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UTILIZING A COMMUNITY-BASED DOULA CARE INTERVENTION TO REDUCE RACE-BASED PERINATAL HEALTH INEQUITIES IN JEFFERSON COUNTY, KENTUCKY

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Abstract

Target Population and Need
The United States is currently the only industrialized nation in the world experiencing increasing rates of pregnancy-related mortality.[1,2] Black women die at 3-4 times the rate of their white counterparts.[1-5] This disparity is likely caused by the experience of systemic racism, which increases allostatic load and produces epigenetic modifications linked to higher likelihood for poor birth outcomes. Biases perpetuated by health care providers result in black women being less likely to receive quality healthcare and more likely to experience poor perinatal health outcomes.[1-7] The provision of doula-based care can mitigate these racial disparities and should be available to all pregnant women.[8]

Program Approach
The provision of community-based doula care and health education classes provides an integrated solution for improving black maternal health outcomes.[2,6-8] This program references an established doula care program from Greensboro, North Carolina, to inform implementation in Jefferson County, Kentucky.

Performance Measures and Evaluation
A post-test analysis of maternal and infant outcomes will be conducted to determine the efficacy of this intervention. A process evaluation will also be conducted during program implementation to ensure the program is being implemented with fidelity while also meeting the unique needs of the population it serves.

Capacity and Experience of the Applicant Organization
The Louisville Metro Health Department has a long-standing history of serving the Louisville Metro community to improve health and promote wellness. Implementation of the Healthy Beginnings Doula Program will continue to serve our residents to meet the needs of women and children in our community.

Partnerships and Collaboration
The HBDP will partner with local resources, such as WIC and HANDS, to ensure the needs of our program participants are met. Our Community Advisory Board will continue to work with us to maintain these partnerships and collaborate with the Louisville Metro community to ensure we are properly serving our participant base.

Project Management
Our Project Director will oversee operations of the HBDP in Jefferson County, supervise the doula staff and health educator, and work more broadly with the Health Department to maintain departmental initiatives. A Principal Investigator from the University of Louisville School of Public Health and two graduate students will be contracted to collect and analyze data.

Target Population and Need

Maternal Mortality and Doula Care

In the United States, maternal and infant mortality rates are the highest for any nation in the industrialized world.[1] This disparity is further compounded when stratified for racial differences. Black women in the United States are three to four times more likely to die from pregnancy-related complications than their white counterparts.[1] In addition to rising mortality rates, black mothers are also experiencing increased rates of pregnancy-related hypertension, diabetes, and chronic heart disease.[1] The cause of this disparity was largely a mystery until recently when medical providers and public health officials began to recognize that the race-based inequities in maternal health outcomes was rooted in systemic racism as a fundamental cause of disease.[2]

The experience of racism in the clinical setting commonly manifests through the biases that providers have toward black women and pain. Black women often report that their providers did not take their pain seriously, leading to increased rates of cardiovascular complications (such as pulmonary embolism), postpartum hemorrhage, and death.[8] These biases held by providers are often rooted in the incorrect assumption that black women have higher pain tolerances than other women, are seeking prescription pain medication for improper use, and generally are less credible than other women in the clinical context.[8] In these ways, the implicit racial biases held by providers serve as a fundamental cause of disease as the perpetuation of racism directly impacts the health of black women and ultimately leads to increased rates of mortality and other pregnancy-related complications.[8,11] To combat these stereotypes, and to empower black women to continue to advocate for themselves in the

clinical setting, the American Public Health Association (APHA) has recommended that community-based doulas provide support during labor and delivery, along with care during both the prenatal and postpartum timeframes.[8]

Community-based doulas provide care to their patients in many ways. These paraprofessionals are trained and certified to provide prenatal, labor and delivery, and postpartum support to supplement the clinical care that an expecting patient needs. Prenatally, doulas provide education regarding breastfeeding practices and perinatal exercise and nutrition, make referrals to clinics for adequate prenatal care, connect families to local social services (HANDS, WIC, SNAP, Medicaid, etc.), and provide coaches for labor and delivery preparation. During labor and delivery, the doula is often present to provide support for their patient and advocacy when needed. Studies show that the utilization of doula services during labor and delivery lead to reduced rates of cesarean sections and reduced needs for pain medication during and after delivery.[2,6,7] If doula services continue postpartum, patients are typically provided with additional breastfeeding support, postpartum care, education about birth spacing, and parenting support. For these reasons, it is recommended that women receive perinatal doula support to improve overall maternal and infant health and wellness and to reduce perinatal racial health disparities.

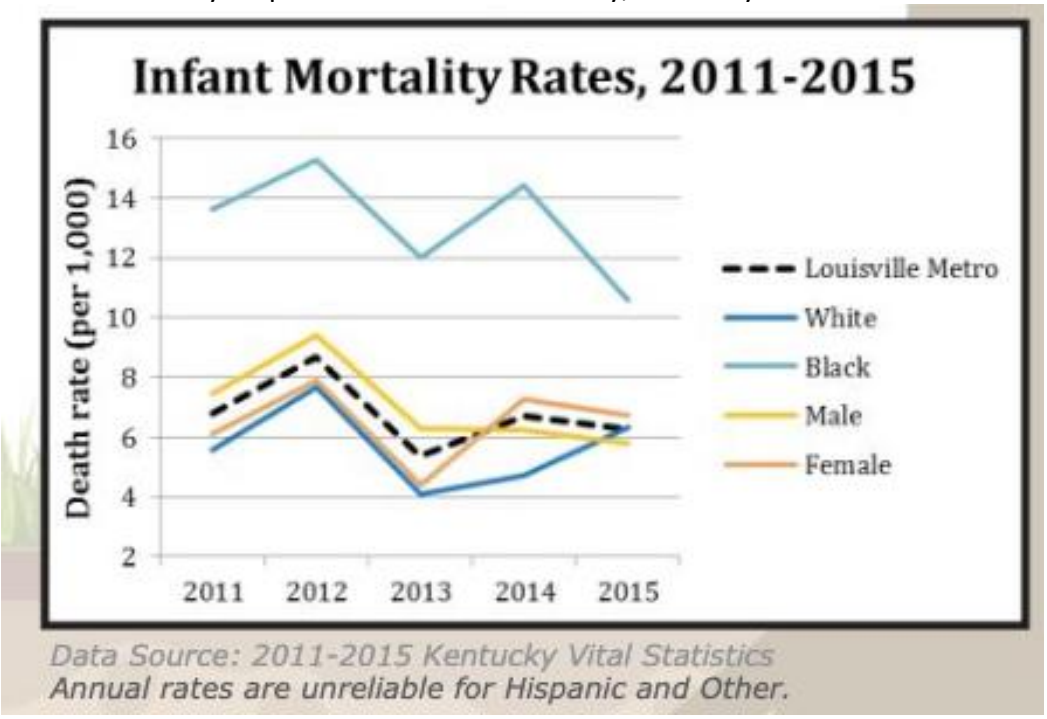
Infant Mortality

With regard to infant mortality data, the Centers for Disease Control and Prevention (CDC) show that the infant mortality rate in the United States is approximately 5.8 deaths per 1,000 live births.[3] According to the guidelines that have been set forth by Healthy People 2020,

it appears at first glance that the United States met these guidelines.[3] Unfortunately, when stratified by race, we see a drastic disparity that exists in infant mortality rates across racial groups. At the national level, white infant mortality rates are approximately 4.9 deaths per 1,000 live births. Compared to black infant mortality rates, which are approximately 11.4 deaths per 1,000 live births, we see that black infant mortality rates are far above the guidelines proposed by Healthy People 2020.[4]

