

# Disparities in Access to Primary Dental Care: A Systemic Review

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## Abstract

Primary dental care is essential for the maintenance of health and wellbeing. Aside from maintaining the state of teeth for matters of appearance, primary dental care prevents the development of more severe health issues down the line. Furthermore, dental conditions are generally more relatively preventable, compared to other conditions that have chronic effects on health. This further highlights the importance of access to primary dental care. However, in America, numerous barriers exist in attaining a level of care needed for the prevention of dental conditions. Socioeconomic disparities account for a large barrier to care, as the cost of dental visits surpasses the perceived value of the visit for some patients. Geographic barriers also limit access if there are transportation or distance issues. Furthermore, examination of demographic factors including race, gender, and educational attainment reveal more trends in access and use of primary dental care services. In addition, the interactions of these factors and considerations of intersectionality are crucial in obtaining a clear picture of dental disparities.

This paper seeks to address the question: "How do differences and interactions between socioeconomic, geographic, and other demographic variables affect access to primary dental care?" By examining existing disparities and their root causes, insight can be gleaned about possible ways to coordinate more targeted public health action to minimize these differences and expand access to primary dental care.

*Keywords: Primary Dental Care, Public Health, Dental Disparities, Socioeconomic Factors, Demographics*

## Introduction

Dental care is predominantly an aspect of primary care, as individuals within a community often see dentists in an outpatient setting for simple procedures or preventative care (Morris & Burke, 2001). Consequently, dental care is one frontline aspect of maintaining health and wellness within a community. Furthermore, sufficient dental care is crucial for the prevention of multiple conditions, including tooth loss, oral cancers, and tooth decay, which have lasting impacts on health. Globally, oral diseases are some of the most common diseases, despite their relatively preventable nature. They incur health burdens as quality of life is disrupted, with effects ranging from pain that interferes with functioning to sepsis. The importance of dental care makes it even more important to examine the reasons why dental care is insufficient in certain populations, leading to disparities in disease prevalence and overall health and wellness.

It is also important to recognize that patterns in the prevalence of dental conditions illuminate certain barriers to care; for instance, children in poverty, socially marginalized groups, and older individuals disproportionately feel the burden of dental diseases and experience insufficient access to dental care (Peres et al., 2019). The fact that the prevalence of preventable dental

conditions has remained high, especially in countries with lower income, highlights the barrier posed by the cost of dental treatment. Because of this inherent obstacle, advancements in dentistry may not be as useful on a larger scale if socioeconomic hurdles are not addressed.

In America, the pattern of unmet need due to certain disparities is likewise reflected. Barriers also prevent a large portion of the United States of America population from adequate preventative dental care, despite how prevention is easier and less expensive than treatment if any problems arise (Vargas & Arevalo, 2009). Socioeconomic problems present major obstacles to care. Aside from financial barriers, many other demographic variables lead to dental care disparities. In this paper, the factors examined consist of socioeconomic status, geographical location, race, gender, and educational attainment. These can affect different aspects of visiting a dentist, from not being able to physically visit due to time or geographic constraints, to not being able to afford dental care if it is physically available. In addition, social capital and health literacy are also considerations. Some possible barriers to treatment are illustrated in Figure 1. These barriers may be stronger or weaker for individuals depending on the aforementioned variables and possibly other factors. In addition, the interactions of these factors and considerations of intersectionality are crucial in obtaining a clear picture of dental disparities. Some of these factors may compound, heightening disparities disproportionately in certain population subsets. Both controlling for factors to isolate variable effects and examining the overall picture with the interplay of variables could be helpful, as one reveals correlational effects more strongly while the other is more reflective of the real world.

