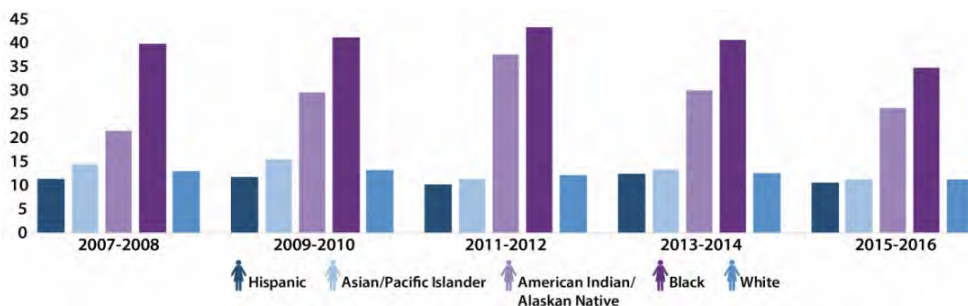




In Partnership with the United Health Foundation 7th Quarterly Report (July 1- September 30, 2022)

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. The data on healthcare disparities from the 37 North Carolina counties along or east of the I-95 corridor are stark. 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; and one in eight are uninsured. Ninety-four of the 100 counties in North Carolina are designated as mental health provider shortage areas and eastern NC has a disproportionate share of these underserved counties. Socioeconomic factors in the region limit access to transportation, adequate nutrition and basic necessities in the maternal population.

On a larger scale, the United States has unacceptably high maternal mortality rates, especially for African American and American Indian mothers. Several factors contribute to this health disparity, including prevalence of underlying conditions, racism-induced stress, unconscious bias in health care, and lack of quality prenatal care.¹ 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.² As of 2016, the U.S. pregnancy-related mortality ratio was 16.9 per 100,000 live births.³ However, as the following figure shows, there are significant racial disparities within this calculated statistic:



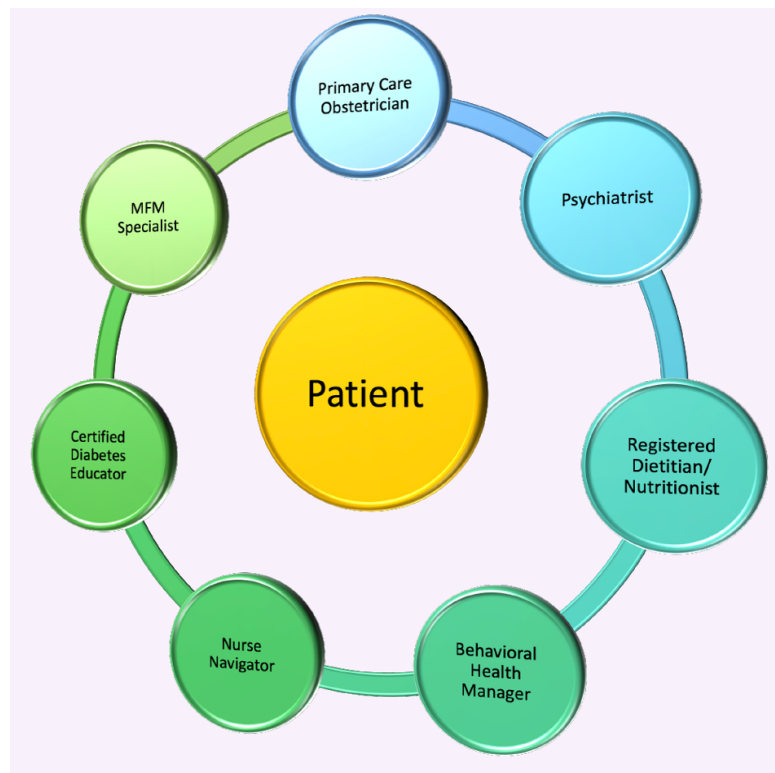
Trends in pregnancy-related mortality ratios among race from 2007-2016.⁴

These data demonstrate 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 2015.⁵ COVID-19 highlighted these disparities and health outcomes even further.⁶ Maternal mortality is due to a confluence of factors, not all of which are within the clinical walls. These factors include social determinants of health; disproportionate rates of preexisting health conditions; limited access to health care, including high-quality prenatal care; and the role of pervasive racism. All of these factors contribute to disparate health outcomes for Black and American Indian/Alaskan Native (AI/AN) women and their families.

MOTHeRS Project: Outreach through Telehealth

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.⁷⁻⁹ 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. The following components of the MOTHeRS Project address both the physical and mental well-being of these high-risk pregnant women.

Key Components of the MOTHeRS Project Collaborative Care Model



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. High-risk pregnancies can also 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 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. The project has developed a medically-tailored emergency food bag for high-risk pregnant women identified as food insecure in the clinical setting. Those who screen positive are provided this medically-tailored food bag, nutrition education, and links to existing community resources. This approach promotes effective nutrition education and healthy behavior. This work was presented at the annual meeting of the Society for Nutrition Education and Behavior. Additionally, our 2nd quarterly report included an abstract that was published in the August issue of the Journal of Nutrition Education and Behavior. It was titled “MOTHeRS Project: Acceptability of a Medically Tailored Food Bag Treating Food Insecurity of High-Risk Pregnant Patients.”^{10, 11}

