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Abortion at 12 or more weeks' gestation and travel for later abortion care among Mississippi residents

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Abstract

Objective: To assess the association between indicators of economic disadvantage and geographic accessibility of reproductive health services and abortions ≥12 weeks' gestation in Mississippi.

Study Design: This cross-sectional study used data on Mississippi residents who obtained abortion care from 12 of 14 facilities in Mississippi, Alabama, Louisiana, and Tennessee in 2018. We estimated logistic regression models to assess the association between levels of county deprivation, the number of obstetrician/gynecologists per 10,000 women, and one-way distance to the nearest facility with having an abortion ≥12 weeks' gestation. We compared the median one-way distance to the facility where patients <12 weeks', 12–15 weeks', and ≥16 weeks' gestation received care, using Kruskal-Wallis tests.

Results: Of the 4,455 Mississippi residents who obtained abortions, 73% were Black, 59% lived ≥50 miles from a facility, and 60% obtained care in Mississippi. Overall, 764 (17.2%) abortions were performed ≥12 weeks' gestation. In adjusted models, those in counties with moderate (OR, 1.47; 95% CI: 1.15–1.90) and high (OR: 1.36, 95% CI: 1.01–1.83) (vs low) levels of economic deprivation and counties with 0.1–1.4 (vs ≥2.5) obstetrician/gynecologists per 10,000 women (OR: 1.55; 95% CI: 1.06–2.27) had higher odds of obtaining an abortion ≥12 weeks' gestation. Mississippi residents who obtained abortions ≥16 weeks' gestation traveled a median 143 miles one way to the facility where they received care, compared to 69 miles and 60 miles traveled by those <12 weeks' and 12–15 weeks' gestation, respectively (p<.001).

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Conclusions: Many Mississippi residents obtained abortion care ≥12 weeks' gestation, which is related to greater economic constraints and limited geographic access to reproductive health services.

Implications: People's need for abortions ≥12 weeks' gestation may be higher in communities with limited access to reproductive health services and among those living in areas with greater economic disadvantage. State laws that narrow gestational limits would increase long-distance travel for later abortion care, and disproportionately affect those with fewer resources.

Keywords

abortion; Mississippi; travel; gestational bans

1. Introduction

Mississippi has one of the most restrictive abortion policy environments in the United States (US) [1]. State laws require in-person, state-directed counseling 24 hours before abortion and parental consent for minors, ban commercial and public insurance coverage for abortion, and prohibit the use of telemedicine and dilation and evacuation procedures, effectively prohibiting abortions ≥16 weeks from a person's last menstrual period (LMP) [2]. The state has one licensed abortion facility, and other women's health services are very limited [3,4]. Mississippi is also the poorest US state [5], with notable disparities between groups and communities. Poverty rates among Black women are more than twice that of white women, and many counties have high levels of persistent poverty and economic vulnerability [6,7].

Limited geographic accessibility of reproductive health services and greater economic disadvantage, factors associated with abortion ≥12 weeks' gestation [8–11], may contribute to many Mississippians needing abortion later in pregnancy. However, there are few options for this care. The Jackson, Mississippi clinic provides services up to 16 weeks' gestation owing to extensive licensing and staffing restrictions [12], and hospital-based abortion services are limited. The few facilities in neighboring states that provide care at later gestations are located long distances from many Mississippi counties [13]. Mississippi residents who seek out-of-state care also encounter numerous restrictions, including mandatory waiting periods of 24 (Louisiana), 48 (Alabama, Tennessee) and 72 hours (Arkansas), which may add further delays [14–18].

In 2018, Mississippi passed a law prohibiting abortions after 15 weeks' gestation, except for medical emergencies or severe fetal anomalies, claiming – contrary to scientific evidence – that the law would improve patient safety [19,20]. The 5th Circuit Court of Appeals ruled that the law was unconstitutional because it prohibited abortion before viability [21]. The state appealed this ruling, and in May 2021, the US Supreme Court agreed to hear the case to decide whether any pre-viability bans are constitutional.

In this cross-sectional study, we assessed the percentage of Mississippi residents who obtained abortions ≥12 weeks' gestation and individual and geographic attributes associated with receiving care at this point in pregnancy. We also describe the distance Mississippi

residents travel to obtain abortions ≥16 weeks' gestation to identify the potential implications of the Court's decision.

