

Affordable but Inaccessible? Contraception Deserts in the US States

Rebecca J. Kreitzer

University of North Carolina at Chapel Hill

Candis Watts Smith

Pennsylvania State University

Kellen A. Kane

University of North Carolina at Chapel Hill

Tracee M. Saunders

University of Iowa

Abstract

Context: This article focuses on whether, and the extent to which, the resources made available by Title X—the only federal policy aimed specifically at reproductive health care—are equitably accessible. Here, equitable means that barriers to accessing services are lowest for those people who need them most.

Methods: The authors use geographic information systems (GIS) and statistical/spatial analysis (specifically the integrated two-step floating catchment area [I2SFCA] method) to study the spatial and nonspatial accessibility of Title X clinics in 2018.

Findings: The authors find that contraception deserts vary across the states, with between 17% and 53% of the state population living in a desert. Furthermore, they find that low-income people and people of color are more likely to live in certain types of contraception deserts.

Conclusions: The analyses reveal not only a wide range of sizes and shapes of contraception deserts across the US states but also a range of severity of inequity.

Keywords Title X, contraception, federalism, GIS, I2SFCA

Where one lives has a significant effect on one's health outcomes. This is exemplified by the research that shows that zip codes have strong predictive value for life expectancy (Chetty et al. 2016; VCU Center on Society and Health 2015); some have suggested that one's zip code is a better predictor of well-being than one's genetic code (Roeder 2014). Sandefur and Smyth (2011: v) expound on this matter, noting, "Geography is destiny: the services available to people from eligible populations . . . are determined not by what their problems are or the kinds of services they may need, but rather by where they happen to live." As such, the geography

of health is neither apolitical nor race- or class-neutral. For example, the responsibility of building and closing public hospitals is in the hands of state and local policy makers; closures tend to occur in poor and Black neighborhoods, where morbidity and mortality rates are much more dire than in middle-class or white neighborhoods and where traditional political resources are low (McLafferty 1982; Thorpe and Brecher 1987; Whiteis 1992; Williams and Collins 2001). In this article, we home in on the effects the confluence of geography, race, and class has on access to affordable, evidenced-based reproductive health care services. Specifically, we ascertain the scope and severity of what we call *contraception deserts*, and we determine the demographic profile of the residents of these spaces of inequity.

A contraception desert is a locality that not only has low access to the family planning resources provided by public policy due to the built environment but also may be marked by what scholars like Jamila D. Michener (2017) call concentrated disadvantage—localities where populations who are already made vulnerable due to socioeconomic and racial inequalities are isolated from a geography of opportunity. We define *equity* as the provision of goods in response to their necessity; or, in other words, *equitable* means that barriers to resources are lowest for those people who need them most. This article focuses on the extent to which Title X, the only federal program dedicated exclusively to family planning, is equitably accessible.

Access to health care is not uniform across America, and private medical practices are not required to provide equitable access to health care. However, we focus on one's potential access to Title X–funded clinics because a government providing services *must* do so equitably. Additionally, unlike Medicaid, which may provide insurance payments toward reproductive health care services, Title X–funded clinics are *physical places* where the public—without account to gender, age, or citizenship status—can go to attain evidence-based, confidential services and resources for reproductive health care regardless of the status of their insurance (e.g., public, private, uninsured) or financial need. At some level, this research provides an evaluation of this public institution and speaks to whether it is accountable to the American public.

We address two related questions of inequity. First, our analyses are motivated by concerns around the role federalism plays in maintaining or ameliorating inequality. Given that Title X is a federal policy administered at the state level—sometimes by the states themselves (through Departments of Health) while at other times by nonprofit organizations or

federally qualified health centers (FQHCs)—there is heterogeneity in resource distribution. Given the heterogeneity in the way that Title X is implemented across the states, we ask, how does the shape and scope of contraception deserts differ across the US? We predict that some states will have smaller contraception deserts and will deliver resources more equitably than others. Thus, this article contributes to literature highlighting the dialectical relationship between federal and state policy and the ramifications of interstate differences in implementing federal policy. This research also combines theories and methods of political science, geography, public policy, and public health to contribute new knowledge around an important but often overlooked aspect of the politics of reproductive health care in the United States: equitable access to reproductive health care resources beyond abortion.

Second, we ask, What kind of people are most likely affected in each state? Our analyses find that across several states, people of color and poor people are the primary occupants of certain types of contraception deserts. Ultimately, we show that low-resourced people and people of color face spatial hindrances in attaining reproductive health care even when these services are, on their face, affordable or even free. Our results reveal that although some states have smaller contraception deserts than other places and, furthermore, that the interstate range in proportion of residents who live in contraception deserts is quite large, it is consistently the case that people of color and poor people are overrepresented in contraception deserts across the 14 states we analyze here. When we account for non-spatial barriers to access (i.e., levels of poverty), we find yet another illustration and layer of concentrated disadvantage whereby, in this case, people of color are acutely affected.

We begin with a brief explanation of Title X and the political contexts likely to influence accessibility across states. Then we provide a brief review of the geography of health and the concept of accessibility to build the groundwork for our empirical expectations and hypotheses. By analyzing federally funded clinics across several states, we are able to speak to the range of accessibility to affordable family planning resources. We provide necessary and timely analyses of these dynamics using geographic information systems (GIS) and spatial analysis—specifically the integrated two-step floating catchment area (I2SFCA) method—to gain leverage over data from Offices of Population Affairs and the US Census. We close by discussing our findings and mapping future points of inquiry.

Title X

Family planning policy is increasingly salient in American political conversations, but the tenor of this discussion has transformed dramatically over time. In the mid-twentieth century, policy makers across the two major political parties largely supported policies that provided low-barrier, equitable access to affordable contraception (Meier and McFarlane 2001). This widespread, bipartisan support for family planning culminated in President Nixon passing Title X of the Public Health Service Act in 1970. Just prior to signing, President Nixon wrote, “It is clear that the domestic family planning services supported by the Federal Government should be expanded and better integrated.” He went on to explain, “It is my view that no American woman should be denied access to family planning assistance because of her economic condition” (quoted in Rodberg 2011). Today, it is difficult to find political consensus on this matter particularly because contraception politics are increasingly linked to abortion by conservative political elites (Aiken and Scott 2016).