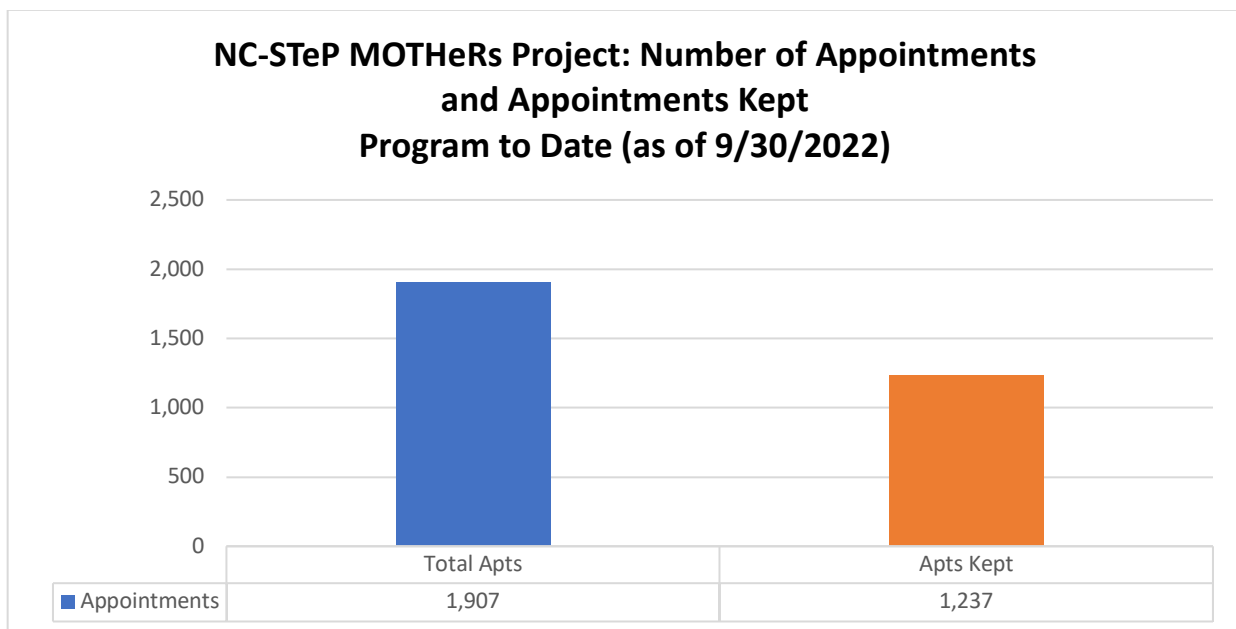
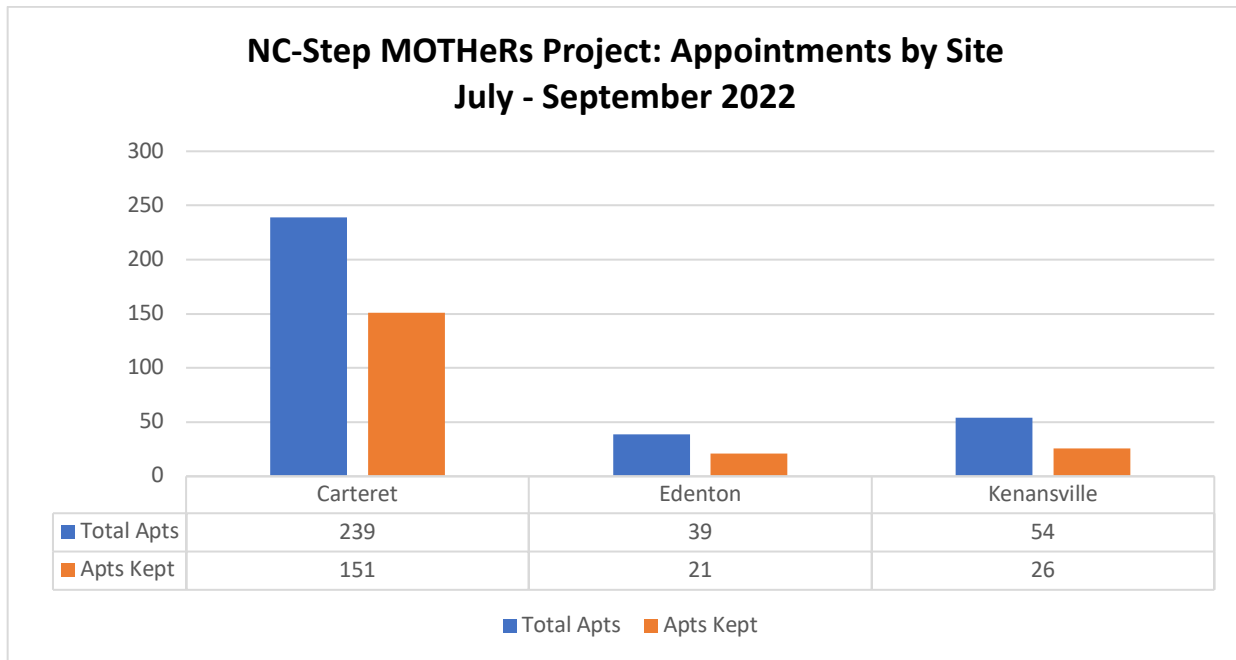
Through our formalized partnerships at the clinical sites, patients in the practices are cared for by both an MFM specialist and their local physician through a combination of telehealth and face-to-face visits. This model helps manage patients in clinics closer to their homes and minimizes travel to 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.

Seventh Quarter MOTHeRS Project Data

This 7th quarterly report covers the time period from July 1 to September 30, 2022. Our first clinical site, Carteret Ob-Gyn Associates, has been operational since mid-January 2021. Two additional sites in Chowan and Duplin counties went live in July 2021. A fourth site in Dare County went live in September 2022. The decision to add the Dare County site was made after the Dare County practice expressed an eagerness to join the MOTHeRS Project and the fact that we had capacity to provide services at a 4th site.

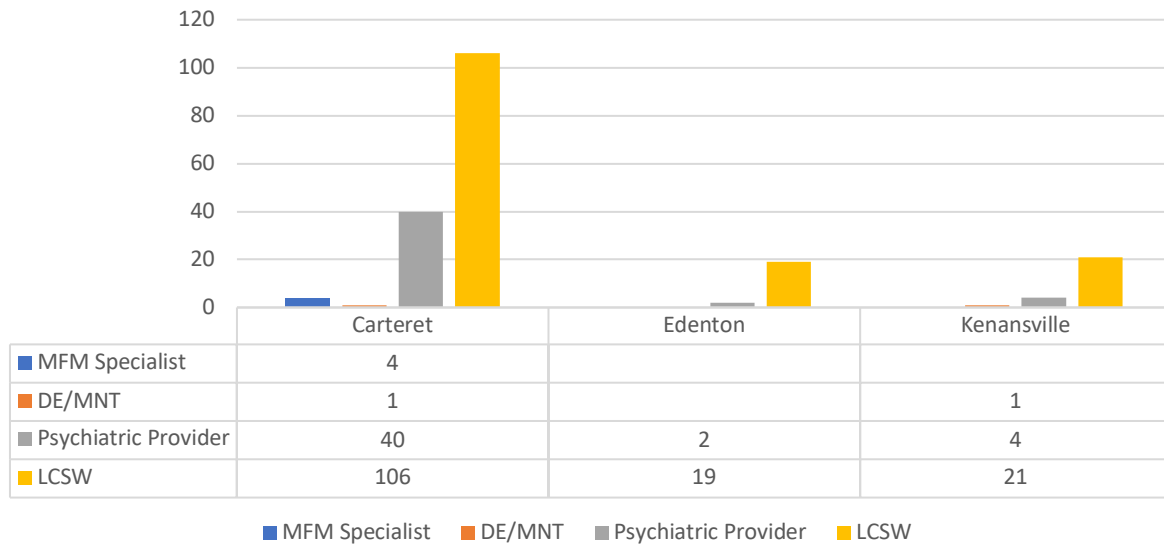
All four sites now have all equipment for telehealth in place, with providers and staff trained in use of the equipment and its integration with the Electronic Health Record (EHR). Providers are credentialed and their schedules are already built into EHR. Ultrasound machines for most of the sites are integrated with PACS (picture archiving and communication system) to enable our MFM specialist to see images remotely. PACS is a medical imaging technology used primarily in healthcare organizations to securely store and digitally transmit electronic images and clinically-relevant reports.