2. Methods

2.1. Data sources

We collected data on Mississippi residents who obtained abortion care in calendar year 2018 from 12 of the 14 non-hospital facilities in Mississippi, Alabama, Louisiana, and Tennessee. We did not collect data from the remaining two Tennessee facilities or from the three facilities in Arkansas. These five facilities are ≥150 miles from any Mississippi county, and we anticipated few residents would travel there for care; only one percent of Mississippi-resident abortions occurred in Arkansas in 2018 [22]. We also did not collect data from the nearest Florida facility because it provided intermittent services in 2018.

Staff at the Mississippi facility provided a de-identified individual-level dataset from the Induced Termination of Pregnancy (ITOP) forms that Mississippi requires providers to submit for each abortion. At all open facilities in Alabama (n=3) and Louisiana (n=3), research assistants abstracted ITOP forms for Mississippi residents into a secure database. Staff at Tennessee facilities queried electronic medical record (EMR) data and provided the research team with de-identified datasets of Mississippi residents.

The ITOP and EMR information at all facilities included patient age, race and ethnicity, gestation at abortion, type of abortion, and geographic residence, including state and county and/or zip code. The Institutional Review Boards (IRB) at the University of Alabama at Birmingham and University of California, San Francisco approved the data collection and analysis protocol. The University of Texas at Austin IRB determined the analysis of de-identified data was not human subjects research.

2.2. Measures

We categorized abortions according to type and gestation: medication ≤10 weeks' gestation and procedures obtained at <12 weeks' gestation, 12–15 weeks' gestation and ≥16 weeks' gestation. We defined our primary outcome as procedures occurring ≥12 weeks from LMP to facilitate comparisons with prior studies in restrictive settings [10,11] and because additional cervical preparation is often used at this gestation and may contribute to increase costs [23]. Because Alabama requires facilities to report abortions based on weeks post-fertilization, we estimated gestation at the time of abortion by adding two weeks to post-fertilization age for all abortions in that state.

We also estimated the one-way driving distance from patients' county of residence to open facilities in Mississippi, Alabama, Arkansas, Louisiana and Tennessee in 2018. Since the majority of records had county of residence only, we matched records in which only zip code was provided with the corresponding Mississippi county so estimates were consistent; in cases where zip codes crossed county lines, we assigned records to the county with the largest percentage of the zip code's population. We used Stata's *georoute* command [24] to compute the number of miles between the population-weighted centroid of each Mississippi county and open facilities. Using these estimates, we determined the distance to the nearest

facility (i.e., shortest distance) as an indicator of the geographic accessibility of services and actual travel distance to the location where patients obtained care. Based on the distribution of the data and to facilitate comparisons with other reports [9,25], we categorized one-way distance to the nearest facility and actual travel distance as <20 miles, 20 to 49 miles, 50 to 99 miles, and ≥100 miles. We subtracted distance to the nearest facility from actual travel distance to determine how much farther patients traveled for care and categorized this as: traveled to nearest facility, traveled 1–49 miles, 50–99 miles and ≥100 miles beyond the nearest facility.

Additionally, we considered other county-level attributes that reflect people's economic circumstances and access to obstetric services, which may be related to abortion delays [8]. To capture economic variation across counties, we constructed a composite county-level index of area deprivation using principal components analysis (PCA). A composite index has several advantages over using individual economic measures (e.g., poverty, educational attainment) by more accurately capturing the multidimensional aspects of socioeconomic inequality, resource availability, and opportunity structure and addressing problems of multicollinearity between variables [26,27]. PCA also identifies variables that capture the maximum variation across the data. We initially included 14 county-level indicators of socioeconomic disadvantage obtained from 5-year estimates of the American Community Survey and that have been used in previous research [26–28]: percent of population with <9 years of education, ≥12 years of education, working in blue collar jobs, living in poverty, living in single parent households, living in a household with no car, no phone, or no plumbing, county unemployment rate, home ownership rate, median home value, median monthly mortgage, and median household income. After standardizing the indicators so they were measured on the same scale, we ran the PCA model and sequentially eliminated variables that had low factor loadings. We retained seven variables that had the highest factor loadings and explained 69% of county-level variation (Table 1). Because the continuous scores are not meaningful on their own, we followed approaches used elsewhere [26,28] and grouped counties into the following categories based on quartiles: low deprivation (bottom 25%), moderate deprivation (middle 50%) and high deprivation (top 25%).

