In Partnership with the United Health Foundation

Quarterly Report, April 30, 2021

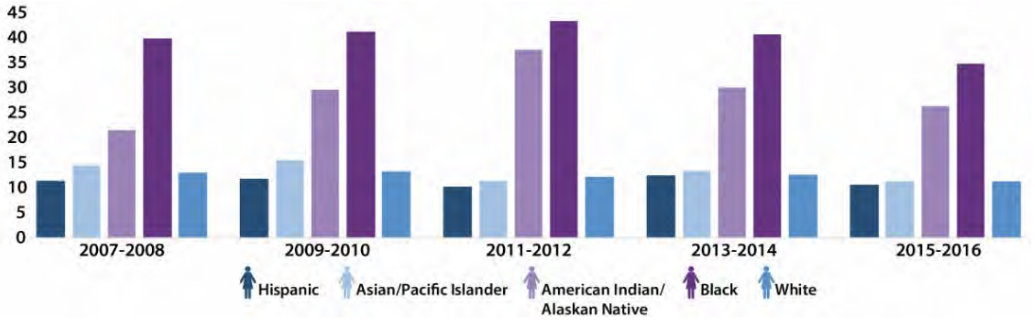
Project Summary

The pandemic resulting from the novel coronavirus forced healthcare providers to rethink and quickly reinvent the delivery of care to patients, particularly in rural settings. Fear of COVID-19 and the lack of definitive and timely information caused many patients to be no-shows at clinic appointments, and, as a result, not receive the care they needed. This posed an especially critical challenge for the maternal fetal and newborn population in the 29-county area that East Carolina University (ECU) serves. ECU, the safety net provider for 1.4 million people in eastern North Carolina, is the only source for high-risk prenatal care in the region. COVID-19 exacerbated an already dire situation for the health of expectant and new mothers in our region. Consider this:

- Co-morbidities present in eastern NC include a high rate of diabetes and hypertension.
- More than 50 percent of the women our providers see are overweight or obese.
- Of the 37 North Carolina counties along or east of the I-95 corridor, all but 10 have heart disease mortality rates higher than the national and state averages. At least 22 of those counties also have diabetes mortality rates higher than both the national and state averages.
- One in four of our mothers live in poverty; one in eight are uninsured.
- Ninety of the 100 counties in N.C. are designated as mental health provider shortage areas. Mental health specialists have been warning us about a surge in mental health and substance abuse disorders that will occur both during the pandemic and its aftermath.
- Socioeconomic factors in the region limit access to transportation, adequate nutrition and basic necessities in the maternal population.
- Of the 55 maternal deaths that occurred from 2008-2017, 38 or 69.1% were African American women.

- While eastern North Carolina has improved from having one of North Carolina's worst infant mortality rates in 2014 to the state average today, we recognize more has to be done.
- According to the World Health Organization (WHO), worldwide about 10% of pregnant women and 13% of women who have just given birth experience a mental disorder, primarily depression.

Nationally, more than 700 women a year die of complications related to pregnancy in the U.S., and two-thirds of these deaths are preventable.[1] As of 2016, the U.S. pregnancy-related mortality ratio was 16.9 per 100,000 live births.[2] However, there are significant racial disparities within this calculated statistic, as the following figure shows:



Trends in pregnancy-related mortality ratios among race from 2007-2016.[3]

