Rural–Urban Disparities in Pregnancy Intentions, Births, and Abortions Among US Adolescent and Young Women, 1995–2017

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Objectives. To examine rural–suburban–urban disparities in intendedness and resolution of first pregnancies among adolescent and young women (aged 15–19 and 20–24 years) across racial/ethnic backgrounds in the United States.

Methods. We used the National Survey of Family Growth and pooled pregnancy files from 2002 through the 2015–2017 surveys. We report baseline rural–suburban–urban disparities in first pregnancy intention and outcomes. We used multinomial logistic regression to estimate these disparities, accounting for sociodemographic background, religious upbringing, and other factors.

Results. The first adolescent pregnancies of rural women were more likely to be unintended and end in live birth relative to their urban counterparts. Disparities were most striking among Black adolescents, with about 60% of first adolescent pregnancies among rural Black women being unintended and ending in live birth (urban: 51%). Newly collected state health department data on rural and urban adolescent births and abortions corroborate the findings from the National Survey of Family Growth.

Conclusions. Rural–urban differences in the share of first adolescent pregnancies ending in live births are not accounted for by pregnancy intention or confounding individual-level characteristics. Future research should explore the role of structural barriers, including access to family planning and abortion services. (*Am J Public Health.* 2019; 109:1762–1769. doi:10.2105/AJPH.2019.305318)

In 1967, President Lyndon B. Johnson's National Advisory Commission on Rural Poverty produced a report entitled *The People Left Behind*. The rural United States was then characterized by low education, chronic poverty, high unemployment, dilapidated housing, and food insecurity. Although the life chances of rural people have improved substantially,[1] rural–urban differences in life expectancy have recently widened.[2] Rural people face significant deficits in health behaviors and outcomes,[3,4] limited access to community-based health care,[5,6] and exposure to unhealthy living conditions at home and work.[7] High rates of rural mortality from drug abuse, alcoholism, and suicide[8,9] highlight a new "geography of despair" and give urgency to the *Healthy People 2020* report's goal of eliminating persistent spatial inequalities (http://bit.ly/2kV3vMP). Unfortunately, rural women today are often "left behind" in such discussions, especially on matters affecting them most, such as reproductive health and childbearing.

Indeed, a 2016 Centers for Disease Control and Prevention (CDC) brief marked the first government report of rural–urban disparities in adolescent birth rates.[10] Following the 2016 presidential election, the report received widespread news coverage, with the *Los Angeles Times* publishing an article titled "There's Another Type of Rural–Urban Divide in America: Teens Having Babies."[11] The National Campaign to Prevent Teen and Unintended Pregnancy[12] first documented this trend in 2013, reporting greater recent declines in adolescent birth rates in urban than rural counties. Adolescent birth rates in rural areas are about one third higher than in urban areas.[10,12] These reports placed the national spotlight on large and persistent rural–urban disparities in adolescent birth rates. Rural adolescents may be vulnerable to local conditions that limit unintended pregnancy management options.

Although about one fifth of US adolescent pregnancies are intended,[13] adolescent pregnancies and births are usually assumed to be unintended when information on pregnancy intentions is unavailable. Whether rural–urban disparities in adolescent births in part reflect differences in pregnancy intentions or in how unintended pregnancies are resolved is unclear but important for public policy and family planning. In addition, assessing unmet need in early adulthood can be especially challenging without reliable information on pregnancy intentions. Women in their early 20s have higher rates of unintended pregnancies than do adolescents,[13] and early adulthood is a critical life stage. Unintended pregnancies can derail educational plans and restrict employment options[14] among rural women already facing limited economic prospects.

Another important unanswered question is whether rural–urban disparities in women's unintended pregnancy outcomes—a live birth or not—mostly reflect well-documented geographical differences in

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This article was accepted July 30, 2019.

doi: 10.2105/AJPH.2019.305318

family socioeconomic status and religious upbringing[1,15,16] or result from spatial disparities in local conditions. For example, rural women face large geographic barriers to abortion providers. Research shows that 95% of women in California lived in counties with an abortion clinic in 2014 compared with only 9%, 4%, and 23% in the rural states of Mississippi, Montana, and South Dakota, respectively.[17] Rural–urban disparities in educational and economic opportunities may also shape rural–urban disparities in whether unintended pregnancies end in a live birth or abortion. Indeed, women in poor communities may perceive lower opportunity costs to having a child,[18] and rural women benefit less from a college degree and often have fewer employment options than do urban women.[19]