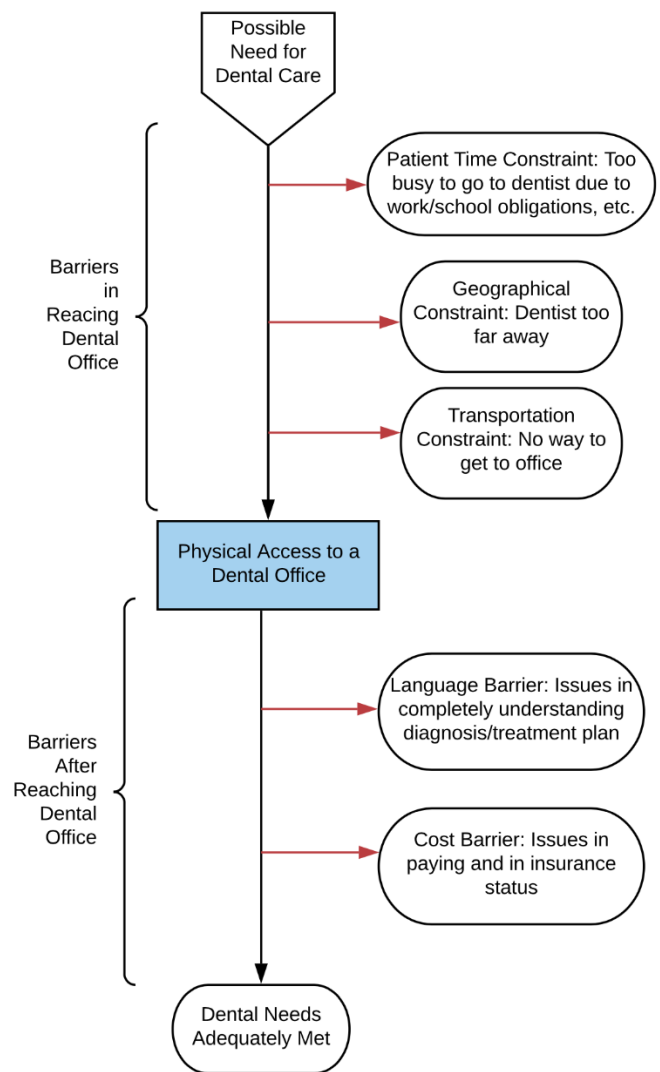


FIGURE 1: Possible Barriers to Accessing Primary Dental Care

History has pointed towards there being effective strategies for improving dental health for the broad population. The reduction in the prevalence of dental caries via community tap water fluoridation (with about 75% of those with community water supplies receiving optimally fluoridated water), has been widely hailed as a modern public health achievement in the USA (Allukian et al., 2018). Despite this success, there are still issues that need to be addressed, such as the high prevalence of preventable dental caries and periodontal disease (Northridge, Kumar, & Kaur, 2020). Regarding existing public health

initiatives targeting dental care, oral conditions are highlighted by the Healthy People 2030 objectives. These objectives include those seeking to minimize disparities, such as increasing the proportion of the population with dental insurance and decreasing the percentage who could not access necessary dental care from 4.6% reported in 2017 to 4.1% by 2030. Further minimization of disparities is essential for achieving equitable healthcare in the USA.

## Methods

To find publications concerning disparities in dental care, the Medline database was searched for English-language literature that addressed existing disparities in primary dental care, along with publications suggesting possible solutions. To review relatively recent public health studies, only papers from the past twenty years were reviewed. In addition, only studies that examined dental trends in America were selected. A broad search was first conducted using the phrase “dental disparities.” After reviewing recent publications in this category, a set of recurring factors accounting for disparities was determined. These were socioeconomic status, geographical location, race, gender, and educational attainment. To further review these specific categories, searches were targeted towards dental disparities depending on those factors. For example, the search term “socioeconomic dental disparities” was used to delve into publications relating socioeconomic inequalities with disparities in dental care. Overall, a total of 27 publications were reviewed for information concerning data and trends for dental care disparities and possible solutions to them.

## Results

### *Socioeconomic Factors*

Socioeconomic issues stand out as a key obstacle to adequate dental treatment, as a 2014 survey after the implementation of the Affordable Care Act in America revealed that across different categories of age, income, and insurance status,

dental care had a disproportionately high financial barrier compared to other types of healthcare (Vujicic, Buchmueller, & Klein, 2016). One important aspect in overcoming financial barriers is insurance coverage. Medicaid provides insurance coverage for low-income Americans, and recent expansions in dental care for Medicaid in 2014 were projected to increase the chance of dental visits within a year by 16.4-22% (Choi, 2011). Retrospective data showed that Medicaid expansions increased the likelihood of dental visits by over 10% in 2016, compared to before the expansion took effect. In the state of Oregon, after Medicaid expansion of dental care, the percentage with unmet dental needs dropped by 13.5%, although it did not affect the rate of use for any dental services not covered under Medicaid (Baicker, Allen, Wright, Taubman, & Finkelstein, 2018).

