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The Impact of Location on Healthcare Access for Individuals with Disabilities

This paper analyzes healthcare access for individuals with disabilities living in rural areas. In current political discussion, we typically think of insurance coverage as the metric to analyze healthcare access. However, as demonstrated by studies of healthcare in the United Kingdom, people with disabilities continue to face barriers to health care even with universal healthcare systems. In particular, individuals in rural areas have less healthcare access than urban residents. This is due to factors including socioeconomic status, insurance coverage, access to competent care, and transportation. This study aims to understand if disability status exacerbates the issue of access in rural areas. This paper reviews how location impacts care access through quantitative analysis of datasets regarding preventative care for individuals with disabilities. This work finds preventative care, including routine check-ups and mammograms, are accessed more frequently in increasingly metropolitan areas. Some factors including dental care and mammograms also had disparities in care for disabled and nondisabled populations. These factors are viewed through the lens of the social model of disability, addressing whether rural areas are constructed in a way that supports healthcare access for people with disabilities.

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Introduction

Roughly 12% of adults 18-65 years old have a disability (Center on Budget and Policy Priorities, 2017). However, these individuals continue to face social and economic stressors, particularly when accessing healthcare. People with disabilities (PWD) often have specialized healthcare needs which increases their healthcare utilization. As a population, people with disabilities are one of the largest groups of healthcare consumers in the United States (Drainoni et al., 2006; Kronick et al., 1996). Additionally, this group has healthcare needs which often span years, thereby increasing their interactions with the healthcare system (Drainoni et al., 2006). As such, it is particularly important to examine how barriers to healthcare impact individuals with disabilities. Policy discussions currently address these barriers by focusing on how to improve health insurance access. This is important, given the financial barriers to healthcare that many disabled people face (National Council on Disability, 2009). However, it is also essential to examine fundamental barriers beyond insurance. The United Kingdom has a National Health Service with a universal basic insurance program, which should theoretically remove healthcare cost barriers. Yet, studies within the United Kingdom have continued to reveal healthcare disparities for people with disabilities (Sakellariou & Rotarou, 2017). Therefore, even as the United States contemplates the institution of universal healthcare, we must ensure that we also address other barriers to healthcare access.

This paper focuses on the way that living in a rural community creates healthcare barriers within the United States, particularly for individuals with disabilities. Pulling from the example of the United Kingdom, even the institution of a universal insurance program cannot guarantee equal healthcare access for all. Other factors limit the effectiveness of universal insurance. In particular, disabled individuals in rural areas have less resources which can limit their access to

care. In both the United Kingdom and the United States, disabled individuals in rural communities seem to have worse healthcare access (Sakellariou & Rotarou, 2017; Emerson et al., 2009; Merwin et al., 2006). This is due to a number of factors including lack of facilities, transportation barriers, and compounding factors which lead to worse overall health in rural disabled populations. Healthcare facilities in rural areas tend to be more spread out than in urban areas, which is accompanied by a lack of specialized care in rural areas (Rosenblatt and Hart, 2000). Due to this, individuals in rural communities often have long transportation times to access care (Nicholson & Cooper, 2011). Since people in rural areas are also typically of worse health and lower socioeconomic status, a lack of nearby healthcare facilities can be compounded (Merwin et al., 2006; Adler & Ostrove, 1999). This is particularly true for people with disabilities, who also experience lower socioeconomic status and worse health on average (Center for Disease Control, 2019; White, 2002). Part of the difficulty PWD have in accessing healthcare is a lack of social and structural supports to facilitate equal healthcare access (Oliver & Barnes, 2010). Clearly, many factors combine to limit healthcare resources in rural areas. Even as policymakers argue for a more universal insurance program, these changes will not be effective at increasing care if patients cannot travel to the specialized care centers they need. As such, it is important to recognize how location creates barriers in order to improve our structural supports for rural people with disabilities. While these papers have examined healthcare disparities within rural areas, relatively little literature exists on the healthcare experience of people with disabilities in rural areas. Furthermore, while the United Kingdom has literature on this topic, work in the United States is even more limited. The work largely focuses on interview data with people with disabilities. Therefore, there is not a clear understanding of how

widespread the healthcare limitations for rural PWD are. This paper attempts to address this gap through a quantitative analysis.

This paper will analyze its quantitative results through the lens of the social model of disability. In the following section I will outline the social model of disability as a theoretical framework to inform my study. I will then outline major policies which are useful to understanding healthcare systems for rural PWD, such as the Americans with Disabilities Act and Medicaid. This will be followed by an analysis of the major findings of literature on rurality, disability, and healthcare. Utilizing the literature, I will perform a quantitative analysis of access to preventative care as a proxy of access to healthcare. My methods attempt to address the lack of large quantitative studies found in the literature. By addressing this gap, I will be able to better analyze the extent of healthcare limitations for rural individuals with disabilities. My study will be done through the utilization of the Centers for Disease Control and Prevention Disability Health Data System and the University of Montana Disability Counts dataset. By combining these resources I will analyze how frequently people with and without disabilities access several measures of preventative care, and then explain these differences through the social model framework. Specifically, I will describe why women's healthcare may be particularly impacted based on the amount of variation in mammograms between urban and rural populations. I will also describe how factors such as health insurance may impact levels of dental care for disabled and nondisabled populations. Finally, I will address the strengths and limitations of this study and directions for further research.

Theoretical Framework

The Social Model of Disability

This work will be analyzed through the framework of the social model of disability. The social model of disability conceptualizes disability as a sociopolitical category. This model rose to counter the medical model of disability, which asserts disability as an illness which can be solved through the advances of the medical field (Retief & Letšosa, 2018). The medical model clearly places the location of the “problem” on the individual’s body. In contrast, the social moves the site of the problem to exclusionary physical and social structures or attitudes (Oliver & Barnes, 2010; Shakespeare, 2013). The social model of disability was created by activists for disability rights to address social limitations of the medical model (Beckett & Campbell, 2015; Retief & Letšosa, 2018). This occurred in the wake of British reforms to the welfare state which disproportionately impacted people with disabilities and politicized their interests (Durell, 2014). The social model asserts that we have not built our society to be utilized by people without normal abilities, thereby creating the categorization of disability (Retief & Letšosa, 2018; Shakespeare, 2013). For example, an individual born with a disability does not inherently see anything negative about their condition (Goering, 2015). Rather, this individual becomes disabled through interactions with societal structures that create impairment. This can occur through environmental barriers, organizational barriers, and attitudinal barriers. Environmental barriers may include inaccessible facilities, such as a lack of adjustable tables within a doctors office (Center for Disease Control, 2019; Disability Rights Education and Defense Fund, 2014). Organizational barriers can refer to a lack of accessible programs. For example, the Medicaid sponsored Non-Emergency Medical Transportation system is difficult to access and often does not follow the schedule it sets out for patients (Iezzoni et al., 2006; The Henry J. Kaiser Family Foundation, 2019). Attitudinal barriers can occur when physicians see disabled patients as incompetent or not worth listening to. There have been many examples of healthcare

professionals harming patients because they would not listen to a specific healthcare need the disabled patient said they had (Disability Rights Education and Defense Fund, 2014). In each of these cases, the disabled patient is not inherently receiving worse care due to their disability. However, the manner in which doctors' offices are constructed, the way programs function, and the way physicians see disabled patients prevent disabled patients from receiving the same quality of care as nondisabled patients.

In this way, the social model is helpful in understanding and addressing healthcare limitations for people with disabilities. Yet, there are critiques of the social model as a theoretical framework. Critiques of the social model as a framework largely focus on the difficulty in differentiating between limitations of disability and limitations of social and structural processes. In essence, these critiques say that in placing the responsibility of disability on society, the actual experiences of people with disabilities are erased. Shakespeare (2006) claims that even in situations where physical accommodations can be made for people with disabilities, this only limits the inconvenience of impairments. Indeed, he believes that no social or structural accommodation can actually equalize people with and without disabilities. In this way, there is nuance to how we understand impairment and disability. As Oliver notes, in the social model of disability "the 'reality' of impairment is not denied, but is not the cause of disabled people's economic and social disadvantage. Instead... society restricts their opportunities to participate in mainstream economic and social activities rendering them more or less dependent" (Oliver & Barnes, 2010). This reflects how this paper utilizes the social model. Instead of denying physical impairments, I aim to understand how social and physical constructions may make it more difficult for people with disabilities to access care for their impairments. Through this discussion I am using the social model in the context of healthcare. This explicitly acknowledges the reality

of impairment within disabled populations, and the specialized healthcare needs that PWD may not be effectively treated for due to social and structural factors. This conceptualization of the social model does not see it as a binary where all of the blame is placed on the individual or on society. Rather, there can be limitations to the life of people with disabilities and also societal constructions which deepen the divide between disabled and nondisabled people. Through this understanding it will be easier to address the strengths and limitations of our policies concerning healthcare access for rural and disabled individuals.

