**Providers for Parents: Improving Maternal and Infant Health through Doulas and Provider Education**

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On behalf of Raising St. Louis

## EXECUTIVE SUMMARY

Providers for Parents (PFP) is a program that connects mothers and other family members to help build the autonomy of patients in health settings; reduces the high infant mortality rate; promotes providers' cultural competency; and increases access to health care. We are an extension of Raising Saint Louis, a program at St. Louis Children's hospital, world-class choice for parents seeking medical care for infants, children, and adolescents. PFP has strong connections to local organizations focused on maternal and infant health, which makes are program more sustainable and improves family's access to local resources. We are educating obstetric providers, both nurses and physicians, as well as office managers, on implicit bias and cultural humility. Our patient centered education program teaches providers how to adapt to the needs of patients through interactive learning and hotspotting sessions, where they learn from real patients about their barriers to access and quality care. We are also connecting mom with doulas that support the physical and emotional wellbeing of moms and babies while acting as healthcare brokers between providers and parents. By the end of the well-rounded program, we can see less babies with low birth weights, less deaths due to untreated pregnancy complications, more providers that equipped to adapt care to the barriers of patients, and more moms involved in care decision making. These outcomes bring with them cost savings in terms of emergency services and future healthcare expenses in the St. Louis region. Parents for Providers in achieving this goal, will help the infant and maternal health system in St. Louis work and saves lives. $300,000 of funding will go towards helping moms flourish and helping providers give quality care to their patients.

## PUBLIC HEALTH PROBLEM AND CONTEXT

### Landscape

Despite major advances in maternal and infant care in the United States, there thousands of infants die every year. Infant mortality rate and maternal mortality (MMR) rate are two of the most widely used indicators of the overall health status of a countries and communities. Infant mortality is the death of an infant before his or her first birthday (CDC, 2019). In 2018, 21,000 infants died in the United States. The United States has the highest MMR amongst high income countries, with an estimation of approximately

700 women dying each year due to pregnancy and delivery-related complications[1]. In 2018, the Center for Disease Control reported that over 21,000 infants died from risk factors like preterm birth, low birth weight, access to pre-pregnancy and prenatal care, and unsafe infant sleep environments[2]. While there have been major advances in maternal care in the United States, there are still disparities in infant and maternal health outcomes. Race is not a risk factor, but systemic and institutionalized racism influence social practices and access to resources[3]. Mothers and infants of color disproportionately experience poorer health outcomes and lack access to quality healthcare services. Black infants are nationally 2.3 times more likely to be born preterm and suffer mortality[2]. Compared to their white peers, Non-Hispanic Black women were three times likely to die from pregnancy-related complications and non-Hispanic American Indian or Alaskan Native women were 2 times likely to die due to pregnancy related complications between 2014 and 2017[1]. Black women experience higher rates of subchorionic hemorrhages, preeclampsia, cardiac events, and infections[4]. These disparities in health outcomes are influenced by the biases and racism that dictate the care provided by physicians. A survey conducted by the Society for Maternal Fetal Medicine presented discrepancies between providers' acknowledgement of disparities in their areas of practice and their consideration of implicit bias. They found that 84% of physicians agreed that disparities impact their practice but 29% acknowledged that personal biases affected the care they provide. In terms of treatment, Black mothers are more likely to have their perceived health and pain status untreated. A Staton et al. Showed that physicians were more likely to underestimate the pain of black patients compared to nonblack patients.

This harsh reality of racial disparities extends to the City of St. Louis. This small county has an infant mortality rate that is three times higher than the state of Missouri and twice that of the national rate[5]. The infant mortality rate for Black women in St. Louis City is 9.3, which is three times higher than White women[6]. In 2018, 13 percent of babies delivered were of low birth weight, which was twice that of the state of Missouri and the United States[7]. Black women in St. Louis City disproportionately experience pregnancy complications and give birth to babies preterm[5]. Many of these babies that have poor health outcomes due to low birth weight. Low birth weight is important to consider because infants born with low birth weight are more likely to experience health complication that require specialized healthcare services. Despite the high rates of infant mortality and pregnancy-related maternal deaths in St. Louis, the majority of poor infant and maternal health outcomes are preventable. A 2017 annual report conducted by the Department of Health and Senior Services found that 80% of pregnancy-related deaths were preventable with changes that focus on patient, family, provider, facility, system, and community factors[8]. The stark disparities in infant mortality rates are closely related to socioeconomic status, poverty, access to care, and place. Certain zip codes in north St. Louis city, like 63107, 63120, 63113, 63115, and 63118, have the poorest birth outcomes and the greatest number of individuals living at and below the poverty line in the

entirety of St. Louis[5]. Assessments conducted by the Missouri Foundation for Health indicates that lack of insurance coverage, affordability of health foods, reliable transportation are the most significant barriers to accessing care as expressed by this community. Black women are more likely to be uninsured before becoming pregnant, die of conditions related to pregnancy than white women with the same condition, be exposed to environmental risks, receive subpar medical care based on their location, and experience racial bias from health care providers[6, 7]. Maternal mortality not only relates to when the child is delivered but also with the time after birth. Research now shows that instead of having just one postpartum appointment after 6 weeks, postpartum care should be an ongoing process that is tailored to every woman's individual needs[8]. While there have been advancements made in the field of maternal health in the United States, there is still needs to be policy change that focuses on the health disparities experienced by Black mothers. Programs like Raising STL can be a part of this solution by finding ways to address the social determinants of health that lead to poor health outcomes of Black mothers. Infant mortality rates in St. Louis City indicate that there are gaps in care access and care quality that remain unmet.

**Target Population and Catchment Area**

The target population consists of Black mothers that reside in high risk zip codes for poor maternal and infant health outcomes in St. Louis City and St. Louis County. Findings from the U.S. Census included data from 2010 through 2014 showed that the worst ranked zip codes in St. Louis City in terms of birth outcomes and poverty are: 63107, Fairground Park neighborhood; 63120 Walnut Park East Neighborhood; 63113, Lewis Place Neighborhood; 63115, Penrose neighborhood; and 63118, Benton Park neighborhood. The zip codes in St. Louis County with the poorest birth outcomes and highest neighborhood poverty are: 63133, Pagedale Wellston neighborhood; 63044, Bridgedon neighborhood; 63136, Jennings neighborhood; 63138, North County area, and 63135, Ferguson area.

