

# Evaluating Minority Representation in Perinatal Research: A Single-Site Comparison of Study Enrollment and Hospital Population

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## Research Article

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# Abstract

## Background

Perinatal research faces persistent challenges to inclusive recruitment due to time-limited eligibility, caregiving demands, and postpartum recovery, with additional barriers disproportionately affecting racial and ethnic minority populations. Despite recognition of these challenges, limited real-world evidence exists on whether commonly used recruitment approaches yield study populations that reflect the diversity of the clinical populations they serve. To address this gap, we examined the demographic diversity of participants enrolled in three perinatal studies using differing recruitment strategies and compared each study population to the overall birthing population of a single women's specialty hospital.

## Methods

We compared the hospital's birthing population to the participant demographics of three observational studies conducted concurrently (2021–2023) with differing recruitment strategies. Study A, which consisted of a 30-minute online survey, used indirect outreach without compensation; study B, which consisted of a 30-minute online survey, used direct, remote outreach with \$15 compensation; and study C, which involved a blood draw and a 30-minute visit, combined indirect and in-person clinic-based recruitment, offered Spanish-language support, and provided \$50 compensation. One-sample tests of proportions were used to compare the demographics (race, ethnicity, age) of each study to that of the hospital's birthing population ( $n = 15,174$ ).

## Results

Compared to hospital demographics, Study A enrolled 84.1% White, 11.5% Black, and 5.1% Hispanic participants ( $p < 0.001$  for all comparisons). Study B enrolled 68.9% White, 28.3% Black, and 4.0% Hispanic participants ( $p < 0.001$  for all comparisons). Study C enrolled 50.3% White ( $p = 0.327$ ), 40.2% Black ( $p < 0.001$ ), and 9.5% Hispanic participants ( $p = 0.082$ ).

## Conclusions

Recruitment strategies that prioritize accessibility, such as in-person outreach, language support, and greater compensation, lead to improved representation of minority populations in perinatal research and enhance the relevance of findings to those disproportionately affected by adverse maternal outcomes.

## BACKGROUND

Racial and ethnic disparities in maternal and infant morbidity and mortality in the United States have worsened in recent years, highlighting the need for inclusive perinatal research to improve outcomes for underserved populations.<sup>1–4</sup> Despite a well-documented history of underrepresentation, growing evidence demonstrates that intentional, equity-centered strategies can enhance diversity in study recruitment and retention.<sup>5–7</sup>

Perinatal research presents unique challenges to inclusive recruitment. Narrow eligibility windows tied to gestational age, childcare responsibilities, and postpartum recovery complicate participation. These obstacles intersect with additional barriers disproportionately affecting minority populations, including language differences, financial strain, transportation limitations, mistrust in medical institutions, and lack of familiarity with clinical research.<sup>8–10</sup> Inflexible and indirect recruitment methods may also unintentionally lead to the exclusion of minority populations, thereby perpetuating health inequities.

While previous studies have underscored the importance of equitable research design, there remains limited real-world evidence on how specific recruitment strategies perform in practice within perinatal populations.<sup>7, 9–11</sup> A better understanding of which methods facilitate more inclusive enrollment is essential to designing research studies that reflect the communities they intend to serve. Bridging this gap requires examining not only the existing barriers but also how various methods, including modality, compensation, and language access, influence participation. With this in mind, our group examined how different recruitment methods for three separate research studies conducted at a single women's specialty hospital affected participant diversity.

Between 2021 and 2023, our team conducted three large, concurrent observational studies targeting perinatal populations. Although the studies shared comparable eligibility criteria and study duration, they differed in their recruitment and retention strategies. Each offered varying degrees of support to reduce participation barriers. This situation provided an opportunity to directly evaluate study populations generated by different recruitment and retention approaches and their representation of the hospital population.

The aim of this analysis was to determine which combination of strategies yielded participant populations reflective of the hospital's birthing population. We hypothesized that recruitment approaches that reduced known participation barriers, such as language accessibility and limited financial incentives, would result in study population that more closely resembled the hospital's demographic profile.