Infant mortality rates in Kentucky show a similar set of trends. The overall infant mortality rate in the state of Kentucky is 6.5 deaths per 1,000 live births, so Kentucky has not yet reached the goal proposed by Healthy People 2020.[4] When stratified by race, again, we see that white infant mortality rates (6.5 deaths per 1,000 live births) are much lower than black infant mortality rates (10.4 deaths per 1,000 live births). These statistics are almost identical when analyzed at the local level. In Jefferson County, Kentucky, black infants die at a rate of approximately 10.5 deaths per 1,000 live births compared to their white counterparts, which die at a rate of about 6.5 deaths per 1,000 live births.[5] Racial health disparities with regard to infant mortality are shown below in Figure 1.

Figure 1. Infant Morality Disparities in Jefferson County, Kentucky[5]



Based on data collected by the Office of Vital Statistics and a Community Needs Assessment conducted by the Jefferson County Health Department, black infant health is a public health crisis in Jefferson County. In addition to disparate rates of infant mortality, black infants are also much more likely to be born preterm and with low birth weight when compared to white infants.[5] Figures 2 and 3 below illustrate racial/ethnic disparities for preterm birth and low birth weight, respectively.

Figure 2. Preterm Birth Disparities in Jefferson County, Kentucky[5]

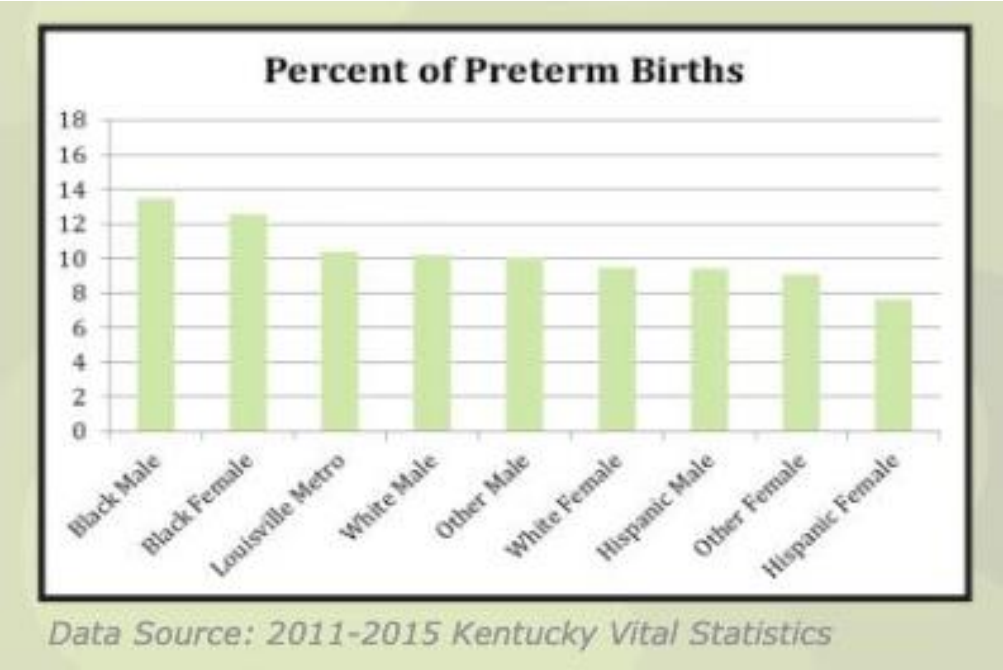
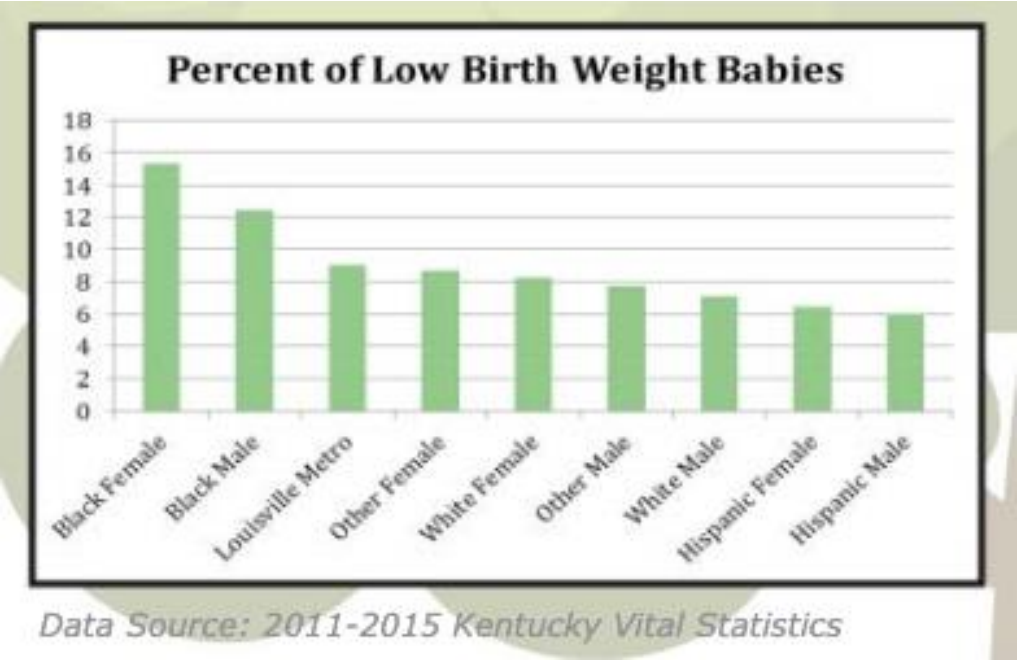


Figure 3. Low Birth Weight Disparities in Jefferson County, Kentucky[5]



Jefferson County has identified that some likely causes of this racial disparity in black infant health are rooted in systemic racism. In this county, black parents are much more likely to experience loss of employment and work in lower paying jobs.[5] On top of unstable employment opportunity and low income, many black parents are also exposed to food deserts, making adequate perinatal nutrition almost impossible for many black mothers.[5] The Health Equity Report also states that black parents are more likely to experience involvement in the Criminal Justice System, which has a variety of negative impacts on mothers and infants.[5] If a parent is jailed at any point, this can result in the loss of employment which can contribute to the income disparities previously discussed.[5] Additionally, if a pregnant mother is placed in jail, the stress that she may experience can be directly correlated with lack of proper prenatal care and subsequent poor pregnancy-related and birth outcomes.[5] These racial disparities must be addressed in order to ensure adequate maternal and infant health in Jefferson County.

