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Improving Access to Medical Lactation Support and Counseling: Building the Case for Medicaid Reimbursement

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Abstract *Objective* While the Affordable Care Act improves access to lactation services for many women across the US, low-income mothers in states without Medicaid expansion lack coverage for lactation support. As these states consider individual Medicaid reimbursement policies, the availability, effectiveness, and cost-benefit of lactation services must be evaluated. We conducted such an analysis for low-income mothers in North Carolina (NC), providing a model for other states. *Methods* First, we analyzed the distribution of NC International Board Certified Lactation Consultants (IBCLCs) and county-level breastfeeding rates among low-income infants. Logistic regression was used to examine the association between IBCLC density and 6-week breastfeeding duration. Finally, state advocates collaborated on a cost-benefit analysis of Medicaid coverage of IBCLCs. *Results* Maps of the NC breastfeeding support landscape indicate that IBCLCs are available to provide services to low-income women across the state. Compared to counties with no IBCLCs, those with high IBCLC density were found to have a 6-week breastfeeding prevalence ratio of 1.20 (95% CI 1.12, 1.28). Medicaid reimbursement of IBCLCs showed an estimated annual cost savings of $2.33 million. *Conclusions for Practice* In one state without Medicaid expansion, we found that breastfeeding support resources are available across the state, high density IBCLC support is associated with increased breastfeeding by low-income mothers, and services are cost-effective. Our model for Medicaid reimbursement in NC provides a framework for states to improve equity in access to optimal lactation support.

Keywords Breast feeding · Lactation · Medicaid reimbursement · IBCLC

Significance

Equity in access to lactation support and counseling is important for reducing disparities in breastfeeding rates; however, low-income mothers in states without Medicaid expansion lack coverage for these lactation services. In one state without Medicaid expansion, North Carolina, we found that breastfeeding support resources are available regionally, higher density IBCLC availability is associated with increased breastfeeding among low-income infants, and services are cost-effective. Our research provides a framework for states to assemble and analyze data in support of Medicaid reimbursement for any form of lactation support and counseling.

Introduction

The numerous health benefits of breastfeeding for mothers and infants are well documented (Chowdhury et al. 2015; Horta et al. 2015; Ip et al. 2009). As a result of these benefits, leading health organizations recommend 6 months of exclusive breastfeeding with continued breastfeeding for 1 year or longer (American Academy of Family Physicians 2014; American Academy of Pediatrics Section on

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Breastfeeding 2012; The American College of Obstetricians and Gynecologists 2016). The breastfeeding exclusivity and duration rates of low-income women fall approximately 28 % below the general population and 28–43 % below Healthy People 2020 targets (CDC 2012; US Department of Health and Human Services 2012). Breastfeeding initiation remains high in this population, indicating women's desire to breastfeed; however, many mothers fail to reach their breastfeeding goals due to multiple barriers, including early problems with breast pain, milk production, and infant latching (Chantry 2011; Hurley et al. 2008; US Department of Health and Human Services 2011). These barriers could be effectively reduced by improving access to optimal lactation support (Bonuck et al. 2014; Britton et al. 2007; Witt et al. 2012).

Section 2713 of the Affordable Care Act (ACA) stipulates that private insurers and expanded Medicaid plans cover the cost of "comprehensive lactation support and counseling by a trained provider during pregnancy and/or in the postpartum period" (Health Resources and Services Administration 2012). Interpretation of this provision varies by insurance company, as the ACA fails to define a specific provider of lactation services. The landscape of breastfeeding support is complex, encompassing peer counselors, physicians, and nurses; however, *The Surgeon General's Call to Action to Support Breastfeeding* describes International Board Certified Lactation Consultants (IBCLCs) as the "only health care professionals certified in lactation care" (US Department of Health and Human Services 2011). The 20 states without Medicaid expansion are not required to cover these professional lactation services (Henry J. Kaiser Family Foundation 2016), and consistent coverage of IBCLC services is lacking even among states that have accepted Medicaid expansion (Herold and Bonuck 2015); therefore, low-income mothers across the country may lack critical breastfeeding support.

