**Transportation Equity GIS Project**

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**Introduction**

The term *equity* is often used interchangeably with the term *equality* which can lead to confusion. Generally, the concept of equality is understood to suggest that people or groups have the same rights and opportunities and should be treated equally. In the context of public transit, it would mean that all groups should be provided with the same level of service and therefore seems to be impractical and rarely the goal in practice or research. In contrast, the concept of equity is understood as, since people or groups may not have the same opportunities, they are provisioned differently to address the disparities in opportunity. Thus, equity is more related to “fairness” or “justice”.

Local and National advocacy organizations such as Disability Rights WA and the American Association of People with Disabilities have both called for greater attention to public transportation as means of creating greater access and opportunity for people with disabilities. In order to advocate to policy makers and transportation planners the need for changes to our transportation system that will better serve the needs of people with disabilities there needs to be data showing how transportation impacts the experience of people with disabilities.

The research question(s) we intend to explore is: What areas of King County are people with disabilities likely to be concentrated in, and how is this influenced by factors such as income level, housing affordability, transit access? How do people with disabilities navigate the trade off between housing costs and access to transportation? We hypothesize that affordable housing is likely to be congregated away from urban centers with sought after resources, which ultimately negatively impacts disabled people who are more likely to rely on public transportation as a primary method of mobility. With this information, we hope to clearly identify areas of underinvestment in accessible public transit and affordable housing to provide a valuable resource for disability justice advocates and community leaders who want to increase accessibility.

**Background**

People with disabilities are often forced to make difficult decisions about where they are able to live, work, and spend their time based on access to public services that are out of their control. For many people with disabilities, mobility presents a significant barrier that requires careful planning. Historically, transportation policy in the United States has disproportionately prioritized investment in transportation systems that favor personal vehicle ownership. Data from the Bureau of Labor Statistics (2018) shows that people with disabilities are more likely to rely on public transportation than people without disabilities and they are also less likely in general to be able to rely on travel by personal vehicle as well (Braumbaugh, p.6). Therefore, access to reliable and accessible public transit is a fundamental part of ensuring that all people, especially those with disabilities, have equal access to opportunity.

By comparing where people with disabilities reside with the location of accessible public transportation options, we can better understand what gaps exist with regard to mobility. When we add in data comparing the location of affordable housing with census income data, we gain additional insight to equity disparities experienced by people with disabilities.

The report “Access to Opportunity through Equitable Transportation” by Stacy et. al. (2020) seeks to identify barriers to equitable transportation access by analyzing four metropolitan regions in the United States. In this case-study, the authors define transportation equity as “transportation decisions made with deep and meaningful community input that leads to transportation networks and land use structures that support health and well-being, environmental sustainability, and equitable access to resources and opportunities” (Stacy et. al., 2020, p. 3). This definition is useful as we consider what the end goal of an analysis such as ours seeks to achieve. Stacy et. al. underscore the correlation between vulnerable communities and a lack of accessible transit, noting that historical legacies of public investment into highway systems between urban centers and suburban communities has largely failed to meet the needs of lower-income, urban communities of color. Not only are these communities burdened by a lack of access to resources and opportunity; transportation inequity has been shown to negatively impact the health and overall well-being of underserved communities as well (p. 18). Notably absent from this report was an in-depth analysis of the ways in which these barriers impact people with disabilities, something we hope to address in our research.

The article, “The Unaffordable City: Housing and Transit in North American Cities” by Anna Kramer (2018) is an analysis of seventeen metropolitan areas in the United States and Canada. The author sought to see the relationship between housing cost, frequent transit networks also known as transitscapes and income levels (p. 2). In her article, Kramer references the idea of “the suburbanization of poverty” which according to Elizabeth Kneebone of the Brookings Institution, (2017), is a reflection that poverty in the suburbs has increased at double the rate of the places that are traditionally associated with higher concentrations of poverty: inner cities or rural areas (n.p.). The author’s results showed some key points about transit and housing: areas that had frequent transit networks had “on average, lower median household incomes and greater proportions of poor and near poor households., as well as mre households without cars and with few people who drive to work” and the housing “on average was older, smaller, denser…with more rental housing” in comparison to areas that were less transit dense” The conclusion of the research, was that many times lower income households are faced with the choice between affordable housing and affordable transportation (p.8). Kramer’s research did not include Seattle/King County in their research area but there is an opportunity through further analysis to show how this region aligns with or contradicts this research. By correlating income, housing affordability and transit, with the added variable of disability we will be able to see what choices disabled individuals in particular are able to make about where to live.