This community-based doula program aligns closely with the needs and resources of the Jefferson County community. With high levels of black maternal and infant mortality in the state and city, an evidence-based doula program that reduces these disparities will help close the mortality gap between black and white members of the community while also improving overall maternal and child health in the city. This doula program was selected because its evidence-base shows that it is effective at reducing infant mortality rates, particularly in black and brown populations, and improves overall maternal experiences and outcomes during the labor and delivery process. Since this program does not exclude participants based on their racial and ethnic identity, all eligible members of the community can participate to receive the health benefits provided by this program.

This program will aim to reach areas in Jefferson County that have the highest rates of black and brown women living in those areas. Of the 615,000 persons living in Louisville, approximately 20% of those persons are black and 50% are women. Utilizing those numbers, this suggests that approximately 30,000 persons living in Louisville may be black women of reproductive age. This program will aim to serve approximately 500 women each year.

To implement this program to the scale of Jefferson County, more staff will be hired than initially employed in the original program. The population of Jefferson County in Kentucky is over double that of Greensboro, NC, with higher numbers of black and brown women living in Jefferson County. To address this size disparity, additional doulas will have to be hired to accommodate a larger participant base, and larger facilities will have to be utilized for teaching health classes and conducting health coaching. This will require working with Jefferson County

Health Department staff and the Kentucky HANDS program to implement this style of intervention both to scale and with fidelity.

In Jefferson County, there are several resources available to the community that can be useful in reducing black infant and maternal mortality and other race-based perinatal health inequities. One of the most useful resources available is the Kentucky HANDS Program[12]. The HANDS Program is a home-visiting services in which families receive regular home visits from a professional or paraprofessional in order to promote health development of any children living in the home, family independence and sustainability, and proper parenting techniques. In addition to the HANDS Program, members of the community can also access services such as Medicaid, WIC, and SNAP (all federal assistance programs) to help ensure that women and children are receiving adequate medical care, nutrition, and supplies/services necessary for perinatal health. Community members can also access the Jefferson County Health Department and the myriad of hospitals and clinical settings for primary, OB/GYN, neonatal, and pediatric health care services.

The Healthy Beginnings Doula Program, first implemented in North Carolina, closely aligns with the goals of the aforementioned services in addressing black infant and maternal mortality and other race-based perinatal health inequities. For this intervention, community-based doulas meet with program participants prenatally, during labor and delivery, and postnatally to empower women to advocate for themselves in clinical settings, to promote sustainability and healthy perinatal care, and to prepare for the childrearing experience. Additionally, program participants can enroll in health education classes regarding breastfeeding practices, perinatal nutrition and exercise, and general health and wellness.

While this program is a highly impactful intervention on its own, administration of this intervention in conjunction with other available community resources is likely to further improve black maternal and infant health in the community to best meet the need to mitigate these disparities.

In order to identify the needs of the community for the resources and interventions provided to the Jefferson County Community, a community needs assessment and health equity report were conducted and published. Based on the findings of the community needs assessment and the health equity report, infant and maternal mortality, particularly in the black community, were highlighted as major concerns for the Jefferson County community. To continue measuring the needs of the community and the impact of the proposed intervention, data collected on infant and maternal health outcomes from participants in this program will be compare to national, state, and local data, as well as what information is provided in the needs assessment and health equity report, to measure the efficacy of this program in meeting the needs of the community.

Black maternal and infant health can be improved in a variety of ways to reduce overall health disparities. The provision of community-based doula care and health education classes provides an integrated solution for improving health outcomes in this population.[2,6-8] This program implementation will utilize the previously established Healthy Beginnings Doula Program to inform the implementation of a similar program in Jefferson County to close the health gap between black women and their white counterparts.

Program Approach

Recruitment and Eligibility

To effectively recruit women into the Healthy Beginnings Doula Program (HBDP), doulas will go out into the community prior to program implementation to recruit eligible women for the intervention. This will include going to local grocery stores, laundry mats, yoga studies and exercise facilities, as well as local healthcare facilities (Health department, OB/GYN clinics, and hospitals). Referrals from other Health Departments initiatives and programs can also be provided to allow women and families to participate in the HBDP. Women will be eligible to participate so long as they enter the program before the end of their second trimester to ensure that they are able to receive the allotted minimum 2 doses of prenatal care visits with their doula and attendance at at least 3 classes. Participants will be incentivized to remain in the program and participate in research tasks through the receiving of perinatal care items, such as diapers and pacifiers, to compensate them for their time. This strategy is expected to be successful because assigning participants doulas with an explanation of the health benefits will likely increase their desire to maintain doula care and participation in the program, along with the provision of crucial perinatal care supplies.

Implementation

In order to address this disparity, the community of Greensboro, North Carolina launched the Healthy Beginnings Doula Program (HBDP) in 2008 to mitigate black maternal health disparities and other race-based perinatal health inequities.[7] The HBDP program focuses on reducing the rates of adverse birth outcomes through a combination of psychosocial and

perinatal support.[7] This support is primarily administered through their doula program, which assigns a community-based doula to women that are at high risk for adverse birth outcomes, particularly black and Hispanic women.[7] These doulas seek to empower participants to voice their concerns to medical professionals, their families, and their partner while also provide physical support during labor and delivery and emotional support throughout the perinatal timeframe. Additionally, participants in this program are provided with nutrition and fitness classes, perinatal care education (which includes breastfeeding initiatives), and psychosocial support through visitation in conjunction with the assigned doula.[7] Participants must attend 3 of these health education classes (which utilizes the Healthy Moms Healthy Babies curriculum) to be assigned a doula. This program was created using a *life course perspective* to recognize that the birth experience is affected by the entire life course of the mother, family, and partner instead of only looking at the 10 months of pregnancy.[7]

Participants in the HBDP, particularly women of color, experience many positive outcomes. Mothers assisted by doulas were four times less likely to give birth to a baby with low birth weight, more likely to proceed with physiologic (vaginal) birth, less likely to seek pain medication during labor and delivery, and were less likely to experience birth complications.[7] Other benefits of this program were that women self-reported higher satisfaction during the perinatal timeframe when they received doula-assisted care, and were more likely to initiate breastfeeding.[7]

When implementing the HBDP program to serve at-risk populations in Jefferson County, Kentucky, there are minor adaptations that should be made. The most important adaptation would be in the selection of the doulas. Since this program was originally implemented in North

Carolina, doulas for a Kentucky-based program should receive a different training protocol to ensure they are administering culturally competent and structurally relevant care to the women being served. Additionally, further training should be provided to teach doulas how to begin to address systemic racism in the healthcare field, likely by providing supplemental education on empowering their patients to advocate for themselves in clinical settings during all stages of perinatal care. We will also be implementing an option for low-income women and families with unreliable access to transportation to participate in our program.