**Program Model: Adpating Raising STL**

Impact Theory: With most women in the high-risk zip codes being African American and the disparities in maternal and infant health outcomes, the program targets the mediating factors affecting a mother's ability to obtain quality and culturally competent care by providers in the St. Louis city and county. Through reports conducted by Missouri's Foundation for Health, it is established that access to prenatal services, cultural differences, transportation, and access to health insurance are the most significant barriers for these communities. If these barriers are removed, access to necessary resources will increase and improve health outcomes.

Causal Theory: High Infant mortality among families in St. Louis City and County, indicated in the infant mortality rate, low birth rate, and maternal health outcomes, is caused by lack of access to care,

socioeconomic status, and race, but is mediated by access to health insurance, health literacy, social support, and culturally competent healthcare providers given that home visits, parent support group meetings, and parent education programs moderate the causes and that racial health disparities and income gaps exist prior to the causes.

**Proposed Interventions**

An evidence-based program design that has been implemented since 1996 is Nurse-Family Partnership Programs (NFP)[9]. NFP are home visitation programs that target prenatal and postnatal care for first time low-income mothers provided by registered nurses. These programs improve maternal health and pregnancy outcomes, child health and development, and parental education in terms of family planning, childcare, and economic stability. For most interventions, visits start with moms prenatally until their child turns the age of two. They have shown to decrease instances of infant death, pregnancy complications, preterm birth, and improve family planning. Some programs have added doulas to programs to support the more direct needs of mothers. Doulas offer a variety of services such as emotional and physical support and educational and maternal advocacy guidance[10]. Community based doulas can improve infant health outcomes by empowering young mothers through providing educational assistance[11]. Studies have shown that doulas can be used as a social support intervention to influence the relationship between social determinants and birth outcomes by addressing underlying issues that often evade clinical approaches to persistent racial and cultural disparities[12, 13]. Home visitation programs and doula services are designed to improve the interpersonal and intrapersonal level of the ecological model for patients, but behaviors on these levels can also be impacted on the provider level through education. The program Provider for Parents propose to fill the quality and access to care gap in St. Louis will combine shared decision making with the support received from doula home visitation programs. Combining these to intervention types will support home intervention programs that are currently being conducted in St. Louis city by Raising St. Louis and the collaboration between Generate Health and Jamaa Birth Village.

**GOALS AND OBJECTIVES**

Despite having a network of local organizations dedicated to improving infant mortality rates, there are gaps in Raising St. Louis' programming. Improving the fidelity of implementation of the Raising St. Louis service delivery model, developing more detailed protocol for developmental and health benchmarks, and increasing program participation and enrollment are needed to restructure program operations to expand outreach. The logic model for Raising St. Louis is designed with the goal of selecting parents with children ranging fetuses to 2 years of age that reside within the 22 high risk zip codes to participate in Raising STL services.

**Goal 1:** To provide access to infant health and family resource connection services that are culturally competent to parents with children under 2 years of age that reside in the 22 high risk zip codes.

**Goal 2:** To decrease infant mortality in select zip codes by developing and implementing sustainable culturally appropriate services for Raising St. Louis families

**Process Objectives:**

- ***Process Objective 1:*** By December 2022, 100% pediatric and obstetric care providers that serve parents within the target zip codes will be sent educational materials regarding program enrollment (for parents and providers) from Raising St. Louis.
- ***Process Objective 2:*** By December 2023, Raising St. Louis will conduct at least 12 parent support meetings to build community and share experiences in a year.
- ***Process Objective 3:*** By January 2024, 200 parents will be enrolled in the program and the online infant care portal to provide coordinated system of family service delivery.
- ***Process Objective 4:*** By December 2022, develop culturally relevant content for outreach and delivered through portal.
- ***Process Objective 4:*** Communications and IT staff will pilot and evaluate two new communication technologies targeted to non-enrolled parents and community members resulting in a 30% increase in site clicks (physicians and broader community) to the Raising St. Louis webpage by January 2024.
- ***Process Objective 5:*** Raising St. Louis will offer Patient-centered training (shared decision-making skill building and hotspotting sessions) opportunities resulting in 75% of staff completing Competent Patient-centered 101 by December 31, 2023.

**Outcome Objectives:**

- ***Short Term Outcome Objective 1*:** By December 2023, 70% parents receiving doula intervention demonstrate improved skills and knowledge of infant care by using safe sleeping positions, healthy nutrition, and awareness of development benchmarks.
- ***Intermediate Term Outcome Objective 2:*** Staff of Raising St. Louis endorse norms of cultural competency and behavior that is patient-centered by the end of the program, December 31, 2024.
- ***Intermediate Term Outcome Objective 2:*** 80% of parents demonstrate improvements to service connection by February 2023.
- ***Long Term Outcome Objective 3:*** By December 2024, reduce the rate of postneonatal deaths between 28 days and 1 year by 20% in zip codes.

