"I Had to Go There for My Own Safety" Negotiations of Access and Autonomy among DC Birth Settings

Elizabeth Avery Borgmann
Dartmouth College, elizabeth.a.borgmann.24@dartmouth.edu

Follow this and additional works at: https://digitalcommons.dartmouth.edu/geography_senior_theses

Part of the Geographic Information Sciences Commons, Human Geography Commons, Maternal and Child Health Commons, and the Women's Health Commons

Recommended Citation
Borgmann, Elizabeth Avery, ""I Had to Go There for My Own Safety" Negotiations of Access and Autonomy among DC Birth Settings" (2024). Geography Undergraduate Senior Theses. 7.
https://digitalcommons.dartmouth.edu/geography_senior_theses/7

This Thesis (Undergraduate) is brought to you for free and open access by the Geography at Dartmouth Digital Commons. It has been accepted for inclusion in Geography Undergraduate Senior Theses by an authorized administrator of Dartmouth Digital Commons. For more information, please contact dartmouthdigitalcommons@groups.dartmouth.edu.
“I Had to Go There for My Own Safety”
Negotiations of Access and Autonomy among DC Birth Settings

Avery Borgmann

A thesis presented to the Department of Geography
Dartmouth College

Advised by Xun Shi, Abigail Neely, and Zaneta Thayer

Hanover, New Hampshire
May 2024
ACKNOWLEDGEMENTS

Above all, I’d like to express my gratitude to “Becky,” “May,” “Joy,” and the many other DC residents who so generously shared their stories with me. Your experiences are the backbone of this thesis and the reason I’ve written anything at all.

To the midwives and doctors who care for DC’s birthing people every day: Thank you for taking the time to share your expertise with me. Your knowledge has fundamentally shaped my understanding of birth in DC, and your work fills me with hope.

To Professors Shi, Neely, and Thayer: Thank you for your unwavering guidance on this project and countless others (nearly all of which have involved birth or babies in some form or another). Thank you for helping me to pivot again and again, and thank you for helping me to see the forest.

To Professors Alvarez León, Lopez, and Lucero: Thank you for challenging me to think critically and creatively about each aspect of this project and for sharing endless wisdom with me, whether over the course of weeks or years.

To Aletha: Thank you for countless hours of technical (and moral) support and wizardry in the Rahr Lab. Your help made all the difference.

To the Department of Geography and the Rockefeller Center: Thank you for supporting my research and enabling me to speak with so many incredible people in DC.

To all my people, in DC and in Hanover: Thank you for spending these four years with me. I am overwhelmingly proud to know and love and learn alongside you all.
# TABLE OF CONTENTS

1. INTRODUCTION .................................................................................................................. 4  
2. BACKGROUND .................................................................................................................... 5  
3. LITERATURE REVIEW ....................................................................................................... 12  
4. GIS METHODS .................................................................................................................. 20  
5. GIS RESULTS ................................................................................................................... 25  
6. INTERVIEW AND SURVEY METHODS ................................................................................. 33  
7. INTERVIEW AND SURVEY RESULTS ................................................................................ 37  
8. DISCUSSION ..................................................................................................................... 46  
9. CONCLUSION .................................................................................................................... 52  
10. REFERENCES .................................................................................................................... 53  
11. APPENDIX A .................................................................................................................... 64  
12. APPENDIX B .................................................................................................................... 66  
13. APPENDIX C .................................................................................................................... 69  
14. APPENDIX D .................................................................................................................... 73  
15. APPENDIX E .................................................................................................................... 75
A note on terminology:

The ways we talk about birth are constantly evolving. Where possible, I use the following terms:

*Black birthing people*, as defined by Julian et al (2020), is “a gender-inclusive term…referring to people who identify racially as Black and have the physiologic capacity for pregnancy and childbirth” (Julian et al., 2020, p. 3).

*Community birth*, proposed by Cheyney et al (2019), serves as a “concise and convenient umbrella term for [planned] home and birth center locations” and challenges normative assumptions of hospital birth as superior to births at home or at birth centers (Cheyney et al., 2019, p. 9).

These terminology choices are informed by the Reproductive Justice lens of this thesis and attempt to center the autonomy of the people at the heart of the stories I’ve told. When describing previous research, however, I defer to the terms selected by the authors in order to accurately report their study populations and findings (Julian et al., 2020).

Lastly, I use the terms DC and the District throughout this thesis to reference my study area, the city of Washington, DC. All are interchangeable.
1. INTRODUCTION

In local papers, birth on the predominantly Black east side of Washington, DC, is a subject of alarm. Rapidly accelerating since 2017, these headlines draw on abundant cases of hospital closures and maternal health disparities to proclaim a state of crisis for Black birthing people, sometimes termed a “maternity care desert” (Itkowitz, 2017; Nash, 2021b, 2021a). For these reasons, wrote Kayla Randall and Kaarin Vembar of the Washington City Paper in 2018, DC is “one of the worst places…in the developed world to deliver a child” (Randall & Vembar, 2018). Their often-cited article echoes a statement by Dr. Barbara Levy, former Vice President of Health Policy for the American College of Obstetricians and Gynecologists, published by local news network WUSA9: “Washington DC is the most dangerous place to give birth in the United States if you are African American” (Kubota et al., 2018). The District’s starkly uneven landscape of access to labor and delivery care is deeply intertwined with historical and ongoing segregation and further complicated by threats of obstetric racism and maternal mortality.

These arguments are well-taken, and they are only part of the story I wish to tell. On this uneven landscape, amid this rhetoric of crisis, childbearing in DC continues, and thousands of Black Washingtonians each year negotiate decisions about where to birth. I seek to understand how birthing people navigate maternity care in DC mentally, as they consider possibilities and make decisions, and physically, as they arrive at the place of their child’s birth. Such lived experiences of decision-making are rarely emphasized, especially in relation to concepts of access.

Thus, this thesis addresses three gaps surrounding labor and delivery care for marginalized birthing people: the need to understand intersecting determinants of access, the relationship between potential access and actual birthplace selection, and the meaning of autonomy when access is constrained. By layering mapping with interviews and surveys, all grounded in Reproductive Justice and reproductive geographies, I integrate individual and population-level analysis towards a holistic understanding of DC’s fragile birth landscape. With goals of supporting equitable policy and informing quality perinatal care, I posed the following questions:

1) How is spatial access to birth settings distributed geographically and socioeconomically?
2) What factors mediate the relationship between potential access and actual selection and use of birth settings?
3) How do birthing people perceive their own access, and how do they make decisions and exercise autonomy under variable access conditions?

As policymakers and health systems respond to the alarm raised by news articles and statistics, symbolized by the DC Council Committee on Health’s recent public roundtable on maternal and infant health, I hope to contribute to a nuanced portrait of birth in DC’s most medically underserved neighborhoods (Henderson, 2023). In this moment of commitment to reducing maternal health disparities in DC, I aim to center and contextualize the experiences of those who kindly shared their stories with me in order to foster solutions that truly address the priorities and needs of birthing people in the community and work towards a District where Black birthing people feel safe and empowered to give birth in the setting of their choice. Finally, I hope that my methodological experimentation offers useful lessons and opportunities for continued work on the interplay between access and autonomy in geographic context, as proposed by scholars of Reproductive Justice and reproductive geographies.
2. BACKGROUND

2.1 DC

The focus of this thesis is the birth landscape navigated by DC residents, which may include seeking care outside of DC. A city of roughly 670,000 residents, DC is divided into 8 wards, illustrated by the bolded numbers in Figure 2.1, that are roughly equal in population (U.S. Census Bureau, 2020). Wards function as units of municipal organization and political representation. Additionally, though ward boundaries can contain substantial variation, wards are often the geographic unit of comparisons within the city, including on topics like maternal health (Chandler & Phillips, 2020; Fontenot et al., 2023; Maternal Mortality Review Committee, 2021)

Figure 2.1
Labor and delivery care in DC and surrounding counties.

![Map of DC and Surrounding Counties](Image)

- The scale and ward boundary symbology used here are maintained across all maps of DC that follow.

2.2 Segregation in DC

Once dubbed “Chocolate City,” Washington, DC, is famous for both Black history and for intense segregation – the D.C. metro area is ranked as the 15th most segregated in the country (McArdle, 2021; Small, 2021). Today, 45 percent of DC residents are Black or African American; this figure peaked at 71 percent in 1970 and dipped below 50 percent in 2011 (Phillips, 2012; U.S. Census Bureau, 2020). DC’s current patterns
of racial, economic, and educational segregation are an interplay between historical legacies and recent developments, and this background is a crucial piece of DC’s current maternal health landscape. These demographic patterns are mapped in Figure 2.2.

Phrases like “east of the river” and “east of the park” circulate as verbal indicators of majority-Black neighborhoods. Citing the Anacostia River and Rock Creek Park, as seen in Figure 2.2, this wording draws on geographic features that have historically represented racial boundaries in the city. In fact, Rock Creek Park was partially constructed as “a barrier to Black settlement in the west” (Prologue DC, 2023). Early 20th-century racial covenants and redlining restricted many Black Washingtonians to one of two areas – older housing near employment in the city center and along rivers, or in “remote” eastern areas of the city, including Anacostia – while historically-Black neighborhoods in pockets of western DC vanished (Brooks & Valadez, 2018; Chandler & Phillips, 2020; Prologue DC, 2023). Even after these mechanisms of segregation were outlawed and Black residents settled in neighborhoods across the eastern side of DC, zoning practices and exclusion from the real estate market had made most of western DC inaccessible to Black Washingtonians (Brooks & Valadez, 2018; Prologue DC, 2023). By 1980, Black residents constituted a strong majority in nearly all areas of eastern DC (Chandler & Phillips, 2020; Prologue DC, 2023). Since then, combinations of gentrification, urban renewal, and infrastructure construction have further displaced Black Washingtonians eastward, including into suburban counties (Chandler & Phillips, 2020; Prologue DC, 2023). The share of white residents in many historically-Black neighborhoods of central areas of DC, such as Shaw and U Street, has increased significantly, and DC’s Black population is increasingly concentrated in Wards 7 and 8 (Brooks & Valadez, 2018; Prologue DC, 2023).

**Figure 2.2**
*Demographic, social, and economic characteristics of DC, by census tract.*

![Figure 2.2: Demographic, social, and economic characteristics of DC, by census tract.](image)
Figure 2.2, continued

Mean Household Income

Households with no Vehicle

Public Insurance Coverage

Uninsured Population

Birth Settings Considered (DC)

- Birth center
- Hospital

Data Source: DC Open Data
2.3 Perinatal Health in DC

DC’s racial segregation is closely tied to economic and educational segregation and to disparities in healthcare access and health outcomes. In the words of Corey Lanham, a representative of the National Nurses United who has advocated against hospital closures in DC, “‘The medical red line in D.C. has already been drawn and it runs down North Capitol Street’” (Yu, 2018). These disparities are particularly stark with regard to perinatal health. For example, Black birthing people in DC, who primarily live east of North Capitol, receive adequate prenatal care less frequently than the general population, a gap that has been attributed to financial and geographic access barriers (Fontenot et al., 2023). Additionally, between 2014 and 2018, DC’s rate of pregnancy-related mortality, defined by the city’s Maternal Mortality Review Committee (MMRC) as the frequency of “death during or within one year of pregnancy, from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy,” was 44.0 deaths per 100,000 live births (Maternal Mortality Review Committee, 2021, p. 11). This figure far exceeds an already staggering national average of 28.4 deaths per 100,000 live births during the same time period, though the difference is not statistically significant due to the small sample size and “wide confidence intervals” for statistics concerning DC (Maternal Mortality Review Committee, 2021, p. 14). In its 2019-2020 annual report, the MMRC revealed that “pregnancy-associated deaths in the District are disproportionately concentrated among non-Hispanic Black birthing people” (Maternal Mortality Review Committee, 2021, p. 16). Ninety percent of the 21 birthing people lost to pregnancy-related death between 2014 and 2018 were Black, and seventy percent were residents of Wards 7 or 8 (Maternal Mortality Review Committee, 2021). Furthermore, in concert with Black birthing people across the country, many more Black DC residents have reported harrowing experiences of racism and negligence in local labor and delivery wards that cannot be fully captured by morbidity and mortality statistics alone (Barthel & Ciammachilli, 2021; M. N. Matthews, 2023; Myszkowski & Pressey, 2018; Nash, 2021a; Proujansky, 2021; Scott & Davis, 2021; Vargas, 2018). Several prenatal care providers I spoke with, all of whom work often with Black birthing people in DC, emphasized that these experiences have amplified distrust in the medical system and in some hospitals more than others (Physician 1, personal communication, March 5, 2024; Physician 2, personal communication, March 25, 2024; Midwife 1, personal communication, March 26, 2024).

2.4 Labor and Delivery Care in DC

DC’s labor and delivery landscape involves a complicated array of options, including multiple hospital systems, community health center networks, and private obstetrics and midwifery practices. At present, five hospitals and one freestanding birth center are open for labor and delivery in DC, as are twelve hospitals and two birth centers in adjoining suburban counties (DC Department of Health, 2023; Maryland State Archives, 2023; Virginia Hospital and Healthcare Association, 2023). The locations of these facilities are shown in Figure 2.1, and the characteristics of all DC facilities are in Table 2.1. Both figures also include Cedar Hill Regional Medical Center, which is projected to open in 2025 (Banner, 2023).

While DC’s overall density of labor and delivery care is high according to March of Dimes’ national standards, district-wide statistics obscure heterogeneity within the city (Fontenot et al., 2023). DC’s singular birth center, operated by a Federally Qualified Health Center (FQHC) since 2010 and mission-driven to care for underserved populations, is the only labor and delivery facility located on the eastern side of the city (Community of Hope, 2022; A. Kearns et al., 2014). Its commitment to serving low-income Black Washingtonians in particular has remained constant since its founding in 2000 (A. Kearns et al., 2014). By contrast, all open hospital-based labor and delivery wards are located in the wealthy, predominantly-white northwest quadrant (DC Health Regulation & Licensing Administration, 2024).

As many news articles have pointed out, the current landscape was established in late 2017, when two labor and delivery wards located in Wards 8 and 5 shuttered (Itkowitz, 2017). Though the city continues to exceed the influential March of Dimes criteria for “full access” to maternity care and former patients of the closed hospitals have sought care elsewhere, their closures further exacerbated an already uneven landscape of birth
care (Brigance et al., 2022; Gilgore, 2023; Itkowitz, 2017). Once the only hospitals on the eastern side of the city, both had primarily served Black patients, many of whom were Medicaid recipients (Itkowitz, 2017; Jamison & Nirappil, 2017; Office of the Attorney General, 2020; Simmons-Duffin, 2017). The first closure, of United Medical Center (UMC) in August 2017, was ordered by the Department of Health following a series of grave medical errors and financial strain; the second, of Providence Hospital in October of the same year, was attributed to a budgetary decision given low utilization of labor and delivery beds (Jamison, 2017; Jamison & Nirappil, 2017; Simmons-Duffin, 2017). Thus, the case of UMC illustrates, residents of Wards 7 and 8 likely received substandard care even when the hospital was present. UMC, as Jennifer C. Nash explains, “while present in the community, was hardly serving its community members with adequate care; in fact, its presence was marked by significant failures of care with material consequences” (Nash, 2021a, p. 312). Explaining the closure, former UMC board chair LaRuby May remarked: “Our decision is really based on the needs of the community…Mothers had already decided that we’re not the place where they want to be” (Jamison, 2017). Despite UMC’s failures, its closure generated great frustration and resistance, and many saw the loss of labor and delivery care altogether as conveying blatant disregard for Black birthing people and their health (Itkowitz, 2017; Jamison, 2017; Nash, 2021a). Together, May’s statement and the turmoil that followed it foreshadow the stories of participants in this thesis, many of whom reported negotiations between safety and the proximity of labor and delivery care options.

A new hospital, which has been in development since 2018 and will be integrated with GW Health when it opens in 2025, is intended to address these inequities: according to George Washington University Hospital CEO Kim Russo, it will “ensure residents of Wards 7 and 8 have access to high quality care in their community” (Banner, 2023). However, its impact in this community remains to be seen.

Table 2.1
Current and future labor and delivery facilities in DC.

<table>
<thead>
<tr>
<th>Ward</th>
<th>Facility</th>
<th>Description</th>
<th>L&amp;D Beds</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Howard University Hospital (Howard)</td>
<td>Academic medical center</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>George Washington University Hospital (GW)</td>
<td>Academic medical center</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>Georgetown University Hospital (Georgetown)</td>
<td>Academic medical center</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>Sibley Memorial Hospital (Sibley)</td>
<td>Community hospital</td>
<td>26</td>
</tr>
<tr>
<td>5</td>
<td>Family Health and Birth Center (FHBC)</td>
<td>Freestanding birth center; FQHC</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Washington Hospital Center (WHC)</td>
<td>Academic medical center</td>
<td>16</td>
</tr>
<tr>
<td>8</td>
<td>Cedar Hill Regional Medical Center (Cedar Hill)a</td>
<td>Community Hospital</td>
<td>To be determined</td>
</tr>
</tbody>
</table>

Note: Abbreviations for each facility, as used in Figure 2.1 are contained in parentheses.

*a Cedar Hill is expected to open in 2025. Its labor and delivery capacity is unknown at the time of writing.

2.5 Prenatal Care and Insurance

The distribution of labor and delivery care is also connected to a complex web of prenatal care. The District is home to multiple different hospital systems, and each prenatal care practice that offers hospital birth is generally contracted with one hospital, where the practice’s providers have privileges to provide labor and delivery care, can schedule procedures like inductions or cesarean section, and can easily access prenatal care medical records (Physician 1, personal communication, March 5, 2024; Midwife 1, personal communication, March 26, 2024). If a pregnant person presents to any hospital in active labor, the hospital would assume care
of that person, regardless of prenatal care affiliation (Physician 1, personal communication, March 5, 2024; Midwife 1, personal communication, March 26, 2024). However, for the reasons described previously, including access to medical records and increased likelihood of receiving labor and delivery care from a familiar doctor or midwife, a birthing person who opts for hospital birth would typically plan to deliver at the hospital with which their prenatal care practice contracts (Midwife 1, personal communication, March 26, 2024). A birthing person who opts for community birth would likely pursue prenatal care with a midwife who attends home births or works at the birth center (Physician 1, personal communication, March 5, 2024). Because the options at each birth facility differ (for example, only one hospital offers hydrotherapy during labor and birth) and some birthing people have a strong preference for one facility over the others, which may be based on these differences and/or the experiences of others in their family and community, local prenatal care providers sometimes initiate conversations about pursuing prenatal care at a practice affiliated with the desired facility (Physician 1, personal communication, March 5, 2024; Physician 2, personal communication, March 25, 2024; Midwife 1, personal communication, March 26, 2024).