The Social Model as an Advocacy Tool

The social model has particular strength for examining structural changes that would benefit individuals with disabilities in regards to healthcare access. As this paper works within the context of the United States, it is also appropriate to focus on the models of capitalist society which places people with disabilities at a disadvantage. This model removes the moral implications that some individuals are more or less deserving of healthcare (Durell, 2014) and provides a basis for structural policy change. Through policy change, our society can hopefully begin to grapple with healthcare barriers for people with both mild and severe disabilities. This framework is particularly relevant given that federal efforts continue to focus on preventing disability as opposed to improving the quality of life of individuals with disabilities (National Council on Disability, 2009).

The potential of the social model can be seen through the Americans with Disabilities Act. While this policy theoretically addresses large scale change to ensure equality for individuals with disabilities, it is not always effective (National Council on Disability, 2009). Part of these issues arise because the barriers facing PWD are systemic in nature. Individuals with disabilities are impacted by social norms and structures which are ingrained into our

society. As such, it can be difficult to fix all of the barriers that individuals with disabilities face with broad policy changes. For example, society has often conceptualized people with disabilities as sick individuals who need to be cured, and are otherwise a drain on society (Barnes & Mercer, 2005). Changing these conceptualizations can be aided by policy, but can take a long time to reach effect. Cultural attitudes regarding disability mean that there are still barriers to having the potential of the Americans with Disabilities Act realized. This includes a lack of policy understanding on the part of healthcare conditions (National Council on Disability, 2009).

Policy limitations related to the social model can also be seen through healthcare policies. Due to the systemic nature of issues facing PWD, multiple factors interact to limit access. This means that even wide reaching policies can miss barriers to care. Universal healthcare programs are intended to ensure access to care for all residents within a community. However, even in countries with universal healthcare, people with disabilities face healthcare barriers (Sakellariou and Rotarou, 2017). Though increasing healthcare coverage is important, the systemic nature of discrimination means that other factors must be examined.

As noted in the section on socioeconomic status, disability, and health, many factors can combine to contribute to the experience of PWD. Individuals with disabilities face social exclusion both due to factors related to their disability and due to social beliefs about them (Emerson et al., 2009). For example, an individual with a disability limiting their mobility may have a more difficult time exercising. Their limited ability to exercise would rise both out of their disability, and out of a lack of access to exercise routines and equipment created for them. The context of higher rates of obesity (Center for Disease Control, 2019) frames the concept of the social model in which a disabled individual has a condition, but faces difficulty from that

condition because society is geared towards able bodied people. People with disabilities face further social constraints due to the correlation of disability with low socioeconomic status (Minkler et al., 2006).

The social model of disability reminds us that many factors contribute to creating a society in which PWD have equitable access to healthcare. As such, this paper aims to examine how the factors of rurality and disability combine to create barriers to healthcare access. In particular, it aims to understand how rurality may further limit a disabled individual's access to healthcare, and what policies may address this issue with awareness of the social model. As Meade et al. (2015) notes, “it is the interaction between these factors [such as transportation, policy, health behaviors, and insurance] that is truly important for healthcare disparities.”

Literature Review

Previous Policy Efforts

The Americans with Disabilities Act (ADA) is the key legislative piece which currently tries to address issues of equality for individuals with disabilities. This legislation requires equitable treatment for people with disabilities, particularly in the realm of employment, services, and facilities (Drainoni et al., 2006). Yet, the literature reveals that the passage of ADA has not resolved issues of access and equity in healthcare for disabled people. In theory, the Americans with Disabilities Act is intended to ensure equality for individuals with disabilities. However, the way it has been implemented limits the effectiveness of its work. The reasons for the lack of implementation are complex. For example, it can be difficult to promote the program at all locations- if a particular healthcare center does not have awareness about the policies of the ADA, doctors may not be aware of how to implement these policies. Due to the large spread of healthcare centers and the potential lack of resources, it can also be difficult to manage if the

proper procedures are being followed everywhere. Furthermore, there may not be funding within individual healthcare centers to ensure that a facility is following the access guidelines of the ADA. The Disability Rights Education and Defense Fund (2014) notes several stories of PWD whose primary care facilities do not have accessible equipment, demonstrating that there is a disconnect between the ADA and healthcare centers. The National Council on Disability (2009) has cited architectural and programmatic barriers to implementation. Architectural barriers can include physically inaccessible healthcare buildings or medical equipment, such as inaccessible scales for wheelchair users (Gould et al., 2019).

There is also a lack of awareness about policy requirements and incentives from the ADA (National Council on Disability, 2009). Of the 44% of healthcare administrators who considered buying accessible equipment, only half were aware of the federal tax program to help facilities buy accessible equipment (Gould et al., 2019). This extends to a lack of awareness about how to create a physically accessible facility more generally. In fact, one study found that “only 46% of healthcare administrators in clinical practices knew that accessible equipment existed, and only 25.4% were able to describe accessible equipment” (Gould et al., 2019). This lack of knowledge leads to inaccessible facilities, and knowledge of the ADA is often gained only through experience. This is exemplified by a study finding that healthcare administrators who had worked in the field longer had less reports of healthcare barriers for people with disabilities (ibid). This holds true for physicians as well. In one study, the majority of physicians interviewed displayed “a superficial or incorrect understanding of their legal responsibilities to patients with disability” (Agaronnik et al., 2019).

Furthermore, there is a lack of enforcement measures for the ADA. There is not a set way to collect data on discrimination outlined in the law, and the department tasked with upholding

the ADA has taken on few cases regarding healthcare access (National Council on Disability, 2009). This lack of clarity holds true for the removal of healthcare barriers for people with disabilities. Making reasonable healthcare accommodations does not mean that each room needs to be accessible to every type of patient, only that accommodations should be available for a disabled patient once they arrive (Agaronnik et al., 2019). As such, healthcare facilities are heavily dependent on staff to know where equipment is and how to make accommodations. Many individuals with disabilities note that their healthcare center does not even have accessible equipment to get them on an examination table (Disability Rights Education and Defense Fund, 2014). As a legal framework which reacts to reports of discrimination, there are also limitations to what the Americans with Disabilities Act can address. For example, it can be difficult to litigate based on healthcare provider bias, even though provider attitudes impact quality of healthcare and the long term health of patients (Gould et al., 2019). Likewise, a majority of people with disabilities surveyed did not cite the Americans with Disabilities Act as having increased their access in public or private sectors (Hinton, 2003).

Another key piece of legislation for the topic of healthcare access is Medicaid. While Medicaid is not specifically oriented towards people with disabilities, it plays a key role in providing healthcare access for people with disabilities. This is done both through providing transportation services to access care and by providing insurance. The institution of Medicaid is highly important for people with disabilities. In fact, disabled people who are considering cross-state moves often make their decisions based on the status of Medicaid in the state they are considering a move to (Grossman & Mullin, 2020). Medicaid provides coverage for over 72.5 million Americans (Centers for Medicare & Medicaid Services, 2019) and provides healthcare coverage for 8 million disabled individuals within the United States (National Council on

Disability, 2009). Medicaid is also the largest payer for personal care assistance in the United States (Grossman & Mullin, 2020).

One method Medicaid services use to increase healthcare is by providing transportation to healthcare services. The Non-Emergency Medical Transportation benefit (NEMT) provides financial assistance for patients to reach providers through taxis, public transportation, and van programs (The Henry J. Kaiser Family Foundation, 2016). While these services are not required federally, many states offer Non-Emergency Medical Transportation through Medicaid. In fact, there are only five states which do not cover this benefit (The Henry J. Kaiser Family Foundation, 2019). Some state transit models require that PWD receive approval that they qualify for a ride before participating in the program (Centers for Medicare and Medicaid Services, 2016). This includes verifying that there is no other reasonable way to reach an appointment and that care is deemed as necessary (ibid). While this service is widely available, the transportation it provides can be limited and unreliable (Iezzoni et al., 2006). The limitations to this program and the specific implications for rural and disabled populations will be discussed at further length in the transportation section of the literature review.

As a health insurance provider, Medicaid is a federally and state funded program which provides healthcare coverage for individuals who may not otherwise have access to insurance (Centers for Medicare & Medicaid Services, 2019). Some groups have mandatory eligibility due to federal law, but eligibility requirements and Medicaid management vary by state (ibid). The existence of Medicaid is essential for the continued insurance of many disabled individuals. While the majority of Americans are insured through their employer, this type of insurance is often unavailable and insufficient for people with disabilities (White, 2002). Due to their higher rates of comorbid conditions (Centers for Disease Control, 2001), people with disabilities

represent a disproportionate amount of healthcare expenditures (Kronick et al., 1996). As such, employer sponsored health insurance often “excludes bad health risks” (Fishman, 2001).