**Strategies & Activities**

Despite having a network of local organizations dedicated to improving infant mortality rates, there are gaps in Raising St. Louis' programming. Improving the fidelity of implementation of the Raising St. Louis service delivery model, developing more detailed protocol for developmental and health benchmarks, and increasing program participation and enrollment are needed to restructure program operations to expand outreach. The logic model for Raising St. Louis is designed with the goal of selecting parents with children ranging fetuses to 2 years of age that reside within the 22 high risk zip codes to participate in Raising STL services and improve qualitative data collection. As shown in Figure 1, the inputs for the program include the Raising St. Louis Team, community doula agencies like Jamaa Birth Village, Washington University (Center for Interpersonal Practice and Education, supporting Children's Hospital Staff, community stakeholders, as well as available technology and access to research expertise. Activities conducted to reach this goal focus on interpersonal education, quality data collection, parent participation, assessment of barriers, connecting mothers to doulas, and improving awareness of infant mortality rates in the St. Louis region. Training providers on implicit bias and misdiagnosis will help them gain cultural competency to meet the individual needs of infants and their parents. It is crucial to link families of infants to local organizations to meet their social, physical, and basic needs. When providing resources to fulfill these needs, Raising St. Louis must design quality indicator assessments for home visitation and program referral success that provide information on the quality of services and to what extent do families perceive needs to be addressed. It is also important to enroll participants early in their pregnancies while employing strategies to improve the retention rate and assess community needs to achieve infant development benchmarks. Activities to promote program retention is providing opportunities for parent support meetings to develop shared goal and providing incentives that correlate with the cultural context of parents. Raising St. Louis will develop a social media campaign to increase enrollment, disseminate finding and establish transparency. Activities involved with the campaign include stakeholder meetings for social media content planning and monthly social media monitoring and analytics feedback.

These activities will result of outputs that show the successful completion of the program activities. For interprofessional improvement, at least 40 providers will complete cultural competency training. In terms of program participation and referrals, 300 referrals conducted by Raising St. Louis and 300 referrals will be processed to connect parents to resources. The 300 referrals will be considered successfully completed after program intake, the reception of resources, and the submission of a referral quality assessment survey. At least 150 parents will be recruited and enrolled from Federally Qualified Health Centers (FQHCs), NFN, and hospitals. To retain parents, 20 community Doulas will provide services and 20 staff members will conduct hotspotting to assess barriers to care and infant development

benchmark achievement. Interprofessional hotspotting is a way for volunteers to go through barriers to care with patients so that physicians and nurses can adjust care plans to work with the current capacity of families[14]. To decrease the cancellation of home visits, 200 providers and parents will have active accounts on a Raising St. Louis program portal, to enabling home visitation participation and monitoring of program utilization. Washington University' Center for Interpersonal Practice and Education have evaluation services available to local organizations and can help inform hottspotting services for the program. Local Doulas offer a variety of services such as emotional and physical support and educational and maternal advocacy guidance[15]. Community based doulas can improve infant health outcomes by empowering young mothers through providing educational assistance[16]. Studies have shown that doulas can be used as a social support intervention to influence the relationship between social determinants and birth outcomes by addressing underlying issues that often evade clinical approaches to persistent racial and cultural disparities[17]. With the skills provided by partners, Raising St. Louis can provide parents with access to a wide array of resources from traditional patient-care services to non-traditional providers like Doulas. To notify the community of Raising St. Louis' goal of decreasing infant mortality, the program can look to gain at least 400 followers on social media platforms. This enables Raising St. Louis to efficiently share program happenings and track online reach.

Improving Raising St. Louis operations will consist of four stages: implementation strategy prioritization, recruitment, implementation of the program, and evaluation of program data. Raising St. Louis activities board is essential for collaboration between various community members. Putting strategies into action will be spearheaded by Raising STL with the crucial input by community members and current providers to prevent program redundancy and strain growing connections with stakeholders doing viable work. After input from numerous stakeholders that have success in community involvement and cultural competency in their programs, strategies to improve implementation facilitators, like evidence of maternal and infant health need, success of other doula interventions, and acknowledgment of need for provider education, and minimize barriers, like hospital structure, parent and provider attitudes, and program, complexity. For recruitment, parents will be recruited from referrals given by hospitals since most Raising St. Louis' parents are referred from FQHCs and NFN[18]. Increasing referrals from hospitals, non-referral locations, can help target more moms and expand reach. Another method for recruitment would be through social media platforms and information session presented at early childcare centers and back-to-school fairs where parents learn about community resources. Implementation of the program will make up the majority of the program timeline, but assessment of strategies and feedback of progress will continue throughout the program. As the program is officially implemented, information regarding services and the progress of Raising St. Louis will be made available across social media platforms and the parent-provider portal. Partners and community stakeholder, like NFN, Parents as Teachers, community

doulas, Washington University's Center for Interpersonal Practice and Education, and supporting Children's Hospital Staff, are important for addressing risk factors that your organization does not have the capacity to address. They have access to human capital, expansive research expertise, unused programmatic funds, and authority that can help Raising St. Louis reach parents and improve infant health outcomes.

## EVALUATION DESIGN AND METHODOLOGY FOR PROVIDERS FOR PARENTS (PFP)

### Introduction

Raising St. Louis has a good network of local organizations dedicated to improving infant mortality rates, but there are gaps in the program programming. The program intervention focusses on increasing program enrollment and retention by targeting program quality with implementation strategies of patient centered interprofessional healthcare and holistic doula services. Interprofessional training for each cohort cycle participates in 2 training sessions, one hotspotting experience with a patient, and performance feedback. In the second portion of the program, doulas are integral facilitators of home visits to address social, emotional, and wellness needs of mothers and families and help interprofessional collaboration amongst providers. The program evaluation aims to improve the fidelity of implementation of the Raising St. Louis service delivery model, develop more detailed protocol for providing supportive care, and assess whether program participation increases from restructured program operations that expand outreach. The purpose of this three-part evaluation is to: determine to what extent the intervention fits the maternal and infant health problem, assess if the interventions are being implemented as initially planned, monitor the achievement of objectives, and evaluate the direct and indirect impacts of the intervention on mothers and medical personnel. While many home-visiting programs are designed to engage families during pregnancy, few studies have analyzed maternal and infant health outcomes during the prenatal, antenatal, and newborn period, much less the impacts of the intervention on health outcomes[19]. PFP was designed with the intention of filling this research gap and combine evidence-based public health interventions with lesser studied program segments such as cultural competency and patient autonomy.