## METHODS

This manuscript was prepared in accordance with the STROBE guidelines for reporting observational studies.<sup>12</sup>

**Study design and setting:** This study examines the racial and ethnic characteristics of three research study populations that employ different recruitment strategies. Studies were conducted by the same principal investigator and team of research coordinators within a singular research program housed within a large, tertiary referral, women's specialty hospital in a southern state in the United States (Fig. 1). This study compares the proportions of race, ethnicity, and age group representation of each study's final population to the obstetrical population of our hospital between 2021 and 2023. Any study-specific surveys or questionnaires unrelated to patient demographic information were not included in this analysis. This study was approved by the Woman's Hospital Foundation Institutional Review Board and given an exempt status (FWA: 0005699; IRB Registration: 00003774). Due to the retrospective nature of this study, a waiver of informed consent was requested and approved by the Woman's Hospital Foundation Institutional Review Board (FWA: 0005699; IRB Registration: 00003774).

### **Studies used for analysis**

Study A was a survey-based study that recruited pregnant individuals to complete a 30-minute online survey about their experiences during the COVID-19 pandemic (Fig. 1). The goal of Study A was to determine the effects of the COVID-19 pandemic on prenatal physical and mental health. No compensation was offered for participation in this study. Recruitment was conducted exclusively through indirect methods, including social media posts, hospital websites, and news stories. Study A was considered to have minimal barrier reduction.

Study B was also a survey-based study that recruited postpartum individuals to complete a 30-minute online survey about their experiences during the COVID-19 pandemic (Fig. 1). The purpose of Study B was to determine the effects of the COVID-19 pandemic on perinatal physical and mental health. Participants were compensated \$15, and recruitment was exclusively through direct, though remote, methods, including calling and texting specific patients with a delivery history during the recruitment window. However, no in-person recruitment was utilized in this study. Study B was considered to have moderate barrier reduction.

Study C was an observational study that included one blood draw (completed in real time) in mid-pregnancy and permission to abstract information from their medical record (Fig. 1). The goal of Study C was to identify biomarkers for predictions of delivery date and pregnancy complications (i.e., premature delivery, preeclampsia, GDM). The visit lasted approximately 30 minutes, and participants were immediately compensated \$50 for their participation. Recruitment for the study used both indirect and direct methods. Indirect outreach included hospital signage and social media posts. Direct recruitment involved approaching patients in person during their prenatal clinic visits or while they were at the hospital for lab work. Additionally, Spanish-speaking participants had access to translated study materials and translation services. The in-person recruitment team was composed entirely of women, the majority of whom were Black, and all were trained to clearly explain the study to potential participants. Because of these strategies, Study C was considered to have the highest level of barrier reduction compared to Studies A and B.

All three studies required participants to be at least 18 years of age. Studies A and C required participants to be pregnant at enrollment, with Study C specifically requiring 18–22 weeks of gestation. Participants in Study C also had to have a previous ultrasound assessment in their first trimester of pregnancy and could not be pregnant with multiple fetuses and/or choose elective c-section or induction. Study B required participants to have delivered a baby at least 3 months after the first COVID-19 case in the state. Enrollment across multiple studies within this analysis was possible.

### **Demographic variables**

Demographic variables included in this analysis (i.e. race, ethnicity, and age) were collected upon study enrollment for each study. All studies used consistent wording for these questions, such as “Are you of Hispanic origin?” and “What is your race?”. Age at enrollment was calculated based on the participant’s date of birth at the date of enrollment.

### **Statistical Analysis**

To assess the representativeness of each study population, the prevalence of demographic variables in each study cohort was compared to that of the hospital delivery population using one-sample tests of proportions, with the hospital delivery proportions serving as the reference (null) values.

## **RESULTS**

### **Study Population and Community Characteristics**

This analysis included three observational studies conducted between 2021 and 2023 at a single women’s specialty hospital. Each study targeted a similar population but used different recruitment strategies (Fig. 1, Table 1). All three studies have closed enrollment; however, only two have been published at the time of this report.<sup>13,14</sup> The final analytic sample included 1,121 participants enrolled in Study A, 1,660 participants enrolled in Study B, and 3,103 participants enrolled in Study C. During the same period, 15,174 hospital deliveries were recorded and used for comparison.

Most participants were between 20 and 40 years of age, which reflects the population of interest (i.e., reproductive-aged individuals who are pregnant or postpartum). To assess representativeness, the study populations were compared with 15,174 deliveries at the hospital during the same period. Among these hospital deliveries, 49.3% were to White birthing individuals, 35.9% to Black birthing individuals, and 8.5% to those of Hispanic origin (Table 1, Fig. 2).

