

STUDY PROTOCOL

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# Study protocol: a mixed-methods study of the implementation of doula care to address racial health equity in six state Medicaid programs

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## Abstract

**Background** Racial inequities in severe maternal morbidity (SMM) and mortality constitute a public health crisis in the United States. Doula care, defined as care from birth workers who provide culturally appropriate, non-clinical support during pregnancy and postpartum, has been proposed as an intervention to help disrupt obstetric racism as a driver of adverse pregnancy outcomes in Black and other birthing persons of colour. Many state Medicaid programs are implementing doula programs to address the continued increase in SMM and mortality. Medicaid programs are poised to play a major role in addressing the needs of these populations with the goal of closing the racial gaps in SMM and mortality. This study will investigate the most effective ways that Medicaid programs can implement doula care to improve racial health equity.

**Methods** We describe the protocol for a mixed-methods study to understand how variation in implementation of doula programs in Medicaid may affect racial equity in pregnancy and postpartum health. Primary study outcomes include SMM, person-reported measures of respectful obstetric care, and receipt of evidence-based care for chronic conditions that are the primary causes of postpartum mortality (cardiovascular, mental health, and substance use conditions). Our research team includes doulas, university-based investigators, and Medicaid participants from six sites (Kentucky, Maryland, Michigan, Pennsylvania, South Carolina and Virginia) in the Medicaid Outcomes Distributed Research Network (MODRN). Study data will include policy analysis of doula program implementation, longitudinal data from a cohort of doulas, cross-sectional data from Medicaid beneficiaries, and Medicaid healthcare administrative data. Qualitative analysis will examine doula and beneficiary experiences with healthcare systems and Medicaid policies. Quantitative analyses (stratified by race groups) will use matching techniques to estimate the impact of using doula care on postpartum health outcomes, and will use time-series analyses to estimate the average treatment effect of doula programs on population postpartum health outcomes.

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**Discussion** Findings will facilitate learning opportunities among Medicaid programs, doulas and Medicaid beneficiaries. Ultimately, we seek to understand the implementation and integration of doula care programs into Medicaid and how these processes may affect racial health equity.

*Study registration* The study is registered with the Open Science Foundation (<https://doi.org/10.17605/OSF.IO/NXZUF>).

**Keywords** Pregnancy, Postpartum, Doula, Medicaid, Implementation science

## Background

Racial inequities in severe maternal morbidity (SMM) and mortality continue to increase and constitute a national public health crisis [1–3]. Maternal mortality in the United States far exceeds that of comparable high-resource nations [4], and Black persons have approximately a threefold higher rate of pregnancy-related mortality compared to white persons. Rates of severe maternal morbidity (SMM), which encompasses life-threatening conditions during pregnancy and postpartum, have increased by nearly 200% in the past 20 years, [2, 3, 5, 6] and significant racial inequities exist in SMM [1, 7–9].

Medicaid programs pay for 42% of all pregnancy care in the United States, including 68% of pregnancy care among Black persons [10]. Social and structural factors drive racial inequities in SMM and mortality, including the policies and decisions that drive medical racism [11–13]. Therefore, Medicaid programs have great potential to implement structural interventions to advance racial equity in healthcare and health outcomes during pregnancy and postpartum [14–16]. Currently, state Medicaid programs take various approaches to implement doula care in terms of the generosity of the doula benefit and the centring of racial health equity as part of the doula policy [17, 18]. Doulas who provide care in the pregnancy and postpartum periods can identify as community-based doulas or full-spectrum (i.e. provide care throughout all pregnancy-related services). A doula is a trained birth worker who provides non-clinical and culturally relevant supports to a person through a health-related experience such as pregnancy and childbirth [19]. This can include emotional, physical and informational support and companionship during pregnancy, delivery and postpartum. Past research has shown that doula services can improve healthcare experiences and health by serving as an advocate on how healthcare systems can best serve birthing persons in a way that works for them [20, 21]. Doula care may disrupt the multiple forms of racism that people experience during pregnancy and postpartum, not only in the healthcare setting [17]. Their work is critical in ensuring evidence-based practice that typically centres white populations is coupled with equitable practices.

