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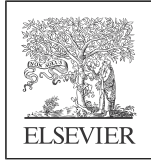
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Black nurse scientists and the undeniable role of historically black colleges and universities

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ABSTRACT

The pandemics of COVID-19 and systemic racism highlighted health inequities that have existed for decades among Black communities. Nurses are positioned to address these health inequities through innovative ideas and research. More specifically, Black nurses, because of their shared lived experience, understand sociostructural factors underpinning health inequities and how to best engage with Black communities. However, only 8% of Black nurses make up the overall nursing workforce and far fewer are nurse scientists. Historically Black Colleges and Universities (HBCUs) can offer critically important options for success in addressing the dearth of Black nurse scientists working across sectors and contributing to rich academic milieu, informing innovative national policy, and creating impactful practice. We discuss challenges and strategies to promoting research careers at HBCUs to attract Black nurse scientists as the next leaders in health inequities research.

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Introduction

The pandemics of COVID-19 and systemic racism (Laurencin & Walker, 2020) bring considerable attention to persistent health disparities and inequities that have plagued Black American communities for decades. There are many complex and varied reasons for these alarming

inequities. Due to historical injustices, factors such as limited access to healthcare, distrust of the healthcare system, systemic racism and implicit bias, low socioeconomic status, poorer and limited health education, and lower health care quality limit opportunities for Black Americans and their families to reach an optimal health status (Bahls, 2011). To better understand how to effectively intervene, it is essential to develop rigorous

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research that focuses on Black American health. However, of greater importance is ensuring that research findings are appropriately interpreted, widely disseminated, and actions are taken to translate the evidence to practice and policy.

Black Americans historically have a fraught relationship with health care systems and the academic research enterprise that has devalued their well-being. Nurses, the most trusted professionals in the nation (Saad, 2020) can have one of the greatest impacts on improving health among Black Americans. Black nurses, specifically, are positioned to understand sociostructural factors underpinning health inequities; the physical, mental, cultural and spiritual requirements to be resilient in America; and how to best engage with Black individuals, families, and communities. However, the nursing workforce does not adequately reflect the U.S. Black population, and the dearth of Black nurse scientists is a looming shortcoming. The critical absence of diversity in the nursing profession is underpinned by inequities that exist to enter the discipline and obtain continuing education such as limited funding and nursing program entry criteria (e.g., graduate research exam scores, grade point averages). Although a variety of programs intended to increase representation in the nursing profession exist (Sullivan, 2004), and the 2010 report from the Institute of Medicine, now the National Academy of Medicine, called for a diverse workforce to advance health (Institute of Medicine 2011), the gap in diverse nurse scientists has been slow to keep up with the need.

It is estimated that African Americans/Black individuals comprised 13.7% of the population in 2020 (US Census Bureau, 2020), but only 6.7% comprised the workforce of registered nurses (Smiley et al., 2021). Phillips and Malone (2014) argue that efforts to reduce health disparities cannot be fully achieved without successfully addressing the underrepresentation of minority nurse leaders in health care. Among nurses in positions of greater influence, Black nurses are only 8.8% of full-time nursing faculty (National League of Nursing, 2017), <10% are deans or directors (National League for Nursing, 2015), and <1% are nurse scientists (Smiley et al., 2021). With the proliferation of Doctor of Nursing Practice (DNP) programs over the last decade, the research doctorate, has steadily decreased over time (AACN, 2019). Many posit that lower salaries in academia compared to those in clinical positions are driving this shift in degree preference, DNP versus PhD, especially among Black nurses who likely experience greater financial barriers (e.g., student loan debt and families with smaller amounts of wealth) than other groups (Mingo, 2008).

