolled in the program between 2015-2017 while looking at factors influencing breastfeeding.

The full impact of the We C.A.R.E. and HFA home visiting programs on breastfeeding *intention* and *initiation* cannot be determined at this time. To fully understand the role these home visiting programs have on increasing breastfeeding *intention* among expecting mothers and how likely pregnant mothers enrolled in home visiting are to *initiate* breastfeeding requires more research. Collecting breastfeeding *intention* data on a national level will help inform future research and assist in the understanding of *initiation* and duration rates.

Home visiting programs continue to be funded because of the impact they have on many aspects of families’ lives, including breastfeeding. The literature shows that support by family, medical providers, home visitors, and organizations increase breastfeeding rates.

Breastfeeding rates in the United States are lower than the WHO recommendations of exclusive breastfeeding for the first six months of life. Breastfeeding is important because it not only provides nutrition for growing infants, it provides long-term health benefits for infants and mothers. Increasing breastfeeding rates will improve the lifelong health of mothers and infants and help set a precedent in families for future generations of mothers to breastfeed.

bibliography

1. Eidelman A, Schanler R., *Breastfeeding and the use of human milk.* Pediatrics, 2012. **129**(3): p. e827-41.

2. World Health Organization. *Breastfeeding*. Maternal, newborn, child and adolescent health 2018 [cited 2018 July 5, 2018]; Available from: <http://www.who.int/maternal_child_adolescent/topics/newborn/nutrition/breastfeeding/en/>.

3. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention (CDC). *Nutrition definitions*. 2018 May 7, 2018 [cited 2018 November 6]; Available from: <https://www.cdc.gov/nutrition/infantandtoddlernutrition/definitions.html>.

4. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention (CDC). *Nutrition Recommendations and Benefits*. 2018 [cited 2018 October 4]; Available from: <https://www.cdc.gov/nutrition/infantandtoddlernutrition/breastfeeding/recommendations-benefits.html>

5. Office on Women’s Health. *Making the Decision to Breastfeed*. 2018 August 27, 2018 [cited 2018 October 4]; Available from: <https://www.womenshealth.gov/breastfeeding/making-decision-breastfeed>.

6. Chung M, et al., *Tufts-New England Medical Center Evidence-based Practice Center. Breastfeeding and maternal and infant health outcomes in developed countries.* Annals of Internal Medicine, 2008: p. 565-582.

7. Collaborative Group on Hormonal Factors in Breast Cancer, *Breast cancer and breastfeeding: collaborative reanalysis of individual data from 47 epidemiological studies in 30 countries, including 50302 women with breast cancer and 96973 women without the disease.* Lancet, 2002: p. 187-95.

8. Ip S, et al., *A summary of the Agency for Healthcare Research and Quality’s evidence report on breastfeeding in developed countries.* Breastfeeding Medicine, 2009.

9. Lipworth L, Bailey LR, and Trichopoulos D, *History of breast-feeding in relation to breast cancer risk: a review of the epidemiologic literature.* National Cancer Institute, 2000: p. 302-312.

10. Stuebe AM, et al., *Lactation and incidence of premenopausal breast cancer: a longitudinal study.* Archives of Internal Medicine, 2009: p. 1364-1371.

11. Office of Disease Prevention and Health Promotion. *Healthy People 2020*. 2018 [cited 2018 July 5]; Available from: <http://www.healthypeople.gov/2020/topics->­‐objectives/topic/maternal-­‐ infant-­‐and-­‐child-­‐health/

objectives'.

12. Allegheny County Health Department (ACHD). *Allegheny County Community Indicators*. 2018 [cited 2018 August 20]; Available from: <https://www.alleghenycounty.us/Health-Department/Resources/Data-and-Reporting/Chronic-Disease-Epidemiology/Allegheny-County-Community-Indicators.aspx>.

13. U. S. Department of Health and Human Services, Centers for Disease Control and Prevention, *Breastfeeding Report Card* 2016.

14. U. S. Department of Health and Human Services, Centers for Disease Control and Prevention, *Racial and Geographic Differences in Breastfeeding- United States, 2011-2015*, in *Morbidity and Mortality Weekly Report*. 2017. p. 723-727.

15. The Academy of Lactation Policy and Practice. *The CLC-Certified Lactation Counselor*. 2018 [cited 2018 October 4]; Available from: <https://www.alpp.org/certifications/certifications-clc>

16. International Board of Lactation Consultant Examiners. *IBCLC Information*. 2018 [cited 2018 October 4]; Available from: <https://iblce.org/about-iblce/vision-and-mission/>

17. Duffee JH, et al., *Early Childhood Home Visiting.* Pediatrics, 2017. **140**(3).

18. Allegheny County Health Department. *Maternal and Child Health*. 2018 [cited 2018 July 9].

19. Florida State University. *PHB Research Basis*. 2018 [cited 2018 July 8].

20. Dewey K, *Maternal and Fetal Stress Are Associated with Impaired Lactogenesis in Humans.* The Journal of Nutrition 2001. **131**(11): p. 3012S-3015S.

21. Chapman DJ and Perez-Escamilla R, *US National Breastfeeding Monitoring and Surveillance: Current Status and Recommendations.* Journal of Human Lactation, 2009. **25**(2): p. 139-150.

22. American Academy of Pediatrics. *Infant Food and Feeding*. 2018 [cited 2018 October 4]; Available from: <https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/HALF-Implementation-Guide/Age-Specific-Content/Pages/Infant-Food-and-Feeding.aspx>.

23. Allegheny County Health Department (ACHD), *Health Equity Brief Maternal and Child Health in Allegheny County*. 2018.