In North Carolina (NC) at the time of this research, Medicaid provided no reimbursement for coordinated lactation support and counseling during prenatal, postpartum, and infant care as recommended by the US Preventive Services Task Force (USPSTF 2008). The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) peer counselors improve access to breastfeeding education and support for many low-income women affected by this lack of coverage; however, peer counselors have a limited scope of practice, leaving mothers on Medicaid without access to the medical lactation services afforded to women with private insurance. Full Medicaid reimbursement for both inpatient and outpatient lactation services delivered by IBCLCs could improve low-income women's access to high-quality health care and reduce breastfeeding disparities. In 2014, the NC Child Fatality Task Force recommended Medicaid reimbursement of medical lactation services, advocating for the role of the IBCLC as a rigorously trained and credentialed provider (North Carolina Child Fatality Task Force 2014). As of January 2016, NC Medicaid, supported by the Child Fatality Task Force, is advancing policy to address this recommendation.

As individual states take similar steps to improve equity in access to lactation support through Medicaid reimbursement, research is needed to explore the availability of lactation providers, their association with breastfeeding outcomes, and the cost-effectiveness of this model. In NC, we hypothesized that (1) an adequate workforce of IBCLCs exists across the state to justify Medicaid reimbursement; (2) geographic regions with a higher density of IBCLCs will have a higher prevalence of breastfeeding at 6 weeks among low-income infants; and (3) medicaid reimbursement of medical lactation services delivered by IBCLCs is a cost-effective means of improving breastfeeding rates and meeting public health goals. We used spatial analysis, logistic regression, and cost-benefit analysis to build the foundation for Medicaid reimbursement of IBCLCs in NC, providing a model for other states.

Methods

Three types of geospatial data were used to explore geographic variation in lactation support and breastfeeding outcomes: (1) locations of maternity centers, WIC agencies, and IBCLCs; (2) county-level breastfeeding data for low-income infants; and (3) state health statistics.

We obtained publicly available geographic coordinates for the 88 maternity centers (CDC 2009) and 86 WIC agencies (WIC 2010a) in NC. Zip code locations of de-identified IBCLCs were accessed from the credentialing organization, the International Board of Lactation Consultant Examiners (IBLCE). Next, we aggregated the number of IBCLCs by county. County-level live birth data from 2010 were acquired from the NC State Center for Health Statistics (State Center for Health Statistics 2011). Using these data, we created our main independent variable for IBCLC density: county-level IBCLCs per 1000 live births. This variable was validated using the state-level mean IBCLC density reported by the Centers for Disease Control and Prevention (CDC) for NC in 2010 (CDC 2013). Our calculated IBCLC density of 4.69 IBCLCs per 1000 live births closely approximated the reported level of 4.63 per 1000 (CDC 2013).

De-identified data from the Pediatric Nutrition Surveillance System (PedNSS) were requested from the Nutrition Services Branch of the NC Division of Public Health. PedNSS is a database compiling surveillance data collected by the CDC for public health clinic visits by low-income infants and children (age 0–5 years) who participate in federally funded maternal and child health programs.

We obtained the most recently available data for 248,223 unique infants in the reporting period from January 1 though December 31 of 2010. Due to the short breastfeeding duration in this population, we analyzed the prevalence of any breastfeeding at 6 weeks as our breastfeeding outcome of interest.

We also obtained 2010 census data for the percentage of individuals from each NC county who reside in an urban area, which includes both "Urbanized Areas" of 50,000 or more people and "Urban Clusters" of at least 2500 and less than 50,000 people (US Census Bureau 2010). These data allowed us to explore regional differences in county-level IBCLC density and breastfeeding outcomes by county urbanity.