The following charts provide data on the number of patients served by the program during the most recent quarter, as well as since program inception in January 2021.

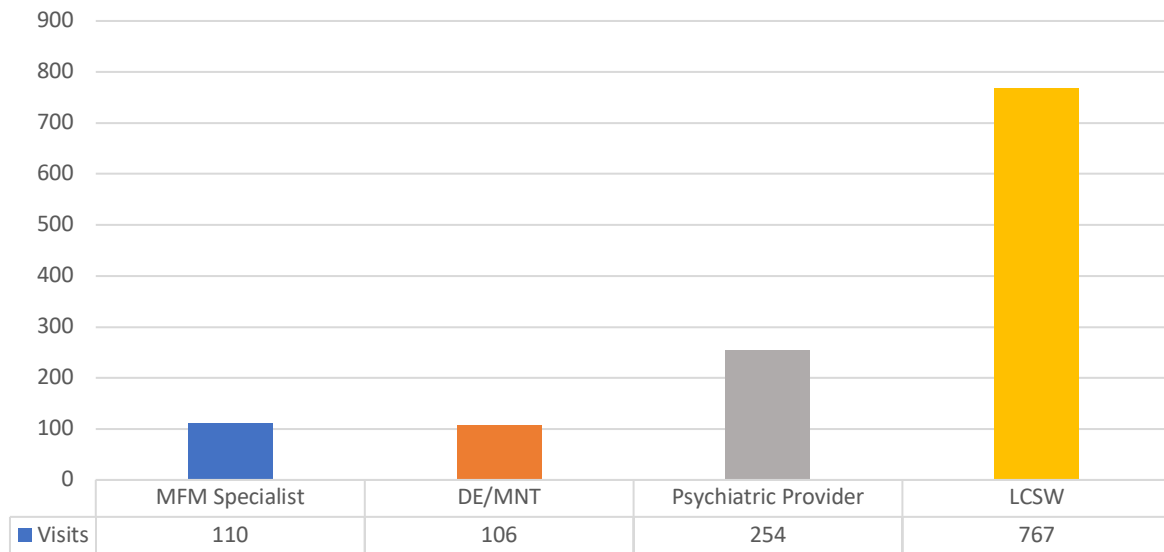


The following charts provide data on the number of patient visits by provider type seen by the program during the most recent quarter, as well as since program inception in January 2021.

NC-STeP MOTHeRs Project: Visits by Site by Provider Type July-September 2022



NC-STeP MOTHeRs Project: Number of Visits by Provider Type Program to Date (as of 9/30/2022)



The table below summarizes MOTHeRS Project results as they relate to impact on patient access, health disparities, and food security:

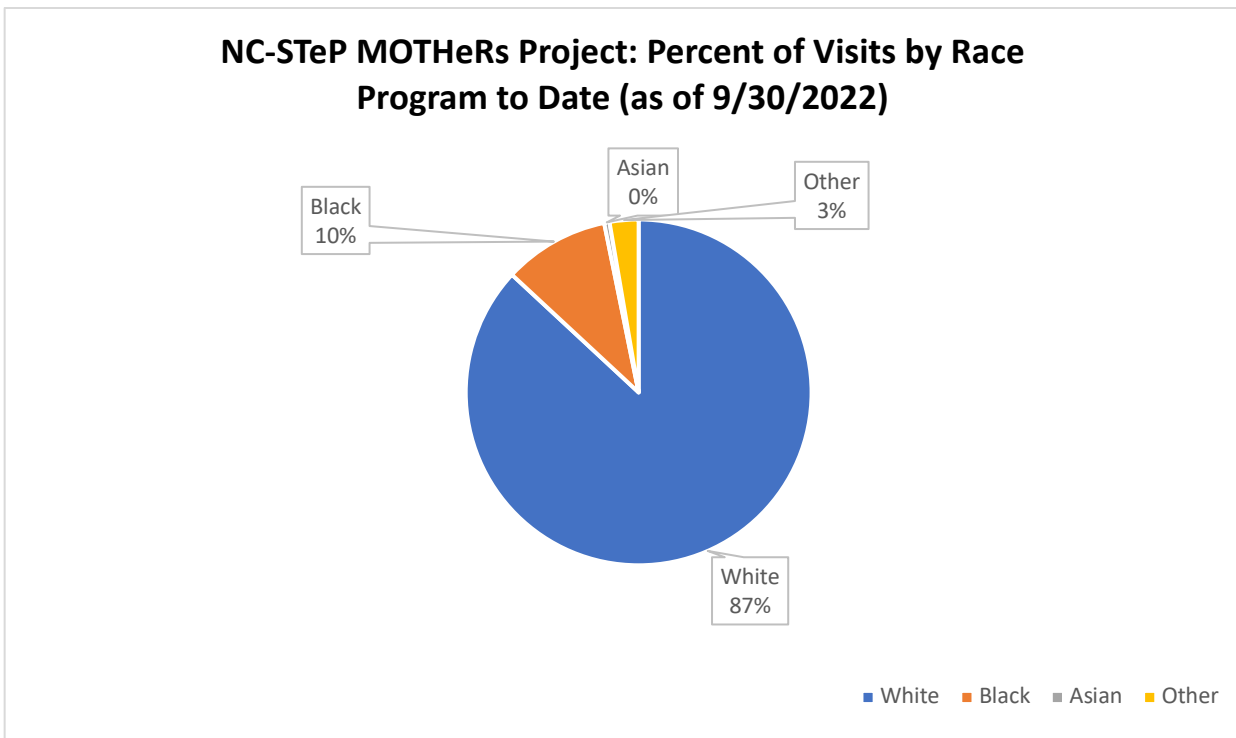
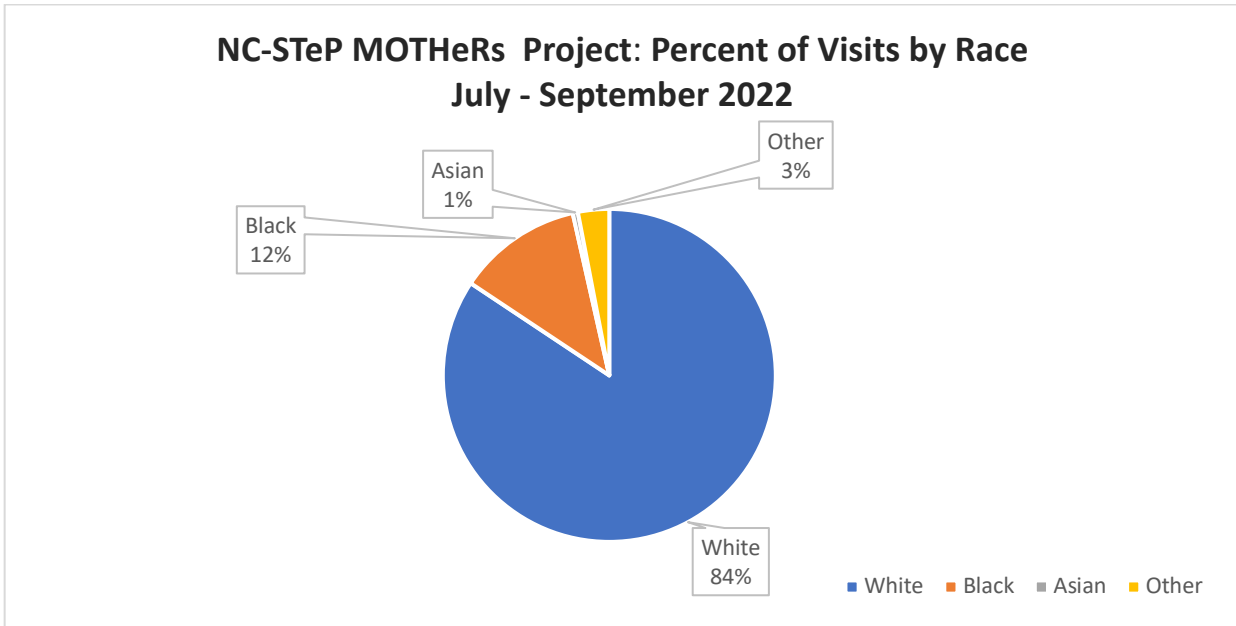
MOTHeRS Project Results July– September 2022