Nursing is a science, technology, engineering, and mathematics (STEM) discipline that incorporates new technology in health care. The STEM designation often reflects a significant orientation toward technical, analytical and quantitative skill development; and brings social, political and economic benefits and consequences (National Science and Technology Council, 2018;

Davidson, 2019). Nurses are analytical thinkers who are masters at biomedical technology, yet this issue is contested and debated with implications for STEM programs such as nursing at Historically Black Colleges and Universities (HBCUs) where infrastructure support is often limited (Clay, 2012). In this paper, we discuss challenges and strategies to promoting research careers at HBCUs to attract Black nurse scientists as the next leaders in health inequities research. It was Howard University, North Carolina Agricultural and Technical (A & T) State University, and Prairie View Agricultural and Mechanical (A & M) University, where four authors of this paper earned baccalaureate degrees, three in nursing and one in exercise science. These four HBCU alumni and nurse scientists are faculty at research-intensive Universities with funded programs of research focused on inequities in dementia, sexual health, violence prevention, and stroke prevention in Black Americans. In 2020, the nurse scientists were selected for the inaugural cohort of the University of California, Davis, Betty Irene Moore Fellowship Program for Nurse Leaders and Innovators. The purpose of this paper is to describe challenges and strategies to promote research careers at HBCUs in order to attract Black nurse scientists as the next leaders in health equities research.

Nursing at Historically Black Colleges and Universities

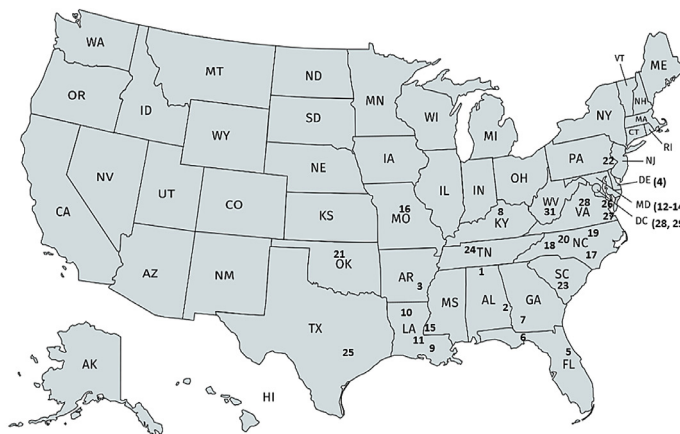
The persistence of health inequities affecting Black communities is urgent and requires focused attention. Nursing programs at HBCUs are involved in initiatives focused on improving the health and wellness of Black Americans. The Higher Education Act of 1965 defines HBCU ($N = 101$ in 19 states, DC and U.S. Virgin Islands) as any institution that was created prior to 1964 with the explicit mission of educating Black Americans (U. S. Department of Education, n.d.). The mission of HBCUs has evolved to include a focus on service and social justice as they continue to primarily serve students from marginalized backgrounds. HBCUs are relevant and necessary because, though they make up only 3% of all colleges and universities in the United States, HBCUs awarded 14 percent of the baccalaureate degrees earned by Black Americans in 2015–16 (National Center for Education Statistics, 2020). HBCUs are the baccalaureate institutions of origin for more than 30% of all Black Americans who go on to earn doctoral degrees (National Academy of Sciences, 2011). Additionally, according to the National Science Foundation (2020), HBCUs were seven of the top eight baccalaureate institutions that produce Black American students who go on to earn doctoral degrees in science and engineering. In the life sciences, the seven top baccalaureate-origin institutions produced over 350 Black American students with doctoral degrees; in the physical sciences, the top eight HBCU-origin

institutions produced over 160 Black American students with doctoral degrees. Howard University, Hampton University and Spelman College were consistently in the upper half.

HBCUs are critically important to the health of our nation and to addressing concerns of minority health and health disparities given their leadership in providing foundational baccalaureate education for research scientists (PhDs) in general and nurse scientists in particular (Tyson et al., 2018). However, HBCUs, originally created specifically to educate formerly enslaved Americans of African descent, face many challenges in fulfilling their missions and contributing to America’s STEM workforce (Clay, 2012). HBCUs are forced to navigate issues affecting STEM enterprises in an environment that includes declining financial support for public institutions from the U.S. government, low and stagnating endowments, increasing competition for high-achieving students, limited numbers of research faculty and extramural funding, limited support for students who often must balance employment and academic responsibilities, as well as slow and often low graduation rates (Clay, 2012). Financial support is the basis for challenges faced by HBCUs to remain relevant, competitive, continue operations, and produce highly talented and diverse graduates. Specific challenges faced by nursing programs at HBCUs include limited curricula and support systems including mentor programs, and difficulty recruiting, retaining, and developing nurse faculty (Gasman et al., 2020; Tyson et al., 2018). However, given