Some DC birthing people face a trade-off between a convenient prenatal care practice and a prenatal care practice affiliated with a preferred birth location. This trade-off may be particularly relevant for residents of Wards 7 and 8. According to the DC Department of Health, clinics run by two different FQHC networks provide all of the prenatal care physically located in these wards (DC Health, 2018). As one physician explained, these clinics are “designed to be in locations of the highest need” and, along with DC’s FQHC-based birth center, aim to make perinatal care accessible for underserved communities (Physician 1, personal communication, March 5, 2024). They also work to address barriers related to cost and transportation as well as food insecurity and housing, and providers are trained to “meet patients where they are” (Physician 1, personal communication, March 5, 2024; Physician 2, personal communication, March 25, 2024). However, each FQHC network is affiliated with one primary hospital, so birthing people who reside in these neighborhoods and wish to deliver at any other hospital may need to cross the Anacostia and pursue prenatal care with a different provider.

Insurance coverage and cost is another important consideration. As of 2020, DC Healthy Families Program, which is the division of DC Medicaid that provides insurance coverage to low-income pregnant people, requires that all of its contracted managed care organizations contract with all of these hospitals (Department of Health Care Finance, 2020, 2024). As a result, Medicaid recipients, including many residents of Wards 7 and 8, can expect that their insurance will apply to birth at any hospital in the District, and the FQHC birth center also accepts Medicaid. According to DC Health, 64% of prenatal care facilities accept Medicaid, and the vast majority of these Medicaid-accepting practices are based in the same FQHC networks described previously (DC Health, 2018). These links between prenatal care practices and birth facilities can therefore filter the options financially accessible to Medicaid recipients. Insurance can also pose a substantial barrier to community birth. Though DC’s birth center accepts Medicaid, unlike most privately-run birth centers, coverage varies across midwives who provide home birth (Physician 1, personal communication, March 5, 2024).

### 2.6 Local and National Statistics

While the dynamics of birth in DC are certainly place-specific, they also mirror patterns of medicalization of birth in the U.S. at large. Between 2018 and 2022, just over 98 percent of births nationally took place in hospital settings, and approximately two percent were community births (Centers for Disease Control and Prevention, National Center for Health Statistics, 2022).

During the same time period, 98.78 percent of births to all DC-resident mothers and 98.68 percent of births to Black or African-American mothers were hospital births, while just over one percent of births in each group were community births. As illustrated in Table 2.2, community births to DC residents were primarily at home and at free-standing birth centers. Black birthing people intended to give birth at freestanding birth centers and at home at similar rates, but a relatively high rate of unintended home birth increases the total
share of all home birth above the share of birth center births. Additionally, the low rate of intended home birth among Black mothers in DC, who are more likely to be low-income, compared to the general population may result in part from high out-of-pocket costs and barriers related to insurance.

Publicly available data tracks births by mother’s state of residence, not by state of delivery, but several providers I spoke with stated that most DC residents deliver within the District (Physician 1, personal communication, March 5, 2024; Midwife 1, personal communication, March 26, 2024).

Table 2.2
Births to DC Residents, 2018-2022, by Birthplace.

<table>
<thead>
<tr>
<th>Birthplace</th>
<th>% of Total Births</th>
<th>% of Births to Black Mothers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital</td>
<td>98.78</td>
<td>98.68</td>
</tr>
<tr>
<td>Freestanding Birth Center</td>
<td>0.26</td>
<td>0.34</td>
</tr>
<tr>
<td>Home (all)</td>
<td>0.84</td>
<td>0.80</td>
</tr>
<tr>
<td>Home (intended)</td>
<td>0.51</td>
<td>0.33</td>
</tr>
<tr>
<td>Home (not intended)</td>
<td>0.28</td>
<td>0.39</td>
</tr>
<tr>
<td>Home (unknown if intended)</td>
<td>0.05</td>
<td>0.08</td>
</tr>
<tr>
<td>Other</td>
<td>0.11</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Data source: (Centers for Disease Control and Prevention, National Center for Health Statistics, 2022)

Though categorical place of birth for Black DC residents in many ways mirrors the patterns of the general population, insurance coverage and payer status differ substantially from population-wide statistics. Between 2018 and 2022, nearly 70 percent of all births to DC resident mothers fit one of the following profiles: birth in a hospital to a Black or African-American mother, who paid for the birth with Medicaid, OR birth in a hospital to white mother, who paid for the birth with private insurance (Centers for Disease Control and Prevention, National Center for Health Statistics, 2022). These differences again inform this study’s specific focus on the experiences of Black birthing people.
3. LITERATURE REVIEW

3.1 Introduction: Placing Birth Geographies

Though of obvious interest to geographers, expressly spatial perspectives on birth extend far beyond the borders of the discipline to comprise a junction of many fields across the medical and social sciences. The term “birth geographies” itself was introduced in 2021 by Jennifer C. Nash, a Black feminist scholar and lawyer, to capture “a perspective attentive to how race, gender, and space collide and collaborate to shape birth outcomes, birth inequities, and access to perinatal citizenship” in both the presence and absence of hospital-based obstetric care (Nash, 2021a, p. 302). Nash situates this concept within the framework of Reproductive Justice (RJ), as well as its subdivision of birth justice, and persuasively argues geography to be an essential addition to broader RJ conversations, scholarship, and movements (Nash, 2021a, p. 304; Ross & Solinger, 2017, p. 96). As she contends, matters of birth are “fundamentally geographical questions—where one births can fundamentally shape the quality of care (or absence of care) one receives. It can shape whether one lives or dies” (Nash, 2021a, p. 328). According to Nash, birth settings, especially their relationship to the medicalization of birth, often represent a negotiation of perceived safety (Nash, 2021b). In engaging birth geographies, I follow Nash’s lead to embrace RJ as the theoretical framework for this project and employ its tenets in geographic context. By applying lenses and methods that arise from multiple geographic subfields, I aim to strengthen her proposed link between RJ and place.

Though Nash advances her claim for the value of geography in RJ work entirely outside of geographic journals, she employs the “geographies of X” or “X geographies” structure that denotes thematic areas of study within the field of geography and delineates numerous opportunities for synthesis between RJ and geographic thought (Nash, 2021a; Rosenberg, 2016). Inspired by the intersections Nash identifies, I raise “reproductive geographies,” coined by Fannin, Hazen, and England (2018), as a complementary literature body and source of methods and understandings that explicitly invoke a spatial lens (Fannin et al., 2018).

Therefore, I bring together reproductive and birth geographies, as defined by their originators, to advance their shared goals of implementing Reproductive Justice in spatial context.

3.2 Reproductive Justice

First posited by Black feminists in 1994, Reproductive Justice draws on theories of social justice, reproductive rights, and intersectional feminism to center the reproductive health of Black women and other marginalized groups who have experienced disproportionate reproductive devaluation and control (Roberts, 1999; Ross, 2017; Ross & Solinger, 2017; Solinger, 2019). This lens is vital to understanding and uplifting the experiences of Black birthing people in DC, who bear the overwhelming burden of maternal health disparities in the city, and adds key perspective to broader conversations of reproductive geographies (Ross & Solinger, 2017).

RJ’s founders took issue with mainstream white feminism’s fixation on individual choice, its narrow focus on abortion and contraception, and its failure to consider complex and intersecting structural factors, and key actors like SisterSong Women of Color Reproductive Justice Collective (established in 1997) and many others have been instrumental in carrying this vision forward (Roberts, 1999; Ross, 2017; Ross & Solinger, 2017; Silliman, 2004). Since its establishment as an activist movement and a body of scholarship, RJ has maintained three primary tenets: “(1) the right not to have a child; (2) the right to have a child; and (3) the right to parent children in safe and healthy environments” (Ross & Solinger, 2017, p. 9; Silliman, 2004). As Roberts (1999) articulates, “reproductive liberty…must encompass the full range of procreative activities…and it must acknowledge that we make reproductive decisions within a social context, including inequalities of wealth and power” (Roberts, 1999, p. 8). Towards these ends, extensive RJ scholarship highlights the critical importance of access to “safe and dignified” and otherwise high-quality resources surrounding the full spectrum of reproductive health and life (Roberts, 1999, p. 138; Ross & Solinger, 2017, p. 10). Quoting Black feminist theorist Katherine McKittrick, Nash explains:
When she reminds readers that ‘Black matters are spatial matters’ this does not mean that they are not legal or medical matters, but that space organizes access to care (or non-care), to public transportation to move to prenatal appointments, to the nearest hospital, to providers, to peer support for breastfeeding parents or new parents. Her work requires that we ask about the landscapes that disparity creates—landscapes which are inhabited and fought against in quotidian and spectacular ways. (Nash, 2021a, p. 327)

Directly relevant to the experiences of Black birthing people in DC, these landscapes of access are products of interacting structures. Fully conceptualizing access clearly demands the intersectional lens inherent to RJ, which understands the compounding of outcomes associated with multiple forms of inequality as “not additive but integrative” (Ross & Solinger, 2017). This perspective is an essential contribution of RJ theory to reproductive geographies.

Alongside access, RJ stresses the principle of autonomy over one’s own reproductive life and understands access to resources and services to be necessary but not sufficient for autonomy (Ross & Solinger, 2017). Here, current geographic work falls short. An RJ perspective, Ross and Solinger argue, also reminds us that individual and community rights and experiences are inextricably linked and urges us to connect individual experiences with “root causes” and structural contexts (Ross & Solinger, 2017, p. 96). RJ takes interest in both lived experiences and the political, legal, historical, and social backgrounds on which they take place, in part because reproductive control and reproductive autonomy operate on multiple scales (Roberts, 1999; Ross & Solinger, 2017). Like the framework of interacting access and autonomy, this idea of interaction between personal and structural dimensions poses challenges to many traditional approaches to studying reproduction. Thus, the multiscalar principles of access and autonomy define the paired methodology of this thesis, which will attempt to integrate the dynamics of both.

3.3 Reproductive Geographies

The principles of RJ are echoed in Fannin, Hazen, and England’s introduction to reproductive geographies, which aims to “signal the importance of centring reproduction – as lived experience, as object of politics and policy – in geographical analysis” (Fannin et al., 2018, p. 2). Like RJ, reproductive geographies understand reproduction as “an issue of social justice, encompassing not just the effort to exercise sovereignty over one’s body but also the broader economic and institutional constraints that limit people’s reproductive choices” (Fannin et al., 2018, p. 2). In defining reproductive geographies, Fannin, Hazen, and England (2018) explicitly cite RJ work and require close collaboration with feminist scholarship (Fannin et al., 2018, p. 2). Driven by this influence, the foundation of reproductive geographies is an attempt to create dialogue between various approaches to studying topics of reproduction, employing “a socio-cultural lens to explore reproductive experiences beyond the clinical…[as] embodied, cultural, political processes where the physical and the social intertwine” (Fannin et al., 2018, p. 8).

Like geographies of women’s health, which may be understood as the predecessor to reproductive geographies, these perspectives on and methods for studying reproduction are derived from a variety of subfields including feminist and health geographies, which have helped to expand geographers’ interest in reproduction beyond matters of population and demography (Dyck, 2003; Dyck et al., 2001; Fannin et al., 2018; S. A. Matthews, 1995). This combination prepares reproductive geographies to take a holistic perspective, suggesting that spatial contexts combine with identities, resources, and experiences to shape individuals’ understandings of reproduction and reproductive health (Cummins et al., 2007; Dummer, 2008; Dyck, 2003; Dyck et al., 2001; R. Kearns, 1993; R. Kearns & Moon, 2002; Rosenberg, 2016). On the relationship between these academic lineages, Isabel Dyck (2003) remarks, “perhaps it is where there is a blurring of subdisciplinary boundaries that conditions emerge for innovative work” (Dyck, 2003, p. 366); I find that this “blurring” is critical to investigating birth geographies under an RJ framework invested in both access and autonomy.
Fannin, Hazen, and England take up this task, concluding, “Our aim…is not to develop one single methodological or conceptual framework for the study of reproductive processes but rather to bring together previously disparate strands of research on reproduction, broadly conceived, that may only rarely speak to each other” (Fannin et al., 2018, p. 11). By definition, then, reproductive geographies scholarship takes many forms, ranging from population-level studies of access to intimate interviews about lived experience, appears in many places, and may not be labeled as belonging to the subfield (Fannin et al., 2018). Practicing reproductive geographies presents both an opportunity and a challenge to reacquaint these many threads (Dyck, 2003; Dyck et al., 2001; Fannin et al., 2018; S. A. Matthews, 1995). In particular, reproductive geographies presents a framework to study structural and experiential aspects of birth as intertwined, aligning with the premise of RJ.

3.4 Geographies of Birth

As evident in RJ, reproductive geographies, and health geographies scholarship, “access” to adequate healthcare is a complex concept with many, often interrelated determinants (Fannin et al., 2018; Guagliardo, 2004; Khan & Bhargwaj, 1994; Nash, 2021a). Drawing on previous efforts to define access, Khan and Bhargwaj (1994) propose “an interplay between the characteristics of the health care service system and the characteristics of potential users…in a specified area, and modified by health care related public policy/planning efforts” (Khan & Bhargwaj, 1994, p. 66). Utilization, or “realized access,” is distinct from potential access, and this relationship is mediated by “barriers and facilitators that reflect dimensions of both the service system and the potential users” and may depend on the nature of the healthcare need at hand, as well as the nature of the place (Khan & Bhargwaj, 1994, p. 66). According to these theories, access consists of both spatial and non-spatial factors that combine with exercises of autonomy to shape experiences of obtaining healthcare and geographies of birth.

In part due to this diversity of contributors, academic work on geographies of birth is dispersed among many different disciplines. Considering the reproductive geographies / RJ lens selected here, particularly its focus on the relationship between access and autonomy, I have identified a few relevant focal points in this literature: 1) geographic distributions of access to labor and delivery care and access disparities (potential accessibility) and 2) determinants of actual birth setting. Though understood under an RJ framework to be closely linked, these dimensions are typically studied separately.

Where possible, I build on existing work specific to birth. In some cases, however, to address the nuances of birth setting in DC, I draw on methods from other topical focuses.

3.4.1 Spatial Accessibility

Though intertwined with a complex network of determinants, as Nash describes, access to adequate reproductive healthcare hinges in part on a geographic or spatial component (Nash, 2021a). This idea of “spatial accessibility” is popular in public health and is regularly used to detect suspected disparities in access to a specific health-related service across space and across populations. In DC specifically, the uneven spatial distribution of labor and delivery care in DC has been raised as a primary driver of access disparities in the city (Fontenot et al., 2023; Itkowitz, 2017; M. N. Matthews, 2023; Myszkowski & Pressley, 2018). For this reason, spatial accessibility is a useful tool to understand the structural landscapes that RJ and reproductive geographies highlight as vitally important, and I explore spatial accessibility to better understand these landscapes in DC.

Writing about access to health services in general, Guagliardo (2004) points out that spatial accessibility encapsulates both availability, or the number of possible services one may feasibly use, and accessibility, or the difficulty associated with traveling between one’s location and the locations of these services. In urban areas like DC, where his work is based, he argues that these two components should be studied in tandem in order to reveal the relatively unknown role that spatial accessibility plays in determining utilization of
healthcare (Guagliardo, 2004). Over the last two decades, approaches to studying spatial accessibility have multiplied, generally increasing in complexity. Each carries unique assumptions about both availability and accessibility, and many such approaches have been applied to study birth access in domestic and global settings. These differing assumptions also mean that the relevance of each method is defined by the dynamics of the real-world situation it attempts to describe—that is, the relevance is place-specific. It is also important to note that these methods measure potential access, which may or may not accurately reflect the experiences of people in the community. Because spatial analysis of the birth landscape in DC is relatively unexplored, I will evaluate multiple methodologies for their ability to capture the realities faced by birthing people who reside in the city. These approaches are detailed below, referencing work on birth in most cases.

3.4.1.1 Provider-to-population ratio method of measuring spatial accessibility

Among the simplest healthcare access metrics, the provider-to-population ratio is calculated for existing bordered areas such as counties and therefore does not require dedicated spatial analysis software (Guagliardo, 2004). The value of this ratio for a given area consists of some metric of capacity for the desired healthcare service within the area divided by some metric of the relevant population of that area (Guagliardo, 2004; Lucas-Gabrielli et al., 2022; Song et al., 2013). This is the approach employed by March of Dimes, a prominent and often-cited maternal and infant health nonprofit, to define maternity care deserts and can be useful for revealing broad patterns on a national scale (Brigance et al., 2022). However, as Guagliardo identifies, this approach loses meaning in urban environments like DC (Guagliardo, 2004). These ratios assume that care is equally accessible within each unit of space, blurring disparities within, and assume that patients cannot cross political boundaries to receive care, an assumption that does not necessarily hold in small spatial units like the District. By March of Dimes' calculations, DC meets the criteria for “full access to maternity care” based on the number of hospitals offering obstetrical (OB) services and the number of OB providers per birth (Brigance et al., 2022). The following methods will employ GIS technology to improve upon this strategy, widely used at a national scale, and provide nuanced spatial information focused on local disparities within an area understood as “full access.”

3.4.1.2 Nearest-neighbor method of measuring spatial accessibility

Instead of measuring the quantity of available services like the provider-to-population ratio, nearest-neighbor methods quantify spatial access by determining the distance or travel time between the patient’s location and the closest appropriate facility. In their most basic form, nearest-neighbor methods assume that, to the patient, only the nearest service is relevant, even if the difference between that service and the next nearest is only seconds in terms of travel time (Guagliardo, 2004). They also assume that capacity is always sufficient (Guagliardo, 2004). These metrics, therefore, measure only accessibility and not availability—that is, no value is placed on the ability to reach and multiple nearby facilities (Guagliardo, 2004). To address availability, similar methods can be used to calculate the average distance to a group of providers (Guagliardo, 2004; Lucas-Gabrielli et al., 2022).