Spatial Analysis of the Breastfeeding Landscape

We created two maps to illustrate regional variation in IBCLC availability. First, kernel density estimation (KDE) was used to produce hotspot maps to identify areas of high IBCLC concentrations across the state. KDE calculates the density of point features in a predefined neighborhood around each feature, converting discrete points into a more diffuse representation of the spread of the feature across the area. We applied this tool to calculate the density of IBCLCs per 1000 live births around the midpoint of each county, color-coding varying levels of IBCLC concentration. Geographic coordinates of NC maternity centers and WIC clinics were mapped onto these IBCLC hotspot maps to identify the distribution of other breastfeeding resources across the state. Next, a choropleth map of county-level 6-week any breastfeeding prevalence among PedNSS infants was overlaid with proportionally sized symbols representing county-level density of IBCLCs per 1000 live births. ArcGIS 10.1 GIS software (Esri, Redlands, CA) was used to perform these analyses and create both maps.

Logistic Regression of IBCLC Density and Breastfeeding Outcomes

We fit logistic regression models in SAS version 9.4 (Cary, NC) to estimate the association between IBCLC density and any breastfeeding at 6 weeks among low-income infants. The county-level exposure was stratified at the median creating the following three categories: counties with 0 IBCLCs, counties with >0 and ≤3.7 IBCLCs per 1000 live births, and counties with >3.7 per 1000. From a policy perspective, this three-level categorization reflects our interest in quantifying the difference in breastfeeding outcomes for low-income infants with no available IBCLCs in their county and for those residing in counties with a density of IBCLCs below and above the median.

Potential confounding was explored for the following variables: infant race/ethnicity; birthweight; living in a household that receives Food Stamps; the number of people in the infant's household; and county urbanity. To reduce bias, covariates were included as confounders in the model if they (1) were shown to address residual confounding in the literature and (2) resulted in a change in the exposure-outcome effect measure estimate by 10% or greater. To assess effect measure modification, we included covariates if there was (1) evidence of heterogeneity in the exposure-outcome relationship when stratified by the covariate and (2) an LRT p-value <0.05 when comparing the model with and without the interaction term.

Cost-Benefit Analysis of Medical Lactation Services

We collaborated with state advocates to compare the cost of reimbursing medical lactation services with the savings projected from differential rates of infant illnesses in breastfeeding and formula feeding populations using methodology presented by Bartick and Reinhold (2010), which has been similarly applied in Louisiana (Ma et al. 2013). Specifically, gastroenteritis, necrotizing enterocolitis, and lower respiratory tract infections were used to quantify the cost savings from diseases averted (Bartick and Reinhold 2010; Ma et al. 2013), assuming an increase in breastfeeding from the current NC Medicaid breastfeeding rates to Healthy People 2020 goals (US Department of Health and Human Services 2012). While the benefits of breastfeeding extend well beyond these three infant illnesses, we limited our analysis to provide conservative estimates. Additionally, we applied estimates from an Agency for Healthcare Research and Quality report (Ip et al. 2009) to the NC Medicaid population to calculate the number of averted infant deaths associated with meeting the Healthy People 2020 breastfeeding goals.

Breastfeeding rates for Medicaid mothers were estimated by substituting publicly available NC WIC breastfeeding rates (WIC 2010b), since approximately 72% of NC mothers on Medicaid also receive WIC services (State Center for Health Statistics 2013). We estimated disease rates for Medicaid diagnostic codes from the research (Bartick and Reinhold 2010; Ma et al. 2013) and applied them to the total number of NC Medicaid births obtained from the State Center for Health Statistics (State Center for Health Statistics 2011).

The cost of medical lactation support services was estimated at approximately $100 using reimbursement rates at a typical local outpatient facility. We assessed the validity of these rates by comparing them to a national estimation of the median cost of IBCLC services (Gutowski et al. 2014).

