Establishing the Analytical Foundation for Intersecting Public Policy and Design Approaches to Improving Infant and Maternal Health Outcomes

Town+Gown, New York City Department of Design and Construction

Rishabh Basu
Emma Kirsten Ferguson
Jordyn Elizabeth Grady

TABLE OF CONTENTS

DICTIONARY

Phrase	Full Form	Description
APR-DRG Weight	All Patient Refined Diagnosis Related Group Weight	APR-DRG weights are numerical values assigned to each APR-DRG category, varying according to APR-DRG severity (a category is for a particular primary service offered to a patient, based on the severity diagnosed) These weights are used as a basis for calculating payments to hospitals.
SPARCS PUF	Statewide Planning and Research Cooperative System Public Use File	SPARCS is a comprehensive all payer data reporting system established in 1979 as a result of cooperation between the healthcare industry and government. The system was initially created to collect information on discharges from hospitals. SPARCS currently collects patient-level detail on patient characteristics, diagnoses and treatments, services, and charges for each hospital inpatient stay and outpatient (ambulatory surgery, emergency department, and outpatient services) visit; and each ambulatory surgery and outpatient services visit to a hospital extension clinic and diagnostic and treatment center licensed to provide ambulatory surgery services.
DME Add-On	Direct Medical Education Add-On	DME payments cover direct expenses associated with residency training, such as resident salaries, overhead, accreditation fees, and faculty supervision.
ALC	Alternate Level of Care	Alternate Level of Care refers to a situation where a patient in a hospital setting no longer requires the intensity of care provided by that specific facility but is awaiting discharge or transfer to a more appropriate care setting.
FFS	Fee-for-service	Under the FFS model, the state pays providers directly for each covered service received by a Medicaid beneficiary.
MMC	Medicaid-managed Care	Under managed care, the state pays a fee to a managed care plan for each person enrolled in the plan. In turn, the plan pays providers for all of the Medicaid services a beneficiary may require that are included in the plan’s contract with the state.
HIPAA	Health Insurance Portability and Accountability Act	Signed into law in 1996, HIPAA is a US law that protects the privacy of health data and gives patients control over their health information.
CD	Community District	Administrative division of New York City
HMO	Health Maintenance Organisation	Type of health insurance plan that typically requires members to choose a primary care physician (PCP) and get referrals from them to see specialists within the plan's network

EXECUTIVE SUMMARY

The landscape of pre-, peri-, and postnatal care in New York City reveals stark disparities in access, funding, and provider distribution. These disparities disproportionately affect boroughs and communities depending on their geography and demographics. This report focuses on pregnancy-related services in New York City, specifically how healthcare facilities receive funding for services and how natal services are provided. This report places emphasis on Medicaid-enrolled providers and Medicaid reimbursements for public healthcare facilities. The intention is, with an understanding of Medicaid funding and demographics, to advise the development of Medicaid-funded alternative birthing facilities for New York mothers who exemplify the greatest need.

A literature review highlights the benefits of providing accessible, equitable, and patient-centered care to mothers from diverse backgrounds. This report focuses on socioeconomic status, race, and education as the dominating factors contributing to maternal and infant health outcomes. Secondly, an evaluation of birth trends in NYC echoes trends nationwide– fewer and fewer babies are being born each year. On average, between 2011 and 2021, the annual rate of decline for all births across NYC was 2.61%. However, this trend is not universal across all birth locations. This evaluation importantly discusses the rise in the share of out-of-hospital births that occur at home, at birth centers, and alternative birthing locations. This contextualizes the evolving birth landscape and its shift away from the heavily medicalized birth model towards more patient-centered care.

Next, an overview of maternity and natal health care providers and facilities identifies the current geographical distribution of providers and the prevalence of midwife-assisted births. This section best provides the knowledge of *where* healthcare services are being provided and *by who.* This overview of healthcare providers reveals a heavier use of midwives in the Southeast Bronx at Jacobi Medical Center and in Borough Park at Maimonides Medical Center– both healthcare facilities with initiatives aimed at improving maternal health outcomes and addressing the inequities often found in natal care. Further discussion adds sociocultural context to the current geographical distribution of healthcare providers and strengthens the literature connecting culturally responsive care to diverse natal needs.

Beyond the provider level, this report then identifies the healthcare facilities providing natal services and details their individual Medicaid funding flows. Most importantly, this section focuses on identifying and visualizing Medicaid reimbursements for *all* of the 36 natal services provided to patients. This section relies on hospital discharge data from 2015 to 2021 to track overall funding, costs, and profit margins for natal services. As seen in *Table 1.1*, which aggregates the financing of all NYC healthcare facilities, Medicaid reimbursements have remained relatively constant. However, the total estimated profit has steadily declined. This imbalance is a dramatic swing from a net profit of $270 million in 2015 to a net loss of $218 million in 2015. The stagnant reimbursement rates and decreasing profit margins indicate a rise in costs unmet by new Medicaid financing. Furthermore, *Table 1.1* reflects the consistent rise of accounting deficits across the same period, rising from $2.1 billion in 2015 to nearly $3.7 billion

in 2021. The growing gap between Medicaid reimbursement and actual costs raises concerns about the long-term sustainability of maternal care, particularly for birth-focused centers that cannot subsidize their losses with the Medicaid reimbursement received for non-natal services.

Table 1.1: Capital and Medicaid Reimbursement Annual Summary

Year	Total Capital Reimbursement (in millions)	Total Reimbursement (in millions)	Total Estimated Profit (in millions)	Accounting Gap (in millions)
2015	$193.7	$1,499.9	$270.7	-$2,124.1
2016	$238.7	$1,558.9	$293.9	-$2,172.4
2017	$195.5	$1,408.7	$128.2	-$2,474.6
2019	$186.9	$1,484.1	$111.6	-$3,081.9
2020	$163.3	$1,289.5	-$48.5	-$3,225.4
2021	$189.3	$1,355.8	-$218.7	-$3,695.4

Next, a multidimensional index was constructed to evaluate community level natal care needs. This tool enables future projects to target high-need neighborhoods with high potential to benefit from patient-centered, low-risk, community-based natal care. Drawing from the qualitative research, which included public health data, policy documents, and maternal outcome reports, six key factors were identified as central indicators of maternal health needs: race, maternal education level, household income, Medicaid coverage, access to prenatal care, and total births per district. Altogether, these subindices create a multidimensional report that weighs each factor based on its demonstrated impact in both empirical studies and public health frameworks. This approach attempts to ensure that areas facing both high disparities and high birth volumes are prioritized for intervention, offering a data-driven path toward equitable maternal health.

Lastly, this report introduces a case study on the neighborhood identified by an aggregated multiindex as demonstrating the most need between 2015 and 2021: Borough Park, Brooklyn. The social, cultural, and religious character of Borough Park directly contributes to the high quantity of births observed, in addition to the heavy use of midwives at Maimonides Medical Center. This case study weaves a narrative through the quantitative data previously discussed in the report. Overall, it is the intention that this report serves as an analytical framework for understanding natal care financing, services, and needs across NYC. The report accomplishes this goal through its data analysis, by presenting existing qualitative literature, and by providing a data-driven tool for measuring community level needs.

LITERATURE REVIEW

The United States spends more on maternity care than most developed countries, yet maternal and infant health outcomes continue to lag behind.[1] This has prompted renewed attention to alternative models of care that prioritize the needs, experiences, and agency of pregnant women. Community-based, patient-centered care has emerged as a revolutionary framework for improving outcomes and rebuilding trust in maternal health. This section will review literature that highlights the benefit of these models by addressing their ability to overcome systemic barriers, improve birth outcomes, and empower women through culturally-competent, relationship-focused care.

Reframing Birth in the U.S.

The predominant obstetric model in the United States prioritizes efficiency, risk management, and physician control. Birthing practices in the U.S. have been critiqued as reflecting a capitalist system that prioritizes efficiency and profit over patient autonomy and shared-decision making.[2] Women are often uninformed of the range of birthing options available and instead opt for hospital-based, intervention-heavy care that may not align with their values or personal needs.[3] However, alternative pregnancy and birthing models center the patient by encouraging autonomy and shared decision-making and acknowledging the physical, emotional, and social needs that shape pregnancy and birth.

The Community-Based, Patient-Centered Approach

Community-based, patient-centered care is characterized by accessibility, continuity, cultural-responsiveness, and shared decision making. Compared to traditional OB GYN visits, which are typically 16 minutes or less, midwifery and birth center care models are more holistic and more apt to address complex needs.[4] One patient described her experience at a birth center by saying, "[The midwives] empower you to make your own decisions. They educate you and let you do what you feel is best".[5] These models humanize care by building trust and communication.

Midwives and other community-based providers operate in care models designed to address gaps in the traditional health system, particularly for Medicaid-enrolled patients and underserved populations. These models emphasize continuum of care, extended visit times, and culturally appropriate communication. Recognizing this, many state Medicaid programs have expanded covered prenatal services. New York State Medicaid now reimburses doula services,

---

[1] Brigette Courtot et al., "Midwifery and Birth Centers under State Medicaid Programs: Current Limits to Beneficiary Access to a High-Value Model of Care," The Milbank Quarterly 98, no. 4 (December 2020): 1095, https://doi.org/10.2307/48602837.
[2] Michelle Panazzolo and Ritchlyn Mohammed, "Birthing Trends in American Society and Women's Choices," Race, Gender & Class 18, no. 3/4 (2011): 269, https://doi.org/10.2307/43496848.
[3] Ibid.
[4] Brigette Courtot et al., "Midwifery and Birth Centers under State Medicaid Programs."
[5] Ibid. 1100.

covering up to 8 perinatal visits and 1 labor-and-delivery encounter per pregnancy for Fee-for-Service (FFS) members and Medicaid Managed Care (MMC) plans as of April 1, 2025.[6]

However, structural challenges remain. Inadequate reimbursement rates and outdated billing practices have limited the ability of birth centers to serve Medicaid beneficiaries to meet population-level demand.[7] Despite evidence that birth centers deliver high-quality care at lower cost, current systems prioritize hospital-based, physician-attended births.[8] This makes it difficult to fully integrate community-based models into the broader maternal health infrastructure.

Better Birthing Outcomes

The Strong Start for Mothers and Newborns evaluation, one of the most comprehensive studies of birth center care in the U.S., shows that women who receive care at midwifery-led birth centers consistently have better outcomes, including fewer preterm births, lower rates of low birthweight, and reduced likelihood of cesarean delivery, even when risk factors are accounted for.[9] Additional research on freestanding birth health centers (FBHCs) reinforces this. Women who received care at FBHCs were significantly less likely to experience obstetric interventions such as c-sections, instrumental deliveries, and continuous electronic fetal monitoring. Moreover, they were more likely to carry pregnancy to full term, which decreases neonatal risk.[10] These studies offer compelling evidence that community-based, patient-centered care is effective and essential to improving maternal and infant health outcomes.

Patient satisfaction also increases with these models. The combination of longer visits, emotional support, and a culturally safe environment makes women feel seen, heard, and respected. Patient-centered maternity care has been shown to foster stronger relationships and reduced reported discrimination.[11] In fact, the rise in doula care stems, in part, from broader feminist action to reclaim birth as autonomous, embodied knowledge, citing the "medicalization of birth in the hospital setting as patriarchal and disempowering".[12]

Bridging the Gaps

Community-based care also directly addresses the structural failures of the existing maternity system. For many women, barriers such as lack of provider trust, language barriers,

---

[6] New York State Department of Health, "Doula Services Information for Medicaid Members," Ny.gov, 2024, https://www.health.ny.gov/health_care/medicaid/program/doula.

[7] Brigette Courtot et al., "Midwifery and Birth Centers under State Medicaid Programs."

[8] ibid., 1104.

[9] The Strong Start evaluation found that Medicaid beneficiaries receiving care at birth centers had significantly improved health outcomes compared to a risk-matched control group with standard care. ibid., 1105-1108.

[10] Sarah Benatar et al., "Midwifery Care at a Freestanding Birth Center: A Safe and Effective Alternative to Conventional Maternity Care," Health Services Research 48, no. 5 (October 2013): n/a-n/a, https://doi.org/10.1111/1475-6773.12061.

[11] Laura Attanasio and Katy B Kozhimannil, "Patient-Reported Communication Quality and Perceived Discrimination in Maternity Care," Medical Care 53, no. 10 (2015): 863, https://doi.org/10.2307/26418059.

[12] Monica Basile, "Radical Doulas, Childbirth Activism, and the Politics of Embodiment." In Body Battlegrounds: Transgressions, Tensions, and Transformations, edited by Chris Bobel and Samantha Kwan, 24. Vanderbilt University Press, 2019. https://doi.org/10.2307/j.ctv16759ws.6.

and geographic disparities reduce their ability to access quality care. Midwives and doulas often fill these gaps, particularly when hospitals have restrictive access and blanket protocols. As a result, women are choosing home birth because they "never gained sufficient control within hospitals to replace the active medical management of a passive 'diseased patient with a more holistic, wellness model that stresse[d] self-responsibility, family involvement, and minimal medical intervention."[13] Community-based care offers that alternative.

Despite these benefits, barriers to implementation remain. Insurance systems undervalue non-physician providers and reimbursement for birth centers has been cited as inadequate and inconsistent.[14] These challenges highlight the disconnect between evidence-supported alternatives and the priorities of the current healthcare system.

Conclusion

In conclusion, the research overwhelmingly supports the value of community-based, patient-centered maternity care, specifically in populations historically underserved by the traditional healthcare system. Birth centers demonstrate improved health outcomes, higher patient satisfaction, and prioritize maternal autonomy. Despite structural and financial barriers, these models offer a solution to the United States medicalization of maternity care. As one author notes, if birth centers were more widely available, "more women would realize the various advantages and disadvantages of the birthing practices they choose."[15] Expanding access to community-based, patient-centered birthing centers would positively impact access, dignity, and outcomes for mothers.

[13] Christa Craven, "The Birth of Consumer Activism for Midwives: From the Natural Childbirth Movement to Recent Legislative Efforts." In Pushing for Midwives: Homebirth Mothers and the Reproductive Rights Movement, 44. Temple University Press, 2010. http://www.jstor.org/stable/j.ctt14bt93k.7.
[14] Brigette Courtot et al., "Midwifery and Birth Centers under State Medicaid Programs."
[15] Michelle Panazzolo and Ritchlyn Mohammed, "Birthing Trends in American Society and Women's Choices."

MATERNITY AND NATAL HEALTH CARE PROVIDERS AND FACILITIES

The objective of this section is to model the geographic landscape of maternal and infant Medicaid-enrolled providers. Additionally, this analysis determines current birth trends of New York City mothers and their location preferences for care. By understanding the current options for care in conjunction with natal care accessibility, areas of need can be addressed. These determinations allow for systematic understanding of the birth landscape in terms of current trends, access, and unrecognized need.

Current Birth Trends

Nationwide, the birth rate is steadily declining. Between 2020 and 2023, the number of New Yorkers under the age of 20 declined by 9%, or more than 186,000 people.[16] While it's challenging to pin-point the exact factors contributing to this decline, researchers theorize that this trend is a result of increasing economic pressures and demographic shifts. In urban areas especially, young Americans are having fewer children and later in life in response to shifting societal expectations and financial demands.[17]

From *Figure 2.1*, we see that the aggregate number of births in NYC declines steadily from 2011 to 2021, at an average annual decline of 2.61%. In 2011, just over 113,000 babies were born. In 2021, this number was only around 87,000 babies– a dramatic decline of 23% in just a 10-year period.

[16] Winnie Hu and Troy Closson, "New York City Has 186,000 Fewer Children and Teens Than It Did in 2020," *New York Times*, June 27, 2024. https://www.nytimes.com/2024/06/27/ny.

[17] George Martine, Jose Eustaquio Alves and Suzana Cavenaghi, "Urbanization and Fertility Decline: Cashing in on Structural Change," *International Institute for Environmental Development*, December, 2013. 10653IIED.pdf.

Figure 2.1: Total Births Per Year in NYC, with Annual Percentage Rate of Change (2011-2021)

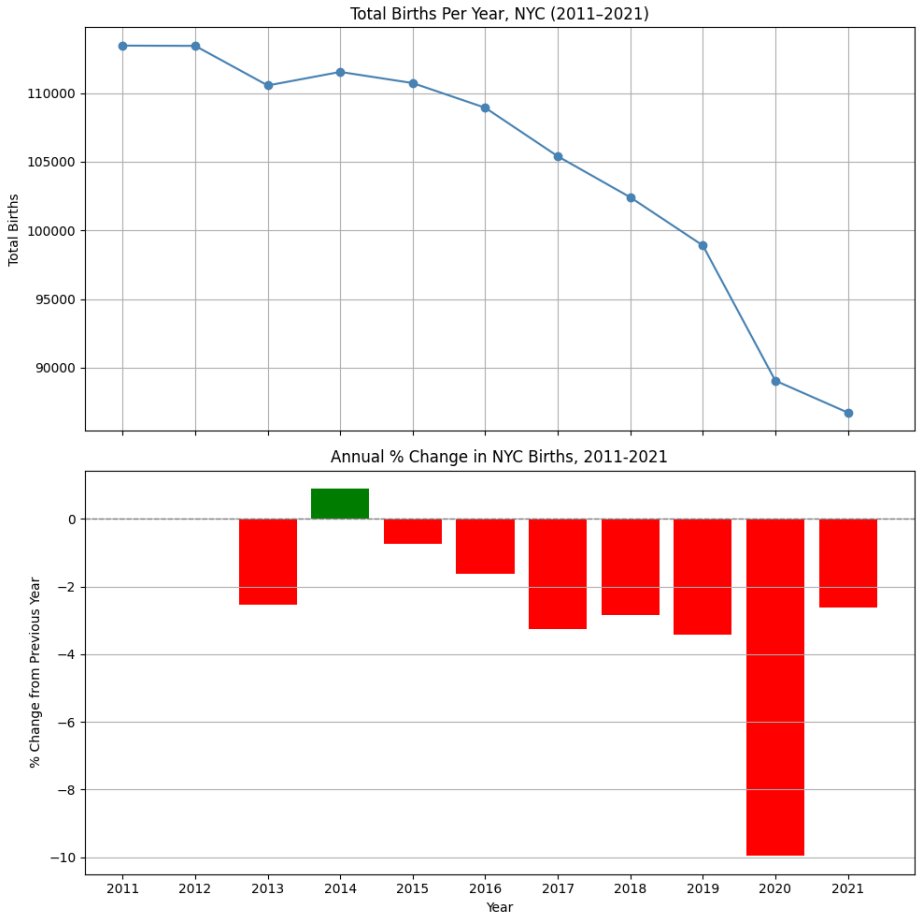


Figure 2.1 aggregates the quantity of births reported to have occurred at non-voluntary hospitals, municipal hospitals, at home, at birthing centers, and at unspecified alternative birthing locations. Although *Figure 2.1* suggests an overall decline in births, and is therefore discouraging to a project aiming to expand childbirth facilities, disaggregating the reported births in NYC by birthing location reveals the decline is impacting births that occur in hospital facilities. In *Figure 2.2a*, it is clear that the births occurring at home, in birth centers, and other locations remain relatively stable between 2011 and 2021. In fact, in *Figure 2.2b,* it is evident that the proportion of births occurring outside of hospitals has increased in recent years.

Figure 2.2a: Total Non-Hospital Births in NYC, 2011-2021

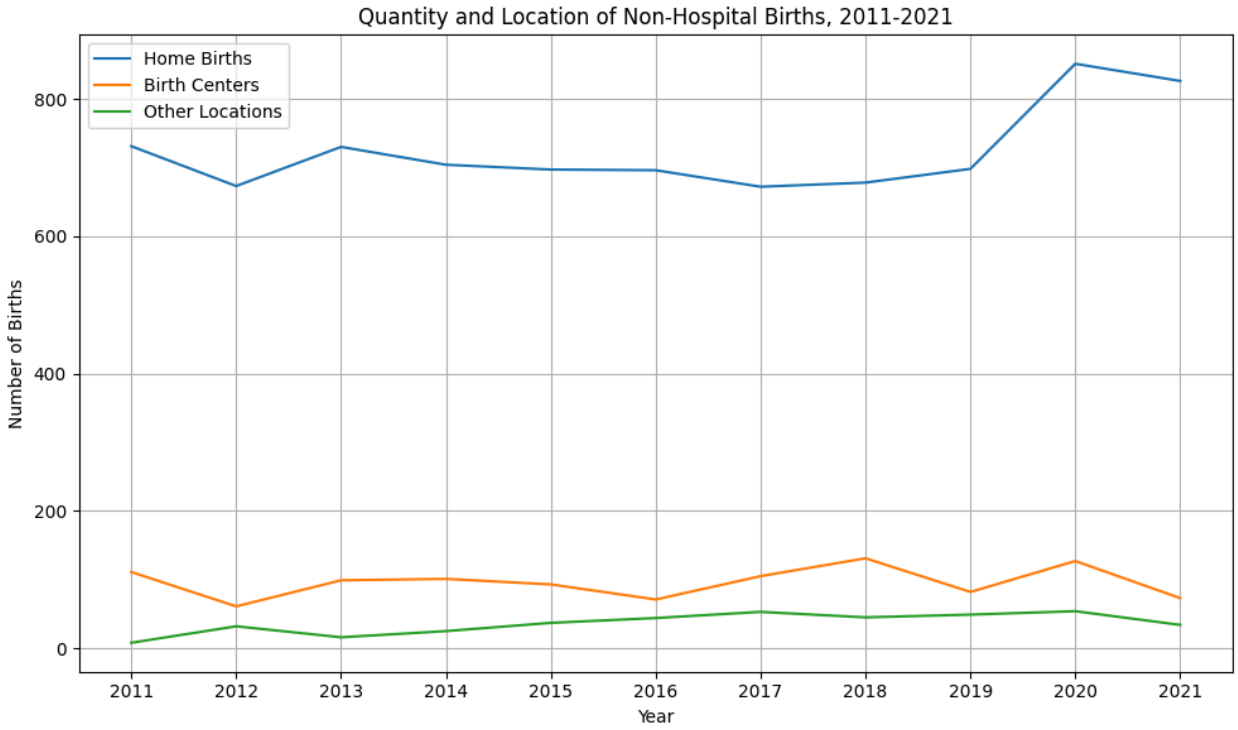
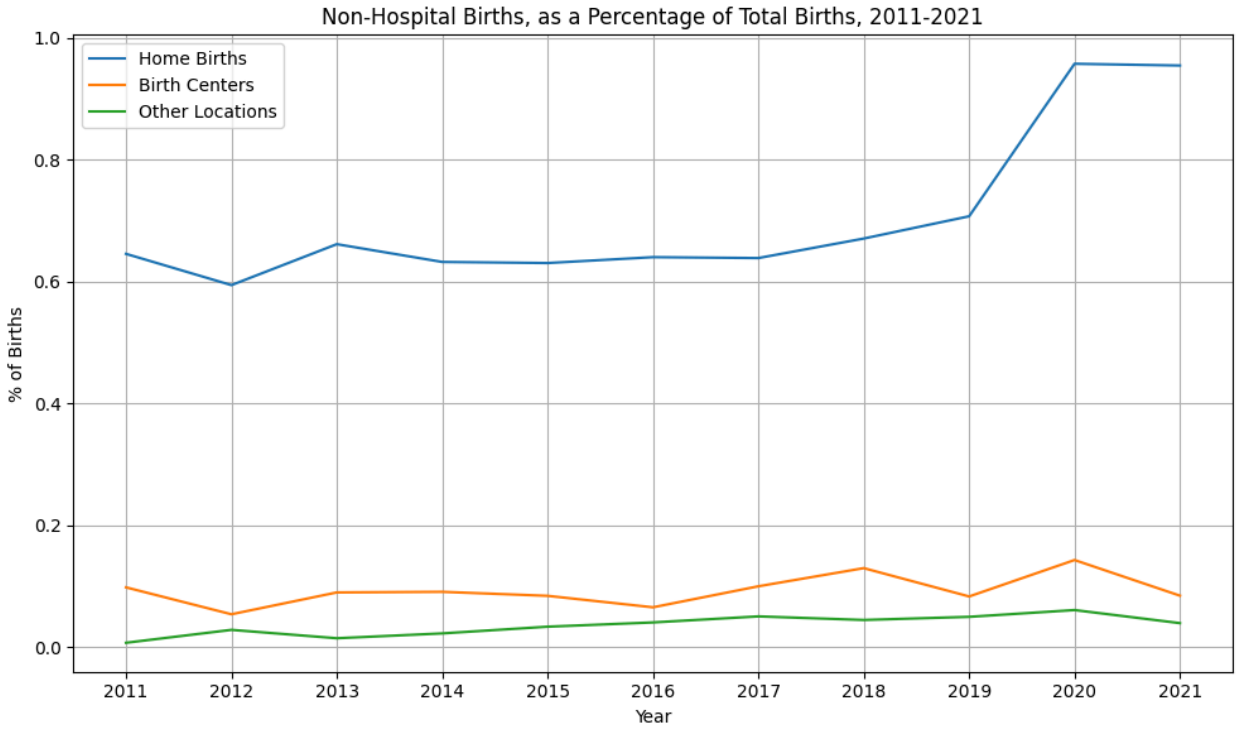


Figure 2.2b: Non-Hospital Births in NYC as a Percentage of Total Births, 2011-2021



Although this data is preliminary and data from the past 4 years is necessary to assert whether or not there is a rising trend, this data improves our confidence that more New Yorkers are opting for out-of-hospital births. Theoretically, this shift may reflect an increased interest in personalized, low-intervention care models which are often associated with midwife-led births, birthing centers, or home births. It may also stem from mistrust in hospital environments, particularly among communities who have historically faced disrespect and misrepresentation in medical settings.