Nearest-neighbor methods are popular in existing studies of birth and have been used many times to delineate disparities in spatial access to labor and delivery care, their relationship to socioeconomic inequality, and their association with adverse maternal and infant health outcomes and stress (Blondel et al., 2011; Grzybowski et al., 2011; Kornelsen et al., 2011; Kozhimannil et al., 2016; Markus & Pillai, 2021; McMorrow et al., 2021; Rayburn et al., 2012; Scrimshaw & Backes, 2020). Of note, the vast majority of these studies focus on rural regions, where healthcare facilities are sparse and the nearest labor and delivery ward might be hours away (Grzybowski et al., 2011; Kornelsen et al., 2009; Kozhimannil et al., 2016; McMorrow et al., 2021; Rayburn et al., 2012). Their relevance can be diminished in urban areas, as they can fail to capture crucial nuances that emerge where multiple birth facilities may exist in close proximity to each other (Guagliardo, 2004). In the most recent March of Dimes report, Fontenot et al (2023) conducted a nearest-neighbor analysis of access to labor and delivery care by ward in DC, which estimated drive times to the nearest labor and delivery facility to be twice as long for Black women than for all other women and longest for residents
of Wards 7 and 8, which are both predominantly Black (Fontenot et al., 2023). Fontenot et al. also raise a crucial consideration in studies of spatial accessibility, arguing that factors like access to transportation and financial resources can compound the distance-based access disparities identified (Fontenot et al., 2023). This ward-level analysis, the most detailed I have found on access to labor and delivery care in DC, can obscure variation within these spatial units. However, the data produced by this method also shows the largest minimum travel distance for DC residents, helping to establish the catchment area size required by the more sophisticated methods. Lastly, without knowing the behavior of DC residents, I cannot rule out the possibility that distance to the nearest labor and delivery facility is an important component of perceived access to care for birthing people. For these reasons, I include the nearest-neighbor method in this study, both as an alternative method and a benchmark for the comparison of different methods.

3.4.1.3 Kernel density estimation method of measuring spatial accessibility

When applied to healthcare access, the kernel-density estimation (KDE) aims to measure the density of services that are usable from a particular location, converting discrete service points into a smooth layer with distance decay (Guagliardo, 2004; Guagliardo et al., 2004; Shi, 2010; Stacherl & Sauzet, 2023). KDE’s application in this context rests on the premise that services offered at a point “spread” beyond that location, usually not limited by political boundaries, and that the service received by a person decreases as the person’s location gets farther from the service point, until it reaches a certain distance from the point, where the service drops to the minimum (Guagliardo, 2004; Guagliardo et al., 2004). That threshold distance, called bandwidth in KDE, can be used to define the service area of a service provider. The service area is the kernel in KDE and is also called the catchment in some more sophisticated methods of quantifying access. Importantly, where the service areas of multiple providers overlap, contributions from each provider are summed to produce the final access score (Guagliardo et al., 2004). As a result, KDE assumes that both availability and accessibility are important and “mutually compensating,” and this compensation meets Guagliardo’s criteria for measuring spatial accessibility in urban areas (Guagliardo, 2004; Shi et al., 2012). Many papers find that the bandwidth, or the extent of the service area, is a critically important parameter and should be chosen carefully (Guagliardo et al., 2004; Shi et al., 2012; Stacherl & Sauzet, 2023). Once a density layer of providers (or other metric of healthcare services) has been produced, it can also be overlaid with a layer showing population density to produce the providers/patients ratio at a much higher spatial resolution, compared with the ratio method described above (Guagliardo et al., 2004; Stacherl & Sauzet, 2023). Though I am not aware of any studies that apply this method to obstetrical care, it has been used to quantify access to primary care in DC, where this study takes place, and my analysis will build on this prior work (Guagliardo et al., 2004).

3.4.1.4 2-step floating catchment area method of measuring spatial accessibility

The so-far most sophisticated access-assessing method developed in health geography is the two-step floating catchment area (2SFCA) method (Luo and Wang 2003). A family of variants have been proposed after its original form (Dai & Wang, 2011; Luo, 2004; Pan et al., 2016; Wang, 2018; Wang & Luo, 2005). Though sometimes set in opposition to KDE, 2SFCA methods are identified by Shi et al. (2012) as a “special case” of KDE (Dai & Wang, 2011; Shi et al., 2012; Stacherl & Sauzet, 2023). 2SFCA, introduced by Luo and Wang (2003), is a well-known member of the broader floating catchment area (FCA) family (Luo & Wang, 2003). Much like the KDE applications described previously, 2SFCA methods incorporate both the distance between the patient and the provider (accessibility) and all reachable providers around the patient’s location (availability). Distinctively, 2SFCA takes into account both the capacity of the provider (e.g., number of beds at the hospital) and the size of demand (e.g., number of patients) within the service area (the catchment). 2SFCA specifically approaches this problem by calculating the services available to each person within the service area of each facility, using distance decay to weight the services based on travel time from the facility, and, in locations where multiple service areas overlap, summing the services that can be received from each facility (Shi et al., 2012). Thus, in the language of KDE, it is the ratio between supply and demand that “spreads,” and 2SFCA can be considered KDE over an inhomogeneous background, with that background being the demand for a particular healthcare service (Shi et al., 2012). 2SFCA methods are particularly similar
to the methodology employed by Guagliardo et al. (2004) to overlay primary care provider and population KDE ratios (Guagliardo et al., 2004). Early papers on 2SFCA recognize this connection to KDE, but the proliferation of “xSFCA” variants that attempt to improve upon this design have at times obscured its conceptual roots (Dai & Wang, 2011; Luo & Wang, 2003; Stacherl & Sauzet, 2023). These modifications vary in their assumptions about the real world and in their technical demand, and many variants of 2SFCA have been applied to study obstetric care and access disparities globally (Song et al., 2013; Tao et al., 2020; Vadrevu & Kanjilal, 2016; Yao et al., 2013). Here, I examine 2SFCA, which assumes that supply, demand, and distance are all relevant determinants of obstetric care access, as a possible metric of maternity care access in DC. Comparison of 2SFCA to other methods, particularly the KDE as described above, positions me to determine the specific drivers of access disparities identified by these methods and critically analyze the relevance of each method to my study setting. This contribution is particularly important given concerns that the 2017 closures have resulted in a shortage of maternity care and increased crowdedness at the hospitals that remain (Itkowitz, 2017; Myszkowski & Pressey, 2018). Finally, by conducting the two processes in parallel, this study helps to clarify their inherent relatedness.

3.4.2 Determinants of Birth Setting

Though some studies of spatial accessibility regard distance as the most important determinant, travel time to care is just one of many factors that influence birthplace selection. For an event as meaningful as birth, these interactions between individuals and the healthcare system that Khan and Bhardwaj identify may be particularly nuanced (Khan & Bhardwaj, 1994). Where multiple options exist, the interactions may involve individuals’ autonomous application of values and preferences to select an appropriate provider. Furthermore, as Roberts points out, access depends on the quality and appropriateness of the options at hand. In her words:

A woman’s freedom to choose among reproductive options does not mean she has reproductive freedom. We should also be concerned about the quality of options available to her. It is possible that all of the alternatives decrease her control over her reproductive health. As a German health activist put it, ‘more choice has no meaning in itself; what is more important is the question: more choice of what?’ (Roberts, 1999, p. 136)

Together, these perspectives indicate that the meaning of access can also hinge on the ways that practitioners in the healthcare system treat patients, particularly low-income people and people of color (Khan & Bhardwaj, 1994; Roberts, 1999).

In an integrative review on birth setting decision-making in the U.S., which covered both quantitative and qualitative studies, George et al. (2022) identified four primary themes: “Birth Setting Safety vs. Risk,” “Influence of Media, Family, and Friends on Birth Setting Awareness,” “Presence or Absence of Choice and Control,” and “Access to Options” (George et al., 2022). Birthing people in general expressed strong preferences for a particular type of birth, often informed by their life experiences, but some described geographic and/or financial barriers that impeded their access to their desired birth setting (George et al., 2022). Several other studies have validated these findings, suggesting that local availability, insurance and payment options, health and pregnancy risk, and values and preferences are all important considerations (Emple, 2010; Kornelsen & Grzybowski, 2006; MacDorman & Declercq, 2019; Regan et al., 2013; Scrimshaw & Backes, 2020). Through critical interpretive synthesis of qualitative research on birth setting, Carlsson et al. (2020) found that “the locations where childbirth takes place are imbued with cultural and personal meanings, and are products of discourse, which influences how care is perceived, given and received” (Carlsson et al., 2020, p. 10).

Scrimshaw and Backes (2020) also identify “structural inequities and biases in the health system and in society at large” as a contributor to perceptions of risk, meaning, and decision-making for some birthing people (Scrimshaw & Backes, 2020). Still, many papers about decision-making include predominantly or entirely
white participants and/or do not explore possible roles of identity and racism in birth setting selection (Sperlich & Gabriel, 2022). As Dána-Ain Davis has written, however, access to and outcomes of high-quality reproductive healthcare for Black birthing people are also threatened by obstetric racism, which “lies at the intersection of obstetric violence and medical racism” (Davis, 2019, p. 561). Naming obstetric racism “highlights the forms of violence and abuse that medical personnel—and potentially any personnel within medical institutions—routinely perpetrate against Black women" and reveals that racism, not race, is at the root of disparities like those revealed by DC’s maternal mortality statistics (Scott & Davis, 2021, p. 682). While this terminology provides a unified description for a host of adverse lived experiences, the authors point out that naming obstetric racism alone does not dismantle it, and several qualitative studies have echoed the prevalence of this concept in understandings of birth among Black birthing people (Hansen et al., 2021; Scott & Davis, 2021; West, 2018). Multiple studies specifically interested in the decision-making of Black birthing people suggest high attentiveness to maintaining safety and autonomy while facing possible obstetric racism (Hansen et al., 2021; Sperlich et al., 2017; West, 2018). Davis (2019), for example, cites the experience of Black midwives in contending that “addressing racism begins with clients being armed with information to make informed decisions about continuing or ending a relationship with a provider” (Davis, 2019, p. 569). Though community birth is disproportionately common among white birthing people, Sperlich et al (2017) found that Black and white participants expressed feeling safest delivering in out-of-hospital settings at approximately equal rates, such that racial gaps in actual birth setting cannot be explained by preference alone and may instead relate to gaps in access to alternative birth settings and information about them (Sperlich et al., 2017).

Most of this research focuses on either access or autonomy and decision-making. Where the relationship between the two appears, it is typically a side note rather than a primary consideration. Informed by an RJ lens, this study will draw on the above research to investigate autonomy and decision-making in the context of access and its structural determinants and center the experiences of Black birthing people.

3.5 Mixed Methods and Participatory GIS

Writing about geographies of women’s health, one of many lineages that contributed to reproductive geographies, Dyck, Lewis, and McLafferty (2001) recognize a “need to be flexible in thinking about methodology” (Dyck et al., 2001, p. 7). Drawing on the research summarized above, as well as its limitations, I argue that a mixed methods approach is uniquely suited to address interacting matters of access and autonomy and their relationships to social context by combining the advantages of multiple different angles (Creswell & Creswell, 2018). In particular, this design positions me to weave together population-level and structural dimensions with experiential narratives, both of which RJ and reproductive geographies understand to be vitally important (Fannin et al., 2018; Ross & Solinger, 2017).

Though not extensively applied to birth settings research, several geographers have raised mixed-methods GIS (sometimes also termed qualitative or participatory GIS) as an opportunity to address gaps between quantitative geographic research and real-world experiences, particularly related to issues of access (Bloch et al., 2018; Cope & Elwood, 2009; Meenar, 2017; Shay et al., 2016). For example, Meenar (2017) and Shay et al (2016) have combined population-level demographic data and qualitative, experiential data from community members to better understand disparities in access to food security and reliable transportation, respectively (Meenar, 2017; Shay et al., 2016). Similarly, Bloch et al (2018) used mixed-methods GIS, including conversations with expert informants, to demonstrate the plurality of transportation-related barriers for low-income women seeking prenatal care and interpret population-level health data (Bloch et al., 2018). The practice of centering participant experiences through participatory map-making has been noted to align with the goals and principles of RJ (Norwood et al., 2022). In this study, mixed methods GIS draws upon advantages of multiple sub-methodologies to closely link personal and structural insights, evaluate potential access in the context of real-world experiences, and center the multifaceted experiences of marginalized birthing people (Creswell & Creswell, 2018). This approach also opens opportunities to complicate traditional access maps and create alternative representations of birth setting landscapes based on lived experience,
illustrating how individual birthing people interact with the healthcare system (Bloch et al., 2018; Khan & Bhardwaj, 1994; Meenar, 2017; Shay et al., 2016). It also contributes to a goal within reproductive geographies of integrating findings from various methodological families to build nuanced and multidimensional understandings of reproduction and its relationship to place (Fannin et al., 2018).
4. GIS METHODS

4.1 Data Acquisition and Preparation

4.1.1 Birth Facilities

Lists of birth facilities and their addresses were compiled from records maintained by government agencies, professional associations, and accreditation bodies across the study area and limited to DC and its immediately surrounding counties. I called each birth facility to confirm its operating status and record its labor and delivery capacity, measured as the total number of obstetrics beds.

Data concerning the new Cedar Hill Regional Medical Center is an exception and comes from a 2023 press release (Executive Office of the Mayor, 2023). Though the release contains the planned total number of beds, it does not specify how many of those beds will be dedicated to obstetrics. To provide a rough estimate for this hospital’s labor and delivery capacity from its total capacity, I applied a linear regression between the total beds and obstetrics beds for all currently operational hospitals. This regression generated an estimate of 15 labor and delivery beds, similar in size to most open hospitals in DC, and is only used in 2SFCA.

4.1.2 Study Area

All geographic data concerning DC comes from Open Data DC, a government-maintained database. This includes the polygons used in all maps of DC.

4.1.3 Demographic Data

All demographic data used in this analysis is ultimately sourced from the American Community Survey 5-year data on the census tract level. I obtained the demographic, economic, housing and social characteristics of DC census tracts between 2017 and 2021 from Open Data DC and fertility data of nationwide census tracts between 2018 and 2022 from ESRI. Both were the most recent data published by these sources at the time of use. I use the number of women who gave birth in the last 12 months, housed in the ESRI fertility data, to represent each census tract’s contribution to demand for labor and delivery care.

4.1.4 Network Data

I used the road network built into the ArcGIS Network Analyst extension. My own experimentation and evidence from Wang and Xu (2011) suggest that travel times calculated with Network Analyst are slightly shorter than those calculated by Google Maps and experienced in reality (Wang & Xu, 2011). Wang and Xu estimate that true travel times are on average about 5 minutes longer than those produced in ArcGIS, and this gap may increase with distance from a city center (Wang & Xu, 2011). However, because DC is quite small geographically and because I am studying spatial variation, I assume accuracy of travel times across DC relative to each other, meaning that any gaps between mapping and reality are consistent across the city.

4.1.5 Distance Decay

Following Shi et al (2012), I used the Gaussian function below to calculate weights corresponding to travel impedance, such that areas close to a facility receive higher access scores than those far away from it (Shi et al., 2012). In line with Rayburn et al (2012) and because all residents of DC live within 30 minutes of at least one open labor and delivery facility, I consider 30 minutes to be the upper limit of drive time (Rayburn et al., 2012). I further divide these 30-minute catchments into 0-10 minute, 10-20 minute, and 20-30 minute buffer rings, designed to pick up spatial variation within the catchments while maintaining a reasonable computational workload. These rings are numbered from the inner to outer in the equation below.
Equation 4.1

Gaussian function for distance decay weights.

\[ W_x = e^{\left(\frac{x-1}{4}\right)^2} \cdot \ln(0.01) \quad (x = 1, 2, 3) \]

Applying this equation gives weight 1 for \( x = 1 \), weight 0.75 for \( x = 2 \), and weight 0.32 for \( x = 3 \).

4.2 Scenarios

This study considers DC residents’ access to birth facilities under several sets of conditions, which vary in facility type and timeline. The former variable considers that some residents may prefer to deliver at a birth center, of which there are only two within driving distance of DC, while others may only consider hospitals. The latter variable acknowledges the 2025 opening of Cedar Hill Regional Medical Center, specifically intended to serve Wards 7 and 8, and enables me to assess the effects of its opening on potential access for residents of currently-underserved areas (Executive Office of the Mayor, 2023). Of note, I am not aware of any new birth center construction plans in or near DC, meaning that residents can expect the current birth center access scenario to accurately reflect the immediate future. Scenarios considered will include access to: 1) any open hospital, as of today (“Open Hospitals”); 2) any open hospital, as of 2025 (“2025 Hospitals”); and 3) any open birth center, as of today (“Birth Centers”).

4.3 Geographic Analysis

Nearest-neighbor methods appear frequently in analysis of labor and delivery access. Conducting this analysis is straightforward and requires the following steps:

1) Produce incremental drive-time buffer rings surrounding each facility, where rings of the same distance “dissolve” together to form contour lines.
2) Trim to the study area.

Alongside nearest-neighbor maps, I also produced maps of drive time to each labor and delivery facility individually. These maps help to contextualize the nearest neighbor maps, as well as the experiences of participants who plan to travel to a specific birth facility (covered in depth in Chapter 7).

Access can also be calculated as kernel density estimation, where scores depend upon the distance between a theoretical person and the services available to them. The highest scores are assigned to areas close to several facilities, the lowest scores are assigned to areas located far from all facilities, and intermediate scores are assigned to areas in between. Assigning these scores using ArcGIS Pro involves the following steps:

1) Produce incremental drive-time buffer rings surrounding each facility.
2) Assign a weight to each buffer ring polygon according to its distance from the facility.
3) Produce one raster per facility, where the value of each cell is the weight assigned to the corresponding area in step 2.
4) Sort rasters produced in step 3 into the five access scenarios described previously.
5) Sum the individual-facility rasters included in each access scenario to produce one raster per scenario.
6) Trim each raster to the study area.