We used recently released data from the National Survey of Family Growth (NSFG) to investigate these unresolved questions and provide new estimates of rural–urban disparities in pregnancy intentions and outcomes among female adolescents (aged 15–19 years) and young women (aged 20–24 years). These individual-level data allow us to assess unmet need by examining the resolutions of unintended pregnancies. We also highlight rural and urban disparities across racial/ethnic minority populations. Unlike previous studies that used conventional population or other highly aggregated areal data, the NSFG enables us to show rural–urban disparities that "net out" key individual-level sociodemographic and cultural differences. Residual gaps may reflect structural disadvantages in rural areas, including distance from abortion clinics. Comprehensive sex education and access to contraception also may be less available to rural adolescents. Sensitivity analyses using newly collected state health department data on rural, suburban, and urban adolescent births and abortion corroborate our main conclusions.

METHODS

We used data from the NSFG, a National Center for Health Statistics (NCHS) survey of a nationally representative sample of women (civilian and noninstitutionalized) aged 15 to 44 years. We pooled pregnancy files from the 2002, 2006–2010, 2011–2013, 2013–2015, and the newly released 2015–2017 NSFG surveys (n = 60 768). We restricted our analysis to first pregnancies occurring between the ages of 15 to 19 years and 20 to 24 years that were not in progress at the time of interview (age 15–19 years: n = 9134; age 20–24 years: n = 5977). We only examined first pregnancies since 1995 (age 15–19 years: n = 5256; age 20–24 years: n = 4078). This sample restriction excluded pregnancies among women who lacked legal access to abortion before *Roe v. Wade* and ensured the timeliness of our results while maintaining adequate cell sizes. We also eliminated cases with missing or NCHS-imputed data for measures used to construct our dependent variable (age 15–19 years: n = 5233; age 20–24 years: n = 4053). For women aged 20 to 24 years, we excluded observations with missing data on our high school diploma measure (n = 4033).

The NSFG includes a measure of pregnancy intention (i.e., "wantresp") with 6 mutually exclusive categories based on survey items that ask respondents to recall the wantedness and timing of each pregnancy right before it occurred. Consistent with convention,[13,20] we defined intended pregnancies as those reported as occurring at the right time or later than desired ("overdue"), and those for which the woman was indifferent or was not sure about the timing. Unintended pregnancies included those reported as unwanted or occurring too soon (mistimed). Our dependent variable combined information on pregnancy intention and pregnancy outcome and consisted of the following categories: (1) intended pregnancy ended in live birth, (2) unintended pregnancy ended in live birth, (3) unintended pregnancy ended in abortion, and (4) a residual category (else), which included pregnancies ended in miscarriage or stillbirth, or intended pregnancies ended in abortion (0.55% of analytic sample). Data from the NSFG is subject to abortion underreporting,[13] but sensitivity analyses of abortion data from state health departments (see Results section) provide reassurance that abortion underreporting cannot explain the rural disadvantage.

Finally, the NSFG assigns US Office of Management and Budget (OMB)–defined metropolitan statistical area (MSA) status based on respondents' address at the time of interview. We refer to women living in principal cities of MSAs as "urban," in other parts of MSAs as "suburban," and outside MSAs as "rural." We defined race/ethnicity as non-Hispanic White, non-Hispanic Black, Hispanic, and other. Our control variables included age at interview, year of conception, whether the conception occurred within 48 months of the interview, respondent's mother's age at first birth and educational attainment, whether the respondent lived with both biological or adoptive parents since birth, the religion (and Christian denomination) in which the respondent was raised, whether the respondent held a high-school diploma at the time of conception (for women aged 20–24 years), and marital status at conception. Descriptive statistics for controls are shown in Table A1 (available as a supplement to the online version of this article at http://www.ajph.org).

We first present weighted descriptive statistics for pregnancy intentions and resolutions by urbanicity and racial/ethnic background. Given the potential for residential relocation and recall bias for older conceptions, we present the distribution of our dependent variable among first conceptions occurring within 48 months of the survey interview (cutoff guided by NSFG cell size recommendations) for comparison.