Research suggests that doula care programs improve delivery outcomes and birth experiences. A recent Cochrane systematic review of 26 trials in 17 countries found that doula support led to a 25% reduced risk of Caesarean-section delivery, and a 30% reduced risk of individuals reporting negative feelings about their birth experience [22]. Studies from the Minnesota, California and Florida Medicaid programs estimated a 41–53% reduced risk of Caesarean section among birthing persons who received doula services, relative to those who did not [23, 24]. Caesarean section may serve as an important proxy for adverse outcomes because it contributes, via the risk of severe obstetric complications [25], to 37% of cases of SMM [26]. Further, an evaluation of a New York City program to connect Black and other persons of colour with doula services found that access to doula care significantly reduced the risk of preterm birth – from 12.4% to 6.3% [27]. Prior work suggests that Medicaid's adoption of doula care programs could help improve pregnancy and postpartum health outcomes, particularly if Black, Indigenous and persons of colour (BIPOC) communities can access doula programs [28–30].

This project will support doula research for equitable advances in Medicaid pregnancy health (Project DREAM). Project DREAM will add to knowledge about the role of Medicaid doula benefits in addressing racial equity in pregnancy and postpartum outcomes by assessing variation in the implementation of doula programs in six diverse states and investigating the extent to which doula care programs improve SMM and other outcomes for BIPOC birthing populations.

## Methods

### Study design

We will conduct a non-randomized mixed-methods intervention evaluation study to support doula research for equitable advances in Medicaid pregnancy health (Project DREAM) by assessing the implementation and effectiveness of Medicaid doula care programs on racial equity in postpartum healthcare quality and health outcomes in six US states. The study aims to compare differences in beneficiary experiences, postpartum treatment for chronic conditions (cardiovascular and mental health and substance use disorders) and risk of SMM

postpartum among Medicaid beneficiaries who receive doula services, relative to beneficiaries who receive standard care. We focus on Black and BIPOC populations and we will also assess differences in outcomes by race group. Our project draws on the infrastructure of the Medicaid Outcome Distributed Research Network (MODRN), which provides a process to develop consensus-based study designs across sites and to conduct standardized data collection and analyses [31].

WCG IRB approved this study, effective 6 November 2023. We registered the study with the Open Science Foundation (<https://doi.org/https://doi.org/10.17605/OSF.IO/NXZUF>).

**Conceptual framework**

We propose to study how Medicaid implementation of doula programs (including variation in how or whether Medicaid benefits are centring BIPOC populations) affects postpartum health. As part of this project, we recognize the range of expertise that is needed to address these research objectives. As such, our study includes community-based doula and university-based research partners. To additionally inform and contextualize research findings, our study’s advisory board includes Medicaid participants, doula organization partners, Medicaid clinical leaders and researchers.

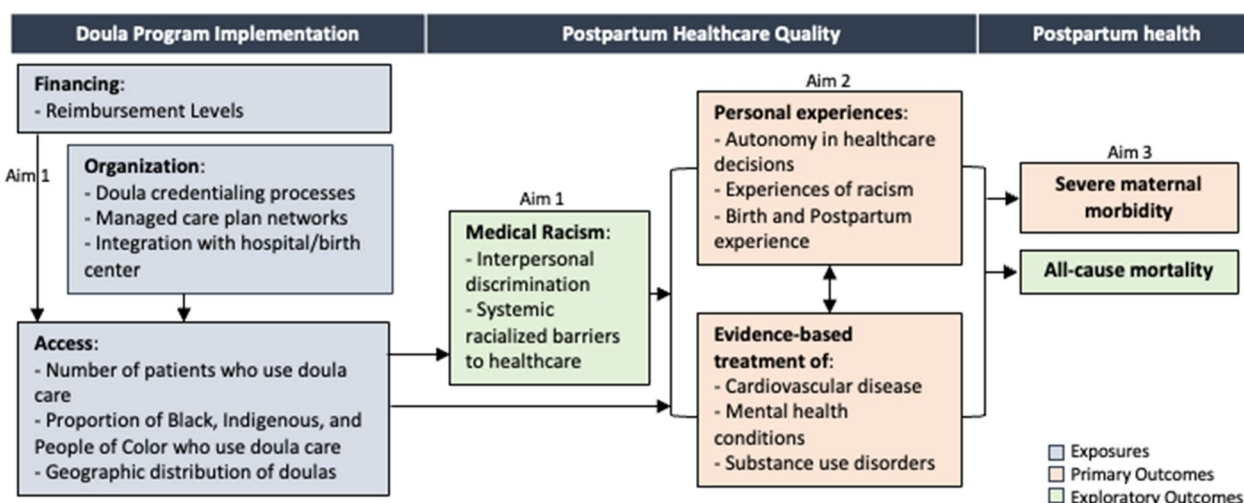
Our analytical conceptual model draws on the integrated-Promoting Action on Research Implementation in Health Services (iPARIHS) Implementation Science Framework [32]. The iPARIHS framework conceptualizes the successful implementation of an intervention as the dynamic interaction of multiple actors within a