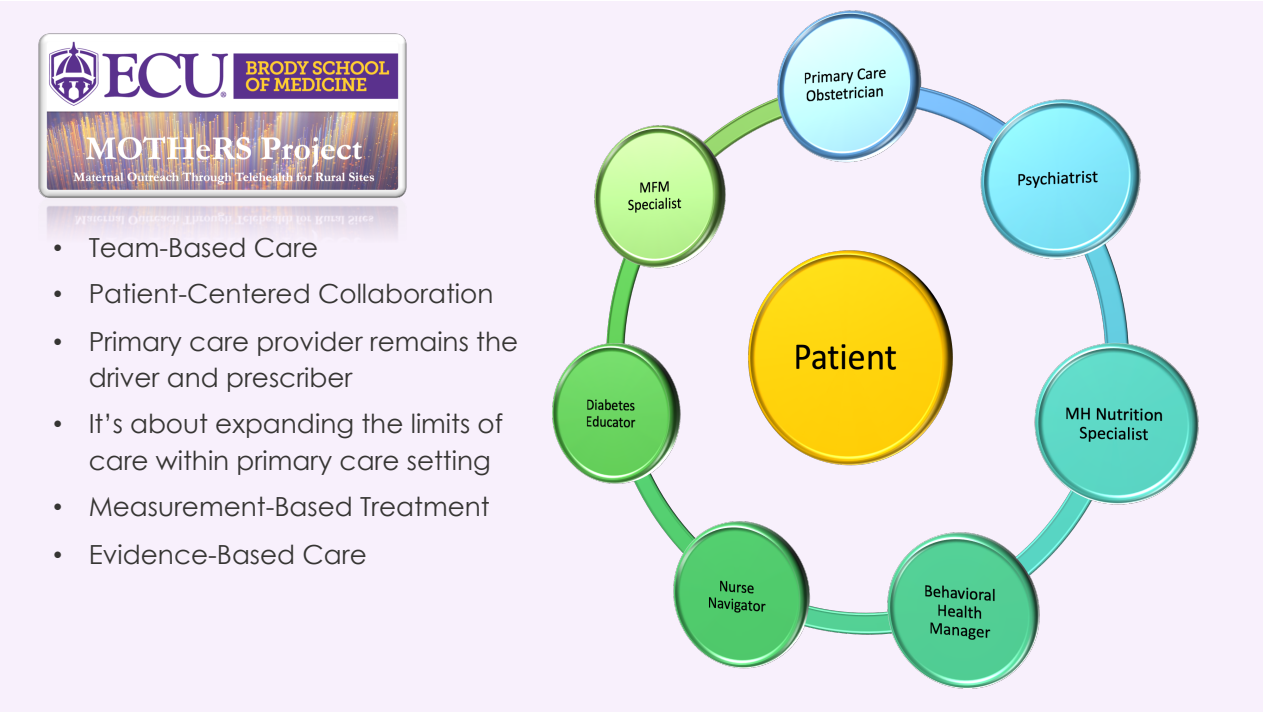
This figure demonstrates that maternal mortality disproportionately affects-black and American Indian/Alaska Native women in the U.S. Additionally, there are disparities between rural and urban populations. According to publicly available data from the U.S Centers for Disease Control and Prevention (CDC) and analyzed by *Scientific American*, rural areas had a pregnancy-related mortality ratio of 29.4 per 100,000 live births versus 18.2 in urban areas in 2015.[4]

One Solution: Outreach through Telehealth

We believe that where an expectant or new mother lives should not negatively impact her physical or mental wellbeing or that of her child. In July 2020, ECU proposed to expand NC-STeP—a statewide telepsychiatry program founded by ECU's Dr. Sy Saeed— to bring multidisciplinary care to three community-based primary care obstetric clinics in Carteret, Duplin, and Chowan counties.[5-7] The **MOTHeRS (Maternal Outreach through Telehealth for Rural Sites) Project** was funded through a generous investment from the United Health Foundation. Through this collaborative care model that encompasses patient, nurse navigator, diabetes educator, behavioral health manager, primary obstetrician, maternal fetal medicine (MFM) specialist, and psychiatrist, the MOTHeRS' Project provides much-needed support and the insights of specialty physicians to these identified practices. Telehealth consultations bring

experts to these communities, saving patients and families the time and inconvenience of travel. Such telehealth services also provide a valuable way to offer patients follow-up care after a procedure, eliminating the need for them to travel to the academic medical center in Greenville to see a specialist. The association of food insecurity and diet quality with mental health, and with poor outcomes in high-risk pregnancies, has been established. The MOTHeRS Project screens all patients at its clinical sites for food insecurity. Those who screen positive are provided a medically designed food bag, nutrition education, and are linked with existing community resources. High-risk pregnancies can exacerbate depression and anxiety, and hospitalization can further increase the stress of a high-risk pregnancy. Women hospitalized for high-risk pregnancies may therefore be at increased risk of depression and the subsequent adverse neonatal outcomes. The following components of the MOTHeRS Project address the both the physical and mental well-being of these high-risk pregnant women.