The 2-Step Floating Catchment Area (2SFCA) method builds on the above steps. In addition to the distance between a pregnant person and a birth facility, in this case, 2SFCA considers the ratio between supply and demand associated with a particular facility. Supply corresponds to the labor and delivery capacity of a given facility, or the number of beds, and demand corresponds to the number of births occurring within 30 minutes of that facility. This ratio is then weighted by the value determined in step 2 above, according to the buffer ring polygons in which it lies. Therefore, assigning 2SFCA scores involves the following steps:
1) Determine the 30-minute catchment area of each facility (which may extend beyond DC).
2) Use areal interpolation to estimate the number of births occurring in each catchment area.
3) For each facility, divide its capacity (number of labor and delivery beds) by the number of births occurring in its catchment area to calculate the supply/demand ratio for that facility.
4) Produce incremental drive-time buffer rings surrounding each facility.
5) Assign a weight to each buffer ring polygon according to its distance from the facility.
6) Join facility characteristics (including supply/demand ratio) to corresponding buffer ring polygons.
7) For each buffer ring polygon, multiply the weight assigned in step 5 by the facility’s supply/demand ratio calculated in step 3 to calculate 2SFCA access scores for that facility.
8) Produce one raster per facility, where the value of each cell is the access score calculated for that area in step 2.
9) Sort rasters produced in step 3 into the five access scenarios described previously.
10) Sum the individual-facility rasters included in each access scenario to produce one raster per scenario.
11) Trim each raster to the study area.

Though 2SFCA’s inclusion of a supply/demand ratio requires additional steps, the service area steps of both FCA and 2SFCA are essentially the same. Therefore, by calculating this ratio first (steps 1-3 of 2SFCA) and using the same weights for both processes, many of the shared steps can be completed simultaneously; this overlap is illustrated by Table 4.1.

**Table 4.1**  
Comparison of steps across methods.

<table>
<thead>
<tr>
<th>Nearest Neighbor</th>
<th>KDE</th>
<th>2SFCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create 30-minute catchment area</td>
<td>Areal interpolation of births into catchment area</td>
<td>Calculate supply/demand ratio</td>
</tr>
<tr>
<td>Create incremental drive-time buffer rings (contour)</td>
<td><strong>Create incremental drive-time buffer rings</strong></td>
<td></td>
</tr>
<tr>
<td>Join facility characteristics to buffer ring polygons</td>
<td><strong>Assign weights to buffer ring polygons</strong></td>
<td></td>
</tr>
<tr>
<td>Assign weights to buffer ring polygons</td>
<td>Multiply weight by supply/demand ratio</td>
<td></td>
</tr>
<tr>
<td>Produce one raster per facility where value = weight</td>
<td>Produce one raster per facility where value = 2SFCA scores</td>
<td></td>
</tr>
<tr>
<td><strong>Sort rasters into access scenarios</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sum facility rasters, creating one raster per scenario</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clip to DC</td>
<td><strong>Clip to DC</strong></td>
<td></td>
</tr>
</tbody>
</table>

Note: Bolded rows indicate steps that were carried out simultaneously for both KDE and 2SFCA analysis.
The logical design for these three methods is also represented visually by the flowcharts in Figure 4.1 below.

**Figure 4.1**
*Logical flowcharts for GIS methods.*

**Method 1: Nearest Neighbor**
- Birth facility locations
- Create non-overlapping buffer rings around each facility
- Map of drive time to nearest facility
- Road network

**Method 2: Kernel Density**
- Birth facility locations
- Create buffer rings around each facility
- Buffer ring polygons for all facilities
- Assign distance-decay weights
- Maps of access scores for each facility
- Sum scores across facilities
- Map of density
- Road network

**Method 3: 2SFCA**
- Create catchment area around each facility
- Facility catchment areas
- Fertility rates by census tract
- Birth facility capacities
- Road network
- Birth facility locations
- Gaussian equation weights
- Disaggregate birth data
- Demand within each catchment area
- Calculate supply/demand ratio
- Supply/demand ratio for each facility
- Create buffer rings around each facility
- Buffer ring polygons for all facilities
- Assign distance-decay weights
- Buffer rings with weights
- Calculate access scores for each facility
- Maps of access scores for each facility
- Sum scores across facilities
- Map of 2SFCA scores

Note: Bolded rectangles represent the input data and output maps.

**4.4 Statistical Analysis**

To improve the clarity of visualizations and statistical analysis, each set of access scores was converted to a scale of 1 to 100. From each scaled access score raster, zonal statistics were applied to calculate average scores.
by census tract, which were then joined to ACS data for those tracts. Three tracts with five households or fewer were screened out due to the absence of metrics including median income - these tracts were the National Mall and two university campuses. Average access scores were also calculated on the ward level.

Bivariate correlations were calculated between each set of access scores and each socioeconomic variable on the census tract level. Correlation matrices were also produced to demonstrate the relationships between each set of access scores and to reveal any collinearity among predictor variables.

Based on these bivariate relationships, multivariate models were produced to investigate the relative contributions of variables related to race, income, and education and the relationships between various bivariate associations.
5. GIS RESULTS

5.1 Overview of GIS Results

All three mapping methods establish clear geographic trends in potential spatial access to labor and delivery care. For hospital labor and delivery care, this trend forms an axis along which potential spatial access increases moving westward and decreases moving eastward. The areas identified as low in potential spatial access generally fall within the boundaries of DC’s Northeast and Southeast quadrants and within Wards 5, 7, and 8, but it is important to note that the methods used here reveal spatial variation in access within these broader spatial units. For this reason, I rely on these political boundaries to point out general trends and direct attention to relevant regions of visualizations while recognizing that variation exists within them.

In addition, the mapping results suggest that potential spatial access to birth centers is highest in Wards 5, 6, 7, and 8, the same areas where potential spatial access to hospital-based care is lowest. This calculation includes both the FQHC-based birth center in Ward 5 and a privately-run birth center in Alexandria, Virginia, which does not accept Medicaid and therefore is likely not financially accessible Medicaid recipients. The high potential spatial access to birth center care in otherwise medically-underserved areas, however, at least in part reflects the mission of the FQHC birth center. The low number and small size of these birth centers mean that the patterns of potential spatial access to them look quite similar across methods, so differences between methods with respect to birth centers are not examined in depth.

Compared to the nearest-neighbor maps, KDE and 2SFCA introduce spatial variation in the form of a gradient from high access in the west to low access in the east; the gradients produced by the two metrics are generally similar. Both methods suggest that residents in the eastern corner of Ward 7 experience the very lowest potential spatial access in DC, which is not resolved by the construction of a new hospital in Ward 8.

5.2 Nearest Neighbor

As seen in Figure 5.1, except for small portions of Joint Base Anacostia-Bolling in western Ward 8, the nearest-neighbor maps indicate that all DC residents currently live within a 20-minute drive of the nearest labor and delivery ward. Most areas of Wards 1, 2, and 3 are within 10 minutes of the nearest facility, while substantial portions of Wards 4, 5, 6, 7, and 8 lie between 10 and 20 minutes of the nearest facility. The addition of Cedar Hill Regional Medical Center in 2025 will place most of Ward 8 within a 10-minute drive of the nearest facility but does not alter minimum theoretical drive times for any other areas.

Because DC’s only birth center is located in Ward 5, drive times to this birth center are highest for residents of this area and increase for residents who live south and west of Ward 5. As discussed later, this pattern reflects the intentional placement of the Family Health and Birth Center in an underserved community.

Maps of travel time to each DC birth facility, which complement these results, can be found in Appendix A.

5.3 KDE and 2SFCA

One of the major differences between the maps produced by these two methods, shown in Figure 5.2, is the distribution of very high access to hospital labor and delivery care. Specifically, KDE finds the vast majority of Ward 2 to be among the highest-access areas, much like Ward 3. However, 2SFCA suggests that only the western end of Ward 2 is similar to Ward 3 in access. This difference likely reflects the high population density and, relatedly, the high number of births in DC’s downtown area, which is considered by 2SFCA. 2SFCA also shows less variation within the generally low access to hospital labor and delivery care within Ward 5 and Ward 8, which may reflect that areas closer to labor and delivery care also have high demand for that care.
Figure 5.1
Drive time to the nearest open hospital, at present and in 2025, and to the nearest freestanding birth center.

Note: Though not shown in these maps, birth settings outside of DC were considered in this analysis.
Both methods suggest limited changes to access after the opening of Cedar Hill in Ward 8. Furthermore, ward-level averages across methods and across scenarios confirm that Wards 5, 7, and 8 are the lowest in potential spatial access to hospital-based maternity care (Table 5.1), informing participant selection.

Table 5.1.
Average potential access scores by ward and across DC.

<table>
<thead>
<tr>
<th>Ward</th>
<th>Open Hospitals (KDE)</th>
<th>2025 Hospitals (KDE)</th>
<th>Birth Centers (KDE)</th>
<th>Open Hospitals (2SFCA)</th>
<th>2025 Hospitals (2SFCA)</th>
<th>Birth Centers (2SFCA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>1</td>
<td>66.21</td>
<td>9.37</td>
<td>63.02</td>
<td>8.71</td>
<td>60.63</td>
<td>4.62</td>
</tr>
<tr>
<td>2</td>
<td>78.33</td>
<td>8.08</td>
<td>76.19</td>
<td>8.08</td>
<td>63.64</td>
<td>16.59</td>
</tr>
<tr>
<td>3</td>
<td>71.82</td>
<td>8.06</td>
<td>64.78</td>
<td>8.18</td>
<td>32.16</td>
<td>8.55</td>
</tr>
<tr>
<td>4</td>
<td>56.69</td>
<td>10.2</td>
<td><strong>49.9</strong></td>
<td>10.39</td>
<td>36.14</td>
<td>12.02</td>
</tr>
<tr>
<td>5</td>
<td><strong>44.63</strong></td>
<td>11.12</td>
<td><strong>42.83</strong></td>
<td>11.86</td>
<td>66.59</td>
<td>10.15</td>
</tr>
<tr>
<td>6</td>
<td>59.34</td>
<td>13.04</td>
<td>63.5</td>
<td>12.72</td>
<td>80.88</td>
<td>7.92</td>
</tr>
<tr>
<td>7</td>
<td><strong>32.85</strong></td>
<td>14.39</td>
<td><strong>37.33</strong></td>
<td>15.01</td>
<td>68.3</td>
<td>9.19</td>
</tr>
<tr>
<td>8</td>
<td><strong>40.46</strong></td>
<td>11.91</td>
<td><strong>48.94</strong></td>
<td>11.44</td>
<td>75.47</td>
<td>12.16</td>
</tr>
<tr>
<td>All</td>
<td>53.51</td>
<td>18.53</td>
<td>53.2</td>
<td>16.32</td>
<td>50.23</td>
<td>20.41</td>
</tr>
</tbody>
</table>

Note: Bolded cells show mean values below the citywide mean for a given access scenario and method.

Figure 5.2
Access to currently open hospitals, open hospitals in 2025, and birth centers, as calculated by KDE and 2SFCA.
Figure 5.2, continued
When averaged by census tract, KDE and 2SFCA access scores for the same scenario are very highly correlated, as seen in Table 5.2. Notably, these census tract averages obscure subtle differences in the patterns of potential access produced by the two methods. However, the close relationship between these metrics reflects relatively consistent ratios of hospital beds to births within the service area across hospitals in DC.

### Table 5.2
*Correlation coefficients between access scores in six scenarios.*

<table>
<thead>
<tr>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
<th>Scenario 4</th>
<th>Scenario 5</th>
<th>Scenario 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Open Hospitals (KDE)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. 2025 Hospitals (KDE)</td>
<td>0.96***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Birth Centers (KDE)</td>
<td>-0.2**</td>
<td>0.02</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Open Hospitals (2SFCA)</td>
<td></td>
<td>0.89***</td>
<td>-0.34***</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5. 2025 Hospitals (2SFCA)</td>
<td></td>
<td>0.93***</td>
<td>0.94***</td>
<td>-0.19**</td>
<td>0.98***</td>
</tr>
<tr>
<td>6. Birth Centers (2SFCA)</td>
<td></td>
<td>-0.2**</td>
<td>0.03</td>
<td>1.00***</td>
<td>-0.34***</td>
</tr>
</tbody>
</table>

*Significant at $p = 0.5$, **significant at $p = 0.01$, ***significant at $p = 0.001$. Color intensity corresponds to correlation strength; blue cells show positive correlations and red cells show negative correlations. Bolded values show the correlation coefficients for access scores under the same scenario, calculated with different methods (KDE vs 2SFCA).

Additionally, potential access to hospitals at present is highly correlated with access to hospitals in the future when calculated using the same methodology (KDE vs 2SFCA). The correlations between potential access to birth centers and potential access to hospitals are generally weak but more variable. When using 2SFCA, higher potential access to birth centers is associated with lower potential access to hospitals both now and in 2025.

### 5.4 Socioeconomic Disparities

Univariate regressions on the census tract level revealed significant socioeconomic disparities in potential access to labor and delivery care, detailed in Table 5.3.

As expected based on Table 5.2, the relationship between any given socioeconomic variable and access under a particular scenario as calculated using KDE is generally very similar to the relationship between that same socioeconomic variable and access for that same scenario as calculated using 2SFCA (e.g. the correlation between income and access to birth centers, calculated by KDE is very similar to the correlation between income and access to birth centers, calculated by 2SFCA). The similarity in correlation coefficients reflects very strong correlations between KDE and 2SFCA scores when averaged by census tract, established above.

Low potential access to hospitals, both at present and after the new hospital opens, is most strongly associated with a high share of Black or African American residents and is also associated with high rates of public insurance. By contrast, high potential access to hospitals is correlated with higher shares of white and Asian residents, high median household income, and high rates of college graduates. Interestingly, high access to hospitals is also weakly correlated with high percentages of households that do not own a vehicle, which may be in part because DC’s dense central area is both particularly high in labor and delivery care and particularly low in vehicle ownership.
## Table 5.3
Correlation coefficients between socioeconomic variables and access scores in six scenarios.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Scenario Correlation Coefficient and Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Open Hospitals (KDE)</td>
</tr>
<tr>
<td>White</td>
<td>0.72***</td>
</tr>
<tr>
<td>Black</td>
<td>-0.78***</td>
</tr>
<tr>
<td>Asian</td>
<td>0.61***</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.4***</td>
</tr>
<tr>
<td>Median Income</td>
<td>0.46***</td>
</tr>
<tr>
<td>Mean Income</td>
<td>0.5***</td>
</tr>
<tr>
<td>Below Poverty</td>
<td>-0.38***</td>
</tr>
<tr>
<td>HS Graduates</td>
<td>0.43***</td>
</tr>
<tr>
<td>2-Year Degree</td>
<td>-0.44***</td>
</tr>
<tr>
<td>4-Year Degree</td>
<td>0.71***</td>
</tr>
<tr>
<td>Graduate Degree</td>
<td>0.69***</td>
</tr>
<tr>
<td>Privately Insured</td>
<td>0.6***</td>
</tr>
<tr>
<td>Publicly Insured</td>
<td>-0.63***</td>
</tr>
<tr>
<td>No insurance</td>
<td>-0.19**</td>
</tr>
<tr>
<td>No Vehicle</td>
<td>0.19**</td>
</tr>
</tbody>
</table>

*Significant at $p = 0.5$, **significant at $p = 0.01$, ***significant at $p = 0.001$.

Note: All variables other than income and vehicle ownership are percentages of the population. Income variables represent the median and mean households, respectively, and vehicle ownership is a percentage of households. Color intensity corresponds to correlation strength; blue cells show positive correlations and red cells show negative correlations. Bolded rows show the variables in each category with the strongest correlations to potential access to hospital labor and delivery care.

For all variables except vehicle ownership, the correlation coefficients between socioeconomic variables and access to birth centers are opposite in direction compared to the correlation coefficients between the same variable and access to hospitals. Thus, high potential access to birth centers is correlated with low income and low rates of college education. The ability to select a birth center is in many contexts associated with wealth and high educational attainment, and this correlation is very specific to DC, where the singular birth center was intentionally constructed to serve low-income neighborhoods.

Importantly, many of these variables are strongly correlated with each other (Table 5.4). In particular, variables describing the racial and ethnic demographics, educational attainment, and insurance enrollment of residents of a census tract are very closely associated with each other (in many cases, $r > 0.85$). These variables are also related to measures of income, though these correlations are slightly weaker (generally $0.6 > r > 0.7$). This collinearity reflects the close relationships between multiple forms of inequality and marginalization in DC and also informs selection of variables for multivariate regressions.
Table 5.4.
Correlation matrix of predictor variables considered.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
<th>10.</th>
<th>11.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. White</td>
<td>46.4</td>
<td>31.8</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Black</td>
<td>46.2</td>
<td>34.1</td>
<td>-0.97***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Asian</td>
<td>5.6</td>
<td>5.3</td>
<td>0.61***</td>
<td>-0.69***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Hispanic</td>
<td>10.8</td>
<td>8.8</td>
<td>0.21**</td>
<td>-0.36***</td>
<td>0.17*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Median Income</td>
<td>104.6</td>
<td>53.5</td>
<td>0.72***</td>
<td>-0.69***</td>
<td>0.38***</td>
<td>0.14*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Mean Income</td>
<td>139.5</td>
<td>72.6</td>
<td>0.73***</td>
<td>-0.71***</td>
<td>0.39***</td>
<td>0.13</td>
<td>0.92***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. 4 Yr Degree</td>
<td>60.5</td>
<td>27.8</td>
<td>0.95***</td>
<td>-0.94***</td>
<td>0.63***</td>
<td>0.21**</td>
<td>0.74***</td>
<td>0.74***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Privately insured</td>
<td>72.6</td>
<td>20.9</td>
<td>0.88***</td>
<td>-0.86***</td>
<td>0.57***</td>
<td>0.18***</td>
<td>0.77***</td>
<td>0.74***</td>
<td>0.92***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Publicly insured</td>
<td>34.5</td>
<td>20.5</td>
<td>-0.87***</td>
<td>0.87***</td>
<td>-0.66***</td>
<td>-0.25***</td>
<td>-0.69***</td>
<td>-0.66***</td>
<td>-0.91***</td>
<td>-0.93***</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. No insurance</td>
<td>3.3</td>
<td>2.8</td>
<td>-0.42***</td>
<td>0.33***</td>
<td>-0.15*</td>
<td>0.23**</td>
<td>-0.46***</td>
<td>-0.46***</td>
<td>-0.44***</td>
<td>-0.49***</td>
<td>0.35***</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11. No Vehicle</td>
<td>34.7</td>
<td>16.9</td>
<td>-0.08</td>
<td>0.04</td>
<td>0.14*</td>
<td>-0.01</td>
<td>-0.53***</td>
<td>-0.48***</td>
<td>-0.14*</td>
<td>-0.26***</td>
<td>0.13</td>
<td>0.24***</td>
<td>1</td>
</tr>
</tbody>
</table>

*Significant at $p = 0.5$, **significant at $p = 0.01$, ***significant at $p = 0.001$.  