Additionally, while half of the disabled population has a job, 16% still lack health insurance (ibid). This type of insurance coverage can also be limited for individuals with disabilities, given that they are unemployed or underemployed at higher rates than the general populace (Brooks, 2019). In fact, “Fifty-two percent of the working-aged population with disabilities is employed, compared with more than 80% of those without disabilities” (White, 2002). Additionally, private insurance is often out of reach due to affordability or denial of coverage (National Council on Disability, 2009).

Policy efforts have largely tried to improve healthcare access for people with disabilities by increasing access to institutions without an understanding of the broader context of healthcare limitations. For example, the Americans with Disabilities Act attempts to improve access by providing physical accommodations and preventing discrimination solely based on disability. Likewise, Medicaid aims to improve healthcare access by enabling access to affordable insurance. While both of these measures address specific barriers to healthcare for people with disabilities, neither acknowledges the multidimensional nature of healthcare access. In order to truly improve healthcare access for people with disabilities, policies need to address multiple factors and the ways that these factors combine. For example, an individual without insurance may have further limitations in what healthcare locations they can access, leading to more interactions with facilities poorly equipped to treat PWD. As such, truly effective policies will address how unaffordable insurance, discriminatory healthcare environments, and a lack of institutional healthcare access all limit healthcare access together.

Rurality is another factor which can further limit healthcare access for people with disabilities. While this section focuses solely on the aims and critiques of specific policies, the next sections will delve into different aspects of healthcare barriers for rural and disabled individuals. The next section discusses how rural residents and people with disabilities are particularly limited in their access to quality insurance. The following section will address how socioeconomic status, disability, and rurality combine to create unique barriers to healthcare. Medicaid will again be discussed in the next section discussing transportation barriers, as Medicaid provides limited healthcare transportation.

Insurance

As discussed in the previous section, access to healthcare can be an important factor for people with disabilities. However, it is also important for people living in rural communities more broadly. It is well established that an individual from a rural community is more likely to have lower income, which may result in having worse insurance (Merwin et al., 2006). As Larson and Hill (2005) describe, individuals living in rural areas are also less likely to have comprehensive health insurance than individuals in urban areas. This could result from not being able to afford comprehensive insurance, or from the usage of programs like Medicaid. Medicaid has certainly provided increased care for many individuals in rural communities. Almost 1.7 million Americans in rural areas gained healthcare coverage through Medicaid expansion with the Affordable Care Act (Center on Budget and Policy Priorities, 2018). For many individuals in rural areas, Medicaid is the only healthcare provider they can use. While many people in America get their insurance through an employer, “fewer rural employers offer health insurance than those in urban areas, and self-employment is more prevalent in rural America” (ibid).

Access to insurance and Medicaid is also of importance to individuals with disabilities in particular. People with disabilities tend to be high Medicaid users in part due to difficulty accessing insurance through employers. As discussed earlier, PWD are unemployed at higher rates than the general population (Brooks, 2019; White, 2002). Similarly, even those who do have employment face difficulties receiving insurance through their employer (Fishman, 2001). This creates an economic need for PWD to use Medicaid for healthcare coverage (Iezzoni et al., 2006). Medicaid appears to provide similar provider access to employer sponsored or private market coverage (Center on Budget and Policy Priorities, 2017).

However, there are still barriers that disabled individuals on Medicaid face, particularly in rural areas. The limited amount of care providers that accept Medicaid can increase the distance a poor individual has to travel to receive care, or cause them to delay seeking care (Drainoni et al., 2006). It has also been demonstrated that disabled individuals using Medicaid are also less likely to receive preventative care. The likelihood of receiving preventative care is inversely correlated with the level of disability (Chan et al., 1999). Individuals with disabilities have also complained of the Medicaid system being difficult to navigate or unsuited to their needs (Drainoni et al., 2006). In sum, rural populations and disabled populations utilize Medicaid at higher rates than the general population. Due to the limited number of healthcare facilities which accept Medicaid, this can contribute to limited healthcare access for rural PWD.

Socioeconomic Status, Disability, and Health

Lack of insurance availability is partly due to low socioeconomic status (SES) within rural areas. While a lack of insurance or use of Medicaid can delay care, poor socioeconomic status can decrease the health of a population. The negative impacts of low socioeconomic status on health have been well established within the literature. Poverty can be a healthcare risk factor

by increasing social stress, which leads to negative health outcomes. It can also contribute to unhealthy behaviors. Increased socioeconomic stress may contribute to poor health outcomes by increasing hormones such as cortisol (Vliegenthart, et al. 2016). High cortisol and continued stress can lead to high blood pressure and weight gain (Block et al., 2009). Individuals of low socioeconomic status may also be limited in their ability to afford healthy food sources or have unhealthy eating habits (Lallukka et al., 2006). This can increase rates of obesity which is a health risk for cardiovascular disease, stroke, and cancer (Center for Disease Control, 2019). Individuals in rural areas are typically of lower socioeconomic status than the general population, putting them at a greater health risk for SES linked illnesses. In fact, nonmetropolitan areas have 3.7% more individuals living in poverty and \$5,000 less per capita income than metropolitan peers (Merwin et al., 2006). The health of rural residents corresponds with the expectation of a lower SES population (Eberhardt and Pamuk, 2004; Adler & Ostrove, 1999; Vliegenthart et al., 2016). Rural residents from different parts of the nation have a higher death rate from pulmonary disease, cardiovascular disease, and cancer (Eberhardt and Pamuk, 2004). They also typically have higher blood pressure and greater rates of obesity than individuals from metropolitan areas (ibid).

The link between socioeconomic status and disability has been established in the literature (Minkler et al., 2006). As socioeconomic class increases, the number of functional limitations an individual has decreases (ibid). This pattern holds true across socioeconomic status up to individuals living 700% above the poverty line (ibid). In fact, “nearly 40% of people with disabilities have family incomes below 200% of the federal poverty level, compared with 22% of those without disabilities” (White, 2002). Furthermore, people with disabilities experience lower social mobility over their lifetime than the general population (Emerson et al., 2009). Having a

disability has correlations both with lower socioeconomic status (Minkler et al., 2006) and poorer overall health (Center for Disease Control, 2019). Individuals with disabilities have higher rates of illness unrelated to their specific condition of disability (Emerson et al., 2009). For example, those with mobility and intellectual disabilities have higher rates of obesity (Center for Disease Control, 2019). When compounded with the higher incidence of obesity in rural areas, disabled individuals residing in these communities suffer even greater risk. In addition to greater risk of obesity, individuals with disabilities typically have lower fitness and greater risk of depression (Rimmer, 1999). Part of this is due to the increased likelihood of disabled individuals developing secondary conditions (ibid). This means that disabled individuals often have higher healthcare needs than their metropolitan peers (Newacheck et al., 2004), and simultaneously have fewer financial resources to obtain that care (Minkler et al., 2006). As such, disabled people “are one of the largest and most underserved subpopulations” in the United States (Meade et al., 2015).

Therefore, combining the condition of disability and rurality likely leads to worse healthcare outcomes. Since both populations experience worse health and have less economic resources to obtain care, these conditions may combine to create particularly poor healthcare access in rural and disabled populations. As Iezzoni et al. (2006) notes, low SES and associated use of Medicaid can limit rural PWD’s access to healthcare centers. As such, an already small subsection of rural care providers is further narrowed. This will be discussed more in the later section on competent care for PWD in rural areas. Socioeconomic status also forces rural PWD to make difficult decisions about what types of care they can afford, from assistive technologies to prescription medications (Iezzoni et al., 2006). While these difficulties exist in both rural and nonrural settings, rurality can exacerbate healthcare limitations. This is due to a lack of

comprehensive insurance in rural areas (Zhang et al., 2000; Larson and Hill, 2005) and lack of career opportunities for PWD in rural areas (White, 2002). As such, PWD in rural areas have less economic opportunities to access healthcare.

Spread of Healthcare Centers and Transportation

In the previous section, it was established both rural and disabled populations have lower socioeconomic status than the general population (Merwin et al., 2006; Minkler et al, 2006). The literature also revealed that socioeconomic status also has an inverse correlation with health (Adler & Ostrove, 1999). Due to their relatively poor health, rural and disabled individuals have particularly high healthcare needs. Yet, rural individuals are not always able to access high quality healthcare. In fact, The Henry J. Kaiser Family Foundation (2019) reports that “at least 3.6 million people miss or delay medical care each year because they lack available or affordable transportation.”

Within rural communities, care can be limited by the large spread of healthcare centers. In many rural communities, healthcare centers must be spread out over a large area (Nicholson and Cooper, 2011). In fact, metropolitan areas have almost twice the physicians per capita compared to nonmetropolitan areas, with even lower numbers of specialists (Merwin et al., 2006). Put in other terms, “while 20% of Americans live in rural areas, only 9% of the nation's physicians practice there” (van Dis, 2002). The amount of specialized care in rural areas is particularly limited (Iezzoni et al., 2006; Rosenblatt and Hart, 2000). The lack of healthcare centers for these areas means that individuals often face distance as a healthcare barrier (Syed et al., 2013). However, transportation to healthcare centers can also be difficult to access in rural areas. A literature review by Syed et al. (2013) revealed six studies in which distance was a

barrier to healthcare. Three studies suggested that rural populations had a greater distance to travel for care and consequently faced less access (ibid).