To estimate the overall number of IBCLC visits needed, we hypothesized that most women would benefit from

Table 1 Baseline characteristics of North Carolina Pediatric Nutrition Surveillance System (PedNSS) infants ≥6 weeks of age between January 1 and December 31 of 2010

	County-level IBCLC density[a]			
	0 (n = 1811), no. (%)	>0 and ≥3.7 (n = 4389), no. (%)	>3.7 (n = 5138), no. (%)	Total (n = 11,338), no. (%)
Any breastfeeding at 6 weeks				
No	1120 (61.8)	2451 (55.8)	2789 (54.3)	6360 (56.1)
Yes	691 (38.2)	1938 (44.2)	2349 (45.7)	4978 (43.9)
Infant race/ethnicity				
Non-Hispanic White	1013 (55.9)	2138 (48.7)	1814 (35.3)	4965 (43.8)
Non-Hispanic Black	438 (24.2)	1181 (26.9)	1750 (34.1)	3369 (29.7)
Hispanic	301 (16.6)	900 (20.5)	1375 (26.8)	2576 (22.7)
Other	59 (3.3)	170 (3.9)	199 (3.9)	428 (3.8)
Birthweight				
Normal/high	1537 (84.9)	3558 (81.1)	4200 (81.7)	9295 (82.0)
Low	274 (15.1)	831 (18.9)	938 (18.3)	2043 (18.0)
Receives food stamps				
No	1079 (60.8)	3345 (77.0)	3718 (72.8)	8142 (72.5)
Yes	697 (39.3)	1001 (23.0)	1393 (27.3)	3091 (27.5)
Household no. [mean (SD)]	4.2 (1.5)	4.0 (1.5)	3.9 (1.5)	4.0 (1.5)
County % urban [mean (SD)]	37.0 (22.6)	66.8 (22.3)	82.6 (21.3)	69.2 (27.0)

[a]IBCLC density is calculated per 1000 live births

lactation services and that the majority of difficulties would be fairly rapidly resolved. While the research on this issue is sparse, several studies were considered in making these projections. Chantry reported most women experience breastfeeding problems, with 92% experiencing problems at 3 days and 83% experiencing problems at 1 week postpartum (Chantry 2011). Studies have documented improvement in breastfeeding rates using a protocol whereby all breastfeeding mothers received a single lactation consult at their first pediatric visit, regardless of breastfeeding difficulties (Su et al. 2007; Witt et al. 2012). Based on these limited data, state advocates projected that 75% of Medicaid mothers would require medical lactation therapy, requiring an average of 1.3 visits. All cost-benefit analysis calculations were completed using Microsoft Excel.

Results

We obtained data on 11,338 PedNSS infants for our analysis of county-level IBCLC density and any breastfeeding at 6 weeks (Table 1). The outcome of interest, breastfeeding at 6 weeks, was common across all levels of the exposure strata. This population was approximately half non-Hispanic White, one-third non-Hispanic Black, and one-fifth Hispanic, and the majority were not breastfeeding at 6 weeks. The proportion of infants who are non-Hispanic White was larger in counties with lower IBCLC density, and the proportion non-Hispanic Black or Hispanic was larger in counties with higher IBCLC density.

Eighteen percent of infants were born at low birthweight (<2500 g) and the prevalence of normal birthweight was similar across counties with differing IBCLC density. Almost one-third of infants lived in households receiving Food Stamps, a proxy for higher poverty settings. This proportion of infants receiving Food Stamps was larger among households in counties with 0 IBCLCs, which also had a slightly higher mean number of household members. Average household size in this population was 4.0 members, and households were drawn from counties that were nearly 70% urban on average. The percentage of the county considered urban increased with increasing IBCLC density, from 37% in counties with 0 IBCLCs to 82.6% in counties with >3.7 IBCLCs per 1000 live births.

Spatial Analysis

Figure 1 uses hotspots, indicated by warmer tones, to represent areas with higher IBCLC density. The distribution of maternity centers and WIC clinics is also shown. While IBCLC hotspots appear to be most concentrated in approximately five regions, the distribution of hotspots across the state indicates a regional availability of IBCLC services that is relatively well aligned with maternity center locations. IBCLCs are present in only approximately 18 of 86 (21%) NC WIC agencies (WIC 2010a), although the exact number of WIC-based peer counselors and IBCLCs was not publicly available.