Despite coverage improvements, disparities are still evident – the same study that reported an increased rate of dental visits in 2016 also noted this change was mainly in states with high dentist concentrations – areas with fewer dentists saw no dental visit rate improvements (Wehby, Lyu, & Shane, 2019). There are still significant gaps in met need across socioeconomic groups: in the state of Georgia, 59% of need was met for low-income children, compared to 96% for high-income children (Cao, Gentili, Griffin, Griffin, & Serban, 2017). Another study from Florida discovered that although for both Hispanic and non-Hispanic patients, emergency dental care at hospitals was most often covered by Medicaid, current Medicaid coverage alone would not adequately bring equity in terms of high-quality dental care (C. A. Serna, Arevalo, & Tomar, 2017) (Demby & Northridge, 2018). Dentist participation in public insurance also matters as the median met need in Georgia increased from 30.5% to 100% as projected provider acceptance of Medicaid rose from 20% to 80% (Cao et al., 2017). Indeed, Medicaid’s “low and inconsistent reimbursement rates” contribute to dentists

rejecting Medicaid. Compounded with the payment factor is that patients of lower socioeconomic status might experience more difficulties taking time off work to visit a dentist, or have transportation challenges (Patrick et al., 2006).

The repercussions of unmet dental care have led to a higher prevalence of dental conditions, such as untreated dental caries. For instance, low-income respondents in the US on average have double the prevalence of mild to moderate untreated caries (26.2% compared to 13.2%), and 2-3 times higher prevalence of severe untreated caries. In addition, publicly insured low-income adults still had a 20.5% prevalence of mild to moderate untreated caries, while privately insured adults had a prevalence of 13.3%, showing a gap in public insurance coverage (Williams, Wei, Griffin, & Thornton-Evans, 2021).

Overall, socioeconomic disparities are very significant when it comes to dental care. Among Americans with unmet dental need, 78% cited the inability to afford dental care accounted for 78%, and the same study found that low-income adults reported unmet dental care three times more frequently than higher-income adults (Williams et al., 2021).

### *Geographic Factors*

Aside from purely the cost aspect of dental care being a hurdle with those of lower socioeconomic status, issues often arise with difficulties in finding reliable transportation, compounded by the time it takes to see a dentist (Patrick et al., 2006). Transportation factors, availability of dental care, and convenience of visiting a dentist are encompassed by geographic factors. Commonly, this most prominently affects low-income populations with transportation barriers and rural populations where there are fewer dentists.

Regarding transportation, cost of transportation and access to regular transportation is a

significant concern. Data from the Iowa Dental Wellness Plan revealed that 11% of respondents noted that transportation problems accounted for unmet dental need. In the model, travel distance was not correlated with a significant difference in dental care usage, but rather cost of travel had a significant negative correlation with dental care utilization (McKernan et al., 2018). A study from Georgia found travel distance disparities across urban and rural populations: while the average travel distance to dentists was 3.7 and 17.2 miles for high and low income children respectively, and these values increased to 11.6 and 32.9 miles for high and low income children in exclusively rural areas (Cao et al., 2017).

Furthermore, rural populations are affected by other public health dental care disparities, including lower dental care utilization, higher prevalence of dental caries, less fluoridated water supplies, greater travel distances, fewer dentists per capita, and increased travel distances to dentists (Skillman, Doescher, Mouradian, & Brunson, 2010). Rural populations also have less access to hospital-based dental care (Harrison, Daniel, & Nemecek, 2007). Overall, these issues reveal a significant disparity, towards which public health policy should be directed to mitigate these differences between rural and urban dental care.

### *Racial Factors*

Racial factors also contribute to disparities in dental care, even when demographic and socioeconomic variables are accounted for. For instance, in the US, older black patients had a significantly higher prevalence of decayed teeth compared to older white patients after controlling for other socioeconomic/demographic factors (Liang, Wu, Plassman, Bennett, & Beck, 2013). In addition, non-Hispanic whites in America are the most likely to receive annual dental exams, which are a key aspect of preventative primary dental care (Horner-Johnson, Dobbertin, & Beilstein-Wedel, 2015). Within specific geographic areas, disparities can be seen: compared to their rural

white counterparts, rural African American populations had significantly more tooth loss even if there was a stable source of health care. Overall, rural African American populations show a 28% rate of tooth loss and 34% rate of dental visits, which are high and low proportions respectively (Caldwell, Lee, & Cagney, 2017). For comparisons within public insurance, Latino and African American children report longer intervals between dental visits compared to white children on Medicaid. This same trend is reflected within private insurance, with African American and Latino children visiting dentists at a lower rate than white children (Pourat & Finocchio, 2010).