system affected by their broader context and culture. Four key constructs measure the translation of knowledge to practice [33, 34]. Innovation (i.e. adapting doula care interventions across different states), contributors (i.e. doulas, Medicaid administrators, beneficiaries), context (i.e. culture and baseline practices within a healthcare system or Medicaid program) and facilitation (i.e. the process by which doula care is implemented in practice) (See Fig. 1).

We will assess contributors’ perspectives (doulas, beneficiaries) regarding access to doula care and healthcare experiences during the postpartum period. We will examine the context in terms of state-level barriers and facilitators to doula care and person-reported experiences of discrimination and medical racism. Findings will facilitate cross-state learning opportunities among Medicaid programs, doulas and Medicaid beneficiaries about best practices in how to implement doula programs in a sustainable way. Ultimately, we seek to understand the implementation and integration of doula care programs into Medicaid and how these processes may affect racial equity in healthcare quality and outcomes.

**Settings and participants**

We selected six state Medicaid programs in various stages of implementing doula care programs (Table 1). Within each state, we will collect data from doulas and Medicaid beneficiaries, and we will use administrative healthcare data from the Medicaid programs. Figure 2 provides an overview of the study timing, recruitment and retention of subjects and analysis of healthcare data.



**Fig. 1** Conceptual framework for the study of doula care to advance racial equity in postpartum health. We hypothesize that upstream factors related to program implementation will affect experiences of care. These intermediate healthcare outcomes will subsequently impact our primary outcome of severe maternal morbidity

**Table 1** State Medicaid programs doula intervention strategies

State	Est. births per year in Medicaid	Implementation status	Participating doula organization(s) research partner	Participating university research partner
Kentucky	25 000	State legislation to require doula coverage introduced but not passed (2022) One Medicaid managed care plan offers doula care (2023)	Kentucky Doulas Hope's Embrace	University of Kentucky
Maryland	27 000	State legislation passed to make doula service coverage available for all Medicaid beneficiaries (2022) State Plan Amendment approved (2022)	Mamatoto Village	University of Maryland, Baltimore County
Michigan	41 000	State plan amendment approved (2023) Additional state legislation pending (2023)	Black Mothers' Breastfeeding Association	University of Michigan
Pennsylvania	50 000	Managed care plans permitted to contract with doulas (2024) State Plan Amendment planned (2025)	Genesis Birth/PA Doula Commission	University of Pittsburgh
South Carolina	27 000	Developing doula interventions is a component of the South Carolina Birth Outcomes Initiative (2022)	BirthMatters	University of South Carolina
Virginia	31 000	State legislation passed calling on Medicaid to submit State Plan Amendment (2021) State Plan Amendment approved (2021)	Birth in Color RVA Urban Baby Beginnings	Virginia Commonwealth University