Transportation barriers can be particularly difficult for individuals with disabilities. Although the Americans with Disabilities Act requires equitable access to transportation, many public transit options are not actually accessible (Iezzoni et al., 2006). For example, Bezyak et al. (2017) found that 47.9% of disabled people surveyed reported public transportation as inadequate for their needs. While ride share programs do exist such as paratransit and the Non-Emergency Medical Transportation Service as discussed in the earlier section on Medicaid, these services are often unreliable. Over a third of PWD surveyed reported “issues with scheduling reservations, long wait times, drivers missing pick-up windows, and lengthy travel times” (Bezyak et al., 2017). Drainoni et al. performed a study on the consumer experiences of patients with disabilities, and found that Medicaid transit frequently caused patients to run hours behind schedule. This can cause individuals to miss their appointments (Drainoni et al., 2006), further delaying treatment. This is problematic given the high healthcare needs of PWD. Due to the specifics of their conditions, people with disabilities also frequently need specialized care. As previously mentioned, specialized care is particularly limited in rural areas. Iezzoni et al. (2006) found that participants with doctors in their area were not able to use Medicaid to access transportation to specialists who could better care for their needs. Rural hospitals often have a limited capacity to provide specialized care, so people with disabilities are often referred out to urban centers. This can lead to a chain of referrals (Iezzoni, Killeen, & O’Day, 2006) which delays care and turns the experience of seeking care into a lengthy affair. In this way, people with disabilities have their healthcare access limited through distance to care centers (Iezzoni et al., 2006; Drainoni et al., 2006). This is further exacerbated by inaccessible public transportation

systems (Bezyak et al., 2017). As such, transportation barriers pose serious challenges for rural PWD when attempting to access healthcare services.

These barriers are heightened for PWD in rural areas. With the increased distance to healthcare centers, it becomes even more difficult for people with disabilities to access the specialized care they need. As Iezzoni et al. (2006) notes, the “low population and long distances” in rural communities “make paratransit services extremely expensive to operate.” This increases the existing difficulties with accessing healthcare through Medicaid transit and paratransit. Furthermore, access to public transportation is limited in rural areas, with “40% of rural residents with no public transit options,” and inadequate transportation being twice as likely in disabled populations (McDaniels et al.). Rural PWD have noted that local public transit often does not have accessible entrances despite the Americans with Disabilities Act (Iezzoni et al., 2006). The lack of accessible transportation in rural areas therefore greatly impacts people with disabilities as they try to access healthcare.

Access to Competent Care

Due to the wide spread of healthcare facilities and the lack of healthcare professionals, it can also be difficult for individuals in rural areas to access competent care. As discussed, it can be difficult to recruit and retain healthcare professionals to rural areas (Ricketts, 2000), which limits the healthcare experience available in rural areas. Specialized physicians in particular are unlikely to work in rural areas (Rosenblatt and Hart, 2000), which limits the availability of competent care workers for people with disabilities (Iezzoni et al., 2006). Competent care is particularly important for individuals with disabilities. Disabled people frequently have specialized care needs both relating to their specific condition, and secondary conditions related to their disability (Rimmer, 1999). Since there are less specialized physicians in rural areas

(Rosenblatt and Hart, 2000), it can be difficult for people with disabilities to access the type of competent care they need. Iezzoni et al. (2006) conducted a study focusing specifically on healthcare access for people with disabilities in rural areas. They note that “interviewees think local physicians do not follow new medical developments and are uninformed about disabilities.” Indeed, this is borne out when looking at the experiences of disabled people within rural healthcare offices. Patients with disabilities reported that healthcare professionals were not aware of their needs, from not having equipment to not being aware of how to treat certain conditions (Disability Rights Education and Defense Fund, 2014). Furthermore, nurses and physicians often do not listen to patients with disabilities about their specific healthcare needs. One individual notes that nurses did not listen to their requests to be transferred in a particular way, leading to the patient’s knee popping out of place (ibid). These healthcare barriers can be viewed through the social model of disability. In these examples, disabled individuals do not have worse healthcare experiences due to any physical impairments. Rather, it is the lack of education and socialization of healthcare professionals on the topic of disability that interferes with the care of PWD. Due to the lack of competent care in rural areas, people with disabilities often have to travel to urban areas where specialized healthcare centers are offered (Nicholson & Cooper, 2011). As discussed in the transportation section, such travel can delay care for people with disabilities (Iezzoni, 2006).

In sum, the literature review reveals how individuals with disabilities and people from rural areas have unique barriers to healthcare. Specifically, rural disabled individuals still face multiple forms of significant healthcare limitations within the United States (Sakellariou & Rotarou, 2017; National Council on Disability, 2009). This occurs through a lack of health insurance access (Larson & Hill, 2005; National Council on Disability, 2009; Drainoni et al.,

2006; Iezzoni et al., 2006), transportation (Syed et al., 2013; Iezzoni et al., 2006), and competent care (Disability Rights Education and Defense Fund, 2014; Iezzoni et al., 2006). Prior literature has analyzed the relationship between rurality, disability, and healthcare access through demographic analysis of healthcare encounters (Bell et al., 2013) and through interviews with people with disabilities (Iezzoni et al., 2006; Nicholson & Cooper, 2011). While this has been effective at measuring the qualitative barriers to healthcare, to my knowledge no one has yet conducted a widespread quantitative analysis. Nicholson and Cooper (2011) did use primary care notes for some quantitative analysis to determine healthcare access for individuals with intellectual disabilities in rural areas, but quantitative analysis had a small sample size of rural individuals. The study measured healthcare encounters for 39 rural individuals with intellectual disabilities and 633 urban participants with intellectual disabilities. My study will address the Centers for Disease Control and Prevention data from across the nation, and as such will be reliable in determining rural/urban healthcare disparities for PWD. Nicholson and Cooper (2011) found that rural individuals with intellectual disabilities in fact had greater or equal access to care as urban individuals. While this study did not examine able bodied individuals healthcare access, other UK based studies have found similar barriers to those in the United States (i.e. poor resource distribution, transportation issues, and social determinations) (Baird and Wright, 2006). This is important to note, because it gives policy makers more information on which groups to target when addressing healthcare access. Clearly, the use of quantitative data is important in addressing whether healthcare gaps based on location exist in a meaningful way, and the extent to which location impacts access. Furthermore, the study by Nicholson and Cooper (2011) was conducted in Scotland. It is then useful to analyze this question in the context of the United States. Lastly, the use of interview data has often led to small sample sizes. To my knowledge,

this study is the first time that widespread quantitative data is analyzed on the issue of location and care access for individuals with disabilities. In this way, this essay addresses a gap in the literature by providing quantitative information to the discussion on healthcare access for rural PWD. This method of analysis will provide a solid basis to advocate for policy to improve healthcare access for people with disabilities in rural areas by demonstrating the extent to which healthcare is limited for PWD in rural areas.

Research Design

Hypotheses

My analysis addresses two primary hypotheses to determine the extent of healthcare for rural people with disabilities. Firstly, I hypothesize that healthcare access would be generally worse in increasingly rural areas. This hypothesis would be consistent with other research in the United States on healthcare access in rural areas, including Larson and Hill (2005). I hypothesize that this holds true across all types of preventative care analyzed, including routine check-ups, dental visits, flu vaccination, colorectal cancer screening, cervical cancer screening, and mammograms. This would be demonstrated with a positive correlation between increasing metropolitan status of a state and the number of preventative care interactions.

Secondly, I hypothesize that the preventative care access in rural areas would be worse for people with disabilities than people without disabilities. The literature review demonstrates that people with disabilities are underserved across many healthcare conditions (Meade et al., 2015; National Council on Disability, 2009; Drainoni et al., 2006; Iezzoni et al., 2006).

Therefore, I hypothesize that people with disabilities have less preventative care across conditions including dental work, routine check-ups, and various screenings. This hypothesis is supported if the rate of care for people with disabilities is lower than the rate of care for people

without disabilities. If both hypotheses are supported, more rural and more disabled populations would have decreased healthcare access. When combined, this demonstrates that rural people with disabilities had the least preventative care compared to nondisabled rural, disabled metropolitan, and nondisabled metropolitan populations.