Title X is the only federal program dedicated exclusively to family planning and reproductive health care. Title X is administered by 10 regional offices of the US Public Health Service, rather than by state or welfare departments, and organizations must apply to funds. Grants are awarded on a competitive basis, so organizations, including states, must “win” their grant from the federal government (Meier and McFarlane 2001). Each state has at least one Title X grantee, and in about half of the states, the state is the sole grantee. In other states, there are multiple grantees or the state subcontracts the funds and tasks to other organizations (National Family Planning and Reproductive Health Association 2016).

Each Title X–funded clinic is required to offer “a broad range of acceptable and effective medically approved contraceptive methods and related services” (Office of Population Affairs 2014).¹ Aside from a complete exclusion of abortion procedures, there is a plethora of combinations of resources that each clinic provides. “A broad range” is implemented differently across the Title X grantees and clinics, but because grantees have to apply and win grants, there is at least a basic standard for all Title X clinics to follow. Additionally, services must be provided on a voluntary and confidential basis, even to unemancipated minors. Title X–funded clinics also deliver preventive health services, such as cervical and breast

1. What is considered “evidence based” and “a broad range” is in flux. In March 2019 the Trump administration published a rule that removed the requirement that contraception be “medically approved” methods (Hasstedt 2019).

cancer screening, HIV prevention education, testing and referral, and pregnancy diagnosis and referral on a sliding scale for affordability.

Given that resources for the program are devolved from the federal government to the states (or to other local entities), it is important to note some additional complexities regarding how effectively and equitably the policy works. At the most basic level, grantees have the power over where to place a Title X–funded clinic. These siting decisions have ramifications for who will have physical access to these spaces, and therefore there are immediate consequences for the size and scope of contraception deserts. Second, given that states and the federal government tend to vie for power, a state's relationship with or view of the federal government's policies concerning this matter will shape the extent to which the policy is effectively implemented. For example, even before the Trump administration made its recent major changes to Title X rules for resource allocation, nine states had already prohibited Title X funds from going to providers that also provide abortion services, are affiliated with abortion providers, or refer clients to abortion providers (Guttmacher Institute 2019).² In a tug-of-war, the federal government under the Obama administration named additional grantees to sidestep the states that did not want to send funds through certain organizations. This conflict is well represented by the case of North Carolina; when the Republican-dominated General Assembly sought to prevent Planned Parenthood from receiving Title X funds, the Obama administration named Planned Parenthood of North Carolina as an additional grantee (Flynn 2013).

Moreover, states are often more competitive grantees because they have infrastructure to implement the program, but states can also decide to bow out of the program altogether, potentially creating wider areas of inaccessibility. In contrast, they can also decide to bolster the program by supplementing (or substituting) the program with state funds. In the wake of the most recent rule changes to this policy—often referred to as the “gag rule” and the “physical separation rule”—various states have elected to refuse to take federal funds; others have begun appropriating funds to clinics affected by the new policies (Nakamura 2019). The effects of these state-level policy changes have yet to be determined, but the research here will provide a foundation on which to build for future assessments.

2. In response to a new regulation published by the Trump administration that prohibits Title X grantees from referring patients for abortion except in the case of rape, incest, or medical emergency, Planned Parenthood announced they would withdraw from future participation in the program (McCammon 2019).

An additional policy dimension to consider is whether states chose to expand Medicaid under the Affordable Care Act (ACA) of 2010. While the ACA increased the number of people who have access to health insurance, perhaps counterintuitively, a greater number of people may take advantage of services provided by Title X clinics. Research on Massachusetts, for example, reveals that even though there were more people with access to traditional health care facilities (due to “Romneycare”), there was an increased number of people who began to rely on or maintained their reliance on Title X–type clinics (Ku et al. 2011). In all, two-thirds of Title X recipients have incomes at or below the federal poverty level, roughly half are uninsured (even after the expansions to the ACA), and another 35% have coverage through Medicaid or other public programs (Hassett 2017).

Finally, the Trump administration recently expanded exemptions to the ACA mandate to provide insurance coverage for contraception. While the exemption previously covered only employers who sincerely held religious beliefs against the use of contraception, the exemption now includes any with ostensible moral objection to contraception. “More than 55 million women have had access to birth control without copayments because of the contraceptive coverage mandate,” but “under the new regulations, hundreds of thousands of women could lose those benefits” (Pear, Ruiz, and Goodstein 2017). Without the ACA’s contraception mandate, these families may turn to rely on the Title X program; however, that would ultimately put a greater strain on a program whose budget has been cut during the past several years.

Taken together, variation in state policy, confluence of state policy and federal resource distribution, and state-federal relationship dynamics are all likely to produce larger contraception deserts in some states in comparison to others, thus further embedding inequities in access to affordable, evidenced-based reproductive health care.

The Geography of Health and Concentrated Disadvantage

Scholars of geography, city planning, and public health provide evidence that access to health care is dictated by space, race, and class. Many people live in spaces marked by a geography of health and opportunity, while others live in areas characterized by concentrated disadvantage. Scholars who focus on the geography of health reveal that focusing on the built environment yields greater insight into the mechanisms of racial and class differences in health outcomes than does simply focusing on attitudes and

behaviors. Indeed, one's zip code has a high degree of predictive power for health outcomes; recent research indicates that life expectancy sometimes differs by 20 years across neighborhoods only five miles apart (VCU Center on Society and Health 2015). This finding is representative of the scholarship on the geography of health, which not only reveals that individual behaviors and attitudes influence health outcomes but also points to the structure of the built environment as a major factor that may enhance or dimension one's health (Gordon et al. 2011; Smith and Morton 2009).

For instance, research shows residential segregation is one of the major reasons that (poor) people of color, on average, have worse health outcomes than whites across the class spectrum. While research shows Blacks in segregated communities do not have different values concerning education or hard work than whites (Darity 2011), neighborhood areas can vary in the provision of resources that support health, including "access to public and private transportation, exposure to personal and property crime, amenities, neighborliness, and problems such as litter, noxious odors, and discarded needles" (Williams and Collins 2001). Sociologists David R. Williams and Chiquita Collins (2001: 405) explain, "Segregation is a fundamental cause of differences in health status between African Americans and whites because it shapes socioeconomic conditions for blacks not only at the individual and household levels but also at the neighborhood and community levels." Residential segregation has the direct effect of lowering socioeconomic resources, educational opportunities, and employment opportunities for Blacks in particular (Trounstine 2018). Each of these are major determinants of health outcomes (Acevedo-Garcia et al. 2003; Acevedo-Garcia et al. 2008; Diez Roux and Mair 2010; Williams and Collins 2001; Williams and Jackson 2005) because they lead to concentrated disadvantage, or areas marked by dense poverty and limited political or economic capital (Michener 2017).