Limited obstetric services may delay referrals for abortion following pregnancy confirmation or the identification of high-risk maternal or fetal health conditions. To capture the availability of obstetric services, we used information on the number of obstetrician/gynecologists (ob/gyns) per 100,000 women in each Mississippi county, as documented in the Area Health Resources Files, and divided this value by 10 to reflect benchmarks used by Rayburn et al; none of the counties met the recommended 6.3 ob/gyns per 10,000 women [29,30]. We graphically inspected these data using a LOWESS plot to identify natural cut points in the distribution and categorized counties as having 0, 0.1–1.4, 1.5–2.4, and ≥2.5 ob/gyns per 10,000 women.

2.3. Analysis

We examined the geographic distribution of county deprivation, number of ob/gyns, and proximity to clinics using ArcGIS 10.6. We matched county-level deprivation and ob/gyn

data to polygons of US Census shape files and created a 50-mile radius around facilities in Mississippi and neighboring states.

We excluded records that were missing information on age (n=3), county of residence (n=7), gestation (n=6), or that appeared to have data entry errors (e.g., medication >11 weeks; n=5). We then examined the overall distribution of patients' characteristics, including age (<18 years, 18–24, 25–29, 30–34, ≥35), race or ethnicity (Black, White, Hispanic, Asian, Indigenous, more than one race, other race), county-level economic deprivation, number of ob/gyns in the county of residence, whether their nearest facility was in state, one-way distance to the nearest facility, state where they obtained care, and abortion type and gestation. We also computed the overall percentage of patients who obtained an abortion ≥12 weeks' gestation and assessed sociodemographic characteristics and county-level attributes associated with obtaining an abortion ≥12 weeks' gestation using chi-squared tests, univariate and multivariable-adjusted logistic regression. We considered mixed-effects regression to account for the clustering of observations within counties, but the likelihood ratio test did not indicate that this improved model fit.

Finally, we computed the median and interquartile range (IQR) for one-way distance to the nearest facility and actual travel distance for patients who obtained an abortion <12 weeks', 12–15 weeks', and ≥16 weeks' gestation, and used Kruskal-Wallis tests to assess significant differences between groups. We also assessed differences in the distribution of distance traveled beyond the nearest facility by gestational category, using chi-squared tests. We conducted all statistical analyses using Stata 15.

3. Results

More than three fourths (80%) of Mississippi's 82 counties fell outside a 50 mile-radius of a facility that provided abortion care in 2018, including 62% of low (13/21), 87% of moderate (35/40), and 86% of high (18/21) deprivation counties (Figure 1A). More than half (n=47) of counties did not have an ob/gyn in 2018 and most (n=39) were outside a 50-mile radius of a facility (Figure 1B). In contrast, the majority of counties with 0.1–1.4 ob/gyns per 10,000 women fell within a 50-mile clinic radius.

Of the 4,476 Mississippi-resident abortion records we obtained, 4,455 had complete data and were included in the analysis. The majority of patients were between 18 and 29 years of age, Black, and lived in counties with low levels of deprivation (Table 2). More than 20% lived in counties that did not have an ob/gyn and 10% lived in counties with 0.1–1.4 ob/gyns per 10,000 women. For 42% of patients, the nearest facility was out of state, and more than half (59%) of all patients lived ≥50 miles from the nearest facility. Overall, 60% obtained abortion care in Mississippi and approximately half had a medication abortion.