### **Representation of Minority Perinatal Populations Across Studies**

Among the 1,121 participants enrolled in Study A, the majority identified as White (84.1%), while only 11.5% identified as Black and 5.1% as Hispanic (Table 1, Fig. 2). Compared to the hospital population, Study A significantly underrepresented Black and Hispanic groups ( $p < 0.001$  for each comparison)

(Table 1, Fig. 2). Study A also enrolled an older cohort, with 67.2% of participants aged 30–39, compared with 43.4% in the hospital birthing population ( $p < 0.001$ ) (Table 1).

Of the 1,660 participants enrolled in Study B, 28.3% identified as Black and 4.0% as Hispanic, both significantly lower than their representation in the hospital population ( $p < 0.001$ ) (Table 1, Fig. 2). White participants made up 68.9% of the study cohort, compared to 49.3% in the hospital ( $p < 0.001$ ) (Table 1, Fig. 2A). Similar to Study A, participants in Study B were significantly older than the hospital birthing population, with 54.2% in the 30–39 age range ( $p < 0.001$ ) (Table 1).

Among the 3,103 participants in Study C, 50.3% identified as White (vs. 49.3% in hospital,  $p = 0.327$ ) and 9.5% as Hispanic (vs. 8.5% in hospital,  $p = 0.082$ ), neither of which was statistically different from the hospital population (Table 1, Fig. 2). Notably, Study C enrolled a significantly higher proportion of Black participants (40.2% vs. 35.9% in the hospital,  $p < 0.001$ ), the only study to exceed hospital's Black representation in the comparison group (Table 1, Fig. 2A). In contrast to Studies A and B, Study C participants were slightly younger, with a majority aged 20–29 (55.0% vs. 49.2% in hospital,  $p < 0.001$ ) (Table 1).

## DISCUSSION

This study evaluated the study populations of three perinatal research cohorts concurrently recruited at a single women's specialty hospital, examining how recruitment and retention strategies influence the demographic representativeness of study participants. Each cohort targeted a similar population during the same timeframe, yet used different recruitment strategies, and only one cohort produced a demographically similar study population to that of the hospital. Study C, which used barrier reduction strategies including bilingual materials, in-person recruitment, and real-time compensation, produced a study population that reflected the hospital's birthing population in terms of race, ethnicity, and age. In contrast, Studies A and B, which relied on less inclusive approaches, underrepresented Black and Hispanic participants and skewed older in age.

These findings align with prior literature demonstrating that underrepresentation of minority groups in research is frequently driven by structural barriers.<sup>8</sup> They also highlight that recruitment design can have a measurable and direct impact on who is included in research studies. Study C included higher, real-time monetary compensation, multilingual materials, and integration of research into routine clinical care – all of which were barrier reduction methods not used or used to a lesser extent by the other two studies in this analysis. Additionally, the recruitment team being comprised of mostly Black women may have further improved trust and approachability, echoing research showing more equitable enrollment when there is racial concordance between study staff and participants.<sup>10–11,13–14</sup>

In addition to participant-facing strategies, Study C had the benefit of real-time access to clinical schedules, and Studies B and C had the partial HIPAA authorization waiver granted by the IRB, all of which enabled targeted and efficient recruitment. This approach allowed the research team to pre-

identify eligible patients and conduct in-person outreach during clinic visits (Study C) or contact potentially eligible patients directly (Study B). In addition, providing translated study materials and access to translation services for Spanish-speaking individuals may have helped Study C be more inclusive. Previous studies have shown that offering these resources significantly improves recruitment and retention among Hispanic and Latino participants.<sup>15–16</sup> These observations underscore that inclusive recruitment necessitates intentional planning, institutional support, and a substantial time commitment.

However, these findings should be interpreted with important limitations in mind. Study C differed from other cohorts across multiple recruitment dimensions simultaneously, making it difficult to isolate which specific components were most critical to the observed differences in participant demographics. Additional limitations include differences in study design, study purpose, and study burden (e.g., surveys vs. phlebotomy visits). Additionally, all studies were low-risk and short-term, which may limit generalizability to more intensive or longitudinal research. Future research should investigate which specific recruitment strategies are most effective in enhancing diversity in study participation. It would also be valuable to hear from potential participants, especially those from underrepresented groups, about what influences their decision to join a research study. These insights could guide the development of more inclusive recruitment approaches for future studies.