Finally, we should note that these problems are further exacerbated by political leaders who are more likely to make lean services in poor and Black neighborhoods, where political resources and, therefore, political consequences for doing so are low (Schneider and Ingram 2018). With this extant research in mind, we seek to ascertain whether a pattern of inequality exists for Title X, a policy specifically targeted to low-resourced people.

Accessibility

Accessibility is multidimensional, having both *spatial* and *nonspatial* components. Spatial determinants concern the geographical barriers for people to attain resources, such as travel time. Nonspatial access concerns

nongeographic barriers such as poverty. Since spatial and nonspatial accessibility factors interact to exacerbate inequality, the two dimensions ought to be simultaneously considered to develop an accurate depiction of the geography of opportunity. Indeed, Wang and Luo (2005: 132) assert that “successful integration of spatial and nonspatial factors is critical to design an effective method of assessing healthcare access.”

We also draw attention to sociologist Ronald M. Andersen and his colleagues’ helpful framework, which differentiates between potential and realized access (Andersen et al. 1983). *Potential access* concerns the characteristics of the delivery system, which includes factors like the availability of health care professionals and facilities and the characteristics of the individuals in the area (e.g., age, insurance coverage, health status). The second is *realized access*, which speaks to the rates of use and subjective levels of satisfaction with the health care system. This article homes in on potential access because this aspect of accessibility is concerned with the structural components that may influence whether members of a community successfully attain health care if they need or want to. Again, we seek to determine whether there is “equity of access,” which “may be said to exist when services are distributed on the basis of people’s need for them” (Andersen et al. 1983: 53).

Empirical Expectations

The first issue of concern centers the scope and size of contraception deserts. Specifically, we aim to determine the proportion of American residents living in contraception deserts. We define contraception deserts as an area where potential access to Title X is highly constrained due to spatial and nonspatial factors. Thus, at the very minimum, we would assert that one lives in a contraception desert if they live beyond a reasonable travel range. This basic qualification of a contraception desert concerns spatial access only. We hypothesize variation across the states, whereby some states will evidence a more even distribution of federal resources than others.

We are also concerned with equity; thus, we should like to know whether there exist communities that not only face physical barriers to access but also may be excluded from a geography of health due to nonspatial barriers. Research shows that where there are more people of color, and Black Americans in particular, in a population, public resources are more likely to become difficult to attain and be doled out with racial bias (Key 1949; Katznelson 2005; Soss, Fording, and Schram 2008). Similarly, while there

are both state and federal policies that aim to assist the poor, it is not uncommon for these services and public goods to be difficult to attain due to bureaucratic red tape or paternalistic implementation of policies (Schneider and Ingram 1993; Michener 2017). We leverage our data and methodological strategy to not only account for a range in severity of contraception deserts but also to determine the demographic characteristics of various types of contraception deserts. To be sure, we not only focus on Black Americans but also center Latinx, Asian, and indigenous Americans as well as poor Americans across the ethno-racial spectrum. We predict that people of color and poor people will be overrepresented in spaces of concentrated disadvantage.

Data and Methods

In this article, we evaluate the accessibility of affordable family planning via Title X in 14 states: California, Colorado, Florida, Indiana, Iowa, Kansas, Massachusetts, Michigan, New Mexico, New York, North Carolina, Pennsylvania, Texas, and Washington. While not intended to be nationally representative, these states vary in meaningful ways with respect to geographic regions, heterogeneity in their socioeconomic and demographic populations, geographic size, rural/urban dynamics, and partisan politics. They also vary in how Title X is structured. Most southeastern states (including Florida and North Carolina) rely on the distribution of Title X through county health departments. In contrast, services in states like California and Washington are filtered through a smattering of Planned Parenthood and other family planning clinics, federally qualified health centers, and hospitals and health departments. Many of the other states are somewhere in between—relying on state entities, but supplemented with nonprofit clinics, or vice versa. Descriptive statistics about the selected states can be found in table 1.

Measuring Access with the Integrated Two-Step Floating Catchment Area (I2SFCA) Method

We contribute to a larger literature on access to health care, in part by employing a measure of access that captures multidimensional complexities. We should note that previous approaches to identifying health shortage areas tend to rely on administrative boundaries. Additionally, traditional health shortage measures account for neither unequal spatial distribution of physicians nor the propensity of people to seek health services across

Table 1 Descriptive Statistics of State Sample

	Total Title X clinics	Health dept. clinics, %	Population estimates	White alone, not Hispanic, %	Persons without health insurance, younger than age 65 years, %	Median household income	Persons in poverty, %	Land area in square miles	Dem. vote for House of Rep.
California	356	14%	39,557,045	36.8%	8.3%	\$67,169	12.8%	155,779.22	65%
Colorado	73	58%	5,695,564	67.9%	8.6%	\$65,458	9.6%	103,641.89	52%
Florida	157	87%	21,299,325	53.5%	16.0%	\$50,883	13.6%	53,624.76	48%
Indiana	23	3%	6,691,878	78.9%	9.7%	\$52,182	13.1%	35,826.11	44%
Iowa	40	26%	3,156,145	85.3%	5.6%	\$56,570	11.2%	55,857.13	50%
Kansas	65	98%	2,911,505	75.7%	10.3%	\$55,477	12.0%	81,758.72	46%
Massachusetts	93	1%	6,902,149	71.4%	3.2%	\$74,167	10.0%	7,800.06	66%
Michigan	90	79%	9,995,915	74.9%	6.4%	\$52,668	14.1%	56,538.90	55%
New Mexico	67	66%	2,095,428	37.1%	11.4%	\$46,718	19.5%	121,298.15	58%
New York	187	10%	19,542,209	55.4%	6.3%	\$62,765	13.6%	47,126.40	68%
North Carolina	117	96%	10,383,620	62.8%	12.7%	\$50,320	14.0%	48,617.91	49%
Pennsylvania	191	5%	12,807,060	76.1%	6.7%	\$56,951	12.2%	44,742.70	55%
Texas	95	27%	28,701,845	41.5%	20.0%	\$57,051	14.9%	261,231.71	49%
Washington	72	26%	7,535,591	68.0%	7.5%	\$66,174	10.3%	66,455.52	63%