In 2018, 764 (17.2%) abortions occurred ≥12 weeks' gestation, with 163 (3.7%) performed at ≥16 weeks. The percentage who obtained an abortion ≥12 weeks' gestation was 20% or higher among those <18 years of age, who were Hispanic, lived in counties with moderate or high deprivation, lived in counties with <1.5 ob/gyns per 10,000 women, and lived 20–49 miles from a facility (Table 3). After multivariable adjustment, age <18 years (vs 25–29

years), residence in moderate or high (vs low) deprivation counties, residence in counties with 0.1–1.4 ob/gyns (vs ≥2.5) per 10,000 women, and living 20–49 miles (vs <20 miles) from a facility were associated with higher odds of having an abortion ≥12 weeks' gestation. Mississippi residents who were white (vs Black) and age ≥35 years had lower odds of having an abortion ≥12 weeks' gestation, after controlling for other covariates.

The median one-way distance to the nearest facility for all patients was approximately 60 miles (Table 4). Those who had an abortion ≥16 weeks' gestation traveled a median one-way distance of 143 miles (IQR: 68.9, 275.2 miles) to the facility where they received care, approximately twice as far as those who obtained care <12 weeks' gestation (median: 69 miles; IQR: 15.5, 105.1) and those 12–15 weeks' gestation (median: 60 miles; IQR: 22.3, 105.1; p<.001). Although most patients <16 weeks' gestation received care at the nearest facility, 20% of those who were ≥16 weeks' gestation did so, and a greater percentage of people who obtained abortion care ≥16 weeks' gestation traveled ≥100 miles beyond their nearest facility, compared to those earlier in pregnancy (42% vs <6%).

4. Discussion

In this analysis, we found that 17% of Mississippi residents who obtained an abortion in 2018 did so at ≥12 weeks' gestation – a higher percentage than reported in national-level data (13%) [9]. This difference may be related, in part, to Mississippi's restrictive policy and limited service environment, given that the percentage of abortions ≥12 weeks' gestation is also high in other restricted-access states [10,11]. Additionally, 40% of all Mississippi patients traveled out of state for care, a much larger share than observed nationally [25]. This reflects limited geographic accessibility of in-state options for many residents, and particularly for those needing care later in pregnancy.

Similar to other studies [9–11], we found that Black Mississippians were more likely to get abortions ≥12 weeks' gestation than white Mississippians. The persistence of racial differences may point to exposure to racism in healthcare settings and other unmeasured barriers to timely care, such as working in jobs with unpredictable schedules or limited flexibility and difficulties arranging childcare, which are common among Mississippi women of color [3,6,31]. Minor teens were also more likely to have abortions ≥12 weeks' gestation, which may be related to later recognition of pregnancy, challenges complying with parental involvement requirements, and delays with judicial bypass [32,33].

Along with the inclusion of data from multiple states, a strength of our analysis is our focus on contextual factors related to later abortion care, adding to the limited literature about county-level indicators and timing of abortion. For example, we found that people who lived in more economically disadvantaged areas were more likely to have abortions ≥12 weeks' gestation, which may be due to delays securing financial and travel assistance from others in their community, who also experience economic vulnerabilities. Because of Mississippi's bans on insurance coverage for abortion, those with the least resources must shoulder high out-of-pocket costs of care. Procedure costs later in pregnancy can exceed $1000 [34], and financial assistance from abortion funds may not cover the full costs of care [35,36]. Moreover, costs escalate for procedures ≥16 weeks because Mississippians have to

make multiple long-distance trips to comply with in-person consultation and waiting period requirements and may need to stay overnight for additional cervical preparation [17,18].

We also found that abortions ≥12 weeks' gestation were more common among Mississippians in counties with fewer ob/gyns. This suggests that the state's well-documented provider shortages [4,37] may make it difficult for those who request referrals from ob/gyns following confirmation of pregnancy to obtain timely care and difficult for others to identify high-risk maternal and fetal health conditions early. Our finding that the association was no longer present for people who lived in counties with no ob/gyns, after controlling for other variables, likely reflects the compounding barriers to abortion access in these counties, many of which are located ≥50 miles from abortion-providing facilities and exhibit higher levels of socioeconomic deprivation.

These compounding barriers may also have contributed to selection bias regarding who is ultimately able to obtain care. Unlike national studies [9], Mississippi residents who lived farther from a facility were not more likely to have abortions ≥12 weeks' gestation, after multivariable adjustment. This may reflect a distance threshold past which people are unable to get an abortion – particularly those experiencing economic deprivation and other barriers [38]. Abortion care may become further out of reach if procedures after 15 weeks' gestation are prohibited in Mississippi and Louisiana (where a similar 15-week ban was passed), and if other states enact pre-viability bans [39,40].