This intervention will be based in the Precaution Adoption Process Model (PAPM) to effectively gauge participant willingness to adopt health behaviors promoted by this program, such as breastfeeding practices, perinatal care, and exercise and wellness. The goal of using this approach is to work with participants to get promote the adoption of these practices and maintain them throughout the course of the program. We also hope to give women the skills necessary to have healthy and successful subsequent pregnancies. Health Education replies on Social Cognitive Theory to maximize self-efficacy, while also recognizing the impacts of the environmental and behavioral factors.

The implementation of the HBDP will occur by targeting women eligible for the Kentucky Health Access Nurturing Development Services (HANDS) program, and those with limited access to medical care. In the HANDS program, at-risk families and parents are already served through home visitation to promote proper perinatal care, early childhood care, and sustained independence, which is facilitated by local health departments.[12] Like HANDS, the Healthy Beginnings Doula Program will be implemented in the Louisville Metro Health Department by establishing a partnership with other maternal and child health programs in the

Division of Health Services (such as WIC and Healthy Start). These partnerships will function to provide a population for recruitment, while also allowing for referrals across programs to maximize health benefits and services received by community members. This serves as the perfect vehicle for implementation in Kentucky because many at-risk mothers are already identified and are served by the HANDS program, so implementing the doula program will serve to confer additional health benefits to those most at-risk. During the initial implementation of the HBDP program, the three locations that have been selected are the Jefferson County Health Department, the Norton Healthcare Hospital Network, a local yoga studio, and home-implementation. Transportation vouchers, in the form of Louisville Metro Bus passes, will be provided to participants that are otherwise unable to transport themselves to the perinatal education classes. Based on the community needs assessments and diversity in the populations living in these jurisdictions, the doula program could have its highest impact in reducing race-based perinatal health inequities in these districts and serve to reduce overall maternal mortality.

Group perinatal care, administered through the *Healthy Moms Healthy Babies* health education classes, has been shown to be particularly impactful in reducing racial disparities between white women and women of color, while simultaneously improving perinatal health outcomes for all women.[20-22] The reduction in disparities can largely be attributed to providing social support, through the lens of social cognitive theory, to marginalized women that may not receive social support in other capacities.[20-22] This is an important distinction to make because the goal of our program is to not only reduce race-based perinatal health inequities, but to also improve the overall health of all women served by our program.

In order to ensure that participants in the community-based doula program are not stigmatized, the most important process is in recruitment. Though this program is designed to confer the greatest benefit to black and brown women, women of all racial and ethnic identities will be allowed to enroll to ensure that there are no racial stigmas perpetuated by the program surrounding mortality rates and a great need for this program. In addition to culturally and structurally competent recruitment, all staff participating in the doula program will receive implicit bias training to ensure they are not treating community members participating in this intervention any differently based on any number of implicit biases. Community-based doulas will also be trained to help educate their participants how to effectively advocate for themselves in the clinical setting, especially during the perinatal care processes, to help address any stigma from the medical community in the treatment setting. All doulas must be certified in both labor and delivery and postpartum care. This certification will be provided by DONA international, and doulas will be recruited and certified from the local community to ensure they are trusted by other members of the Louisville Metro participating in this program.

To effectively establish this intervention in the Jefferson County community, a Community Advisory Board (CAB) must be established to ensure the needs of the community are addressed in a culturally competent and intentional manner. The Community Advisory Board will consist of a variety of community members with expertise in healthcare, public health, and addressed the needs of black women in clinical settings. Community Advisory Board Members will be an OB/GYN, a neonatologist, and a pediatrician from local healthcare settings, a member of La Leche League, a member of the Black Mamas Matter Alliance (BMMA), black mothers from the community, and members from the local health department to incorporate a

wide variety of viewpoints and expertise to guide the implementation of this program to maintain its fidelity while also meeting the specific needs of the Jefferson County community.

In addition to working with a local CAB and other stakeholders to ensure this program is meeting the needs of the community, the intervention must also be implemented in a way that is accurate and appropriate for its recipients. The most important component of this program will be the services provided by the doulas, so all community-based doula staff will receive extensive certification and training in prenatal, labor and delivery, and postpartum doula care through Doulas of North America (DONA) International, which is an internationally acclaimed doula education program. The Project Director will provide any further trainings to doula staff to ensure they are prepared to work with members of the Louisville Metro Community. This will ensure all doulas are trained in current best evidence-based practices to guarantee quality care for program participants and are providing culturally competent services to the community they are serving. All program staff, including the doulas, will also be receiving implicit bias training to best mitigate any biases they may have against certain program participants. This is particularly important for addressing biases against low socioeconomic status, race and ethnicity, age during pregnancy, drug use, and nationality. Jefferson County is an extremely diverse county, filled with residents from many different nationalities and racial/ethnic backgrounds, so translation services will also be provided to any program participants that are facing linguistic communication barriers with their doulas and with their education classes.

Sustainability

After the completion of the initial three years of this program, should this program be successful, we will seek to partner with the Kentucky HANDS Program to allow for doulas to bill Medicaid for their services. This will ensure that women and families in need of doulas services will continue to be able to access this mode of care, while also providing them with further access to other valuable maternal and child health programs and resources established within the Louisville Metro Health Department.

Performance Measures and Evaluations

Process Evaluation

To ensure this program has been implemented and is managed properly, and to monitor overall progress of the program, a formative process evaluation will be conducted throughout the first year of the program, and then periodically through the remaining two years. The purpose of this process evaluation is to measure that the program is properly reaching its target audience to scale, to ensure the program is being implemented with fidelity, and to measure the doses delivered by facilitators and doses received by participants. To measure program reach, for each participant recruited, the doulas will track how many prenatal, labor and delivery, and postnatal contacts they have with each participant and health educators will take attendance at each class sessions. These data will be utilized to track how many participants this program has served throughout the course of this grant period, how many contact points were made during program participation, and whether or not doulas and health educators are meeting with participants the required number of times for max efficacy.