administrative boundaries even though few people limit themselves to specific counties or zip codes when identifying a provider; instead, people look for providers within a reasonable driving distance. One approach that has recently gained traction among public health scholars and applied geographers is the *integrated two-step floating catchment area* (I2SFCA) method. This approach was developed by Wei Luo (2004), but is based on previous work on spatial decomposition by John Radke and Lan Mu (2000). The I2SFCA strategy overcomes these limitations by using a smaller unit of analysis to solve the issue of unequal spatial distribution within an area and by using a polygon of reasonable driving distance around providers that can cross administrative borders (Luo 2004; Radke and Mu 2000).

The basic FCA model draws an X-minute polygon (X = some reasonable distance measured in minutes or miles) around the centroid of a census tract to create a “catchment area.” A similar polygon “floats” from tract to tract, and the provider-to-patient ratio is calculated for each tract. The underlying assumption of this method is that services within the catchment area are fully available to all residents in that catchment. This is not necessarily the case, as providers on the edge of one catchment may be more than X minutes away from some residents in the catchment, and some providers on the edge of a catchment may provide services to residents of a nearby catchment (and thus be less available to provide services to residents in their own catchment).

Radke and Mu overcome this problem by repeating the process of creating “floating catchments” twice: once based on provider locations and once based on population locations. This is now widely known as the “two-step floating catchment area” (2SFCA) method (Radke and Mu 2000). Basically, step one creates an initial ratio at each service area centered at a provider (supply) location, and step two adds up the initial ratios in the overlapping service areas to measure provider accessibility at population (demand) localities, considering there may be multiple suppliers in a demand locality. The second catchment uses the population-weighted centroid within a tract (instead of the geographic centroid) to account for unequal population distribution across census geographic space. The 2SFCA method is standard in the applied geography literature, with many well-known variations on the method. The *integrated* 2SFCA incorporates a measure of nonspatial accessibility when making shortage designations. The vast majority of this literature applies the 2SFCA analysis to a single state or metropolitan area.

Our data on Title X–funded clinic locations come from the Office of Population Affairs’ Title X Family Planning Directory (July 2018), which provides the physical address of all Title X grantees and subgrantees. We use the ArcGIS network analyst tool to calculate polygons of a “reasonable driving distance” around the longitude and latitude of Title X clinics in ArcGIS.³ The federal guideline for maximum distance to a primary care provider for the purpose of determining a Health Professional Shortage Area is 30 minutes (DHHS 1993). The standard of 30 minutes is also commonly used in other studies of health care accessibility and distance (Bosanac, Parkinson, and Hall 1976; Fortney, Rost, and Warren 2000; Sherman et al. 2005). While 30 minutes as a standard is common, a “reasonable” driving distance may be different based on the services provided. For instance, an appropriate reasonable driving distance for cancer treatment may be farther away than a reasonable distance to a pharmacy (Luo and Qi 2009). While most healthy people only see a primary care physician annually, contraceptive methods require more frequent visits to a provider. What’s more, many insurance plans limit supply of oral contraception to one to three months, while other methods, like the Depovera shot, are administered in-office every three months.

Moreover, what is perceived as a reasonable driving distance differs across state landscapes. In comparison to those who live in urban areas, people in rural areas tend to expect to drive longer distances for all sorts of resources (e.g., groceries, physicians, schools). We capture this dynamic by employing the Rural-Urban Commuting Area (RUCA) codes from the 2010 Census; the codes classify census tracts using population density, urbanization, and daily commuting patterns. For census tracts with a RUCA score between 1 and 3 (metropolitan area), we drew a 15-minute driving distance around both the population centroids (demand) and clinics (supply). Likewise, we used a 30-minute driving time for tracts with a RUCA score between 4 and 6 (micropolitan area), a 45-minute one for tracts with a RUCA score between 7 and 9 (rural), and a 60-minute one for tracts with a RUCA score of 10 (isolated community).⁴

We merged Title X–funded clinic locations, census tract population, and demographic data using the census geographic identifier from the 2017 ACS to create several variables. The *weighted population* reflects the number of people of reproductive age, 15–44 years old, with access to a given

3. We are grateful for the assistance of Andrew Sandoval Pazmiño (Tulane University) with the clinic location data.

4. The X-minute driving distance is based on a direct route in a vehicle, not the travel time needed to go to a clinic using public transportation, which is likely much longer.

clinic in a given tract. This is the product of the percentage of a census tract captured by the catchment areas and the total reproductive age population of the tract. The *clinic count* reflects the number of clinics a tract has access to,⁵ and the *frequency* reflects the number of tracts for which a given clinic is responsible (the number of tracts that contribute population to a given clinic). We then create a measure of *clinic availability* by summing the *weighted population* by clinic locations. The provider-to-population ratio is then summed by the population locations, creating a measure of *tract spatial accessibility*, which represents the availability of clinics that are reachable from a residential location. More succinctly, the tract spatial accessibility score is essentially the following ratio filtered by a threshold travel time of X minutes, depending on the RUCA designation of the census tract:

$$\frac{\text{number of clinics accessible to a given tract}}{\text{total population of reproductive age for which a clinic is responsible}} \\ = \frac{\sum \text{clinic count}}{\sum \text{clinic availability}}.$$

Finally, we integrate the spatial access data with a measure of nonspatial access, the percent of the population that is below 150% of the federal poverty line. While some I2SFCA use multidimensional measures of nonspatial barriers through factor analysis, we elected to focus only on poverty, for two reasons. First, when we analyzed various measures that proxy need (e.g., availability of a vehicle, number of rooms/person), we found poverty explained nearly all of the variance in the factor analysis we performed in each state.⁶ Second, given that the demographic makeup of each state is quite different, we would not be able to directly compare the results from one state to another; that is to say, because poverty consistently explained a great deal of need in each of the 14 states, we are able to leverage a more parsimonious approach in a comparative analysis here.