	Jul- Sep 2022	Program Total to Date	
Impact on Patient Access			
Number of perinatal visits with MFM specialist	4	110	
Number of missed appointments for high-risk patients (MFM visits not kept)	1	12	
Impact on patient access (calculated as driving miles saved per MFM specialist visit and Diabetes educator/medical nutrition specialist visit: Carteret - 157, Kenansville - 130, Edenton -156)	915 driving miles saved	33,454 driving miles saved	
Number of patient visits with Certified Diabetes Educator or Registered Nutrition Therapist	2	106	
Number of women served for mental health reasons	LCSW visits:	146	767
	Psychiatrist visits:	46	254
	Total Mental Health visits:	192	1,021
Impact on patient access (calculated as driving miles saved per Psychiatrist and LCSW visit: Carteret - 157, Kenansville - 130, Edenton -156)	29,448 driving miles saved	158,054 driving miles saved	
Impact on Health Disparities (as measured by percent of patients served from underserved and diverse backgrounds)	% of visits by Race:		
	White	84.3%	87.0%
	Black	12.1%	9.9%
	American Indian/Alaskan Native		
	Asian	0.5%	0.5%
	Native Hawaiian and Other Pacific Islander		
	Other/Unknown/Missing	3.0%	2.7%
	% of visits by Ethnicity:		
	Hispanic	3.5%	3.6%
	Not Hispanic	96.5%	93.8%
	Unknown/Not Disclosed/Missing	0.0%	2.7%
	% of visits by Insurance Type:		
	Medicaid	41.9%	35.2%
	Medicare	2.5%	0.9%
Commercial	40.4%	49.0%	
Tricare	10.6%	11.8%	
Self-Pay	4.5%	2.3%	
Other/ Unknown/ Missing	0.0%	0.8%	
Food Security	Number of Food Bags Sent to Clinics*	128	801
	Number of Patients Screened for Food Insecurity	4,456	18,991
	Number of Food Bags Distributed**	108	548