Next, we report average marginal effects estimated from multinomial logistic regressions predicting the relationship between metropolitan status and pregnancy intentions and resolutions, adjusting for controls. For example, the average marginal effect of rural residence is the computed difference between the rural and urban (the referent) average predicted probabilities of the outcome, holding all other covariates at observed values.

Next, we report the results of our calculation of adjusted average predicted probabilities for urbanicity by race/ethnicity among adolescent conceptions (where cell sizes permit), holding all other controls at observed values. We did not include interactions in the model used to predict these probabilities. A Wald test indicated that the overall interaction between urbanicity and race was not statistically significant. Moreover, the relationship between urbanicity and pregnancy intention and resolution for Black and Hispanic adolescent conceptions was not statistically significantly different compared with

that of White adolescent conceptions. We used NSFG-imputed variables for missing data and applied appropriate weights to account for the survey design.

RESULTS

Table 1 shows that, relative to urban women's first pregnancies, a larger share of rural women's first pregnancies were intended (age 15–19 years: 25% vs 21%; age 20–24 years: 55% vs 47%). For women aged 20 to 24 years, the share of unintended pregnancies ending in live birth was about 19 percentage points higher for rural relative to urban women (73% vs 54%) while the share of unintended pregnancies ending in abortion was about 14 percentage points lower for rural relative to urban women (rural: 13%; urban: 27%). We saw a consistent pattern among adolescent unintended pregnancies.

Moving to our dependent variable, a larger share of both intended and unintended pregnancies among rural women ended in live births. Smaller shares of pregnancies among rural women were unintended and ended in abortion.

A striking share of rural Black and Hispanic women's adolescent pregnancies were unintended and ended as births (60%). Notably, the share of adolescent pregnancies that were unintended and ended in abortion was 4% among Black rural women compared with 20% among Black urban women. We observed a 15-percentage-point difference between urban White women (45%) and rural Black women (60%) in the share of adolescent pregnancies that were unintended and ended in birth. Conversely, the share of adolescent pregnancies that were unintended and ended in birth was 1 percentage point lower for urban Black women (51%) than for rural White women (52%), on average.

With the exceptions of first pregnancy intentions among women aged 15 to 19 years, conceptions among Hispanic women aged 15 to 19 and 20 to 24 years, and conceptions among Black women aged 20 to 24 years, the χ^2 test rejected the null hypothesis of independence for the previously mentioned relationships ($P < .05$). The patterns in unintended births among suburban women paralleled those in big cities.

Among conceptions occurring within 48 months of the survey interview, 13% of rural

TABLE 1—Weighted Percentages for Intention and Resolution of First Pregnancies by Urbanicity: United States, 1995–2017

	Ages 15–19 Years (n = 5233), %			Ages 20–24 Years (n = 4033), %		
	Urban (n = 2325)	Suburban (n = 2006)	Rural (n = 902)	Urban (n = 1569)	Suburban (n = 1818)	Rural (n = 646)
First pregnancy intentions[a]						
Intended	21	20	25	47	48	55
Unintended	79	80	75	53	52	45
First pregnancy resolutions[a,b]						
Birth	67	67	76	69	73	81
Abortion	16	16	7	16	11	6
Else	17	17	17	15	16	13
Unintended first pregnancies[a,b]						
Birth	63	62	74	54	61	73
Abortion	20	19	9	27	20	13
Else	18	19	17	19	18	14
Pregnancy intention and resolution[a,b]						
Intended, birth	17	18	21	41	41	48
Unintended, birth	49	50	55	29	32	33
Unintended, abortion	16	15	7	15	11	6
Else	18	18	17	16	16	14
Conceptions within 48 mo of interview[c]						
Intended, birth	13	16	15	35	43	42
Unintended, birth	46	44	55	28	29	35
Unintended, abortion	19	18	9	18	11	6
Else	22	22	21	19	17	17
Race/ethnicity						
Non-Hispanic White[a,b]						
Intended, birth	15	15	22	37	42	50
Unintended, birth	45	46	52	27	30	33
Unintended, abortion	17	16	8	19	11	6
Else	23	22	18	17	17	12
Non-Hispanic Black[b]						
Intended, birth	11	13	19	29	27	22
Unintended, birth	51	52	60	40	41	40
Unintended, abortion	20	20	4	13	14	15
Else	19	15	17	18	19	22
Hispanic						
Intended, birth	25	24	21	55	49	. . .
Unintended, birth	53	54	60	25	33	. . .
Unintended, abortion	9	9	9	8	6	. . .
Else	13	13	11	12	13	. . .