that HBCUs are designated as teaching institutions, it should be noted that these institutions are creative in curricula driven by problem-solving, exploratory learning, collaboration, and critical thinking, in the tradition of such great educators and scientists as George Washington Carver (Biography.com Editors 2021) and Katherine Johnson (2019). Furthermore, several alumni of HBCUs outside of nursing such as Kamala Harris, Dr. Martin Luther King Jr., Thurgood Marshall, Toni Morrison, and Oprah Winfrey have had major impacts in the United States across politics, law, social justice, arts and humanities, entertainment and more. Early college experiences at HBCUs shape future opportunities and bolster confidence in leading change. These vital environments are where a new generation of nurse leaders and innovators in health inequities research can be identified and cultivated.

Of the 101 HBCUs, 32 offer nursing degrees across 18 states, the District of Columbia and U.S. Virgin Islands, with the majority located in the southern United States (See Figure 1). Louisiana, Maryland, North Carolina, and Virginia are most populous. All 32 award bachelor’s degrees, while 13 offer masters, five DNP, and three PhD degrees. HBCU nursing Schools and Colleges are key partners in expanding diversity (Gasman et al., 2020; Tyson et al., 2018). Next, we offer strategies to strengthen existing HBCU programs and create more robust efforts to enhance opportunities for supporting a strong cadre of nurse scientist leaders based on past and current programs and the scientific literature.



<p>ALABAMA 1. Oakwood University, B 2. Tuskegee University, B</p> <p>ARKANSAS 3. University of Arkansas at Pine Bluff, B</p> <p>DELAWARE 4. Delaware State University, B</p> <p>FLORIDA 5. Bethune-Cookman University, B 6. Florida A&M University, B, M</p>	<p>GEORGIA 7. Albany State University, B, M</p> <p>KENTUCKY 8. Kentucky State University, B, D</p> <p>LOUISIANA 9. Dillard University, B 10. Grambling State University, B, M 11. Southern University and A&M College, B, M, D, P</p>	<p>MARYLAND 12. Bowie State University, B, M 13. Coppin State University, B, M, D 14. Morgan State University, B, M, P</p> <p>MISSISSIPPI 15. Alcorn State University, B, M</p> <p>MISSOURI 16. Lincoln University of Missouri, B</p> <p>NORTH CAROLINA 17. Fayetteville State University, B 18. North Carolina A&T State University, B 19. North Carolina Central University, B 20. Winston-Salem State University, B, M, D</p>	<p>OKLAHOMA 21. Langston University, B</p> <p>PENNSYLVANIA 22. Lincoln University, B</p> <p>SOUTH CAROLINA 23. Claflin University, B</p> <p>TENNESSEE 24. Tennessee State University, B, M</p> <p>TEXAS 25. Prairie View A&M University, B, M, D</p>	<p>VIRGINIA 26. Hampton University, B, M, P 27. Norfolk State University, B 28. Virginia State University, B</p> <p>WASHINGTON, DC 29. Howard University, B, M 30. University of the District of Columbia, B</p> <p>WEST VIRGINIA 31. Bluefield State College, B</p> <p>U.S. VIRGIN ISLANDS 32. University of the Virgin Islands, B</p>
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B = Bachelors, M = Masters, D=Doctor of Nursing Practice, P=Doctor of Philosophy in Nursing

Figure 1 – HBCUs offering BSN, MSN, DNP, and PhD degrees.

Strategies to Advance PhD Nursing Science Careers at HBCUs

Existing challenges to promoting nursing science careers at HBCUs are significant but can be lessened through a variety of strategies. Nursing can benefit by investing in HBCUs, therein promoting health equity and increasing the pipeline of diverse nurse scientists. Providing research opportunities for undergraduate and graduate nursing students is a promising strategy for promoting future careers and interest in research. However, to do this, approaches must be well thought out and intentional in delivery. Proposed strategies to advance nursing science careers at HBCUs include gifts, creative mentoring, partnerships, collaborations, and creating a culture of research at HBCUs.