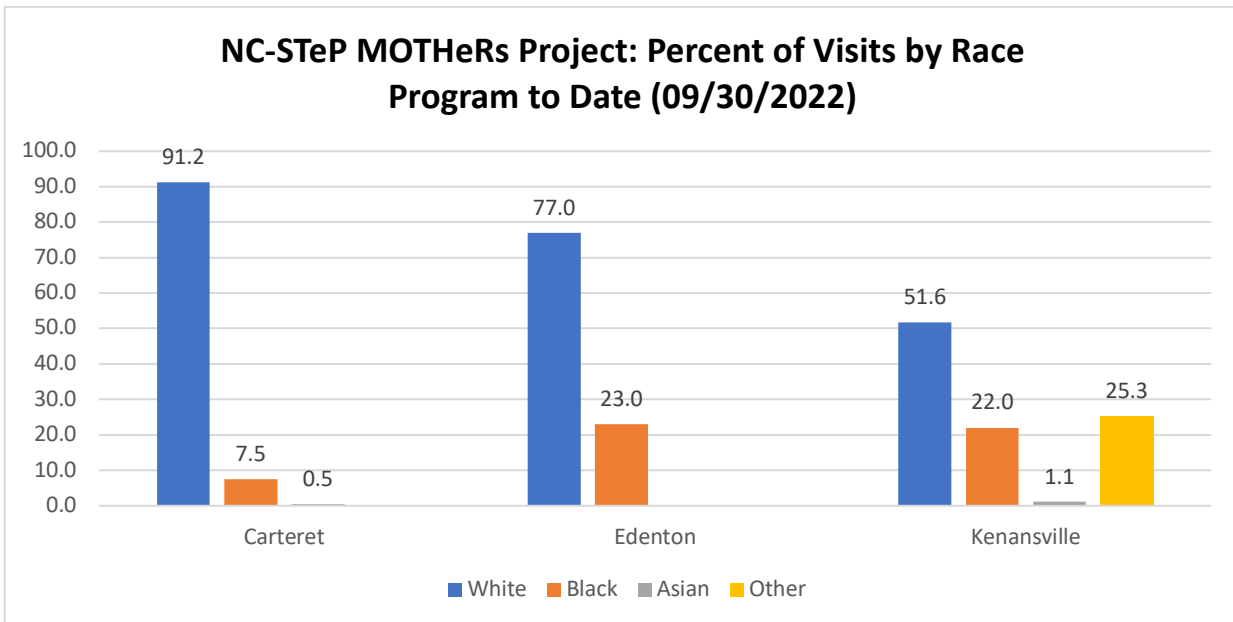
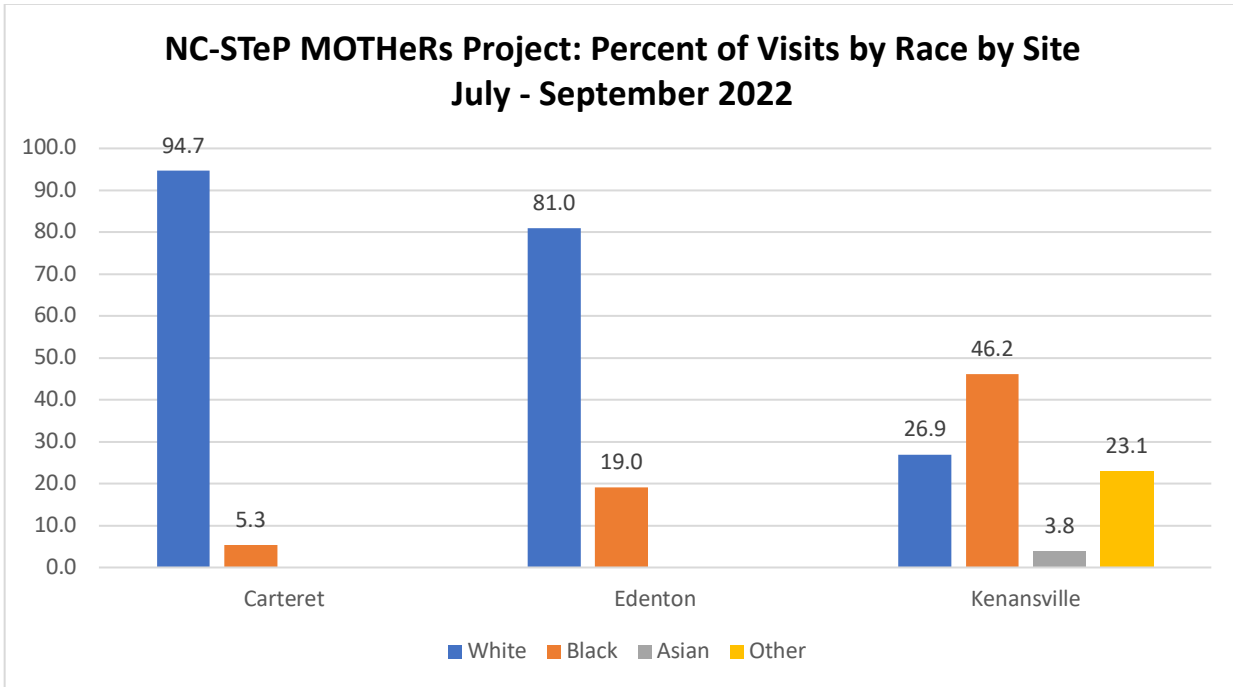
* The number of food bags sent to the clinics comes from the food pantry and is the number they sent during the quarter period.

** The number distributed during the quarter comes directly from the clinic.

The following charts provide data on percentage of visits by race for patients seen by the program during the most recent quarter, as well as since program inception in January 2021.

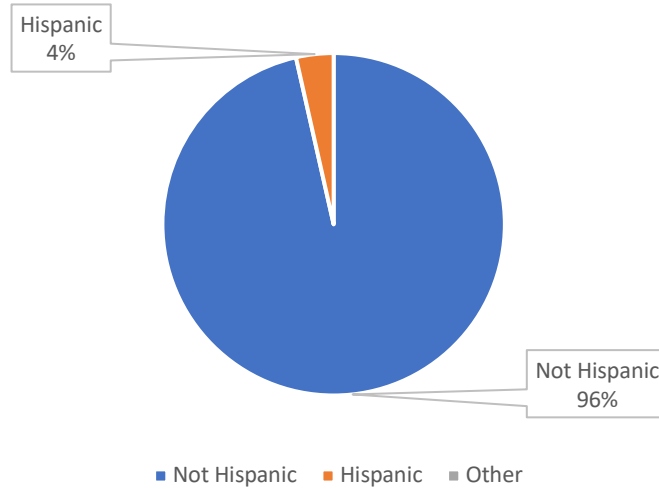


The following charts provide data on percentage of visits by race by site for patients seen by the program during the most recent quarter, as well as since program inception in January 2021.

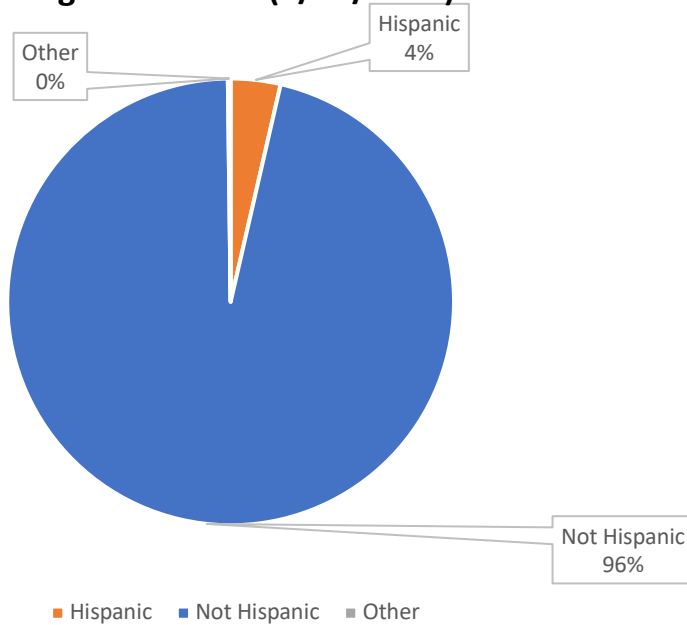


The following charts provide data on percentage of visits by ethnicity for patients seen by the program during the most recent quarter, as well as since program inception in January 2021.