Note. Sample restricted to first pregnancies occurring between 1995 and 2017. Because of small cell sizes, estimates for women from other races/ethnicities and rural Hispanic women aged 20–24 years are not shown.

Source. National Survey of Family Growth, pooled pregnancy files from 2002, 2006–2010, 2011–2015, and 2015–2017.

[a] $P < .05$ from χ^2 test of relationship between urbanicity and the outcome for women aged 20–24 years.

[b] $P < .05$ from χ^2 test of relationship between urbanicity and the outcome for women aged 15–19 years.

[c] n = 1070 among those aged 15–19 years and n = 969 among those aged 20–24 years.

and 15% of urban women's adolescent conceptions were intended and ended via live birth. We saw a larger rural–urban disparity in the share of these more recent adolescent pregnancies ending in unintended birth (55% in rural vs 46% in urban) compared with adolescent conceptions irrespective of elapsed time (55% in rural vs 49% in urban). Rural–urban disparities in unintended births among women aged 20 to 24 years were also larger among more recent conceptions.

Table 2 presents selected average marginal effects of metropolitan status on first pregnancy intentions and resolutions, with adjustment for family socioeconomic and religious background, marital status at conception, and other factors (full set of average marginal effects shown in Table A2, available as a supplement to the online version of this article at http://www.ajph.org). Compared with urban women, on average, rural women's adolescent pregnancies are about 7.6 percentage points more likely to be unintended and end in live birth ($P < .01$) but are about 8.4 percentage points less likely to be unintended and end in abortion ($P < .001$). Although the overall rural–urban patterns among young women's conceptions are similar to those among adolescents, the rural–urban disparity in unintended births is weaker and nonsignificant.

In Table 3, we present the adjusted average predicted probabilities for urbanicity by race/ethnicity, holding all other covariates at their observed values. We focused on adolescent conceptions given the previously outlined results and because of small cell sizes among women aged 20 to 24 years. The rural–urban patterns among White, Hispanic, and Black women are consistent with the aforementioned results.

Sensitivity Analyses

Abortion underreporting may threaten our main results if rural women are more likely to underreport abortions than are urban women. This would result in larger shares of unobserved rural abortions (and unintended pregnancies) and bias our estimates of rural–urban disparities. However, rural underreporting is unlikely to account for the rural–urban disparities we observed. Other highly reliable data from the Guttmacher Institute and elsewhere indicate that women from more rural areas are less likely to have an abortion than are their more urban counterparts.[21,22] We also collected health department data from 25 states that mandate provider abortion reporting and identify maternal county of residence. Significantly, our sensitivity analysis with these new data aligns with recent recommendations for research using survey reports of abortion[23] and reveals metro–nonmetro patterns consistent with our NSFG results.

To illustrate, we compared abortion ratios based on the NSFG to those calculated from state health department data (Table 4). These state health department data are provided at the county level, which allowed us to distinguish between all metropolitan residents (i.e., suburban and urban) and nonmetropolitan residents (i.e., rural). We followed others[17] and defined abortion ratios as the proportion of pregnancies resolved through abortion, excluding miscarriages and stillbirths.

For comparison, the NSFG revealed persistent metro–nonmetro disparities in abortion ratios among first pregnancies and all pregnancies, and among pregnancies across 1995 to 2017 and 2000 to 2017. Among all adolescent pregnancies between 2000 and 2017, the NSFG nonmetro abortion ratios were about 47% lower than overall metropolitan abortion ratios (0.10 vs 0.19). Nonmetro abortion ratios from state health department data across these same years were about 52% lower than metro abortion ratios (0.14 vs 0.29). High numbers of abortions in New York disproportionately influenced these

TABLE 2—Difference in Probability of First Pregnancy Intention and Resolution by Metropolitan Status and Race/Ethnicity: United States, 1995–2017