Births Attended by Midwives

Table 2.1 reveals that licensed midwives are significantly underrepresented in many NYC hospital settings. Only a few hospitals report high rates of births attended by midwives. The most notable being Jacobi Medical Center (58.24%), for the highest percentage of births attended by midwives. Maimonides Medical Center, located near Borough Park, notably reports 22.2% of births attended by midwives with 1,472 cases. Many other major institutions either report negligible percentages or none at all.

As is evident in *Table 2.2a*, the Southeast Bronx neighborhood consists of 85 midwives, which is nearly 18% of the city's total. It is the most focused neighborhood for midwifery care in New York City with an over 10% higher count of midwives than any other neighborhood in the city. The high proportion of midwives in the Southeast Bronx is reflective of the intentional investment in community-based maternal care that providers and community members have advocated for in this historically underserved area.[18]

The Southeast Bronx is home to the Jacobi Medical Center which reports the highest percentage of births attended by licensed midwives (58.24%) among all NYC hospitals with a total of 993 midwife attended births *(see Table 2.1)*. Jacobi has long been involved in initiatives aimed at reducing maternal complications and improving birth equity, particularly for Medicaid-eligible populations. In this context, Jacobi's emphasis on midwifery and culturally responsive care plays a critical role in addressing both the clinical and structural contributors to maternal health disparities. Thus, it is unsurprising that Southeast Bronx is the neighborhood with the city's highest concentration of Medicaid-enrolled midwives *(see Map 2.2b and Table 2.2a)*. This convergence of provider density, public health alignment, and hospital mission helps explain Southeast Bronx's unusually high reliance on midwifery care.

Additionally, Maimonides Medical Center, located in Borough Park notably reports 22.2% of births as attended by midwives. This connection between non-hospital birthing access and midwife-led care deserves greater attention for expanding maternal health options.

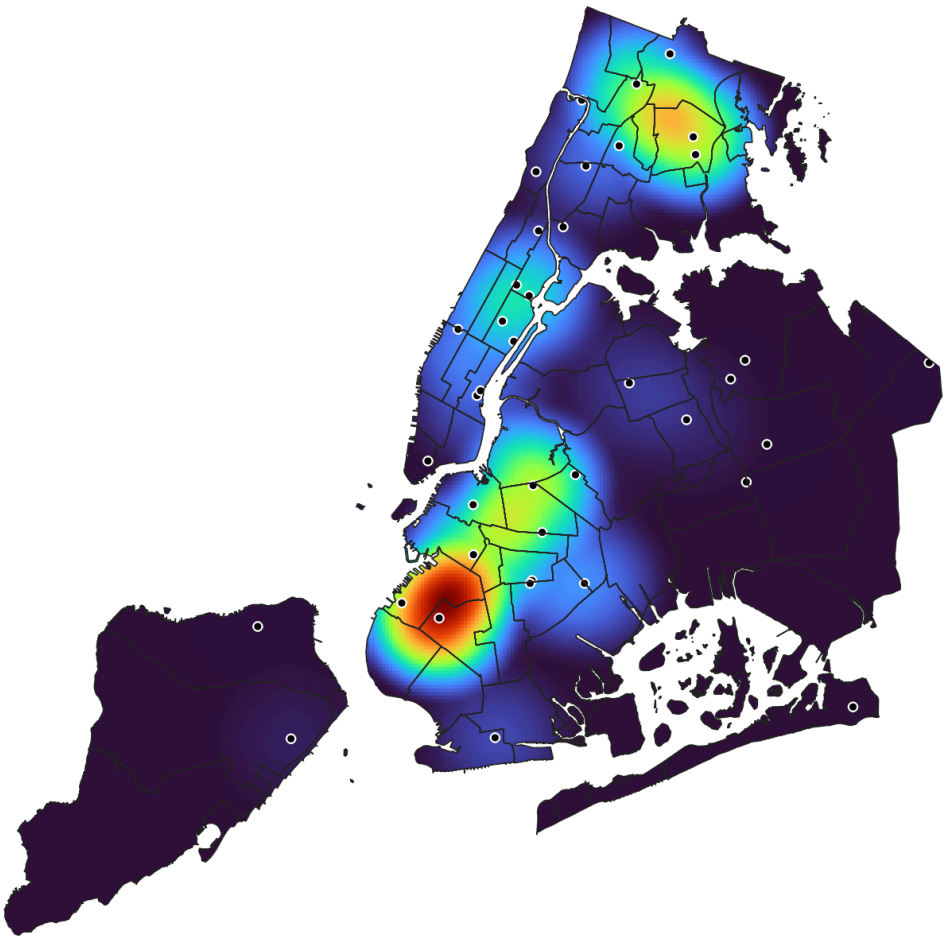
[18] Recently, Montefiore received a $5.4 million grant to expand maternal health programs in the Bronx which further highlights the growing investment in alternative and community-based models of care in the region. This grant supports CenteringPregnancy programs, which is a holistic group-support prenatal care model that aligns well with the borough's high concentration of midwives. Sadie Brown, "Montefiore Receives $5.4M To Fund Bronx Maternal Health Programs," published September 13, 2024. https://www.bxtimes.com.

Table 2.1: Births Attended to By a Licensed Midwife, by NYC Healthcare Facility

Facility Name	Births Attended by a Licensed Midwife	Percentage of All Births at Facility
BELLEVUE HOSP CTR	185	15.69%
BRONXCARE HOSP CTR	132	7.67%
BROOKDALE HOSP MED CTR	285	46.27%
BROOKLYN HOSP CTR - DOWNTOWN CAMPUS	0	0.00%
ELMHURST HOSP	86	4.84%
ELMHURST HOSP CTR	86	4.84%
FLUSHING HOSP	0	0.00%
FLUSHING HOSP MED CTR	0	0.00%
HARLEM HOSP CTR	0	0.00%
INTERFAITH MED CTR	n/a	n/a
JACOBI MED CTR	993	58.24%
JAMAICA HOSP	0	0.00%
JAMAICA HOSP MED CTR	0	0.00%
KINGS COUNTY HOSP CTR	92	7.48%
LENOX HILL HOSP	26	0.62%
LINCOLN MED & MENTAL HEALTH CTR	3	0.21%
LONG ISLAND JEWISH - FOREST HILLS	53	2.73%
LONG ISLAND JEWISH MED CTR	3	0.04%
MAIMONIDES MED CTR	1472	22.20%
METROPOLITAN HOSP CTR	326	36.79%
MONTEFIORE MED CENTER - EINSTEIN CAMPUS	0	0.00%
MONTEFIORE MED CTR - WAKEFIELD	1	0.08%
MOUNT SINAI - BETH ISRAEL	223	3.17%
MOUNT SINAI - MORNINGSIDE	205	4.88%
NY PRESBYTERIAN - ALLEN HOSP	17	0.81%
NY PRESBYTERIAN - BROOKLYN METHODIST HOSP	810	17.36%
NY PRESBYTERIAN - HOSP COLUMBIA PRESBYTERIAN CTR	0	0.00%
NY PRESBYTERIAN - HOSP NY WEILL CORNELL CTR	20	0.27%
NY PRESBYTERIAN - LOWER MANHATTAN HOSP	1	0.05%
NY PRESBYTERIAN - QUEENS	2	0.10%

NYU LANGONE MED CTR	1	0.02%
QUEENS HOSP CTR	2	0.17%
RICHMOND UNIV MED CTR	2	0.07%
ST JOHNS EPISCOPAL HOSP	0	0.00%
STATEN ISLAND UNIV HOSP	34	1.23%

Map 2.1: Heatmap of Births Attended to By a Licensed Midwife, by NYC Healthcare Facility



Providers in NYC

From *Table 2.2a,* it is evident that the number of midwives and OBGYNs in Southeast Bronx far exceeds the number of midwives and OBGYNs in the neighborhood that is the closest second. We see the highest number of doulas, on the other hand, in Borough Park and Canarsie and Flatlands.

There are a total of two neighborhoods with no Medicaid-enrolled midwives (Central Queens and Southwest Brooklyn), and a total of eight with no Medicaid-enrolled doulas (Chelsea and Clinton, Lower Manhattan, Mid-Island, Northeast Queens, Southwest Brooklyn, Stapleton and St. George, Sunset Park, Upper East Side). Kingsbridge and Riverdale has only one OBGYN, and along with Northeast Queens, has only a net total of five providers each.
In this regard, both Southwest Brooklyn and Southeast Bronx are interesting studies, the one with no Medicaid-enrolled midwives or doulas - and the other with the most Medicaid-enrolled midwives and OBGYNs.

These disparities reinforce long standing inequities in healthcare access, often aligning with socioeconomic, racial, and infrastructural divides.

Table 2.2a : No. of providers in NYC by Neighborhood

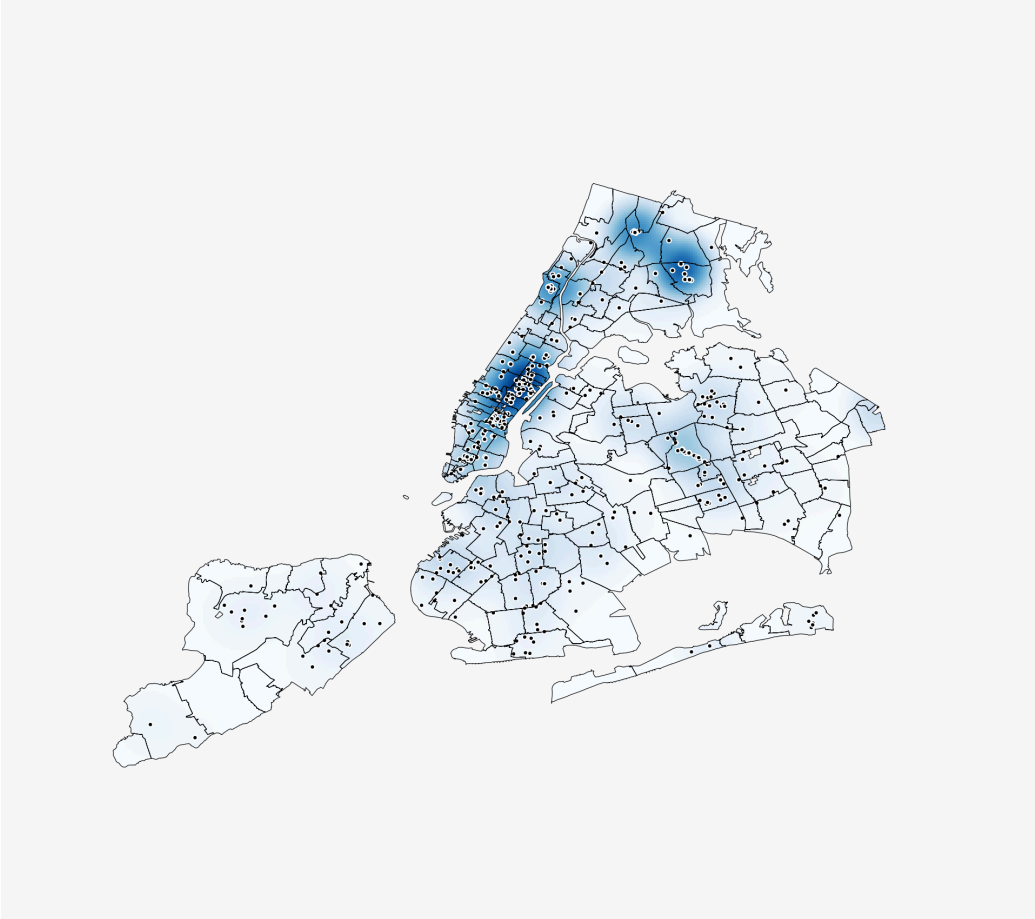
Neighborhood	No. of OBGYNs	No. of midwives	No. of doulas	TOTAL
Borough Park	24	14	10	48
Bronx Park and Fordham	117	12	2	131
Bushwick and Williamsburg	28	26	4	58
Canarsie and Flatlands	9	4	10	23
Central Bronx	41	25	2	68
Central Brooklyn	24	21	8	53
Central Harlem	3	2	4	9
Central Queens	12	0	1	13
Chelsea and Clinton	63	6	0	69
East Harlem	64	24	3	91
East New York and New Lots	8	4	2	14
Flatbush	45	20	3	68
Gramercy Park and Murray Hill	88	23	2	113
Greenpoint	5	4	1	10
Greenwich Village and Soho	21	8	1	30
High Bridge and Morrisania	13	9	1	23
Hunts Point and Mott Haven	4	6	1	11
Inwood and Washington Heights	107	12	3	122
Jamaica	26	16	7	49

Kingsbridge and Riverdale	1	1	3	5
Lower East Side	30	10	2	42
Lower Manhattan	27	10	0	37
Mid-Island	13	2	0	15
North Queens	47	3	1	51
Northeast Bronx	10	11	2	23
Northeast Queens	4	1	0	5
Northwest Brooklyn	53	21	5	79
Northwest Queens	13	9	5	27
Port Richmond	4	1	4	9
Rockaways	22	11	4	37
South Shore	19	1	3	23
Southeast Bronx	159	85	3	247
Southeast Queens	4	1	3	8
Southern Brooklyn	18	18	1	37
Southwest Brooklyn	9	0	0	9
Southwest Queens	42	10	4	56
Stapleton and St. George	28	5	0	33
Sunset Park	43	20	0	63
Upper East Side	120	1	0	121
Upper West Side	14	5	2	21
West Central Queens	71	8	1	80
West Queens	34	16	2	52
TOTAL	**1487**	**486**	**110**	**2083**

Table 2.2b: No. of providers in NYC by Borough

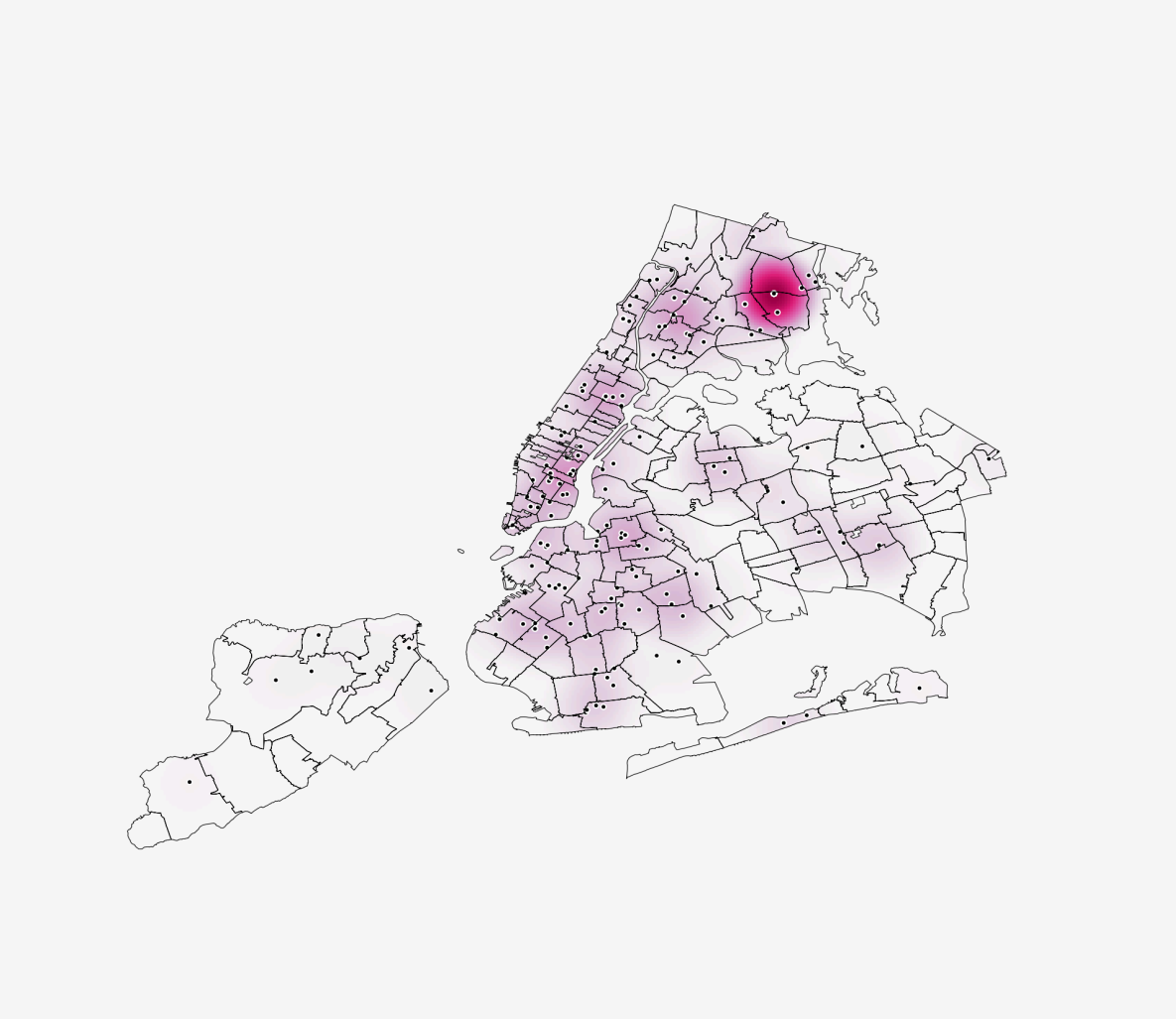
Borough	No. of OBGYNs	No. of midwives	No. of doulas	TOTAL
Bronx	345	149	14	508
Brooklyn	266	152	44	462
Manhattan	537	101	17	655
Queens	275	75	28	378
Staten Island	64	9	7	80
TOTAL	**1487**	**486**	**110**	**2083**

Map 2.2a: Density Heatmap of OB GYN Providers



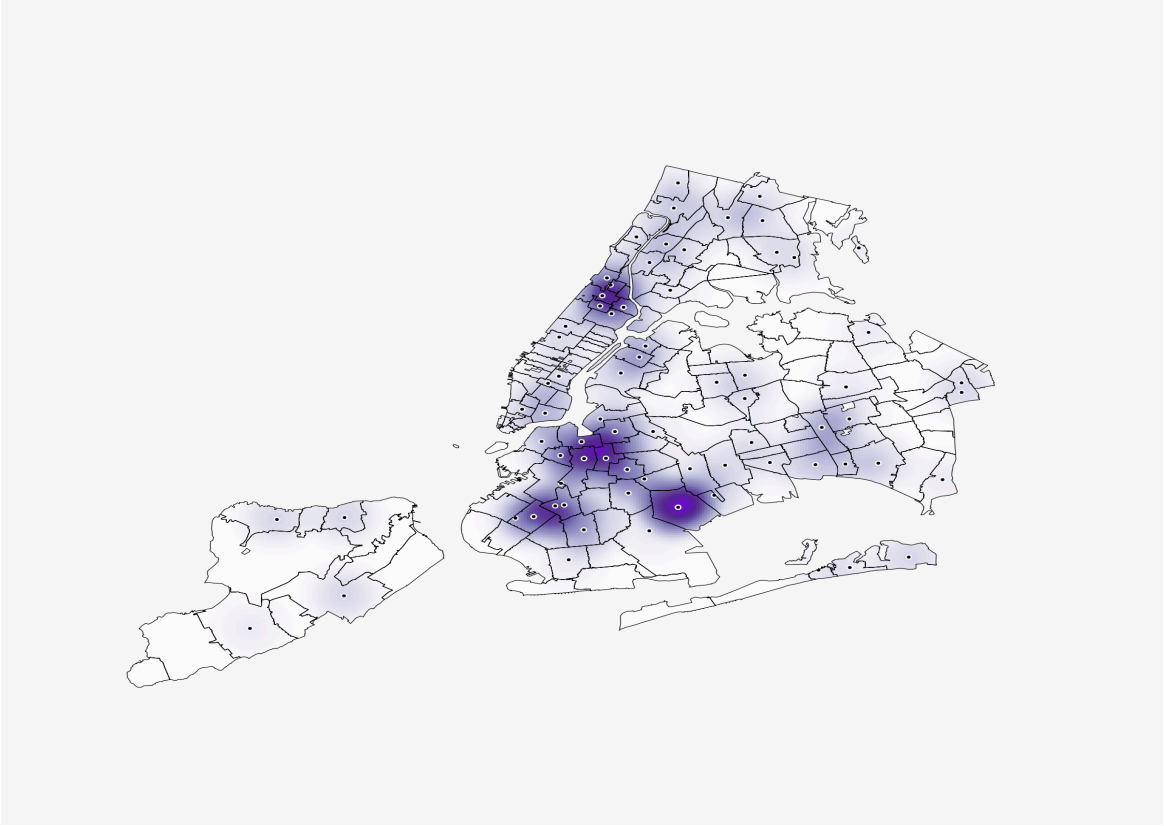
Map 2.2a shows the density distribution of OB GYN providers across New York City, with the highest concentrations in Manhattan and parts of the Bronx, while Staten Island and southeastern Queens show significantly lower provider density.

Map 2.2b: Density Heatmap of Licensed Midwives



Map 2.2b displays a density heatmap of licensed midwives in New York City, indicating a notable concentration in the Southeastern Bronx.

Map 2.2c: Density Heatmap of Licensed Doulas



Map 2.2c presents a density heatmap of licensed doulas in New York City, showing the highest concentrations in Brooklyn.

Disparities in Access by Geography

Tables 2.2a and *2.2b*, along with *Maps 2.2a–2.2c*, highlight disparities in the distribution of maternal health providers across neighborhoods and boroughs. While Manhattan holds the highest number of the city's OBGYNs, it has relatively fewer midwives and doulas. In contrast, Brooklyn leads in doula availability and the Bronx, despite systemic healthcare underfunding, holds the highest number of Medicaid-enrolled midwives.