Figure 2 illustrates the prevalence of any breastfeeding at 6 weeks among low-income infants and IBCLC availability

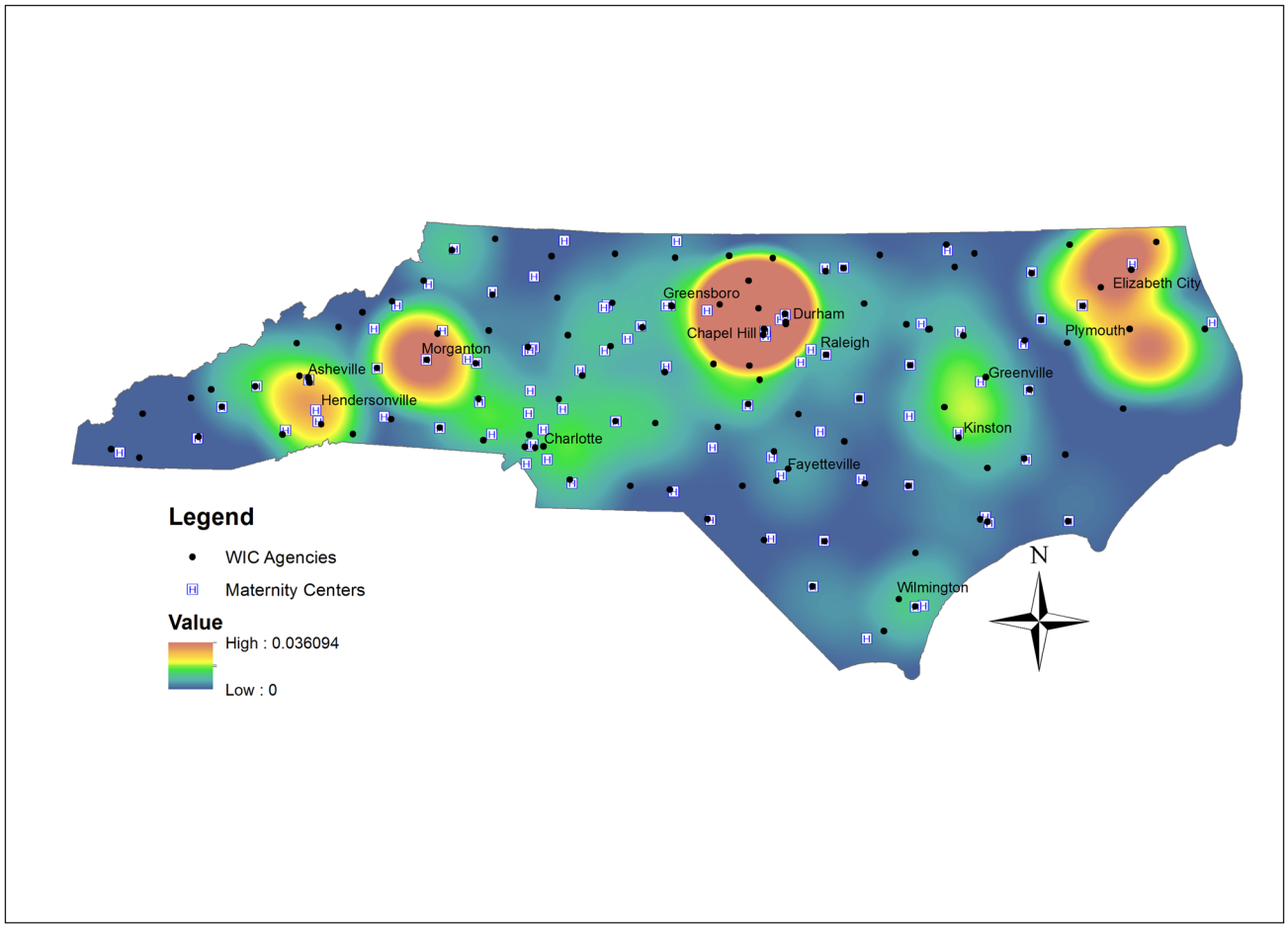

Fig. 1 International Board Certified Lactation Consultant (IBCLC) density hotspots, maternity centers, and WIC agencies

at the county level. The percentage of PedNSS infants who were breastfeeding at 6 weeks was lower in the eastern coastal plain and southern Piedmont counties than in the highly populated central and western counties of the state. In 2010, a total of 574 IBCLCs were available across the state, with the majority located in the three most populous counties in the state. Once adjusted for the number of annual live births, the county-level IBCLC density appeared larger for some of the coastal and western counties where IBCLCs serve a smaller population of mother-infant dyads. While gaps in availability were observed in 47 counties, the distribution of IBCLCs across the remaining 53 counties indicates that these providers are available regionally to provide coverage across the state.