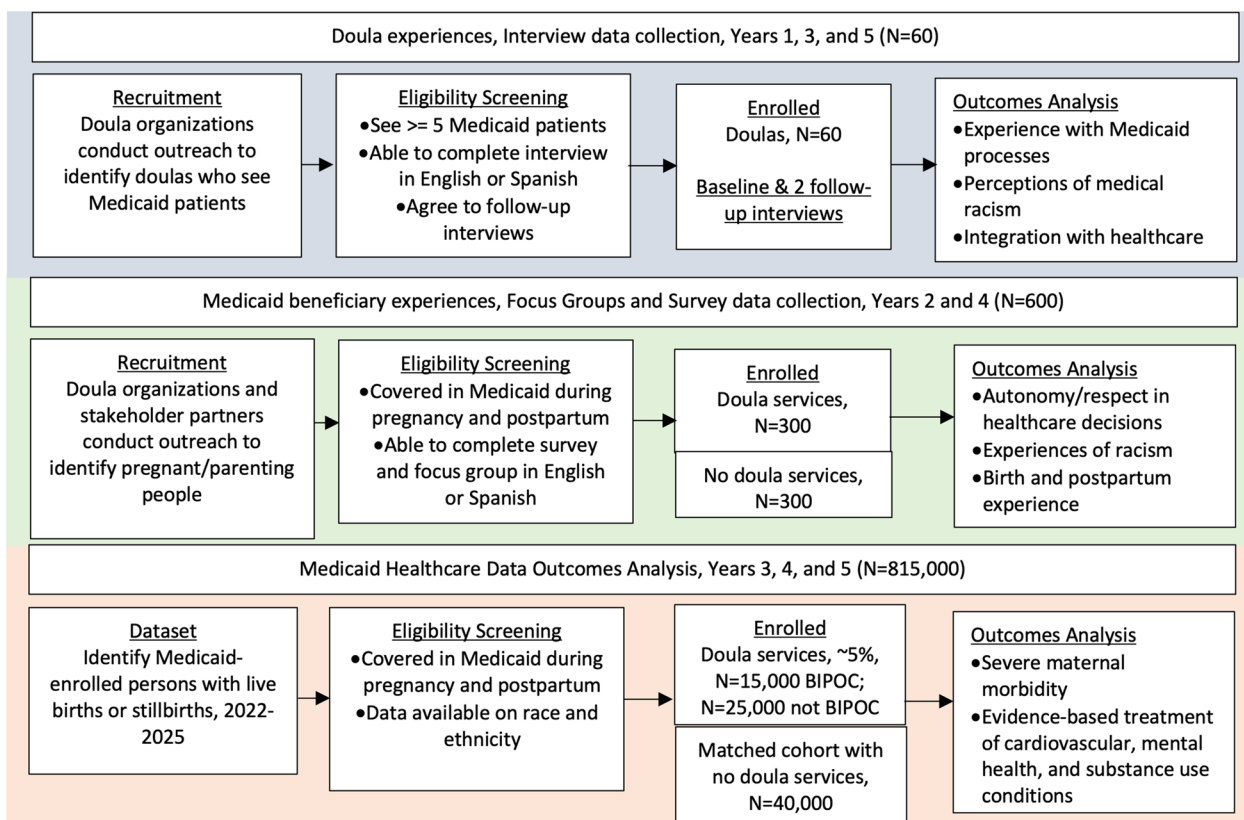
**Doulas**

Doula organization research partners will assist with recruiting at least 10 doulas within each of the 6 states (N=60) to participate in qualitative focus groups and surveys to understand the experiences of doulas with Medicaid participation. Specific implementation domains covered in the interviews will include: adequacy of reimbursement, facilitators and barriers to participating in Medicaid managed care organization networks, integration with hospitals or healthcare systems, experiences working with Medicaid beneficiaries and perceptions of how doula services may affect BIPOC persons, specifically by disrupting obstetric racism. Baseline focus groups will occur in year 1, with follow-up in years 3 and 5 of the project to track changes over time. To advance diversity and inclusion in our study, we will purposively sample doulas from rural and urban areas, including BIPOC doulas and those who serve populations who primarily speak languages other than English. The goal of our focus groups among doulas is not to provide a representative sample, but to provide in-depth information on doulas' experiences. The rigour of qualitative research is judged on the basis of transferability, not generalizability – that is, the extent to which our qualitative results transfer to or fit other similar communities and contexts. The

focus group facilitators have expertise working cross-culturally to create communication models to ensure that participants can share meaningful insights that are communicated into research findings. The sample will be purposively designed with theoretical diversity to ensure the results are transferable to other doulas serving Medicaid community members.