	Age 15–19 Years (n = 5233), Difference[a] (95% CI)				Age 20–24 Years (n = 4033), Difference[a] (95% CI)			
	Intended, Birth	Unintended, Birth	Unintended, Abortion	Else	Intended, Birth	Unintended, Birth	Unintended, Abortion	Else
Metro status (Ref: Urban)								
Suburban	−0.003	0.012	−0.005	−0.003	−0.010	0.041	−0.037	0.005
	(−0.040, 0.034)	(−0.030, 0.054)	(−0.038, 0.027)	(−0.042, 0.035)	(−0.052, 0.033)	(−0.001, 0.084)	(−0.070, −0.004)	(−0.029, 0.039)
Rural	0.027	0.076	−0.084	−0.019	0.063	0.050	−0.087	−0.025
	(−0.024, 0.077)	(0.021, 0.131)	(−0.120, −0.048)	(−0.062, 0.024)	(−0.005, 0.131)	(−0.016, 0.115)	(−0.126, −0.048)	(−0.068, 0.017)
Race/ethnicity (Ref: Non-Hispanic White)								
Non-Hispanic Black	−0.023	0.029	0.040	−0.046	−0.056	0.039	−0.007	0.025
	(−0.059, 0.014)	(−0.025, 0.083)	(0.000, 0.080)	(−0.090, −0.003)	(−0.118, 0.005)	(−0.023, 0.101)	(−0.043, 0.029)	(−0.021, 0.071)
Hispanic	0.027	0.070	−0.035	−0.063	0.059	0.003	−0.035	−0.027
	(−0.012, 0.067)	(0.019, 0.122)	(−0.069, −0.001)	(−0.108, −0.018)	(−0.005, 0.122)	(−0.067, 0.073)	(−0.074, 0.004)	(−0.069, 0.016)
Other	−0.034	0.096	0.041	−0.104	−0.048	−0.084	0.061	0.072
	(−0.111, 0.043)	(−0.020, 0.213)	(−0.034, 0.117)	(−0.168, −0.040)	(−0.161, 0.064)	(−0.170, 0.001)	(−0.023, 0.144)	(−0.037, 0.181)

Note. CI = confidence interval. Sample restricted to first pregnancies occurring between 1995 and 2017. Model also controlled for education level of respondent's mother, age of respondent's mother at first birth, whether lived with both biological or adoptive parents since birth, religious affiliation in which respondent was raised, whether respondent was unmarried at first conception, age at interview, year of conception, whether pregnancy occurred within 48 months of interview, and whether respondent had a high school degree at conception (among women aged 20–24 years).

Source. National Survey of Family Growth, pooled pregnancy files from 2002, 2006–2010, 2011–2015, and 2015–2017.

[a]Average marginal effects from multinomial logistic regression.

TABLE 3—Adjusted Average Predicted Probabilities of First Pregnancy Intention and Resolution for Urbanicity by Race/Ethnicity: United States, 1995–2017

	Ages 15–19 Years (n = 5233), PP (95% CI)			
	Intended, Birth	Unintended, Birth	Unintended, Abortion	Else
Non-Hispanic White				
Urban	0.176 (0.140, 0.212)	0.460 (0.419, 0.500)	0.152 (0.121, 0.182)	0.213 (0.171, 0.255)
Suburban	0.173 (0.142, 0.203)	0.471 (0.432, 0.511)	0.146 (0.120, 0.173)	0.209 (0.175, 0.243)
Rural	0.204 (0.161, 0.247)	0.535[a] (0.488, 0.582)	0.069[a] (0.040, 0.098)	0.192 (0.155, 0.228)
Non-Hispanic Black				
Urban	0.153 (0.122, 0.183)	0.485 (0.440, 0.530)	0.197 (0.154, 0.240)	0.165 (0.125, 0.205)
Suburban	0.150 (0.118, 0.183)	0.497 (0.446, 0.549)	0.190 (0.145, 0.235)	0.162 (0.125, 0.199)
Rural	0.180 (0.132, 0.228)	0.576[a,b] (0.517, 0.635)	0.092[a,c] (0.050, 0.135)	0.151 (0.110, 0.192)
Hispanic				
Urban	0.204 (0.165, 0.244)	0.533 (0.486, 0.580)	0.112 (0.082, 0.143)	0.150 (0.113, 0.187)
Suburban	0.201 (0.164, 0.237)	0.545 (0.498, 0.592)	0.108 (0.077, 0.139)	0.146 (0.108, 0.185)
Rural	0.229 (0.172, 0.285)	0.594[a] (0.530, 0.658)	0.049[a] (0.024, 0.073)	0.128 (0.088, 0.169)

Note. CI = confidence interval; PP = predicted probability. Adjusted average predicted probabilities estimated from the multivariable regression presented in Table 2. Model controlled for education level of respondent's mother, age of respondent's mother at first birth, whether lived with both biological or adoptive parents since birth, religious affiliation in which respondent was raised, whether respondent was unmarried at conception, age at interview, year of conception, and whether pregnancy occurred within 48 months of interview.