Data and measures

I will test these hypotheses with public use data from the Center for Disease Control (CDC) and the University of Montana. The Center for Disease Control collects data on healthcare for individuals with disabilities in alignment with their goal of improving public health in America. Their work with people with disabilities is in recognition of the fact that individuals with disabilities have worse overall health and a risk of developing secondary conditions associated with their primary condition (Center for Disease Control, 2018). They have compiled data from the Behavioral Risk Factor Surveillance System (BRFSS) into the Disability and Health Data System (DHDS). BRFSS conducts phone interviews by state, asking questions about demographics, risk behaviors, and health conditions (Center for Disease Control, 2019). The Disability and Health Data System has age-adjusted its data to account for higher prevalence of disability in older populations. This means that states' level of disability can be compared without concern for the confounding variable of age (Center for Disease Control, 2019). The database includes state level data which gives information on disability estimates, demographics, health risks and behaviors, prevention and screenings, barriers and costs to healthcare, general health, chronic conditions, and mental and emotional health. The information for all of these measures are available for the years 2016 and 2017 (Center for Disease Control, 2017).

For this study, the amount of preventative care received will function as my dependent variable. Specifically, I will focus on the Centers for Disease Control Disability and Health Data

System information concerning prevention and screenings. Screening information is available both for individuals with disabilities and individuals without disabilities. Therefore, I will be able to compare the screenings of these two populations. I have chosen this measure over others tracked by the DHDS because it is the only measure which looks at the number of encounters with the healthcare system, which will provide a measure for access. The category for barriers and costs to healthcare seems as though it would be a good way to measure access barriers, however it only collects information on cost, care coverage, and whether an individual has a primary doctor. Therefore, while it is a good measure for barriers due to cost, it is not suitable for barriers due to location.

The specific types of preventative care which will be assessed are mammograms, cervical cancer screenings, colorectal cancer screenings, routine check-ups, dental care, and flu vaccination. Specifically, the DHDS contains information on whether a female 50-74 years old has had a mammogram in the past two years, if a female 21-65 years old has an up to date cervical cancer screening, if an adult 50-75 has an up to date colorectal cancer screening, if an adult 18 years or older has had a routine check-up in the past year, if an adult 18 years or older has been to the dentist in the past year, and if an adult 18 years or older has had a flu vaccination within the past year. In this study, preventative care will function as a proxy for general healthcare access. Healthcare encounters have been used as a proxy for healthcare access in previous work on the question of access based on location (Nicholson & Cooper, 2011). Furthermore, preventative care is useful to study given its impact on future health outcomes. If individuals in rural areas are experiencing less preventative care they will likely have worse future health (Chen et al., 2015).

Because the Center for Disease Control data on preventative care is only available at the state level, I construct a state-level measure of how rural each state is. The University of Montana has amassed data on location impacts on people with disabilities through the Research and Training Center on Disability in Rural Communities (RTC: Rural, 2017). This program receives funding from the National Institute on Disability, Independent Living and Rehabilitation Research. For this work, I will be utilizing their Disability Counts database to determine how rural a population is. The Disability Counts database contains county level information about the disability rate, demographic data such as race and gender of individuals with disabilities, and the poverty and employment rate of people with disabilities (RTC: Rural, 2017). Information for this database is gained from the American Community Survey which takes survey data on functionality to analyze level of disability. The Disability Counts data also has classified each county in the United States by its rurality, which will allow me to analyze how rural each state is on the whole. This information, in conjunction with the Disability and Health Data System information on preventative care, will allow me to examine whether living in a rural location has an impact on receiving care.

Metropolitan status will function as an independent variable within this study. In this research, I will define rurality by the standards laid out by the Office of Management and Budget, and used in the Disability Counts data. This data has rurality scores at the county level and the level of rurality is split into three subsections. Metropolitan or urban counties have at least 50,000 individuals in a core area, although surrounding populations may also be grouped in. Nonmetropolitan or rural areas have less than 50,000 individuals. Micropolitan areas have a core group of 10,000-50,000 individuals, while noncore counties have less than 10,000 core residents (RTC: Rural, 2016). However, because the Centers for Disease Control only have preventative

care data I will create a state level rurality score. In order to get a weighted measure for how rural a state is, I will calculate how many counties in each state are rural, micropolitan, and metropolitan and then divide the county level scores by the area of the county. That way, rural areas will not be overrepresented because they occupy a larger area of a state. This will allow me to use the two data sets to determine if a state with a higher rurality score has more or less preventative care access for people with disabilities.

Disability and non-disability will also be treated as independent variables. Disability will be assessed by the measures used in the Disability Counts and Center for Disease Control datasets. These two databases measure disability in the same manner, allowing their data to be compared. The four types of disability which will be taken into account are cognitive, hearing, mobility, and vision disability as those are the types measured by the preventative care data. Disability was self-assessed through the survey data from each dataset. For cognitive disability, individuals were asked if they had “serious difficulty concentrating, remembering, or making decisions” due to “a physical, mental, or emotional condition.” Hearing disability was measured by the question “Some people who are deaf or have serious difficulty hearing may or may not use equipment to communicate by phone. Are you deaf or do you have serious difficulty hearing?” Individuals with vision disabilities were determined by the question “Are you blind or do you have serious difficulty seeing, even when wearing glasses?” If an individual answered yes to these questions, they were marked as having a disability (Center for Disease Control, 2019).

The information within the Disability Counts database has statistics from the 2013-2017 American Communities Survey and the 2015 Office of Management and Budget classifications (RTC: Rural, 2017). Although the Center for Disease Control data is from 2016 and 2017, I am

not aware of any significant changes from 2013 to 2019 which would prevent the combined use of these datasets. Therefore, the information from these databases and from my research should still be applicable in 2019. It should be noted that the data on rural areas from the American Community Survey can be limited due to the smaller population size in rural areas (RTC: Rural, 2017). However, the margin of error primarily applies to the estimated population of individuals with disabilities, which is information that will be gathered from the CDC dataset.

There are also several control variables which will be utilized within this study. I have controlled for multiple outside measures that may impact people with disabilities' healthcare access in rural populations including disability rate, per capita income, and Medicaid status of each state. The first control was for the overall number of people with disabilities in a state. This could potentially skew data if there were a disproportionate amount of people with disabilities in a certain state, meaning that their rate of preventative care could appear artificially high. This was controlled for by looking at preventative care as a percentage of each population. For example, the amount of dental care disabled people in the state received was determined by dividing the amount of disabled people receiving dental care by the total number of disabled people within the state. By looking at preventative care as a portion, the rate of disability should not be able to skew the data.

The level of care required was also accounted for. Some studies within the field require the assumption that rural/urban and disabled/nondisabled demographics have the same healthcare needs which can potentially skew data (Nicholson & Cooper, 2011). For example, if rural populations have disproportionate healthcare needs then they will have increased contacts with healthcare services, skewing the data to appear as though rural populations have more healthcare access. This is particularly relevant given that people with disabilities have increased contacts

with the healthcare system. Therefore, our measure for healthcare access will take only preventative care measures into account. Compared to other types of care, preventative care has uniform recommendations for disabled and nondisabled populations. While this measure was not explicitly controlled for in the data, using preventative care allows this concern to be discounted.

Controls were also added for whether states had signed up for Medicaid expansion. States in which the expansion had been implemented were denoted in the dataset by a 1 while states that had not implemented were marked as a 0. Here it is important to note that Nebraska has adopted Medicaid expansion but not yet implemented it, and was thus marked with a 0. The information about whether a state had implemented Medicaid expansion was gained from the Henry J. Kaiser Family Foundation (2020). A control was also added for per capita income by state. This information was found from the Census Bureau using the American Community Survey (Census Bureau, 2018). This aimed to introduce some level of control for socioeconomic status.

Statistical Analysis

I conduct this research by comparing all of the 50 states by their level of rurality and amount of preventative care. The data on preventative care per state will be taken directly from the Center for Disease Control Disability and Health Data System, while the rurality per state will be adapted from the Disability Counts dataset. Using MySQL, I will create a database which factors in each of the preventative care measures as listed above, the rurality score of each state, whether a state has signed up for Medicaid expansion, and the per capita income of each state. I will also create a gap variable determined by subtracting the disabled rate of care in each condition from the nondisabled rate of care. From there, I will run a regression comparing the rurality (percent metropolitan) by the rate of each of the measures of preventative care (i.e.

mammograms, cervical and colorectal cancer screenings, check-up, dentist visit, and flu vaccination) for disabled and nondisabled individuals. This will allow me to see if people in more metropolitan areas generally have more preventative care, and to compare across disabled and nondisabled populations. I will then create a regression comparing the care gap variable to the metropolitan variable. Through this I will be able to determine if the gap in healthcare services for disabled and nondisabled populations increases in more rural areas. I will then look at whether disabled and nondisabled populations access healthcare at different rates through a one sample t-test. To analyze this data I will take into account the 95% confidence interval and mean of the disabled and nondisabled populations in each preventative care condition. If the means for the data lie within each other's confidence intervals, I will count the difference in populations as non-significant. In order to determine statistical significance of my regressions, I will use an alpha level of 0.05. If a p-value is below that threshold, I will consider that section of data to be significant. R-squared values will also be used to determine how much of the correlation in the amount of preventative care can be accounted for by metropolitan status and control variables.