Note: Mean and standard deviation were calculated at the census tract level for each variable. All variables other than income and vehicle ownership are percentages of the population. Income variables represent the median and mean households, respectively, and vehicle ownership is a percentage of households. Color intensity corresponds to correlation strength; blue cells show positive correlations and red cells show negative correlations.

5.5 Multivariate Models

The univariate regressions suggest many strong and statistically significant correlations between demographic variables and potential access scores on the census tract level (Table 5.3). The strongest of these relationships are the correlations between the share of Black residents in a census tract and each of the four measures of potential access to hospital labor and delivery wards. These correlations retain statistical significance even after controlling for possible confounding variables including mean household income and percent of the population with a bachelor’s degree ($p < 0.001$, Table 5.5), both of which also showed strong correlations with potential access in univariate models. This pattern is true across all four metrics of access to hospital-based care, before and after the construction of the new hospital. Among the variables considered, race—and specifically the percentage of Black residents—is the most prominent indicator of disparities in potential
spatial access to labor and delivery wards in DC. The strength of these models is only slightly diminished with the addition of Cedar Hill, suggesting that disparities in spatial access to maternity care will persist despite the new construction.

Table 5.5
Multivariate models for potential access to hospital labor delivery care at present and in 2025.

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Open Hospitals (KDE)</th>
<th></th>
<th>Open Hospitals (2SFCA)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimates</td>
<td>p value</td>
<td>Estimates</td>
<td>p value</td>
</tr>
<tr>
<td>(Intercept)</td>
<td>75.41</td>
<td>&lt;0.001***</td>
<td>89.04</td>
<td>&lt;0.001***</td>
</tr>
<tr>
<td>% Black</td>
<td>-41.64</td>
<td>&lt;0.001***</td>
<td>-52.1</td>
<td>&lt;0.001***</td>
</tr>
<tr>
<td>Mean Income</td>
<td>-0.03</td>
<td>0.112</td>
<td>0.01</td>
<td>0.432</td>
</tr>
<tr>
<td>% 4 Yr Degree</td>
<td>-8.53</td>
<td>0.318</td>
<td>-18.77</td>
<td>0.027*</td>
</tr>
</tbody>
</table>

| Observations   | 203                  | 203                  | 203                    | 203                  |
| R2 / R2 adj.   | 0.612 / 0.610         | 0.621 / 0.616        | 0.611 / 0.609          | 0.620 / 0.614        |

<table>
<thead>
<tr>
<th>Predictors</th>
<th>2025 Hospitals (KDE)</th>
<th></th>
<th>2025 Hospitals (2SFCA)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimates</td>
<td>p value</td>
<td>Estimates</td>
<td>p value</td>
</tr>
<tr>
<td>(Intercept)</td>
<td>71.43</td>
<td>&lt;0.001***</td>
<td>91.52</td>
<td>&lt;0.001***</td>
</tr>
<tr>
<td>% Black</td>
<td>-32.88</td>
<td>&lt;0.001***</td>
<td>-48.21</td>
<td>&lt;0.001***</td>
</tr>
<tr>
<td>Mean Income</td>
<td>-0.04</td>
<td>0.006**</td>
<td>0</td>
<td>0.882</td>
</tr>
<tr>
<td>% 4 Yr Degree</td>
<td>-11.42</td>
<td>0.165</td>
<td>-20.49</td>
<td>0.01*</td>
</tr>
</tbody>
</table>

| Observations   | 203                  | 203                  | 203                    | 203                  |
| R2 / R2 adj.   | 0.505 / 0.503         | 0.536 / 0.529        | 0.551 / 0.548          | 0.567 / 0.561        |

*Significant at p = 0.5, **significant at p = 0.01, ***significant at p = 0.001.
6. INTERVIEW AND SURVEY METHODS

6.1 Ethical Considerations

IRB review was completed with the Committee for the Protection of Human Subjects at Dartmouth College prior to participant recruitment. Because no identifying information was connected to participant responses, this study met criteria for IRB exemption. I instead refer to participants using pseudonyms and numerical IDs to further protect their anonymity. All participants were provided with information about the study and encouraged to ask questions before giving their consent.

6.2 Applying GIS Results

In line with the explanatory sequential mixed methods design, GIS results informed participant selection. Maps were inspected to identify areas of low potential spatial access, which were confirmed to be below average using ward-level zonal statistics. This selection was supported by examining correlations between low spatial accessibility and specific socioeconomic variables present in the low-access areas, explained in Chapter 5. Therefore, following these results, all participant-facing methods focus on Wards 5, 7, and 8.

6.3 Expert Interviews

I spoke with three medical providers—two family medicine physicians and one midwife—whom I contacted through a connection at the community health center where they work. In accordance with their preferences, I refer to them as Physician 1, Physician 2, and Midwife 1. Each provider offers prenatal care through at least one clinic in Ward 5, 7, or 8, and Midwife 1 also attends births at a DC hospital.

These providers shared their expertise in delivering perinatal care for Black and low-income birthing people in DC. Interviews focused on their understandings of the obstetric care landscape in DC, how they counsel patients who are selecting a birth setting, and their knowledge of birth setting determinants and barriers for residents of Wards 5, 7, and 8; specific questions asked are included in Appendix B. Their insights add important background for the stories of birthing people, as discussed in Chapter 2, and also highlight opportunities for perinatal care providers and community health centers to address the injustices and disparities faced by Black birthing people in DC. Lastly, as in Bloch et al (2018), providers were asked for feedback on the three maps of potential access to labor and delivery wards (Bloch et al., 2018).

Expert interview participants were compensated with $50 gift cards following the interview. They were also encouraged to share any additions or alterations to their remarks by contacting me at any time.

6.4 Participant Recruitment and Selection

DC residents who had given birth in the past two years (while living in DC), were 18 years of age or older, and were not pregnant at the time of the study were eligible to participate. Participants were recruited via posts to active, public Facebook groups in the neighborhoods of interest and invited to fill out an interest survey. This survey, reproduced in Appendix C, collected demographic information (Table 6.1) and basic information about the intended participant’s most recent birth (Table 6.2). Given limitations in funding and time, participants who reported being from the wards of interest were prioritized.

After filtering eligible participants to residents of the wards of interest, 6 were randomly selected to schedule an interview and 4 completed the interview. This small sample size was chosen to enable in-depth understanding of individual experiences, which complement the population-level analysis. In addition, 44 individuals (as well as the 2 unable to complete the interview) who submitted the screening survey were invited to complete a more extensive online survey that was developed to address lingering questions after the interviews were completed. Because all interview participants described hospital births, particular attention
was paid to recruiting survey participants with a range of birth settings. Potential participants were sorted by reported birthplace (hospital, home, freestanding birth center) and randomly selected from those groups according to the relative frequency of each birthplace in the broader sample.

Table 6.1
Collection of demographic data.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Initial Screening</th>
<th>Survey Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pronouns</td>
<td>Participants self-reported their pronouns in writing.</td>
<td>Participants self-reported their pronouns by selecting from the following options: she/her; he/him; they/them; and other (write-in).</td>
</tr>
<tr>
<td>Residence</td>
<td>Participants wrote in their zip code and selected their ward (Ward 1 through Ward 8)</td>
<td>Participants wrote in their zip code and selected their ward (Ward 1 through Ward 8)</td>
</tr>
<tr>
<td>Race / Ethnicity</td>
<td>Participants self-described their racial or ethnic identities in writing.</td>
<td>Participants self-described their racial or ethnic identity according to U.S. census categories by selecting from the following options: White; Black or African American; American Indian or Alaska Native; Asian; Native Hawaiian or Other Pacific Islander; Hispanic or Latino; and other (write-in). Participants were able to select more than one response.</td>
</tr>
<tr>
<td>Age</td>
<td>Participants self-reported their age in years.</td>
<td>Participants self-reported their age in years.</td>
</tr>
<tr>
<td>Employment Status</td>
<td>Participants reported their current employment status by selecting from the following options: full-time; part-time; parental leave; stay-at-home parent; none/unemployed; and other (write-in).</td>
<td>Participants reported their current employment status by selecting from the following options: full-time; part-time; parental leave; stay-at-home parent; none/unemployed; and other (write-in).</td>
</tr>
<tr>
<td>Household Income</td>
<td>Participants reported their annual household income using U.S. census categories. They selected from the following options: less than $10,000; $10,000 to $14,999; $15,000 - $24,999; $25,000 - $34,999; $35,000 - $49,999; $50,000 - $74,999; $75,000 - $99,999; $100,000 - $149,999; $150,000 - $199,999; and $200,000 or more.</td>
<td>Participants reported their annual household income at the time they gave birth using U.S. census categories. They selected from the following options: less than $10,000; $10,000 to $14,999; $15,000 - $24,999; $25,000 - $34,999; $35,000 - $49,999; $50,000 - $74,999; $75,000 - $99,999; $100,000 - $149,999; $150,000 - $199,999; and $200,000 or more.</td>
</tr>
<tr>
<td>Insurance Status</td>
<td>Participants self-reported their insurance status by selecting from the following options: no insurance; Medicaid; and private insurance.</td>
<td>Participants self-reported their insurance status by selecting from the following options: no insurance; DC Medicaid (also known as DC Healthy Families Program, DC Health Care Alliance, Immigrants Children’s Program, Amerigroup DC, AmeriHealth Caritas DC, or MedStar Family Choice DC); and private insurance.</td>
</tr>
<tr>
<td>Parity</td>
<td>Participants self-reported the number of times they have given birth.</td>
<td>Participants self-reported the number of times they have given birth.</td>
</tr>
<tr>
<td>Years as DC Resident</td>
<td>Participants who completed an interview were verbally asked to report the number of years they had lived in the DC area.</td>
<td>Participants self-reported the number of years they had lived in the DC area.</td>
</tr>
</tbody>
</table>

Note: Data on participant gender identity and educational attainment were not collected. Differences in data collection between initial screening and the research survey reflect improvements implemented based on screening responses.
I encountered several unexpected difficulties with participant recruitment. Approximately half of participants reported different wards of residence when completing their interview or survey than they had reported during the screening phase. Therefore, only responses from participants who reported living in Wards 5, 7, and 8 during the screening phase and verified this information via interview or survey response were included. Participant selection, including these obstacles, are illustrated in Figure 6.1.

**Figure 6.1**
*Attrition of potential participants.*

Note: 43 of 44 participants initially invited to the additional survey, as well as 2 of 2 participants who were invited but ultimately unable to interview, completed the additional survey.

### 6.5 Participant Interviews

I conducted four semi-structured interviews about participants’ experiences of selecting a birth setting and traveling to it on the day of delivery. All interviews were conducted on Zoom and lasted between 45 minutes and 1 hour. At the beginning of the interview, participants were informed that they could choose to stop at any time and that they would be provided with resources for postpartum mental health upon its conclusion.

Questions, which can be found in Appendix D, focused on participants’ preferences and values concerning birth setting, barriers that affected their ability to access desired birth settings, and strategies for navigating these barriers and exercising autonomy. Participants were also asked about their most recent birth, including where they delivered, the duration of travel to that birth setting, and what mode of transportation they used. Inspired by mixed-methods GIS practices, participants were also presented with the three maps displaying access to hospital labor and delivery care in the present and asked to comment on assumptions held by these maps.

All interview participants were compensated with a $50 Visa gift card and sent postpartum mental health resources.

### 6.3 Survey

The online survey, included in Appendix E, largely addressed the same topics covered in interviews. Through this survey, I collected quantitative data about the characteristics of participants’ most recent birth (Table 6.2) and qualitative data about their experiences and decision-making processes. Questions covered the factors that participants considered in selecting a birth setting, why they delivered where they did, how they traveled there, and any transportation barriers they faced.

All survey participants were compensated with a $10 Visa gift card and sent postpartum mental health resources.
Table 6.2
Collection of quantitative birth data.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Survey Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth setting</td>
<td>Participants self-reported the setting of their most recent birth from the following options: at home; at a hospital; at a free-standing birth center; and other (write-in).</td>
</tr>
<tr>
<td>Proximity</td>
<td>Participants who reported delivering at a hospital reported whether that hospital was the closest one to their home by selecting yes or no.</td>
</tr>
<tr>
<td>Importance of factors</td>
<td>Participants used a sliding scale to designate possible factors as not at all important, somewhat important, very important, or not applicable in their selection of a birth setting. These possible factors included alignment with values, preferences, and birth plan; acceptance of insurance; affiliation with prenatal care provider; health needs or pregnancy complications; reputation among family/friends; own previous birth experiences; friendly and/or knowledgeable staff; quality of equipment and facilities; close or convenient location; enough space and staffing; feeling safest; and other (write-in). Participants also selected the single most important determinant of where they gave birth from the same options.</td>
</tr>
<tr>
<td>Travel time</td>
<td>Participants who did not report selecting home birth reported the number of minutes they traveled to the place where they gave birth.</td>
</tr>
<tr>
<td>Transportation</td>
<td>Participants selected the mode of transportation they used to reach the place where they gave birth from the following options: own car (belonging to someone in the household); borrowed a car from someone outside the household; rideshare (Uber, Lyft, etc); public transportation (bus, Metro, etc); ambulance; and other (write-in).</td>
</tr>
</tbody>
</table>

6.4 Qualitative Analysis

Interview data was transcribed for analysis using Otter.ai. Thematic analysis was applied to the transcripts and qualitative survey responses using a deductive approach informed by RJ theory and focused on the interactions between access and autonomy (Kiger & Varpio, 2020). Themes of interest included 1) values, preferences, and priorities; 2) barriers to access; and 3) autonomy and decision-making. All qualitative coding was completed using Delve software.
7. INTERVIEW AND SURVEY RESULTS

7.1 Sample Characteristics

A total of 25 eligible birthing people participated in the study. Of these 25, three participated in an interview, and 22 completed an online survey about their birth preferences and experiences. All participants were residents of Wards 5, 7, and 8, in accordance with the quantitative findings discussed previously, and Ward 8 is most represented (84% of participants). Data from an additional 23 survey respondents and 1 interview participant, whose responses were not consistent with living in these three wards, were excluded from analysis. Though participants were able to select multiple racial/ethnic identities, all participants self-identified as Black or African American alone. More detailed demographic information on the sample is available in Table 7.1 below.

Table 7.1
Demographic Characteristics of Participants

<table>
<thead>
<tr>
<th></th>
<th>Survey Respondents</th>
<th>Interview Participants</th>
<th>All Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>Mean</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td>27.4</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black or African American</td>
<td>22</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>Household Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than $24,999</td>
<td>10</td>
<td>45</td>
<td>1</td>
</tr>
<tr>
<td>$25,000 to $49,999</td>
<td>4</td>
<td>18</td>
<td>1</td>
</tr>
<tr>
<td>$50,000 to $99,999</td>
<td>5</td>
<td>23</td>
<td>1</td>
</tr>
<tr>
<td>$100,000 to $199,999</td>
<td>3</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>Insurance Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>10</td>
<td>45</td>
<td>1</td>
</tr>
<tr>
<td>DC Medicaid</td>
<td>11</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>Private</td>
<td>1</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ward 5</td>
<td>3</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>Ward 7</td>
<td>1</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Ward 8</td>
<td>18</td>
<td>82</td>
<td>3</td>
</tr>
<tr>
<td>Years as DC Resident</td>
<td>22</td>
<td>13.3</td>
<td>8.0</td>
</tr>
</tbody>
</table>
7.2 Birth Characteristics

No participant had more than two previous births before their most recent delivery. The majority of participants (68%) delivered at a hospital (Table 7.2). The remaining 36% delivered in community locations, including at their home, freestanding birth centers, and a doula’s home (Table 7.2). This figure for community birth in the study sample is notably higher than both the District and national averages of less than 2%. Of the participants who did not deliver at home, most used their own car (35%) or a rideshare service like Uber, Lyft, or a taxi (41%) to reach the location where they gave birth, and these journeys were on average 46.7 minutes in length (Table 7.2).

Table 7.2
Characteristics of participants’ most recent births.

<table>
<thead>
<tr>
<th></th>
<th>Survey Respondents</th>
<th>Interview Participants</th>
<th>All Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parity (including recent birth)</td>
<td>22 1.6 0.6</td>
<td>3 1.7 0.6</td>
<td>25 1.6 0.6</td>
</tr>
<tr>
<td>Birth Setting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital</td>
<td>14 64</td>
<td>3 100</td>
<td>17 68</td>
</tr>
<tr>
<td>Home</td>
<td>5 23</td>
<td>0 0</td>
<td>5 20</td>
</tr>
<tr>
<td>Freestanding birth center</td>
<td>2 9</td>
<td>0 0</td>
<td>2 8</td>
</tr>
<tr>
<td>Other</td>
<td>1 5</td>
<td>0 0</td>
<td>1 4</td>
</tr>
<tr>
<td>Transportation to birth setting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own car</td>
<td>6 35</td>
<td>1 33</td>
<td>7 35</td>
</tr>
<tr>
<td>Borrowed car</td>
<td>1 6</td>
<td>1 33</td>
<td>2 10</td>
</tr>
<tr>
<td>Rideshare</td>
<td>7 41</td>
<td>1 33</td>
<td>8 40</td>
</tr>
<tr>
<td>Public transportation</td>
<td>3 18</td>
<td>0 0</td>
<td>3 15</td>
</tr>
<tr>
<td>Minutes traveled to birth setting (for non-home birth)</td>
<td>17 47.0 29.1</td>
<td>3 45.0 25.0</td>
<td>20 46.7 27.9</td>
</tr>
</tbody>
</table>

7.3 Barriers to Access

The participants in this portion of the study were recruited specifically because they reside in regions of the city predicted to be low in spatial accessibility to labor and delivery services and high in socioeconomic barriers that can make accessing this care even more difficult. Thus, the themes detailed here highlight obstacles that participants raised as complicating their ability to access the birth settings they desired. Many participants cited interacting barriers related to spatial and financial accessibility that reflect the specific geographies of reproductive healthcare in Wards 5, 7, and 8.
7.3.1 Distance and Time

Following from the explanatory sequential mixed methods design, all participants live in areas predicted by mapping techniques to be relatively low in access to obstetric care. According to the nearest neighbor maps, these participants live at most 20 minutes from the nearest open labor and delivery ward - at least in theory.

