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Birth of a City: Exploring the Impact of Residential Segregation on Preterm Birth Dynamics in Atlanta's Newest Cities

By

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Master of Public Health

Epidemiology

_____

Dr. Michael Kramer
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Birth of a City: Exploring the Impact of Residential Segregation on Preterm Birth Dynamics in Atlanta's Newest Cities

By

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B.A., University of Oklahoma, 2022
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Master of Public Health
Emory University
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An abstract of
A thesis submitted to the Faculty of the Rollins School of Public Health of Emory University
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Abstract

Birth of a City: Exploring the Impact of Residential Segregation on Preterm Birth Dynamics in Atlanta's Newest Cities

By Fizza Sattar

Introduction: Preterm birth, a leading cause of neonatal morbidity and mortality globally, is significantly influenced by various social factors. The cityhood movement in Atlanta has been characterized by the formation of new municipalities from predominantly white, affluent neighborhoods. The study explores how this movement, reflecting modern-day segregation trends, has impacted preterm birth rates across newly formed and pre-existing cities, specifically focusing on racial and socioeconomic disparities.

Objective: To explore the correlation between the cityhood movement and preterm birth rates in newly incorporated vs. pre-existing or unincorporated areas of Atlanta, further examining the role of racial and socioeconomic factors as potential mediators of the relationship.

Methods: Analyzing data from 497,419 live births in DeKalb and Fulton counties in Atlanta from 2000 to 2020, the study used logistic regression models to assess the association between cityhood status and preterm birth. Key variables included city incorporation status, maternal demographics, and insurance coverage, adjusting for confounders and potential interactions.

Results: Significant disparities were observed between the maternal characteristics and preterm birth rates of pre-existing and newly incorporated cities. Newly incorporated cities primarily had births to non-Hispanic White mothers (53.5%), higher private insurance coverage (58.8%) and lower preterm birth rates (10.2%). In contrast, pre-existing or unincorporated areas saw predominantly non-Hispanic Black mothers (49.4%), higher usage of public insurance or no insurance (29.7%, 52.2%), and increased preterm birth rates (12.5%). Unadjusted logistic regression highlighted a 26% higher odds of preterm birth in pre-existing areas (OR: 1.26, 95% CI: 1.22-1.31). Adjustments for maternal age, race, and marital status revealed significant associations, with non-Hispanic Black and Multiracial mothers experiencing higher odds of preterm birth. Further adjustments and inclusion of city-specific fixed effects confirmed these disparities, and an interaction term between cityhood status and maternal age showed nuanced impacts on preterm birth risk.

Conclusion: This study underscores the need to consider the historical context of the cityhood movement, finding that newly incorporated cities exhibit lower pre-term birth rates and are influenced by factors such as race and socioeconomic status. Future research should pursue longitudinal and qualitative studies to further understand how urban restructuring affects health disparities.

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Introduction

Urban planning and municipal restructuring have been shown to have profound impacts on public health outcomes, a relationship that has been observed in metropolitan areas across the United States[19]. The unique cityhood movement in the Atlanta metropolitan area has been a significant urban phenomenon, representing a trend in which affluent and predominantly white neighborhoods in unincorporated areas have sought city status, leading to the creation of new municipalities, and excluding other communities from their new city boundaries. Considering the potential impact of this movement on a myriad of health outcomes, this thesis seeks to answer the following question: How did the creation of new municipalities in the Atlanta metropolitan area between 2000 and 2020 influence preterm birth rates across those communities, and were there any differential impacts based on racial or socioeconomic factors?

The aims of this study are twofold:

1. To investigate the role of racial and socioeconomic factors by examining how the racial and socioeconomic composition of communities impacted by the cityhood movement correlated with changes in preterm birth rates.
2. To assess the relationship between the establishment of new municipalities in the Atlanta metropolitan area between 2000 and 2020 and shifts in preterm birth rates across those communities, comparing newly incorporated municipalities and to pre-existing areas of Atlanta over the specified time period.

Background and Literature Review

Preterm Birth

Preterm birth, or prematurity, is defined as delivery prior to 37 weeks gestational age and has been identified as the leading cause of neonatal morbidity and mortality in the world[1].