Although we collected information on Mississippi residents who obtained abortions both in and outside the state, we did not have data on approximately 9% of Mississippi abortions in 2018 [22]. Notably, we did not have data from Georgia or Florida, where facilities offer services later in pregnancy compared to other Southern states [39]. Given the large number of facilities in these states and our resource constraints, it was not possible to collect data at additional clinics, each of which may have only served a few Mississippi residents, but this means we may have underestimated the percentage of abortions ≥12 weeks' gestation and travel distance. Additionally, ITOP and EMR data did not include information on other individual and clinical factors, such as substance use, menstrual history and experiences of pregnancy symptoms, which have been associated with delays obtaining abortion [41]. These should be explored in future research to assess their role in delayed care in a setting with poor healthcare access. Relatedly, we do not know when people tried to obtain abortion following pregnancy discovery and at which points in their pathways to care they were delayed, which may help identify approaches to facilitate earlier access to services.

Despite these limitations, our study demonstrates the importance of considering people's geographic context when assessing who may have a greater need for abortions ≥12 weeks' gestation. Pregnant people in Mississippi would benefit from policies and other structural interventions that facilitate their ability to obtain services as soon as they decide to have an abortion, as well as measures to strengthen – not limit – access to abortion for those who will continue to need care later in pregnancy.

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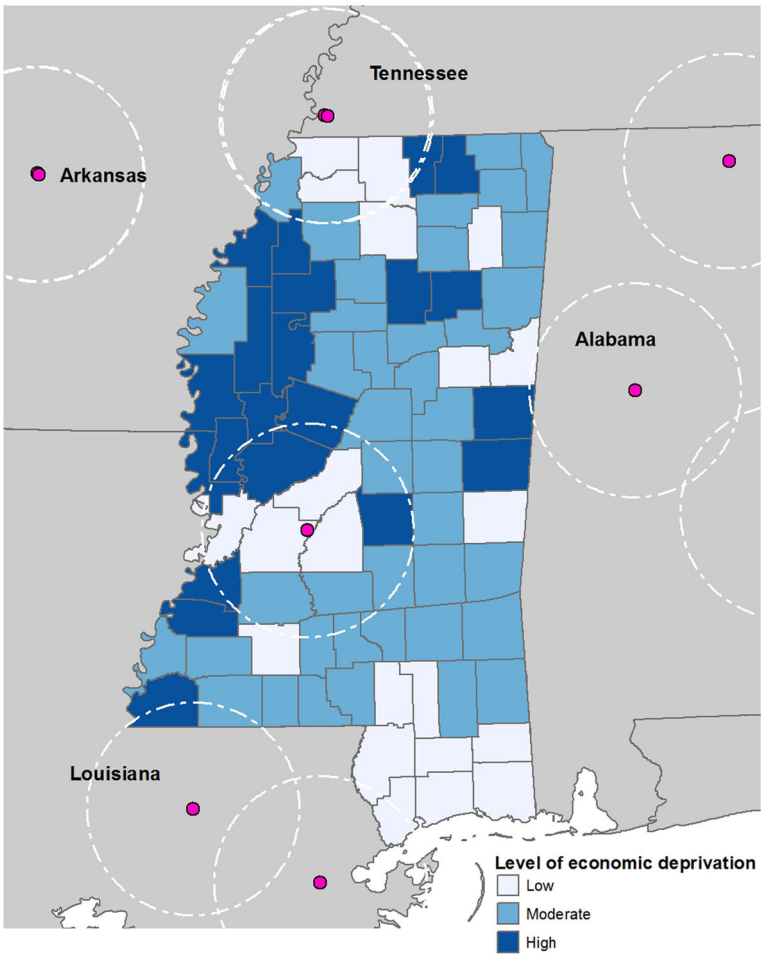

Figure 1A. County-level economic deprivation & abortion facility proximity in Mississippi, 2018
Note: Pink circles represent facility locations. Dashed circles reflect a 50-mile radius around facilities.