Fidelity will be measured in several different capacities. In health education classes, supervisors will sit in on classes to ensure the proper curriculum for each session is being delivered and that there are no omissions or changes to these curricula that will damage the fidelity of these classes. With regard to doula visits and labor and delivery care, focus groups with program participants will be conducted to discuss the activities and content of these visits to gauge if doulas are adequately supporting program participants. These focus groups will occur throughout the first year of the program to ensure the program launches smoothly, then again in the third quarters of the second and third years of the program to measure participant attitudes towards the program and program fidelity. Site visits will also be conducted to interview both doulas and program participants with the intent of gathering structured data about content of doula care. Case file reviews for each participant will also be conducted by program staff to monitor doula visits and care administered.

The doses delivered and doses received for both doula interactions and health education classes will be evaluated using the data collected to measure program reach and fidelity. By taking attendance at classes and monitoring the content of doula-care home visits and labor and delivery support, the dosage administered by facilitators and dosage received by participants will be measured to ensure that all program participants are receiving the maximum dosage relative to their program enrollment. The Project Director will also supervise some Health Education classes to ensure content is being delivered appropriately based on the needs of the community and the curriculum of the original program.

Expected Outcomes

Participation in a modified Healthy Beginnings Doula Program is expected to yield several positive health outcomes. For maternal health short-term outcomes, participants are expected to show higher rates of self-advocacy in the clinical setting, to report increased self-efficacy for breastfeeding initiation and maintenance, to experience decreased rates of cesarean section and pain medication usage, and to report increased knowledge about perinatal health and wellness. Long-term, these health improvements are expected to decreased overall rates of pregnancy-related health complications and mortality to ultimately mitigate perinatal health gaps. The utilization of doula services is also expected to reduce overall costs associated with perinatal care and emergencies, as improved overall maternal health will result in lower need for further medical intervention surrounding perinatal complications.[10,11]

Infant short-term health outcomes are also expected to improve from participation in this intervention. Parents will be better connected to prenatal care, have higher knowledge surround perinatal nutrition and exercise, and breastfeeding will be promoted, so there should be a decrease in incidence of low birth weight and preterm birth. Short-term improvements in infant health should lead to overall decreases in infant mortality and lead to the closure of the infant mortality and other neonatal health disparities gap.

Measures and Outcome Evaluations

Table 1. Performance Measures for Patient Data Collection and Analysis

Construct	**Measure**	**Psychometric Properties**
Infant Mortality	Birth/Death Certificates	N/A
Maternal Morality	Birth/Death Certificates	N/A
Cesarean Sections	Birth Certificates and Electronic Medical Records	N/A
Birth Outcomes	Birth Certificates and Electronic Medical Records	N/A
Breastfeeding Initiation	Birth Certificates and Patient/Doula Self-Report	N/A
Smoking Cessation	Birth Certificates	N/A
Substance Use during Pregnancy	Birth Certificates	N/A
Pain Medication Use During Labor and Delivery	Patient and Doula Self-Report	N/A
Breastfeeding Maintenance	Breastfeeding Self-Efficacy Scale[13]	Cronbach alpha of 0.90
Birth Spacing	Patient Self-Report	N/A
Perinatal Nutrition Knowledge	Pregnancy Nutrition Knowledge Scale[14]	Cronbach alpha of 0.80
Self-Efficacy for Perinatal Exercise	Exercise Self-Efficacy Scale[15]	Cronbach alpha of 0.93
Perinatal Depression	Edinburgh Perinatal Depression Screening (EDPS)[16]	Cronbach alpha of 0.84; acceptable internal reliability
Prenatal Care Knowledge	Preconception and Prenatal Care Knowledge Survey[17]	Frey and Files developed a survey in their study of preconception and prenatal care knowledge. Their survey has not yet been validated, but several subsequent studies have utilized their scale and approach.
Self-Advocacy During Labor and Delivery	Patient Self-Advocacy Scale[18]	Cronbach alpha for all scale components ranges from 0.62 to 0.82; reliable and valid measure for measuring patient self-advocacy in clinical contexts
Patient Satisfaction Regarding Labor and Delivery	Short Assessment of Patient Satisfaction (SAPS)[19]	High reliability (Cronbach alpha of 0.86), strong internal validity,
Increased Connections to Local Resources	Local Resource Review Sheet (created by PI)	This instrument is not validated; however, we will use this to gauge

		baseline knowledge and connectedness to local resources

We will be conducting a post-test analysis of maternal and infant birth outcomes to determine the efficacy of our program. All outcomes will be measured by analyzing birth and death certificates, electronic medical records with patient permission, and self-report data surrounding breastfeeding, perinatal care, and exercise and wellness knowledge and self-efficacy, along with patient satisfaction with regard to labor and delivery and provider interactions.

A four-arm comparison analysis will be conducted to measure program efficacy. A control group of women that would have been eligible to enroll in our program but did not enroll will be used as a baseline comparison group. Data on birth outcomes and perinatal care will be collected from birth and death certificates and electronic medical records. Through our partnership with our birthing hospitals, we will also ask clinicians to administer patient satisfaction and other surveys to these women to collect their self-report data. We will compare these data to data collected from women who participated in the HBDP program with doula care (as administered in the healthcare settings and at the health department, as this is how the initial program was implemented). The third arm of this study will compare outcome data from the HBDP participants that did receive doula care. The final arm of this will be a comparison to women that participate in both HBDP and HANDS. This comparison will determine if there are additional health benefits that are conferred by participating in both programs, and if participation in one program over the other is more beneficial.

As shown in Table 1, a large portion of data with regard to maternal and infant birth and mortality outcomes will be collected by analyzing birth and death certificates, obtained through the Office of Vital Statistics and from the patient. We will also be analyzing Electronic Medical Records (EMRs) when necessary to determine if the patients used substances during or prior to pregnancy and if cessation occurred. Our PI will be developed a questionnaire to collect data on participant knowledge and connectedness to local resources, such as WIC, SNAP, and HANDS. We will also be following the guidance of Frey and Files to develop a preconception and prenatal care knowledge survey to determine the prenatal care knowledge base of participants prior to and after program participation.

Also shown in table 1, we will be administered a number of reliable and validated instruments to measure several constructs and outcomes for our program. We will be administering the Edinburgh Perinatal Depression Screening to measure perinatal depression The Exercise Self-Efficacy Scale will be administered to determine participant self-efficacy for perinatal exercise. Similarly, the Pregnancy Nutrition Knowledge Scale will be administered to determine the level of knowledge participants have surrounding proper perinatal nutrition. These measures will be utilized in conjunction with health education classes, along with the Breastfeeding Self-Efficacy Scale, to measure outcomes during pregnancy and postpartum. These data will then be used to compare outcomes across groups. Finally, the Short Assessment of Patient Satisfaction will be administered following labor and delivery to measure patient satisfaction levels surrounding the labor and delivery process to compare patient satisfaction when doula services are received versus when they are not.