Source. National Survey of Family Growth, pooled pregnancy files from 2002, 2006–2010, 2011–2015, and 2015–2017.

[a]Statistically significant (2-tailed $P < .05$) differences relative to pregnancies of urban women within the same race/ethnicity category.

[b]Rural–urban gap in the probability of unintended birth is statistically significantly different from the rural–urban gap among White and Hispanic women.

[c]Rural–urban gap in the probability of abortion is statistically significantly different from the rural–urban gap among White women.

population-weighted statistics and may be less accurate if judged by observed discrepancies in the numbers of abortions reported to CDC and Guttmacher. Yet, even when New York is excluded, nonmetro abortion ratios are about 46% lower than metro abortion ratios.

Although cell sizes prohibit comparison with the NSFG for recent years, we presented abortion ratios from state health departments for the years 2011 to 2017 and across racial/ethnic groups from selected states providing such breakdowns. Nonmetro abortion ratios were about 69% and 48% lower than those of large central and other metro counties, respectively (nonmetro: 0.11; large central: 0.34; other metro: 0.21). We observed this overall pattern across states. Compared with large central metro ratios, nonmetro abortion ratios were about 69%, 54%, and 50% lower for non-Hispanic White, non-Hispanic Black, and Hispanic women, respectively (among selected states).

Nationally, most adolescent pregnancies are unintended,[13] and Table 1 shows a nonsignificant relationship between metro residence and adolescent first pregnancy intention (unintended: urban = 79%; rural = 75%). These state patterns likely indicate larger shares of nonmetro adolescent unintended pregnancies ending in live birth (vs abortion).

State health department data arguably provide the most appropriate and reliable abortion data for this sensitivity analysis because the Guttmacher Institute does not provide abortion data by county of residence. Still, health departments do not fully capture out-of-state abortions, and abortion providers may not report all abortions to state health departments. These potential reporting problems, however, cannot explain patterns shown in Table 4. Specifically, sensitivity analyses indicated disparities in rural–urban abortion ratios among (1) states with abortion occurrences that closely match those reported by the Guttmacher Institute and (2) counties for which the nearest abortion provider was located within the state (where out-of-state travel would be least likely).

We also conducted a variety of other sensitivity analyses. For example, rural, urban, and suburban residents at the time of survey may have lived in areas with different urbanicity classifications from those of the areas at the time of conception. However, residential relocation is an unlikely source of bias. Indeed, we observed consistent patterns with state health department data, which provided maternal county of residence both at the time of birth and abortion. Moreover, rural–urban baseline disparities in unintended childbearing among adolescent conceptions occurring within 18 months of the survey interview—women with lower chances of relocation—are larger than those reported here (Table B1, available as a supplement to the online version of this article at http://www.ajph.org).

Given that many states require parental consent for an abortion, we estimated models for women aged 19 to 21 years—legal adults who were also less likely to be under direct parental supervision. Results were consistent (Table B2, available as a supplement to the online version of this article at http://www.ajph.org). Analyses also demonstrated a higher share of adolescent pregnancies among rural women ended in live birth when restricted to unintended first pregnancies, net of controls (Table B3, available as a supplement to the online version of this article at http://www.ajph.org). Furthermore, rural–urban disparities in the outcomes of both unwanted and mistimed recent conceptions were consistent with patterns shown in Table 1 (Table B4, available as a supplement to the online version of this article at http://www.ajph.org).