This information is useful for many local and national advocacy groups focused on disability justice. Including Disability Rights Washington and the National Disability Rights Network. This could also be useful for housing affordability advocates and urban planners as they think about the future of King County, especially when we think about the fact that the population continues to grow and there will need to be intentional choices made about the placement of housing and transit moving forward.

Local and national organizations can use this information to be more equitable when expanding public transit in major cities and population hubs, ensuring more areas receive higher Opportunity Index Scores. The Opportunity Index, maintained by the Puget Sound Regional Council ranks neighborhoods based on five elements that affect opportunity: education, economic health, housing access and quality, mobility and transportation access, and environment (Puget Sound Regional Council, n.d.). Based on the map published with King County’s current Opportunity Index ratings, disabled person’s are primarily limited to southern Seattle if they want access to both housing and transportation; other areas in the county come with significant trade offs (Puget Sound Regional Council, n.d.).

**Research Design**

This research question will be answered by combining a framework of social and spatial equity to understand the relationship between disability and access to public services. The social equity lens will be used to examine this problem by targeting vulnerable populations using specific socio-demographic categories. In this case-study, we will be examining data around the percentage of population living with disabilities, as well as data on income distribution by census tracts. We intend to then apply a spatial equity lens to examine where resources are and are not distributed with the intent to to identify geographic areas that lack certain services. In this case, we will be looking at public transportation service routes and affordable housing to better identify a correlation between a lack of these services and areas where people with disabilities live.   
 The variables we are looking at fall into the following categories:

* Independent: Number of residents with disabilities per census tract and median income per census tract obtained from the Census Bureau
* Dependent: Median price of housing by census tract obtained from the Census Bureau and GIS data on public transit routes

King County is a diverse metropolitan region made up of many municipalities, therefore stratifying the data by census tracts will allow us to quickly analyze compounding data in a meaningful way. If we opted to look at these variables from a wider unit of analysis, such as at the county level, important trends and disparities in specific communities would be overlooked.

**Data Sources**

For our project, we plan on using data from a variety of government sources to ensure that our data is high quality and accurate. For our maps, the basis will be the Census Tracts in King County Washington from the 2010 Census. For our variable of disability status we will rely on the most comprehensive source available to us at this time, the American Community Survey. According to the U.S. Census Bureau, The American Community Survey collects data from respondents on six types of disability: hearing difficulty, vision difficulty, cognitive difficulty, ambulatory difficulty, self-care difficulty, and independent living difficulty. For the survey, if a person reports having any of these types of disability they are considered disabled. This data set is able to be produced for census tracts and block groups which means our study will be able to have numbers as well as percentages of disabled persons by census tract (U.S. Census, 2021). For income data, median household income is a metric that will allow us to analyze how the experiences of higher income people differ from lower income people when it comes to disability. For public transit data we are relying primarily on data from King County Metro as that is the transit agency with the most routes that provides local service within the county however the Bureau of Transportation Statistics also has maps that show transit stops and routes in King County as well. For housing data, we are planning on accessing data from King County as well for the location of housing parcels as well as American Community Survey Data again for median house values. This biggest issue we anticipate for our data for this project is being able to find data that aligns according to date as census tracts do change and data is collected at different intervals. For example, .current Census Tract data we are using is dated from 2010 and therefore does not account for the 25% increase in population Seattle has experienced between 2010 and 2020, as well as the impact Covid-19 has had on King County public transportation, such as the closure of certain bus stops or changes in routes due to construction. Using data from national sources vs local sources may also lead to some differences that we will have to reconcile with our research. King County is a rapidly changing metropolitan area and our data will not fully be up to date but instead will somewhat be a snapshot of the past while decisions are being made now about these issues.

Opportunities for various demographic groups are often reduced due to a reduction in accessibility, affordability and availability of transport. Developing a public transport service that follows universal design principles ensures that the built environment is not disabling individuals in a wheelchair. In this study, we'll be evaluating public transport networks to identify the gaps in accessibility by public transport to jobs, home, school etc for wheelchair users compared to non-wheelchair users. In a robust quantitative culture, measuring the level of transit (in)accessibility for these disadvantaged groups will have predominant impacts for bringing attention to how significant this issue is. Access to employment opportunities through public transport in socially vulnerable neighborhoods is notably crucial for the well-being of physically disabled individuals, who are more likely to lack alternative means for mobility.

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