## CONCLUSIONS

This study highlights that improving representation in perinatal research requires intentional strategies that address real-world barriers to participation. When recruitment is thoughtfully designed with equity in mind, it is possible to engage populations that reflect the communities served. These findings provide guidance for researchers and institutions seeking to improve representation in research studies, underscoring the importance of aligning recruitment practices with the broader goal of improving healthcare access for all.

## Declarations

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**Competing interests:** The authors have no relevant financial or non-financial interests to disclose.

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**Declaration of interest:** The authors have nothing to declare.

**Ethics approval:** This study was approved by the Woman's Hospital Foundation Institutional Review Board and given an exempt status (FWA: 0005699; IRB Registration: 00003774). Due to the retrospective

nature of this study, a waiver of informed consent was requested and approved by the Woman's Hospital Foundation Institutional Review Board (FWA: 0005699; IRB Registration: 00003774).

**Helsinki Declaration:** This study and its methods adhered to the Helsinki Declaration.

**Consent to publish:** Not applicable.

**Data availability:** The datasets generated during this study are available from the corresponding author upon reasonable request through the journal. Email: ashley.edwards@womans.org

**Author contributions:** All authors wrote the main manuscript text. Conceptualization was by B.J., D.L., H.R., D.R., and E.S. Methodology was handled by B.J., E.L., and E.S. Project administration was handled by B.J., D.L., and E.S. E.S. was additionally responsible for data curation, formal analysis, investigation, resources, supervision, validation, and visualization. B.J. created Table 1. A.E. created figures 2A and 2B. Final editing and submission preparation was performed by A.E. and J.C. All authors reviewed the manuscript.

**Prior Publication:** This work has not been previously presented at a conference or meeting or been submitted to *BMC Public Health* for publication.

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## Table

**Table 1.** Participant Demographics Across Study Cohorts Compared to Hospital Birthing Population

This table presents the racial, ethnic, and age distribution of participants enrolled in studies A, B, and C alongside demographic data from all hospital deliveries during the study period (N = 15,174). Participant race is categorized as White, Black, or Other (including American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, multiracial, or unspecified). Ethnicity is reported separately as Hispanic or Non-Hispanic. Age groups include 18–19, 20–29, 30–39, and 40+ years.

Comparisons between each study cohort and the hospital population were evaluated for statistical significance. A p-value of less than 0.05 was considered statistically significant.

|                                                             | <b>Hospital*</b> | <b>Study A</b>  | <b>P-value</b> | <b>Study B</b>  | <b>P-value</b> | <b>Study C</b>  | <b>P-value</b> |
|-------------------------------------------------------------|------------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|
| n                                                           | 15174            | 1121            |                | 1660            |                | 3103            |                |
| <b>Race</b>                                                 |                  |                 |                |                 |                |                 |                |
| Black                                                       | 5446<br>(35.9%)  | 129<br>(11.5%)  | <0.001         | 470<br>(28.3%)  | <0.001         | 1247<br>(40.2%) | <0.001         |
| Other                                                       | 2249<br>(14.8%)  | 49 (4.4%)       | <0.001         | 47 (2.8%)       | <0.001         | 296<br>(9.5%)   | <0.001         |
| White                                                       | 7479<br>(49.3%)  | 943<br>(84.1%)  | <0.001         | 1143<br>(68.9%) | <0.001         | 1560<br>(50.3%) | 0.327          |
| <b>Ethnicity</b>                                            |                  |                 |                |                 |                |                 |                |
| Hispanic                                                    | 1279 (8.5%)      | 57 (5.1%)       | <0.001         | 66 (4.0%)       | <0.001         | 295<br>(9.5%)   | 0.082          |
| Non-Hispanic                                                | 13733<br>(91.5%) | 1064<br>(94.9%) | <0.001         | 1594<br>(96.0%) | <0.001         | 2808<br>(90.5%) | 0.082          |
| <b>Age Group</b>                                            |                  |                 |                |                 |                |                 |                |
| 18-19                                                       | 625 (4.1%)       | 23 (2.1%)       | 0.001          | 10 (0.6%)       | <0.001         | 147<br>(4.7%)   | 0.131          |
| 20-29                                                       | 7466<br>(49.2%)  | 290<br>(25.9%)  | <0.001         | 666<br>(40.1%)  | <0.001         | 1707<br>(55.0%) | <0.001         |
| 30-39                                                       | 6593<br>(43.4%)  | 753<br>(67.2%)  | <0.001         | 899<br>(54.2%)  | <0.001         | 1192<br>(38.4%) | <0.001         |
| 40+                                                         | 490 (3.2%)       | 55 (4.9%)       | 0.003          | 85 (5.1%)       | <0.001         | 57 (1.8%)       | <0.001         |
| *From 1/1/21-12/31/22; 'Hospital' missing n=162 ethnicities |                  |                 |                |                 |                |                 |                |