IBCLC Density and Breastfeeding Rates

As the density of IBCLCs increases, the crude prevalence of any breastfeeding at 6 weeks trends upward (Cochran–Armitage trend $p < 0.001$). Using counties with no IBCLCs as a reference, counties with low IBCLC density have a prevalence ratio of 1.16 (95% CI 1.08, 1.24) and infants residing in counties with high IBCLC density have a breastfeeding prevalence ratio of 1.20 (95% CI 1.12, 1.28) (Table 2).

While no covariate met a priori criteria for confounding, county urbanity appeared to be a strong effect measure modifier in our data. After stratifying by level of urbanity in the county of infant residence, the association between IBCLC density and any breastfeeding at 6 weeks was no longer strictly monotonically increasing. The strongest effect was seen among infants who live in a highly urban county (94% urban) with >0 and ≤3.7 IBCLCs per 1000 live births. In general, higher breastfeeding rates were associated with having more than zero IBCLCs in an infant's county of residence (Table 2).

IBCLC Cost-Benefit Analysis

On March 26, 2014, we collaborated with state advocates to present a cost-benefit analysis to the Child Fatality Task Force, a legislative study commission created to examine the causes of child death and make recommendations to the Governor and the General Assembly. This analysis found

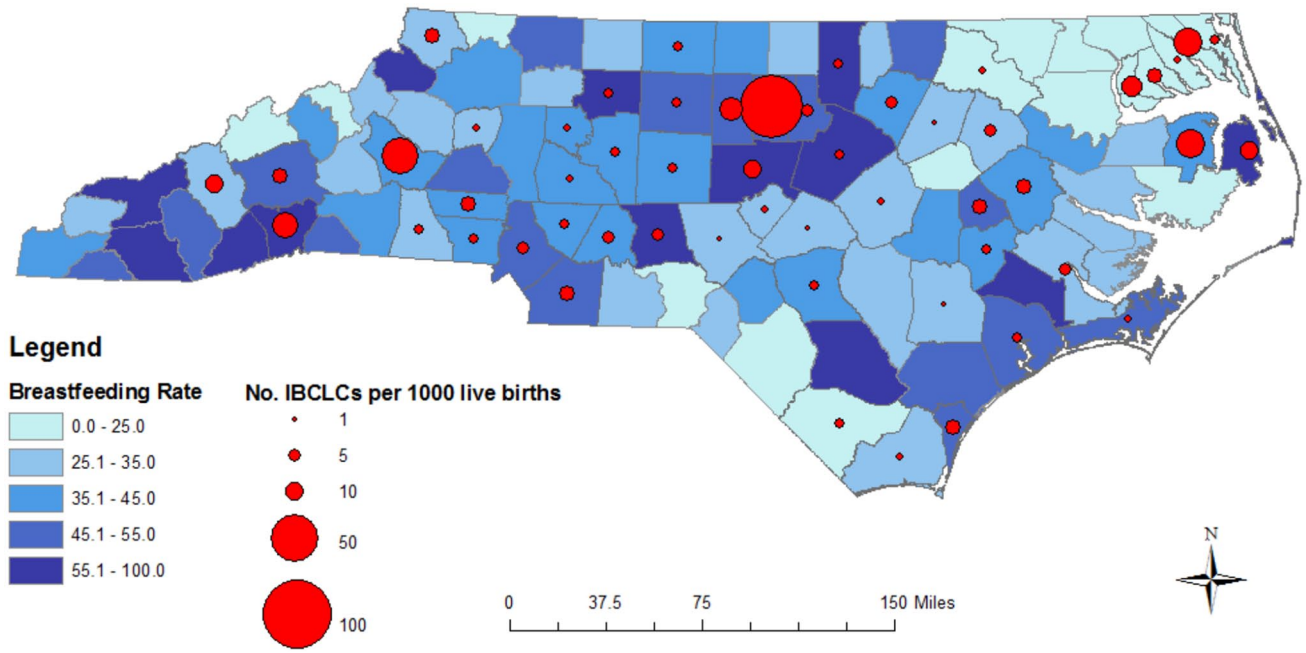

Fig. 2 County-level breastfeeding rates for 2010 Pediatric Nutrition Surveillance System (PedNSS) infants at 6 weeks and International Board Certified Lactation Consultant (IBCLC) density

Table 2 Comparison of crude and stratified prevalence ratios of any breastfeeding at 6 weeks among North Carolina Pediatric Nutrition Surveillance System infants by county-level International Board Certified Lactation Consultant (IBCLC) density

Prevalence ratio of any breastfeeding (95% CI)	County-level IBCLC density[a]		
	0	>0 and ≤3.7	>3.7
Crude estimate	1.00	1.16 (1.08, 1.24)	1.20 (1.12, 1.28)
Estimate stratified by county urbanity			
52%	1.00	0.97 (0.89, 1.06)	1.10 (1.01, 1.21)
72%	1.00	1.17 (1.04, 1.31)	1.15 (1.02, 1.29)
94%	1.00	1.44 (1.22, 1.70)	1.20 (1.02, 1.41)

CI confidence interval

[a]IBCLC density is calculated per 1000 live births