Limitations

Though this intervention will provide doula support and health education to participants to effectively reduce health disparities experienced by black mothers and infants, there are some limitations that must be addressed. This intervention focused on empowering patients to advocate for themselves in the clinical labor and delivery setting, but biases and stigma held by medical professionals still may result in disparate medical care as black women are not believed when reporting pain or other symptoms. To address these attitudes held by medical professionals, implicit bias training and culturally/competent medical education (or continuing medical education for those already practicing) should be made mandatory for all professionals.

One other limitation that must be addressed is the sustainability for this intervention. Though likely to be highly effective, providing community-based doula care to all patients in need is costly, even if overall medical costs are reduced through the provision of care, as doula staff and necessary resources are expensive. To promote further sustainability for this program, policy-level change should occur to allow Medicaid coverage for community-based doula care services. This change would allow for doulas to bill Medicaid for the provision of their services rather than charging their patients and will increase access to all Medicaid recipients rather than limiting the scope of this program to those enrolled.[10,11]

Capacity and Experience of the Applicant Organization

As the Louisville Metro Public Health Department, the implementation of the Healthy Beginnings Doula Program is expected to meet the needs of its target audience based on prior experience in implementing similar programs in Louisville. As the Public Health Department for

the Louisville Metro area, our organization has experience in working with a large population in a diverse community through the administration of the Health Access Nurturing and Development Services (HANDS) Program. Additionally, the Louisville Metro Public Health Department has many sustained partnerships with other relevant organizations, such as the Center for Health Equity (CHE), Racial Equity Here, Healthy Babies Louisville, and Healthy Start for the promotion of maternal and child health and addressing structural racism in the Louisville Metro.

Due to these extensive partnerships and reputability within the Louisville Metro Clinic, the establishment of a Community Advisory Board of diverse stakeholders and decision-makers from across the community is a top priority. By working with members of the aforementioned partner programs, women of color in the community that our program plans to serve, local OB/GYNs, and a member of the Black Mamas Matter Alliance, a wide array of experiences will be utilized to ensure this program is implemented with fidelity, but also with the intent to serve the unique needs of the Louisville Metro. The Louisville Metro Public Health Department has a long-standing history of collecting data to ensure our programs are successful and using these data to ensure the continuous quality improvement of our services.

The Louisville Metro Public Health Department has a strict no tolerance policy to ensure the prevention of discrimination of employees and program participants on the basis of sex, race, sexual orientation, gender identity, color, nationality and citizenship status, disability status, and genetic information. This policy is enforced strictly, and any violations may result in corrective action as necessary.

Partnerships and Collaboration

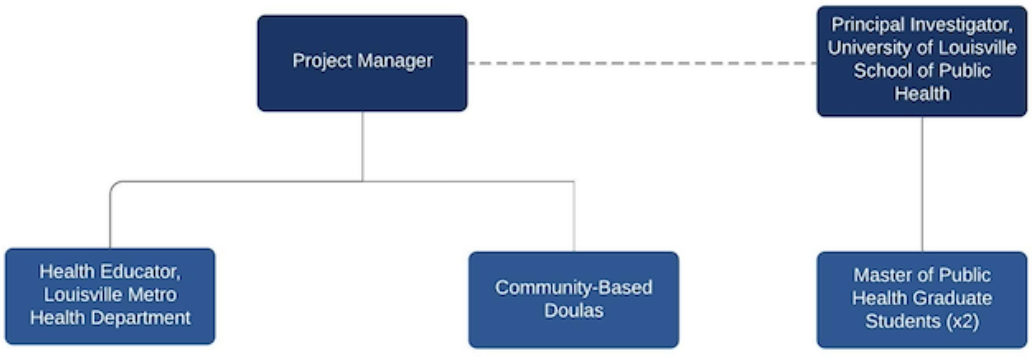
Utilization of the Healthy Beginnings Doula Program has support from several key stakeholders in the Jefferson County community. We will be partnering with several local resources, including Women, Infants, and Children (WIC), HANDS, and Supplemental Nutrition Access Program (SNAP), to make sure that all program participants are connected to the local resources the Louisville Metro offers to promote health in women and children. These partnerships will allow for doulas to refer program participants to each respective service to ensure that women and their newborns receive adequate nutrition during the perinatal period, along with any additional home visitation services that the HANDS program offers, such as aiding in childhood development. Each of these evidence-based resources will collaborate with HBDP to utilize existing systems of service provision to guarantee access to all women in need in the Louisville Metro.

In addition to these local resources, the HBDP will partner with local hospitals and OB/GYN clinics to receive referrals for program participation, along with the ability to collect data regarding maternal and infant health outcomes. This will allow a wide variety of data to be collected from the Louisville Metro area and allow for doulas to refer women for perinatal care when appropriate. These partnerships will also ensure that doula-assisted birth is recognized and supported in the clinical setting. In clinical settings, we will also be working with health care providers to connect HBDP participants with clinical social workers to make referrals and meet the psychosocial needs of our participants that are otherwise unmet by the doulas (such as referrals to therapy, social services, etc.).

A Community Advisory Board of local women, public health officials from WIC, SNAP and HANDS, OB/GYNs and pediatricians, and a member of the Black Mamas Matter Alliance will be assembled to provide guidance to HBDP staff in meeting the needs of women and children in the Louisville Metro. The local women in this CAB will initially be women that have given birth in the Louisville Metro prior to program implementation to provide insight into their experiences and needs throughout their perinatal care. After the first year of the program, we will recruit women that have gone through the Healthy Beginnings Doula Program to join the CAB to provide further insight into their experiences of the program and how the program can be adapted to best meet the needs of the local community. This group will also help ensure the program is successful in working with the previously mentioned partners to reach a wide client base and meet the specific needs of women in the Louisville Metro.