### Formative Evaluation

The formative evaluation (FE) will be a mixed methods analysis that draws from various data sources from the development of Providers for Parents through its implementation. The rationale behind FE is to assess how Raising St. Louis' home visitation program was implementing intervention services, identify a suitable intervention to address gaps in the quality of the services and perceived acceptability of

the current program, and developing a new implementation strategy. To conduct a well-rounded FE, PFP was inspired by Stetler and colleagues' four stage FE model: Developmental FE, Implementation-focused FE, Progress-focused FE, and Interpretive FE. The most content and time relevant stages of the Stetler FE is the Developmental FE as it is used to assess the current intervention climate, barriers and facilitators of the intervention, and values program feasibility[19]. A large portion of data will be gathered via an online Parent for Provider portal, so this new technology will be developed and piloted during the FE. The Data collected from FE will feedback into the operationalization of program terminology, the structure of program management, the timeline for interprofessional curricula, the acceptability of the PFP portal, and the involvement of stakeholders in the research. Qualitative data that document the intervention design will be collected through surveys completed by service providers and parents; minutes from stakeholder advisory meetings; the number of staff and parents properly utilizing PFP; and documents concerning email and video call correspondence between Raising St. Louis' staff and community stakeholders such as families, obstetric providers, and doulas. This FE will help Raising St. Louis understand whether the intervention fits the needs of parents and the home visitation program, set targets for measurement, and decide feasibility of solutions.

**Process Evaluation and Performance Monitoring Plan**

The process evaluation for Providers for Parents will monitor the activities being conducted and to see whether there are adequate resources to meet achieve the outcome of improved maternal and child health outcomes. Stage two and three of Stetler's FE model will be adapted for this because they correlate with the goal of the process evaluation in terms of deviation between the program plan and its operationalization, as well as the monitoring of the intervention elements. The evaluation and monitoring will be used for feedback to providers and families as well as dissemination of findings Washington University school of Medicine. Data regarding interprofessional development and activities, change in the continuum of prenatal care services, capacity of doulas in the home visiting program, the amount of time staff spend with training and home visits, the number of hours devoted to each program phase, and use of patient-centered hotspotting training will be collected. To determine whether the program was implemented as intended, PFP will measure the number of home visits conducted, the number of pregnant women and households served, the organization of home visit and provider training staffing arrangements and the number of people recruited for the program. This information will be gathered via an online Parent for Provider portal to increase conveniency and data analysis for activity logs and surveys. Participants' names will remain anonymous to protect privacy and increase participant forthcomingness but will note role in the intervention for grouping. Qualitative data collection via questionnaires, surveys, individual interviews, and focus group interviews during parent support meetings are helpful for detailed information.

Quantitative data collected for the process evaluation include the number of completed home visits; number of parents that are retained in the program; number of providers that voluntarily complete the patient-centered training.

In the indicator table in the index there are five example indicators for the process evaluation. Indicators for program staffing are the number of staff facilitating training sessions for medical students and department managers, and the ratio of staff to those receiving the interventions. In terms of program reach, access issues associated with parents in the program and students in the interprofessional training are used to assess barriers to implementation, as well as hours logged for each household during house visits. Indicators for stakeholder inputs include hours dedicated to program meetings and the number of benchmarks met in terms of the research and program timeline. Activities and output indicators are centered around the Interprofessional and cultural competency training and the home visitation service. The number of students that completed all training sessions, the number of missed sessions, and the students perceived acceptability of training are important indicators for the education segment of the intervention. Home visitation indicators for the program are the number of completed home visits for each parent, the number of missed or cancelled home visits, perceived acceptability of doula partnership, and the number of active accounts on program portal used by providers and parents to enable home visitation participation and utilization.

**Impact Evaluation Plan**

For this evaluation, the Provider for Parents team will compile information to assesses the program's effect on participants. Stetler's last stage of the FE model, Interpretive FE, will be adapted to understand the meaning of a successful implementation, and the implementation strategies' impact. Key outcomes include changes in bias awareness, knowledge interprofessional collaboration skills, attitudes towards patient barriers, and behavior change regarding perceived patient wellness. A modified control design presented by Torre et.al will be conducted for the three clinical groups of obstetric professionals and parents enrolled in the program (shown in figure 3a and 3b)[20,21]. This will allow groups in the control and treatment group to receive the intervention. Obstetric nurses, Obstetric physicians, and department or clinic managers will be assigned to a control group or an intervention group. The control group will consist of Nurses, Obstetric nurses, Obstetric physicians, and department or clinic managers will be from different settings within Washington University Hospital and Children's Hospital: the Maternal-Fetal Medicine Obstetrics and Gynecology Department which is located in Barnes-Jewish Center for Outpatient Health at Missouri Baptist Medical Center, the Newborn Follow-up Program, The Division of Newborn Medicine at Children's Hospital, and the Division of Maternal-Fetal Medicine, Genetics, and Ultrasound of the

Department of Obstetrics. These groups were chosen because Washington University physicians are the medical staff of St. Louis Children's Hospital. The thee departments work with families on all levels of care from primary provider care for moms and infants to extensive surgery for infants and babies. Using participants from separate departments in different hospital locations will resolve issues related to contamination of groups due to interactions between colleagues. The control group will only receive current WASHU interprofessional and cultural competency related training that is integrated into the curriculum during the semester prior to their final degree requirements. Parents will be randomly assigned to a control group that receives current Raising St. Louis home visits or an intervention group that receives standard program services along with doula home visits. Parents in the intervention of control group will be from They will be given a specific survey link that correlates with their cycle and group.

Pre and post training surveys will measure provider teams (Obstetric nurses, physicians, and managers) teamwork skills, bias understanding, and acceptability of training. These will be assessed at three time points to better hypothesize trends. Pre and post home visitation surveys for parents and nurses to measure the acceptability of doulas in the home visit program and a survey to measure provider acknowledgment of mother autonomy by providers. Quantitative data collected for the impact evaluation include data regarding number of parents retained in the program, number of parents that perceived improvement of provider behaviors due to doula involvement. In the indicator table in the index there are six example indicators for the implementation evaluation.