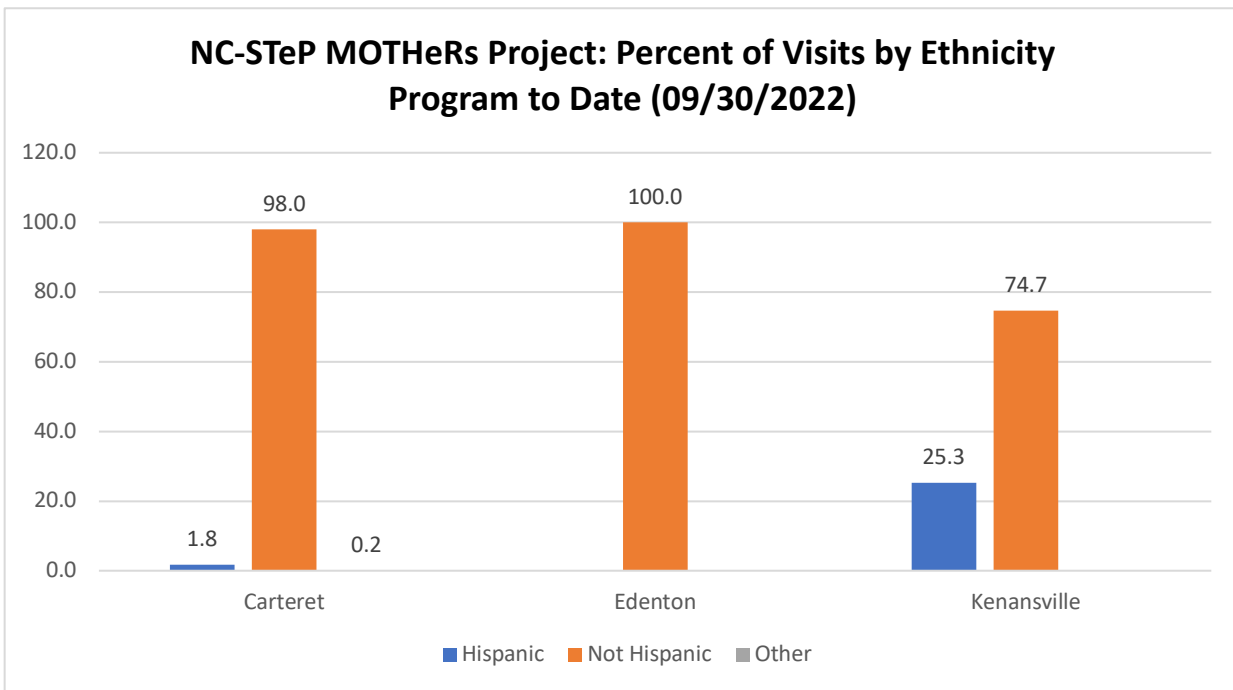
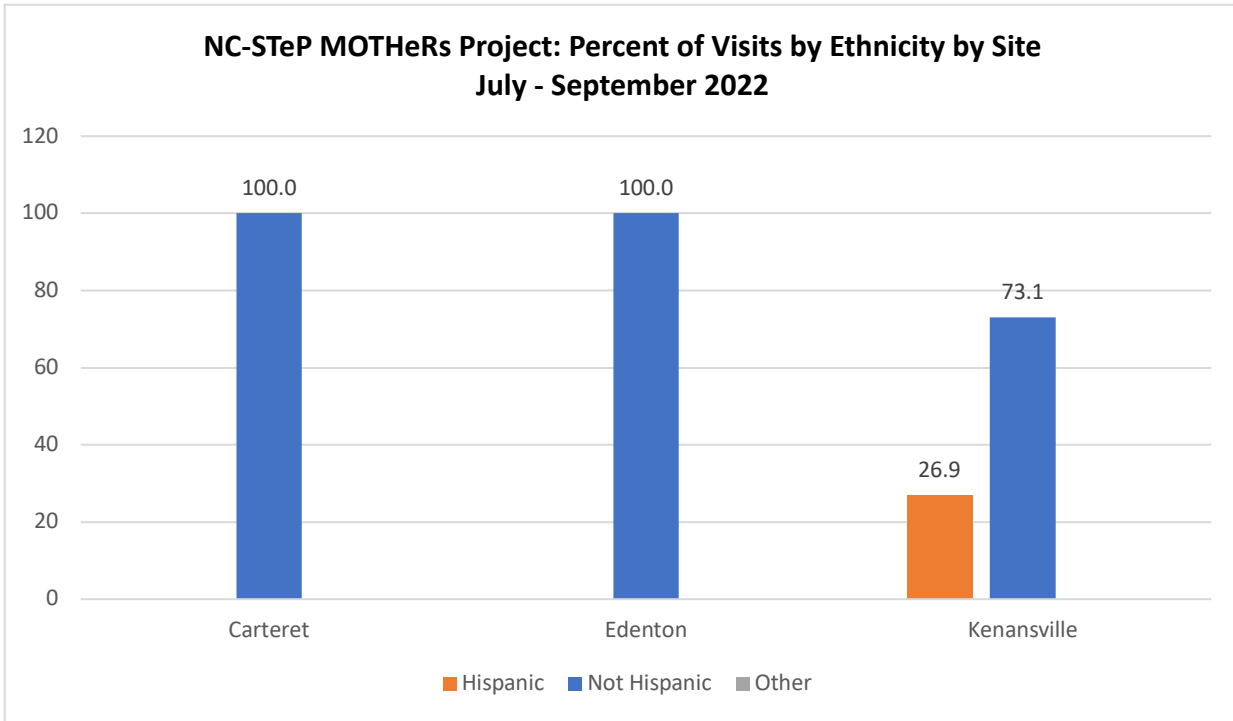
**NC-STeP MOTHeRs Project: Percent of Visits by Ethnicity
July - September 2022**