DISCUSSION

This article highlighted patterns of pregnancy intentions and childbearing in the rural United States at a time when rural people and places have been "left behind" in a globalizing economy and urban-centric policies. Our goal was to identify geographic and racial disparities in first pregnancy intentions and resolutions, focusing in particular on the resolution of unintended pregnancies. Data from the NSFG (2002–2017) provide a singular conclusion: rural adolescents are significantly more likely than are their suburban and big-city counterparts to have

TABLE 4—Adolescent Abortion Ratios by Metropolitan Status, National Survey of Family Growth and State Health Department Data: United States, 1995–2017

	Total	Metro		Nonmetro
		Large Central	Other Metro	
NSFG				
First pregnancies, 1995–2017 (n = 4401)	0.19			0.08
First pregnancies, 2000–2017 (n = 2849)	0.18			0.10
All pregnancies, 2000–2017 (n = 4349)	0.19			0.10
State health department data				
2000–2017[a]	0.29			0.14
2011–2017[b]		0.34	0.21	0.11
Race/ethnicity (select states; 2011–2017)[c]				
Non-Hispanic White		0.32	0.19	0.10
Non-Hispanic Black		0.28	0.25	0.13
Hispanic		0.14	0.11	0.07
States (2011–2017)				
Arkansas		NA	0.12	0.07
Colorado		0.23	0.21	0.16
Delaware		NA	0.32	NA
Georgia		0.37	0.23	0.10
Idaho		NA	0.17	0.12
Kansas		NA	0.16	0.08
Maine		NA	0.29	0.20
Michigan		0.29	0.27	0.14
Minnesota		0.32	0.27	0.11
Mississippi		NA	0.15	0.10
Missouri		0.19	0.17	0.06
Montana		NA	0.26	0.18
Nevada		0.22	0.20	0.15
New York (2011–2016)		0.58	0.41	0.28
North Carolina		0.31	0.20	0.13
North Dakota		NA	0.19	0.13
Ohio		0.28	0.19	0.10
Oregon		0.38	0.27	0.18
Pennsylvania		0.42	0.25	0.11
South Carolina		NA	0.20	0.15
South Dakota		NA	0.10	0.04
Utah		0.18	0.11	0.06
Texas (2011–2016)		0.20	0.12	0.08
Virginia		0.39	0.25	0.09
Washington (2011–2016)		0.50	0.30	0.23

Note. NA = not applicable; NSFG = National Survey of Family Growth. Abortion ratios were calculated as the proportion of pregnancies (excluding miscarriages and stillbirths) that ended in abortion.[17] The National Center for Health Statistics rural–urban classification schemes (based on 2000 and 2010 Office of Management and Budget delineations of metropolitan statistical areas)[24] were applied to county-level data from state health departments. "Total" metro includes large central metro and other metro counties. Additional data sources available in Appendix C (available as a supplement to the online version of this article at http://www.ajph.org).

[a]Calculated from all states listed except Arkansas, Maine, Ohio, and South Dakota for which multiple years could not be obtained. Ratios calculated without New York: metro: 0.24, nonmetro: 0.13.

[b]Calculated from all states listed. Ratios calculated without New York: large central: 0.27, other metro: 0.20, nonmetro: 0.11.

[c]Calculated from the following states that provided custom data by both race and ethnicity: Arkansas, Colorado, Georgia, Idaho, Kansas, Michigan, Minnesota, Missouri, Montana, Nevada, North Dakota, Oregon, and Texas. Rates without Texas were White—large central: 0.31, other metro: 0.20, nonmetro: 0.10; Black—large central: 0.28, other metro: 0.26, nonmetro: 0.13; Hispanic—large central: 0.14, other metro: 0.15, nonmetro: 0.09.

unintended first pregnancies that end in a live birth.

Our study makes several specific contributions. First, it provides baseline estimates of rural–urban disparities in pregnancy intentions and their resolution. Significantly, rural–urban disparities in the share of first adolescent pregnancies ending in unintended live birth cannot be explained by differences in key cultural factors—such as early marriage or religion—or by family background.

Second, the adolescent pregnancies of rural women were not more likely to end in live birth simply because they were more likely to be intended. Rather, compared with those in big cities and suburbs, a larger proportion of rural first pregnancies were unintended and ended in live birth.

Third, we examined pregnancy outcomes among women aged 20 to 24 years. We did not observe statistically significant rural–urban disparities in the probability of having a first conception that ended in unintended live birth, net of controls, among these young women. Yet, when we considered resolutions of more recent conceptions and resolutions among unintended conceptions only (Table 1), we saw sizeable baseline disparities. Notably, 73% of rural women's unintended conceptions ended in live birth compared with only 54% of urban women's unintended conceptions. Research should further examine rural–urban disparities in unintended pregnancy resolution among women in early adulthood.