**Medicaid study participants**

We will recruit at least 50 Medicaid beneficiaries per state in each of years 2 and 4 (300 in each year for a total of 600 participants) who have had a delivery and received doula care in the 6 months prior to participating in surveys and focus groups. Medicaid participants will complete brief surveys including demographic questionnaires, instruments to measure medical autonomy and everyday discrimination scales. Focus groups will facilitate group discussion of their births and postpartum periods, the experiences of doula care, and perceptions about how doula services may have affected their experiences in medical care. We will collect cross-sectional data from two different samples of Medicaid beneficiaries in years 2 and 4 of the project. Consistent with our study's goals of understanding how doula benefits may address obstetric racism, we will purposively sample Medicaid



**Fig. 2** Logic model of recruitment and retention of study subjects and analysis of Medicaid healthcare data. Doulas and Medicaid beneficiaries will be recruited into the study. Medicaid administrative healthcare data will be used to study the outcome of severe maternal morbidity

beneficiaries from a range of geographic areas and will oversample BIPOC Medicaid beneficiaries.

**Administrative healthcare data**

SMM occurs in an estimated 1–2% of delivery hospitalizations and requires a large population to detect clinically meaningful changes due to interventions. We will collect information on person-level clinical outcomes from Medicaid administrative healthcare data and will not recruit individuals for the healthcare-related component of this study. The Medicaid healthcare data will include an estimated 237 700 Black persons across all six states with a delivery, and an estimated 577 300 persons of other races with a delivery, between 2022 and 2025 inclusive. From this comprehensive dataset, we will study the subset of those who use doula services (anticipated *N*=15 000 BIPOC and *N*=25 000 not BIPOC) compared with a propensity-matched cohort of those who do not use doula services (anticipated *N*=40 000). Each participating site has converted its Medicaid healthcare data files to a MODRN Common Data Model so the data have a consistent structure, list of variables and variable formats across states, including comparable variables on

Medicaid eligibility categories. This facilitates efficient analyses and comparable results using state-specific data. The MODRN common data model includes a census of inpatient, outpatient, professional and pharmaceutical services billed to the Medicaid program for all enrolled individuals. A distributed research network (DRN) includes multiple organizations using a common data model to support centralized development of analytic plans with local execution of analyses [35–40].

**Study outcomes**

Table 2 includes details about primary and secondary outcomes measurement and related statistical power considerations.

Our primary outcomes include SMM, person-reported measures of respectful obstetric care and evidence-based postpartum care for chronic conditions. SMM will be defined on the basis of a modified version of the Centers for Disease Control and Prevention (CDC) algorithm, which includes 21 indicators of life-threatening adverse events or medical interventions related to such events [26]. We will measure non-fatal SMM (with and without blood transfusion) in inpatient records at delivery, from