Key Components of the MOTHeRS Project Collaborative Care Model



The poster below will be presented to the Society for Nutrition Education and Behavior (SNEB)—an organization that represents the unique professional interests of nutrition educators worldwide. It outlines what MOTHeRS Project is doing to promote effective nutrition education and healthy behavior. The poster describes the process used to develop a medically-tailored emergency food bag for high-risk pregnant women identified as food insecure in the clinical setting.

MOTHeRS' Project: Acceptability of a Medically Tailored Food Bag Treating Food Insecurity in High-Risk Pregnant Patients

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Summary Statement:

- **Food insecurity (FIS)** during pregnancy is related to poor diet quality and is associated with *increased risk of pregnancy and fetal complications.*
- Current interventions may be missing some women with FIS at critical points during pregnancy
  - Data from FNS suggests less than 50% of all eligible women participate in the WIC program
  - FIS is often cyclical, and women who may be food insecure at one point in their pregnancy may not identify as food insecure at another point

Objective:

To develop a medically tailored, nutritionally-complete emergency food bag with nutrition education handouts to address FIS identified in rural, high-risk pregnant women in the clinical setting

Use of Theory:

- Grounded in the **socio-ecological model**
- Addressing FIS to improve health outcomes in high-risk pregnant women requires a multi-layered approach and should include intervention at:
  - Individual (food behaviors, stigma, knowledge)
  - Community (screening, education, resources)
  - Societal levels (nutrition assistance programs)

Target Audience:

High-risk pregnant women who screen positive for FIS at *any* pre-natal appointment in three counties in rural, Eastern NC selected to pilot The MOTHeRS' Program

- Identified using the 2-Question Hunger Vital Sign Screener, validated for use in the clinical setting

1. **Within the past 12 months, we worried that our food would run out before we got money to buy more**
   Never *Usually* *Sometimes*
2. **Within the past 12 months, the food we bought just didn't last and we didn't have money to get more**
   Never *Usually* *Sometimes*

SNEB Nutrition Educator Competencies : 2.2; 5.5; 8.1

Program Description:

The **MOTHeRS' Project** is a pilot program, funded by the United Health Foundation

- To provide mental health and maternal-fetal services via telehealth to women with high-risk pregnancies in rural OB-GYN practices
- *AND to address FIS*, as rates in these counties (18-24%) exceed the state average (15%)

Development of an Emergency Food Bag

- Review of literature identified **9 under-consumed, essential nutrients**
- USDA and NIH food lists used to compile lists of foods high in target nutrients
- Reviewed foods/nutrients provided in WIC Food Package V
- Interviewed local nutrition and health professionals to gather information on the characteristics, habits, and preferences of high-risk pregnant women
- Availability and affordability determined using an online local grocery store

Food Bag Characteristics

- 31 shelf-stable food items, weighing ~26 lbs, and costing less than $70
- Contains foods that are good sources of identified target nutrients
- Appropriate regardless of trimester or comorbidities
- Available and acceptable to women in rural, eastern NC
- *Complements* WIC Food Package V
  - Meets target nutrient needs for **2 weeks** *on its own*, & **4 weeks** *combined with WIC*

Nutrient Analysis of MOTHeRS' Food Bag

Nutrient	RDA[1]	Bag Provision[2]	%RDA Covered (over 2 wks)
Calories	2000 kcal	23,658 kcals	85%
Protein	80 gm	1,193 gm	107%
Fiber	28 gm	404 gm	103%
Folate, DFE	600 mcg	14,337 mcg	171%
Iron	27 mg	464 mg	123%
Vitamin D	15 mcg	178 mcg	84%
Calcium	1.0 - 1.3 gm	14,208 mg	88%
Choline	> 450 mg	4,184 mg	66%
Iodine	220 mcg	991 mcg	32%
Total Omega 3's	650 mg	15,510 mg	170%
DHA	300 mg	4,110 mg	98%