However, the birthing people in this sample (including both interview and survey participants) who selected hospital birth traveled an average of 49 minutes to that hospital on the day of delivery, over twice the maximum predicted travel time to the nearest facility. 65% of survey respondents who delivered at a hospital did so at the hospital nearest to their home, and several reported choosing that hospital specifically because it was closest. The remaining 35% of survey respondents who delivered at a hospital did not deliver at the facility nearest to their home; their reasons for doing so are discussed in detail in subsequent sections. Participants who delivered at community settings other than their homes (including two participants who gave birth at freestanding birth centers and one who delivered at a doula’s home) traveled an average of 28 minutes to these locations.

Participants living in Wards 5, 7, and 8 generally saw long distances to hospitals as a barrier to receiving quality maternity care and a source of stress for pregnant residents. When asked about her experience living in Ward 8, “May,” a second-time mother, reflected, “It’s kind of depressing, because I don’t have enough accessibility to the hospital.”

Participants’ understanding of long distances as an obstacle was also reflected in their desires to see more hospitals built in their communities. Both interview and survey participants wished for high-quality labor and delivery care nearby. “Becky,” also a second-time mother from Ward 8, elaborated on this vision:

I think there are not more options in terms of hospitals for the DC residents. If possible, maybe each neighborhood has a hospital for its residents to go to because sometimes labor can get very messy. You could have a very fast labor. And before you know, you're traveling a very far distance, let's say 50 minutes before you get there, you're already delivering in the car, so I feel that there should be more options.

Similarly, in thinking about the possibility of a new hospital in her neighborhood, “May” shared, “[Closeness] is very important because most women, when they give birth, they might not have that stress of being driven to a far distance. So I feel the closeness is very good.”

7.3.2 Transportation

For many participants, limitations in access to reliable and efficient transportation compounded the barriers posed by long distances and travel times. Where possible, participants overwhelmingly preferred to travel by personal car, and these participants generally reported relatively smooth journeys and few transportation-related barriers. Notably, several participants reported that the pain of contractions and/or worries about their baby made their drives to the hospital stressful, but these concerns related more to the distance traveled than the mode of transportation.

Travel times for participants who were unable to access a car were higher on average than travel times for participants who drove to give birth (Figure 7.1), and arranging alternative transportation to the hospital frequently brought about significant stress and anxiety. These participants generally expressed a preference for rideshare services over public transit in order to avoid unnecessary stress or delays. However, some participants still reported substantial difficulties and stressors associated with rideshare services and taxis. One survey respondent, whose rideshare to the hospital lasted 90 minutes, explained, “I had no choice than to use this means of transportation cause I didn’t own a personal car. Our journey was a stressful one [and] I was so scared” (first-time mother, Ward 8). Additionally, because she went into labor in the middle of the night,
“Becky” had trouble finding an Uber to take her to the hospital. Others noted the high cost of rideshare and instead opted for public transit. One participant from Ward 8 shared that her 90-minute ride on public transportation was “a scarring thing for me…It was stressful. I never wish to experience [it]” (second-time mother, Ward 8).

Figure 7.1
Impact of mode of transportation on travel time to give birth outside the home.

7.3.3 Cost and Insurance

In addition to issues of distance and transportation, many study participants faced significant financial barriers to accessing their desired labor and delivery care. 22 of 25 participants reported an annual household income in the year that they gave birth below the city’s median of approximately $100,000. Additionally, 52% (n=11) of participants received health insurance through DC Medicaid, 44% (n=11) were uninsured, and 4% (n=1) had private insurance.

Though no survey respondents selected “accepted my insurance” as the single most important determinant of their birth location, many mentioned insurance or cost as one of several reasons that led them to select a birth location. These participants included those who delivered at home as well as in hospitals. Additionally, both participants who delivered at a free-standing birth center mentioned worrying about affording labor and delivery care, and one of these participants explained her decision to pursue birth center care simply: “It was less expensive for me” (first-time mother, Ward 8).

Financial obstacles were also prevalent immediately following delivery. For “May,” who knew little about insurance prior to giving birth and paid out of pocket, expensive hospital bills quickly became a burden. She explained, “At first, I didn’t have any issues, but in the long run, I had a lot of financial issues because I couldn’t really meet up with the high cost of the drugs and everything. So I had that type of barrier.”

When what they wished were different about giving birth in DC, several survey respondents specifically mentioned high costs: “One thing that I’ve noticed is that the cost of giving birth in DC can be very high, and many people struggle to afford the necessary care” (first-time mother, Ward 8).

In addition to generally high costs of obstetric care, some participants, like “Becky,” also mentioned understanding certain hospitals to be more expensive than others. She found researching the cost of birth at various hospitals to be “exhausting” and realized that she could not afford delivering at the facility closest to her home. Other participants expanded on this tension between spatially and financially accessible hospitals. A survey participant and Medicaid recipient shared, “I wished most birthing place[s] in D.C. accepted my insurance card coverage…That way I won’t have to travel long distance to give birth” (second-time mother, Ward 5).
7.4 Seeking Safety

Although participants cited extensive geographic and financial barriers to accessing their desired labor and delivery care, they generally did not regard such barriers as the primary determinants of their birth setting selection. Instead, both quantitative and qualitative results show, participants consistently prioritized the birth settings they believed would ensure safety for themselves and their babies. Though individual definitions of safety (and the nature of danger associated with birth) varied, participant concerns largely fell into two primary categories: 1) safety from emergent complications, and 2) safety from racism and discrimination. Across participants, high-quality facilities and experienced, unbiased staff were generally understood as essential to a safe birthplace.

Figure 7.2
Reported importance of factors in birthplace selection.

7.4.1 Perceptions of Safety and Hospital and Community Birth

Birthing people’s commitment to ensuring their own safety, as well as the safety of their babies, emerged as a primary factor in birthplace selection. Exactly half of survey participants selected “I felt safest there” as the single most important determinant of their birth location, and all but one participant rated this choice as “very important” (n=16) or “somewhat important” (n=5), the highest scores of any factor assessed. Interview participants also highlighted safety as their top priority. Furthermore, although participants generally rated feelings of safety as a more important than preference-related factors like “reputation among family and friends” and “friendly and/or knowledgeable staff,” both survey responses and interviews demonstrated that many attributes of a birth setting contribute to participants’ perception of it.

In alignment with their quantitatively ranked priorities, participants’ verbal and written recollections consistently reaffirmed the irre replaceability of feeling safe from harm. For example, when asked about her values surrounding birth, “Becky” began by sharing her defining preference: “I always want to give birth where I know it’s safer” (second-time mother, Ward 8). Another participant explained, “I value my safety as well as the safety of my baby” (second-time mother, Ward 8). Both of these participants delivered in hospital settings, and their reasoning for doing so is discussed further in Section 7.4.2.

Perceived safety also helped establish preferences for community birth. All but one participant who gave birth in community settings connected their decision directly to feelings of comfort and safety. One of these participants wrote simply, “I felt safer there [at home]” (first-time mother, Ward 8). 5 of 8 participants who selected community birth, including 3 of 5 who delivered at home and 2 of 2 who chose a free–standing birth center, stated that feeling safest there was the most important factor in their selection of a birth setting (Figure 7.2).
Figure 7.2
Participant birth settings by most important factor considered in birthplace selection.

Note: Here, other includes births in free-standing birth centers.

7.4.2 Safety from Emergent Complications

For many participants, perceived safety underpinned preferences between home and community birth and informed what birth settings they considered possible or reasonable. Many participants, particularly those who favored hospital birth, expressed deep worries about the possibility of experiencing life-threatening complications and associated safety with medicalization, including advanced facilities, equipment, and treatment options and experienced medical staff. For participants who preferred hospital birth, their emphasis on safety also informed which hospital they chose.

For example, one survey respondent explained that “ensuring the hospital chosen is equipped to handle potential emergency situations is critical to feeling safe and cared for” (second-time mother, Ward 8), and “May” shared that she preferred hospital birth over home birth because hospitals “have all the facilities that [are] needed.” Similarly, a third-time mother from Ward 5 wrote, “I gave birth to my child in the hospital because I couldn’t do it on my own at home…because it is more safer in the hospital…the healthcare professional midwife will all be there to watch you and observe you.”

Other respondents discussed the importance of proper and clean facilities and quality equipment to “actually guarantee the safety of my baby” (second-time mother, Ward 5) and to “give me a sense of assurance that I’m in the right place” (second-time mother, Ward 8). Some participants were referred to a specific hospital by their prenatal care provider due to the quality of care provided there.

Much like their preference for high-quality facilities, participants also stressed that friendly, attentive, and experienced medical staff helped them to feel safe and comfortable during birth. “Becky” pointed out that certain hospitals are staffed by “more experienced healthcare professionals that would be able to help me out if I have a complication.”

“Joy,” a first-time mother from Ward 8, shared that her preferred hospital had “more facilities, and the doctors are available at any time of the day. They are jovial, they are friendly. And I also feel safe even if there’s going to be any complications at the end of it.” On several occasions, such doctors and nurses partially or fully alleviated participants’ fears about birth and possible complications. Continuing her praise for the staff who cared for her during her delivery, “Joy” recalled:

Actually, I was kind of scared at first when I was going to deliver you know, I was anxious like will I come back dead or alive, and will my child come back dead or alive? But with doctor encouragement and the nurses, I was able to just look at my mind and lose the anxiety. The doctor has already trained me that I would come out alive with my child.
For “Joy,” finding medical staff she ultimately described as “caring,” “accommodating,” and “qualified,” was essential to evaluating possible birth settings and feeling safe during birth.

### 7.4.3 Safety from Racism and Discrimination

Three participants, who like all participants in this study identified as Black or African American, specifically highlighted their consciousness of racism and discrimination when seeking out birth settings and professionals.

One survey respondent reflected on her decision to select a doula and deliver at the doula’s home:

> I felt more comfortable having a doula who shares my race and cultural background, as this created a stronger sense of connection and understanding. Additionally, the doula had a better understanding of the unique challenges and experiences faced by Black mothers, such as higher rates of maternal mortality and discrimination in the healthcare system (first-time mother, Ward 8).

This participant felt that working with a Black doula would help to protect her from the specific dangers that racism poses for Black birthing people, including but not limited to increased rates of pregnancy-related death. “May,” who encountered significant financial and transportation barriers to delivering at her preferred hospital, shared that she had selected that hospital because she was confident that the providers there did not perpetuate racism or bias. In her words:

> I went there because there was no racial discrimination. The doctors were not looking at me with a discriminating eye, and my friends told me [the doctors and nurses] are welcoming, that there’s no discrimination, that they see people of color okay and everything. I think that’s another reason I went there. The doctor was so friendly and welcoming. Maybe if I went the first day, and he acted at the outset somehow towards me, I think I would have gone for another hospital, but they were really friendly.

Her experience receiving prenatal care at this hospital system reassured her that she would be safe from racism and discrimination, and her words also suggest that she evaluated care options based on their ability to care for Black birthing people specifically. Though she ultimately deemed these providers acceptable, “May” was also prepared to pivot if she noticed signs of discrimination.

The final participant who explicitly mentioned the possibility of discrimination was a first-time mother from Ward 8 who opted for home birth in part because she found it to be more affordable. Like “May,” she reported a generally positive experience, writing, “giving birth…was less stressful because I did it in my home and I felt comfortable and I was not discriminated by anyone because of my color.”

Interestingly, all three spoke about ensuring the absence of discrimination in the birth settings they selected, implying that labor and delivery care at other birth settings is marred by racism and that the possibility of encountering such racist care was a realistic one that must be minimized. Though none directly or personally described such negative experiences, these participants demonstrated acute awareness of this threat.

### 7.5 Decision-Making and Negotiations of Autonomy

As detailed in the sections above, participants faced substantial access barriers to labor and delivery care in general, and some participants understood specific birth settings to be more geographically or financially accessible than others. However, participants also unmistakably considered DC birth settings to differ in terms of safety and desirability, and very few participants accepted matters of distance or cost as primary determinants of their ultimate birth setting. Instead, when facing complex and intersecting barriers, birthing
people made decisions by gathering information, weighing possibilities, and ultimately prioritizing their safety and wellbeing despite obstacles.

7.5.1 Information Gathering

Three interview participants shared that they had carried out independent research in order to determine which hospitals might meet their needs and preferences. This research addressed the key factors, including quality of facilities, attitudes of staff, and cost, identified previously. It also took multiple different forms. “Joy” was able to take a tour of her intended labor and delivery ward and assess whether it met her expectations. Similarly, “May” “read that [the hospital she chose] had good maternity wards, and they provide comprehensive maternity care. That’s one of the reasons I really chose it.”

Even more participants mentioned consulting with others in their social networks, primarily friends and sometimes relatives. 82% of survey respondents reported that a birth facility’s reputation among family and friends was somewhat or very important in their decision. One participant who chose to deliver at home shared, “my mum and friends recommended a good midwife for me” (first-time mother, Ward 8).

The participants who described discussing their plans with others primarily mentioned positive reviews and recommendations that inspired them to select the same facilities where their conversation partner had delivered; only two mentioned avoiding specific facilities after learning of their negative reputations from friends. One participant, for example, explained, “I gave birth there because my close friend had the best pregnancy care and swift delivery, which boosted my confidence” (first-time mother, Ward 8). Similarly, in describing the hospital where she eventually delivered, “Joy” noted that she had “seen the way they treated…people that were delivering…and the way the doctors attended to them.” After her own positive experience at that hospital, “Joy” planned to continue the practice of sharing information within her social network. She elaborated, “I can convince my friends to go there because I can testify to their wellbeing.”

“May” selected a hospital based on testimony from her friends and her own observations of the care one of these friends received. She described noticing that the doctors and nurses were thorough when monitoring the health of her friend. Furthermore, as described in section 7.4.3, May’s conversations with her friends informed her initial impression that staff at the hospital would “see people of color okay and everything.” She also evaluated the hospital based on her experiences with prenatal care there, which she found aligned with her friends’ positive reviews. Like “Joy,” “May” also noted, “I think I can recommend this hospital to anybody.” She contrasted this hospital with others in the area, stating, “my friends, they say most hospitals are not that equipped.”

Drawing on independent research and friends’ experiences helped “May” and many other participants to draw distinctions between birth settings that proved essential in decision-making. Using the information they gathered prior to birth, participants understood birth settings to differ substantially in their ability to ensure safety and present positive birth experiences.

7.5.2 Implementation of Priorities Despite Barriers

Participants perceived birth setting options to vary in both accessibility and safety. At times, multiple priorities or barriers conflicted and/or no available option met all criteria for a satisfactory birth location. Participants’ understandings of and commitments to safety, as well as the information they collected, became particularly crucial when multiple preferences held by the same individual pointed to different options or when desirable options were difficult to access.

In some cases, because accessing any option is difficult, the importance of these barriers in determining birth setting selection was diminished. Where birth settings were seen as similarly inaccessible, participants
consistently chose the one they perceived to be safest. In other cases, though, participants explained that accessing safe care required confronting additional barriers to access.

Much like the survey respondent who could only afford to deliver at a distant hospital, where her insurance would be accepted, several participants found the nearest hospitals to their homes unsatisfactory with regard to safety, and some took on longer travel times in order to deliver at hospitals other than the nearest one (Figure 7.5). These participants continued to relate safety to the quality of facilities and staff available at each possible hospital.

“May,” who borrowed a friend’s car for the 45-minute drive from her home in Ward 8 to her preferred labor and delivery ward, expressed measured support for a new hospital near her: “So if it’s closer and then if it has all the equipped facilities, and also good nurses and doctors, I’m okay with it.” Even if much more convenient to reach, she would need to confirm that the new hospital met her standards before accepting it as a viable option.

“Joy,” who experienced great stress over safety during birth, felt similarly, sharing that “living close to hospitals doesn’t justify that you are safe…. You know, our life is important.” Like many other participants, Joy derived a sense of safety from her perception of the hospital’s facilities and services. She expressed her inclination to take on additional travel hurdles for the sake of perceived safety: “I think it depends on the facility the hospital [has]. If the hospital is far, using me as an instance, I don’t mind the distance because they have adequate facilities.”

**Figure 7.5**
*Travel times by birthplace.*

Another Ward 8 resident and first-time mother traveled 90 minutes via rideshare to reach a hospital she felt she could trust to safely care for herself and her baby. As she explained:

I selected this hospital because the one closest to my home wasn’t equipped with good facilities, and I didn’t want to take the risk of endangering my life and the life of my baby…. Even though the distance wasn’t encouraging, I had no choice. I had to go there for my own safety.

This participant wrote that she wouldn’t have had to navigate additional travel barriers if the nearest hospital had “the necessary equipment and good services.” She had determined which hospital best fulfilled her priority of safety and undertook logistical challenges to ensure she could deliver where she needed to be to feel safe. For this participant, the trade-off was in no way optional.
8. DISCUSSION

The integration of these two sets of results reveals a complex relationship between potential spatial access, non-spatial access, autonomy and decision-making, and actual use. For participants, distance and travel time were relevant barriers to access but rarely the only (or even most important) determinants of where individuals in my study sought labor and delivery care. Instead, the participants in this study understood safety, not proximity or travel time, to be the most important factor in selecting a birth setting.

8.1 Geographic Disparities in Access to Labor and Delivery Wards

Collectively, the results characterize an uneven spatial landscape of labor and delivery care in DC, consistent with the clustering of all open facilities in Northwest DC.

Using GIS methods recognized for their ability to detect geographic access disparities, these findings quantitatively reinforce the concerns voiced by community members, healthcare providers, advocates, and journalists following the 2017 obstetric care closures in Wards 5 and 8, which a contemporary Washington Post article proclaimed left “no labor and delivery services exist on the east side of the city” (Itkowitz, 2017). As expected based on the locations of open facilities, potential spatial access to hospital-based care decreases moving from the predominantly white and wealthy Northwest quadrant to the predominantly Black and low-income Northeast and Southeast quadrants. This gradient both supports the findings of Fontenot et al, which established ward-level differences in travel time to the nearest labor and delivery hospital that have increased since the closures, and expands upon this research by revealing variations in access within the wards commonly described as low in access (Brigance et al., 2022; Fontenot et al., 2023).