Results

Routine Check-Ups

My results asked whether an adult (18+) had received a check-up within the past year. I compared the results for respondents with disabilities and respondents without disabilities, first in metropolitan areas then in rural areas. States with a greater percentage

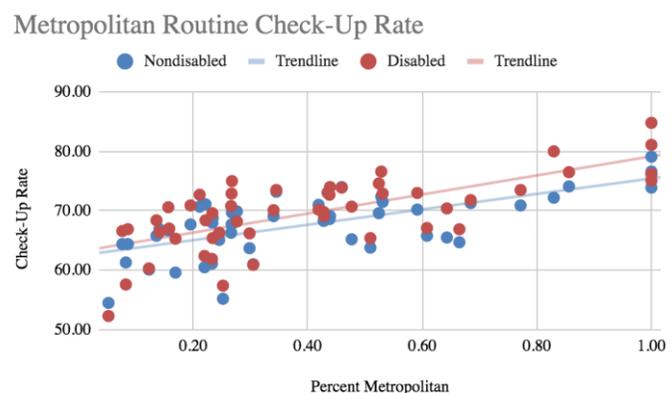


Figure 1. Rate of Check-Ups

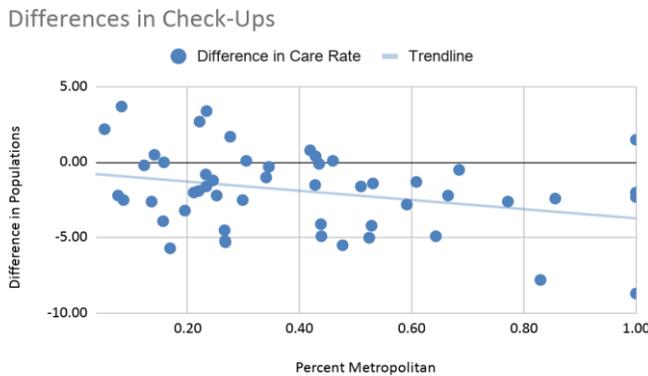


Figure 2. Gap of Check-Ups

For people without disabilities, 44.5% of the variation in routine check-ups was determined by metropolitan status ($p=8.03E-8$) (Figure 1). When examining the difference in healthcare received by disabled and nondisabled populations, the gap in healthcare access was larger in more rural areas ($p=.015$) (Figure 2). However, a one-sample T-test revealed that the difference in means between disabled and nondisabled populations was less than 2%, and was within the 95% confidence interval of difference. This suggests that disabled and nondisabled populations did not access healthcare at significantly different rates.

Dental Visits

I also examined the preventative measure of dental care. For this condition, the Centers for Disease Control and Prevention asks if an adult (18+) has been to the dentist within the past year. Disabled people did not have statistically significant differences in dental care based on rurality

of metropolitan areas had increased rates of check-ups, both in disabled and nondisabled communities. Both results were statistically significant, with percent metropolitan predicting 49.3% of the variation in routine check-ups for disabled people ($p=8.13E-9$) (Figure 1).

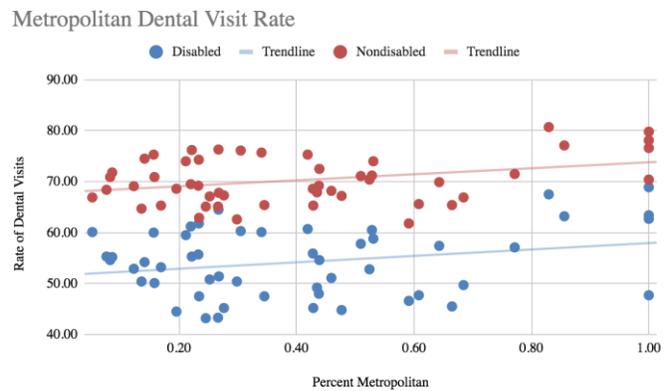


Figure 3. Rate of Dental Visits

($p=.502$) (Figure 3). This finding held true for populations without disability as well ($p=.587$). Similarly, there were not significant differences in the rate of care for disabled and nondisabled populations ($p=.151$). However, there were differences in the rate of dental care for individuals with and without disabilities. The rate of care for people with disabilities had a mean of 54.2 with a confidence interval of 52.3-66.1. Meanwhile, the rate of care for people without disabilities had a mean of 70.3 with a confidence interval of 69.0-71.6.

Flu Vaccination

The Centers for Disease Control and Prevention also provide data on the rate of flu vaccination. Similarly to the other measures, they ask whether an adult (18+) has received a flu vaccine within the past year. People with disabilities did not have statistically different flu vaccinations in metropolitan areas ($p=.295$). The number of flu vaccinations in more metropolitan areas were also not different for people without disabilities ($p=.762$). Similarly, the difference in populations was not correlated with metropolitan status ($p=.195$). This held true for a t-test comparing the two samples as well.

Colorectal Cancer Screening

This measure asks whether an adult 50-75 years old has an up to date colorectal cancer screening. Individuals with disabilities at first seemed to have higher rates of colorectal cancer screenings in metropolitan areas, but when controlling for socioeconomic status and Medicaid expansion the results became nonsignificant ($p=.234$).¹ This held true for nondisabled populations as well ($p=.082$). Likewise, the difference in receipt of colorectal cancer screenings did not vary by metropolitan status in a statistically significant way ($p=.376$) and the disabled and nondisabled populations did not vary from each other by a significant amount.

¹ Evidence was not found that Medicaid expansion mitigated the impact of rural/urban differences when comparing states that had and had not adopted expansion.

Cervical Cancer Screening

This measure asks if a female 21-65 years old has an up to date cervical cancer screening. Results for neither the disabled nor nondisabled population demonstrated significant variance in cervical cancer screenings based on how metropolitan a state is ($p=.394$ and $p=.294$). Similarly, the difference in care between disabled and nondisabled populations did not vary by metropolitan status when accounting for control variables ($p=0.095$). This was consistent when comparing the rate of care between populations using a t-test.

Mammogram

The Centers for Disease Control and Prevention also have preventative care data on mammograms. This measure asks whether a female 50-74 years old has had a mammogram in the past two years. 39.7% of the variation in mammograms could be attributed to how metropolitan an area is for people with disabilities ($p=2E-6$). Like disabled populations, nondisabled populations experienced increasing rates of mammograms as metropolitan status increased. 36.1% of the variation in nondisabled populations could be attributed to metropolitan status ($p=1.19E-4$).

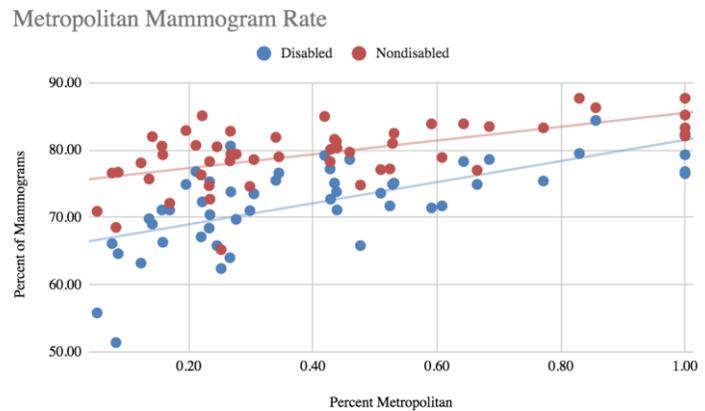


Figure 3. Rate of Mammograms

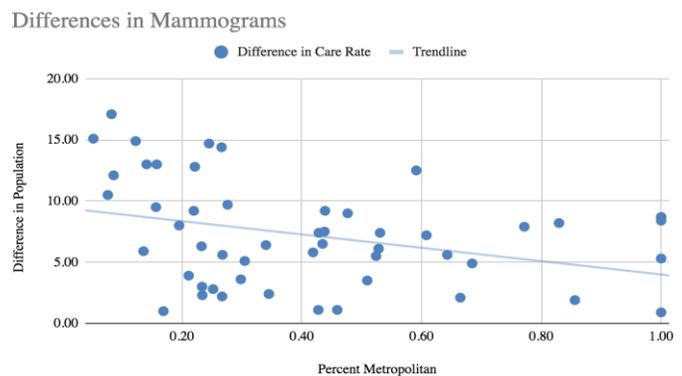


Figure 4. Gap in Mammograms

The difference in care rate between disabled and nondisabled populations had 14.7% variance, with greater healthcare gaps in more rural areas ($p=.011$). Based on a one sample t-test, individuals with disabilities also get less care on average. Disabled populations had a mean mammogram rate of 72.2 with a confidence interval of 70.5-74.0. Meanwhile, nondisabled populations had a mean rate of 79.5 with a confidence interval of 78.2-80.8.