Prematurity is classified as a worldwide epidemic with a global incidence of 15 million occurrences per year[1]. Preterm births can be attributed to various factors, with the most common causes including pre-eclampsia, eclampsia, and intrauterine growth restriction[2]. Spontaneous preterm birth is recognized as a syndrome stemming from a multitude of factors, including infection or inflammation, vascular disease, and uterine overdistension. Many important risk factors for spontaneous prematurity have been identified to include chronic stress, interpersonal and structural racism, low maternal education, low income, and a history of previous preterm birth [2, 13].

Chronic stress as a risk factor within this hypothesis refers to life-course exposure to stressors prior to conception[14]. These preconceptional stressors are classified as major life events temporarily distant from the pregnancy, such as Adverse Childhood Experiences, as well as chronic stressors over a significant portion of the mother's life, occurring from situations such as long-time exposure to poverty, perceived discrimination, or high-crime neighborhoods[14]. Studies have shown that both acute and chronic psychosocial stress interact with maternal health over the life course and may cause racial disparities in preterm birth rates[14]. Mothers living in places characterized by decreased opportunity, inequality, or rapid change may experience chronic stress as a result of these situations, thereby placing them at a higher risk of experiencing a preterm birth.

Interpersonal and structural racism additionally play an influential role in adverse birth outcomes. Interpersonal racism refers to prejudice and discrimination that occurs between people, manifesting through behaviors, actions, and beliefs favoring one race over another. Structural racism is the systemic inequality rooted in historical and societal policies and practices that perpetuates racial inequities. A recent study found that different measures of residential

segregation, a manifestation of structural racism, were differentially associated with race-specific adverse birth outcomes[15]. Among Black mothers, exposure to prejudice and hypersegregation was associated with an increased risk of several adverse birth outcomes, including preterm birth and low birthweight. Additionally, there were greater racial disparities in preterm birth in racially isolated counties. Local events in the Atlanta metropolitan area have perpetuated residential segregation and racial isolation within counties. The inclusion of interpersonal and structural racism as a risk factor for preterm birth is vital, as mothers who are exposed to racism and prejudice are placed at a higher risk of experiencing a preterm birth.

Similarly, income inequality has been exacerbated by local events in the Atlanta metropolitan area. A 2016 study found that any increase in state-level income inequality was associated with a 7% increase in risk of preterm birth[16]. The study also found that when inequality expanded over the course of the year leading up to the delivery, risk of preterm birth increased regardless of the degree of initial inequality. The findings additionally show that an increase in inequality was equally detrimental for women with public and private insurance statuses, indicating a broader impact on risk of preterm birth.

With such a high prevalence globally and so many contributing social factors, prematurity can have significant emotional and economic impacts on families and on society as a whole. Infants who are born preterm are at a significantly higher risk for various long-term health complications including asthma, learning disabilities, attention deficit disorder, and emotional problems[6]. Preterm infants are also at a higher risk for developing insulin resistance and hypertension as adults. Similarly, the toll of experiencing a preterm birth on mothers is significant. Maternal psychological distress – including symptoms of anxiety, depression, and post-traumatic stress disorder – is more frequently reported during the postpartum period by

women who delivered preterm than those who delivered at term[6]. On an economic front, the Institute of Medicine estimated that the societal cost of preterm birth in the U.S. in 2005 was $26 billion annually[6].

The United States experiences a particularly high rate of preterm births, with nearly 1 in 10 babies born premature every year[1]. In addition to this, the United States suffers from a persistent disparity in preterm birth rates across racial and ethnic subgroups[3]. In 2007, the Centers for Disease Control and Prevention highlighted a clear disparity between the overall (12.7 per 1000), the non-Hispanic white (11.5 per 1000), and the non-Hispanic black (18.3 per 1000) preterm birth rates[4]. Additional points of disparities that have been identified within preterm birth rates include maternal education level, access to prenatal care, smoking, stress, and neighborhood disadvantage. Culhane and Goldenberg (2011) found that when comparing the rates of preterm birth for women residing in disadvantaged neighborhoods to those living in more advantaged areas, without considering maternal race/ethnicity, a clear pattern of risk emerges. Non-Hispanic black women tend to live in more disadvantaged neighborhoods, and these neighborhoods are associated with a higher risk of preterm birth[4]. Pearl et al (2018) found similar conclusions, with research supporting that exposure to residential poverty is related to an elevated risk of preterm birth, particularly among black women[5]. Krieger et al (2020) explored historical redlining in the United States and found that historical redlining may be a structural determinant of present-day risk of preterm birth[17].