## Figures

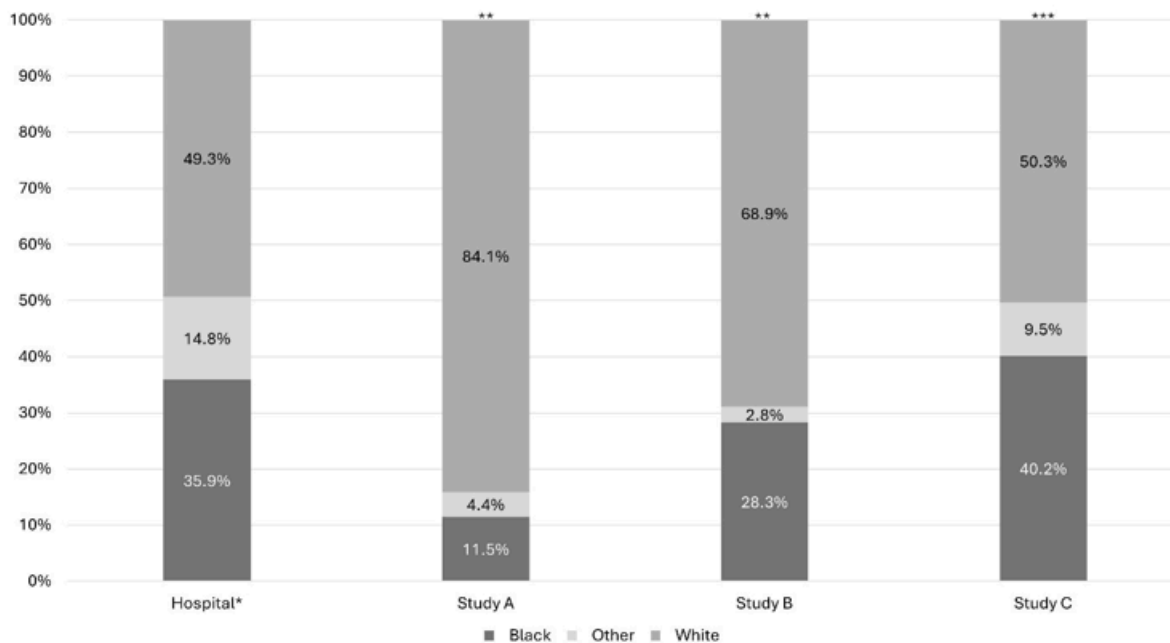
| Study A                                                                                                                                                                                      | Study B                                                                                                                                                                                      | Study C                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N=1,121                                                                                                                                                                                      | N = 1,600                                                                                                                                                                                    | N = 3,103                                                                                                                                                                                                                                  |
| <b>Eligibility Criteria</b> <ul style="list-style-type: none"> <li>At least 18 years old</li> <li>Pregnant at the time of enrollment</li> </ul>                                              | <b>Eligibility Criteria</b> <ul style="list-style-type: none"> <li>At least 18 years old</li> <li>Delivered a baby between June 10, 2020 - September 30, 2021</li> </ul>                     | <b>Eligibility Criteria</b> <ul style="list-style-type: none"> <li>At least 18 years old</li> <li>18-22 weeks pregnant at time of enrollment</li> </ul>                                                                                    |
| <b>Study Design</b> <ul style="list-style-type: none"> <li><u>Procedure</u>: online survey</li> <li><u>Compensation</u>: none</li> <li><u>Length of participation</u>: 30 minutes</li> </ul> | <b>Study Design</b> <ul style="list-style-type: none"> <li><u>Procedure</u>: online survey</li> <li><u>Compensation</u>: \$15</li> <li><u>Length of participation</u>: 30 minutes</li> </ul> | <b>Study Design</b> <ul style="list-style-type: none"> <li><u>Procedure</u>: 1 blood draw</li> <li><u>Compensation</u>: \$50</li> <li><u>Length of participation</u>: 30 minutes</li> </ul>                                                |
| <b>Recruitment Methodologies</b> <ul style="list-style-type: none"> <li><u>Approach</u>: Indirect</li> <li><u>Medium</u>: Social media</li> <li><u>Language(s)</u>: English</li> </ul>       | <b>Recruitment Methodologies</b> <ul style="list-style-type: none"> <li><u>Approach</u>: Direct</li> <li><u>Medium</u>: Call/text</li> <li><u>Language(s)</u>: English</li> </ul>            | <b>Recruitment Methodologies</b> <ul style="list-style-type: none"> <li><u>Approach</u>: Indirect + Direct</li> <li><u>Medium</u>: Approached in clinic, social media, posters</li> <li><u>Language(s)</u>: English and Spanish</li> </ul> |