Project Management

Figure 4. Healthy Beginnings Doula Program Organization Chart

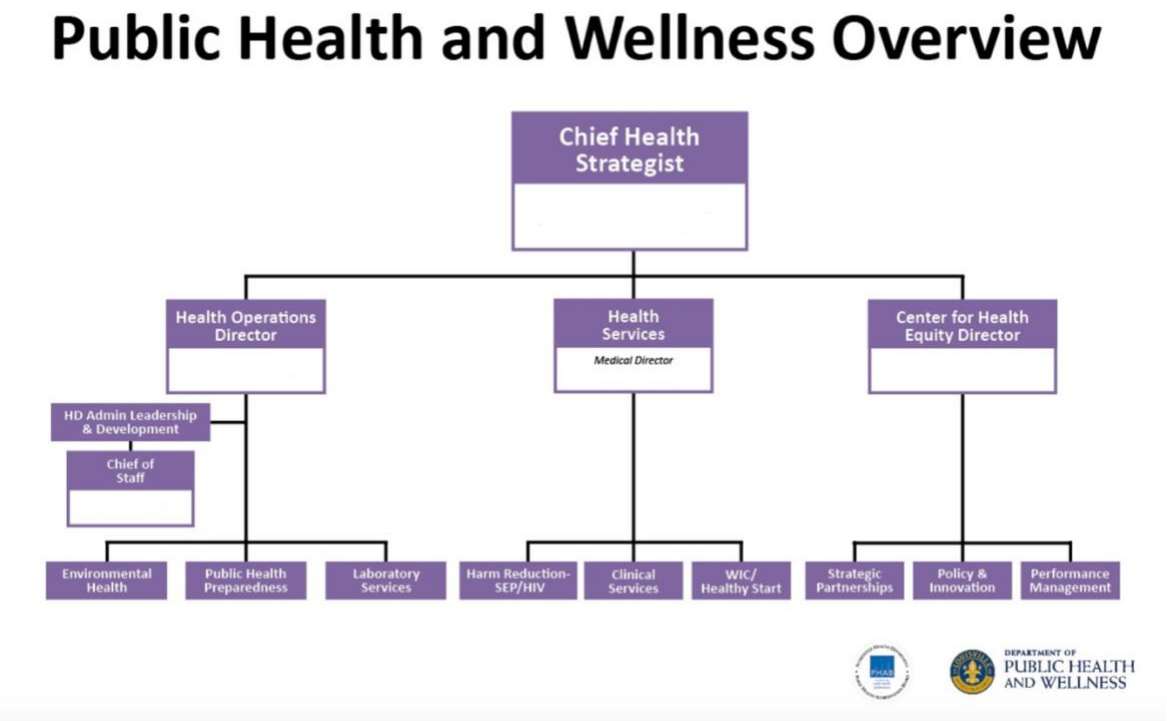


The Project Director for this program, Brendan Mathews, MPH, will be responsible for overseeing program operations, supervising the doula staff and health educators, working with the health department to ensure all departmental initiatives are met and maintained, and working with the program's principal investigator to ensure data collection and analysis occur in a timely fashion. Our Project Director, a current employee of the Louisville Metro Health Department, brings experience in working with other Maternal and Child Health initiatives, such as working with WIC and the HANDS Program, and will be well-suited to manage this program's implementation and delivery. The Project Director currently is working in Louisville Metro Health Department Division of Health Services and will be transitioning from his current role into the Director role for this program.

We will be working with four community-based doulas whose main role in the HBDP is to meet with program participants to provide perinatal support. Our doulas will host group classes or go into the participants' homes dependent upon their needs, to deliver the HBDP perinatal care and support curriculum to our participants. They will be responsible for meeting with program participants a minimum of three times prenatally, be present during labor and delivery, and meet with program participants three times postpartum. During these meetings, doulas will administer surveys to participants based on the previous mentioned schedule (see Performance Measures and Evaluation). A health educator from the Louisville Metro Health Department will also be contracted to teach regular perinatal health and wellness classes, breastfeeding practices, and perinatal care classes to our participants. This health educator comes from the Division of Health Services and brings experience in teaching maternal and child health education classes prior to this program.

Finally, a Principal Investigator (PI) from the University of Louisville School of Public Health will be contracted to oversee data collection and analysis efforts throughout the project. Our PI will be working with two allotted MPH students to conduct focus groups (alongside our doulas) with program participants, to ensure that data is being collected properly and in a timely fashion, and to conduct data analysis for our outcome analyses.

Figure 5. Louisville Metro Health Department Organization Chart[23]



As part of the Louisville Metro Health Department, the Healthy Beginnings Doula Program will be housed under their Division of Health Services in conjunction with other maternal and child health initiatives, such as WIC, HANDS, and Healthy Start. We will also work in partnership with the Center for Health Equity to establish strategic partnerships and policy for the sustainability of this program in collaboration with the HANDS program.

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Appendix A: Logic Model

Program: Healthy Beginnings Doula Program (BBDP) Logic Model

Situation: Maternal and Infant mortality, along with other race-based perinatal inequities (rates of physiologic birth, preterm birth, and low birth weight), in Kentucky disproportionally affect black communities. In Jefferson County, black mothers are 3-4 times more likely to die from pregnancy-related complications than their white counterparts. Additionally, black infants are 2.3 times more likely to die within their first year of life than their white counterparts and bear the majority of the burden of low birth weight and preterm birth rates. The BBDP seeks to reduce these disparities and improve maternal and infant health outcomes by providing community-based doula support, improving perinatal care practices, and providing educational and social support to program participants.

Inputs	Outputs		Outcomes--Impact		
	Activities	*Participation*	*Short*	*Intermediate*	*Long*
• Facilities for participant recruitment (FQHCs, hospitals/ healthcare facilities) • Centralized meeting location (i.e. at a health center, yoga studio) • Data from Jefferson County Health Department regarding infant mortality by race/ethnicity • Evidence-base for community-based doula programs for reducing race-based perinatal inequities • Existing supportive services (SNAP, WIC, HANDS)	• Hire and train community-based doulas (time/labor, salaries, continued trainings/ education requirements) • Develop and implement educational classes (staff time and labor costs) • Doulas participate in labor and delivery • Recruit participants • Doulas engage in pre-natal home visits • Doulas engage in post-natal home visits	• Quality-trained doulas • Trainings in breastfeeding practices and maintenance, perinatal nutrition, perinatal exercise, and general wellness • Patient self-advocacy, patient satisfaction, decreased need for clinical interventions (c-section and pain meds) • Engaged participants • Patient self-advocacy, removal of toxic/dangerous substances from home, smoking and substance use cessation, labor and delivery preparation • Parenting techniques, breastfeeding practices, sustainability	• Improved patient satisfaction surrounding the labor and delivery experience • Improved knowledge and self-efficacy surrounding perinatal care, exercise and nutrition during the perinatal timeframe, smoking and controlled substance cessation • Enhanced connections to other local resources and increased use of these resources (HANDS, WIC, SNAP, etc.) • Decreased pain medications during labor and delivery	• Improved birth outcomes (decreases in preterm birth, low birth weight, neonatal abstinence syndrome) • Increased rates of physiologic birth (decreased rates of caesarian sections and associated birth complications) • Initiation and/or maintenance of perinatal care • Maintenance of perinatal care routines and sustained breastfeeding practices • Increased self-advocacy in healthcare settings among women during perinatal care visits • Increased birth spacing	• Decreased maternal mortality rates • Decreased infant mortality rates • Reduction in race-based perinatal health disparities • Decreased costs associated with poor perinatal outcomes • Reduction in stigma surrounding women of color in the healthcare setting among providers • Improved long-term child health outcomes related to increased breastfeeding and home environment improvements