Fourth, we presented rural–urban disparities by race and ethnicity. Rural women of color are often neglected in the academy and public health sphere. However, our results revealed large baseline shares of Hispanic and Black adolescent conceptions ending in unintended births and striking rural–urban disparities among Black adolescents. In addition, we saw comparable shares of urban Black and rural White adolescent conceptions ending in unintended births, further underscoring the importance of considering both urbanicity and racial/ethnic background when studying pregnancy intention and resolutions.

Using up-to-date survey data and the most reliable source of county-level data on abortion, our analyses of unintended pregnancies—and their resolution—placed the

spotlight on rural women, who are often invisible in the empirical literature. Our sensitivity analyses indicated that limitations of the NSFG, especially on the underreporting of abortions, are unlikely to affect our main conclusions. Indeed, rural–urban patterns in the resolution of adolescent pregnancies from state health data corroborate our findings from the NSFG.

Our study represents a national baseline for further study, not the final answers to a neglected topic that clearly deserves more attention. For example, we were only able to speculate about possible mechanisms underlying the rural–urban disparities. Perhaps the most obvious potential mechanism is more limited access of rural women to family planning and abortion clinics.[25] In fact, new state legislative restrictions on abortion access[26] likely affect isolated rural women most.[27,28] Rural adolescents also may perceive fewer opportunity costs of an unintended birth because of limited employment options.[19] Local cultural scripts also may discourage rural adolescents—regardless of family background and religious upbringing—from terminating unintended pregnancies. Our estimates provide an empirical benchmark for future research to explore how restricted abortion access, local economic disadvantages, and cultural norms shape unintended pregnancy management in the rural United States.

Public Health Implications

The conceptualization and measurement of pregnancy intentions are increasingly fraught with controversy.[29,30] As a public health issue, reducing unintended pregnancies is usually viewed as a matter of either insuring reproductive autonomy or of improving birth outcomes.[13] In the rural South, for example, more than 50% of all African American babies are born to poor mothers,[31] which is likely linked to failures of the health care system and unintended childbearing.[32] Limited use of or access to reproductive health services and poor birth outcomes is presumably linked to intergenerational poverty. A reproductive justice framework, however, does not problematize or stigmatize women's pregnancy intentions but instead emphasizes the barriers or constraints to family planning services, including abortion, that limit reproductive autonomy.[30] The fact that first pregnancies of rural adolescents are more likely to end as unintended births—even independent of individual-level risk factors—suggests that living in rural areas may restrict reproductive autonomy and women's choices for managing unintended pregnancies. By contrast, urban adolescents—even those with an unintended pregnancy—are presumably better able to exercise their reproductive autonomy, especially if abortion is regarded as an "accepted, legitimate and accessible means of fertility control."[30(p1)]

Conclusions

Rural Americans continue to be "left behind" despite significant economic gains following the publication of *The People Left Behind* more than 50 years ago. Our research shines a light on arguably the most neglected of the left behind. Urban–rural disparities are perhaps less tied today than in the past to individual sociodemographic factors. Issues such as geographic access and isolation in health care—including reproductive health care—may instead represent an important dimension of the new geography of exclusion. For rural women, the long-run costs of unintended pregnancies seem most germane, especially because unintended childbearing has negative consequences for educational attainment, earnings, and maternal and child health.[14,33–35] Now is not the time to restrict access to family planning services in rural areas or ignore other constraints on rural women's reproductive autonomy. AJPH

CONTRIBUTORS

A. Sutton and D. T. Lichter wrote the article. A. Sutton collected data, conducted the analyses, managed the revisions and responses to reviewers, and contributed to the conceptualization and design of the study. D. T. Lichter conceptualized the study and contributed to its design. S. Sassler contributed to the conceptualization and design of the study and to writing and editing the article. All authors critically reviewed the study.

ACKNOWLEDGMENTS

We are thankful for the support of the Frank H. T. Rhodes Postdoctoral Fellowship Program and the Cornell Population Center at Cornell University. This article benefitted from presentations at the annual meetings of the Rural Sociological Society and Population Association of America. We appreciate Bolun Zhang's assistance compiling the data from state health departments. We are also grateful for the helpful feedback of our anonymous reviewers.

CONFLICTS OF INTEREST

There are no funding or other conflicts of interest.

HUMAN PARTICIPANT PROTECTION

This study reports results from analysis of de-identified, publicly released data and is exempt from institutional review board review as per section 46.101(b) of National Institutes of Health document 45 CFR 46.

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