Designating Spaces as Deserts

We designate two types or tiers of severity for contraception deserts; these are differentiated by color in figure 1. First, if the population-weighted centroid of a tract has no access to a clinic in the first catchment, we assign

5. Other applications of the 2SFCA use the number of physicians rather than the number of clinics in their calculations. The number of physicians at a clinic location is a more refined measure; however, that is simply not available for Title X clinics.

6. We can share the individual, state-level factor analysis upon request.

Contraception Deserts United States

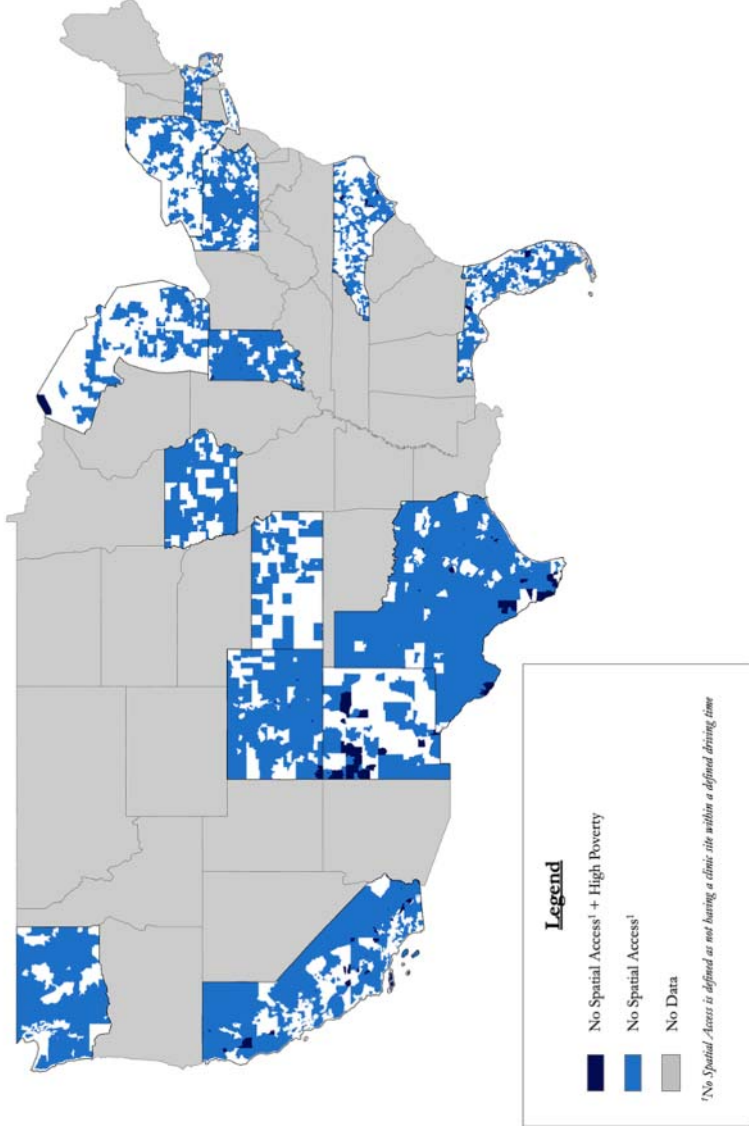


Figure 1 US map of contraception deserts.

a spatial accessibility score of 0 and designate the tract a desert; these areas include tracts with no spatial access but average- or low-need populations. This type of contraception desert is indicated by gray. Second, we identify a subset of this first category if more than 50% of the population is below 150% of the federal poverty line. In other words, these spaces are in dire straits, as they have no spatial access *and* a high-needs population; these spaces are indicated by black. White areas of the state maps have spatial access to Title X. Overall, the map in figure 1 highlights a range in the severity of contraception deserts and captures a multidimensional depiction of reality.

Results

Size of Contraception Deserts

As predicted, we find evidence that implementation of Title X varies significantly across states as does the scope and severity of contraception deserts. Figures 2 and 3 reveal the proportion and number of people affected across the 14 states, respectively.⁷ The proportion of populations in contraception deserts of any kind range from around 17% in California to upward of near 50% in Texas. Needless to say, assessing the sheer number of people affected provides a different perspective on the data. Though California has a “low” percentage of people in deserts, this translates into 2.8 million people being left out. Roughly 5.8 million people in Texas live in some type of contraception desert.

States and other Title X grantees have different strategies for implementing Title X. Some states rely primarily on county health departments or schools while others have a mix of providers focused in urban areas. Because of these siting decisions, the percent of the state’s landmass in a contraception desert varies significantly. We find that states that primarily use county health departments or schools constitute three out of the four states with the best spatial access; that is to say, they have the lowest proportion of landmass that would be considered a contraception desert. Kansas, North Carolina, and New Mexico rely on county health departments and schools, and New York uses a mix of providers. Spatial access is high in these states because Title X–funded clinics are distributed fairly evenly across the states though not necessarily with regard to how the states’ populations are distributed.