From *Table 2.2b*, we can see that there is a significant disparity between the number of midwives, OBGYNs and doulas across all five boroughs. 40% of the city's doulas are enrolled in Brooklyn alone; Queens only records roughly 15% of the city's midwives, while the Bronx, Brooklyn and Manhattan have 20-30% each; and over 35% of the City's OBGYNs are in Manhattan, while the Bronx, Brooklyn and Queens each record only 18-23% of them. Staten Island is, on the other hand, universally underserved by midwives, doulas and OBGYNs alike.

Non-Hospital Facility Availability

As shown in *Table 2.3*, non-hospital birth facilities are most concentrated in Brooklyn and Queens, each with 63 such sites. The Bronx has fewer than half that number, even though areas like the Southeast Bronx demonstrate significant interest in midwife-led care. This geographic imbalance suggests a disconnect between community demand and infrastructure investment. In boroughs where midwifery services are already active and culturally relevant, the shortage of non-hospital birthing options lacks resolve.

As shown in *Table 2.2a*, neighborhoods like Southeast Bronx that have 247 total providers reflects more than demographics, but is a reflection of institutional investment and policy prioritization. From *Table 2.2b*, the Bronx has roughly 25% of Medicaid-enrolled natal providers overall. However, from *Table 2.3*, the Bronx only 22 has non-hospital facilities whereas Brooklyn and Queens have 63, this being the difference between 11% and over 30% of the total non-hospital facilities. Meaning, places with disparate numbers of providers do not have the structure to accommodate the health needs of their patients. These disparities call for alternative strategies and culturally competent, community-rooted maternal health models that can meet families where they are.

Table 2.3: No. of Non-Hospital Facilities by Borough

Borough	**No. of Facilities**
Bronx	22
Brooklyn	63
Manhattan	41
Queens	63
Staten Island	14
TOTAL	**203**

Significance

These findings have both policy and programmatic implications. First, the increase in demand for non-hospital births demonstrated in *Figure 2.2b* indicates the need for investment in Medicaid-covered community-based birth centers. Second, the uneven geographic distribution of midwives, doulas, and facilities means that birthing choice is restricted by geographic area which ultimately undermines equity goals in maternal care.

Efforts to expand access to midwifery and doula services must take into account both provider availability and the infrastructure needed to support them, especially in boroughs like the Bronx where the demand of services outpaces the availability of facilities to support them.

MEDICAID FUNDING

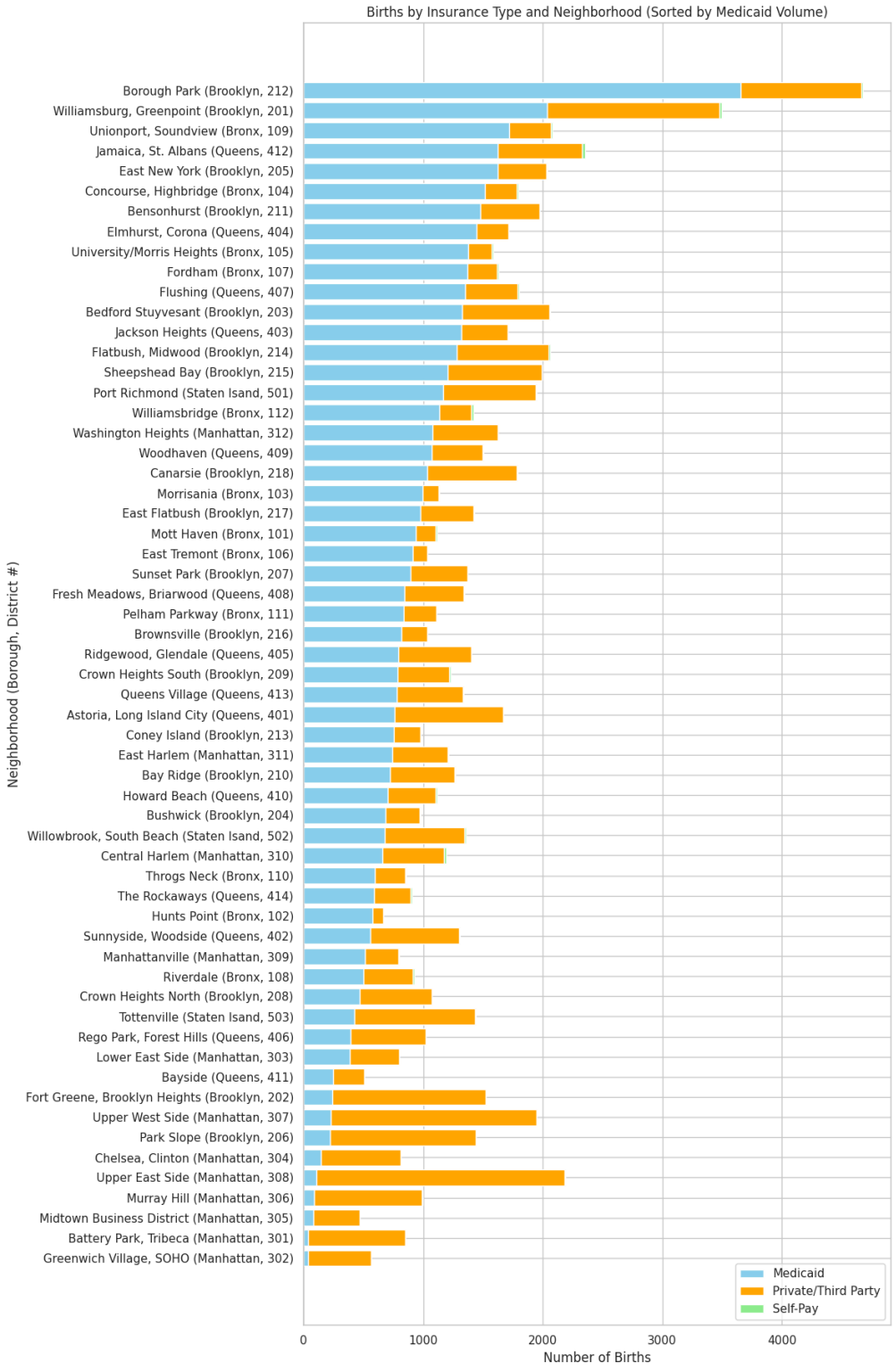
Health financing is the backbone of healthcare provision. Therefore, to adequately understand how services are provided and to whom, it is integral to evaluate insurance coverage and provider reimbursements. With this foundation, we can reveal funding and coverage gaps, issues of health inequity, potential barriers to healthcare access, and existing community needs. This section will briefly discuss the amount of births covered by insurance types before delving into Medicaid financing for natal services. This discussion will include calculations for city-wide Medicaid reimbursement by facility for all natal services and standard vaginal deliveries.

Medicaid-Enrolled Births

In 2021, across NYC, 59.45% (51,564) of births were reimbursed by Medicaid, 38.93% (33,765) of births were reimbursed either by private insurance or by the Health Maintenance Organization (HMO), and 0.41% (353) of births were paid for out-of-pocket. *Figure 3.1a* and *Figure 3.1b* display quantities of births paid by each insurance type designation, sorted by total births paid for by Medicaid. As shown in the figures, the distribution of Medicaid-enrolled mothers varies significantly across community districts. Not only does this data indicate a diverse landscape of healthcare needs, but it also suggests that healthcare financing is geographically dependent.

Figure 3.1a: No. of Births Paid by Insurance Type, by Borough (2021)

Figure 3.1b: No. of Births Paid by Insurance Type, by Neighborhood (2021)



Methodology for Medicaid Funding Analysis

Medicaid fee-for-service (FFS) reimbursement for inlier payments (discharges) is made up of several components (MMC reimbursements work in a different manner) :

1. Service Component
2. Educational Component - DME (Direct Medical Education) Add-On
3. Capital Component
4. ALC (Alternate Level of Care) Component
5. Surcharge (if applicable) - paid out if the provider signed authorization for Medicaid direct payment of surcharge to the pool administrator.

Components 2 to 4 vary by facility and year. Component 1 varies by service, facility and year. Every year, initial facility rates for Medicaid are published on January 1, which may be revised later in the year once or more.

From 2015 to 2021, Medicaid rates were established and revised as follows *(see appendix I)* :

2015 : Initial rates - January 1, Revised rates - April 1

2016 : Initial rates - January 1, Revised rates - No revisions

2017 : Initial rates - January 1, Revised rates - April 1

2019 : Initial rates - January 1, Revised rates - No revisions (for FFS rates)

2020 : Initial rates - January 1, Revised rates - April 2

2021 : Initial rates - January 1, Revised rates - October 1, December 1 (Managed Care only)

The rates that were in existence for the majority of each year were used in the calculations. Data for the ALC component (component 4) received by individual patients is protected under HIPAA, and we were unable to find whether or not a hospital is due to receive a Medicaid surcharge (component 5). Therefore, for ease of calculation, we assumed components 4 and 5 to be non-existent across all facilities.

The SPARCS data sets designate 36 natal service categories eligible for Medicaid reimbursements in New York State:

I. Pelvic evisceration, radical hysterectomy & other radical GYN procs
II. Cesarean delivery
III. Vaginal delivery w sterilization &/or D&C
IV. Vaginal delivery w complicating procedures exc sterilization &/or D&C
V. Vaginal delivery
VI. Postpartum & post abortion diagnoses w/o procedure
VII. Other antepartum diagnoses
VIII. Neonate, transferred <5 days old, not born here
IX. Neonate, transferred < 5 days old, born here
X. Neonate w ECMO

XI. Neonate birth weight <1500 g w major procedure
XII. Neonate birth weight <500g or GA <24 weeks
XIII. Neonate birth weight 500-749g w/o major procedure
XIV. Neonate birth weight 750-999g w/o major procedure
XV. Neonate bwt 1000-1249g w resp dist synd/oth maj resp or maj anom
XVI. Neonate birth weight 1000-1249 g w or w/o other significant condition
XVII. Neonate birth weight 1250-1499 g w resp dist synd/oth maj resp or maj anom
XVIII. Neonate birth weight 1250-1499 g w or w/o other significant condition
XIX. Neonate birth weight 1500-2499 g w major procedure
XX. Neonate birth weight 1500-1999 g w major anomaly
XXI. Neonate birth weight 1500-1999 g w resp dist synd/oth maj resp cond
XXII. Neonate birth weight 1500-1999 g w congenital/perinatal infection
XXIII. Neonate birth weight 1500-1999 g w or w/o other significant condition
XXIV. Neonate birth weight 2000-2499 g w major anomaly
XXV. Neonate birth weight 2000-2499 g w resp dist synd/oth maj resp cond
XXVI. Neonate birth weight 2000-2499 g w congenital/perinatal infection
XXVII. Neonate birth weight 2000-2499 g w other significant condition
XXVIII. Neonate birth weight 2000-2499 g, normal newborn or neonate w other problem
XXIX. Neonate birth weight >2499 g w major cardiovascular procedure
XXX. Neonate birth weight >2499 g w other major procedure
XXXI. Neonate birth weight >2499 g w major anomaly
XXXII. Neonate, birth weight >2499 g w resp dist synd/oth maj resp cond
XXXIII. Neonate birth weight >2499 g w congenital/perinatal infection
XXXIV. Neonate birth weight >2499 g w other significant condition
XXXV. Neonate birth weight >2499 g, normal newborn or neonate w other problem
XXXVI. Neonatal aftercare

The reimbursement rate varies for each of the above “APR-DRG categories” (services) by severity, classified as: a) Minor, b) Moderate, c) Major, and, d) Extreme. Therefore, the severity of the service discharged is also considered when calculating the final reimbursement.

APR-DRG weights were altered twice in the last 12 years - once on July 1, 2014 and the other time on July 1, 2018 *(see Appendix I)*. Therefore, 2014 weights were applied to the years 2015-2017 and 2018 weights were applied to the years 2019-2021. Due to the mid-year change in APR-DRG weights, it is not possible to accurately measure reimbursements for this year. Resultantly, 2018 SPARCS data was removed from this analysis.

SPARCS PUFs from 2015 to 2021 detail discharge information at the individual level for all patients. After filtering for Medicaid-covered patients, the individual patient discharges can be used to calculate Medicaid reimbursements by using a formula that includes APR-DRG

weights and NYS Medicaid FFS payment rates for each facility. The result is an estimated minimum Medicaid reimbursement for each facility or type of service.

Total Estimated Reimbursement = (APR-DRG Weight × Case Payment Rate + DME Add-On + Capital Payment Rate) × No. of discharges[19]

After having calculated reimbursement estimates for each discharge, we calculated profit and accounting gap estimates as follows :

Profit Estimate = Total Estimated Reimbursement - Total Costs
Accounting Gap Estimate = Total Estimated Reimbursement - Total Charges

Table 3.1a provides a summary of the Medicaid funding received by all NYC facilities, in 2021, by natal service, weighted according to the quantity of cases for each category of severity.

Table 3.2a provides a summary of the Medicaid funding received by each NYC facility, in 2021, for all of the 36 natal services.

Table 3.2b provides a summary of the funding received by each NYC facility, in 2021, for standard, low-risk vaginal deliveries and standard afterbirth care. Low-risk standard vaginal deliveries are classified as of "Minor" (1) or "Moderate" (2) severity for vaginal deliveries (APR DRG Code : 560) and neonatal aftercare (APR DRG Code : 863).

[19] NYSDOH Medicaid FFS and HMO Claims Payment Calculation. https://www.health.ny.gov/facilities/hospital/reimbursement/apr-drg/rates/ffs/2021/docs/2021-05-21_hmo_claims_payment_wks_jan2021.xls.

Table 3.1a: Medicaid Funding by Natal Service (2021)

Service	Mean Total Costs	Mean Total Charges	Mean Estimated Reimbursements	Mean Profit Estimate	Accounting Gap Estimate
Pelvic evisceration, radical hysterectomy & other radical GYN procs	$30,712	$27,553	$23,292	-$7,420	-$56,085
Cesarean delivery	$18,055	$13,721	$15,016	-$3,038	-$33,717
Vaginal delivery w sterilization &/or D&C	$18,800	$23,137	$13,280	-$5,520	-$33,504
Vaginal delivery w complicating procedures exc sterilization &/or D&C	$13,941	$18,154	$13,436	-$505	-$25,728
Vaginal delivery	$10,878	$4,744	$10,504	-$375	-$18,720
Postpartum & post abortion diagnoses w/o procedure	$9,475	$15,109	$9,788	$313	-$20,125
Other antepartum diagnoses	$9,356	$11,032	$9,586	$228	-$17,882
Neonate, transferred <5 days old, not born here	$8,060	$15,452	$11,551	$3,491	-$22,792
Neonate, transferred < 5 days old, born here	$7,517	$1,622	$6,635	-$882	-$13,966
Neonate w ECMO	$605,147	$1,434,729	$286,066	-$319,081	-$2,300,259
Neonate bwt <1500g w major procedure	$579,667	$679,645	$356,934	-$222,733	-$2,414,454
Neonate bwt <500g or GA <24 weeks	$197,076	$313,557	$63,357	-$133,720	-$748,015

Neonate birthwt 500-749g w/o major procedure	$391,034	$101,108	$231,468	-$159,566	-$1,205,545
Neonate birthwt 750-999g w/o major procedure	$300,310	$209,705	$197,127	-$103,183	-$874,323
Neonate bwt 1000-1249g w resp dist synd/oth maj resp or maj anom	$221,969	$168,604	$150,053	-$71,916	-$735,442
Neonate birthwt 1000-1249g w or w/o other significant condition	$82,433	$69,878	$82,541	$108	-$327,031
Neonate bwt 1250-1499g w resp dist synd/oth maj resp or maj anom	$188,066	$174,869	$117,834	-$70,233	-$502,655
Neonate bwt 1250-1499g w or w/o other significant condition	$88,549	$52,494	$71,451	-$17,098	-$212,671
Neonate bwt 1500-2499g w major procedure	$448,665	$581,612	$195,790	-$252,875	-$1,613,977
Neonate birthwt 1500-1999g w major anomaly	$119,335	$175,093	$79,402	-$39,934	-$374,679
Neonate bwt 1500-1999g w resp dist synd/oth maj resp cond	$97,008	$96,325	$69,390	-$27,618	-$283,182
Neonate birthwt 1500-1999g w congenital/perinatal infection	$69,245	$56,696	$50,261	-$18,985	-$206,533
Neonate bwt 1500-1999g w or w/o other significant condition	$43,583	$59,021	$35,346	-$8,237	-$120,863
Neonate bwt 2000-2499g w major anomaly	$55,671	$276,578	$39,002	-$16,669	-$203,054

Neonate bwt 2000-2499g w resp dist synd/oth maj resp cond	$53,031	$53,031	$38,007	-$15,024	-$153,964
Neonate bwt 2000-2499g w congenital/perinatal infection	$34,851	$57,706	$24,233	-$10,618	-$78,274
Neonate bwt 2000-2499g w other significant condition	$33,714	$44,224	$27,894	-$5,820	-$98,938
Neonate bwt 2000-2499g, normal newborn or neonate w other problem	$9,655	$14,576	$11,852	$2,197	-$20,740
Neonate birthwt >2499g w major cardiovascular procedure	$322,551	$568,603	$150,868	-$171,683	-$1,207,547
Neonate birthwt >2499g w other major procedure	$199,711	$636,445	$100,174	-$99,537	-$795,592
Neonate birthwt >2499g w major anomaly	$27,125	$138,480	$17,834	-$9,291	-$91,814
Neonate, birthwt >2499g w resp dist synd/oth maj resp cond	$30,482	$68,917	$24,072	-$6,410	-$78,554
Neonate birthwt >2499g w congenital/perinatal infection	$26,152	$27,355	$16,677	-$9,475	-$52,017
Neonate birthwt >2499g w other significant condition	$16,431	$32,816	$13,310	-$3,121	-$43,555
Neonate birthwt >2499g, normal newborn or neonate w other problem	$5,035	$3,954	$5,890	$855	-$10,941
Neonatal aftercare	$181,530	$301,049	$50,492	-$131,038	-$525,174

Table 3.1b: Mean Estimated Profit from Medicaid Reimbursements for Low-Risk Standard Vaginal Deliveries (2015-2021)

Year	***Vaginal deliveries (in $)***
2015	$1,850
2016	$2,174
2017	$1,481
2019	$1,574
2020	$696
2021	-$246

Table 3.2a: Medicaid Funding by Facility for All Natal Services (2021)

Facility Name	Total Capital Reimbursement	Mean Capital Reimbursement	Total Estimated Reimbursement	Mean Estimated Reimbursement	Total Estimated Profit	Mean Profit Estimate	Total Estimated Accounting Gap	Mean Accounting Gap
BRONX-LEBANON HOSP CTR - FULTON	6,263	$482	$148,784	$11,445	-$83,878	-$6,452	-$114,349	-$8,796
BRONXCARE HOSP CTR	1,538,324	$482	$39,185,061	$12,272	-$16,436,209	-$5,148	-$5,397,656	-$1,690
BROOKDALE HOSP MED CTR	287,292	$288	$13,866,957	$13,881	-$16,833	-$17	-$13,500,742	-$13,514
BROOKLYN HOSP CTR	$1,883,691	$748	$20,356,712	$8,084	$4,142,109	$1,645	-$79,157,256	-$31,437
CHILDRENS HOSP AT MONTEFIORE	$199,015	$1,268	$4,420,862	$28,158	-$1,515,307	-$9,652	-$29,058,358	-$185,085
COHEN / LONG ISLAND JEWISH SCHNEIDER CHILDREN'S HOSP	$3,244,973	$936	$42,818,247	$12,354	-$2,358,989	-$681	-$258,173,984	-$74,488
COLUMBIA UNIV IRVING MED CTR	$8,749,470	$2,477	$81,698,209	$23,131	-$28,630,297	-$8,106	-$395,228,742	-$111,899
ELMHURST HOSP	$7,168,567	$2,170	$31,300,370	$9,476	-$15,421,205	-$4,669	-$69,220,236	-$20,957
FLUSHING HOSP	$2,645,115	$638	$26,830,623	$6,475	$2,287,967	$552	-$32,739,929	-$7,901
INTERFAITH MED CTR	$1,438	$288	$40,141	$8,028	$10,472	$2,094	-$26,428	-$5,286
JACOBI MED CTR	$10,463,247	$3,377	$50,865,664	$16,419	-$17,876,728	-$5,770	-$64,952,350	-$20,966
JAMAICA HOSP	$1,974,192	$706	$24,437,396	$8,743	$1,052,479	$377	-$31,784,697	-$11,372
KINGS COUNTY HOSP CTR	$5,246,219	$2,445	$34,196,632	$15,935	-$31,257,219	-$14,565	-$56,476,499	-$26,317
KINGSBROOK JEWISH MED CTR	$863	$288	$20,607	$6,869	$999	$333	-$39,362	-$13,121
LENOX HILL HOSP	$2,815,679	$1,894	$15,458,611	$10,396	$3,935,260	$2,646	-$54,603,168	-$36,720
LINCOLN MED	$7,810,589	$2,666	$28,399,022	$9,693	-$27,089,962	-$9,246	-$58,421,215	-$19,939
LONG ISLAND JEWISH - FOREST HILLS	$2,817,116	$936	$20,705,703	$6,881	-$525,530	-$175	-$60,710,662	-$20,176
LONG ISLAND JEWISH MED CTR	$3,347,958	$936	$32,505,255	$9,090	-$2,523,407	-$706	-$107,733,242	-$30,127

MAIMONIDES MED CTR	$12,844,157	$1,199	$111,535,146	$10,410	$23,557,202	$2,199	-$285,839,268	-$26,679
MONTEFIORE MED CENTER - EINSTEIN CAMPUS	$6,780,446	$1,268	$92,925,720	$17,373	$14,633,563	$2,736	-$356,645,792	-$66,675
MONTEFIORE MED CTR - WAKEFIELD	$2,882,545	$1,268	$33,606,664	$14,779	$8,483,557	$3,731	-$102,104,921	-$44,901
MOUNT SINAI - BETH ISRAEL	$8,393	$1,679	$48,049	$9,610	-$28,998	-$5,800	-$132,634	-$26,527
MOUNT SINAI - MORNINGSIDE	$3,506,918	$1,414	$32,657,348	$13,168	$204,821	$83	-$132,132,230	-$53,279
MOUNT SINAI - MORNINGSIDE	$15,555	$1,414	$111,563	$10,142	-$17,663	-$1,606	-$421,676	-$38,334
MOUNT SINAI - QUEENS	$7,542	$1,077	$97,927	$13,990	$57,219	$8,174	-$64,013	-$9,145
NORTH CENTRAL BRONX HOSP	$4,417,874	$2,494	$14,352,983	$8,114	-$12,853,672	-$7,266	-$31,485,118	-$17,798
NY PRESBYTERIAN - ALLEN HOSP	$8,960,032	$2,477	$46,090,515	$12,743	$17,209,913	$4,758	-$78,148,035	-$21,606
NY PRESBYTERIAN - LOWER MANHATTAN HOSP	$1,976,806	$2,477	$10,373,141	$12,999	$4,018,900	$5,036	-$18,445,829	-$23,115
NY PRESBYTERIAN - BROOKLYN METHODIST HOSP	$2,009,270	$432	$36,957,566	$7,953	-$3,092,222	-$665	-$76,943,996	-$16,558
NY PRESBYTERIAN - QUEENS	$2,590,310	$655	$34,311,388	$8,673	$6,859,823	$1,734	-$99,348,886	-$25,113
NYC HEALTH + - BELLEVUE	$5,801,439	$2,385	$42,683,941	$17,551	-$18,565,236	-$7,634	-$63,820,808	-$26,242
NYC HEALTH + - HARLEM	$5,194,192	$4,544	$15,414,439	$13,486	-$15,222,385	-$13,318	-$24,517,711	-$21,450
NYC HEALTH + - METROPOLITAN	$2,370,631	$1,551	$14,318,907	$9,371	-$22,883,983	-$14,976	-$26,925,296	-$17,621
NYC HEALTH + - SOUTH BROOKLYN	$5,396,147	$2,677	$17,537,698	$8,699	-$6,488,619	-$3,219	-$35,038,717	-$17,380
NYU LANGONE -	$17,366,968	$2,813	$62,234,242	$10,080	-$10,501,826	-$1,701	-$165,099,280	-$26,741