**Table 2** Measurement, timing and statistical power considerations for primary and secondary outcomes

Outcome	Measurement	Timing	Minimum detectable effects*
Primary outcomes			
Severe maternal morbidity	Modified Centers for Disease Control and Prevention algorithm	Delivery through 42 days and through 365 days postpartum	Assuming a baseline rate of 5%, the largest detectable difference is 1.21% point
Person-reported health and wellbeing	Mothers Autonomy in Decision-Making scale [41] and Mothers On Respect index [42]	Pregnancy through 365 days postpartum	Assuming a baseline score of 35, the minimum detectable difference in score of BIPOC beneficiaries versus not is 3.4 points in the score
Evidence-based postpartum care for chronic conditions: treatment for hypertension	Follow-up visit within 10 days for blood pressure evaluation and screening (source ACOG [43]) or outpatient visit with first position diagnosis code related to hypertension or outpatient visit with cardiologist	7–365 days postpartum	Among NHB women with hypertension, assuming a prevalence rate of 21.4%, bringing sample size down to 50 883. Assuming a baseline treatment rate of 18% [44], the largest detectable difference is 4.93% point
Evidence-based postpartum care for chronic conditions: treatment for mental health conditions (excluding substance use disorders)	Screening for depression during the postpartum period (source: ACOG [45, 46]) in either maternal or infant claims [47] or outpatient visit with first position diagnosis code for a mental health disorder or outpatient visit with mental health specialist	7–365 days postpartum	Among NHB women with MH disorder, assuming a prevalence rate of 21%, bringing the sample size to 49 932. Assuming a baseline treatment rate of 80%, the largest detectable difference is 4.88% point
Evidence-based postpartum care for chronic conditions: treatment for substance use disorders	Use of medication for opioid use disorder (Source: ACOG [48]) or outpatient visit with first position diagnosis code for substance use disorder or outpatient visit with substance use disorder specialist	7–365 days postpartum	Among NHB women with SUD disorder, assuming a prevalence rate of 10%, bringing the sample size to 23 777. Assuming a baseline treatment rate of 60%, the largest detectable difference is 8.79% point
Secondary outcomes			
All-cause mortality	Number of postpartum persons who die of any cause per 100 000 births	Delivery through 365 days postpartum	No statistical models will be applied
Participant experiences of discrimination or medical racism: racial or socioeconomic discrimination	Everyday Discrimination Scale	Delivery through 365 days postpartum	Assuming a baseline score of 3, the minimum detectable difference in score of BIPOC participants versus not is 0.14 point in the score

\*Detectable effect sizes were calculated at a significance level of 0.05 and a power of 0.8, assuming at least 1% of the population of interest (i.e. non-Hispanic Black) engages with doula care over a period of 4 years, with a total sample size of 237 700. The total sample size was inferred from the number of non-Hispanic Black persons with deliveries paid for by Medicaid in 2020 among the six states, multiplied by four. If a greater proportion of the population uses doula services, we will be powered to detect even smaller effect sizes.

delivery through 42 days and through 365 days postpartum, including intensive care unit (ICU) admission in the definition of SMM. We will measure SMM with and without evidence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, as this disorder contributed to SMM and mortality during the study period [49]. We will assess wellbeing related to person-reported experiences in maternity care settings, using the validated Mothers Autonomy in Decision-Making scale [41] and Mothers On Respect index [42], which include items related to equitable, respectful care. These scales have been shown to be reliable and have been validated via community-engaged research processes. Importantly, both scales demonstrate the ability to measure person-driven priorities in the context of obstetric care. Third, we will assess healthcare utilization (outpatient visits and medication use) related to the management of chronic conditions during 7–365 days after delivery. Specifically, we will focus on the management of hypertension, mental health conditions and substance use disorders as these conditions represent primary causes of postpartum pregnancy-associated mortality [50, 51].

Secondary outcomes include participant experiences of discrimination or medical racism and all-cause mortality. We will use the Everyday Discrimination Scale [52], which has been validated and in use for 20 years to date [53, 54], to assess Medicaid beneficiaries' experiences of racial or socioeconomic discrimination. The scale assesses the perception of and frequency of interpersonal discrimination. To investigate more qualitatively, we will also assess experiences of racism in the medical system via conducting qualitative focus groups with Medicaid beneficiaries. Finally, the number of maternal deaths per 100 000 births from delivery through 365 days postpartum, stratified by race and whether the decedent used doula services, will be assessed. We will not apply statistical analyses to this outcome, given the anticipated low number of cases of mortality.

## Analyses

### Implementation data

To track implementation of specific elements of doula programs, we will collect documents that reflect implementation of Medicaid doula programs from state Medicaid agencies, other state regulatory bodies, Medicaid managed care plans, healthcare systems and doula and other healthcare provider organizations. At the end of each project year, we will prepare a report to share with partners for input and for them to check the accuracy of our implementation information. The final implementation matrix will quantify certain implementation domains (e.g. reimbursement amount is a quantitative variable), and it will also include qualitative data (e.g.

anecdotes from partners pertaining to successful strategies to centre BIPOC populations).