	Routine Check-Up	Dental Visit	Flu Vaccination	Colorectal Cancer Screening	Cervical Cancer Screening	Mammogram
Disabled Percent Metropolitan	.702*** (2.531)	.251 (2.655)	.253 (2.244)	.296 (2.539)	-.184 (16.610)	.655*** (2.901)
Per Capita Income	.161 (7E-5)	.74*** (7.4E-5)	.293 (6.2E-5)	.353 (7.1E-5)	-.185 (4.62E-4)	.280 (8.1E-5)
Medicaid Expansion	.151 (1.475)	.419 (1.548)	.222 (1.308)	.158 (1.48)	-.222 (9.683)	.153 (1.691)
Nondisabled Percent Metropolitan	.669*** (2.254)	.336 (2.08)	.213 (2.123)	.385* (2.475)	-.221 (17.723)	.590*** (2.236)
Per Capita Income	.147 (6.3E-5)	.672*** (5.8E-5)	.420** (5.9E-5)	.437* (6.9E-5)	-.221 (4.93E-4)	.342 (6.2E-5)
Medicaid Expansion	-.046 (1.314)	.3 (1.213)	.2 (1.238)	.280 (1.443)	-.266 (10.332)	.082 (1.304)
Logistic Regression Correlations, Standard Errors in Parenthesis * $p<0.1$, ** $p<0.05$, *** $p<0.001$						

Table 1. Regression Correlations for Each Preventative Care Measure

Analysis

In this work, I had two primary hypotheses. Firstly, I believed that preventative care would be more frequently accessed in increasingly metropolitan areas for both disabled and nondisabled populations. Consequently, this would also mean that rural residents would utilize less preventative care. The measure of preventative care for rural residents would act as a stand in for

healthcare access in rural communities. It appears that living in a more metropolitan area increases the level of preventative care in some cases. In the conditions for routine check-ups and mammograms, individuals in states with a larger metropolitan area accessed more care. These results were most pronounced for routine check-ups, in which over 40% of the variation in preventative care can be predicted from variation in how metropolitan a state is. In the mammogram condition, 35-40% of the variation was predicted by metropolitan status. For the conditions of routine check-ups and mammograms, preventative care was accessed more in increasingly metropolitan areas, supporting the hypothesis that preventative care is worse in rural areas for some conditions. Meanwhile, colorectal cancer screenings, cervical cancer screenings, flu vaccinations, and dental visits did not have statistically significant results. Due to the fact that other preventative care measures did not demonstrate statistically significant results, these findings may not be able to apply towards general healthcare access in rural areas.

Other works have also found healthcare disparities in routine check-ups and mammograms. Casey et al. (2001) utilized the 1997 Behavioral Risk Factor Surveillance System, finding that rural populations had less than the recommended level of preventative care in most measures. Preventative care in rural areas was particularly poor for mammograms, reflecting my results. One study focusing specifically on women from rural areas also found that the rate of mammograms were lower in rural areas (Larson and Correa-de-Araujo, 2006). A study analyzing the impact on distance from healthcare centers from rural areas found that “the odds of missing or delaying a routine health check-up were found to increase as distance to the health care service increased” (Mattson, 2011). This is consistent with the finding that routine check-ups would decrease as rurality increased. However, some of these studies have also found rural healthcare disparities in preventative measures which were not supported by my results. For

example, Casey et al. (2001) also found that colorectal cancer screenings occurred less frequently in rural areas than urban areas. Similarly, Larson and Correa-de-Araujo (2006) found that women from rural areas had fewer cholesterol checks, breast exams, and dental exams than women in urban counties in addition to having fewer mammograms.

Secondly, I hypothesized that along with less preventative care in rural areas, people with disabilities would have less preventative care than people without disabilities. People with disabilities generally have worse health care access than people without disabilities (Sakellariou and Rotarou, 2017; Mudrick et al. 2012). Individuals in rural areas also typically have less healthcare access than individuals from metropolitan areas (Bell et al., 2013; Merwin et al., 2006; van Dis, 2002). As demonstrated above, this holds true for preventative care measures including mammograms and routine check-ups (Casey et al., 2001; Larson and Correa-de-Araujo, 2006). I hypothesized that these factors would compound for disabled individuals living in rural areas, further decreasing their utilization of preventative care services. Again, this held true for some measures of preventative care in my study. In particular, people with disabilities had worse preventative care than people without disabilities in the dental care and mammogram conditions. Meanwhile, access to colorectal cancer screenings, cervical cancer screenings, flu vaccination, and routine check-ups did not have a significant difference between disabled and nondisabled populations. The disparities in dental care in particular may be reflected by a lack of Medicaid coverage for dental work. The decreased access to mammograms is particularly interesting, given that it is the only condition which is worse in both rural and disabled populations. The mammogram condition will be further discussed under the social model framework after an analysis of the dental care variable.

While there were statistically lower dental visits for nondisabled populations in rural areas, disabled populations did not experience less dental visits in rural populations. Rather, people with disabilities had less dental care across states with varying metropolitan areas. This likely reflects the availability of dental care and dental insurance within the United States. In 2009, 130 million Americans lacked dental insurance (Bersell, 2017). While Medicaid provides dental coverage until age 21, it is extremely limited for adults older than 21 (ibid). In line with this understanding are the findings of Heaton et al. (2004) who looked at nondisabled populations. This study found that rural individuals were less likely to have dental insurance, and that a lack of dental insurance played a significant role in determining the number of unmet dental needs (Heaton et al., 2004). Meanwhile, studies in the United Kingdom have not found rural/urban disparities in dental care. The National Health Service of the United Kingdom provides universal dental insurance, which the majority of citizens are satisfied with (Bedi et al., 2005). Accordingly, rural citizens of the United Kingdom experienced similar dental care rates to the general population and expressed satisfaction with their care (Rawlinson, 2001). This result also held true for rural disabled populations in the United Kingdom. In particular, Nicholson and Cooper (2011) found that adults with intellectual disabilities in rural areas had equal or better healthcare access than those in urban areas. This study found that individuals with intellectual disabilities in rural areas had more contact with dental services, emergency services, and secondary care (ibid). By comparing the United States with the United Kingdom, we can see the role that insurance may play in reducing dental care for PWD in the United States.

The literature has also been consistent with my finding that rural women with disabilities have lower rates of mammograms. Rates of mammograms have consistently been found to be lower in more rural areas (Casey et al., 2001; Larson and Correa-de-Araujo, 2006). People with

disabilities also have particularly low rates of mammogram screenings (Barr et al., 2008; Chan et al., 1999; Wei et al., 2006). Similarly to the dental care condition, insurance seems to be a barrier to mammogram access for many disabled individuals. 81% of disabled women with private insurance received a mammogram within the last two years, compared to 73% of disabled women with public insurance, and just 50% of disabled women without insurance (Wei et al., 2006). Chan et al. also (1999) found that women utilizing Medicare had lower preventative care rates of mammograms and pap smears. Furthermore, they found that women's receipt of care reduced with an increasing number of functional limitations (ibid). Rural residents also have worse insurance generally, including higher insurance premiums, copayments, and fewer benefits in their coverage (Zhang et al., 2000). These individuals are also more likely to have no insurance than urban individuals, which is thought to reduce access to mammograms (ibid). To my knowledge, work has not been done examining the difference in insurance rates of rural disabled women compared to rural nondisabled women. However, both disabled women and rural women receive less mammograms due to a lack of insurance coverage. Therefore, it is reasonable to believe that improving insurance coverage may decrease the mammogram gap between rural disabled and urban nondisabled populations.

However, the literature has also raised accessibility of facilities and doctor-patient relationships to be a significant indicator of the rate of mammogram screenings in rural disabled women. The literature, as well as women with disabilities themselves, consistently point to inaccessible facilities as a reason mammograms are not accessed. For example, Wei et al. (2006) suggests that disabled women may access mammograms at a lower rate due to mobility limitations. One patient with disabilities reported that her physician's office lacked any adjustable height exam tables, preventing her from accessing a range of care (Disability Rights

Education and Defense Fund, 2014). Low rates of preventative care in rural disabled women can also be attributed to a lack of physician advocacy for preventative care. Women are consistently more likely to receive mammograms if it is recommended by their physician (Barr et al., 2008; Finney Rutten et al., 2004). Physicians may recommend less care towards PWD due to misconceptions about communication barriers. Patients with disabilities have frequently reported physicians not speaking directly to them about their results due to a perceived lack of intelligence (Disability Rights Education and Defense Fund, 2014). The literature has indeed found that physicians do not explain what a mammogram is or its goals to disabled patients, creating a barrier to care (Llewellyn et al., 2011; Wilkinson et al., 2011). This may factor in to how doctors inform patients about essential preventative care such as mammograms, leading to a lack of awareness and care in PWD. Finney Rutten et al. (2004) found that lack of awareness of the screening was the primary barrier for women with disabilities, followed by a lack of recommendation by their physician. Furthermore, healthcare staff is often unaware of the needs of people with disabilities. When PWD went in for mammograms, they were met with insensitive staff throughout the process from scheduling their appointment to receiving results (Barr et al., 2008). One patient reported telling her physician that she needed a pap smear, and a lower table in order to access the pap smear. In response, her physician said “That’s a great idea. Find one” (Disability Rights Education and Defense Fund, 2014). While my work did not examine pap smears as a measure of preventative care, this has also been accessed less frequently by women with disabilities. The literature has suggested that these rates may be lower given that doctors assume disabled women will be less sexually active, and thereby lower risk for cervical cancer (Wei et al., 2006).