Though the views of birthing people living in zones of high potential spatial access were not assessed, residents of Wards 5, 7, and 8 expressed dissatisfaction with long travel times to obstetric care. Their stress and frustration confirm the real-world significance of theoretical geographic disparities in an urban area, which may appear subtle relative to those identified in rural contexts (Guagliardo, 2004; McMorrow et al., 2021). As Nash has posited, landscapes of access matter and affect the lived experiences of the people who inhabit them (Nash, 2021a). These findings highlight the importance of specific attention to differences in access to labor and delivery care in urban areas, which may be obscured in national or state-level analysis.

Importantly, all measures of potential spatial access explored here rest on the assumption that distance/travel time is the foremost determinant of access to labor and delivery services and that these values can be adequately estimated based on basic knowledge of facility locations, potential patient locations, and transportation systems. However, participants’ experiences, communicated through stories and through numerical data about drive times, serve as a reminder that estimated travel times may be inaccurate in ways that are not consistent across the population. For low-income DC residents in particular, expected travel times may be extended or even multiplied by the need to pursue transportation other than a private car, which can also introduce additional financial pressure (Fontenot et al., 2023). Therefore, physical and financial access to adequate transportation, which is also unevenly distributed in geographic space, constitutes an important component of spatial accessibility. Particularly for birthing people without a private car, estimated travel times may be better understood as minimum travel times that are often scaled up.

8.2 Relationship between Geographic and Socioeconomic Disparities

Such geographic disparities overlap with and are intimately related to spatial patterns of socioeconomic inequality and legacies of segregation in DC. This overlap, which occurs not just on the census tract level but also in the lived experiences of individuals and families, means that patterns of inequality interact with each other to intensify barriers in a way that distinctly disadvantages Black birthing people.
The correlations established here further existing research on disparities in access for Black residents, previously found to face increased travel times to labor and delivery facilities on the ward level (Fontenot et al., 2023). This relationship is maintained on a finer spatial scale, the census tract, and also extends to other social and economic variables. On the census tract level, low potential spatial access is associated with a high share of Black residents, low mean income, low rates of college education, and high rates of Medicaid enrollment. This finding aligns with existing literature on reduced access to maternity care for socioeconomically marginalized birthing people in both rural and urban settings and also with understandings of DC’s interrelated residential racial, income, and educational segregation (Brigance et al., 2022; Chandler & Phillips, 2020; Rayburn et al., 2012).

Furthermore, the persistence of correlations between the share of Black residents and potential spatial access when controlling for income and education suggest that race is a primary predictor of potential spatial access, mirroring research on racial disparities in maternal health outcomes (Kennedy-Moulton et al., 2022). In both cases, high socioeconomic status does not protect Black birthing people from disparities. Though the multivariate models produced here highlight reduced potential spatial access for Black birthing people, independent of income or education, a sole focus on these models overlooks the reality that Black DC residents are more likely than white residents to experience additional socioeconomic barriers to reproductive healthcare (Chandler & Phillips, 2020; Fontenot et al., 2023).

Many census tracts, particularly those where the majority of residents are Black, see overlapping manifestations of socioeconomic inequality (Chandler & Phillips, 2020). A high degree of collinearity between variables relating to race, income, education, and insurance, all of which are associated with disparities in potential spatial access, suggests that residents in many tracts with low potential spatial access may be contending with additional barriers to receiving perinatal care. Additionally, though associations between potential spatial access and car ownership are relatively weak on a population level, barriers are intensified in areas where labor and delivery care is far away and vehicle access is limited (Fontenot et al., 2023).

As predicted by the associations between potential spatial access and variables related to income and education, nearly all study participants from Wards 5, 7, and 8 identified additional socioeconomic considerations that complicated their ability to access labor and delivery care. For example, travel times were multiplied for participants who had to turn to ride share or public transportation, sometimes deciding between the two on the basis of cost. These participants’ experiences navigating DC’s birth landscape demonstrate that the mathematical correlations between potential spatial access and measures of socioeconomic marginalization have real-world meaning. Not only do distance and travel-based barriers co-occur with socioeconomic barriers, but these different sets of obstacles to labor and delivery care interact with and compound each other. Potential access disparities and their associations with other barriers are realized in participants’ lived experiences. Relatedly, GIS methods successfully identified disparities but underestimated their magnitude, complexity, and intersections with each other, further validating this application of mixed-methods GIS.

The relationship between multiple access barriers serves as a reminder that metrics of spatial access communicate only one component of the structural context that birthing people navigate (Guagliardo, 2004). The relationship further indicates that other challenges to receiving high-quality labor and delivery care, though sometimes described as non-spatial, are also distributed unequally across space in patterns that can mirror the distribution of and therefore experiences of spatial access for already-marginalized birthing people (Nash, 2021a). This dynamic embodies the idea of intersectionality, which is fundamental to RJ theory. Multiple forms of marginalization, which overlap in geographic space and in individual experiences, combine to further intensify access barriers (Ross & Solinger, 2017).
8.3 Role of Birth Centers

Potential spatial access to birth centers, where approximately a quarter of one percent of births to DC residents take place, is distributed in a markedly different way. Though not equal across the city, the results suggest that birth center care is most spatially accessible to residents of Wards 5, 6, 7, and 8, the very areas abandoned by hospital-based labor and delivery care. Although weak, associations on the census tract level between high potential spatial access to birth center care and high shares of Black residents, high rates of Medicaid enrollment, low mean income, and low rates of college education align with the mission of DC’s only birth center, which is part of a system of community health centers. These associations are opposite in direction of nationwide trends for community birth, which is currently more common among white, wealthy, highly-educated women who pay out-of-pocket or use private insurance (MacDorman & Declercq, 2019). These trends in potential spatial access are also reflected in vital statistics data, which show that 64% of birth-center births among DC residents were to Black mothers and at least 36% were paid for using Medicaid (Centers for Disease Control and Prevention, National Center for Health Statistics, 2022).

Though the sample size of participants who chose to deliver at a freestanding birth center was small, these participants’ ability to find a solution to their combined safety and cost-related concerns underscores the impact of this rare resource in DC. Their perspectives echo the stated goals of the FQHC-based birth center, which aims to provide high-quality obstetric care for Black and low-income birthing people in particular (M. N. Matthews, 2023).

8.4 Quality Matters and Safety First

Despite demonstrating the real-world implications of the GIS results in many ways, as discussed previously, participant experiences also complicate the stories told by maps. Though many participants discussed barriers like distance, cost, and transportation, their perceptions of access (no matter what this word means to them) among possible birth settings were consistently secondary to their perceptions of safety. While the specific birth setting where each individual felt safest varied, achieving this sense of comfort was a shared value across the group, consistent with previous research on birth setting selection (George et al., 2022; Sperlich et al., 2017; Sperlich & Gabriel, 2022). Participant narratives emphasized time and again that DC’s birth options are not equivalent in quality in the minds of the birthing people who use them. These qualitative differences were both subjective and personal, meaning they varied across the sample, and they cannot be summed up through ratings or lists of available services. Instead, they relied heavily on the reputations of each facility among social networks, particularly with regard to perceived quality of equipment and care of staff.

The clustering of hospital-based obstetric care in DC means that facilities are both far from Black and low-income residents and close to each other, which creates a unique landscape on which birth decisions are made. Thus, the travel time to reach the nearest facility may be only marginally lower than the time to reach another facility understood to be safer or otherwise more desirable. In some cases, the consistently high barriers to access any labor and delivery ward, such that all care was similarly difficult to obtain, counterintuitively decreased the relevance of geographic and financial factors in decision-making, thereby increasing the relative importance of subjective differences between facilities and further explaining participants’ decisions to select hospitals other than the closest one to their homes.

Where multiple barriers intersected or conflicted and participants had to negotiate priorities, feelings of safety consistently prevailed over any other considerations in selecting which birth setting the participant would pursue, even in the presence of geographic, financial, and other barriers. Instead of considering distance first and selecting from the most proximate options, as a solitary focus on mapping might imply, most participants first made judgments across DC birth facilities about those facilities’ ability to safeguard their safety and the safety of their children. After determining which options they judged to be safe, many participants considered how they would access care at these facilities, both geographically and financially. As other researchers have
found, participants took into account many sources of information, including independent research and knowledge-sharing within social networks, to construct these perceptions and determine which birth setting(s) would meet their needs (Hansen et al., 2021; West, 2018).

Their stories of conducting research and navigating additional hurdles to select and deliver at the birthplace they deemed safest also reflects the particular pressure exerted on Black birthing people, who are more likely to contend with geographic and financial barriers, to self-create safety and avoid poor outcomes in the face of obstetric racism (Hansen et al., 2021; Nash, 2021b; Scott & Davis, 2021; West, 2018). This pressure is particularly evident in the responses of three participants, who specifically named racism or maternal health disparities in their reasoning for selecting a specific birthplace, but may also be implied in the words of other participants who emphasized the importance of “welcoming” staff. Participants generally did not cite concerns like maintaining autonomy over their bodies or avoiding unnecessary interventions, both of which other researchers have identified as important to Black birthing people (Hansen et al., 2021; West, 2018).

Participants’ decisions to prioritize safety sometimes entailed sacrificing convenience or affordability. This pattern simultaneously reflects a specific urban context, where multiple options are theoretically possible, a semblance of autonomy to make decisions that protect themselves and their families, and an undue stressor on already-marginalized birthing people. Furthermore, participants who faced this trade-off specifically contested language of “choice,” reinforcing the key RJ principle that access to quality (or “safe and dignified”) reproductive healthcare is a prerequisite to experiencing autonomy Roberts, 1999, p. 138; Ross & Solinger, 2017, p. 10).

8.5 Contextual Meanings of Access

As previous researchers have acknowledged, spatial access interacts with many other factors to shape the ability of individuals and communities to receive healthcare (Fannin et al., 2018; Guagliardo, 2004; Khan & Bhardwaj, 1994; Nash, 2021a). The nature of the negotiations between theoretical and realized access are highly susceptible to context (Khan & Bhardwaj, 1994). Though some researchers have proposed spatial accessibility as a primary component of narrowing possible options into actual decisions, study participants’ stories of traversing long distances and overcoming spatial barriers to obtain desirable labor and delivery care indicates that subjective factors, especially perceived safety, are dominant over other factors in determining birthplace selection. Participants repeatedly showed a commitment to reaching the birthplace they judged most appropriate despite significant impedance. Thus, identified barriers related to distance, cost, and transportation acted more as barriers that introduced stress (emotional, financial, and otherwise) than as prohibitory or preventative mechanisms (Khan & Bhardwaj, 1994). This willingness to incur substantial burdens in order to access a specific birth setting may reflect understandings of birth as an event where feelings of safety are particularly variable and particularly important, especially given knowledge of poor treatment and poor outcomes for Black birthing people.

While previous research primarily addresses barriers in accessing the nearest hospital, the presence of multiple hospitals with variable characteristics means that this definition of access does not reflect the birth experiences of DC residents. Though many participants considered proximity in their birthplace selection and some delivered at the hospital nearest to them, participants generally did not accept the nearest hospital outright and regarded more distant hospitals as feasible to reach. This gap has been anticipated by previous researchers and offered as a justification for methods like KDE and 2SFCA, which account for the impact of multiple facilities and also quantitative characteristics of those facilities, respectively (Guagliardo, 2004).

However, participants’ narratives of selecting a birth setting also shed light on the context-dependent relevance of the inclusion of factors intended to improve upon pure spatial accessibility metrics. For example, issues like financial resources and transportation access, which are spatially distributed but not traditionally included in quantitative access metrics, do significantly impact the difficulty of obtaining labor and delivery care. However, in the case of labor and delivery care in DC, participants were generally not interested in the
number of facilities available, which has been proposed as a relevant contributor to access (Guagliardo, 2004). Instead, many participants expressed selecting a single birth setting as adequate or desirable based on its perceived quality and ability to care for Black birthing people. Participants sought access to birth settings that they believed had the staffing and facilities to keep them safe. Their explanations specifically undermine the premise of mutual compensation between accessibility and availability inherent to methods like KDE and 2SFCA (Guagliardo, 2004). That is, multiple facilities understood as providing sub-optimal care cannot be equivalent to a single facility that does meet patient needs and expectations. This distinction again embodies RJ’s emphasis on safe reproductive healthcare suited to community needs (Roberts, 1999; Ross & Solinger, 2017). Because many participants did not regard the facilities they perceived to be low-quality as options at all, spatial accessibility in this context may be better understood as the difficulty of reaching one’s desired birth facility (a modification of Guagliardo’s definition) and becomes relevant in the context of facilities deemed acceptable by the birthing person and their supporters (Guagliardo, 2004).

This finding is also supported by participants’ reflections on the possibility of a new hospital in Ward 8. After the construction of the new hospital in 2025, these disparities in potential spatial access are expected to continue, though slightly reduced in magnitude. Though the CEO of George Washington University Hospital, with which the new Ward 8 hospital will be affiliated, has remarked that the new construction will “ensure residents of Wards 7 and 8 have access to high quality care in their community,” its addition does little to address gaps in potential spatial access for some of the lowest-access areas of Ward 7 (Executive Office of the Mayor, 2023). Furthermore, participants echoed their views about the quality of existing hospitals, explaining that this new hospital would only make a difference in their experiences if it provided care of the same or better quality than that offered at distant hospitals. Otherwise, participants explained, they will continue to take on the burdens of traveling across the Anacostia River to access care. Thus, in order to realize its goal of serving residents in Wards 7 and 8, and given the subjective nature of participant and community perspectives, this hospital must both provide safe, respectful perinatal care to Black birthing people and establish a trustworthy relationship in the community.

Participants’ experiences also lend perspective to other nuances of spatial accessibility mapping. For example, though some have expressed concerns about the capacity of existing hospitals to absorb new patients after the 2017 closures—and a few participants worried about the capacity or staffing of the facilities they considered, which 2SFCA attempts to address via the supply-demand ratio—“crowdedness” was typically at most a minor contributor to patients’ perceptions of their access to the services at specific facilities. Given the complex network of obstetric care in DC, which includes both prenatal providers and labor and delivery care as well as insurance determinants, a catchment area method may not be an effective metric of demand for a specific facility. Capacity-related barriers may derive from limitations in the prenatal care system, often related to insurance status, which can determine which patients have priority for desirable hospital beds.

Therefore, while KDE and 2SFCA reveal relatively clear spatial access disparities, particularly concentrated among socioeconomically marginalized birthing people, their proposed improvements over nearest-neighbor methodology do not necessarily produce access metrics that better represent the lived experiences of DC residents.

8.6 Limitations and Future Directions

Despite the advantages of its mixed methods design, which is particularly beneficial in addressing the limitations associated with spatial accessibility mapping, this thesis is subject to several limitations. The relatively small sample size is not representative and is unlikely to encapsulate the diversity of views and experiences among Black birthing people in DC. Underrepresentation of birthing people from Wards 5 and 7 in the sample, including the zip codes where potential spatial access is the lowest, may also obscure differences in experience related to place of residence, and I repeatedly encountered difficulty verifying where in DC potential participants lived.
Furthermore, my relatively brief interactions over online platforms posed challenges to the depth of engagement with lived experience and to participants’ autonomy in impacting the research. I found that my interview plans were not sufficiently adapted to the range of technological and health literacy among participants, an issue only partially resolved by distributing the longer-form survey; this structure was particularly detrimental with regard to seeking participant feedback on maps.

The concerns raised by participants in this study, particularly related to labor and delivery ward equipment and facilities, differed somewhat from other studies’ findings of birth preferences among Black birthing people: participants in this study rarely explicitly raised issues of autonomy and freedom from medical intervention that several studies have identified as responses to obstetric racism (Hansen et al., 2021; West, 2018). Some differences were specific to DC—participants expressed strong qualitative and reputational differences between DC hospitals, many of which were directly tied to perceived safety. These concerns may, by extension, also relate to narratives of obstetric racism and maternal mortality linked to specific birth settings in the DC area. However, the results do not conclusively reveal the source of DC residents’ concepts of safety during birth or the extent to which these concepts reflect themes identified in previous work. It is possible, for example, that participants held these views but did not feel comfortable or compelled to share them; that participants were not familiar with this language but might resonate with the concepts if described another way; that participants’ perspectives were fundamentally different from those documented in existing literature; or some other explanation.

Future research in this community should delve into the meanings of “safety” for Black birthing people in DC, which may be numerous, and seek to understand how these perceptions of relative safety form. Most simply, this work may involve in-depth research about each birth facility and its reputation in the community. Another possible approach might include investigating the diversity of ways in which Black birthing people understand and interpret disparities in access, autonomy, and outcomes in order to better understand variation within this community. Which birthing people come to associate safety with medicalized hospital birth, and which birthing people come to seek birth experiences that may challenge prevailing obstetric practices? Who expresses birth preferences in terms of autonomy and power? Who gains familiarity with language like birth justice and obstetric racism, and who resonates with these terms?
9. CONCLUSION

Where birthing people live matters, and where they birth matters too. The uneven landscape of birth options and outcomes in DC represents an intersection of multiple forms of inequality, from insurance coverage to maternal mortality, which converge all too often in the experiences of Black birthing people. This reality cannot be separated from issues of racism, which manifest in the legacies of segregation that have shaped where DC residents live and how they accumulate wealth and in the many forms of ongoing disregard for Black perinatal health that so many scholars across disciplines have identified (see, for example, Nash, 2021a, 2021b; Roberts, 1999; Scott & Davis, 2021). Thus, the access barriers journalists have repeatedly cited combine with a looming presence of obstetric racism and maternal mortality to compose heterogeneous landscapes of low perceived safety and care for Black birthing people.