BROOKLYN								
NYU LANGONE MED CTR	$8,435,947	$2,813	$46,442,781	$15,486	-$35,935,981	-$11,983	-$239,700,587	-$79,927
QUEENS HOSP CTR	$5,422,891	$2,494	$22,424,765	$10,315	-$14,799,114	-$6,807	-$60,853,114	-$27,991
RICHMOND UNIV MED CTR	$1,864,696	$894	$16,641,016	$7,977	$2,432,034	$1,166	-$27,337,378	-$13,105
ST BARNABAS HOSP	$875,602	$689	$10,993,923	$8,657	-$437,970	-$345	-$14,176,322	-$11,162
ST JOHNS EPISCOPAL HOSP	$449,227	$584	$6,292,135	$8,182	-$2,060,347	-$2,679	-$10,186,994	-$13,247
STATEN ISLAND UNIV HOSP	$3,286,655	$810	$31,757,399	$7,826	-$1,601,908	-$395	-$42,762,863	-$10,538
THE MOUNT SINAI HOSP	$6,116,229	$1,077	$86,190,560	$15,182	-$4,814,217	-$848	-$273,272,177	-$48,137
UNIV HOSP BROOKLYN	$1,850,863	$1,368	$23,348,301	$17,257	-$4,448,415	-$3,288	-$20,561,071	-$15,197
WEILL CORNELL MED	$5,313,594	$2,477	$36,801,753	$17,157	-$506,448	-$236	-$139,999,082	-$65,268
WOODHULL MEDICAL	$11,749,976	$4,925	$29,332,313	$12,294	-$11,558,650	-$4,844	-$30,661,265	-$12,850
WYCKOFF HEIGHTS MED CTR	$1,653,198	$909	$13,086,092	$7,194	$1,947,154	$1,070	-$21,440,450	-$11,787
TOTAL	$189,348,115		$1,355,823,131		-$218,719,746		-$3,695,404,388	

Map 3.2a: Heatmap of Total Medicaid Reimbursement for All Natal Services, with Maternal Healthcare Facilities (2021)

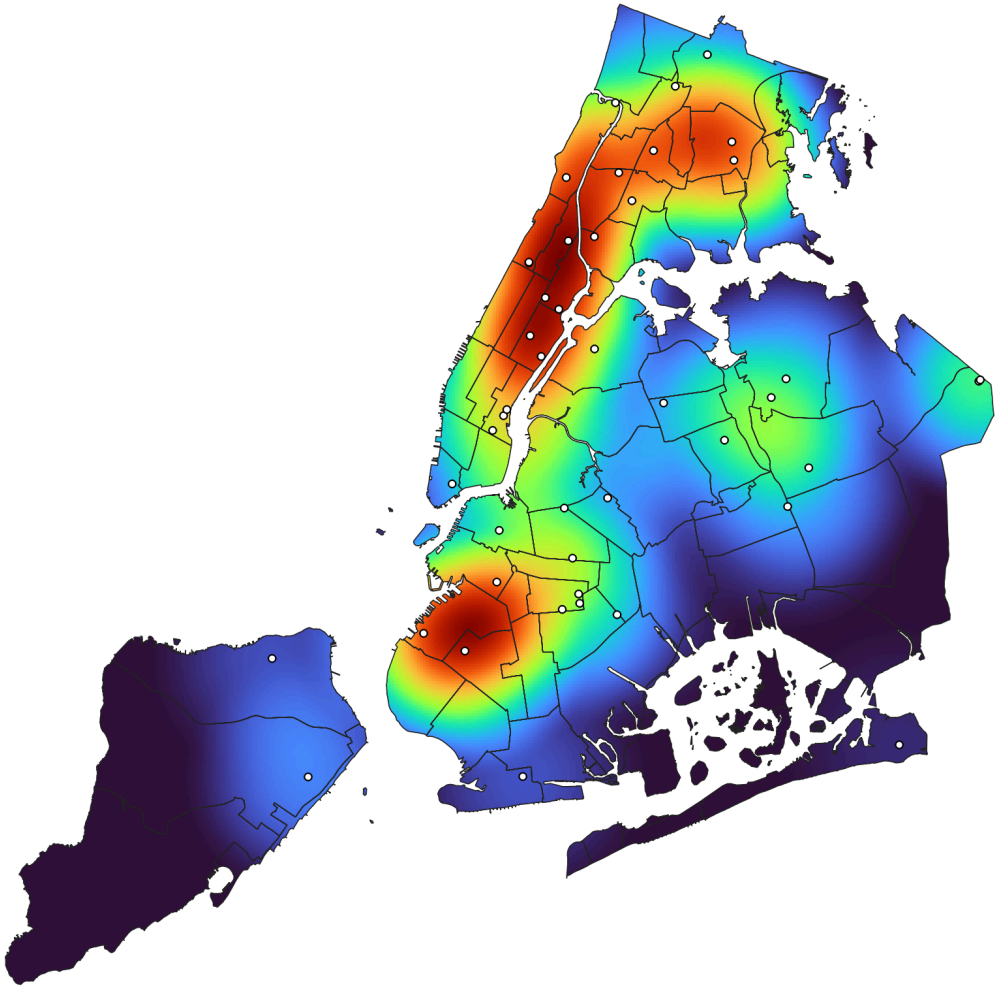


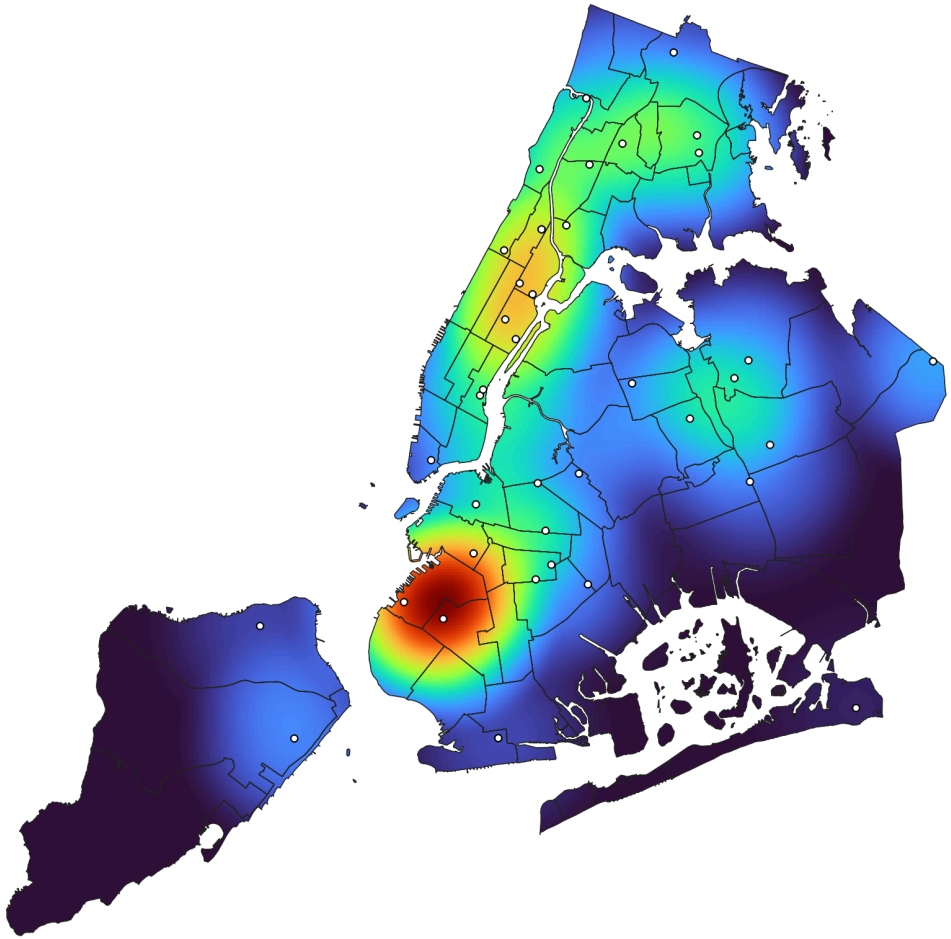
Table 3.2b: Medicaid Funding for Standard Vaginal Delivery and Standard Afterbirth Care, by Facility (2021)

Facility Name	Total Capital Reimbursement	Mean Capital Reimbursement	Total Estimated Reimbursement	Mean Estimated Reimbursement	Total Estimated Profit	Mean Profit Estimate	Total Estimated Gap	Mean Accounting Gap
BRONX-LEBANON HOSP CTR - FULTON	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
BRONXCARE HOSP CTR	$389,278	$482	$8,304,609	$10,229	-$66,238	-$78	$2,023,122	$2,483
BROOKDALE HOSP MED CTR	$66,143	$288	$2,040,785	$8,719	-$110,098	-$351	-$2,337,695	-$9,674
BROOKLYN HOSP CTR	$432,396	$748	$4,139,859	$7,046	$1,455,306	$2,467	-$9,435,363	-$16,042
CHILDRENS HOSP AT MONTEFIORE	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
COHEN / LONG ISLAND JEWISH SCHNEIDER CHILDRENS HOSP	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
COLUMBIA UNIV IRVING MED CTR	$1,788,538	$2,477	$10,171,673	$13,933	$1,759,065	-$2,540	-$17,995,535	-$24,222
ELMHURST HOSP	$2,096,529	$2,170	$9,007,889	$9,314	-$3,023,200	-$3,125	-$16,876,777	-$17,449
FLUSHING HOSP	$630,002	$638	$6,349,096	$6,437	-$275,838	-$281	-$9,001,353	-$9,129
INTERFAITH MED CTR	$288	$288	$9,073	$9,073	$6,383	$6,383	$3,118	$3,118
JACOBI MED CTR	$2,502,668	$3,377	$10,037,657	$13,484	-$2,187,194	-$2,903	-$10,558,920	-$14,125
JAMAICA HOSP	$483,130	$706	$5,371,924	$7,750	-$1,022,811	-$1,366	-$10,157,899	-$14,357
KINGS COUNTY HOSP CTR	$1,420,342	$2,445	$7,508,571	$12,838	-$5,220,714	-$8,880	-$10,125,290	-$17,248
KINGSBROOK JEWISH MED CTR	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
LENOX HILL HOSP	$764,986	$1,894	$3,744,877	$9,344	$1,890,504	$4,666	-$8,307,854	-$21,157
LINCOLN MED	$1,916,660	$2,666	$6,531,740	$9,053	-$4,560,539	-$6,312	-$10,823,674	-$14,988

LONG ISLAND JEWISH - FOREST HILLS	$825,755	$936	$7,085,972	$8,018	-$1,749,044	-$1,983	-$22,097,177	-$24,985
LONG ISLAND JEWISH MED CTR	$1,739,515	$936	$14,827,415	$8,018	-$1,694,687	-$923	-$45,489,181	-$24,799
MAIMONIDES MED CTR	$4,767,707	$1,199	$42,620,628	$10,944	$6,939,349	$1,519	-$89,357,662	-$23,857
MONTEFIORE MED CENTER - EINSTEIN CAMPUS	$1,436,202	$1,268	$14,955,302	$12,947	$2,166,054	$1,799	-$31,783,832	-$27,575
MONTEFIORE MED CTR - WAKEFIELD	$626,199	$1,268	$6,504,892	$12,947	$630,048	$1,424	-$15,568,023	-$30,166
MOUNT SINAI - BETH ISRAEL	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
MOUNT SINAI - MORNINGSIDE	$855,518	$1,414	$6,263,272	$10,310	$1,248,669	$2,084	-$15,365,554	-$25,169
MOUNT SINAI - QUEENS	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NORTH CENTRAL BRONX HOSP	$1,357,831	$2,496	$4,600,778	$8,435	-$3,552,149	-$6,465	-$9,135,372	-$16,668
NY PRESBYTERIAN - QUEENS	$721,568	$655	$9,911,196	$9,133	$1,477,622	$1,350	-$20,842,154	-$19,293
NY PRESBYTERIAN - ALLEN HOSP	$1,478,888	$2,477	$8,606,665	$17,175	$1,242,650	$2,798	-$15,878,328	-$42,903
NY PRESBYTERIAN - BROOKLYN METHODIST HOSP	$757,530	$432	$13,471,646	$7,830	-$4,157,147	-$2,452	-$21,058,484	-$12,644
NY PRESBYTERIAN - LOWER MANHATTAN HOSP	$577,188	$2,477	$3,316,126	$13,933	$1,013,461	$4,464	-$4,732,071	-$19,189
NYC HEALTH + - BELLEVUE	$1,517,153	$2,385	$8,189,402	$12,832	-$2,224,212	-$3,454	-$9,918,585	-$15,488
NYC HEALTH + - HARLEM	$890,693	$4,544	$2,395,720	$20,354	-$2,095,754	-$28,689	-$3,458,484	-$43,569

NYC HEALTH + - METROPOLITAN	$673,334	$1,551	$4,088,852	$9,308	-$5,443,310	-$12,207	-$6,478,780	-$14,544
NYC HEALTH+ - SOUTH BROOKLYN	$695,932	$2,677	$2,513,805	$11,180	-$483,383	-$14,252	-$4,044,894	-$44,474
NYU LANGONE - BROOKLYN	$5,746,796	$2,813	$22,256,118	$10,843	$2,450,444	$1,213	-$41,974,349	-$20,286
NYU LANGONE MED CTR	$2,838,236	$2,813	$10,899,159	$10,843	$1,910,683	$1,864	-$18,341,736	-$18,466
QUEENS HOSP CTR	$1,364,453	$2,494	$4,763,996	$8,686	-$2,737,853	-$4,895	-$12,019,263	-$21,698
RICHMOND UNIV MED CTR	$564,951	$894	$4,794,956	$7,680	$1,294,117	$2,019	-$3,571,058	-$5,897
ST BARNABAS HOSP	$217,866	$689	$2,490,975	$7,862	$642,410	$2,018	-$2,168,423	-$6,856
ST JOHNS EPISCOPAL HOSP	$107,487	$584	$1,544,981	$8,284	-$975,335	-$5,241	-$2,304,262	-$12,428
STATEN ISLAND UNIV HOSP	$1,188,153	$810	$11,531,479	$7,952	$967,188	$578	-$16,492,602	-$11,615
THE MOUNT SINAI HOSP	$1,972,664	$1,077	$22,908,959	$12,559	$4,533,557	$2,459	-$31,805,501	-$17,521
UNIV HOSP BROOKLYN	$396,711	$1,368	$3,917,132	$13,513	$1,750,658	$6,036	-$1,388,210	-$4,799
WEILL CORNELL MED	$1,464,025	$2,477	$8,237,872	$13,933	$2,875,664	$4,867	-$13,234,692	-$22,378
WOODHULL MEDICAL	$3,619,544	$4,925	$9,530,168	$12,834	-$4,039,885	-$5,045	-$10,379,269	-$13,398
WYCKOFF HEIGHTS MED CTR	$424,433	$909	$3,077,290	$6,620	$1,822,842	$3,883	-$1,612,700	-$3,615
TOTAL	$51,317,293		$328,522,508		-$83,696,064		-$578,147,245	

Map 3.2b: Medicaid Reimbursement for Standard Vaginal Delivery and Afterbirth Care, with Maternal Healthcare Facilities



Discussion of Findings

From *Table 3.1b,* we see that the Medicaid reimbursement for standard vaginal deliveries, on average, generated a net profit for service providers between 2015 and 2020. In 2021, Medicaid reimbursements did not meet costs, and the average deficit was around $246.37 per delivery. If this deficit continues after 2021, a birth center exclusively providing vaginal delivery services would not be financially operational with similar Medicaid reimbursements alone.

From *Table 3.2a*, we see that, in total, hospital facilities across NYC providing, pre-, peri- and post-natal services incurred a total loss of about $220 million in 2021 from providing said services under Medicaid. Our analysis shows that, for this year, they were reimbursed an estimated total of $1.35 billion through Medicaid, of which $190 million formed the capital component. This data suggests that Medicaid reimbursements for natal services are inadequate in covering the associated costs.

From *Table 3.2b,* which isolates low-risk, standard vaginal deliveries and neonatal afterbirth care, we see that hospital facilities across NYC incurred a total loss of about $84 million in 2021. Our analysis shows that, for this year, they were reimbursed an estimated total of $328 million through Medicaid, of which $51 million formed the capital component. Similarly to our data for all natal services, this data suggests that Medicaid reimbursements for low-risk vaginal delivery services are inadequate in covering costs, especially when considering the costs associated with newborn afterbirth care.

NEEDS INDEX

This report utilizes a multidimensional needs index to analyze birth demographics and identify high-need community districts with the highest potential to benefit from patient-centered alternative birthing centers. Based on qualitative research and literature, this report identifies six contributors to maternal and infant health outcomes and community needs– race, education, income, quantity of births, Medicaid enrollment, and the rate of prenatal care use.

The needs index is dependent on NYC's maternal and natal demographics data from 2015 to 2021. This data includes the quantity of births with certain attributes within each community district. For example, the maternal and natal demographics dataset includes the quantity of births in each community district by the mother's race, mother's education level, insurance type used to pay for the birth, and trimester in which prenatal care was initiated, if at all. This dataset *does not* detail family or the mother's income. Therefore, median income data for families and individuals was gathered for each community district (*see Appendix I*).

Using the data available, six subindices were crafted to measure each of the six factors. Although these factors are interconnected, the subindices attempt to measure these factors independently. The weight system used within each index and to combine the subindices into a multidimensional index is based on qualitative research. Although this methodology differentiates and isolates contributors to maternal health outcomes, it is our understanding that these factors are heavily intertwined and often co-dependent. Ultimately, the multidimensional index pairs the quantitative data from the demographics dataset with qualitative weightage in an attempt to measure the complex and sociocultural character of healthcare needs and outcomes.

It's important to note that no reliable data on median family or individual income was collected for NYC's community districts in 2020. Consequently, the rest of data from 2020 was also excluded in calculating the 2015-2021 aggregated sub-indices and the 2015-2021 aggregated multidimensional needs index. This report highlights the 2015-2021 aggregated subindices and 2015-2021 multidimensional needs index. These indices summarize births between 2015 and 2021 altogether, for each community district. This allows each sub-index and the multi-index to measure need based on a longer period of time. In the deliverables attached to this report are additional indices for each individual year between 2015 and 2021. This allows the viewer to control by year or evaluate year over year trends.

Race Index :

A 2021 report published by the New York City Department of Health and Mental Hygiene surveyed pregnancy-associated deaths from 2018 to 2021 to determine contributors and measures of maternal mortality in NYC. According to this report, in 2021, the pregnancy-associated mortality ratio (PAMR) was 58.4 deaths per 100,000 live births. Of these deaths, 74.1% were considered preventable, 19% were considered not preventable, and the preventability of 6.9% of births could not be determined. The data surveillance also revealed racial disparities. Of the women, 39.7% of the deaths were Black, 36.2% were Hispanic, 12.1%

were Asian American Pacific Islander (AAPI), 8.6% were White, and 3.4% were of unknown race.[1]

A 2020 study, "Racial Disparities in Maternal and Infant Health: Current Status and Efforts to Address Them," reported that 30% of pregnancy-related deaths in the United States were either directly or indirectly caused by racial discrimination. The same report found that Black and Hispanic women were more likely to experience scolding or dismissive behavior from their healthcare providers than their White counterparts. In addition, 22% of Black women who have given birth reported being denied pain medication they thought they needed.[2] Evidently, racial discrimination in the maternal healthcare environment plays an integral and inexcusable role in maternal health outcomes.

In 2022, the CDC reported that over half of these maternal deaths occur outside of the hospital.[3] In NYC in 2021, 32.% of maternal deaths occured at home and 27.6% happened in the emergency room.[4] The observed racial disparities and the prevalence of deaths occurring out-of-hospital raises multiple questions– could race play a role in whether or not women seek help? A 2018 report by Benkert et al. determined that a patient's willingness to seek help and follow-up care is heavily influenced by their trust in the medical system to validate their concerns and administer proper care.[5] Racial bias, dismissive providers, and medical abuse all erode a patient's trust in the medical system and, consequently, women often underestimate the severity of their own symptoms and avoid seeking care.[6]

Maternal mortality is heavily influenced by race, as is the rate of medical mistrust. A 2022 study involving 2,700 birthing women determined that 1 in 6 women experienced mistreatment by medical providers. Of these women, 38% were Indigenous American, 25% were Hispanic, 22.5% were Black, 14.1% were White. These abuses are considered "obstetric racism" and directly erode provider-patient relationships and institutional trust for women of color. Interviews of the women generated powerful qualitative findings as well. The patients reported unequal power dynamics, racial discrimination, and feelings of vulnerability. Racially motivated abuses were especially noted among Black women, whereas Hispanic women were more likely to express fears related to their immigration status.[7]

---

[1] Ashwin Vasan, "NEW YORK CITY DEPARTMENT of HEALTH and MENTAL HYGIENE," September 2024, https://www.nyc.gov/assets/doh/downloads/pdf/data/maternal-mortality-annual-report-2024.pdf.

[2] Latoya Hill et al., "Racial Disparities in Maternal and Infant Health: Current Status and Efforts to Address Them," Kaiser Family Foundation, October 25, 2024, https://www.kff.org/racial-equity-and-health-policy/issue-brief/racial-disparities-in-maternal-and-infant-health-current-status-and-efforts-to-address-them/.

[3] Amber B Vayo, "'Why Would I Go Back There?': Medical Mistrust and the Problem of Maternal Mortality," Law & Policy 47, no. 1 (November 27, 2024), https://doi.org/10.1111/lapo.12258.

[4] Ashwin Vasan, "NEW YORK CITY DEPARTMENT of HEALTH and MENTAL HYGIENE,"

[5] R. A. Cuevas Benkert, H. S. Thompson, E. Dove-Medows, and D. Knuckles. 2018. "Ubiquitous Yet Unclear: A Systematic Review of Medical Mistrust." Behavioral Medicine 45, no. 2: 86–101

[6] Amber B Vayo, "'Why Would I Go Back There?'"

[7] Thu T. Nguyen et al., "Racism during Pregnancy and Birthing: Experiences from Asian and Pacific Islander, Black, Latina, and Middle Eastern Women," Journal of Racial and Ethnic Health Disparities 10, no. 6 (November 30, 2022), https://doi.org/10.1007/s40615-022-01475-4.