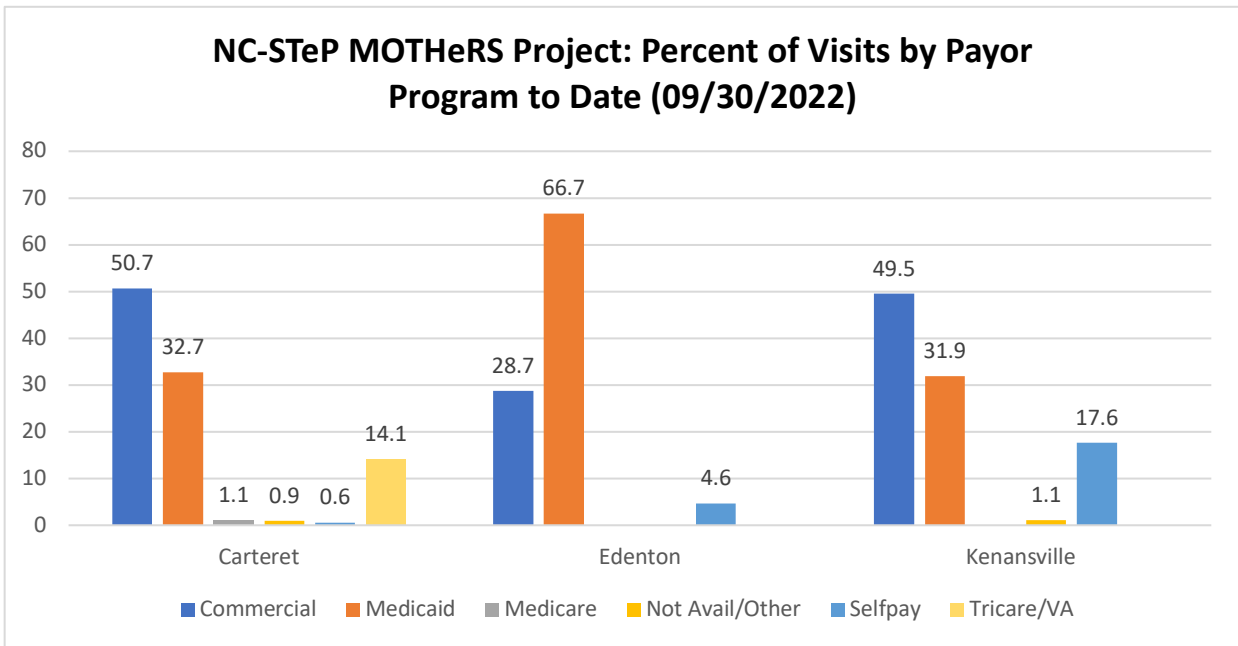
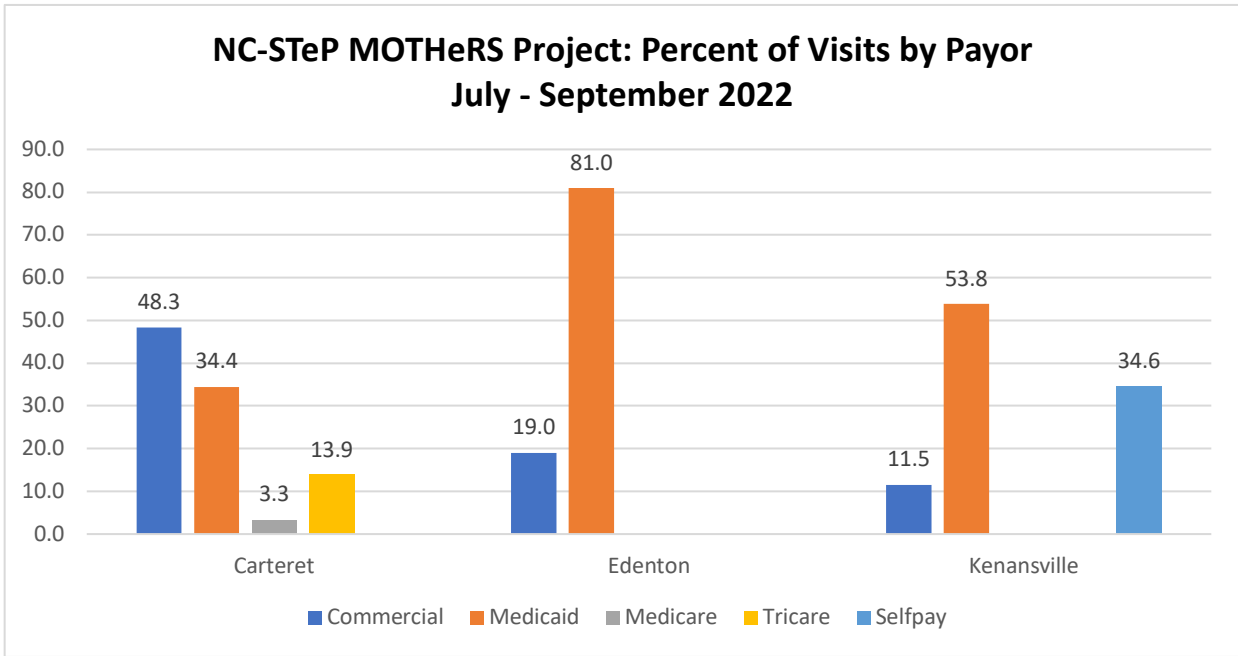
**NC-STeP MOTHeRs Project: Percent of Visits by Ethnicity
Program to Date (9/30/2022)**



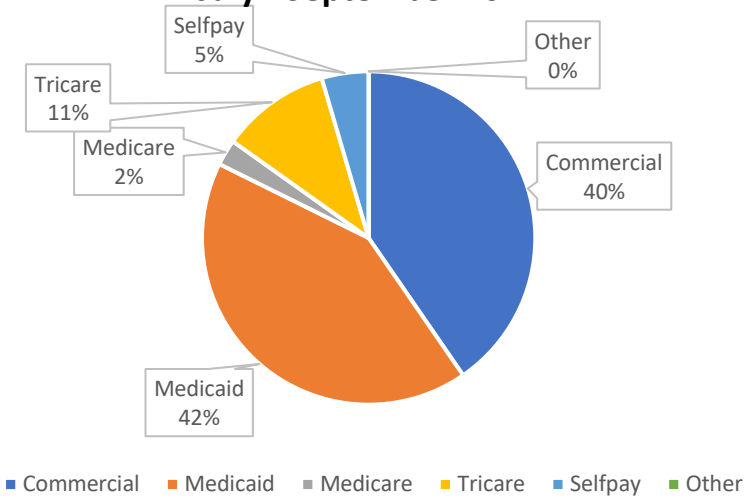
The following charts provide data on percentage of visits by ethnicity by site for patients seen by the program during the most recent quarter, as well as since program inception in January 2021.



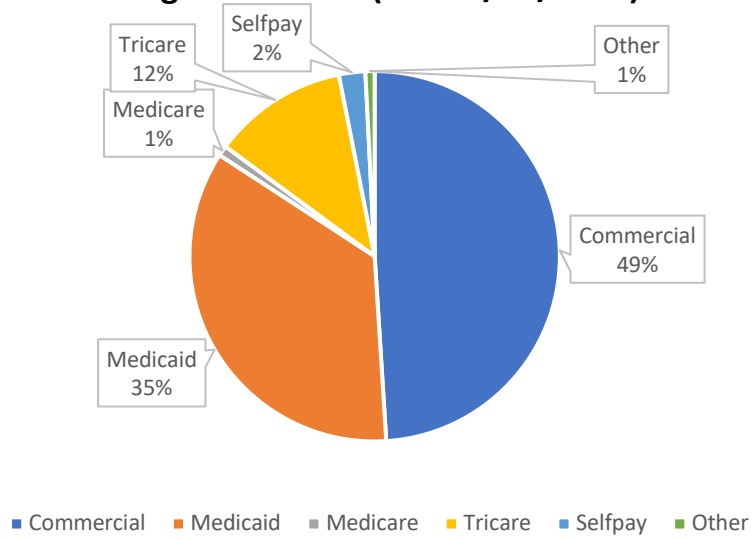
The following charts provide data on percent of visits by payor type for patients seen by the program during the most recent quarter, as well as since program inception in January 2021.