Just as hospital closures are only one of many developments that have produced inequalities in access to quality perinatal care for Black birthing people, hospital construction must be seen as only one part of the resolution. Birthing people must be able to reach and afford their desired labor and delivery care, and the building of new facilities should be accompanied by a broadening of public insurance coverage for birth and funding for safe and comfortable transportation options to reduce financial and geographic barriers. However, in the words of interview participant Joy, “living close to hospitals doesn’t justify that you are safe.” Neither does the ability to pay for care. Quality matters, and safety is in the eye of the beholder—that is, DC’s network of labor and delivery stakeholders must commit to dismantling obstetric racism at all scales, improve and equalize the quality of labor and delivery care, and ultimately work to understand and implement what the birthing people they care for need to be safe and feel safe.
10. REFERENCES


https://planning.dc.gov/sites/default/files/dc/sites/op/page_content/attachments/Segregation%20Report%202011-18-20%20FINAL.pdf


https://doi.org/10.1111/jmwh.12947


https://www.communityofhopedc.org/healthcare/family-health-and-birth-center


https://doi.org/10.4135/9780857024541


https://doi.org/10.1016/j.socscimed.2007.05.036


https://opendata.dc.gov/datasets/DCGIS::hospitals/about


Dyck, I. (2003). Feminism and Health Geography: Twin tracks or divergent agendas? Gender, Place & Culture, 10(4), 361–368. https://doi.org/10.1080/0966369032000153331


https://digitalcommons.macalester.edu/geography_honors/24/


https://doi.org/10.1111/birt.12640


https://doi.org/10.1186/1472-6963-11-147


https://doi.org/10.1016/j.healthplace.2003.01.001


mistakes-led-to-shutdown-of-united-medical-center-obstetrics-ward/2017/08/14/5639006a-8114-11e7-b359-15a3617c767b_story.html


Maryland State Archives. (2023). *Maryland Hospitals by County* [dataset].
https://msa.maryland.gov/msa/mdmanual/01glance/html/hospital.html#mo


https://doi.org/10.1016/0016-7185(95)00036-4

https://www.washingtonpost.com/opinions/2021/08/14/goodbye-chocolate-city/


Black Feminism in Practice: A Reflection on Community-Based Participatory Research in Cincinnati.
Societies (Basel, Switzerland), 12(1), 17. https://doi.org/10.3390/soc12010017

https://oag.dc.gov/blog/investigating-closure-providence-hospital

Pan, J., Zhao, H., Wang, X., & Shi, X. (2016). Assessing spatial access to public and private hospitals in
Sichuan, China: The influence of the private sector on the healthcare geography in China. Social
Science & Medicine, 170, 35–45. https://doi.org/10.1016/j.socscimed.2016.09.042

Center.

https://mappingsegregationdc.org/#story


Randall, K., & Vembar, K. (2018, August 30). Women in D.C. Face Obstacles at Every Step of Pregnancy and

Rayburn, W. F., Richards, M. E., & Elwell, E. C. (2012). Drive times to hospitals with perinatal care in the
https://doi.org/10.1097/AOG.0b013e318242b4cb


https://data.census.gov/profile/District_of_Columbia?g=040XX00US11


11. APPENDIX A

Estimated drive times for DC residents to each DC birth facility.
FHBC

WHC

Cedar Hill

Sibley

DC Birth Setting
- Birth center
- Hospital

Drive Time
- 0 - 5 minutes
- 6 - 10 minutes
- 11 - 15 minutes
- 16 - 20 minutes
- 21 - 25 minutes
- 26 - 30 minutes
12. APPENDIX B

Interview Guide - Perinatal Stakeholder

Introduction + Logistics

1. Consent to be recorded first.
2. Opportunity to ask questions, confirm consent to participate.
3. Talking about birth can be difficult. We can stop the interview at any time. You will be provided with postpartum mental health resources at the end of the interview.
4. Housekeeping
   a. Using demographic information.
   b. Create and remember pseudonym.
   c. Possible follow-up interviews.
   d. Gift card after the interview – same email?

Section I: Your Work

Section IA: Profession, Location, and Patients

Firstly, I’d like to ask you a bit about your work.

1. What is your profession?
2. In which ward or wards of DC do you work?
3. How would you describe your work?
4. How would you describe the demographics of the community you serve? In which neighborhoods do they live?
   a. Do you work with people who identify with specific racial or ethnic groups more often than others?
   b. Are most people you work with insured? Do they have primarily private insurance or Medicaid?
5. How does working in this location affect your practice as a healthcare provider?

Section IB: Navigating Current Options

1. How would you describe the current options where DC residents can give birth? [Follow up about locations / geography]
   a. To what extent do you see these options as accessible, financially, geographically, or otherwise, to the birthing people you work with?
2. How do you counsel birthing people who are deciding where to give birth?
   a. To what extent is travel time from home to place of birth an important consideration for your patients?
   b. What concerns about birth location come up most often among your patients?
   c. [What else is important?]
3. What barriers, if any, impact your patients’ autonomy in selecting a birth location?
   a. How do you help them navigate these barriers?
4. Are the birthing people you work with satisfied with the options in the DC area?
   a. Do you think the current birth location options meet the needs of the community? Why or why not?
Section IC: Future and Feedback

1. Could you tell me about a positive aspect of the birth options for DC residents?
2. [What, if anything, would you like to change about the birth options for DC residents?]
3. The new Cedar Hill Regional Medical Center on the old St. Elizabeth’s campus (Alabama Ave SE) is scheduled to open in 2025. To what extent do you think the new hospital will benefit your patients or address the barriers they may face?
4. 4. What else about giving birth in the DC area do you think is important for others to understand?

Section II: Maps and Reflection

Now that we’ve talked a bit about your birth, we’ll transition to the second section of the interview, which focuses on maps. Maps are a common tool to represent access to labor and delivery care – that is, how easy or hard it is to get the care you need – but they aren’t perfect, and some are a closer match to the real-world situation than others are. I am going to show you a few different ways to measure and display access to labor and delivery care in DC, and I’d love to hear your reflections on them based on your experience.

I want to point out that these maps will focus on access to hospitals because more than 99 percent of DC babies are born in hospital settings, and there are many more hospitals than birth centers in the DC area.

Section IIA: Nearest Neighbor Map

Map 1: One of the simplest ways to represent access is to calculate the distance from any location to the nearest open labor and delivery unit, which looks like this.

1. What are your reactions to this map?
2. What does it tell us?
3. What is it missing?
4. What do you think about the factors considered in this map?

Section IIB: Kernel Density Estimation Map

Map 2: Next, if we want to consider people who live close to multiple facilities to have greater access, so that more options = more access, we get a map like this.

1. What are your reactions to this map?
2. What does it tell us?
3. What is it missing?
4. What do you think about the factors considered in this map?

Section IIC: 2SFCA Map

Map 3: Finally, if we take Map 2 and also try to estimate how “busy” each hospital is by comparing the number of beds to the number of people who live near it, so that more options = more access and less busy options = more access, we get a map like this.

1. What are your reactions to this map?
2. What does it tell us?
3. What is it missing?
4. What do you think about the factors considered in this map?

Section IID: Final thoughts
1. Do you think some of these maps represent access to labor and delivery care better than others? Why?
2. Finally, what else about giving birth in the DC area do you think is important for others to understand?
3. Do you have any questions for me?
DC Birth Places Study Interest Form

Completing this survey expresses your interest in joining Investigating Access and Choice among D.C. Birth Settings. If you are selected to participate in the study, you will receive a follow-up email with a link to schedule your interview. This interest survey does not guarantee your participation in the study.

This research project is being conducted by Avery Borgmann and Xun Shi from the Geography Department at Dartmouth College, Hanover, NH, USA. It concerns the places that DC residents give birth and why, as well as barriers that limit choice of birth setting for DC residents. The project aims to inform public health intervention in DC, such as the construction of new birth facilities, and to communicate the preferences of DC residents and people who work in maternal health with researchers and public health officials.

You are eligible for this study if: you are a DC resident, 18 years of age or older, gave birth within the last two years (while you were living in DC), and are not currently pregnant.

People interested in improving access to maternal healthcare in DC may want to participate. The risks of participation are minimal and are explained in more depth in the document below.

Please click the link below to download and review the study information and consent form.

Please confirm that you have reviewed the file above.

☐ I have reviewed the study information and consent form.

Please confirm that you are eligible for the study because you: are a DC resident, 18 years of age or older, gave birth within the last two years (while you were living in DC), and are not currently pregnant.

☐ I am eligible for this study.

The following section contains basic questions about you.

Please enter your email address here:

________________________________________________________________

What pronouns do you use? for example: she/her/hers, he/him/his, they/them/their, etc.

________________________________________________________________

What is your zip code of residence?

________________________________________________________________
In which ward of DC do you live?

- Ward 1
- Ward 2
- Ward 3
- Ward 4
- Ward 5
- Ward 6
- Ward 7
- Ward 8

How do you describe your race and ethnicity?

________________________________________________________________

What is your age, in years?

________________________________________________________________

What is your employment status?

- Full-time
- Part-time
- On parental leave
- Stay-at-home parent
- None / unemployed
- Other
What is your approximate household income?

- Less than $10,000
- $10,000 to $14,999
- $15,000 to $24,999
- $25,000 to $34,999
- $35,000 to $49,999
- $50,000 to $74,999
- $75,000 to $99,999
- $100,000 to $149,999
- $150,000 to $199,999
- $200,000 or more

What is your insurance status?

- No insurance
- Medicaid
- Private insurance

How many times have you given birth?

________________________________________________________________

This section asks questions about your most recent birth.

When did you give birth?

(Table Truncated to 63 Columns)
Where did you give birth?

- At home
- At a hospital
- At a birth center
- Other

How long, in minutes, did it take you to travel from your home to the place where you gave birth? If you gave birth at home, enter "0."

________________________________________________________________

How did you travel to the place where you gave birth? If you gave birth at home, write N/A.

________________________________________________________________

How did you learn about this survey? If on Facebook, please share the name of the group.

________________________________________________________________
Interview Guide - Birthing Person

Introduction + Logistics

1. Consent to be recorded first.
2. Opportunity to ask questions, confirm consent to participate.
3. Talking about birth can be difficult. We can stop the interview at any time. You will be provided with postpartum mental health resources at the end of the interview.
4. Housekeeping
   a. Using demographic information.
   b. Create and remember pseudonym.
   c. Possible follow-up interviews.
   d. Gift card after the interview – same email?

Section I: Pregnancy and Birth Experience

The first section of the interview focuses on you and your experiences with labor and delivery care as a DC resident.

Before we talk specifically about your birth, I would love to know more about accessing medical care in general in your neighborhood.

Section IA: Before Birth - Neighborhood, Options, and Values

5. When you found out you were pregnant, where did you believe it might be possible for you to give birth? **Follow up on any barriers that come up: location, finance, insurance, health…
   a. [Which of these was your first choice?]
6. Could you share a bit (more) about any values or preferences you may hold about where you would like to give birth?
   a. What might an ideal option have looked like to you?
7. Did anything make it hard or impossible for you to access your preferred birth location?
8. In the final weeks of your pregnancy, where did you intend to give birth?
   a. How did you arrive at this conclusion?
   b. [What factors were most important? Distance?]
   c. What feelings did you experience when planning your birth location?

Section IB: Birth - Experiences and Autonomy

1. During your pregnancy or delivery, were there any changes in where you planned to give birth?
   a. Did you ultimately deliver at the closest facility to your home? Why or why not?
   b. [If not closest] What led you to deliver there instead of at a closer facility?
   c. Tell me more about traveling there while in labor.
2. [Could you elaborate on any barriers that prevented you from accessing your desired birth location?]
3. To what extent do you feel that you had the power to make decisions or choices in where you gave birth?

Section IC: After Birth - Future and Feedback

1. How do you feel about the birthing options for DC residents?
2. [What, if anything, would you like to change?]
3. The new Cedar Hill Regional Medical Center on the old St. Elizabeth’s campus (Alabama Ave SE) is scheduled to open in 2025. Would the new hospital change your plans for a future birth? Why or why not?

Section II: Maps and Reflection

Now that we’ve talked a bit about your birth, we’ll transition to the second section of the interview, which focuses on maps. Maps are a common tool to represent access to labor and delivery care—that is, how easy or hard it is to get the care you need—but they aren’t perfect, and some are a closer match to the real-world situation than others are. I am going to show you a few different ways to measure and display access to labor and delivery care in DC, and I’d love to hear your reflections on them based on your experience.

I want to point out that these maps will focus on access to hospitals because more than 99 percent of DC babies are born in hospital settings, and there are many more hospitals than birth centers in the DC area.

Section IIA: Nearest Neighbor Map

Map 1: One of the simplest ways to represent access is to calculate the distance from any location to the nearest open labor and delivery unit, which looks like this.

5. What are your reactions to this map?
6. What does it tell us?
7. What is it missing?
8. What do you think about the factors considered in this map?

Section IIB: Kernel Density Estimation Map

Map 2: Next, if we want to consider people who live close to multiple facilities to have greater access, so that more options = more access, we get a map like this.

5. What are your reactions to this map?
6. What does it tell us?
7. What is it missing?
8. What do you think about the factors considered in this map?

Section IIC: 2SFCA Map

Map 3: Finally, if we take Map 2 and also try to estimate how “busy” each hospital is by comparing the number of beds to the number of people who live near it, so that more options = more access and less busy options = more access, we get a map like this.

5. What are your reactions to this map?
6. What does it tell us?
7. What is it missing?
8. What do you think about the factors considered in this map?

Section IID: Final thoughts

1. Do you think some of these maps represent access to labor and delivery care better than others? Why?
2. Finally, what else about giving birth in the DC area do you think is important for others to understand?
3. Do you have any questions for me?
DC Birth Places Study - Follow Up

This survey is a follow-up to the interest form you filled out regarding the Investigating Access and Choice among D.C. Birth Settings study. Though you were not randomly selected to complete an interview, this form provides an opportunity to share your experiences and opinions with the study team so that your perspective is represented in the final report.

This research project is being conducted by Avery Borgmann and Xun Shi from the Geography Department at Dartmouth College, Hanover, NH, USA. It explores the places where DC residents give birth and why, as well as barriers that limit their choice of birth setting. The project aims to inform public health interventions in DC, such as the construction of new birth facilities, and to communicate the preferences of DC residents and people who work in maternal health with researchers and public health officials.

You are eligible for this study if: you are a DC resident, 18 years of age or older, gave birth within the last two years (while you were living in DC), and are not currently pregnant.

People interested in improving access to maternal healthcare in DC may want to participate. The risks of participation are minimal and are explained in more depth in the document below. Postpartum mental health resources will be shared at the end of the survey.

Please click the link below to download and review the study information and consent form. Note that the form is different from the form you read when you expressed interest in this study.

Please confirm that you have reviewed the file above and consent to participate in this research. If you do not wish to participate, please exit the survey now.

- I have reviewed the study information and consent form, and I consent to participate.
- I do not consent to participate and wish to end the survey now.

Please confirm that you are eligible for the study because you: are a DC resident, 18 years of age or older, gave birth within the last two years (while you were living in DC), and are not currently pregnant. If you are not eligible, please exit the survey now.

- I am eligible for this study.
- I am not eligible for this study, and the survey will end now.
The following section contains basic questions about you.

What pronouns do you use?

- She/Her
- He/Him
- They/Them
- Other: please write in ________________________________

What is your zip code of residence?

_______________________________
In which ward of DC do you live?

○ Ward 1
○ Ward 2
○ Ward 3
○ Ward 4
○ Ward 5
○ Ward 6
○ Ward 7
○ Ward 8

How do you describe your race and ethnicity? Check all that apply.

☐ White
☐ Black or African American
☐ American Indian or Alaska Native
☐ Asian
☐ Native Hawaiian or Other Pacific Islander
☐ Hispanic or Latino
☐ Other: please write in

____________________________________________________________________

How old are you, in years?

____________________________________________________________________
What is your employment status?

- Full-time
- Part-time
- On parental leave
- Stay-at-home parent
- Student
- None / unemployed
- Other: please write in ________________________________

What is your approximate annual household income at the time you gave birth?

- Less than $10,000
- $10,000 to $14,999
- $15,000 to $24,999
- $25,000 to $34,999
- $35,000 to $49,999
- $50,000 to $74,999
- $75,000 to $99,999
- $100,000 to $149,999
- $150,000 to $199,999
- $200,000 or more
What is your insurance status?

- No insurance
- DC Medicaid (also known as DC Healthy Families Program, DC Health Care Alliance, Immigrants Childrens’ Program, Amerigroup DC, AmeriHealth Caritas DC, or MedStar Family Choice DC)
- Private insurance

In years, how long have you lived in the DC area?

________________________________________________________________

Have you ever lived outside the United States?

- No
- Yes, born outside the United States
- Yes, but born in the United States

How many times have you given birth?

________________________________________________________________

This section asks questions about your most recent birth.

Please select the month and year (NOT the day) of your most recent birth.

(Table Truncated to 63 Columns)

Where did you give birth?

- At home
- At a hospital
- At a free-standing birth center
- Other: please write in ________________________________
Was the hospital labor and delivery ward where you gave birth the closest one to your home?

○ Yes

○ No

Why did you select this hospital instead of the one closest to your home?

How important were the following factors in your decision to deliver where you did? Please drag the sliders below.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Not at all important</th>
<th>Somewhat important</th>
<th>Very important</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment with my preferences, values, and birth plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accepted my insurance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My prenatal care provider delivers there</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health needs or pregnancy complications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reputation among family/friends</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own previous birth experiences</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friendly and/or knowledgeable staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of equipment and facilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location close to my home or convenient for me</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enough space and staffing for me</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I felt safest there</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other: please write in</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In a few sentences, please share more about why you gave birth where you did. If possible, elaborate on any factors you classified as "very important" in the previous questions by writing about why
these factors mattered to you and how they affected your decision.

Which of these factors was the single most important determinant of where you gave birth?

- Alignment with my preferences, values, and birth plan
- Acceptance of my insurance
- Affiliation with my prenatal care provider
- Health needs or pregnancy complications
- Reputation among family/friends
- Own previous birth experiences
- Friendly and/or knowledgeable staff
- Quality of equipment and facilities
- Location close to my home or convenient for me
- Enough space and staffing for me
- I felt safest there
- Other: please write in __________________________________________________

On a scale of 0 to 10, how satisfied are you with the options for birth in the D.C. area?

<table>
<thead>
<tr>
<th>Completely unsatisfied</th>
<th>Completely satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>5 10</td>
</tr>
</tbody>
</table>

How satisfied are you with the options for birth in the D.C. area?

How long, in minutes, did it take you to travel from your home to the place where you gave birth?

________________________________________________________________
How did you travel to the place where you gave birth?

- Own car (belonging to someone in your household)
- Borrowed a car from someone outside your household
- Rideshare (Uber, Lyft, etc)
- Public transportation (bus, Metro, etc)
- Ambulance
- Other: write in __________________________________________________

In a few sentences, please share about your experience traveling to the place where you gave birth. Feel free to use the following questions to get started:

Why did you use the form of transportation you selected above?
What was it like to use this form of transportation?
Did you experience stress or anxiety about transportation to the place where you gave birth?
Did you experience any obstacles or delays in getting to the place where you gave birth?

What, if anything, do you wish were different about giving birth in D.C.?

If there is anything else you would like the study team to know about giving birth as a D.C. resident, feel free to share it here.