### Qualitative analyses

For our focus group data, we will transcribe interview audio recordings verbatim and transcripts spot-checked against the audio recordings for accuracy. Then, we will delete audio files to protect participants' confidentiality. We will analyse and report qualitative data using the Consolidated criteria for Reporting Qualitative Research (COREQ) Framework [55]. To analyse data, we will use template analysis, which combines features of deductive content analysis and inductive grounded theory, thereby allowing us to obtain specific information on participant perspectives while also capturing any new or unanticipated themes [56]. Two coders will separately code the first three interview transcripts, meet to compare codes, discuss inconsistencies in coding approaches and then alter or add codes. They will repeat this process for the next three items. After this, the coders will meet with the full study team to discuss the coding scheme and a coding rulebook that provides definitions, rules and examples for each code. We will repeat this iterative process until we fully develop the coding scheme. The coders will independently code all transcripts and resolve any coding discrepancies via discussion. Once coding is complete, synthesis of content will begin by organizing codes under broader domains (meta-codes) as well as sub-codes. Reported results will include descriptive statistics of the characteristics of participants, such as demographics. The primary analysis will be to convey qualitative data, including the use of illustrative quotes.

### Quantitative analyses

First, we will evaluate the extent to which doula care facilitates equity in the quality of postpartum care, postpartum treatment for chronic conditions (cardiovascular and mental health and substance use disorders) and experiences of postpartum care. We will generate propensity scores to match Medicaid beneficiaries who used doula services to those who did not [57]. We anticipate a sample of 15 000 BIPOC beneficiaries and 25 000 non-BIPOC beneficiaries who used doula services, and a matched cohort of 40 000 beneficiaries of all races who did not use doula services. Propensity score matching should allow us to achieve balance on the observed covariates (and unobserved covariates that are correlated with those observed) between beneficiaries who do and do not access doula services, ensuring comparable groups [58–60]. We will conduct analyses of baseline data to assess whether the matching technique achieves balance, and we can adjust to alternative techniques (e.g. weighting approaches) if needed. State-specific

generalized regression models (we will base the choice of model on the distribution of the outcome) will incorporate matched data and will examine differences in outcomes between BIPOC beneficiaries who do and do not use doula services, and between BIPOC and white beneficiaries who use doula services. Because this matched analysis cannot rule out potential unmeasured confounding in cases where confounders are not associated with observable characteristics in administrative data, we will conduct sensitivity analyses for unmeasured confounding in meta-analyses [61].

Second, we will estimate the effects of state Medicaid doula care programs on racial equity in SMM. To estimate the effects of the Medicaid doula care programs, we will use a quasi-experimental approach that takes advantage of the variation in the timing of states' adoption of doula programs, as well as variation in factors that facilitate doula access, such as reimbursement rates. We will use a comparative interrupted time series (ITS) analysis with the interventions of interest implemented at different times [62]. We will include Medicaid beneficiaries of all races who have a delivery in the six states of interest (anticipated  $N=815\,000$  all beneficiaries; anticipated  $N=237\,700$  BIPOC beneficiaries). On the basis of our implementation matrix, we will construct time-varying exposure measures of implementation of doula programs in Medicaid, including reimbursement rates, integration of doulas into healthcare systems and Medicaid beneficiaries' levels of access to doulas. Using this measure, we will compare trends in outcomes in states with different implementation of doula programs over multiple time points to identify changes in outcomes over time. We will use log linear or Poisson regression models to test for significant effects of doula program implementation on changes in the SMM rate within each race/ethnic group, with number of births (population at risk) as an offset variable to account for the differences in the denominator of SMM rate across state and year [63]. We will extend the models to include an interaction term between the doula program implementation strength and the proportion of BIPOC Medicaid beneficiaries. The models will use autoregressive error to account for non-independence of repeated measures. We will use the quasi likelihood information criteria to assess goodness-of-fit of our regression models [64].

### Limitations

This research has limitations. First, we cannot randomly assign participants to receive doula care, and thus rely on an observational study design. Although random assignment to treatment has historically represented the gold standard for understanding causal effects, we will use rigorous longitudinal analyses for understanding the causal

impacts of interventions in the real world [65]. Second, our study includes six states, whereas other state Medicaid programs outside of our study have also implemented doula programs. Results from our study, therefore, may not generalize to other states with different implementation strategies. Third, for the evaluation of SMM, which requires large population-level data, we rely on administrative healthcare data that were not designed for research but for Medicaid programmatic and payment purposes. To minimize potential measurement bias from these types of administrative data, our team will use validated measures to the greatest extent possible and will consider multiple sensitivity analyses for the measurement of SMM. Finally, our evaluation of doula services should be interpreted in the context of state development of the Medicaid benefit, with some states having more experience implementing doula care than other states.