7. Details concerning the prevalence of contraception deserts can be found in tables A1 and A2 of the online appendix.

Percent of Reproductive Age Population in Deserts

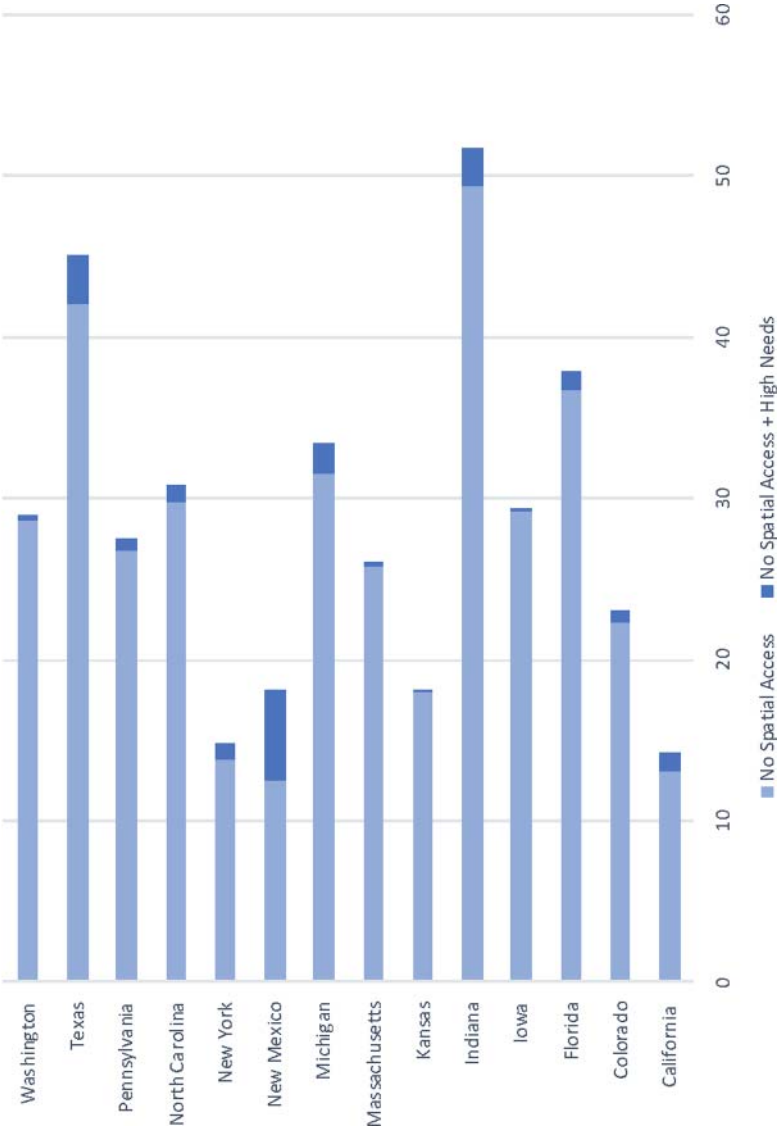


Figure 2 Percentage of population in contraception deserts.

Number of People of Reproductive Age in Deserts

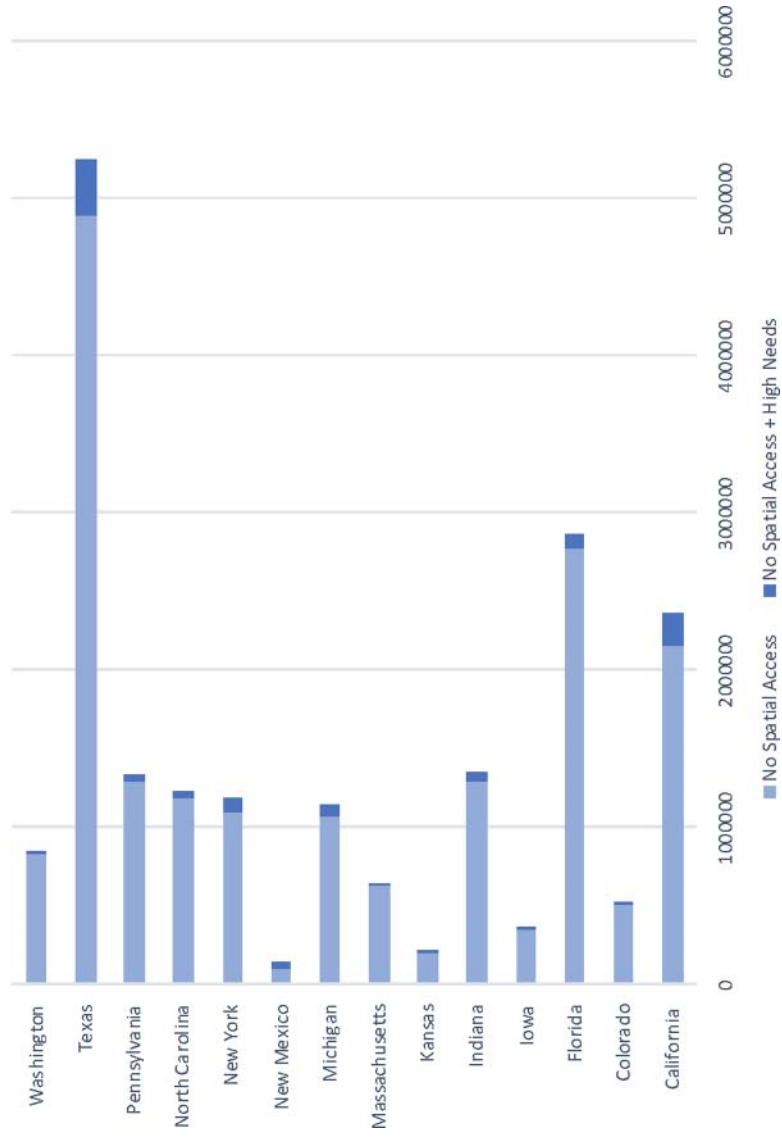
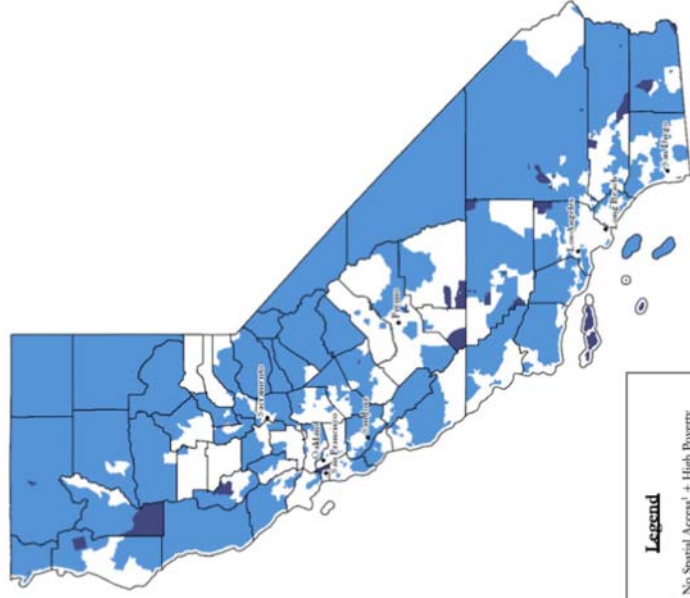


Figure 3 Number of people in contraception deserts.