Neighborhoods and Health

The belief that an individual's physical environment greatly influences their health is deeply rooted in both historical and present-day perspectives and is fundamental to understanding the intricate ways in which one's health can be impacted. Where an individual

resides can impact their access to education, employment, social support, physical activity, nutritional food, and safety. Considering this, factors such as residential segregation and neighborhood-level socioeconomic inequality perpetuate disparities in health statuses and social determinants. A neighborhood-level patterning of health disparities between racial/ethnic groups has been present within the U.S. for decades[7]. The aggregation of socioeconomic resources within neighborhoods has been linked to a myriad of poor health outcomes, ranging from low birth weight to cancer incidence, to heart disease incidence and mortality[7]. Numerous studies have consistently highlighted a positive correlation between neighborhood disadvantage and disease, injury, and mortality. Segregation's role in producing health disparities revolves around the systematic division of communities along racial and socioeconomic lines, leading to an unequal distribution of resources and opportunities.

Segregation not only perpetuates socioeconomic disadvantages, but also creates barriers to healthcare access and healthy living conditions, directly impacting the health outcomes of marginalized populations. Vu et al (2024) identified several key mechanisms through which residential segregation influences disparate health outcomes among Black infant populations, including lower access to prenatal care, higher levels of prejudice, greater transportation barriers, and increased food insecurity[18]. Janevic et al (2021) identified racial residential segregation to be a driver for high infant mortality rates, and as well as being significantly associated with higher preterm birth rates[8]. Through these various mechanisms, segregation enables health inequities from birth and throughout the life course.

Atlanta's Cityhood Movement

Every so often in the Atlanta metropolitan area, unincorporated neighborhoods will join the long-spanning state-wide movement to form their own city. Prior to incorporation, these

neighborhoods do not fall within any city limits and are thereby governed at the county level. The cityhood movement first struck Atlanta in 2005 with the incorporation of the city of Sandy Springs[9]. With this shift, Sandy Springs residents were able to have their own elected officials, laws, and ordinances. The first eight cities that were formed as a part of this movement in Atlanta were distinctly composed of white upper-class neighborhoods, with their racial/ethnic minority and lower-income counterparts excluded[9]. Many of these cities were formed just as their previous county's demographics and leadership became more racially and politically diverse, causing the typically high income, predominantly white neighborhoods to feel distrustful of and disrespected by the county leadership. Residents of the new cities have cited their desire for more control as their motivator to incorporate, specifically over tax dollars, housing, and zoning decisions[9].

More recently, three unincorporated areas in Cobb County, GA were rejected by voters on the 2022 ballot[10]. Had these cities been created, they would have held some of the wealthiest and whitest real estate in Atlanta's western suburbs. The residents of this county were heavily motived by the issue of housing density, as Cobb County was planning to build affordable subsidized housing in the area[10]. Ultimately, the driver behind city incorporation has historically been to control the way in which public dollars are distributed and what is built in their communities. Although Cobb County has grown increasingly diverse in recent decades, with non-Hispanic white residents making up 51% in 2022 as opposed to 85% in 1990, these neighborhoods were an exception[10]. One of the proposed incorporated cities would have been made up of 70% white residents, while the other two proposed cities would have a median income that would exceed $110,000 as opposed to the county median of $78,000[10].

The cityhood movement has had disastrous impacts on those left behind in the unincorporated parts of the counties – historically their more diverse neighbors. As of 2012, Fulton County, GA estimated that the cityhood movement had cost them $38 million per year[11]. County officials are left with the difficult choice of either raising taxes or providing less to those left behind. As the Atlanta Journal-Constitution wrote in 2015, "These new cities have become mostly white islands of safety and affluence. What's remaining is heavily black [and] less well-off" [11]. Several experts have theorized that Georgia's cityhood movement is a form of modern-day segregation, with new spatial boundaries separating communities of color from their white counterparts and thereby cutting them off from valuable resources and support[12]. Within the scope of this hypothesis, mothers in unincorporated spaces going through cityhood changes may be especially vulnerable to the situations and risk factors of chronic stress due to the motivations behind the cityhood movement, thereby placing them at a higher risk of experiencing a preterm birth. As residential segregation has historically been associated with higher rates of preterm birth, this research aims to explore how the creation of new municipalities in the Atlanta metropolitan area influence preterm birth rates across those communities, and if there are any differential impacts based on racial or socioeconomic factors.