Figure 1

### Study Design and Recruitment Methodologies Across Three Perinatal Research Studies

Summary of participant eligibility criteria, study procedures, compensation, and recruitment and retention methods for Studies A, B, and C. All three studies targeted perinatal populations, but they varied in design, recruitment, and retention approaches.

A.



B.

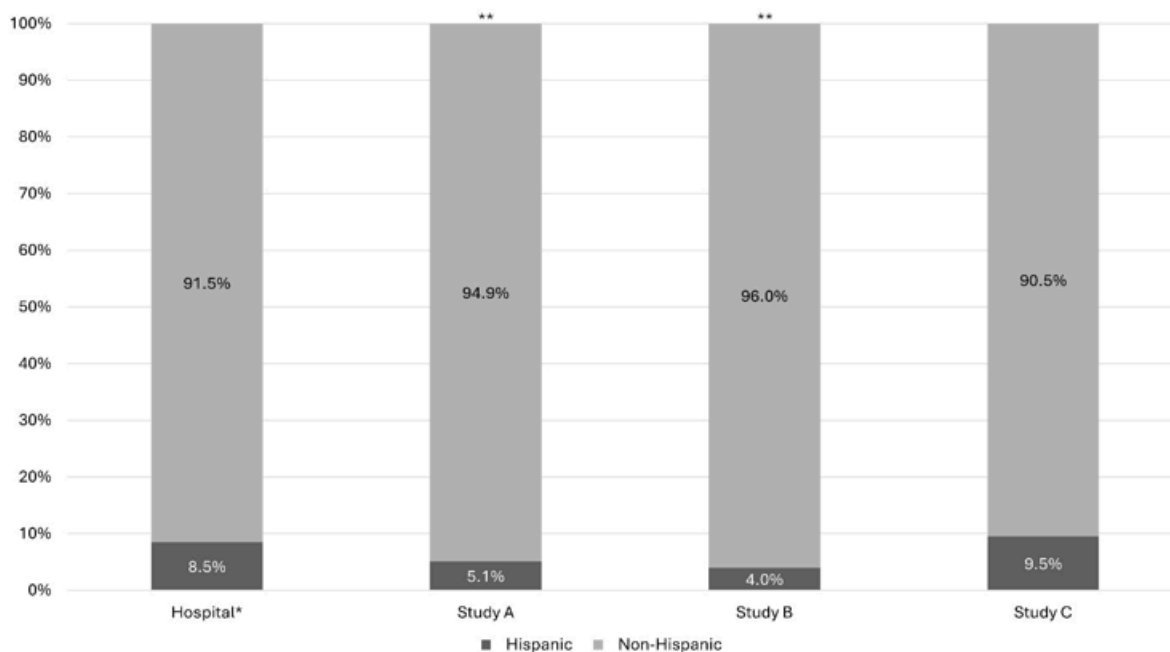


Figure 2

### Racial, Ethnic, and Hispanic Representation in Study Populations Compared to Hospital Birth Population

(A) Racial distribution of study participants across Studies A, B, and C compared to the hospital's overall birthing population. Categories include Black, White, and Other (which includes American Indian or

Alaska Native, Native Hawaiian or Other Pacific Islander, more than one race, or unspecified). Double asterisks (\*\*) identify significantly lower minority representation when compared to the hospital. Triple asterisks (\*\*\*) identify significantly higher minority representation when compared to the hospital.

**(B)** Hispanic ethnicity distribution among study participants and the hospital birthing population. Double asterisks (\*\*) identify significantly lower minority representation when compared to the hospital.