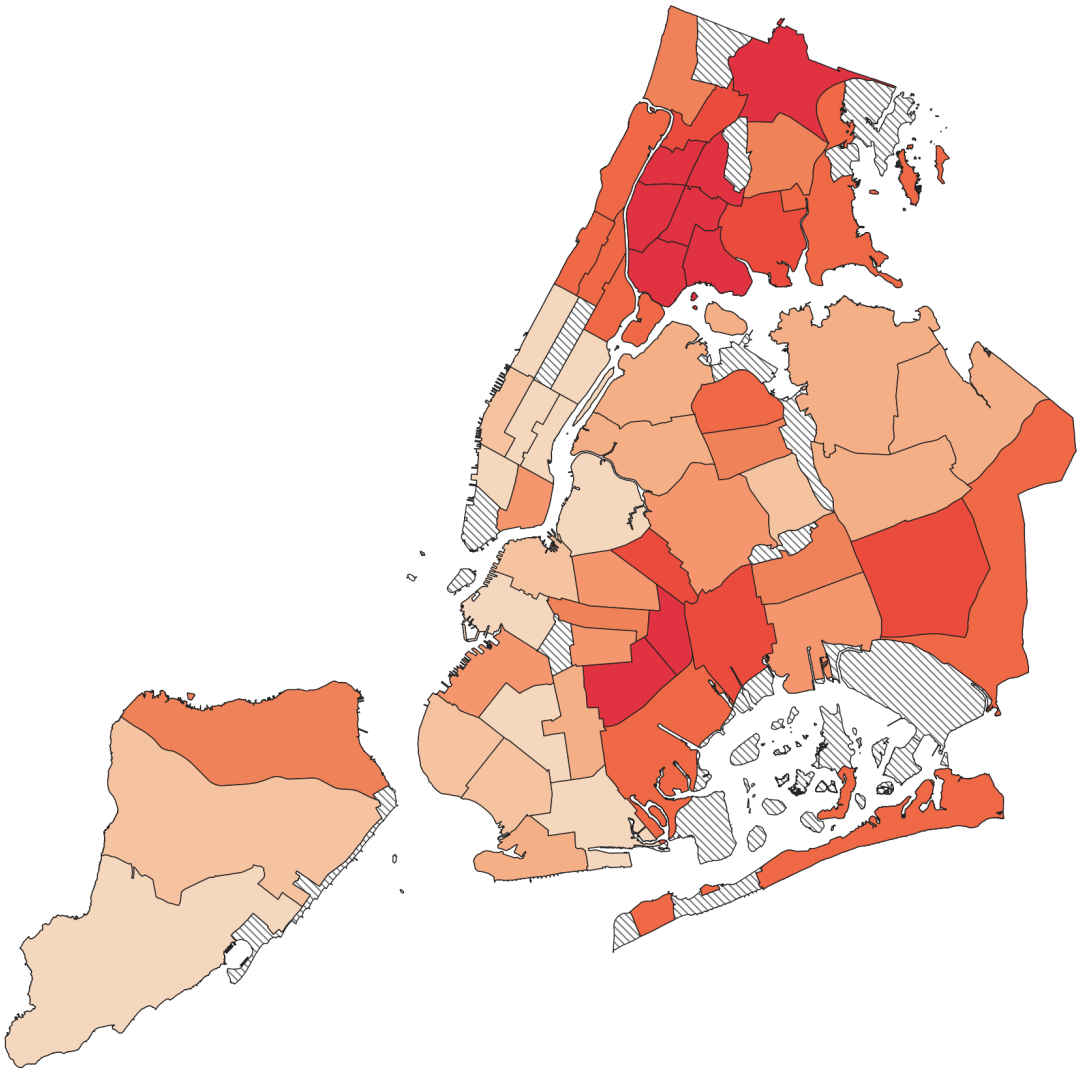
Race also impacts health access. According to a 2025 report by the American Academy of Pediatrics, 25% of Black women in the United States first meet their health care providers during their delivery. In addition, Black women are less likely to have OBGYNs assigned as their providers.[8] These racial disparities in provider access indicate delays or avoidance of healthcare services.

The NYC maternal and natal demographics data only specifies four racial designations: White, Black, AAPI, and Hispanic. Based on the qualitative studies, Black and Hispanic mothers are considered at the highest risk for this index. Although studies report that Hispanic mothers experience higher rates of medical mistrust, the high rate of maternal mortality and poor health outcomes among Black mothers result in a slightly higher weightage for Black mothers.

Formula : Race index = (45.71 × Births with black mothers + 40 × Births with hispanic mothers + 14.29 × Births with AAPI mothers)/(10 × Total number of births)
Range : 0-4.571
Methodology : Black mothers were considered at highest risk for unfavorable maternal health outcomes, followed closely by Hispanic mothers. AAPI mothers were considered slightly higher risk than White mothers, which is considered the baseline and at no elevated risk based on racial identity alone.
Findings: *Brownsville (Brooklyn)* seems to have the most need based on maternal race alone, while *Greenwich Village/SOHO (Manhattan)* seems to have the least.

[8] Jennifer Hanford, "Medical Mistrust, Distrust, and Trauma: The Impact on Neonatal Care," American Academy of Pediatrics, April 2, 2025, https://publications.aap.org/journal-blogs/blog/31715/Medical-Mistrust-Distrust-and-Trauma-The-Impact-on?autologincheck=redirected.

Map 4.1: Race Index by NYC Community District, 2015-2021



Education Index

Education empowers women to act autonomously for their health and the health of their children. A 2022 report, "Evidence for Causal Links between Education and Maternal and Child Health: Systemic Review" claims that better-educated women are considered more likely to have higher levels of health knowledge that enable them to better navigate health care systems. In addition, the report claims that a mother's education is related to other treatment-oriented health behaviors, such as exclusive breastfeeding, seeking mental health services, and the effective use of childcare services.[9]

[9] Barbara S. Mensch et al., "Evidence for Causal Links between Education and Maternal and Child Health: Systematic Review," Tropical Medicine & International Health 24, no. 5 (February 15, 2019), https://doi.org/10.1111/tmi.13218.

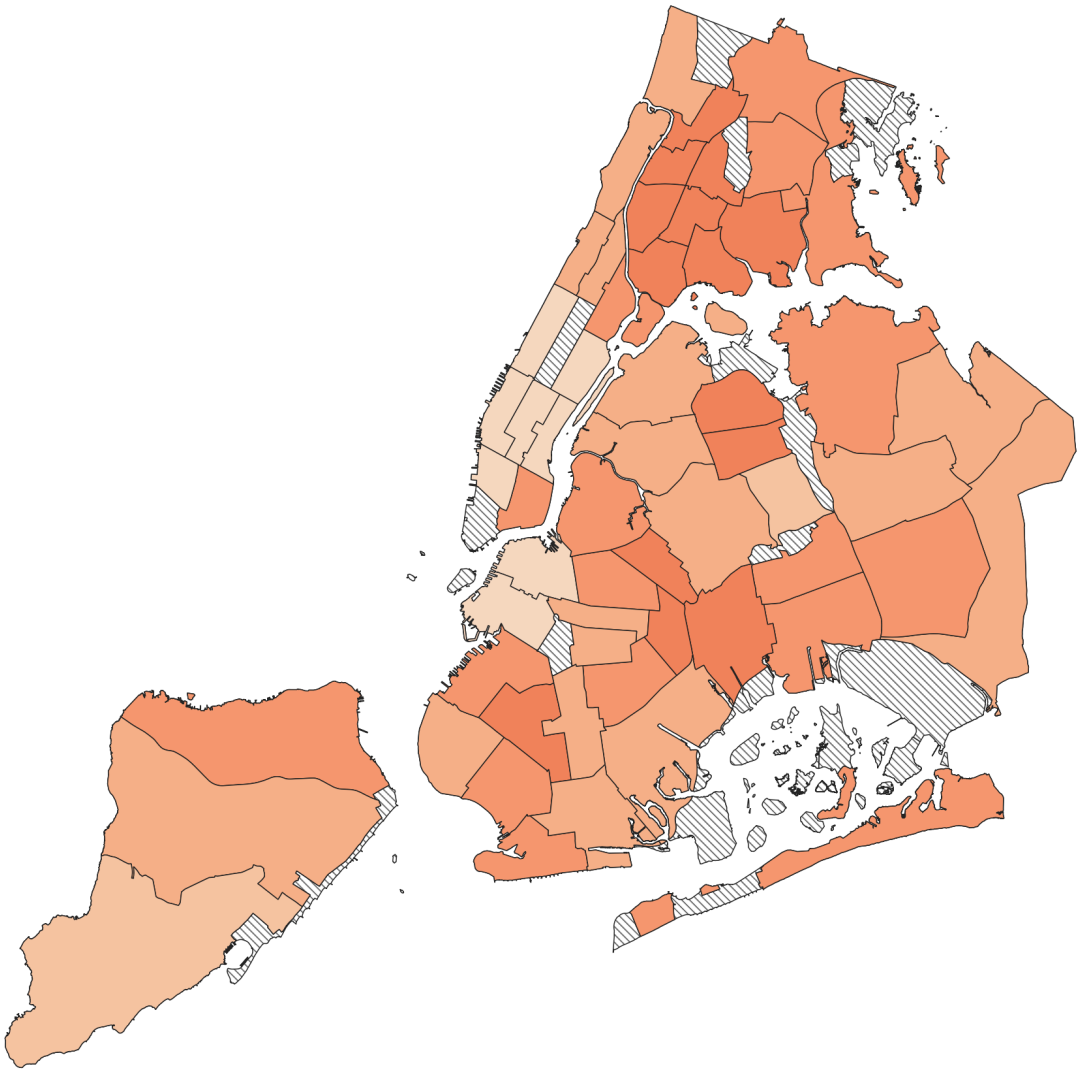
Another report, “Health Literacy Levels among Women in the Prenatal Period: A Systematic Review”, concludes that a mother’s level of education plays a significant role in preventing and treating poor health outcomes for both herself and her children. Of the 42 studies summarized in this report, many hypothesize that education develops health literacy, communication, and information seeking skills.[10] Consequently, educated women are empowered to make autonomous and proactive healthcare decisions. Educated and proactive health behaviors are powerful tools in increasing patient engagement with healthcare providers and reducing maternal deaths.

The NYC maternal and natal demographics data specifies the quantity of births in a community district by a mother with the following academic designations: 11th grade or less/no diploma, high school graduate/GED, some college/associate degree, bachelor's degree, and masters degree or higher.

Formula : Education index = (40 × Births with mothers with less than a high school education + 30 × Births with mothers with a high school diploma/GED + 20 × Births with mothers with an associate’s degree + 10 × Births with mothers with a bachelor’s degree)/(10 × Total number of births)
Range : 0-4
Methodology : Mothers’ education is weighted progressively, with the weightage reducing with increasing education, all relative to mothers with a Master’s degree or more.
Findings : *Mott Haven* (*Bronx)* seems to have the most need based on maternal education alone, while *Upper East Side (Manhattan*) seems to have the least.

[10] Maiken Meldgaard, Mads Gamborg, and Helle Terkildsen Maindal, “Health Literacy Levels among Women in the Prenatal Period: A Systematic Review,” Sexual & Reproductive Healthcare 34 (December 2022): 100796, https://doi.org/10.1016/j.srhc.2022.100796.

Map 4.2: Education Index by NYC Community District, 2015-2021



Income Index

Income level is a key social determinant of maternal health, influencing patient access to quality healthcare, proper nutrition, stable housing, and supportive services. In general, nearly half of adults below the median income in the United States report at least one cost-related problem in accessing necessary health care. These patients report skipping medical tests, avoiding treatment, neglecting follow-ups, being unable to afford medications, and/or being unable to afford recommended lifestyle changes.[11] Although poverty is directly related to poor

[11] The Commonwealth Fund, "The Cost of Not Getting Care: Income Disparities in the Affordability of Health Services across High-Income Countries," www.commonwealthfund.org, November 16, 2023, https://www.commonwealthfund.org/publications/surveys/2023/nov/cost-not-getting-care-income-disparities-affordability-health.

health outcomes across the board, socioeconomic inequality and state level health policies are considered to play a larger role in shaping women's health care, particularly prenatal care, family planning, and children's healthcare.[12]

According to a 2023 study, "How Does High Socioeconomic Status Affect Maternal and Neonatal Pregnancy Outcomes? A Population-Based Study among American Women," women with higher socioeconomic statuses experience more favorable conditions for pregnancy and exhibit less risky behavior, compared to women with lower socioeconomic status. In addition, this report found that high socioeconomic status predisposes women to better outcomes, even when controlling for confounding factors such as race and education. In particular, women with higher socioeconomic status showed significantly decreased risks of pregnant-induced hypertension, gestational hypertension, preeclampsia and gestational diabetes. This report strongly suggests that access to healthcare, particularly to prenatal care, significantly improves health outcomes.[13]

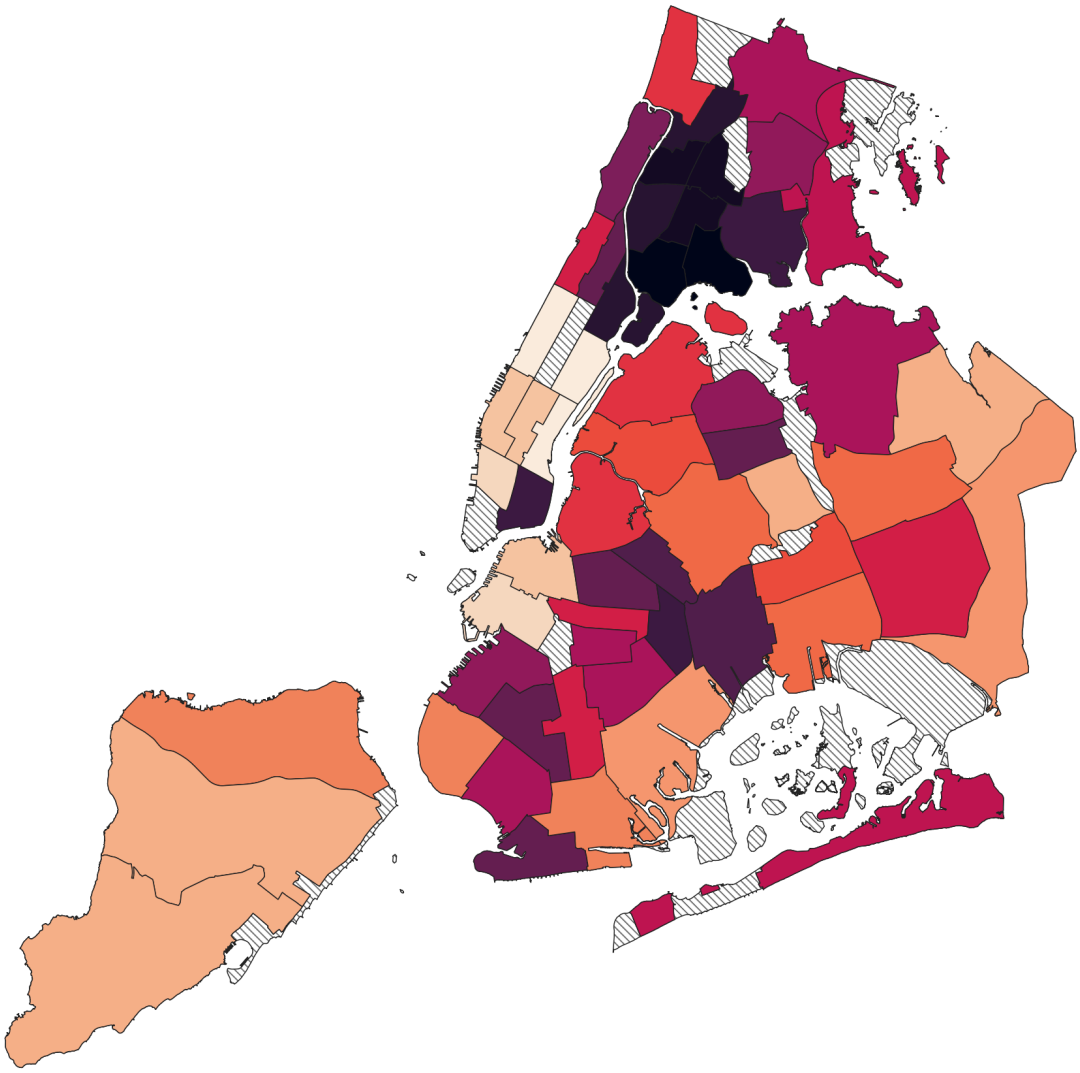
The income subindex considers the median family income without children and median family income with children for each of the community districts. The median income for families without children is considered to overall evaluate the wealth of the community district and its effect on residence.. However, this value is not weighted as much as the median income for families with children, as this allows the index to focus particularly on birthing families.

Formula : Income index = 10 × (0.75 × (1 - Percentile median family income with children across NYC) + 0.25 × (1 - Percentile median family income without children))
Range : 0-10
Methodology : There is three times as much weight put on median family income with children as on median family income without children, as this index attempts to measure the income demographics of birthing families and their needs.
Findings : *Hunts Point (Bronx)* seems to have the most need based on median family income alone, while *Upper West Side (Manhattan)* seems to have the least.

---

[12] Dovile Vilda et al., "Income Inequality and Racial Disparities in Pregnancy-Related Mortality in the US," SSM - Population Health 9, no. 100477 (December 2019): 100477, https://doi.org/10.1016/j.ssmph.2019.100477.
[13] Laura Nicholls-Dempsey et al., "How Does High Socioeconomic Status Affect Maternal and Neonatal Pregnancy Outcomes? A Population-Based Study among American Women. Socioeconomic Status and Pregnancy Outcomes," European Journal of Obstetrics & Gynecology and Reproductive Biology: X 20 (October 12, 2023): 100248, https://doi.org/10.1016/j.eurox.2023.100248.

Map 4.3: Income Index by NYC Community District, 2015-2021



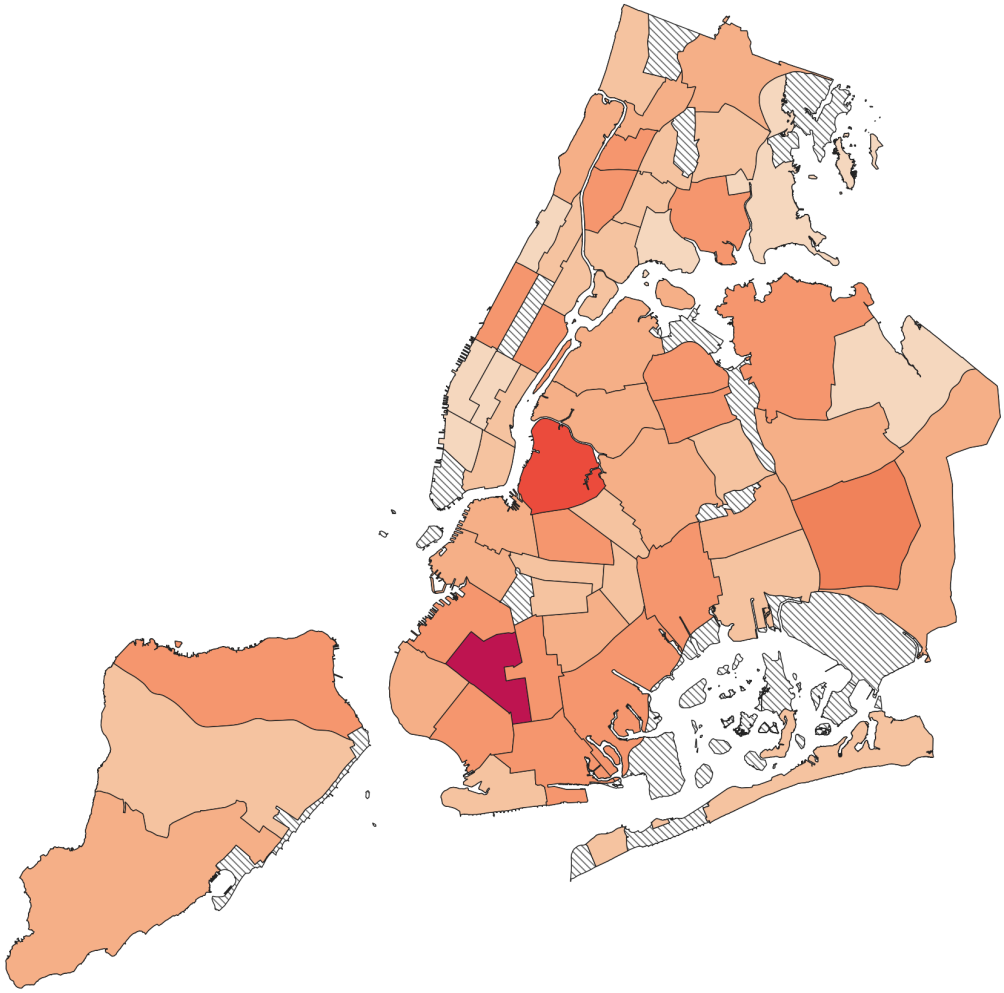
Birth Index

The total number of births in a neighborhood is a crucial factor in determining the demand for maternal and infant health services. Areas with higher birth volumes require more resources, including prenatal care, delivering support, and postnatal services. Incorporating birth quantity into the index ensures that neighborhoods with greater population growth and birth rates receive appropriate prioritization for intervention and resource allocation.

Most importantly, the quantity of births occuring in a community district validates the other indices. Community district need is only relevant if births are occurring. The NYC maternal and natal demographics data can be used to calculate the total births that occurred in each district. This subindex score is based on each community district's proportion of births relative to all births across NYC.

Formula : Birth index = Percent total number of births across NYC (in %)
Range : 0-100
Methodology : The birth index is a simple percentage, signifying the proportion of births in a particular community district relative to all births in NYC in a given year (or aggregated across all years).
Findings : *Borough Park (Brooklyn)* has had the highest overall birth incidence in the City, while *Midtown Business District (Manhattan)* has had the lowest.

Map 4.4: Aggregated Birth Index by NYC Community District (2015-2021)



Medicaid Index

A community-based, equity minded mission to shape NYC's current birth landscape must consider Medicaid patients. In 2021, as found in the NYC maternal and natal demographics dataset, 51,564 (59.5%) of births in NYC were paid for by Medicaid. This is notably higher than

the national average of 42% and the state average of 48%.[14] Medicaid-funded births, however, are characteristically different from those funded by private insurance and can be considered an indicator of a community's need for empowered patient-focused natal care.

According to a 2020 study, a mother on Medicaid is considered three times more likely than a mother on private insurance to feel as though she did not have a choice on whether or not she had a vaginal birth, cesarean birth, or episiotomy. The study documents Medicaid patients' limited ability to participate in the decision making process for their own care.[15] Medicaid enrollment is directly related to a mother's autonomous decision making over her birth plan and the degree in which a community can benefit from a Medicaid funded natal care center that prioritizes patient agency and well-being.