Outcome indicators in the impact evaluation focus on the student provider knowledge, patient support, and behavior outcome levels of the logic model. Interprofessional teamwork skills scores, improved implicit Bias Scores, and understanding of the validity of patient's feelings of wellbeing are important for measuring provider knowledge. The percent of parents that experienced increased social support with doulas and the percent of providers that score above 80% in patient-centeredness help gauge parents' perceived support. Indicator of behavior changes include the percent of parents that exhibit parenting behaviors prescribed by providers and the percent of mothers that exhibit healthy prenatal practices prescribed by their providers. For the impact level of the logic model, the two examples of impact categories are infant and maternal health. Indicators for the long-term impacts of the intervention will be based on the percent of infants with low birth weight, the percent of mothers breastfeeding infants, and the percent of infants that meet all development benchmarks in between birth and 3 months post birth. Maternal health indicators for PFP are the number of mothers that receive early postnatal care within 5 days of birth, the amount of pain medication used by the mother during delivery, and the perceived satisfactory rating of birth experience.

Data will be analyzed by the Center for Public Health Systems Science as they have helped evaluate past Raising St. Louis Programs. Information gained will be used for feedback into the obstetric departments at Washington University in St. Louis (WASHU) affiliated medical centers and the design of obstetric nurse and physician students fourth-year curriculum.

**Economic Evaluation**

The economic evaluation will occur alongside the modified controlled trial. Due to the public health nature of the doula home visitation intervention a cost-effectiveness analysis (CEA) was conducted from a societal perspective[22]. CEA is useful for comparing alternative methods of achieving the same effect in a program. Health and social service data as well as additional family expenses will be collected along with trial data. PFP will use patient data from survey to measure economic resource utilization, household costs related to care services, nutrition, and transportation. Estimation of costs will be summed for each mom and child and the mean difference in costs between the two arms of the modified control trial. A societal perspective was taken such that costs to the health service, social services, employment costs related to physical ability to work for income, and costs to families were included. For the provider education intervention, a cost-benefit analysis be conducted based on the ROI analysis framework's indicators of human resources, material cost, technology costs, and infostructure costs[23]. HR cost indicators include cost of administration for the groups and time sent on education like scheduling meetings and planning of courses. Indicators for materials costs like cost of education materials for providers and parents and the production of these materials. Technology cost indicators will be monthly cost of the PFP portal and managing electronic patient records. Lastly, infrastructure cost indicators include cost of locating providers for education training and costs of housing interprofessional patient centered learners. Data for this portion of the economic evaluation will be gathered from PFP facilitator logs, program invoices, and hospital clinic quarter reports.

**CONCLUSION**

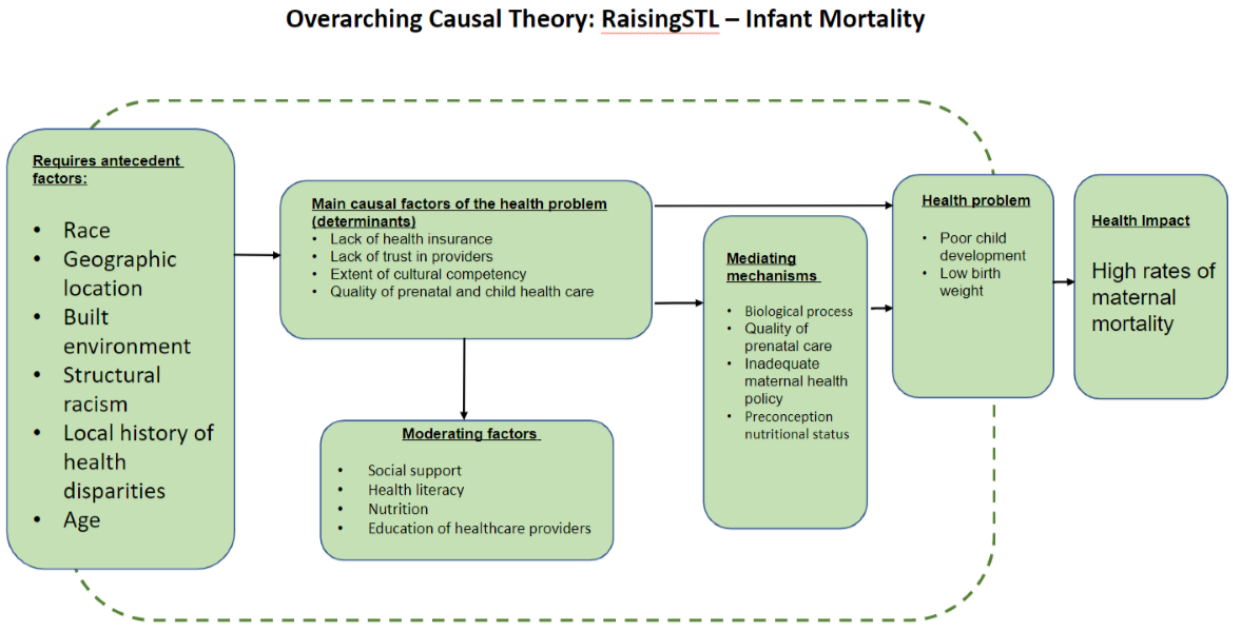
Infant mortality rate is one of the most widely used indicators of the overall health status of a community. Sadly, St. Louis City has an infant mortality rate of that is three times high than the state of Missouri and almost twice that of the national rate. On top of that, black moms and infants disproportionately have poor health outcomes and lack access to quality healthcare. Providers for Parents (PFP) is educating obstetric providers to improve maternal and infant health outcomes and connecting

moms and babies with doulas that support the needs of families not addressed by traditional providers. By the end of the well-rounded program, we can see less babies with low birth weights, less deaths due to untreated pregnancy complications, more providers that equipped to adapt care to the barriers of patients, and more moms involved in care decision making. These outcomes bring with them cost savings in terms of emergency services and future healthcare expenses in the St. Louis region. Parents for Providers in achieving this goal, will help the infant and maternal health system in St. Louis work and saves lives. $300,000 of funding will go towards helping moms flourish and helping providers give quality care to their patients.  By joining Parents for Providers, we can achieve the goal of a healthier St. Louis because it makes economic sense, makes our health system work better, and it saves lives.