Methods

Population

The study population is comprised of pregnancies resulting in live births born between 2000 and 2020 to residents in Dekalb or Fulton counties in Georgia who resided in neighborhoods that would eventually, or had already, become newly incorporated cities. The study population excludes births to residents of long-standing cities and neighborhoods that

remained unincorporated through the time period. The study sample consists of 497,419 live births in Dekalb or Fulton counties within the years of 2000 and 2020.

Measures

Among the population of pregnancies in the ever-incorporated or newly-incorporated neighborhoods, the study exposure is defined as whether the city had not yet or had already incorporated into a new city at the time of each birth. This variable was categorized as "Pre-New City" and "Post-New City" to indicate if the birth occurred prior to or after the creation of the new city. Exposure data was obtained by comparing city limits in Dekalb and Fulton counties overtime.

The outcome of preterm birth was defined as births occurring prior to 37 weeks gestational age. Outcome data was obtained via IRB approval through the 2010 US Census based on maternal residential census tract. Births occurring prior to 37 weeks gestational age were categorized as "Preterm", while any other births in the dataset were categorized as "Not Preterm". Births prior to 22 weeks gestational age were excluded.

Other variables considered in the analysis included maternal age, maternal race, maternal marital status, insurance coverage type, low birthweight, birth year, and year of city incorporation. Insurance coverage type was classified as Public, Private, Other, or None. Low birthweight was classified as Low Birthweight (less than 2500g) and Normal Birthweight. Births with a birthweight less than 500 grams were excluded.

Analysis

The study sample of births was summarized using descriptive statistics, breaking down the race, age, marital status, and insurance type of each mother in the dataset according to the

birth's cityhood status. Logistic regressions were performed to explore the relationship between cityhood status, preterm birth, and other variables. Maternal age and year of city incorporation were controlled for in the models as potential confounders. Maternal race, marital status, insurance coverage type, and birth year were considered as effect modifiers, with marital status and insurance type being used to measure socioeconomic status. City name was added for fixed effects in the model.

Results

Descriptive Statistics

Descriptive statistics for the study population are presented in Table 1, consisting of 497,419 live births in Dekalb or Fulton counties within the years of 2000 and 2020. There were 68,872 live births in pre-new city or unincorporated space, and 64,750 live births in post-new city space.

	Pre-New City (N=68872)	**Post-New City (N=64750)**	**Overall (N=133622)**
Maternal Race			
Asian	3673 (5.3%)	9960 (15.4%)	13633 (10.2%)
Black or African American	34011 (49.4%)	17629 (27.2%)	51640 (38.6%)
White	29358 (42.6%)	34611 (53.5%)	63969 (47.9%)
Multiracial	1655 (2.4%)	2348 (3.6%)	4003 (3.0%)
Other	175 (0.3%)	202 (0.3%)	377 (0.3%)
Maternal Age			
Mean (SD)	29.6 (6.16)	31.2 (5.58)	30.4 (5.94)
Median [Min, Mix]	29.9 [11.2, 54.1]	31.6 [13.0, 55.3]	30.9 [11.2, 55.3]
Insurance Type			
Private	10496 (15.2%)	38049 (58.8%)	48545 (36.3%)
Public	20426 (29.7%)	13812 (21.3%)	34238 (25.6%)
Other	2007 (2.9%)	2100 (3.2%)	4107 (3.1%)
None	35943 (52.2%)	10775 (16.6%)	46718 (35.0%)

Marital Status			
Married	41162 (59.8%)	45282 (69.9%)	86444 (64.7%)
Unmarried	27710 (40.2%)	19468 (30.1%)	47178 (35.3%)

Table 1: Descriptive statistics of cityhood status.

There appears to be significant variation across cityhood status in the racial distribution of mothers in the study. In newly incorporated cities or post-new city space, the majority of live births were to non-Hispanic White mothers (53.5%), followed by non-Hispanic Black mothers (27.2%) and Asian mothers (15.4%). In contrast, pre-existing or non-incorporated areas saw a higher proportion of live births to non-Hispanic Black mothers (49.4%), with non-Hispanic White mothers (42.6%) and Asian mothers (5.3%) following.