Gifts and Creative Mentoring Programs

Recent gifts to HBCUs from billionaires like Michael Bloomberg (\$100 million) and Mackenzie Scott (\$800 million) demonstrate their understanding of the great impact of HBCUs. Gifts can be used to develop scholarships, programs, and professorships that provide opportunities to expose and engage students in research. For example, literature strongly supports the benefits of mentorship in guiding career trajectories and meeting established goals (Deatrck, & Given, 2011; Kostovich, 2010). Representatives from three HBCUs in Maryland, highlighted the power of partnership and collaboration in developing a self-described statewide mentoring training initiative. The mentoring training was designed for leaders from HBCU schools of nursing from across the country and state action coalition leaders from the Future of Nursing: Campaign for Action, an initiative of AARP Foundation, AARP, and the Robert Wood Johnson Foundation. The partnership focused on helping students stay in school, graduate, and pass licensure exams (www.campaignforaction.org, 2020). Similar creative mentoring programs with a goal of increasing the pipeline of minority nurse scientists can be developed.

Opportunities exist for nurse scientists to develop mentoring programs that would allow nursing students from HBCUs to be engaged in research experiences with their programs of research and research teams. An example of a mentoring program that could be a model for this type of engagement is the [Diversity in Nurse Anesthesia Mentorship program \(2021\)](#). The mission of this program is to inform, empower, and mentor under-served diverse populations with information to prepare them for a successful career in Nurse Anesthesia. The Florida Prostate Cancer Research Training Opportunities for Outstanding Leaders (ReTOOL) Program is a collaboration between the University of Florida and Florida Agricultural and Mechanical (A & M) University that includes mentorship, didactic curriculum, networking, and hands on experience in cancer research with a goal of increasing

the pool of underrepresented minority candidates with scientific and academic career progression paths focused on reducing cancer health disparities (Odedina et al., 2019). Lastly, the National Institutes of Health funded Research Education in Cardiovascular Conditions (RECV) project at [New York University Rory Meyers College of Nursing \(2021\)](#) provides mentorship, hands-on research experiences, and interdisciplinary training during a 10-week summer research program designed for diverse undergraduate and graduate students from Howard University who are interested in cardiovascular-disease related science careers.

Partnerships and Collaborations

Research Intensive Institutions. Undergraduate and graduate nursing students at HBCUs should be provided with opportunities to collaborate with research intensive schools within the HBCU or at an external research-intensive institution. HBCUs with nursing programs vary in their degree programs with some having only undergraduate programs and others with graduate level programs (See [Figure 1](#)). Only four have PhD programs, which limits the intensity of the research being conducted by faculty in these programs. However, some Universities as a whole, are research intensive with other schools having a strong research portfolio. For example, North Carolina A&T State University is a research-intensive HBCU, ranking fourth in the North Carolina University-system in research funding. However, the school of nursing is teaching focused and only offers an undergraduate program. Engaging nursing students in interdisciplinary research opportunities as an undergraduate research assistant is an innovative strategy that has benefits across disciplines. Providing an interdisciplinary research fellowship that allows nursing students to apply for an undergraduate research assistant position with a researcher in another discipline (e. g., engineering) allows for an enriched experience. Nursing programs can collaborate with other Schools within their University to offer their students such opportunities. This example can also extend across institutions. When the opportunity presents, matching these students with scientists from minority backgrounds is recommended, but not required. Scientists, should however, have cultural competence and application in working with students of color.

Partnerships between HBCUs and other research-intensive nursing schools have been a strategy to increase the diversity of nurse scientists and nurses who hold a PhD. We describe three exemplars with references for how this can be done. To address the underrepresentation of ethnic minorities in research-focused nursing doctoral programs, Winston-Salem State University (WSSU) Division of Nursing partnered with Duke University School of Nursing to establish a Bridge to the Research Doctorate program ([Brandon et al., 2014](#)). This 6-year program, funded by the National Institute of General Medical

Sciences (4R25GM102739-05) provided a research honors track for graduate nursing students from underrepresented minority groups who were enrolled at WSSU, with the aim of preparing them to seamlessly transition into a PhD program at Duke University. This partnership was mutually beneficial. Duke graduated the largest number of ethnic minorities with PhDs as a result of this partnership. Of the 11 Bridge scholars who graduated from WSSU, eight matriculated to Duke and of the eight, five (63%) have graduated thus far (D. Brandon, personal communication, June 11, 2021). There are six papers in the literature connected to this grant (NIHReporter, 2021). However, funding for this program ended. Sustainability plans for such programs are needed to have a lasting impact in the development of a diverse group of PhD prepared nurses and nurse scientists.