Meanwhile, other studies have found that certain other variables make a difference in racial disparities in dental care and controlling for these makes the differences statistically insignificant. One study noted that enabling “resource variables” including income level, insurance, census region, and metropolitan statistical area, make the difference in utilization in dental services between whites, African Americans, Mexican Americans, and other race/ethnicity groups no longer significant. The study, from 2003, found no significant difference between utilization of dental services for racial groups when they are all privately insured. The only statistically significant differences reported in the study were between privately insured whites with publicly insured whites, Mexican Americans, and other race/ethnicity groups (Doty & Weech-Maldonado, 2003). This disparity is not necessarily because of a lack of perceived need for dental care – one study found that only 20.5% of Hispanic migrant farmworkers visited a dentist in the past year, while 61.2% reported they believed their mouths were in poor condition (Claudia A. Serna et al., 2020).

One study studying the differences in dental care across racial groups compared data from 2001 and 2016. It found that for children, prevalence of dental care use increased from [31.4%, 33.3%,

38.1%, 56.8%] in 2001 to [44.1%, 50.7%, 55.2%, 59.8%] in 2016 for African American, Hispanic, Asian, and white children. This indicated that all groups except for African American children reached 49% dental care use, the Healthy People 2020 goal threshold. This shows a significant difference in absolute disparities for all groups, but the change in disparity was lowest for African American children (Robison, Wei, & Hsia, 2020). Overall, racial disparities regarding primary dental care in the US should be studied more in-depth. Controlling for certain factors may or may not lead to statistically significant differences in different markers in oral health and access to quality primary dental care. As previously stated, controlling for certain markers helps to form a stronger correlation and clarify certain problems, but other times overall outcome and the convergence of many factors should be taken holistically as that is reflective of real life. However, some studies show trends that have pointed towards a narrowing of racial disparities over the past years.

#### *Gender Factors*

Gender disparities in dental care are nuanced and reveal areas where public health intervention can be focused. Men tend to have poorer oral health, which can be attributed to behavioral factors, including increased tobacco/alcohol use, and biological factors, including hormone and immune system differences. Public health interventions can help target the behavioral aspects. Overall, men ignore their oral health and have poorer oral hygiene habits. This is associated with men reporting more negative attitudes about dental visits and less oral health literacy (Lipsky, Su, Crespo, & Hung, 2021).

Conversely, women encounter financial barriers to dental care more often, as one study noted that 15% of men and 20% of women “did not receive dental care due to cost.”

When assessing access to dental care, approximately 20% of women, as opposed to 15% of men, “did not receive dental care due to cost” (Ioannidou, 2017).

### *Educational Factors*

Differences in educational attainment are also associated with disparities regarding dental health care. Obtaining education above a high school diploma (over 12 years of education) was correlated with a lower number of missing teeth, lower prevalence of dental decay. Even after controlling for demographic variables of age, gender, and race, the difference was still statistically significant. Compared to the rate of tooth decay for those obtaining more than 12 years of education, the risk ratios were 2.45 and 1.84 respectively for those who did not get a high school diploma and those who had no education beyond a high school diploma. The rates of use of dental sealants were higher in those who had more than 12 years of education compared with less than 12 years of education (4.9% and 4.6% in 2005–2006 and 2007–2008, respectively) (Liu, Li, & Walker, 2014). In addition, high education attainment was associated with both a lower probability of poor oral health and better self-rated oral health (Assari, 2019). The question remains of to what extent these educational effects are associated with other variables, such as financial status, or if these educational effects are more direct, such as having an impact on dental health literacy.

### **Discussions**

Reviewing studies examining disparities in primary dental care has revealed many overarching trends. Overall, socioeconomic and insurance challenges pose major barriers to patients seeking quality dental care. Disparities between Medicaid and private insurance can be targeted by public health policy, and previous evidence has shown that expansions for dental care in Medicaid has helped decrease unmet dental care need. Lower income is still associated

with reduced access to primary dental care, but reforms could help bridge the gap in dental care access in lower versus higher class households.

Furthermore, rural populations have less accessible dental health care than urban populations. Racial disparities suggest that white Americans have the highest levels of dental utilization, although controlling for certain economic variables decreases this disparity in one study. Gender factors suggest women have improved oral health due to better health literacy and attitude towards dentists, as well as a lower rate of smoking and alcohol consumption, but women also face financial barriers to dental care more often. Finally, educational attainment over a high school diploma is associated with better dental outcomes.