California



Texas

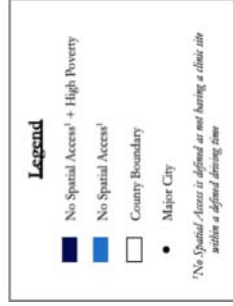
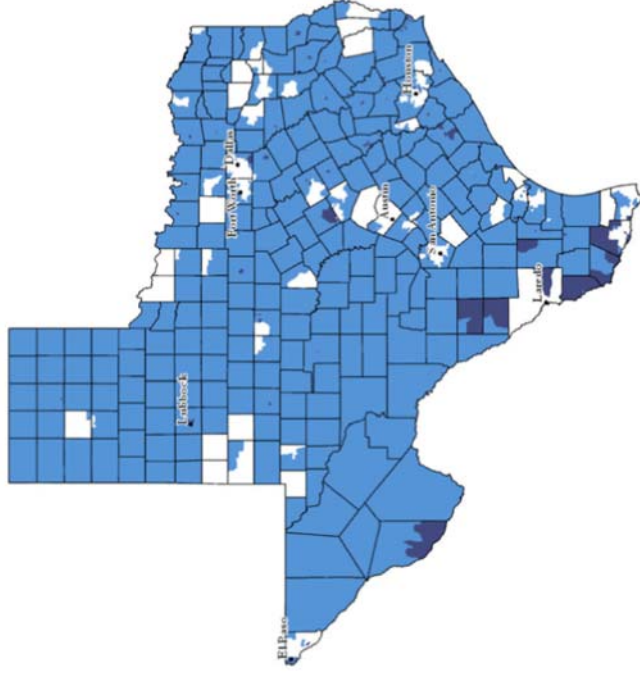


Figure 4 Contraception deserts in Texas and California.

The states with the worst spatial access include Texas, Iowa, and California. The problems that arise from primarily focusing on the even distribution of sites without considering where populations actually reside are put in high relief when we compare Texas and California (see figure 4). Both of these states have a large proportion of their landmass that would be deemed contraception deserts, but Texas has the highest percent of the population that lives in a contraception desert (near 50%) while California has the smallest (around 17%). What's more, while California has 356 clinics to serve 39.5 million people, Texas has only 95 clinics to serve 28.7 million (see table 1). All told, California appears to be using its resources more strategically and efficiently.

Residents of Contraception Deserts

We also evaluate the degree to which contraception deserts are areas of concentrated disadvantage and racial inequity. We determine the demographic profile of residents who live in each kind of contraception desert, with an emphasis on calculating the percent of the Black, Latinx, indigenous, and Asian-American populations (see tables 2A and 2B). Racial minorities may be more in need of public resources than their white counterparts because of the built environment around them (Gordon et al. 2011; Smith and Morton 2009). While race and class tend to be highly correlated, it is worth noting that the intersection of race, class, and space appear differently across racial groups. For instance, low-income whites are not generally isolated in the same way that low-income Blacks are—often being dispersed among middle-income white neighbors. In contrast, middle-class Blacks are often segregated alongside or on the borders of low-income Black communities (Adelman 2004; Smith 2019). What this means is that middle-class Blacks face many of the same kinds of barriers that their low-income racial group members do, and furthermore, that higher income does not necessarily protect people of color in the same way that it does white Americans (Eligon and Gebeloff 2016; Hamilton et al. 2015). The final column in these tables also shows the population below 150% of the federal poverty line that lives in each type of desert.

By moving beyond the Black-white paradigm that tends to dominate questions of inequality, we find that racial minorities of various backgrounds tend to be overrepresented in spaces defined as contraception deserts. Table 2A, for instance, reveals that 38.8% of California's population is Latinx, but this group is grossly overrepresented in the worst kind of contraception desert; if we walked into a contraception desert that has no spatial access and is high-needs (based on the levels of poverty), 68%

Table 2A Demographics of States and People in Contraception Deserts

State	Contraception desert type	Desert, Black, %	Desert, Latinx, %	Desert, Native American, %	Desert Asian, %	Desert below the 150% federal poverty level, %
California	No spatial access	3.07%	28.05%	0.92%	10.46%	19.18%
	No spatial access + high need	4.65%	65.67%	2.18%	4.87%	59.72%
	Total in state	5.66%	38.82%	0.74%	14.18%	24.72%
Colorado	No spatial access	2.63%	15.94%	0.94%	2.07%	17.08%
	No spatial access + high need	6.16%	45.97%	11.31%	0.47%	53.84%
	Total in state	3.94%	21.27%	0.92%	3.04%	19.33%
Florida	No spatial access	13.61%	24.61%	0.27%	2.89%	21.27%
	No spatial access + high need	37.43%	44.61%	0.32%	0.82%	55.94%
	Total in state	15.86%	24.90%	0.28%	2.70%	26.00%
Indiana	No spatial access	4.24%	5.89%	0.21%	1.64%	19.58%
	No spatial access + high need	39.50%	13.92%	0.35%	3.66%	60.49%
	Total in state	9.13%	6.72%	0.22%	2.03%	23.83%
Iowa	No spatial access	0.91%	3.53%	0.21%	0.94%	18.50%
	No spatial access + high need	4.72%	1.44%	1.53%	0.00%	61.47%
	Total in state	3.29%	5.73%	0.34%	2.28%	20.36%
Kansas	No spatial access	2.38%	6.37%	1.06%	1.18%	17.52%
	No spatial access + high need	14.68%	21.35%	5.16%	2.51%	52.91%
	Total in state	5.60%	11.58%	0.78%	2.79%	21.64%
Massachusetts	No spatial access	2.50%	3.84%	0.10%	4.85%	10.35%
	No spatial access + high need	20.22%	60.21%	0.33%	3.79%	74.07%
	Total in state	7.29%	11.20%	0.21%	6.17%	17.40%

Table 2B Demographics of States and People in Contraception Deserts (cont'd)