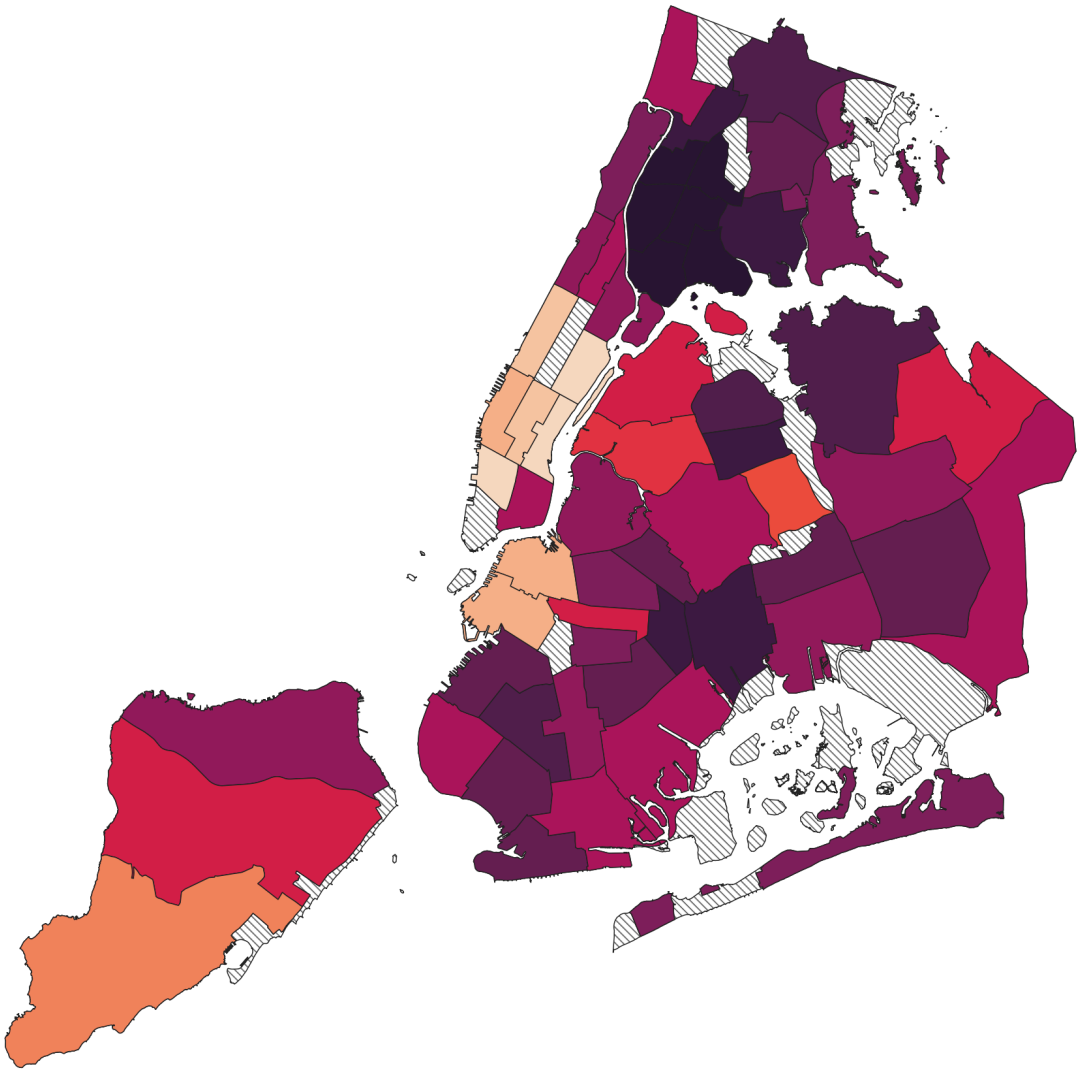
Notably, Medicaid reimbursement rates expanded in 2022 to 95% for all natal services and expanded coverage to cover Doula services in 2024, which includes 8 appointments.[16] Any goal that aims to improve equitable access to maternal healthcare services must consider the potential in communities with high proportions of Medicaid enrollees. With the recent expansion of Medicaid coverage in NYS, there is a high opportunity to create accessible care for historically underserved communities.

The NYC maternal and natal demographics data specifies the quantity of births paid for my Medicaid, by a third party or Health Maintenance Organization (HMO), or out-of-pocket. The Medicaid index measures the proportion of births paid for by Medicaid, relative to the births paid for by the other insurance types in the community district.

Formula : Medicaid index = 10 × Proportion of births paid by Medicaid
Range : 0-10
Methodology : The Medicaid index measures the proportion of births on Medicaid in each community district.
Findings : *East Tremont (Bronx)* has had the highest overall births on Medicaid, while *Battery Park/Tribeca (Manhattan)* has had the lowest.

[14] KFF, "Births Financed by Medicaid," KFF, October 17, 2019, https://www.kff.org/medicaid/state-indicator/births-financed-by-medicaid/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22.
[15] Michelle Samuels, "Medicaid-Covered Mothers Have Less Say in Birthing Experience | SPH," Bu.edu, 2020, https://www.bu.edu/sph/news/articles/2020/medicaid-covered-mothers-have-less-say-in-birthing-experience/.
[16] New York State Department of Health, "New York State Medicaid Doula Services Benefit," www.health.ny.gov, accessed June 16, 2025, https://www.health.ny.gov/health_care/medicaid/program/doula/.

Map 4.5: Aggregated Medicaid Index by NYC Community District, 2015-2021



Prenatal Care Index

Prenatal care covers a wide spectrum of healthcare interventions that improve health outcomes for both mothers and their newborns. Prenatal care includes, but is not limited to, check-ups, nutritional counseling and vitamin supplementation, psychosocial and mental health support, infection screening, and immunizations.[17] These measures are often critical determinants in neonatal health outcomes– according to a 2021 report, preliminary observational studies indicate that group prenatal care reduces preterm birth by over 41% and reduces NICU

[17] Mohammed Nasser Albarqi, "The Impact of Prenatal Care on the Prevention of Neonatal Outcomes: A Systematic Review and Meta-Analysis of Global Health Interventions," Healthcare 13, no. 9 (May 6, 2025): 1076, https://doi.org/10.3390/healthcare13091076.

admissions.[18] The rate of prenatal care can be used as an indicator of maternal health risks in a multitude of ways. Not only is prenatal care directly related to maternal health outcomes, but whether or not mothers access prenatal care is an indicator of accessibility barriers that may not otherwise be captured by other measures.

The trimester in which a woman accesses prenatal care, if at all, is often correlated with the income, education, and race of the mother. The women most vulnerable to pregnancy-related mortality are also those least likely to access prenatal care.[19] According to a 2024 report, "Maternal and Infant Mortality: Barriers to Prenatal Care," potential barriers to prenatal care include, but are not limited to, a lack of transportation, no leave off of work or school, lack of childcare, no appointments available with providers, being unable to afford expenses associated with prenatal care and nutrition, and being unaware of the pregnancy.[20]

Notably, a 2021 report "Community-Based Models to Improve Maternal Health Outcomes and Promote Health Equity" found that a South Carolina group prenatal care program for pregnant Medicaid beneficiaries saved the state $2.3 million by preventing premature births.[21] Not only does the prenatal care index indicate barriers to healthcare access, but it also identifies areas where a new patient-centered health center could both create access for underserved Medicaid recipients and profit through its community-based model.

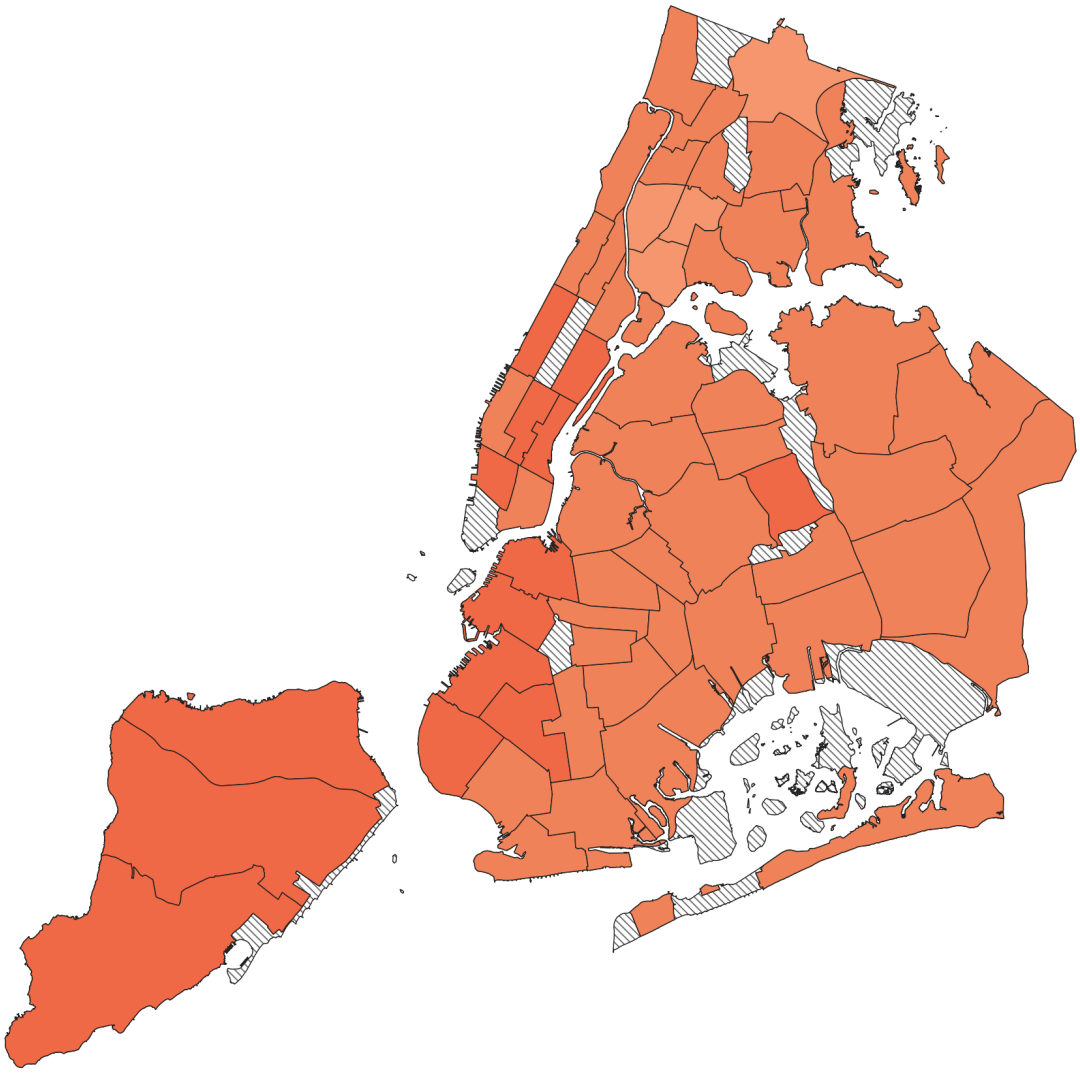
The NYC maternal and natal demographics data specifies the quantity of births in each community district by the trimester in which prenatal care was initiated. This composes four designations: prenatal care initiated in the 1st trimester, prenatal care initiated in the 2nd trimester, prenatal care initiated in the 3rd trimester, and no prenatal care initiated at all.

> **Formula** : Prenatal care index = (50 × Births with mothers who received no prenatal care + 33.5 × Births with mothers who received prenatal beginning the third trimester + 16.5 × Births with mothers who received prenatal beginning the second trimester)/(10 × Total number of births)
> **Range** : 0-5
> **Methodology** : Mothers' access to prenatal care is weighted progressively, with the most weightage on mothers who received none, and the least on mothers who received care only beginning the second trimester, all relative to mothers who received care beginning the first trimester.
> **Findings** : *Tottenville (Staten Island)* and *Upper East Side (Manhattan)* seem to have the most need based on access to prenatal care alone, while *Williamsbridge (Bronx)* seems to have the least.

---

[18] The Commonwealth Fund, "Community-Based Models to Improve Maternal Health Outcomes."
[19] Rebecca A. Krukowski et al., "Correlates of Early Prenatal Care Access among U.S. Women: Data from the Pregnancy Risk Assessment Monitoring System (PRAMS)," Maternal and Child Health Journal 26, no. 2 (October 4, 2021), https://doi.org/10.1007/s10995-021-03232-1.
[20] Lia Triscari, "Maternal and Infant Mortality: Barriers to Prenatal Care | Region V," Region V Public Health Training Center, May 3, 2024, https://www.rvphtc.org/2024/05/03/maternal-and-infant-mortality-barriers-to-prenatal-care/.
[21] The Commonwealth Fund, "Community-Based Models to Improve Maternal Health Outcomes."

Map 4.6: Aggregated Prenatal Care (PNC) Index by NYC Community District, 2015-2021



Multi-Dimensional Needs Index

In combining all indices into our multidimensional need index, the most weight is assigned to race, followed by reliability on Medicaid, access to prenatal care, median family income, and maternal education. This value is then multiplied by the birth index to scale according to the quantity of births happening in a community district.

> **Formula** : 2 × Birth index × ((32.73 × Race index + 21.82 × Medicaid index + 20 × Prenatal care index + 16.36 × Income index + 9.09 × Education index)/500)
> **Range** : 0-267.108

Methodology : In combining all indices into our multidimensional need index, the most weight is assigned to race, followed by reliability on Medicaid, access to prenatal care, median family income, and maternal education, then multiplying by the birth index to scale need according to the quantity of births happening in a community district.
Findings : *Borough Park (Brooklyn)* seems to have the most overall need, while *Greenwich Village/SOHO (Manhattan)* seems to have the least.

Map 4.7: Aggregated Multidimensional Needs Index by NYC Community District, 2015-2021

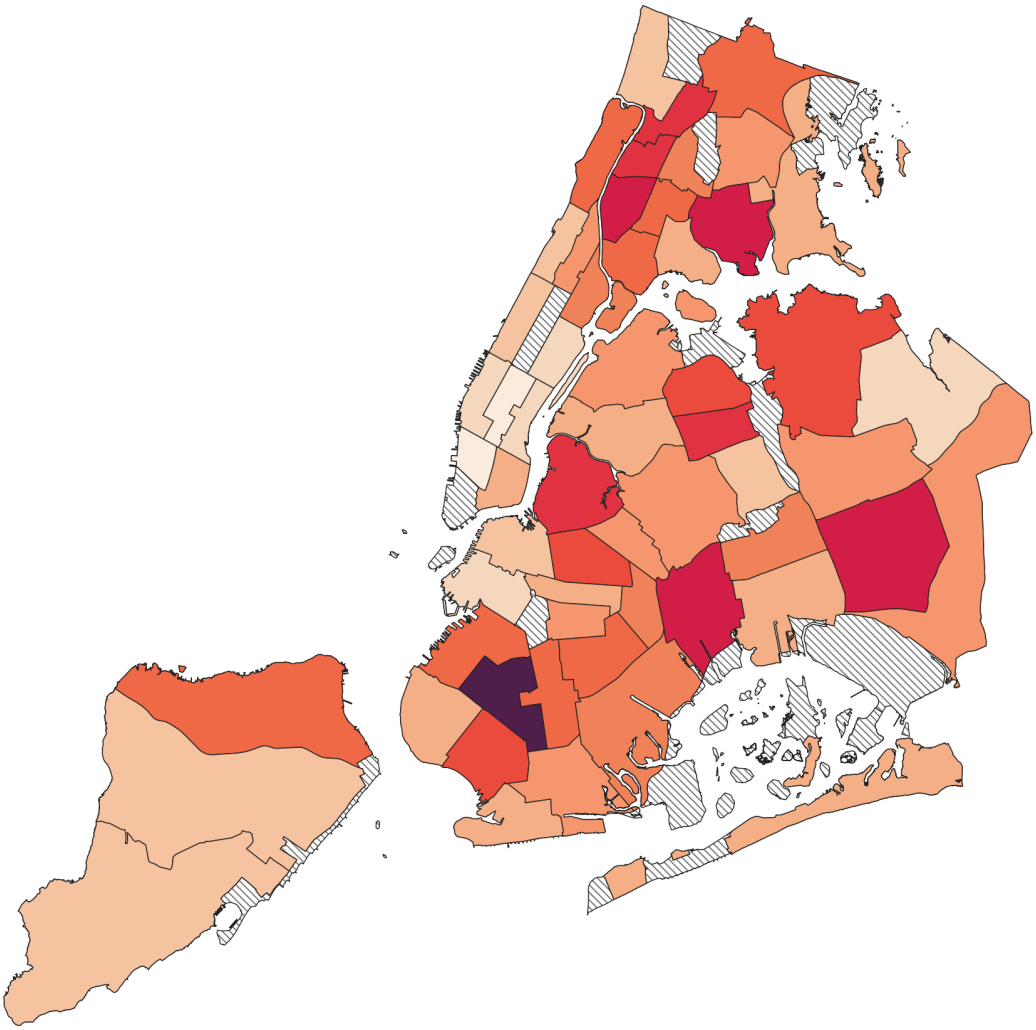


Table 4.1: Aggregated Indices by Community District in NYC

Neighborhood	Race Index	Education Index	Income Index	Birth Index	Prenatal Care Index	Medicaid Index	Need Index
Astoria, Long Island City	1.66	1.61	4.11	1.84	2.91	4.76	2.20
Battery Park, Tribeca	0.66	0.66	0.68	1.04	3.13	0.42	0.46
Bay Ridge	1.23	1.82	2.58	1.66	3.06	5.76	1.90
Bayside	1.59	1.53	1.91	0.60	2.96	4.92	0.63
Bedford Stuyvesant	2.38	2.37	7.03	2.14	2.81	6.71	3.57
Bensonhurst	1.37	2.20	5.97	2.47	2.99	7.38	3.78
Borough Park	0.58	2.55	7.20	5.00	3.00	7.90	7.85
Brownsville	4.24	2.59	8.43	1.22	2.60	8.05	2.57
Bushwick	3.58	2.52	7.92	1.12	2.76	7.59	2.20
Canarsie	3.25	1.85	2.50	2.09	2.76	5.82	2.89
Central Harlem	3.43	1.95	7.08	1.42	2.69	5.91	2.43
Chelsea, Clinton	1.31	1.01	1.10	0.96	2.96	2.02	0.66
Concourse, Highbridge	4.02	2.69	8.94	2.23	2.48	8.67	4.84
Coney Island	1.83	2.08	7.37	1.16	2.79	7.50	1.95
Crown Heights North	2.61	1.63	4.75	1.21	2.85	4.84	1.64
Crown Heights South	2.10	1.89	5.68	1.38	2.76	6.64	2.09
East Flatbush	4.19	2.18	5.89	1.74	2.59	7.17	3.21
East Harlem	3.32	2.19	8.73	1.39	2.74	6.44	2.59
East New York	3.88	2.57	7.75	2.47	2.66	8.05	5.00
East Tremont	4.02	2.81	9.32	1.18	2.53	8.91	2.62
Elmhurst, Corona	2.91	2.58	7.37	2.21	2.82	8.31	4.23
Flatbush, Midwood	1.83	1.88	4.66	2.36	2.88	6.53	3.34
Flushing	1.87	2.20	5.85	2.47	2.84	7.56	3.93
Fordham	3.67	2.60	8.64	2.00	2.59	8.47	4.17
Fort Greene, Brooklyn Heights	1.27	0.91	1.10	1.64	3.06	1.76	1.10
Fresh Meadows, Briarwood	1.72	1.71	3.43	1.65	2.89	6.01	2.09
Greenwich Village, SOHO	0.55	0.75	0.51	0.69	3.11	0.82	0.31
Howard Beach	2.43	2.25	3.05	1.22	2.76	6.44	1.68
Hunts Point	4.08	2.80	9.83	0.76	2.48	8.73	1.71

Jackson Heights	3.16	2.56	6.48	2.16	2.80	7.95	3.99
Jamaica, St. Albans	3.57	2.40	4.75	2.77	2.63	7.17	4.71
Lower East Side	2.14	2.04	8.39	1.13	2.90	5.81	1.85
Manhattanville	3.10	1.98	4.53	0.95	2.71	6.21	1.45
Midtown Business District	0.97	0.82	1.27	0.55	3.04	1.27	0.33
Morrisania	4.15	2.75	9.49	1.35	2.48	8.69	3.00
Mott Haven	4.05	2.86	9.66	1.43	2.48	8.72	3.19
Murray Hill	0.81	0.65	0.25	1.21	3.08	0.73	0.55
Park Slope	0.96	0.86	0.93	1.59	3.09	1.56	0.96
Pelham Parkway	2.99	2.32	6.27	1.28	2.58	7.52	2.23
Port Richmond	2.73	2.18	2.63	2.19	3.04	6.09	3.03
Queens Village	3.42	1.95	2.08	1.53	2.79	5.99	2.15
Rego Park, Forest Hills	1.11	1.14	1.82	1.28	3.06	3.69	1.11
Ridgewood, Glendale	2.07	1.99	3.14	1.70	2.88	5.96	2.22
Riverdale	2.92	1.73	4.45	1.01	2.80	5.62	1.47
Sheepshead Bay	0.78	1.83	2.97	2.16	2.97	5.98	2.42
Sunnyside, Woodside	1.72	1.56	3.81	1.55	2.93	4.53	1.80
Sunset Park	2.00	2.51	6.40	2.06	3.06	7.29	3.40
The Rockaways	3.01	2.21	5.17	1.20	2.72	6.79	1.94
Throgs Neck	3.23	2.18	5.04	0.94	2.60	6.78	1.53
Tottenville	0.64	1.33	1.53	1.50	3.19	2.59	1.07
Unionport, Soundview	3.62	2.64	8.22	2.25	2.51	8.20	4.56
University/Morris Heights	4.05	2.73	9.11	2.02	2.50	8.80	4.43
Upper East Side	0.59	0.58	0.17	2.43	3.19	0.53	1.00
Upper West Side	0.91	0.74	0.08	2.28	3.07	1.19	1.14
Washington Heights	3.14	1.99	6.78	1.93	2.82	6.64	3.35
Williamsbridge	4.11	2.40	5.59	1.60	2.37	7.97	3.00
Williamsburg, Greenpoint	0.69	2.35	4.07	3.53	2.90	6.01	4.23
Willowbrook, South Beach	1.11	1.73	1.99	1.38	3.11	4.74	1.38
Woodhaven	2.59	2.26	3.52	1.74	2.78	7.10	2.60

BOROUGH PARK AND MATERNAL HEALTH: THE ROLE OF CULTURE AND ACCESS

Borough Park is a community where cultural, religious, and structural factors have shaped the maternal health landscape in many ways. This section will examine the impact of community and cultural norms on institutional trust, birth practices, and maternal support systems in the high-fertility, tightly-knit Brooklyn neighborhood. The following case study will highlight the influence of religious values, provider relationships, and system design on maternal health outcomes and access to care in the community.

Community Context

Borough Park, located in southern Brooklyn, is home to one of the largest Haredi Jewish populations in the United States. The term "Haredi" refers to a subset of Orthodox Judaism characterized by strict adherence to Jewish law, modesty, and isolation from secular influences.[1] In Borough Park, Haredi families dominate the religious landscape and hold deep communal ties and shared norms around reproduction and gender roles. The neighborhood has the highest birth rate in the city, which has contributed to rapid demographic growth of the Jewish population in the area over the past two decades. The sustained population growth is also reflected by additional demographic trends of large household sizes, early marriage norms, and high fertility rates.[2] As a result, Borough Park represents a distinct environment for understanding how maternal health care is experienced and navigated in a community of strong cultural and religious norms.

The neighborhood's economic conditions play a key role in shaping maternal health care needs. While community cohesion is high, Borough Park also contains a significant number of low-income households. Nearly half of Hasidic families in New York City fall below the poverty line.[3] This is due, in part, to the traditional economic model of ultra-Orthodox households. Culturally, many families rely on a single income, as men engage in full-time religious study while women take on both childrearing and financial responsibilities.[4] This norm has direct implications for access to healthcare, especially during pregnancy and postpartum.

Gender Roles and Family Dynamics

The community's family structure is shaped by religious tradition and clearly defined gender roles that are reflected in daily life and long-term expectations. For the Orthodox Jewish community, modesty and spiritual purity are central values that are enforced through gender

[1] Steven M. Cohen, Ph.D. Jacob B. Ukeles, Ph.D. Ron Miller, Ph.D. Jewish Community Study of New York: 2011 Comprehensive Report (UJA-Federation of New York, 2012), 22. https://www.jewishdatabank.org.
[2] Cohen, Ukuleles, and Miller, Jewish Community Study of New York, 61.
[3] Ibid.
[4] Rachel Harris and Karen Skinazi, "'Was I Afraid To Get Up and Speak My Mind? No, I Wasn't': The Feminism and Art of Jewish Orthodox and Haredi Women," Shofar 38, no.2 (2020): 7-8. JSTOR.

separation in education, public life, and medical care.[5] The standard of modesty shapes the way that Haredi women dress, behave, and socialize. This principle influences their expectations around childbirth and natal care.

Education is gender-segregated at an early age to reflect the social expectation of men in the public sphere and women in the private sphere.[6] Meaning, women have significant responsibility in the private and reproductive spheres, but are formally excluded from decision-making structures in religious and legal domains. They are expected to manage the household, raise children, and work to support their families financially.[7]

Birth Practices and Institutional Trust

For Haredi women, pregnancy and birth are considered deeply spiritual experiences. Childbirth is described as a sacred responsibility because bringing a child into the world is considered a fulfillment of divine purpose.[8] This framework shapes how natal care is accessed and experienced. While many women have confidence in both spirituality and the medical system, religious norms and rabbinical guidance often carry more influence in health decisions than medical institutions.