Gasman et al. (2020) describe additional partnerships like the National Institute of Nursing Research and National Institute of Minority Health and Health Disparities funded, Research Enrichment and Apprenticeship Program between North Carolina Central University (NCCU) and the University of North Carolina – Chapel Hill and the Hampton University and University of Pennsylvania Center to Reduce Health Disparities (Hutchinson et al., 2007). Goals of these 5-year partnerships included increasing the number of African American nurse researchers and promoting the development of culturally competent research on health disparities. HBCU student outcomes included receipt of funded pilot studies, completed research projects and dissertations, publications, and presentations at national and international conferences (Gasman et al., 2020; Hutchinson et al., 2007). Overall, 25 publications resulted from these partnership programs (NIHReporter 2, 2020a; NIHReporter 3, 2020b). However, in addition to plans for sustainability, more outcome data (i.e., number of program participants who earn a PhD, secure federal funding, obtain research awards) for such programs are needed. There are no accessible databases for HBCU nurse graduates. One recommendation would be to establish a repository/database which would serve as an invaluable resource commemorating the successes of HBCU nurse graduates.

Federal. Partnerships between federal agencies and HBCUs through grant opportunities and assistance, internships, and special programs can also strengthen the capacity of HBCUs in supporting students and faculty. The Health Resources and Services Administration Bureau of Health Workforce (BHW) improves the health of underserved and vulnerable populations by strengthening the health workforce and connecting skilled professionals to communities in need. BHW transforms the health care workforce by creating community-based training opportunities, recruitment and retention incentives, and sustained support for clinicians working in rural and underserved areas. BHW recruits, trains, and retains health care providers through scholarship and loan repayment programs.

Through programs like the National Health Service Corps, Nurse Corps, and health careers pipeline and diversity programs, skilled professionals are ready to serve in Health Professionals Shortage Areas in rural and underserved communities (www.hrsa.gov). The BHW reports almost 500,000 participants in the 2019-2020 reporting period across all training sites and all health professions programs.

Further, each Institute and major Office of the National Institutes of Health (NIH) has substantial training, outreach, and summer programs available to HBCU students and qualified applicants across the nation. For example, the National Institute on Aging (NIA) supports annually the Butler-Williams Scholars Program, providing unique opportunities for junior faculty and researchers new to the field of aging to gain insight about aging research (NIA, 2020). The post-doctoral program lectures cover research topics on the biology of aging; genetics and Alzheimer's disease; health, behavior, and aging; and health disparities research related to aging. Discussion sessions focus on methodological approaches and interventions. The program also includes support and consultation for the development of participants' research interests as well as advice on preparing and submitting research grant applications to NIA. Applications are sought from emerging researchers, including those who may have limited involvement in research on aging. Researchers with an interest in health disparities research related to aging are encouraged to apply and applicants from diverse backgrounds, including individuals from underrepresented racial and ethnic groups, individuals with disabilities and women are sought and encouraged to apply for NIH support and training (www.nia.nih.gov). To reiterate, each Institute at the NIH has a summer training program for students. Tracking outcomes of such programs can be challenging due to individual participant privacy and change in name and institution, however, tracking partnerships with HBCUs is more feasible. For example, in 2018, the National Cancer Institute in the "Partnerships to Advance Cancer Health Equity" reported in two of its initiatives (U54 and P20 mechanisms) a total of nine Partnerships with HBCUs. The total budget for the initiative was \$41,635,107 with HBCUs receiving \$8,743,372 (21% of total budget; National Cancer Institute, 2018).

Additionally, in 2017 Diane Frasier, director of the Office of Acquisition and Logistics Management, established the Path to Excellence and Innovation (PEI) Program at NIH in accordance with a White House initiative to promote excellence and innovation at HBCUs. PEI's mission is to empower HBCUs with the knowledge, resources, and skills needed to compete for and win partnership opportunities within NIH, specifically for grants, contracts, and cooperative agreements (NIH Record, 2021).