With these findings, it is important to note that these are not all the possible factors leading to disparities and that the interactions between variables may compound or mediate certain effects. For example, having a disability is another factor that leads to patients being unable to receive needed dental care. This effect is further compounded for disabled individuals in underserved racial groups – one study found this was especially prominent for American Indian, Alaska Native, and multiracial individuals, as they had fewer receipt of examinations, delays in obtaining care, and more cases of not receiving needed care (Horner-Johnson et al., 2015).

Accounting for the compounding effect of multiple variables provides information to implement public health policy more effectively. While looking at individual variables gives a more simplified picture where correlations can be clearly drawn, it is important to realize that people in real life have many interacting factors that affect their access to primary dental care. Healthcare research has shifted towards a more intersectional lens of analysis, but many dental studies still focus narrowly on certain variables and note other

factors as “confounders” instead of examining intersections. For example, one study analyzing the impact of racial discrimination on dental care separated gender, race, and ethnicity as “confounders” rather than studying the combination of variables (Elaine Muirhead, Milner, Freeman, Doughty, & Macdonald, 2020). Indeed, literature commenting on intersectionality and access to dental care is sparse. However, when expanded to healthcare literature in general, important intersectionality studies have insights that might be applied and further studied in dentistry. For instance, a study on low-income African American women found the intersection created a healthcare environment of stereotypical assumptions and discriminatory practices. The intersection of identities led to interactions with healthcare providers that resulted in issues including a need for patient self-advocacy to have their concerns addressed and provider disregard for patient preferences (Okoro, Hillman, & Cernasev, 2021). Because the discussed demographic variables are not mutually exclusive, multiple combinations of them could be studied to see what unique issues occur due to intersectional identities, and how they impact access to primary dental care. Thus, solutions to disparities in dental care should seek effective change while accounting for how individuals are multi-faceted.

### **Conclusions**

Multiple disparities exist within access to primary dental care and dental outcomes. With future research and improvements in public health policy, these disparities can further lessen. Public health research so far does address the role of multiple disparity factors such as the effects of income, race, insurance, and geographic factors as thoroughly as needed. In addition, these disparities should be marked with multiple indicators aside from just dental utilization, including the quality of the care itself (Northridge et al., 2020).

Through researching these disparities and targeting policy, outcomes can be improved. Medicaid expansion for dental care has already been shown to improve dental care utilization (Baicker et al., 2018). Transportation barriers can also be addressed to help low-income individuals, such as improved public transport (McKernan et al., 2018). For example, because access to a dentist might be challenging based on time, cost, or transportation, dental basics being incorporated as part of primary care clinicians’ patient education might help. Family physicians could improve dental health literacy through basic counseling, and basic dental health evaluations could help individuals who usually do not see a dentist as a separate health trip (Stephens, Wiedemer, & Kushner, 2018). Especially for rural areas, mass solutions such as increased water fluoridation and increased dental health curriculum, or implementation of dental mobile clinics or telehealth screening could improve dental health and provide additional points of access aside from formally visiting an established hospital or dentist’s office (Skillman et al., 2010). Granted, a limitation to policies that reduce barriers is the willingness of individuals to change their dental habits even after barriers are lowered. A study of rural teens in Washington state showed low response to efforts made by researchers to reach out and encourage dental care interventions. Conversely, emancipated teens and young adults under 26 engaged with the same offers by researchers at a much higher rate, showing inherent willingness to seek dental care is key even with lowered barriers (Weinstein, Coolidge, Raff, & Riedy, 2009).

A model of more community health centers for rural areas could also lower barriers to dental care (Nycz, Acharya, & Glurich, 2020). However, there would have to be research to create models for sustainable rural dental clinics, as rural hospitals have been closing at an increasing rate, suggesting healthcare institution challenges in rural areas. Some of these closures can be

attributed to changes in policy, which should be re-examined to ensure sustainable rural healthcare systems (Balasubramanian & Jones, 2016). Finally, encouraging dental students from rural areas through loan programs and increased recruitment could help rural disparities, as dentists from rural areas are about six times more likely to practice rurally compared to urban students (McFarland, 2012).

All these solutions do incur costs and could face political opposition, as many public health efforts require government involvement and shifts in budgets, creating another limitation. For instance, opposition to government involvement regarding healthcare has undermined the perception of Medicaid (Dalen, Waterbrook, & Alpert, 2015). This could affect the use of public health insurance in certain states, as some have opted out of Medicaid expansions. However, narrowing disparities and improving the overall access to dental care in the United States could help prevent diseases that could have much more costly repercussions if left untreated.

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