Hospitals are the primary birth setting for most Borough Park residents. Maimonides Medical Center is the most widely used hospital for labor and delivery in Borough Park based on its proximity, kosher accommodations, and willingness to adjust for Sabbath observance.[9] However, institutional trust is conditional. While many Borough Park families rely on hospitals and modern medical interventions, satisfaction is often tied to the degree to which providers respect modesty norms, Sabbath observance, and family purity laws.[10] Concerns over electronic doors (which cannot be operated on Shabbat), male providers, or clinical practices that contradict halakhic rulings can make hospitals feel unwelcoming.[11] Some women report feeling dismissed or misunderstood when care providers overlook modesty norms or fail to recognize the importance of religious authority in health decisions, which can create mistrust and reluctance to seek institutional care.[12]

Rabbis play a critical role in healthcare navigation. Couples often consult religious authorities before making decisions about contraception, genetic testing, or medical

---

[5] Shimrit Prins Engelsman, Ephrat Huss, and Julie Cwike, "How Ultra-Orthodox (Haredi) Israeli Women Cope With Normative and Difficult Pregnancy and Childbirth Experiences," Nashim A Journal of Jewish Women's Studies & Gender Issues, no.33 (2018): 139. JSTOR.
[6] Engelsman, Huss, and Cwike, "How Ultra-Orthodox (Haredi) Israeli Women Cope," 147.
[7] Cohen, Ukuleles, and Miller, Jewish Community Study of New York, 219.
[8] Lynn Callister, Sonia Semenic, and Joyce Foster, "Culture and Spiritual Meanings of Childbirth: Orthodox Jewish and Mormon Women," Journal of Holistic Nursing 17, no.3 (1999): 288. https://doi-org.libezproxy2.syr.edu/10.1177/089801019901700305.
[9] "Hospital Amenities," Maimonides Heath. Accessed June 22, 2025. https://maimo.org.
[10] Family purity laws are a practice widely accepted by Haredi couples which govern marital intimacy, require physical separation during and shortly after menstruation, and affect reproductive planning. Engelsman, Huss, and Cwike, "How Ultra-Orthodox (Haredi) Israeli Women Cope," 147.
[11] Ibid., 151.
[12] Ezra Gabbay, Matthew W. McCarthy and Joseph J. Fins, "The Care of the Ultra-Orthodox Jewish Patient," Journal of Religion and Health 56, no. 2 (2017): 545-560. JSTOR.

interventions. When medical recommendations must be delayed for halakhic consultation care timelines can be disrupted. In some cases, rabbis actively facilitate access to care by approving interventions; however, in others, they may restrict it.[13] This dynamic is indicative of the importance of designing healthcare interventions that engage both clinical and spiritual decision-makers.

The Role of Midwives and Doulas

Midwives and doulas are highly valued in Borough Park. Borough Park has one of the highest concentrations of doulas in New York City, and midwives attended 1,472 births in 2021. In labor and delivery, husbands are often restricted from physical contact due to religious prohibitions during a woman's niddah status.[14] In these cases, doulas provide physical comfort and emotional support that the husband cannot. Their presence has been shown to enhance maternal satisfaction and reduce stress during labor.[15] In this way, doulas serve not only as support persons, but as facilitators of culturally aligned care.

Barriers and Community-Based Supports

Structural barriers shape maternal care experiences for many Haredi women in Borough Park. Comprehensive natal education and access to care can be impacted by the norms of traditional modesty requirements, limited access to culturally competent providers, and the communal expectation to conceive early in marriage.[16] These factors contribute to gaps in maternal care, particularly when women feel discomfort discussing reproductive issues or navigating secular health systems.

At the same time, Borough Park's social infrastructure provides important protective factors. Communal support systems of mutual aid, postpartum meal delivery, and informal childcare support from extended family or neighbors are well-established norms in Orthodox Jewish culture. These support systems reduce isolation and protect families from the full impact of economic hardships. In many cases, women express greater confidence in community-based care and rabbinic guidance than in institutional systems that may not accommodate religious life.[17]

Implications for System Design

The Borough Park case underscores the limitations of standard maternal care models in meeting the needs of culturally distinct, high-birth communities. Interventions that disregard

[13] Engelsman, Huss, and Cwike, "How Ultra-Orthodox (Haredi) Israeli Women Cope," 149.
[14] The term niddah refers to a woman's halakhic, or legal status, during menstruation when physical intimacy with her spouse is forbidden. Niddah status may influence how women interpret or manage their prenatal or gynecological care needs. Engelsman, Huss, and Cwike, "How Ultra-Orthodox (Haredi) Israeli Women Cope," 146.
[15] "Community-Based Doulas Are Improving Maternal Mental Health Outcomes and Expanding the Health Care Safety Net," National Association of Community Health Centers, published September 14, 2023. https://www.nachc.org/community-based-doulas-are-improving-maternal-mental-health-outcomes-and-expanding-the-health-care-safety-net/.
[16] Engelsman, Huss, and Cwike, "How Ultra-Orthodox (Haredi) Israeli Women Cope," 141.
[17] Cohen, Ukuleles, and Miller, Jewish Community Study of New York, 111.

religious norms risk diminishing institutional trust. Conversely, efforts that engage community leaders, invest in culturally responsive staff, and integrate spiritual values into care planning are more likely to succeed.

Designing effective maternal and infant care in Borough Park requires recognition of both the barriers and strengths in the community. This means improving Medicaid navigation and facility access and supporting trusted actors, such as doulas and midwives, who are grounded in cultural understanding. Borough Park demonstrates that maternal and infant health is not simply a medical matter, but one defined by community, faith, and culture.

CONCLUSION

These findings reveal consistent inequities in maternal and infant health care infrastructure across New York City. This reality is shaped by the disconnect that is seen in the areas of highest need and the availability of Medicaid-supported, community-centered care in New York City.

Citywide birthing trends point to a shifting landscape in maternal care. This is indicated by declining overall birth rate while demand for out-of-hospital care remained constant. Although home births still represent less than 1% of total births, there is a strong demonstration of preferred midwifery care, such as neighborhoods like Southeast Bronx with 85 midwives and Borough Park with 1,472 midwife-attended births in 2021, as referenced in *Figure 2.2b* and *Table 2.1*. This suggests that there is growing inconsistency between community preferences and the current medicalized, maternal infrastructure. Thus, indicating a shift away from the hospital-centered model that has dominated the modern maternal care system in New York City.

However, this perceived shift in preference is not met with an equitable distribution of provider resources. Analysis of Medicaid-enrolled professionals shows that there are geographic disparities of care throughout the city. Notably, OB GYN's remain heavily located in Manhattan, while the Bronx and Brooklyn, boroughs with large populations of Medicaid-funded births, are comparatively underserved. Patterns such as this suggest a systemic failure to align availability of Medicaid-supported services with individual-level demand and demographic need. While Medicaid is an essential to maternal care, the current financial structure is under strain. In 2021, natal care facilities in New York City were unable to cover around $220 million from Medicaid provisions. The total reimbursement for the year was an estimated $1.35 billion through Medicaid, with $190 million being the capital component as referenced in *Table 3.1*. If this trend holds up beyond 2021, it is safe to assume that non-hospital facilities will face similar circumstances of being unable to cover the cost incurred by Medicaid provided care.

The multi-dimensional needs index developed for this project offers a data-driven framework to target maternal and infant health interventions by weighing systemic inequities related to race, socioeconomic status, education, seeking prenatal care, and healthcare coverage. This multi-dimensional index highlights neighborhoods such as Borough Park and East New York that have a high need for maternal health support. However, communities like these often lack access to non-hospital birthing facilities, culturally competent providers, and Medicaid-eligible options. Without the infrastructure to successfully navigate these needs, disparate outcomes are likely to persist.

To create an equitable maternal and infant health care system in New York City, policymakers must carry out reforms that address provider distribution, Medicaid funding, and the expansion of community-based birth infrastructure, specifically for neighborhoods with high-needs.

FURTHER RECOMMENDATIONS

While this report highlights the need to address disparities in maternal health across New York City, several areas warrant further exploration to support the development of targeted, data driven interventions. The following recommendations suggest additional lines of inquiry to strengthen our understanding of maternal health and refine solutions for vulnerable populations.

1. Research involving non-hospital facilities providing maternal services

Future research should explore the role of non-hospital facilities, such as community clinics, that offer maternal health services, even if not explicitly designed for maternity care. These facilities, often operating in tandem with other health services, play a critical role in providing accessible prenatal and postnatal care, particularly in underserved areas. By investigating how these clinics support maternal health, gaps in service delivery can be identified, and opportunities to expand care models that complement hospital-based systems.

2. Research involving providers whose enrollment with Medicaid is pending in NYS

A critical gap in the current analysis lies in examining providers in the process of enrolling with Medicaid in New York State. These providers, including midwives, doulas, and other maternal health specialists, may face barriers to participation in Medicaid, which limits access to care for low-income individuals. Further research is needed to examine how pending enrollment affects service availability and quality, specifically for those reliant on Medicaid.

3. Research involving Medicaid reimbursement for non-hospitals

Given the growing interest in non-hospital birth models, further analysis should be conducted on Medicaid reimbursement policies for non-hospital maternal care providers, such as birth centers and home birth midwives. While Medicaid reimbursement for hospital services has been examined in this report, non-hospital providers are often underfunded or excluded from reimbursement programs. This is a significant barrier to expanding access to community-based birth options. Investigating these funding structures and recommending potential policy reforms will be crucial for ensuring equitable access to quality care.

4. Furthering present research beyond 2021

The findings presented in this report are based on data aggregated through 2021. Given the rapidly changing landscape of maternal health, particularly in the wake of the COVID-19 pandemic, it is imperative that this research be extended to include more recent data. Analyzing outcomes from 2022 onward allows a clearer view of the impact of ongoing public health crises, shifts in healthcare delivery, and evolving policies that affect maternal health outcomes. This updated data will provide a more up-to-date understanding of current trends and help guide future research more effectively.

BIBLIOGRAPHY

1. Albarqi, Mohammed Nasser. “The Impact of Prenatal Care on the Prevention of Neonatal Outcomes: A Systematic Review and Meta-Analysis of Global Health Interventions.” Healthcare 13, no. 9 (May 6, 2025): 1076. https://doi.org/10.3390/healthcare13091076.
2. Attanasio, Laura, and Katy B Kozhimannil. “Patient-Reported Communication Quality and Perceived Discrimination in Maternity Care.” Medical Care 53, no. 10 (2015): 863–71. https://doi.org/10.2307/26418059.
3. Basile, Monica. “Radical Doulas, Childbirth Activism, and the Politics of Embodiment.” In Body Battlegrounds: Transgressions, Tensions, and Transformations, edited by Chris Bobel and Samantha Kwan, 23–37. Vanderbilt University Press, 2019. https://doi.org/10.2307/j.ctv16759ws.6.
4. Benatar, Sarah, A. Bowen Garrett, Embry Howell, and Ashley Palmer. “Midwifery Care at a Freestanding Birth Center: A Safe and Effective Alternative to Conventional Maternity Care.” Health Services Research 48, no. 5 (October 2013): n/a-n/a. https://doi.org/10.1111/1475-6773.12061.
5. Brown, Sadie. “Montefiore Receives $5.4M To Fund Bronx Maternal Health Programs.” Published September 13, 2024. https://www.bxtimes.com.
6. Callister, Lynn, Sonia Semenic, and Joyce Foster. “Culture and Spiritual Meanings of Childbirth: Orthodox Jewish and Mormon Women.” *Journal of Holistic Nursing* 17, no.3 (1999): 288. https://doi-org.libezproxy2.syr.edu/10.1177/089801019901700305
7. Cohen, Steven M. Ph.D. Jacob B. Ukeles, Ph.D. Ron Miller, Ph.D. *Jewish Community Study of New York: 2011 Comprehensive Report*. New York: UJA-Federation of New York, 2012. https://www.jewishdatabank.org.
8. Courtot, Brigette, Ian Hill, Caitlin Crossbarnet, and Jenny Markell. “Midwifery and Birth Centers under State Medicaid Programs: Current Limits to Beneficiary Access to a High-Value Model of Care.” The Milbank Quarterly 98, no. 4 (December 2020): 1091–1113. https://doi.org/10.2307/48602837.
9. Craven, Christa. “The Birth of Consumer Activism for Midwives: From the Natural Childbirth Movement to Recent Legislative Efforts.” In Pushing for Midwives: Homebirth Mothers and the Reproductive Rights Movement, 40–60. Temple University Press, 2010. http://www.jstor.org/stable/j.ctt14bt93k.7.
10. Engelsman, Shimrit Prins, Ephrat Huss, and Julie Cwike. “How Ultra-Orthodox (Haredi) Israeli Women Cope With Normative and Difficult Pregnancy and Childbirth Experiences,” *Nashim, A Journal of Jewish Women's Studies & Gender Issues,* no.33 (2018): 139-151. JSTOR.
11. Gabbay, Ezra, Matthew W. McCarthy and Joseph J. Fins. “The Care of the Ultra-Orthodox Jewish Patient.” J*ournal of Religion and Health* 56, no. 2 (2017): 545-560. JSTOR.

12. Hanford, Jennifer. “Medical Mistrust, Distrust, and Trauma: The Impact on Neonatal Care.” American Academy of Pediatrics, April 2, 2025. https://publications.aap.org/journal-blogs/blog/31715/Medical-Mistrust-Distrust-and-Trauma-The-Impact-on?autologincheck=redirected.
13. Harris, Rachel and Karen Skinazi. “‘Was I Afraid To Get Up and Speak My Mind? No, I Wasn't’: The Feminism and Art of Jewish Orthodox and Haredi Women.” *Shofar* 38, no.2 (2020): 7-8. JSTOR.
14. Hill, Latoya, Samantha Artiga, Usha Ranji, and Alisha Rao. “Racial Disparities in Maternal and Infant Health: Current Status and Efforts to Address Them.” Kaiser Family Foundation, October 25, 2024. https://www.kff.org/racial-equity-and-health-policy/issue-brief/racial-disparities-in-maternal-and-infant-health-current-status-and-efforts-to-address-them/.
15. Hu, Winnie and Troy Closson, “New York City Has 186,000 Fewer Children and Teens Than It Did in 2020,” New York Times, June 27, 2024. https://www.nytimes.com/2024/06/27/ny.
16. KFF. “Births Financed by Medicaid.” KFF, October 17, 2019. https://www.kff.org/medicaid/state-indicator/births-financed-by-medicaid/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22.
17. Krukowski, Rebecca A., Lisette T. Jacobson, Jemima John, Patricia Kinser, Kendra Campbell, Tracey Ledoux, Kara L. Gavin, Chi-Yang Chiu, Jiajang Wang, and Abbey Kruper. “Correlates of Early Prenatal Care Access among U.S. Women: Data from the Pregnancy Risk Assessment Monitoring System (PRAMS).” Maternal and Child Health Journal 26, no. 2 (October 4, 2021). https://doi.org/10.1007/s10995-021-03232-1.
18. Maimonides Health, “Hospital Amenities.” Accessed June 22, 2025. https://maimo.org.
19. Martine, George, Jose Eustaquio Alves and Suzana Cavenaghi, “Urbanization and Fertility Decline: Cashing in on Structural Change,” International Institute for Environmental Development, December, 2013. 10653IIED.pdf.
20. Mensch, Barbara S. et al., “Evidence for Causal Links between Education and Maternal and Child Health: Systematic Review,” Tropical Medicine & International Health 24, no. 5 (February 15, 2019), https://doi.org/10.1111/tmi.13218.
21. Meldgaard, Maiken, Mads Gamborg, and Helle Terkildsen Maindal. “Health Literacy Levels among Women in the Prenatal Period: A Systematic Review.” Sexual & Reproductive Healthcare 34 (December 2022): 100796. https://doi.org/10.1016/j.srhc.2022.100796.
22. Mensch, Barbara S., Erica K. Chuang, Andrea Melnikas, and Stephanie R. Psaki. “Evidence for Causal Links between Education and Maternal and Child Health: Systematic Review.” Tropical Medicine & International Health 24, no. 5 (February 15, 2019). https://doi.org/10.1111/tmi.13218.
23. National Association of Community Health Centers. “Community-Based Doulas Are Improving Maternal Mental Health Outcomes and Expanding the Health Care Safety

Net.” Published September 14, 2023. https://www.nachc.org/community-based-doulas-are-improving-maternal-mental-health-outcomes-and-expanding-the-health-care-safety-net/.

24. New York State Department of Health. “Doula Services Information for Medicaid Members.” Ny.gov, 2024. https://www.health.ny.gov/health_care/medicaid/program/doula.
25. Nguyen, Thu T., Shaniece Criss, Melanie Kim, Monica M. De La Cruz, Nhung Thai, Junaid S. Merchant, Yulin Hswen, Amani M. Allen, Gilbert C. Gee, and Quynh C. Nguyen. “Racism during Pregnancy and Birthing: Experiences from Asian and Pacific Islander, Black, Latina, and Middle Eastern Women.” Journal of Racial and Ethnic Health Disparities 10, no. 6 (November 30, 2022). https://doi.org/10.1007/s40615-022-01475-4.
26. Nicholls-Dempsey, Laura, Ahmad Badeghiesh, Haitham Baghlaf, and Michael H. Dahan. “How Does High Socioeconomic Status Affect Maternal and Neonatal Pregnancy Outcomes? A Population-Based Study among American Women. Socioeconomic Status and Pregnancy Outcomes.” European Journal of Obstetrics & Gynecology and Reproductive Biology: X 20 (October 12, 2023): 100248. https://doi.org/10.1016/j.eurox.2023.100248.
27. Panazzolo, Michelle, and Ritchlyn Mohammed. “Birthing Trends in American Society and Women’s Choices.” Race, Gender & Class 18, no. 3/4 (2011): 268–83. https://doi.org/10.2307/43496848.
28. Samuels, Michelle. “Medicaid-Covered Mothers Have Less Say in Birthing Experience | SPH.” Bu.edu, 2020. https://www.bu.edu/sph/news/articles/2020/medicaid-covered-mothers-have-less-say-in-birthing-experience/.
29. The Commonwealth Fund. “Community-Based Models to Improve Maternal Health Outcomes and Promote Health Equity.” www.commonwealthfund.org, March 4, 2021. https://www.commonwealthfund.org/publications/issue-briefs/2021/mar/community-models-improve-maternal-outcomes-equity.
30. The Commonwealth Fund. “The Cost of Not Getting Care: Income Disparities in the Affordability of Health Services across High-Income Countries.” www.commonwealthfund.org, November 16, 2023. https://www.commonwealthfund.org/publications/surveys/2023/nov/cost-not-getting-care-income-disparities-affordability-health.
31. Triscari, Lia. “Maternal and Infant Mortality: Barriers to Prenatal Care | Region V.” Region V Public Health Training Center, May 3, 2024. https://www.rvphtc.org/2024/05/03/maternal-and-infant-mortality-barriers-to-prenatal-care/.
32. Vasan, Ashwin. “NEW YORK CITY DEPARTMENT of HEALTH and MENTAL HYGIENE,” September 2024,

https://www.nyc.gov/assets/doh/downloads/pdf/data/maternal-mortality-annual-report-2024.pdf.

33. Vayo, Amber B. "'Why Would I Go Back There?': Medical Mistrust and the Problem of Maternal Mortality." Law & Policy 47, no. 1 (November 27, 2024). https://doi.org/10.1111/lapo.12258.
34. Vilda, Dovile, Maeve Wallace, Lauren Dyer, Emily Harville, and Katherine Theall. "Income Inequality and Racial Disparities in Pregnancy-Related Mortality in the US." SSM - Population Health 9, no. 100477 (December 2019): 100477. https://doi.org/10.1016/j.ssmph.2019.100477.
35. Witting, Lillian. "Limited Access: Poverty and Barriers to Accessible Health Care." National Health Council. National Health Council, January 20, 2023. https://nationalhealthcouncil.org/blog/limited-access-poverty-and-barriers-to-accessible-health-care/.

APPENDIX I

List of Data Sources

Sl. No.	URL	Data Source	Data Manipulation
DATA ON PROVIDERS			
1.	https://health.data.ny.gov/Health/Medicaid-Enrolled-Provider-Listing/keti-qx5t/about_data	Medicaid Enrolled Provider Listing *Unit of Observation: Provider*	Filtered on counties in NYC, then merged with 3 on zip code
2.	https://s3.amazonaws.com/public.prod.emedny.org/provider/Pending_Provider_File.xlsx	Medicaid Pending Provider Listing *Unit of Observation: Provider*	
3.	https://github.com/erikgregorywebb/nyc-housing/blob/master/Data/nyc-zip-codes.csv	NYC Zip Codes and Corresponding Neighborhoods and Boroughs *Unit of Observation: Zip Code*	
4.	https://www.health.ny.gov/statistics/facilities/hospital/maternity/#county	Hospital Maternity-Related Procedures and Practices Statistics *Unit of Observation: Facility, Type of Birth*	Concatenated data on "All Births" for each hospital in Bronx, Kings, Queens, New York and Richmond counties
DATA ON MEDICAID REIMBURSEMENT			
5.	https://health.data.ny.gov/Health/Hospital-Inpatient-Discharges-SPARCS-De-Identified/82xm-y6g8/about_data	Hospital Inpatient Discharges (SPARCS De-Identified): 2015 *Unit of Observation : Discharge*	Filtered for counties in NYC, and discharges with any payment typology of "Medicaid" - then merged with 11. on APR-DRG Code + APR-DRG Severity Code, followed by merging with 13. Sheet "PUB-MA-FFS-Acute" on Operating Certificate Number

6.	https://health.data.ny.gov/Health/Hospital-Inpatient-Discharges-SPARCS-De-Identified/gnzp-ekau/about_data	Hospital Inpatient Discharges (SPARCS De-Identified): 2016 *Unit of Observation: Discharge*	Filtered for counties in NYC, and discharges with any payment typology of "Medicaid" - then merged with 11. on APR-DRG Code + APR-DRG Severity Code, followed by merging with 14. Sheet "PUB-MA-FFS-Acute" on Operating Certificate Number
7.	https://health.data.ny.gov/dataset/Hospital-Inpatient-Discharges-SPARCS-De-Identified/22g3-z7e7/about_data	Hospital Inpatient Discharges (SPARCS De-Identified): 2017 *Unit of Observation: Discharge*	Filtered for counties in NYC, and discharges with any payment typology of "Medicaid" - then merged with 11. on APR-DRG Code + APR-DRG Severity Code, followed by merging with 15. Sheet "PUB-MA-FFS-Acute" on Operating Certificate Number
8.	https://health.data.ny.gov/Health/Hospital-Inpatient-Discharges-SPARCS-De-Identified/4ny4-j5zv/about_data	Hospital Inpatient Discharges (SPARCS De-Identified): 2019 *Unit of Observation: Discharge*	Filtered for counties in NYC, and discharges with any payment typology of "Medicaid" - then merged with 12. on APR-DRG Code + APR-DRG Severity Code, followed by merging with 16. Sheet "PUB-MA-FFS-Acute" on Operating Certificate Number
9.	https://health.data.ny.gov/Health/Hospital-Inpatient-Discharges-SPARCS-De-Identified/nxi5-zj9x/about_data	Hospital Inpatient Discharges (SPARCS De-Identified): 2020 *Unit of Observation: Discharge*	Filtered for counties in NYC, and discharges with any payment typology of "Medicaid" - then merged with 12. on APR-DRG Code + APR-DRG Severity Code, followed by merging with 17. Sheet "PUB-MA-FFS-Acute" on Operating Certificate Number