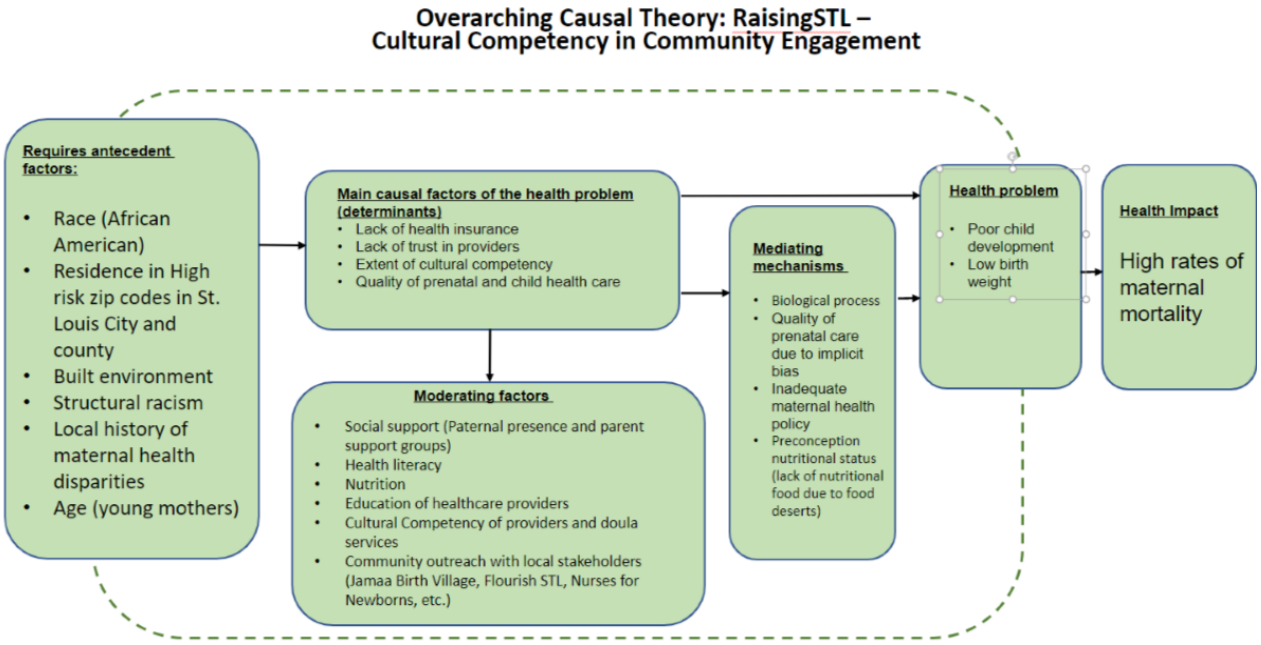
## APENDIXES

### Appendix 1: Raing STL Contatchment Area


## Appendix 2: Infant Mortality Causal framework




## Appendix 2: Maternal Health Causal framework




## Figure 1: Logic Model

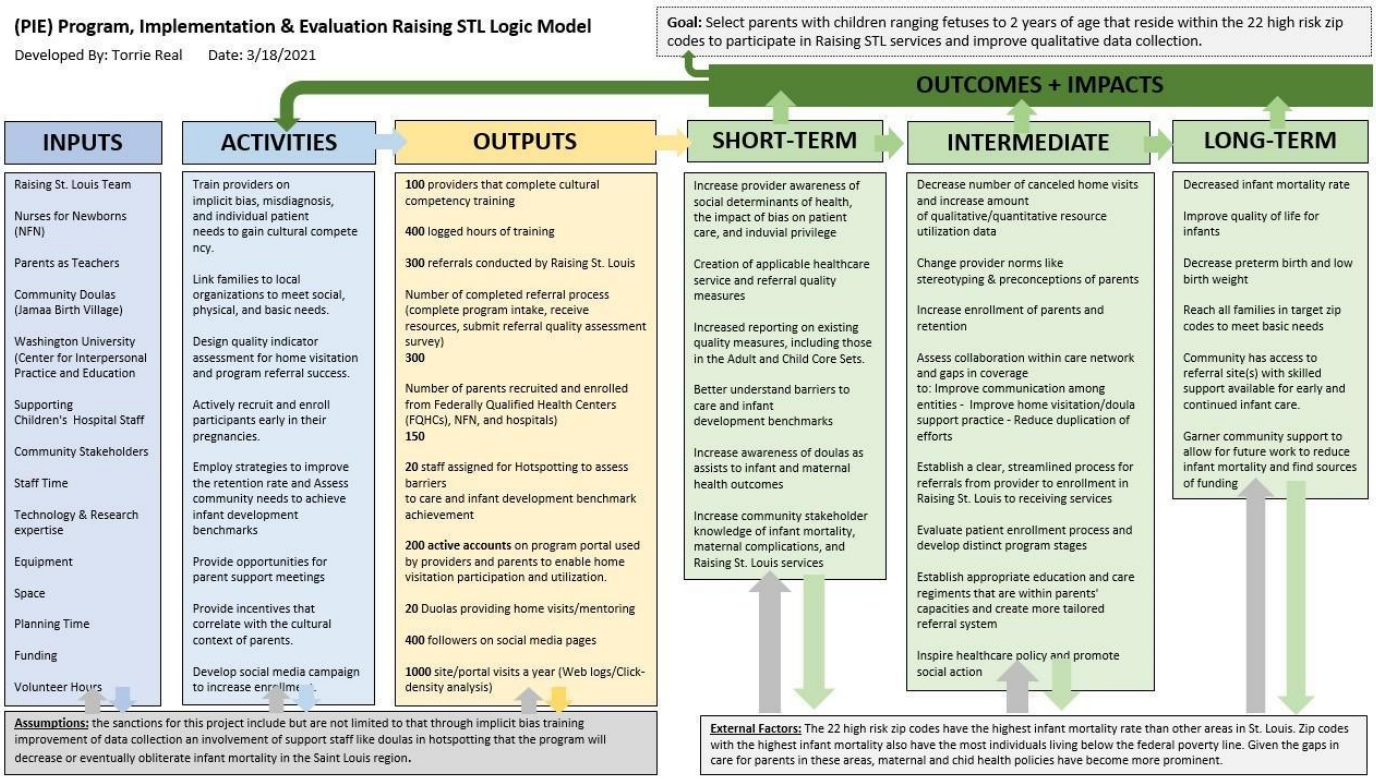


**FIGURE 2:** PROVIDERS FOR FAMILIES INDICATOR TABLE

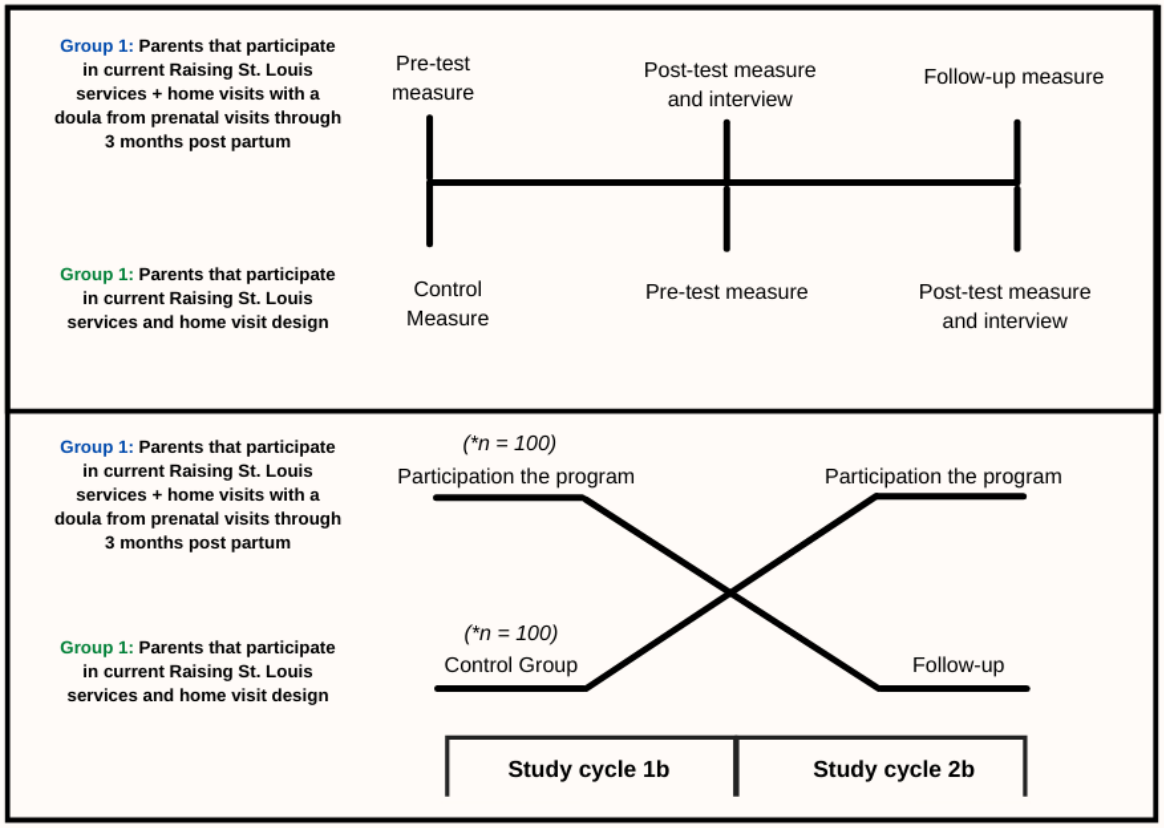
| **Logic Model Component** | **Indicators** | **Data sources and Timeline** | **Participant Sample Size *OR* Indicator Target*** |
|---|---|---|---|
| *Inputs* | | | |
| Program staffing | Number of staff facilitating training sessions<br>Ratio of staff (training facilitators and doulas) to students and parents | PFP Staff Survey/ Online data entry log<br><br>First three months of program | Medical students, nursing students, department/clinic managers (~90)<br><br>Parents (~200)<br>Doulas (~20) |
| Reach | Access issue (ie. poverty, family social support) associated with parents<br>Access issues (ie. curricula scheduling, location of training) associated with providers/students<br>Hours logged for each household in terms of house visits | PFP Staff Survey/ Online data entry log<br><br>Throughout Implementation | Medical students, nursing students, department/clinic managers (~90)<br><br>Parents (~200)<br>Doulas (~20) |
| Stakeholders | Hours of program briefing meetings<br>Research/Program Timeline progress | Meeting Minutes Documentation<br><br>Throughout Implementation | Medical students, nursing students, department/clinic managers (~90)<br><br>Parents (~200)<br>Doulas (~20) |
| *Activities & Outputs* | | | |