Assumptions
Community-based doulas are trained to provide culturally competent evidence-based care to the families they serve, participants are willing to receive continual support from health educators and community-based doulas

External Factors
Medical provider attitudes towards black women (systemic/structural racism) during perinatal care visits; housing and environmental factors contributing to maternal and infant health disparities; recruitment access and barriers to recruitment for target population

Appendix B: Gantt Chart

Healthy Beginnings Doula Program Gantt Chart

		Timeline											
		Year 1				Year 2				Year 3			
Task	Description	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1	**Program Development**												
1.1	Finalize IRB and Program Measures	X											
1.2	Hire and Train Community-based Doulas and Program Staff	X											
1.3	Establish Bus/Cab Voucher System	X											
1.4	Develop Health and Wellness Class Curricula	X											
1.5	Establish Community Partnerships with WIC, SNAP, and HANDS	X											
1.6	Create Community Advisory Board	X											
1.7	Hire and Train Research Staff (PI, GAs)	X											
1.8	Finalize locations for Class Meetings and Doula Care	X											
1.9	Formative Program Evaluation	X	X	X	X			X				X	
2	**Program Implementation**												
2.1	Recruit Eligible Participants		X	X	X	X	X	X	X				
2.2	Provide Transportation Vouchers to Eligible Participants		X	X	X	X	X	X	X	X	X	X	X
2.3	Community-Based Doulas engage in Prenatal Care Services		X	X	X	X	X	X	X	X	X	X	
2.4	Community-Based Doulas provide support during Labor and Delivery			X	X	X	X	X	X	X	X	X	X
2.5	Community-Based Doulas engage in Postnatal Care Services			X	X	X	X	X	X	X	X	X	X
2.6	Perinatal Health and Wellness Class Provision		X	X	X	X	X	X	X	X	X	X	X
3	**Outcome Measurement and Evaluation**												
3.1	Measure Patient Satisfaction Data		X	X	X	X	X	X	X	X	X	X	X
3.2	Measure Patient Self-Advocacy Data		X	X	X	X	X	X	X	X	X	X	X
3.3	Measure Breastfeeding Data		X	X	X	X	X	X	X	X	X	X	X
3.4	Measure Perinatal Exercise and Nutrition Data		X	X	X	X	X	X	X	X	X	X	X
3.5	Measure Maternal Health Outcomes (Birth/Death Certificates)		X	X	X	X	X	X	X	X	X	X	X
3.6	Measure Infant Health Outcomes (Birth/Death Certificates)		X	X	X	X	X	X	X	X	X	X	X
3.7	Data (outcome) Analysis									X	X	X	X

Appendix C: Budget and Justification

Table 1: *Healthy Beginnings Doula Program* Three Year Budget

Cost Category	Year 1	Year 2	Year 3
A. Personnel	**$347,000**	**$357,690**	**$362,676**
B. Fringe	**$118,078**	**$121,619**	**$123,891**
C. Supplies	**$5,000**	**$1,000**	**$1,000**
D. Travel	**$8,000**	**$8,000**	**$7,000**
E. Research Incentives	**$8,000**	**$10,000**	**$5,000**
Total	**$486,078**	**$498,310**	**$499,567**

Table 2: Annual Personnel Costs

Position	Time Requirement	Baseline Salary	Total Cost
Project Director	**50%**	**$50,000**	**$25,000**
Principal Investigator	**10%**	**$100,000**	**$10,000**
MPH Students x 2	**50%**	**$12,000**	**$24,000**
Doulas x 6	**100%**	**$40,000**	**$240,000**
Health Educator	**40%**	**$50,000**	**$16,000**

Project Director: The Project Director will oversee program operations. This includes assigning doulas to individual participants, supervising the doulas and health educator, handling program communications, assembling the Community Advisory Board, managing referral systems, and oversee process evaluation.

Principal Investigator: The Principal Investigator will be from the University of Louisville School of Public Health and will be responsible for process and outcome evaluations, along with the supervision of the MPH Graduate Students to oversee data collection and analysis.

MPH Students: MPH Graduate Students will work with the Project Director and the Principal Investigator to analyze data from process and outcome evaluations.

Doulas: Our 6 doulas will engage in home visits with participants along with providing labor and delivery support.

Health Educator: The Health Educator is responsible for teaching each Health Education Class, along with following up with program participants on any class sessions that may need additional follow-up.

Table 3: Annual Fringe Benefits

Position	Fringe Benefits
Project Director	**$8,403**
Principal Investigator	**$2,743**
MPH Students x 2	**$12,980**
Doulas x 6	**$88,080**
Health Educator	**$5,872**

Fringe Benefits will be paid to each employee to support retirement, health insurance, and other salaried benefits. A 3% annual increase is expected for both salary payments and fringe benefits to adjust for cost of living increases.

Table 4: Annual Program Supply Costs

Item/Supply	Cost
Prenatal Care Items	**$1,000**
Class Demonstration Dolls	**$1,000**
Diapers	**$1,000**

Swaddling Materials	**$1,000**
Breastfeeding Pumps and Bottles	**$1,000**

Our program supplies will include items needed to conduct our health education class sessions regarding prenatal care, breastfeeding, safe infant sleep, and neonatal care.

Table 5: Annual Travel Costs

Travel	Cost
Annual Conferences	**$5,000**
Mileage Reimbursements ($0.40 per mile)	**$2,000**
Louisville TARC Bus Passes ($15 each)	**$1,000**

Annual Conferences: Our Project Director and Principal Investigator will attend annual conferences for research and program implementation. These costs will be covered and include travel and lodging.

Mileage Reimbursements: Doulas traveling to the homes of program participants and to the hospital will be reimbursed at a rate of $0.40 per mile traveled.

TARC Bus Passes: Bus passes will be provided to program participants without reliable transportation to our class locations. Each bus pass costs $15 and covers 10 rides per pass. A total of approximate 60 passes will be purchased each year for our participants.

Table 6: Annual Research Incentive Costs

Research Incentive Item	Cost
Bottles	**$4,000**
Pacifiers	**$1,000**
Diapers	**$5,000**

For our program participants participating in our focus groups and process evaluations, a gift basket of perinatal care items will be provided to thank them for their time. These baskets will include bottles, pacifiers, and diapers.