Socioeconomic factors, measured by insurance coverage type and marital status, indicated that private health insurance is significantly more commonly used in newly incorporated areas, covering 58.8% of live births, compared to 15.2% in pre-existing or unincorporated areas. Public health insurance covered 21.3% of live births in newly incorporated areas, and 16.6% of these areas are uninsured. In contrast, public insurance covers 29.7% of live births in pre-existing or unincorporated areas with 52.2% of the population being uninsured. Unmarried mothers have a higher prevalence of preterm birth in pre-new city or unincorporated spaces (40.2%) which decreases after city incorporation (30.1%). The inverse of this relationship can be seen for married mothers, as they experience a lower prevalence of preterm birth in pre-new city spaces (59.8%) which increases after city incorporation (69.9%).

Table 2 presents a breakdown of the outcome variable of preterm birth based on the exposure of city incorporation status. There were a total of 15,181 preterm live births that occurred in Dekalb or Fulton counties within the years of 2000 and 2020, with 10.2% occurring in newly incorporated space and 12.5% in pre-existing or unincorporated space.

	Pre-New City (N=68872)	Post-New City (N=64750)	Overall (N=133622)
Preterm Birth			
Preterm	8605 (12.5%)	6576 (10.2%)	15181 (11.4%)
Not Preterm	60267 (87.5%)	58174 (89.8%)	118441 (88.6%)

Table 2: Descriptive statistics of preterm birth.

Logistic Regression Models

Table 3 displays results from the logistic regression analyses on five sequential models, investigating the factors associated with the likelihood of preterm birth. Statistical significance for each model is denoted by asterisks.

Variables	**Model 1** OR (95% CI)	**Model 2** OR (95% CI)	**Model 3** OR (95% CI)	**Model 4** OR (95% CI)	**Model 5** OR (95% CI)
Cityhood status (ref = Post-New City)	*1.26 (1.22-1.31)	*1.26 (1.20-1.31)	0.99 (0.95-1.04)	0.95 (0.89-1.01)	0.96 (0.90-1.02)
Maternal age		*1.01 (1.01-1.02)	*1.03 (1.02-1.03)	*1.03 (1.02-1.03)	*1.03 (1.03-1.04)
Year of city creation		1.00 (0.99-1.00)	*0.98 (0.97-0.98)	*0.98 (0.97-0.98)	*0.98 (0.97-0.98)
Maternal race					
Asian			ref	ref	ref
Black or African American			*1.63 (1.52-1.75)	*1.55 (1.44-1.68)	*1.56 (1.44-1.68)
White			*1.14 (1.07-1.22)	*1.15 (1.07-123)	*1.55 (1.07-1.23)
Multiracial			*1.24 (1.10-1.39)	*1.22 (1.08-1.37)	*1.22 (1.08-1.38)
Other			1.29 (0.92-1.77)	1.29 (0.91-1.77)	1.29 (0.92-1.77)
Insurance status					
Private			ref	ref	ref
Public			1.01 (0.96-1.07)	1.01 (0.96-1.06)	1.01 (0.96-1.07)
Other			0.94 (0.85-1.04)	0.94 (0.84-1.04)	0.94 (0.85-1.05)
None			0.98	0.98	0.99

	(0.93-1.03)	(0.93-1.03)	(0.94-1.05)
Marital status (ref = Married)	*1.32 (1.26-1.38)	*1.32 (1.26-1.38)	*1.31 (1.26-1.37)
Cityhood x Age			*0.99 (0.98-1.00)

Table 3: Sequential logistic regression models. Model 1 is unadjusted, Model 2 adjusts for potential confounders, Model 3 adjusts for additional individual covariates, Model 4 adjusts for fixed effects, and Model 5 adds the interaction term.

Model 1 is unadjusted, solely considering the association of cityhood status with preterm birth. This model reveals a significant increase in the odds of preterm birth by 26% for births in pre-existing or unincorporated spaces compared to giving birth in new cities (OR: 1.26, 95% CI: 1.22-1.31).

Model 2 adjusts for the potential confounders of maternal age and year of city creation. This model maintains the previously observed significant influence of cityhood status (OR: 1.26, 95% CI: 1.20-1.31), additionally revealing a 1% increase in the odds of preterm birth with each additional year of maternal age (OR: 1.01, 95% CI: 1.01-1.02).

Model 3 additionally adjusts for various individual level covariates, such as maternal race, insurance status, and marital status. The year of city creation has an odds ratio of 0.98 (95% CI: 0.97-0.98), indicating a 2% lower odds of preterm birth in areas prior to incorporation as compared to newly incorporated cities. Additionally, Black or African American mothers have 63% increased odds of preterm birth (OR: 1.63, 95% CI: 1.52-1.75) and Multiracial mothers have a 24% increased odds (OR: 1.24, 95% CI: 1.10-1.39) when compared to Asian mothers. White mothers also show an increased odds for preterm birth (OR: 1.14, 95% CI: 1.07-1.22). Marital status is also significantly associated with increased odds of preterm birth, with unmarried women exhibiting a 32% increased odds of preterm birth compared to married women (OR: 1.32, 95% CI: 1.26-1.38).