This information suggests that the element of competent care is important for ensuring that PWD receive mammograms. Having a lack of accessible resources to allow mammograms points towards a less physically competent healthcare facility. Meanwhile, the physicians themselves also demonstrate a lack of competence towards women with disabilities. We can better understand the impact of competent care on the rate of mammograms through the social model of disability. As discussed in the literature review section, the social model describes disability is something that is socially constructed (Anastasiou & Kauffman, 2013; Beckett & Campbell, 2015; Shakespeare, 2013). In the context of this study, this means that women with disabilities are not receiving mammograms at a lower rate than their peers due to their disability. Rather, it is the social and structural limitations of healthcare centers that lead to a lack of preventative care in rural disabled women. Disabled women consistently cite being treated as unintelligent, freakish, and subhuman when receiving healthcare (Disability Rights Education and Defense Fund, 2014; Llewellyn et al., 2011). These attitudes towards disability are exacerbated in rural areas, where physicians have less knowledge on the topic of disability (Iezzoni et al., 2006). As such, physicians in rural areas also have increased discomfort when working with PWD, limiting the quality of care (Devkota et al., 2017). These attitudes decrease the quality of healthcare and treat rural disabled women as other. Therefore, rural disabled women are less likely to continue receiving important care including mammograms (Llewellyn et al., 2011). With the social model, we can see how the cultural processes treat disabled women as different, specifically in rural areas where there is less competent and specialized care. This process then limits the care received by rural women with disabilities, potentially increasing the healthcare divide between women with and without disabilities.

It is also important to note the majority of preventative care measures did not have statistically significant differences between rural disabled and metropolitan nondisabled populations. This was true for dental visits, flu vaccination, colorectal cancer screenings, and cervical cancer screenings. Based on my results, individuals without disabilities may have fewer flu vaccinations and colorectal cancer screenings in correlation with per capita income per state. This may suggest that nondisabled populations are limited in care due to socioeconomic status. However, with the exception of dental care, per capita income did not seem to play a significant role in healthcare access for disabled populations. One possible reason for this is that people with disabilities need a high level of healthcare and may have secondary health complications which make maintaining preventative care essential (Center for Disease Control, 2018). As such, PWD use healthcare at a higher rate than people without disabilities. The work of Kennedy et al. (2017) compared healthcare utilization of disabled and nondisabled populations. They found that people with disabilities were “nearly 6 times more likely to have seen a physician 10 or more times in the previous 12 months than those without disabilities (38.0% vs 6.0%), and more than 5 times as likely to have been admitted to the hospital (19.4% vs 4.7%)” (Kennedy et al., 2017). This is despite PWD experiencing increased healthcare barriers compared to nondisabled populations, particularly in terms of affordability (ibid). Considering these results contextualizes my work, and suggests that PWD may seek preventative care at high rates despite difficulties in accessing care. For example, a disabled person who knows they will suffer complications if they get the flu may go out of their way to get a flu vaccine, even if their healthcare center is far away, expensive, and without transportation.

Strengths and Limitations

One strength of this study was its ability to take on a large scale quantitative analysis for the United States. Other studies within the United States have largely been focused on qualitative data based on interviews with rural individuals with disabilities, such as the Drainoni et al., 2006 study. Furthermore, these studies have had small sample sizes which can lead to skewed data. The nature of this study allows it to address the extent to which healthcare is limited in rural communities and for people with disabilities. By pulling from the Centers for Disease Control and Prevention data, this study is also able to perform an analysis examining healthcare access across the United States with a large subject sample. This allows it to draw conclusions about where increased healthcare funding and support systems would be most beneficial, as well as what types of supports are the most important. This paper is also strong in that aspects of its literature review and analysis lend it to policy suggestions. By introducing comparisons between the United States and United Kingdom it becomes easier to see how a universal healthcare system may impact access for rural people with disabilities. Likewise, the social model of disability provides an activism oriented framework. Through this model, it becomes easier to understand how healthcare access can best be increased for rural people with disabilities.

It is important to discuss the existing limitations to this study. The largest challenge with this study is that it attempted to take a wide range of data across the United States. This allows us to synthesize a large amount of data and look at how widespread the problem of healthcare access is across the United States. However, it is potentially less beneficial in comparing rural and urban communities. This study used a statewide rurality score, however this level of generalization does not allow us to see the disparities between very rural and very urban areas which may be more evident in comparing county level data. Furthermore, there are differences among states which make them difficult to compare, such as attitudes towards receiving

healthcare. Therefore, it may be beneficial to compare healthcare access within rural and urban communities in the same state.

As a quantitative study, this work also cannot take into account the full range of healthcare limitations for rural disabled individuals. Qualitative studies have been able to use interview data to determine specific limitations that rural disabled individuals identify. As such, they are perhaps better positioned to address issues which most directly impact people with disabilities. For example, my study found that mammogram rates were significantly lower in rural disabled populations. However, actual rural residents with disabilities may prefer that more resources be allocated to addressing gaps in routine check-ups than mammograms. As a purely quantitative work, my study is not able to address which types of care should be prioritized or what implementation would be most effective. This work is also correlative in nature, which comes with limitations. While it sheds light on which types of preventative care have the largest healthcare barriers, the study is not able to determine causation. Therefore, while it appears that mammograms are accessed at particularly low rates by rural disabled populations, there could be other variables determining this causation which were not controlled for.

Conclusion

Through a review of the literature, we can see that diverse barriers exist for rural disabled individuals. A review of the literature revealed that rural and disabled individuals face healthcare barriers primarily in the realms of insurance, socioeconomic status, transportation, spread of healthcare centers, and a lack of competent care. Many people in the United States face insurance barriers which block their access to healthcare. This is particularly relevant for people of low socioeconomic status who may not have access to high quality private insurance. Low socioeconomic status is associated both with living in a rural area and having a disability, which

can lead to poor health outcomes. However, disabled individuals in rural areas have a difficult time accessing healthcare centers. This is due both to the lack of accessible transportation and the wide spread of healthcare centers. When people with disabilities are able to reach healthcare centers, rural healthcare centers are often lacking in cultural competence and specialized facilities.

This essay sought to address a gap in the literature by providing a quantitative analysis of how rural disabled people access preventative care across the United States. Furthermore, this work utilized the social model of disability to better understand the implications of the quantitative results. With a quantitative analysis of preventative care data this work has found that preventative care access can be limited in rural areas, and that people with disabilities can face particular access barriers. Specifically, people in rural areas receive less preventative care in terms of routine check-ups and mammograms. Disabled people have worse preventative care access in dental care and mammogram conditions. These findings suggest that dental care access is particularly impacted by insurance coverage and that routine check-ups should be improved in rural communities for people with and without disabilities. The only condition in which rural disabled individuals had especially limited preventative care was for mammograms. The lens of the social model demonstrates the importance of competent care in improving mammogram rates for patients with disabilities.

The results found by this study have revealed that there is still much to be learned about healthcare access in rural and disabled communities. For example, are there other types of care such as emergency services which have particularly low access in rural disabled communities? Is there one particular healthcare barrier that places more disadvantage on rural disabled populations? Does examining rurality in a different way yield different results? Future work

could address these questions by using a similar model to this study to look at other types of healthcare information. A study would also be warranted to discuss mammogram access for people with disabilities specifically, in order to analyze why these gaps exist. Additionally, this work could be expanded on through the use of survey data as some other rural studies in the field have done. As opposed to pulling from currently available data sources, this would allow researchers to create their own variables and assess healthcare access in terms of the primary healthcare barriers laid out in the literature review. Finally, it would be useful to perform a study like this using aggregate county level data on rurality. My study created average state rurality scores in order to use the state level preventative care data from the Centers for Disease Control. However, future work measuring rurality and care access at the county level would allow researchers to gain a more precise view of how these variables interact. By addressing these limitations, researchers will gain a better understanding of how healthcare can be limited for rural people with disabilities. This understanding will better enable policy makers to address barriers for one of the largest groups of healthcare consumers in the United States (Drainoni et al., 2006; Kronick et al., 1996).

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