10.	https://health.data.ny.gov/Health/Hospital-Inpatient-Discharges-SPARCS-De-Identified/tg3i-cinn/about_data	Hospital Inpatient Discharges (SPARCS De-Identified): 2021 *Unit of Observation: Discharge*	Filtered for counties in NYC, and discharges with any payment typology of "Medicaid" - then merged with 12. on APR-DRG Code + APR-DRG Severity Code, followed by merging with 18. Sheet "PUB-MA-FFS-Acute" on Operating Certificate Number
11.	https://www.health.ny.gov/facilities/hospital/reimbursement/apr-drg/weights/siw_alos_2014.htm	APR-DRG Service Intensity Weights and Average Length of Stay July 1, 2014 *Unit of Observation: Service+Severity*	
12.	https://www.health.ny.gov/facilities/hospital/reimbursement/apr-drg/weights/2018-07-01_final_weights.htm	Final APR-DRG Weights Effective July 1, 2018 *Unit of Observation: Service+Severity*	
13.	https://www.health.ny.gov/facilities/hospital/reimbursement/apr-drg/rates/ffs/2015/docs/2015-04_pub_ip_ffs.xls	APR-DRG and Exempt Rates for Medicaid Fee-for-Service (effective 04/01/2015) *Unit of Observation: Facility*	
14.	https://www.health.ny.gov/facilities/hospital/reimbursement/apr-drg/rates/ffs/2016/docs/2016-01-01_pub_ip_ffs.xls	APR-DRG and Exempt Rates for Medicaid Fee-for-Service (effective 01/01/2016) *Unit of Observation: Facility*	
15.	https://www.health.ny.gov/facilities/hospital/reimbursement/apr-drg/rates/ffs/2017/docs/2017-04-01_pub_ip_ffs.xlsx	APR-DRG and Exempt Rates for Medicaid Fee-for-Service (effective 04/01/2017) *Unit of Observation: Facility*	

16.	https://www.health.ny.gov/facilities/hospital/reimbursement/apr-drg/rates/ffs/2019/docs/2019-01-01_pub_ip_ffs.xlsx	APR-DRG and Exempt Rates for Medicaid Fee-for-Service (effective 01/01/2019) *Unit of Observation: Facility*	
17.	https://www.health.ny.gov/facilities/hospital/reimbursement/apr-drg/rates/ffs/2020/docs/2020-10-06_pub_ip_ffs_apr2020.xlsx	APR-DRG and Exempt Rates for Medicaid Fee-for-Service (effective 04/02/2020) *Unit of Observation:*	
18.	https://www.health.ny.gov/facilities/hospital/reimbursement/apr-drg/rates/ffs/2021/docs/2021-05-21_pub_ip_ffs_jan2021.xlsx	APR-DRG and Exempt Rates for Medicaid Fee-for-Service (effective 01/01/2021) *Unit of Observation: Facility*	
DATA ON COMMUNITY DEMOGRAPHICS			
19.	https://www.nyc.gov/site/doh/data/data-sets/public-use-birth-datasets.page	Community District Public Use Birth Datasets (By Year) *Unit of Observation: Community District*	Merged with 20. on community district (yearwise from 2011 to 2021)
20.	https://data.cccnewyork.org/data/table/66/median-incomes#66	Median Incomes By Community District (By Year) *Unit of Observation: Community District*	

APPENDIX II

List of Deliverables

Sl. No.	Filename	Description	Relative Pathname
DATA ON PROVIDERS			
1.	List_of_All_Providers.xlsx	List of all Medicaid-enrolled providers in NYC, offering pre-, peri- and post-natal services *Unit of Observation: Provider*	…./Deliverables/Data/Data on Providers/List_of_All_Providers.xlsx
2.	List_of_All_Facilities.xlsx	List of all Medicaid-enrolled facilities in NYC, offering pre-, peri- and post-natal services *Unit of Observation: Facility*	…./Deliverables/Data/Data on Providers/List_of_All_Facilities.xlsx
3.	Providers_of_Interest.xlsx	List of all Medicaid-enrolled (exclusively) pediatricians, midwives, doulas and OBGYNs in NYC *Unit of Observation: Provider*	…./Deliverables/Data/Data on Providers/Providers_of_Interest.xlsx
4.	Facilities_of_Interest.xlsx	List of all Medicaid-enrolled facilities exclusively offering pediatric, maternal and natal care in NYC *Unit of Observation: Provider*	…./Deliverables/Data/Data on Providers/Facilities_of_Interest.xlsx
5.	No._of_Facilities.xlsx	Number of Medicaid-enrolled facilities (hospital and non-hospital) in NYC, offering pre-, peri- and post-natal services, by borough *Unit of Observation: Borough*	…./Deliverables/Data/Data on Providers/No._of_Facilities.xlsx
6.	No._of_Doulas_Midwives_OBGYNs.xlsx	Number of Medicaid-enrolled doulas, midwives and OBGYNs in NYC, offering pre-, peri- and post-natal services, by zip code, neighborhood and borough *Unit of Observation: Zip Code/Neighborhood/Borough*	…./Deliverables/Data/Data on Providers/No._of_Doulas_Midwives_OBGYNs.xlsx
7.	Hospital_Birth_Data.xlsx	Data on the number and type of hospital births (as of 2021) by facility, including information on the no. of births attended by licensed midwives *Unit of Observation: Type of Birth (by facility)*	…./Deliverables/Data/Data on Providers/Hospital_Birth_Data.xlsx

DATA ON MEDICAID REIMBURSEMENT			
8.	List_of_Hospital_Services.xlsx	List of Medicaid-reimbursable pre-, peri- and post-natal services in NYS *Unit of Observation: Service*	…./Deliverables/Data/Data on Medicaid Reimbursement/List_of_Hospital_Services.xlsx
9.	Medicaid_Discharges_Full.xlsx	List of all Medicaid discharges in pre-, peri-, and post-natal services from all hospital facilities in NYC, over the years 2015-2021 (excluding 2018), with estimates for Medicaid reimbursement, profit and surplus for each discharge *Unit of Observation: Discharge (by year)*	…./Deliverables/Data/Data on Medicaid Reimbursement/Medicaid_Discharges_Full.xlsx
10.	Medicaid_Funding.xlsx	Total Medicaid reimbursement, profit and surplus estimated by facility, service and by service weighted across severities, by year *Unit of Observation: Facility/Service +Severity/Service (by year)*	…./Deliverables/Data/Data on Medicaid Reimbursement/Medicaid_Funding.xlsx
11.	List_of_Facilities.xlsx	List of hospital facilities providing pre-, peri- and post-natal services in NYC *Unit of Observation: Hospital*	…./Deliverables/Data/Data on Medicaid Reimbursement/List_of_Facilities.xlsx
12.	Medicaid_Midiwifery_Reimbursement_Fee_Schedule.xlsx	Medicaid reimbursement schedule for all midwifery services in NYS *Unit of Observation: Service*	…./Deliverables/Data/Data on Medicaid Reimbursement/Medicaid_Midiwifery_Reimbursement_Fee_Schedule.xlsx
DATA ON COMMUNITY DEMOGRAPHICS			
13.	NYC_Maternal_and_Natal_Demographics_by_CD.xlsx	Maternal neonate, and family demographics for all births in NYC, by community district over the years 2015-2021 (and aggregated over all years), including estimates of sub- and multi-index values for each (as well as for an aggregation over all years) *Unit of Observation: Community District (by year)*	…./Deliverables/Data/NYC_Maternal_and_Natal_Demographics_by_CD.xlsx

APPENDIX III

List of Visualizations

Sl. No.	Filename	Visualization	Relative Pathname
VISUALIZATIONS RELATED TO PROVIDERS			
1.	Births_Attended_by_Midwives.png	Density heat map visualizing the proportion of hospital births attended by licensed midwives across NYC	…/Deliverables/Visualizations/Visualizations Related to Providers/Births_Attended_by_Midwives.png
2.	Heatmap_Doulas.png	Density heat map visualizing Medicaid-enrolled doulas across NYC	…/Deliverables/Visualizations/Visualizations Related to Providers/Heatmap_Doulas.png
3.	Heatmap_OBGYNs.png	Density heat map visualizing Medicaid-enrolled OBGYNs across NYC	…/Deliverables/Visualizations/Visualizations Related to Providers/Heatmap_OBGYNs.png
4.	Heatmap_Midwives.png	Density heat map visualizing Medicaid-enrolled midwives across NYC	…/Deliverables/Visualizations/Visualizations Related to Providers/Heatmap_Midwives.png
5.	Heatmap_Pediatricians.png	Density heat map visualizing Medicaid-enrolled pediatricians across NYC	…/Deliverables/Visualizations/Visualizations Related to Providers/Heatmap_Pediatricians.png
6.	Map_Doulas_Midwives_OBGYNs.png	Map visualizing Medicaid-enrolled midwives, doulas and OBGYNs overlaid on top of each other	…/Deliverables/Visualizations/Visualizations Related to Providers/Map_Doulas_Midwives_OBGYNs.png
VISUALIZATIONS OF FUNDING			
7.	2015.png	Density heat map visualizing Medicaid reimbursement estimates by facility in maternal and natal services (in 2015)	…/Deliverables/Visualizations/Visualizations of Funding/Total Reimbursement by Facility/2015.png
8.	2016.png	Density heat map visualizing Medicaid reimbursement estimates by facility in maternal and natal services (in 2016)	…/Deliverables/Visualizations/Visualizations of Funding/Total Reimbursement by Facility/2016.png

9.	2017.png	Density heat map visualizing Medicaid reimbursement estimates by facility in maternal and natal services (in 2017)	…/Deliverables/Visualizations/Visualizations of Funding/Total Reimbursement by Facility/2017.png
10.	2019.png	Density heat map visualizing Medicaid reimbursement estimates by facility in maternal and natal services (in 2019)	…/Deliverables/Visualizations/Visualizations of Funding/Total Reimbursement by Facility/2019.png
11.	2020.png	Density heat map visualizing Medicaid reimbursement estimates by facility in maternal and natal services (in 2020)	…/Deliverables/Visualizations/Visualizations of Funding/Total Reimbursement by Facility/2020.png
12.	2021.png	Density heat map visualizing Medicaid reimbursement estimates by facility in maternal and natal services (in 2021)	…/Deliverables/Visualizations/Visualizations of Funding/Total Reimbursement by Facility/2021.png
13.	2015.png	Density heat map visualizing Medicaid reimbursement estimates for standard delivery and aftercare services in maternal and natal services (in 2015)	…/Deliverables/Visualizations/Visualizations of Funding/Total Reimbursement For Standard Maternal and Natal Care/2015.png
14.	2016.png	Density heat map visualizing Medicaid reimbursement estimates for standard delivery and aftercare services in maternal and natal services (in 2016)	…/Deliverables/Visualizations/Visualizations of Funding/Total Reimbursement For Standard Maternal and Natal Care/2016.png
15.	2017.png	Density heat map visualizing Medicaid reimbursement estimates for standard delivery and aftercare services in maternal and natal services (in 2017)	…/Deliverables/Visualizations/Visualizations of Funding/Total Reimbursement For Standard Maternal and Natal Care/2017.png
16.	2019.png	Density heat map visualizing Medicaid reimbursement estimates for standard delivery and aftercare services in maternal and natal services (in 2019)	…/Deliverables/Visualizations/Visualizations of Funding/Total Reimbursement For Standard Maternal and Natal Care/2019.png
17.	2020.png	Density heat map visualizing Medicaid reimbursement estimates for standard delivery and aftercare services in maternal and natal services (in 2020)	…/Deliverables/Visualizations/Visualizations of Funding/Total Reimbursement For Standard Maternal and Natal Care/2020.png

18.	2021.png	Density heat map visualizing Medicaid reimbursement estimates for standard delivery and aftercare services in maternal and natal services (in 2021)	…/Deliverables/Visualizations/Visualizations of Funding/Total Reimbursement For Standard Maternal and Natal Care/2021.png
19.	Aggregated.png	Density heat map visualizing Medicaid reimbursement estimates for standard delivery and aftercare services in maternal and natal services (aggregated, 2015-2021, excluding 2018)	…/Deliverables/Visualizations/Visualizations of Funding/Total Reimbursement For Standard Maternal and Natal Care/Aggregated.png
20.	Aggregated.png	Density heat map visualizing Medicaid reimbursement estimates by facility in maternal and natal services (aggregated, 2015-2021, excluding 2018)	…/Deliverables/Visualizations/Visualizations of Funding/Total Reimbursement by Facility/Aggregated.png
VISUALIZATIONS RELATED TO DEMOGRAPHICS			
21.	By_CD.png	Bar graph visualizing the various types of maternal insurance across NYC (in 2021)	…/Deliverables/Visualizations/Visualizations Related to Demographics/Maternal Insurance/By_CD.png
22.	By_Borough_and_CD.png	Bar graph visualizing the various types of maternal insurance across NYC, by borough (in 2021)	…/Deliverables/Visualizations/Visualizations Related to Demographics/Maternal Insurance/By_Borough_and_CD.png
23.	By_CD.png	Bar graph visualizing type of maternal prenatal care across NYC (in 2021)	…/Deliverables/Visualizations/Visualizations Related to Demographics/PNC/By_CD.png
24.	By_Borough_and_CD.png	Bar graph visualizing type of maternal prenatal care across NYC, by borough (in 2021)	…/Deliverables/Visualizations/Visualizations Related to Demographics/PNC/By_Borough_and_CD.png
25.	Change_in_Birth_Rate.png	Change in birth rate in NYC, 2011-2021	…/Deliverables/Visualizations/Visualizations Related to Demographics/Change_in_Birth_Rate.png
26.	Change.png	Change in no. of non-hospital births by location in NYC, 2011-2021	…/Deliverables/Visualizations/Visualizations Related to Demographics/Non-Hospital Births/Change.png

27.	Percent_Change.png	Percent change in no. of non-hospital births by location in NYC, 2011-2021	…/Deliverables/Visualizations/Visualizations Related to Demographics/Non-Hospital Births/Percent_Change.png
VISUALIZATIONS RELATED TO INDICES			
28.	Race_Index.png	Density heat map visualizing maternal race index across NYC (in 2021)	…/Deliverables/Visualizations/Visualizations Related to Indices/2021/Race_Index.png
29.	Education_Index.png	Density heat map visualizing maternal education index across NYC (in 2021)	…/Deliverables/Visualizations/Visualizations Related to Indices/2021/Education_Index.png
30.	Income_Index.png	Density heat map visualizing median family income index across NYC (in 2021)	…/Deliverables/Visualizations/Visualizations Related to Indices/2021/Income_Index.png
31.	Births_Index.png	Density heat map visualizing births index across NYC (in 2021)	…/Deliverables/Visualizations/Visualizations Related to Indices/2021/Births_Index.png
32.	Medicaid_Index.png	Density heat map visualizing Medicaid index across NYC (in 2021)	…/Deliverables/Visualizations/Visualizations Related to Indices/2021/Medicaid_Index.png
33.	PNC_Index.png	Density heat map visualizing prenatal care index across NYC (in 2021)	…/Deliverables/Visualizations/Visualizations Related to Indices/2021/PNC_Index.png
34.	Multi_Index.png	Density heat map visualizing multidimensional index across NYC (in 2021)	…/Deliverables/Visualizations/Visualizations Related to Indices/2021/Multi_Index.png
35.	Race_Index.png	Density heat map visualizing maternal race index across NYC (in 2020)	…/Deliverables/Visualizations/Visualizations Related to Indices/2020/Race_Index.png
36.	Education_Index.png	Density heat map visualizing maternal education index across NYC (in 2020)	…/Deliverables/Visualizations/Visualizations Related to Indices/2020/Education_Index.png
37.	Births_Index.png	Density heat map visualizing births index across NYC (in 2020)	…/Deliverables/Visualizations/Visualizations Related to Indices/2020/Births_Index.png

38.	Medicaid_Index.png	Density heat map visualizing Medicaid index across NYC (in 2020)	…/Deliverables/Visualizations/Visualizations Related to Indices/2020/Medicaid_Index.png
39.	PNC_Index.png	Density heat map visualizing prenatal care index across NYC (in 2020)	…/Deliverables/Visualizations/Visualizations Related to Indices/2020/PNC_Index.png
40.	Race_Index.png	Density heat map visualizing maternal race index across NYC (in 2019)	…/Deliverables/Visualizations/Visualizations Related to Indices/2019/Race_Index.png
41.	Education_Index.png	Density heat map visualizing maternal education index across NYC (in 2019)	…/Deliverables/Visualizations/Visualizations Related to Indices/2019/Education_Index.png
42.	Income_Index.png	Density heat map visualizing median family income index across NYC (in 2019)	…/Deliverables/Visualizations/Visualizations Related to Indices/2019/Income_Index.png
43.	Births_Index.png	Density heat map visualizing births index across NYC (in 2019)	…/Deliverables/Visualizations/Visualizations Related to Indices/2019/Births_Index.png
44.	Medicaid_Index.png	Density heat map visualizing Medicaid index across NYC (in 2019)	…/Deliverables/Visualizations/Visualizations Related to Indices/2019/Medicaid_Index.png
45.	PNC_Index.png	Density heat map visualizing prenatal care index across NYC (in 2019)	…/Deliverables/Visualizations/Visualizations Related to Indices/2019/PNC_Index.png
46.	Multi_Index.png	Density heat map visualizing multidimensional index across NYC (in 2019)	…/Deliverables/Visualizations/Visualizations Related to Indices/2019/Multi_Index.png
47.	Race_Index.png	Density heat map visualizing maternal race index across NYC (in 2018)	…/Deliverables/Visualizations/Visualizations Related to Indices/2018/Race_Index.png
48.	Education_Index.png	Density heat map visualizing maternal education index across NYC (in 2018)	…/Deliverables/Visualizations/Visualizations Related to Indices/2018/Education_Index.png
49.	Income_Index.png	Density heat map visualizing median family income index across NYC (in 2018)	…/Deliverables/Visualizations/Visualizations Related to Indices/2018/Income_Index.png

50.	Births_Index.png	Density heat map visualizing births index across NYC (in 2018)	…/Deliverables/Visualizations/Visualizations Related to Indices/2018/Births_Index.png
51.	Medicaid_Index.png	Density heat map visualizing Medicaid index across NYC (in 2018)	…/Deliverables/Visualizations/Visualizations Related to Indices/2018/Medicaid_Index.png
52.	PNC_Index.png	Density heat map visualizing prenatal care index across NYC (in 2018)	…/Deliverables/Visualizations/Visualizations Related to Indices/2018/PNC_Index.png
53.	Multi_Index.png	Density heat map visualizing multidimensional index across NYC (in 2018)	…/Deliverables/Visualizations/Visualizations Related to Indices/2018/Multi_Index.png
54.	Race_Index.png	Density heat map visualizing maternal race index across NYC (in 2017)	…/Deliverables/Visualizations/Visualizations Related to Indices/2017/Race_Index.png
55.	Education_Index.png	Density heat map visualizing maternal education index across NYC (in 2017)	…/Deliverables/Visualizations/Visualizations Related to Indices/2017/Education_Index.png
56.	Income_Index.png	Density heat map visualizing median family income index across NYC (in 2017)	…/Deliverables/Visualizations/Visualizations Related to Indices/2017/Income_Index.png
57.	Births_Index.png	Density heat map visualizing births index across NYC (in 2017)	…/Deliverables/Visualizations/Visualizations Related to Indices/2017/Births_Index.png
58.	Medicaid_Index.png	Density heat map visualizing Medicaid index across NYC (in 2017)	…/Deliverables/Visualizations/Visualizations Related to Indices/2017/Medicaid_Index.png
59.	PNC_Index.png	Density heat map visualizing prenatal care index across NYC (in 2017)	…/Deliverables/Visualizations/Visualizations Related to Indices/2017/PNC_Index.png
60.	Multi_Index.png	Density heat map visualizing multidimensional index across NYC (in 2017)	…/Deliverables/Visualizations/Visualizations Related to Indices/2017/Multi_Index.png
61.	Race_Index.png	Density heat map visualizing maternal race index across NYC (in 2016)	…/Deliverables/Visualizations/Visualizations Related to Indices/2016/Race_Index.png

62.	Education_Index.png	Density heat map visualizing maternal education index across NYC (in 2016)	…/Deliverables/Visualizations/Visualizations Related to Indices/2016/Education_Index.png
63.	Income_Index.png	Density heat map visualizing median family income index across NYC (in 2016)	…/Deliverables/Visualizations/Visualizations Related to Indices/2016/Income_Index.png
64.	Births_Index.png	Density heat map visualizing births index across NYC (in 2016)	…/Deliverables/Visualizations/Visualizations Related to Indices/2016/Births_Index.png
65.	Medicaid_Index.png	Density heat map visualizing Medicaid index across NYC (in 2016)	…/Deliverables/Visualizations/Visualizations Related to Indices/2016/Medicaid_Index.png
66.	PNC_Index.png	Density heat map visualizing prenatal care index across NYC (in 2016)	…/Deliverables/Visualizations/Visualizations Related to Indices/2016/PNC_Index.png
67.	Multi_Index.png	Density heat map visualizing multidimensional index across NYC (in 2016)	…/Deliverables/Visualizations/Visualizations Related to Indices/2016/Multi_Index.png
68.	Race_Index.png	Density heat map visualizing maternal race index across NYC (in 2015)	…/Deliverables/Visualizations/Visualizations Related to Indices/2015/Race_Index.png
69.	Education_Index.png	Density heat map visualizing maternal education index across NYC (in 2015)	…/Deliverables/Visualizations/Visualizations Related to Indices/2015/Education_Index.png
70.	Income_Index.png	Density heat map visualizing median family income index across NYC (in 2015)	…/Deliverables/Visualizations/Visualizations Related to Indices/2015/Income_Index.png
71.	Births_Index.png	Density heat map visualizing births index across NYC (in 2015)	…/Deliverables/Visualizations/Visualizations Related to Indices/2015/Births_Index.png
72.	Medicaid_Index.png	Density heat map visualizing Medicaid index across NYC (in 2015)	…/Deliverables/Visualizations/Visualizations Related to Indices/2015/Medicaid_Index.png
73.	PNC_Index.png	Density heat map visualizing prenatal care index across NYC (in 2015)	…/Deliverables/Visualizations/Visualizations Related to Indices/2015/PNC_Index.png

74.	Multi_Index.png	Density heat map visualizing multidimensional index across NYC (in 2015)	…/Deliverables/Visualizations/Visualizations Related to Indices/2015/Multi_Index.png
75.	Race_Index.png	Density heat map visualizing maternal race index across NYC (aggregated, excluding 2020)	…/Deliverables/Visualizations/Visualizations Related to Indices/Aggregated/Race_Index.png
76.	Education_Index.png	Density heat map visualizing maternal education index across NYC (aggregated, excluding 2020)	…/Deliverables/Visualizations/Visualizations Related to Indices/Aggregated/Education_Index.png
77.	Income_Index.png	Density heat map visualizing median family income index across NYC (aggregated, excluding 2020)	…/Deliverables/Visualizations/Visualizations Related to Indices/Aggregated/Income_Index.png
78.	Births_Index.png	Density heat map visualizing births index across NYC (aggregated, excluding 2020)	…/Deliverables/Visualizations/Visualizations Related to Indices/Aggregated/Births_Index.png
79.	Medicaid_Index.png	Density heat map visualizing Medicaid index across NYC (aggregated, excluding 2020)	…/Deliverables/Visualizations/Visualizations Related to Indices/Aggregated/Medicaid_Index.png
80.	PNC_Index.png	Density heat map visualizing prenatal care index across NYC (aggregated, excluding 2020)	…/Deliverables/Visualizations/Visualizations Related to Indices/Aggregated/PNC_Index.png
81.	Multi_Index.png	Density heat map visualizing multidimensional index across NYC (aggregated, excluding 2020)	…/Deliverables/Visualizations/Visualizations Related to Indices/Aggregated/Multi_Index.png
82.	Legend.png	Legend of Index Values for Community District Need Indices	…/Deliverables/Visualizations/Visualizations Related to Indices/Legend.png