| Interprofessional & cultural competency/humility training | Number of students that completed all training sessions.<br>Number of missed training session<br>Perceived acceptability of training | Educational Survey/ Online data entry log | Medical students, nursing students, department/clinic managers (~90) |

| | | | |
|---|---|---|---|
| | | Throughout Implementation | |
| Home visitation service | Number of completed home visits for each parent.<br>Number of missed/cancelled home visits<br>Perceived acceptability of training<br>Number of active accounts on program portal used by providers and parents to enable home visitation participation and utilization | PFP Staff Survey/ Online data entry log<br><br>Throughout Implementation | Parents (~200)<br>Doulas (~20) |
| *Outcomes* | | | |
| Provider Knowledge | Interprofessional/teamwork skills scores (over 80%)<br>Improved implicit Bias Scores (over 80%)<br>Understanding validity of patient's perception of health | Training Pre-test/Post-test, focus group interview, knowledge assessments<br><br>After training cycle | Medical students, nursing students, department/clinic managers (~90)<br><br>Parents (~200)<br>Doulas (~20) |
| Patient Autonomy & support | % of parents that experienced increased social support with doulas<br>% of providers that score above 80% in patient-centeredness | Training Pre-test/Post-test, focus group interview<br><br>After training cycle for providers; monthly for parents | Parents (~200)<br><br>Doulas (~20) |
| Behavior | % of parents that exhibit parenting behaviors prescribed by providers | Health records, | Parents (~200)<br><br>Doulas (~20) |