State	Contraception desert type	Desert, Black, %	Desert, Latinx, %	Desert, Native American, %	Desert, Asian, %	Desert below the 150% federal poverty level, %
Michigan	No spatial access	6.74%	3.94%	0.41%	3.06%	17.81%
	No spatial access + high need	60.87%	5.59%	0.43%	0.39%	60.43%
	Total in state	13.62%	4.87%	0.52%	2.90%	24.48%
New Mexico	No spatial access	1.48%	42.28%	16.85%	1.43%	29.72%
	No spatial access + high need	0.14%	46.06%	47.59%	0.56%	58.88%
	Total in state	1.93%	48.13%	9.47%	1.43%	32.11%
New York	No spatial access	4.38%	10.43%	0.28%	5.83%	16.61%
	No spatial access + high need	5.26%	26.50%	0.35%	24.11%	58.12%
	Total in state	15.49%	18.90%	0.39%	8.40%	23.54%
North Carolina	No spatial access	15.68%	7.76%	0.74%	2.32%	21.87%
	No spatial access + high need	35.35%	26.69%	0.50%	1.72%	57.92%
	Total in state	21.23%	9.15%	1.17%	2.68%	26.54%
Pennsylvania	No spatial access	2.55%	3.45%	0.14%	2.43%	16.00%
	No spatial access + high need	7.94%	4.08%	0.17%	5.71%	65.28%
	Total in state	10.79%	6.80%	0.19%	3.25%	21.16%
Texas	No spatial access	9.57%	28.95%	0.52%	5.09%	20.47%
	No spatial access + high need	15.04%	63.74%	0.56%	2.09%	57.17%
	Total in state	11.75%	39.11%	0.47%	4.56%	26.37%
Washington	No spatial access	2.05%	9.91%	1.95%	5.52%	16.70%
	No spatial access + high need	3.00%	50.54%	12.18%	1.51%	51.68%
	Total in state	3.58%	12.30%	1.30%	8.11%	20.04%

of the population would be Latinx. In Colorado, 0.92% of the population is indigenous, but in contraception deserts marked both by spatial and nonspatial barriers, 11.3% of the population is Native American. Similar results can be found for Blacks in Florida, who see twice their states' population proportion in spaces marked by inequitable access to Title X. Race and class are intricately linked, but they are not perfectly correlated; our results further illustrate the very definition of concentrated disadvantage. Overall, we find similar trends in racial and economic inequity in each of the 14 states we analyze. What is important to note, then, is that even though some states have smaller contraception deserts than others and still others have lower proportions of their state's residents who live in contraception deserts, each state sees that people of color and poor people are disproportionately found in spaces marked by concentrated disadvantage.

Conclusion

The extent to which individuals in the United States have access to abortion has garnered much attention from academics, the media, and the mass public (Finer and Henshaw 2003; Jones, Darroch, and Henshaw 2002; Jones and Jerman 2014; Jones et al. 2008; Saad 2009). A major reason abortion access has come to the forefront of Americans' minds is because of a recent proliferation of state-level abortion restrictions. Indeed, states enacted more abortion restrictions between 2011 and 2013 than during the entire previous decade (Nash et al. 2013). However, the paucity of attention on the accessibility of affordable contraception relative to abortion is surprising given that more than *30 times as many women obtain publicly funded contraception a year than an abortion* (Jatlaoui 2017). Just as we see a growing number of "abortion-free zones"—or places where families may travel more than 100 miles—across the US, it is not far-fetched to imagine the development and growth of *contraception deserts*, or localities where there is inadequate and inequitable access to affordable reproductive health care and family planning resources (Saunders, Kreitzer, and Smith 2018). As the Trump administration made strides to reduce the kinds of organizations that are allowed to receive federal funding (e.g., Planned Parenthood) as well as increase the kinds of organizations that do not provide evidenced-based contraception and reproductive health services (e.g., crisis pregnancy centers), this is likely to become a reality rather soon.

Our goal is to introduce the concept and measure of contraception deserts and determine the scope and severity of spaces of inequity across several US states. Our methodological strategy allows us to simultaneously consider spatial and nonspatial barriers to potential access to

Title X–funded clinics. We speak to how one’s built environment prevents access to public resources and to how structural vulnerability poses an additional barrier to accessibility.

First, we find there is state variation in the size of contraception deserts. The proportion of reproductive-age residents who would have difficulty attaining access to Title X resources ranges from a low of 17% in New York and California to just more than 50% in Indiana and Texas. It is worth reiterating that states (as well as nonprofit organizations or FQHCs, when they are grantees) have a great deal of power over whether and the extent to which contraception deserts will appear in their states. Grantees have the power to make more efficient and more equitable siting decisions, at the very least. States can choose to bolster the program through additional appropriations, or state legislators can choose to exacerbate inequality by excluding certain kinds of organizations from attaining funds or simply electing to opt out of participating altogether through state policy.

Second, our research adds to the body of literature which reveals that when resources and power are devolved from the federal government to state and local governments, racial disparities are often exacerbated or perpetuated (Katznelson 2005; Soss, Fording, and Schram 2008, 2011). Specifically, we find that if we go to either type of contraception desert, people of color (and low-income people) are disproportionately likely to live in these spaces, in comparison to their overall population in the state.

These findings speak to the relationship between federalism and the politics of inequality. Our findings reveal that the implementation of this small but impactful program varies wildly, oftentimes to the detriment of already marginalized populations. The analyses provide further evidence that inequity is a policy choice. States *can* implement policy in ways that mitigate structural inequality. We support these claims by comparing 14 states with one another; it is clear that some are capable of placing Title X–funded clinics where they are needed most. The steps we’ve taken here are insightful and impactful, but exploratory; moving forward, scholars will need to analyze the political determinants of this aspect of social policy as well as the outcomes for uptake, or lack thereof.

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Rebecca J. Kreitzer is an assistant professor of public policy at the University of North Carolina at Chapel Hill. Her research focuses on women’s political representation and gender and racial policy inequality in the US states.

rkreit@email.unc.edu

Candis Watts Smith is an associate professor of political science and African American studies at Pennsylvania State University. Even in quarantine, her research focuses on American politics with an emphasis on racial attitudes and structural racism.

Kellen A. Kane is a PhD student in public policy at the University of North Carolina at Chapel Hill. His research focuses on social inequalities, state and local politics, interest groups, and LGBT politics.

Tracee M. Saunders is a PhD student in political science and health informatics at the University of Iowa and an NSF GRFP Fellow. Her research focuses on health policy, bureaucratic politics, and social inequalities.

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