that if the NC Medicaid population, comprising 61,200 births, increased breastfeeding rates from the current level to those recommended by Healthy People 2020, an estimated 500 cases of lower respiratory tract infection, 6000 cases of gastroenteritis and 10 cases of necrotizing enterocolitis would be averted annually. Cost savings for averted cases of these three diseases alone would be $7.1 million. Beyond these three common diagnostic categories, numerous other conditions would also likely be averted, leading to additional savings to the Medicaid budget. Additionally, increasing NC Medicaid breastfeeding rates to Healthy People 2020 goals would prevent an estimated 14–18 infant deaths annually through averted cases of sudden infant death syndrome.

Overall, coverage of lactation support services by NC Medicaid was estimated to cost approximately $4.77 million annually. While this represents a significant expenditure, the total estimated cost savings was projected to be $2.33 million (for Cost-Benefit Analysis Rationale presented to the Child Fatality Task Force see http://bit.ly/206NBbK).

Discussion

Our findings indicate that breastfeeding support resources are available regionally across NC, IBCLC availability is associated with increased breastfeeding at 6 weeks, and services are cost-effective. Maps show that IBCLC services are relatively well aligned with maternity center locations to meet the needs of mothers on Medicaid. Our finding that the prevalence of 6-week any breastfeeding increased as county-level IBCLC density increased confirms our hypothesis that IBCLC availability is associated with improved breastfeeding prevalence. Finally, providing reimbursement for appropriate medical lactation care services for NC Medicaid infants was found to be a financially sound investment.

Hot spot and descriptive mapping demonstrate the broad availability of IBCLCs in NC, while also indicating locations of maternity centers and WIC agencies in regions farther from hot spots where IBCLC training and recruitment could be prioritized. Similar geospatial analyses have been used in NC to map the distribution of dental Medicaid providers available to provide pediatric oral health services (Kranz et al. 2014) and in California to determine hot

spots of WIC-eligible nonparticipants to improve outreach efforts (Stopka et al. 2014). Visual representations of data to highlight the association between the availability of providers and health outcomes or to identify regional disparities in access provide easily interpretable evidence to policymakers seeking to reduce differential access to health care services.