### Discussion

This research will contribute evidence on how Medicaid doula care programs can improve racial equity in SMM among Medicaid populations by disrupting medical racism and facilitating evidence-based care and improved care experiences. Specifically, this research project will: (1) provide ongoing information on the landscape of how implementation of doula programs evolves in six state Medicaid programs; (2) elucidate the experiences of doulas and Medicaid beneficiaries in these states; (3) highlight perspectives of the experiences of BIPOC Medicaid beneficiaries; and (4) generate quantitative estimates from Medicaid healthcare data on doula programs' effects on health equity.

A vast body of research describes the persistent inequities within the healthcare system's delivery of quality obstetric care to Black persons and other persons of colour relative to white persons. Medicaid enrollees have reported difficulty in accessing obstetric care, difficulty in receiving requested help with their health and experience racial and socioeconomic biases in care [66]. Many Medicaid programs have implemented doula care programs to stem SMM and mortality trends that disproportionately affect Black and other persons of colour. However, due to the federalist structure, which offers states flexibility in Medicaid program operations, there are significant variations in state doula care models (e.g. centring of racial equity, access to care, reimbursement rates) with limited evidence on which model components and implementation approaches bare the greatest impact [17, 67, 68].

Therefore, by making three primary innovations in the field, our mixed methods research will address doula care program decisions and birthing persons' decision-making on healthcare system navigation. Project DREAM represents one of the first multi-state studies of doula



care interventions and racial equity in Medicaid populations, addressing the limitations in prior evidence largely restricted to white and middle-class populations. Second, it aims to capture community and lived-experience perspectives through community-engaged research by including both doula organizations, which have explicit goals of Black racial equity, and Medicaid enrollees who have used doula care as our research partners. Third, it incorporates the research infrastructure of MODRN, a well-established collaboration between university researchers and state Medicaid agencies, to facilitate the analysis of Medicaid healthcare data to identify postpartum treatment for chronic conditions commonly associated with SMM and mortality [31].

Findings from our research will directly inform best practices to implement doula care programs in Medicaid in ways that will ensure that such care is accessible and relevant to the populations who can benefit most. Multiple stakeholders can use these as well as whether these programs are poised to specially promote racial equity. These findings of build a supportive system for high-quality postpartum care, including Medicaid administrators actively engaged in initiatives aimed to address pregnancy health outcomes [10], doula birth providers who want to understand the best way to participate in Medicaid to serve BIPOC communities and pregnant persons who seek the best quality of care and a positive and supportive postpartum experience.

#### Abbreviations

BIPOC	Black, Indigenous and persons of colour
MODRN	Medicaid Outcomes Distributed Research Network
SMM	Severe maternal morbidity

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#### Author contributions

Study conception and/or design: Jarlenski, Kennedy, Ahrens, Zivin, Clark, Barnes, Tang, Goetschius, Ashford and Gareau; acquisition, analysis and interpretation of data: Tang, Jarlenski, Mosley, Mendez and Kennedy; drafting or significantly revision of the manuscript: all authors; approval of the manuscript submission: all authors; and agreement to be personally responsible for author's own contributions: All authors.

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#### Availability data and materials

When study data collection is complete, de-identified data from focus groups and interviews will be available from the authors upon reasonable request. The Medicaid administrative healthcare data for the study will be used under data use agreements with individual state Medicaid agencies are therefore not publicly available.

#### Data availability

No datasets were generated or analysed during the current study.

#### Declarations

##### Ethics approval and consent to participate

WCG IRB approved this study, effective 6 November 2023. We will obtain informed consent from all doula and Medicaid beneficiary participants.

##### Consent for publication

Not applicable.

##### Competing interests

The authors declare no competing interests.

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