**NC-STEP MOTHeRs Project: Percent of Visits by Payor
July - September 2022**



**NC-STEP MOTHeRs Project : Percent of Visits by Payor
Program to Date (as of 9/30/2022)**

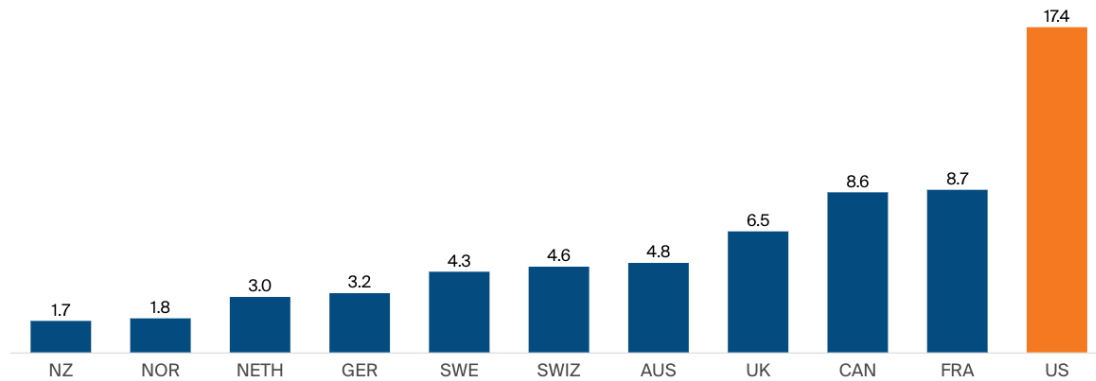


Conclusions:

Despite high health care spending, the United States has some of the worst maternal outcomes in the industrialized world.¹²⁻¹⁵

Maternal Mortality Ratios in Selected Countries, 2018 or Latest Year

Deaths per 100,000 live births



[Download data](#)

Notes: The maternal mortality ratio is defined by the World Health Organization as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.

Data: OECD Health Data 2020, showing data for 2018 except 2017 for Switzerland and the UK; 2016 for New Zealand; 2012 for France.

The collaborative co-management model developed by the MOTHeRS Project 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 to patients' homes from their tablets, computers, or smart phones, if clinically indicated.

Evidence points toward significantly high maternal deaths of Black and other minority women, especially those in rural areas. There are significant challenges facing rural women in 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.

REFERENCES

1. Reddy S, Patel N, Saxon M, et al. Innovations in U.S. Health Care Delivery to Reduce Disparities in Maternal Mortality Among African American and American Indian/Alaskan Native Women. *J Patient Cent Res Rev.* 2021 Spring; 8(2): 140–145. Published online 2021 Apr 19.
2. Pregnancy-Related Deaths. (2019, February 26). Retrieved from <https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pregnancy-relatedmortality.htm>.
3. Pregnancy Mortality Surveillance System. (2019, October 10). Retrieved from <https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm>.
4. Infographic: Racial/Ethnic Disparities in Pregnancy-Related Deaths -United States, 2007–2016. (2019, September 4). Retrieved from <https://www.cdc.gov/reproductivehealth/maternal-mortality/disparities-pregnancy-relateddeaths/infographic.html>.
5. Maron, DF. Maternal Health Care Is Disappearing in Rural America. *Scientific American.* (2017). Retrieved from: <https://www.scientificamerican.com/article/maternal-health-care-is-disappearing-in-rural-america/>.
6. Artiga S, Corallo B, Pham O on behalf of Kaiser Family Foundation. Racial disparities in COVID-19: key findings from available data and analysis. [accessed May 9, 2022]. Published August 17, 2020. <https://www.kff.org/racial-equity-and-health-policy/issue-brief/racial-disparities-covid-19-key-findings-available-data-analysis/>
7. East Carolina University. North Carolina Statewide Telepsychiatry Program (NC-STeP). Available at <https://www.ecu.edu/cs-dhs/ncstep/>. Accessed June 22, 2021.
8. Statewide Telepsychiatry Program. Retrieved from: <https://www.ncdhhs.gov/divisions/office-rural-health/office-rural-health-programs/statewide-telepsychiatry-program>. Accessed June 22, 2021.
9. Summary Report on SFY 2020 North Carolina Statewide Telepsychiatry Program (NC-STeP) Funds General Statute 143B-139.4B. Report to the Joint Legislative Oversight Committee on Health and Human Services and Fiscal Research Division by the North Carolina Department of Health and Human Services, October 30, 2020. Retrieved from <https://files.nc.gov/ncdhhs/Telepsychiatry-Report--Annual-NC-STeP-Report--2020--Final-.pdf>.
10. Smith B, Kolasa KM, Sastre LR, Craven K. MOTHeRS Project: Acceptability of a medically tailored food bag treating food insecurity in high-risk pregnant patients. Poster presented at: SNEB 2021 Annual Conference; August 9, 2021; Department of Family Medicine, East Carolina University, Greenville, NC. ECU ScholarShip link: <http://hdl.handle.net/10342/9038>
11. Smith B, Kolasa KM, Craven K. Emergency Food Bag and Patient Education for the MOTHeRS' Project. Presented at: ECU Family Medicine Research Day; June 10, 2021; Department of Family Medicine, East Carolina University, Greenville, NC. ECU ScholarShip Link: <http://hdl.handle.net/10342/9073>

12. Maternal mortality ratio (modeled estimate, per 100,000 live births) -Finland, Venezuela, RB. (n.d.). Retrieved from https://data.worldbank.org/indicator/SH.STA.MMRT?locations=FI-VE&year_high_desc=false
13. MacDorman M, Declercq E. The failure of United States maternal mortality reporting and its impact on women’s lives. Published in final edited form as: *Birth*. 2018 Jun; 45(2): 105–108. Published online 2018 Jan 4.
14. Gunja MZ, Tikkanen R, Seervai S, Collins SR on behalf of The Commonwealth Fund. *What is the status of women’s health and health care in the U.S. compared to ten other countries?* Published December 19, 2018. Available at: <https://www.commonwealthfund.org/publications/issue-briefs/2018/dec/womens-health-us-compared-ten-other-countries>. Accessed May 9, 2022.
15. Tikkanen R., et al., *Maternal Mortality and Maternity Care in the United States Compared to 10 Other Developed Countries* (Commonwealth Fund, Nov. 2020). <https://doi.org/10.26099/411v-9255>

Contact for more information:

Sy Atezaz Saeed, MD, MS, FACPsych
Professor and Chair Emeritus
Department of Psychiatry and Behavioral Medicine
Brody School of Medicine | East Carolina University
Executive Director
North Carolina Statewide Telepsychiatry Program (NC-STeP)
Phone: 252.744.2660 | e-mail: saeeds@ecu.edu