| | | | |
|---|---|---|---|
| | % of mothers that exhibit healthy prenatal practices (ie. nutrition, vitamins, exercise) prescribed by providers | focus group interview<br><br>Monthly | |
| *Impact* | | | |
| Infant Health | % of infants with low birth weight<br>% of mothers breastfeeding infants<br>% of infants that meet all development benchmarks in between birth and 3 months pos birth | Health records, focus group interview<br><br>After receiving services (post 1 year) | Parents (~200)<br>Doulas (~20) |
| Maternal Health | Early postnatal care within 5 days of birth<br>Amount of pain medication used by the mother during delivery.<br>Perceived satisfactory rating of birth experience. | Health records, focus group interview<br><br>After receiving services (post 1 year) | Medical students, nursing students, department/clinic managers (~90)<br><br>Parents (~200)<br>Doulas (~20) |

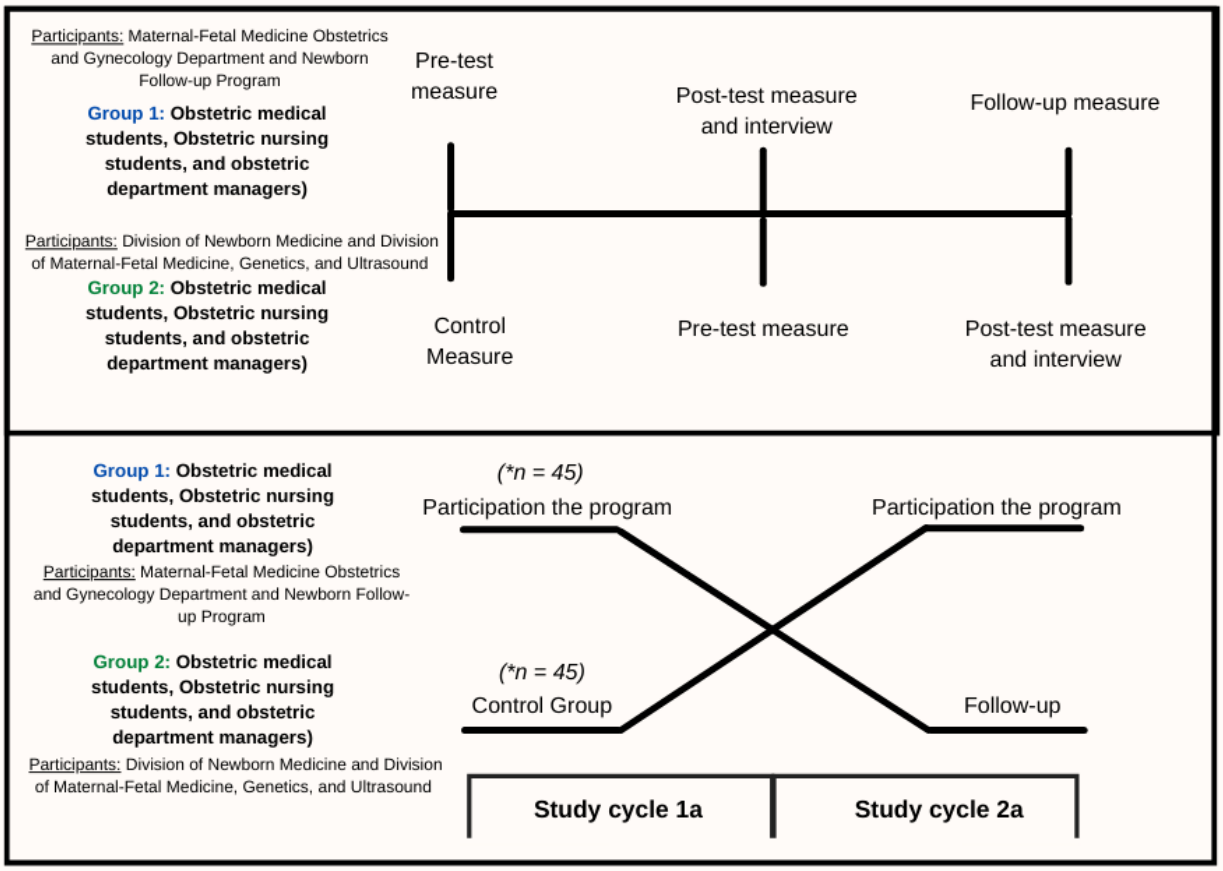
Figure 3: Evaluation Study Design

## Figure 3b: Impact Evaluation Study Design




Design model derived from Torre and colleagues

## Figure 3a: Impact Evaluation Study Design




***each group consists of 60 obstetric physicians, 60 obstetric nurses, and 8 department managers***

Design model derived from Torre and colleagues

**Program Timeline**

# Program Gantt Chart

## Providers for Parents

| START DATE | END DATE | DESCRIPTION | DURATION (days) |
|---|---|---|---|
| 1/1/21 | 2/1/21 | Reviewing program strategies, provider curricula, and data collection tools | 30 |
| 2/8/21 | 3/8/21 | Piloting curricula and PFP portal | 30 |
| 3/10/21 | 4/10/21 | Feedback of pilot and refinement of program strategies and tools | 30 |
| 4/17/21 | 7/30/21 | 1st cohort of provider education training + evaluation | 103 |
| 4/17/21 | 1/30/22 | 1st cohort of doula home visitation program +evaluation | 283 |
| 4/17/21 | 7/30/21 | 2nd cohort of provider education training + evaluation | 103 |
| 4/17/21 | 1/30/22 | 2nd cohort of doula home visitation program + evaluation | 283 |
| 1/1/21 | 2/1/22 | Recruiting providers for program | 390 |
| 1/1/21 | 2/1/21 | Recruiting Moms for program | 30 |

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