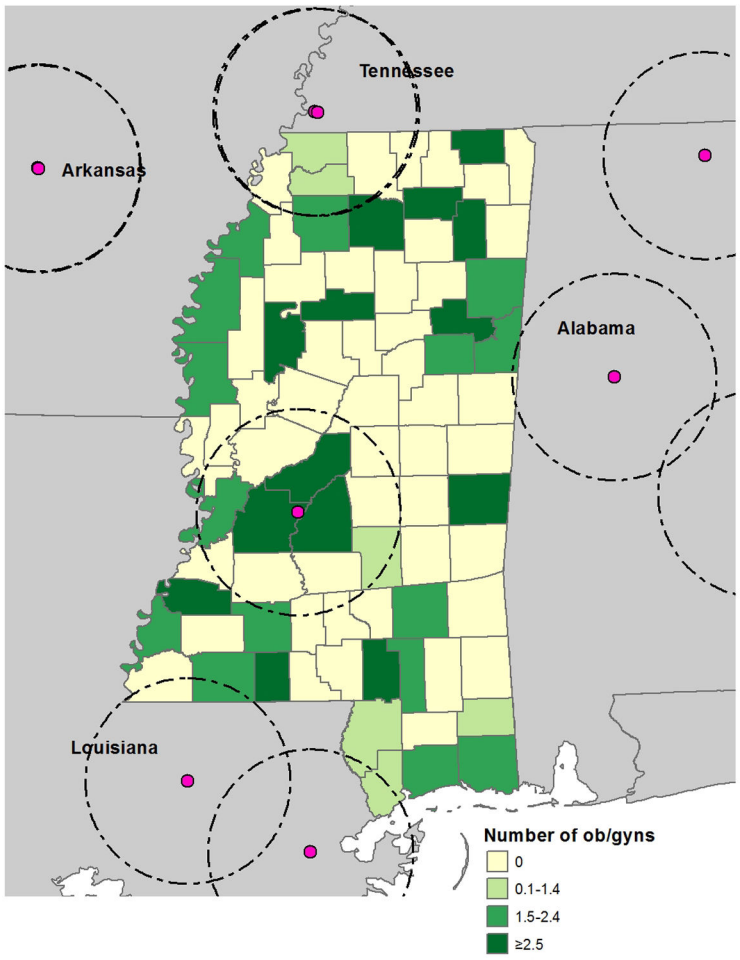

Figure 1B. Number of ob/gyns per 10,000 women & abortion facility proximity in Mississippi, 2018

Note: Pink circles represent facility locations. Dashed circles reflect a 50-mile radius around facilities.

Table 1.

County-level economic indicators included in the deprivation index, by level of deprivation

County-level variables	Level of deprivation		
	Low	Moderate	High
Population with <9 years of education, %	3.9	6.8	8.9
Population with ≥12 years of education, %	87.6	80.2	76.0
Population in blue collar jobs, %	25.0	34.9	34.3
Population living in poverty, %	17.5	22.3	32.1
Median household income	46,476	37,946	30,028
Median home value	130,350	85,100	68,800
Median monthly mortgage	1,188	964	920

Table 2.

Characteristics of Mississippi residents who obtained abortion care, 2018

	N	%
Age, years		
<18	157	3.5
18–24	1,575	35.4
25–29	1,387	31.1
30–34	796	17.9
≥35	540	12.1
Race/Ethnicity		
Black	3,256	73.1
White	971	21.8
Hispanic	82	1.8
Asian	54	1.2
Indigenous	9	0.2
More than one race, other race	63	1.4
Unknown	20	0.5
Level of county deprivation		
Low	2,851	64.0
Moderate	956	21.5
High	648	14.6
Ob/gyn's per 10,000 women in county of residence, n		
0	957	21.5
0.1–1.4	423	9.5
1.5–2.4	1,221	27.4
≥2.5	1,854	41.6
Nearest abortion facility is in Mississippi		
Yes	2,587	58.1
No	1,868	41.9
One-way distance to nearest facility, miles		
<20	1,196	26.8
20–49	643	14.4
50–99	2,106	47.3
≥100	510	11.4
State where obtained care		
Mississippi	2,675	60.0
Tennessee	880	19.8
Alabama	655	14.7
Louisiana	245	5.5
Abortion type and gestation		
Medication	2,305	51.7
Procedure <12 weeks	1,371	30.8

	N	%
Procedure 12–15 weeks	601	13.5
Procedure ≥16 weeks	163	3.7
Unknown procedure type[a]	15	0.3

[a]People with an unknown procedure type were <12 weeks' gestation

Table 3.