1. RDA's based on findings from literature review and Brown LS. Chapter 1: Nutrition requirements during pregnancy. In: Sharlin J, Edelstein S, eds. Essentials of Lifecycle Nutrition. Jones and Bartlett; 2011:1-24.
2. Nutrient analysis performed using ESHA Nutrient Database

Development of Educational Materials

3 complementary handouts (English and Spanish), evaluated by 18 professionals with expertise serving rural, underserved pregnant women and/or FIS, developed to:

- Provide a guide for healthy eating during pregnancy, tips on food safety, and recipes to utilize food bag items

Implementation

- Clinic office staff trained to receive and distribute emergency food bags, screen for FIS, and counsel recipients using MOTHeRS' Project handouts
- Emergency food bag, education, and community resource list provided *each time* a patient screens positive for FIS

Evaluation Methods:

Process evaluation

- Semi-structured, audio-recorded telephone interviews using validated content - transcribed verbatim
- Deductive content analysis to identify themes
- Independent review of transcripts by the research team (n=4) using codebook, to develop consensus of themes

Results:

Preliminary themes suggest acceptance, high satisfaction, utilization of the emergency food bag and limited access to other food resources

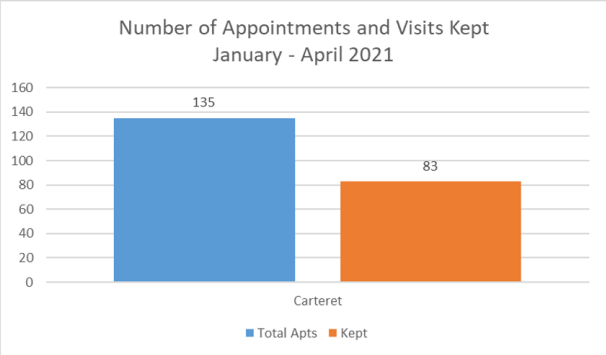
Conclusion:

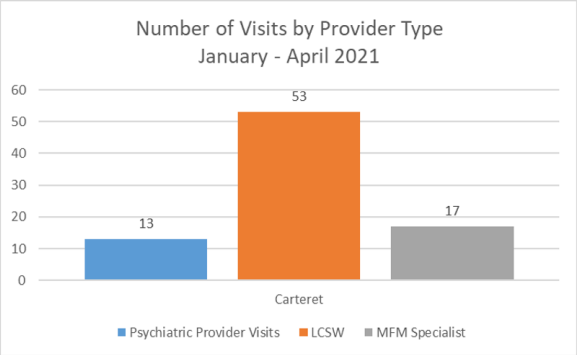
Our findings align with previous studies demonstrating that **medically-tailored food resources provided in the clinical setting are acceptable** and potentially associated with reduced social stigma

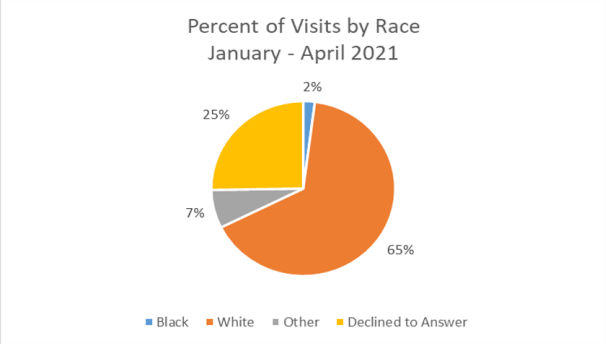
First Quarter MOTHeRS Project Data

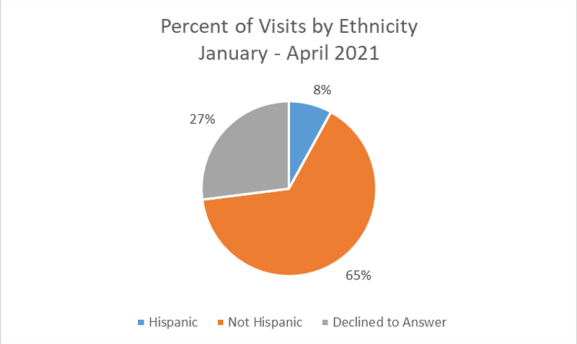
Here we present the results of the first four months of operation at Carteret OB-Gyn Associates—the first MOTHeRS Project site. We expect two additional sites in Chowan and Duplin counties to go live in July 2021 and for the number of patients served to grow considerably once the project is fully operational at all three sites.