Model 4 further expands the analysis by including fixed effects for city in the model, aiming to control for any city-specific unobserved heterogeneity. Chunk tests were then performed on the additive scale, utilizing the AIC to determine the best fitting model and any significant interactions. The inclusion of these fixed effects does not significantly alter the model results, which largely align with those of Model 3. Significant effects continue to be observed for Black or African American mothers (OR: 1.55, 95% CI: 1.44-1.68), White mothers (OR: 1.15, 95% CI: 1.07-1.23), Multiracial mothers (OR: 1.22, 95% CI: 1.08-1.37), and marital status (OR: 1.32, 95% 1.26-1.38).

Model 5 is the most comprehensive, including all the previous variables as well as an interaction term between cityhood status and maternal age. This model indicates a significant interaction between the two variables of interest (OR: 0.99, 95% CI: 0.98-1.00). Maternal race and marital status both continue to maintain a significant relationship with preterm birth.

Discussion

This study examined how the creation of new municipalities within the Atlanta metropolitan area between 2000 and 2020 influenced preterm birth rates across the impacted communities, with a particular focus on the differential impacts of the cityhood movement on racial and socioeconomic composition. The findings suggest a complex relationship between cityhood status and variations in preterm birth rates.

Descriptive Statistics

Cityhood status appears to be associated with changes in the racial composition of the newly incorporated vs. original cities. This can be seen in Table 1, where 49.4% of all births were born to non-Hispanic Black mothers prior to city incorporation, but it decreases

significantly post-new city creation (27.2%). However, non-Hispanic White mothers exhibit the opposite trend, with city incorporation resulting in an increase of live births from pre-new city (42.6%) to post-new city (53.5%). These results clearly indicate the changes in the racial composition of an unincorporated space once it is incorporated into a new city, specifically depicting the trend of a more diverse, majority Black neighborhood becoming a majority White city. This trend further supports existing literature as it depicts the exclusion of racial minorities in the creation of new cities in Atlanta, allowing for these new cities to be largely made up of White individuals once incorporated.

A similar trend can be seen in the disparities in socioeconomic status pre- and post-new city, as was measured by marital status and insurance coverage type in the study. The prevalence of being married increased from 59.8% pre-new city to 69.9% post-new city, while unmarried mothers decreased from 40.2% pre-new city to 30.1% post-new city. Within insurance type, only 15.2% of all births in pre-new city space were covered by private health insurance, compared to 58.8% in post-new city space. On the other hand, public health insurance covered 29.7% of all births in pre-new city space and 21.3% in post-new city space. 52.2% of all births pre-new city are uninsured, but only 16.6% are uninsured post-new city. Similar to the racial disparities present in post-new city spaces, the socioeconomic disparities can also be credited to the history of exclusion in the cityhood movement.

The significant increase in private insurance coverage from pre- to post-new city supports existing literature as it provides additional evidence of higher-SES individuals moving into newly incorporated cities and lower-SES individuals being left out. This is further supported by the significance of 52.2% of pre-new city live births being uninsured and 29.7% being covered by public insurance, both of which decreased significantly in the post-new city population.

Additionally, Table 2 shows that the overall prevalence of preterm birth decreases from 12.5% pre-new city to 10.2% post-new city. Considering existing literature and the historical context of the cityhood movement in Atlanta, the racial and socioeconomic disparities as well as the prevalence of preterm birth can be better attributed to the exclusion and segregation involved in the cityhood movement.

Existing literature emphasizes the importance of the wider historical context of the cityhood movement when interpreting these results. As experts in the field have theorized, Georgia's cityhood movement can be considered a form of modern-day segregation, as new spatial boundaries effectively separate communities of color from their white counterparts[12]. Considering the historical context of the cityhood movement in the Atlanta metropolitan area, the descriptive findings can be better explained by first understanding that when a new city is created through the incorporation process, it has historically excluded racial minorities and lower-income community members[9]. Notably, non-Hispanic Black women have a 2-fold greater risk for preterm birth compared to non-Hispanic White women[20]. This implies that the decrease in preterm birth from pre- to post-new city may be more comprehensively explained by the overarching decrease in mothers of a racial minority residing in the newly created cities.