The Scholars Recognition program within the U.S. Department of Education's White House Initiative on HBCUs (n.d.) was created to help form the next

generation of leaders who exhibit and champion HBCU excellence and are expected to make meaningful contributions to society. Program scholars are selected for their academic achievement, civic and campus engagement, and entrepreneurial ethos and provided with resources and outreach and engagement opportunities. At the federal level there is also the potential to advance public and private support for HBCUs through policy innovations in reparation. For example, HR 40, introduced by Representative Sheila Jackson Lee, advances an Act to establish a Commission to Study and Develop Reparation Proposals for African Americans. This Act could offer an educational and advocacy opportunity to raise awareness of the impact of HBCUs in advancing health equity. Such a policy lever could expand support to individuals and organizations to advance educational equity and opportunity for Black scholars, including nurse scientists.

Professional Organizations

Professional organizations and research societies should offer special programs for students at HBCUs to attend research conferences (local, state, regional, national, international) to gain exposure to research and to nurse scientists. For example, when conferences are held in states where HBCUs are located (See [Figure 1](#)), the organizations can reach out to HBCUs to offer discounted rates for attendance or sponsor attendance for students. Membership or diversity committees within these organizations can select members to welcome and guide these students through their conference experience. In 2019, the [American Heart Association \(2021\)](#) launched an HBCU Scholar Program, designed to support the development of minority scientists and health care professionals by exposing them to scientific research. Professional organizations could also facilitate and nurture formal relationships among member organizations to advance system level collaboration.

Creating a Culture of Research Within HBCU Nursing Programs

Whether research is or is not being conducted within HBCUs or their surrounding community, efforts should be made to create a culture of research with emphasis on how research can improve healthcare, patient outcomes, and minimize health disparities and inequities. This is critical in this season of pandemics. Strategies within HBCUs could include engaging research classes with practical examples of nurse scientists, honors research programs or research training programs, and faculty who can identify talented students and connect them with research opportunities.

Within undergraduate and graduate research courses and at campus research and leadership-related events, Black American or minority nurse scientists and their work could be highlighted. It is known that being able to identify with others in your

race allows one to see the possibilities and opportunities that can exist for future scientists and academics. Including the research of minority nurse scientists in assignments, such as literature reviews or critical appraisals are recommended. Inviting minority nurse scientists to share their career trajectories or to guest lecture in the classroom or through a virtual platform is another way for students to be exposed to research programs of minority nurse scientists. The Betty Irene Moore Fellowship Program for Nurse Leaders and Innovators and other programs (e.g., The Rita and Alex Hillman Foundation; The Robert Wood Johnson Foundation, Sigma Theta Tau- International Honor Society of Nursing, National Hartford Center of Gerontological Nursing Excellence, and the Jonas Nursing & Veterans Healthcare of Jonas Philanthropies) that promote nursing leadership, innovation and research also should be highlighted along with their minority nurse fellows, as a way to inspire future nurse scientists. Similarly, these programs can highlight their minority fellows and support them in engaging in outreach to HBCUs and other minority serving institutions.

Conclusions

Since 1940, nursing programs at HBCUs have been instrumental in increasing the workforce of diverse baccalaureate-prepared nurses, but with less credit and accolades on the undeniable impact of HBCUs in providing the foundation and inspiration for careers in nursing research. HBCUs should not be underestimated or overlooked; they have a proven track record of success in productivity and advancement of Black scientists. These scientists often research the health disparities most prevalent yet understudied among Black Americans. Nursing's future as a discipline requires investment in strengthening programs at HBCUs at all levels; therein promoting health equity and contributing to a robust nurse scientist workforce. With growing gifts and endowments, faculty and research resources, mentoring and creatively designed partnerships and programs, it is anticipated that HBCUs will continue to contribute to the STEM workforce and the future of nursing scientists. The knowledge, HBCU pride and cultural humility of these nurse scientists will enable them to lead in creating trusting research environments that can answer questions to help close gaps in the disturbing health inequities faced by our nation.

Author Contribution

Dawn Aycock: Conceptualization, Investigation, Writing – Original Draft, Writing – Review & Editing. Kamila Alexander: Writing – Investigation, Original Draft,

Writing – Review & Editing. Schenita Randolph: Writing – Investigation, Original Draft, Writing – Review & Editing. Fawn Cothran: Writing – Investigation, Original Draft, Writing – Review & Editing. J. Taylor Harden: Conceptualization, Investigation, Writing – Original Draft, Writing – Review & Editing. Heather Young: Funding Acquisition, Writing – Review & Editing.

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