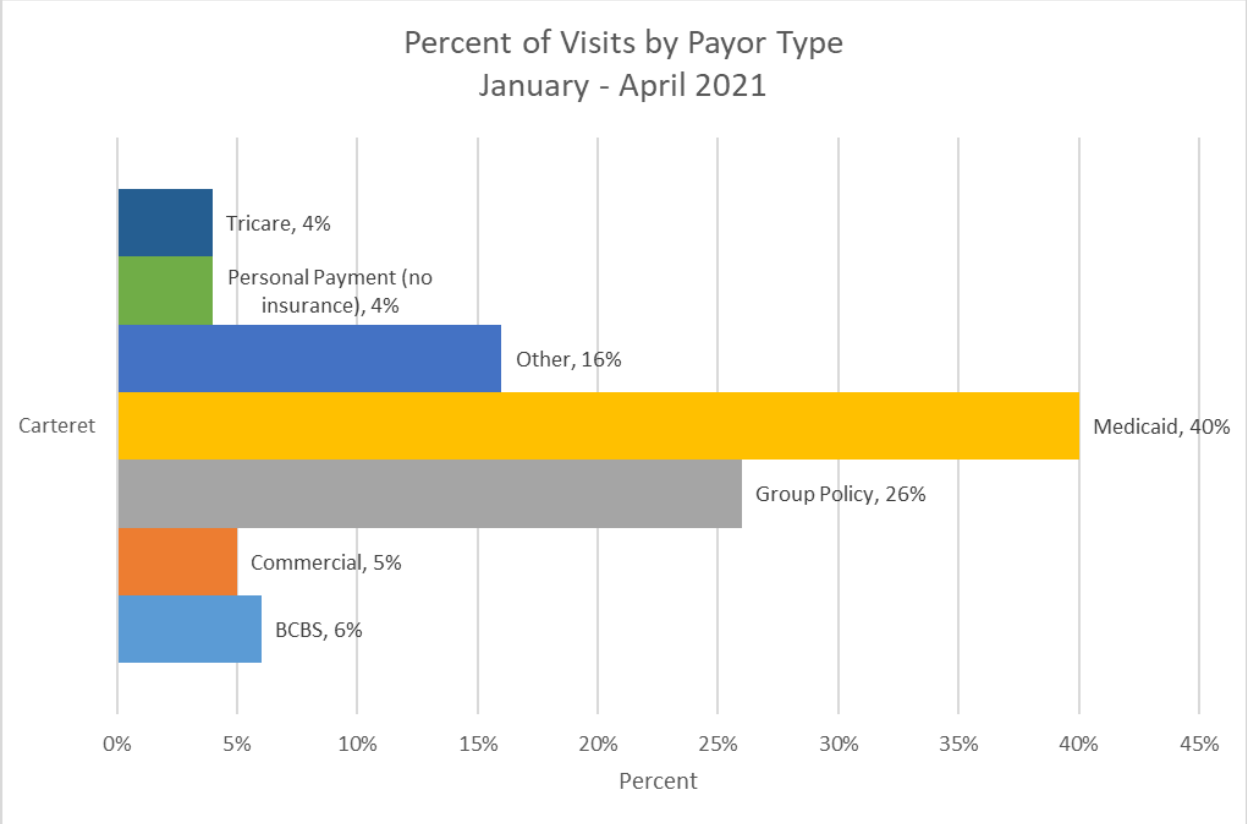
MOTHeRS Project Results JANUARY - APRIL 2021					
		SITE			TOTAL
		Carteret Gyn	Edenton	Kenansville	
Number pf perinatal patients who received care (visits with MFM specialist)		17			17
Number of missed appointments for high-risk patients (MFM visits not kept)		7			7
Impact on patient access					
Number of women served for mental health reasons	LCSW visits:	53			53
	Psychiatrist visits:	13			13
	total Mental Health visits:	66			66
Impact on health disparities as nmeasured by percent of patients served from underserved and diverse backgrounds.	% of visits by race:				
	White	65%			65%
	Black	2%			2%
	American Indian/Alaskan Native				
	Asian				
	Native Hawaiian and Other Pacific Islander				
	Some Other Race	7%			7%
	Other/Declined/Not Disclosed	25%			25%
	% of visits by ethnicity				
	Hispanic	8%			8%
	Not Hispanic	65%			65%
	Other/Unknown/not disclosed	27%			27%
	% of visits by insurance type				
	BCBS	6%			6%
	Commercial	5%			5%
	Group Policy	26%			26%
	Medicaid	40%			40%
	Personal Payment (cash - no inusrance	4%			4%
	Tricare	4%			4%
	Other	15%			15%
Food Security	Number of Food Boxes Distributed	84			84