Characteristics of Mississippi residents associated with obtaining abortion care ≥12 weeks' gestation, 2018

	n (%)		Unadjusted	Adjusted
		p-value[a]	OR (95% CI)	OR (95% CI)
Total	764 (17.2)	--		--
Age, years				
<18	42 (26.7)	<.001	1.77 (1.21–2.59)	1.79 (1.22–2.63)
18–24	295 (18.7)		1.12 (0.93–1.35)	1.13 (0.94–1.37)
25–29	237 (17.1)		1 (ref)	1 (ref)
30–34	123 (15.4)		0.89 (0.70–1.12)	0.87 (0.69–1.11)
≥35	67 (12.4)		0.69 (0.51–0.92)	0.68 (0.50–0.91)
Race/Ethnicity [b]				
Black	583 (17.9)	.025	1 (ref)	1 (ref)
White	138 (14.2)		0.76 (0.62–0.93)	0.73 (0.59–0.90)
Hispanic	19 (23.2)		1.38 (0.82–2.33)	1.35 (0.80–2.29)
More than one race, other race[c]	24 (16.4)		0.92 (0.57–1.48)	1.01 (0.62–1.64)
County deprivation				
Low	445 (15.6)	<.001	1 (ref)	1 (ref)
Moderate	191 (20.0)		1.35 (1.12–1.63)	1.47 (1.15–1.90)
High	128 (19.8)		1.33 (1.07–1.65)	1.36 (1.01–1.83)
Ob/gyn's per 10,000 women in county of residence, n				
0	191 (20.0)		1.38 (1.13–1.69)	0.89 (0.67–1.20)
0.1–1.4	105 (24.8)	<.001	1.83 (1.42–2.36)	1.55 (1.06–2.27)
1.5–2.4	185 (15.2)		0.99 (0.81–1.21)	0.81 (0.63–1.05)
≥2.5	283 (15.3)		1 (ref)	1 (ref)
One-way distance to nearest abortion facility, miles				
<20	165 (13.8)	<.001	1 (ref)	1 (ref)
20–49	149 (23.2)		1.88 (1.47–2.41)	1.49 (1.02–2.18)
50–99	352 (16.7)		1.25 (1.03–1.53)	1.13 (0.85–1.51)
≥100	98 (19.2)		1.48 (1.13–1.96)	1.35 (0.95–1.91)

OR: Odds ratios from logistic regression models; CI: Confidence Interval

[a] Chi-squared p-value

[b] Model also included a term for unknown race/ethnicity

[c] Mississippi residents whose race was listed as Asian (n=54), Indigenous (n=9), more than one race/other race (n=63) were included in the same category owing the small sample in each group that had an abortion ≥12 weeks.

Table 4.

One-way distance to nearest facility and facility where Mississippi residents received abortion care, by gestation

	Gestation at abortion		
	<12 weeks (n=3,691)	**12–15 weeks (n=601)**	**≥16 weeks (n=163)**
	Median (IQR)	**Median (IQR)**	**Median (IQR)**
Miles to nearest facility	59.7 (15.5, 93.2)	58.0 (20.1, 94.8)	62.3 (20.1, 91.7)
Miles to facility where received care[a]	68.7 (15.5, 105.1)	60.3 (22.3, 105.1)	143.2 (68.9, 275.2)
	n (%)	n (%)	n (%)
Miles traveled beyond nearest[b]			
Obtained care at nearest	2,487 (67.4)	362 (60.2)	33 (20.2)
1–49	735 (19.9)	176 (29.3)	45 (27.6)
50–99	313 (8.5)	30 (5.0)	17 (10.4)
≥100	156 (4.2)	33 (5.5)	68 (41.7)

IQR: Interquartile range

[a] Kruskal-Wallis p-value <.001

[b] Chi-squared p-value <.001