Logistic Regression models

In Table 3, the initial unadjusted Model 1 shows a significant association between cityhood status and preterm birth (OR: 1.26, 95% CI: 1.22-1.31), indicating a 26% increase in the odds of preterm birth in pre-existing cities compared to newly incorporated spaces. Upon adjusting for maternal age and the year of city creation, Model 2 maintains the significant association of cityhood status with preterm birth while also identifying maternal age as a risk factor (OR: 1.01, 95% CI: 1.01-1.02).

Model 3 extends the analysis by including additional individual-level covariates such as maternal race, insurance status, and marital status to estimate the role of racial and socioeconomic factors in the association of interest. The significant increase in preterm birth for Black (OR: 1.63) and Multiracial (OR: 1.24) mothers compared to White (OR: 1.14) mothers indicates that racial disparities persist as influential factors in cityhood status and preterm birth rate. Additionally, unmarried women experience a 32% increased odds of preterm birth. The introduction of these covariates into the model diminishes the effect of cityhood status, suggesting that individual-level variables may mediate the relationship between cityhood status and preterm birth. Model 4 further incorporates the fixed effects of city name into the model, with similar results and significant associations as Model 3.

The final Model 5 is the most comprehensive as it introduces the interaction term between cityhood status and maternal age. The main effect of cityhood status in this model (OR: 0.96, 95% CI: 0.90-1.02) indicates that residing in a newly incorporated space has a reduced risk of preterm birth compared to pre-new city or unincorporated space. Specifically, for mothers of the study average age of 30 years old, residing in a newly incorporated city is mildly protective of preterm birth. The model indicates a significant interaction between cityhood status and maternal age (OR: 0.99, 95% CI: 0.98-1.00), pointing to a slight reduction in the effect of maternal age on preterm birth for mothers who delivered after city formation. Notably, maternal race and marital status continue to demonstrate a significant relationship with preterm birth as observed in prior models.

Conclusion

This study effectively addressed the research question of how the creation of new municipalities within the Atlanta metropolitan area between 2000 and 2020 influenced preterm

birth rates, particularly considering the differential impacts based on racial and socioeconomic factors. The findings demonstrate a significant relationship between cityhood status and variations in preterm birth rates, with nuanced impacts across different racial and socioeconomic groups. The study confirmed the initial hypothesis, indicating that pre-new city and unincorporated spaces exhibit higher preterm birth rates and are influenced by factors such as maternal age, racial disparities, and socioeconomic status.

Presently, there is a gap in literature exploring the specific impact of Atlanta's cityhood movement on preterm birth rates and racial and socioeconomic community makeup. By focusing on the nuanced effects of the cityhood movement in the Atlanta metropolitan area, this study provides a critical analysis of the ways in which municipal boundaries have far-reaching implications on public health, particularly for vulnerable populations. It helps shed light on the intersectionality of race and socioeconomic status in health disparities, emphasizing the need for intentional and inclusive urban planning.

Some of the most impactful strengths of this study include its comprehensive data analysis and large sample size. The use of logistic regression models allowed for a thorough exploration of the social determinants of preterm birth as various factors were able to be considered simultaneously. Including fixed effects and interaction terms additionally allowed for a more accurate understanding and estimation of the impact of cityhood status on preterm birth rates. However, this study was not without limitations. The scope of the analysis was subject to the availability and granularity of the data, and the administrative data used does not capture the nuances of individual experiences surrounding the cityhood movement. There may additionally be other unmeasured confounders that influenced the association of interest. The findings of this

study may not be generalizable to other cityhood movements in America, as they are tied into the specific context of Atlanta communities and history.

Future research could focus on longitudinal studies of cities and neighborhoods in Atlanta impacted by the cityhood movement to examine how changes in cityhood status influence preterm birth over time with individual mothers. This approach would help us understand the extent and effects of the loss of resources caused by exclusion from city incorporation. Qualitative studies may also provide a deeper understanding of the individual experiences of mothers impacted by the cityhood movement. Furthermore, there is a need for academic research on the cityhood movement as a whole, and the impact it has had on community health and demographics. As the cityhood movement is an ongoing event in Atlanta and several other metropolitan areas around the country, there is a need for a deeper understanding of the movement and the mechanisms through which it interacts with public health.

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