Number of Appointments and Visits Kept
January - April 2021
160
140
120
100
80
60
40
20
0
135
83
Carteret
Total Apts
Kept


Number of Visits by Provider Type
January - April 2021
60
50
40
30
20
10
0
13
53
17
Carteret
Psychiatric Provider Visits
LCSW
MFM Specialist


Percent of Visits by Race
January - April 2021
2%
25%
7%
65%
Black
White
Other
Declined to Answer


Percent of Visits by Ethnicity
January - April 2021
8%
27%
65%
Hispanic
Not Hispanic
Declined to Answer


Percent of Visits by Payor Type
January - April 2021
Carteret
Tricare, 4%
Personal Payment (no insurance), 4%
Other, 16%
Medicaid, 40%
Group Policy, 26%
Commercial, 5%
BCBS, 6%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
Percent

Through our formalized partnerships at the clinical sites, patients in the practices are cared for by both an MFM specialist and their local physician through a combination of telehealth and face-to-face visits. This model helps manage patients in clinics closer to their homes and minimizes travel to the remote specialty clinics for high-risk patients – such as those with diabetes, chronic hypertension, opioid/substance use and/or psychiatric needs. Aside from enhancing access to services, this model helps to reduce geographic health disparities, enhances patient convenience and improves patient adherence to treatment. By bringing specialists to the primary care sites, this model also reduces professional isolation, enhances recruiting and retention of health professionals in underserved areas, and improves coordination of care across the health care system. This co-management model creates a patient-centered team approach to care delivery and results in both improved patient experiences and a positive impact on maternal fetal health. The model also has the flexibility of providing telehealth services directly at patients' homes from their tablets, computers, or smart phones, if clinically indicated. Additionally, ECU can facilitate shared patient information via electronic health records (EHRs). NC-STeP has developed a Web portal that connects participating hospital emergency departments, community-based providers, and remote psychiatric providers, allowing them to share secure electronic health information regarding patient encounters across different EHRs.[8, 9]

The US has the highest maternal mortality rate out of all developed countries in the world.[10] Evidence points towards significantly high maternal deaths of black and other minority women, especially those in rural areas. There are significant challenges facing rural women from accessing comprehensive, affordable, quality health, maternal health, and mental health care. Given the scale and scope of the issue, we believe that programs like the MOTHeRS Project are very much needed and timely. The project emphasizes the importance of strengthening care coordination and health care delivery, investing in human service programs, and addressing various workforce issues. Although there are numerous programs that have been developed to improve maternal health outcomes, barriers such as persistent poverty, transportation challenges, lack of affordable quality health insurance, chronic health conditions, and workforce shortages have made it difficult to address a complex issue such as rural maternal health care. Through its ongoing work, the MOTHeRS Project expects not only to provide care to those who need it at its clinical sites, but also to generate new knowledge regarding how these barriers can be better addressed to ensure that every woman in rural America has a safe and healthy pregnancy, delivery, and post-natal outcome.

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