24. Pennsylvania Department of Health, *Pennsylvania Breastfeeding Initiation Rate by Race/Ethnic Groups, 2013-2016*. 2018.

25. Pennsylvania Department of Health, *Percent of Live Births to Mothers who Breastfed by County Pennsylvvania Resident Occurances, 2013*.

26. Chertok L, et al., *Intent to Breastfeed: A Population-Based Perspective.* Breastfeeding Medicine, 2011. **6**(3).

27. Annie Casey Foundation, *Kids Count data center*. 2018.

28. Ohio Department of Health, *Predicting Family Engagement in Home Visiting Programs*. 2017.

29. Sipsma H, et al., *Breastfeeding Intentions Among Pregnant Adolescents and Young Adults and Their Partners.* Breastfeeding Medicine, 2013. **8**(4): p. 374-380.

30. Kornides M and Kitsantas P, *Evaluation of breastfeeding promotion, support, and knowledge of benefits on breastfeeding outcomes.* Journal of Child Health Care, 2013. **17**(3): p. 264-273.

31. Shah M and Austin K, *Do Home Visiting Services Received During Pregnancy Improve Birth Outcomes? Findings from Virginia PRAMS 2007–2008.* Public Health Nursing, 2014. **31**(5): p. 405-413.

32. Karp S, et al., *Breastfeeding Initiation in the Context of a Home Intervention to Promote Better Birth Outcomes.* Breastfeeding Medicine. **8**(4): p. 381-387.

33. U. S. Department of Health and Human Services, Centers for Disease Control and Prevention (CDC). *Tobacco Use and Pregnancy*. 2018 June 28, 2018 [cited 2018 July 27]; Available from: [https://www.cdc.gov/reproductivehealth/maternalinfanthealth/tobaccousepregnancy/index.htm.](https://www.cdc.gov/reproductivehealth/maternalinfanthealth/tobaccousepregnancy/index.htm)

34. Collins B, et al., *Longer Previous Smoking Abstinence Relates to Successful Breastfeeding Initiation Among Underserved Smokers.* Breastfeeding Medicine, 2011. **6**(6): p. 385-391.

35. Joeseph H, et al., *The Influence of Smoking on Breast feeding Among Women Who Quit Smoking During Pregnancy.* Nicotene and Tobacco Research 2017. **19**(5): p. 652-655.

36. McKinney C, et al., *Racial and Ethnic Differences in Breastfeeding.* Pediatrics, 2016. **138**(2).

37. Hundalani S, et al., *Breastfeeding Among Inner-City Women- From Intention Before Delivery to Breastfeeding at Hospital Discharge.* Breastfeeding Medicine, 2013. **8**(1).

38. Nommsen-Rivers L, et al., *Comfort with the Idea of Formula Feeding Helps Explain Ethnic Disparity in Breastfeeding Intentions Among Expectant First-Time Mothers.* Breastfeeding Medicine, 2010. **5**(1): p. 25-33.

39. Mickens A, et al., *Peer Support and Breastfeeding Intentions Among Black WIC Participants* Journal of Human Lactation, 2009. **25**(2): p. 157-162.

40. Asiodu I, et al., *Infant Feeding Decision-Making and the Influences of Social Support Persons among First-Time African American Mothers.* Maternal Child Health, 2017. **21**(4): p. 863-872.

41. Jefferson U, *Infant Feeding Attitudes and Breastfeeding Intentions of Black College Students.* Western Journal of Nursing Research, 2014. **36**(10): p. 1338-1356.

42. Persad M and Mensinger J, *Maternal Breastfeeding Attitudes: Association with Breastfeeding Intent and Socio-demographics Among Urban Primiparas.* Journal of Community Health, 2008. **33**(2): p. 53-60.

43. American Academy of Pediatrics, *2015 Award Winners*, in *AAP News*. 2015.

44. National Home Visiting Resource Center, *Home Visiting Yearbook*. 2017.

45. National Home Visiting Resource Center, *State Profile- Pennsylvania* 2016.

46. Healthy Families America. *History*. 2018 [cited 2018 July 12]; Available from: <http://www.healthyfamiliesamerica.org/history/>.

47. Healthy Families America. *The Healthy Families America Strategy*. 2018 [cited 2018 July 12]; Available from: <http://www.healthyfamiliesamerica.org/the-hfa-strategy-1/>.

48. Healthy Families America, *Impacts on Children*. 2018.

49. Healthy Families America, *Impacts on Parents & Families*. 2018.

50. Healthy Families America, *Impacts on Communities* 2018.

51. Health Resources and Services Administration. *Title V Maternal and Child Health Services Block Grant Program*. 2018 [cited 2018 July 12]; Available from: <https://mchb.hrsa.gov/maternal-child-health-initiatives/title-v-maternal-and-child-health-services-block-grant-program>.

52. Florida State University Center for Prevention & Early Intervention Policy, *Partners for a Healthy Baby*. 3 ed. 2010.

53. Rosenbauer J, et al., *Early Nutrition and Risk of Type 1 Diabetes Mellitus - A Nationwide Case-control Study in Preschool Children.* Experimental and Clinical Endocrinology and Diabetes, 2007: p. 502-508.

54. Benedict, M., Paine, L., & Paine, L. *Long-term effects of child sexual abuse on functioning in pregnancy and pregnancy outcome.* Final report, National Center on Child Abuse and Neglect. Washington DC: National Center on Child Abuse and Neglect, 1994: p. 659-670.

55. Prentice, J.C., Lu, M.C., Lange, L. et al. The association between reported childhood sexual abuse and breastfeeding initiation. *J Hum Lact* 2002; 18:219-26.