In our statistical analyses, we observed modification of the IBCLC availability and breastfeeding association by county urbanity, where the highest breastfeeding prevalence ratios were observed for infants living in highly urban counties with greater than zero IBCLCs. While several studies have found breastfeeding rates to be higher in urban versus rural counties (Flower et al. 2008; Li and Grummer-Strawn 2002; Lynch et al. 2011), one previous study found that among low-income women, those living in urban areas had a lower odds of breastfeeding initiation than those living in rural areas (Sparks 2010). While IBCLC availability does not guarantee utilization of services, our finding of higher 6-week breastfeeding prevalence in urban counties with IBCLCs present suggests that IBCLC services in more urban settings may be easier for low-income families to access, potentially as a result of public transportation or cultural norms. High IBCLC density may also be a proxy for counties with stronger breastfeeding hospital and community breastfeeding support and referral services.

The cost-benefit calculations presented by state advocates to the NC legislature were conservative in their estimates for ease of use, omitting the costs of formula, missed work, and repeat hospitalizations (Bartick 2011; Chowdhury et al. 2015; Horta et al. 2015; Rollins et al. 2016) while including only three diseases with significant potential costs to Medicaid that have been identified in previous cost-benefit models (Bartick and Reinhold 2010; Ma et al. 2013). Our calculations modeled the potential health savings associated with reaching Healthy People 2020 breastfeeding objectives, assuming that increasing access to lactation support services for low-income mothers will significantly improve breastfeeding rates. These ambitious assumptions are grounded in models used both nationally (Bartick and Reinhold 2010; Colaizy et al. 2016) and by other states (Ma et al. 2013), as well as in evidence from previous interventions showing the effectiveness of IBCLC services for increasing exclusive breastfeeding and breastfeeding intensity in low-income populations (Bonuck et al. 2014; Su et al. 2007).

A major strength of these analyses was the use of multiple data sources to provide a comprehensive justification for Medicaid reimbursement of IBCLCs that could be easily replicated in other states. We used publicly available state-level breastfeeding and demographic data from the CDC and SCHS, and we accessed de-identified IBCLC data from the credentialing organization. While the CDC discontinued PedNSS surveillance at the end of 2012, we obtained the most recently available data from 2010, as other states could access if conducting similar analyses. Maps of the breastfeeding support landscape and geographic variation in breastfeeding outcomes provide easily interpretable data for communicating with policymakers and insurance companies. Finally, cost-benefit analyses complement the public health and equity motivations for policy change with an economic rationale that may be prioritized by state legislatures weighing various reimbursement policy options.

Our findings must be interpreted within the context of our study design and available data. One limitation of these analyses is the lack of data on specific locations where IBCLCs practice, as IBLCE collects only self-reported zip code locations from IBCLCs at the time of their credentialing exam. As a result, data could potentially be missing for new IBCLCs who haven't yet registered their addresses and invalid for IBCLCs who registered their addresses but have since moved or ceased working. Additionally, IBCLCs may work in a different location from the address provided to IBLCE. We also have no data on the ethnic/racial breakdown of practicing IBCLCs. This is critically needed information as we work towards equity in the field of lactation, decreasing disparities and meeting the needs of the most vulnerable populations. Data were not available to control for potential confounders, such as mother's breastfeeding intention, education, or employment characteristics (Odom et al. 2013; Stuebe and Bonuck 2011; US Department of Health and Human Services 2011). Finally, Medicaid data were unavailable at the time of this study; therefore, we used the breastfeeding rates of WIC mothers in place of Medicaid mothers for the cost-benefit analysis. While all mothers on Medicaid are eligible for WIC services, not all utilize WIC support. It is possible that this substitution contributed to an underestimate of breastfeeding rates in our analysis, as WIC participants have been shown to have lower breastfeeding rates than eligible non-participants (Chatterji and Brooks-Gunn 2004; Jacknowitz et al. 2007).

Equity in access to lactation support and counseling is particularly important for low-income populations who are burdened with both lower breastfeeding rates and higher rates of chronic disease compared to the general population. Our research provides a framework for states to assemble and analyze data in support of Medicaid reimbursement for medical lactation services. While NC specifically targeted IBCLC reimbursement, our approach could be modified by advocacy groups in other states working toward insurance reimbursement for any form of lactation support and counseling. These analyses can be replicated in other states to advocate for consistent reimbursement policies to improve equity in access to lactation services and to reduce breastfeeding disparities.

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