Equity of Access to Bicycle Infrastructure

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The benefits of transportation investments are not distributed equally among communities, as some social groups have not reaped the rewards of developed transportation infrastructure. While transportation equity has largely focused on accessibility to transit and the provision of auto-dominated infrastructure, a growing number of advocates and community organizations are calling for the consideration of bicycle equity in the conversation about current and future bicycle infrastructure development projects. Seeking fair treatment and meaningful involvement in policy formation and decision-making regardless of race/ethnicity, national origin, or income and explicitly seeks an equitable distribution of benefits from bicycle facility investments.

My research focuses on ways to influence structural change to decision-making processes by providing tangible GIS methods for investigating the equity of access to bicycle infrastructure. These methods use GIS software and U.S. Census data to spatially identify populations in relation to the provision of bicycle infrastructure through the creation of a Bicycle Equity Index (BEI). The BEI is a composite measure that uses common indicators of disadvantage such as race/ethnicity, class, and travel characteristics. Equity is then examined through the lens of who has access to infrastructure and who does not.

These methods are demonstrated through the use of a case study using Chicago which revealed disparities in access to bicycle infrastructure specifically for minority, low-income, youth, and elderly populations. Such analyses can validate equity concerns, spur discussions about diversity in bicycle planning, and help ensure more equitable outcomes by elucidating disparate development patterns.
**Figure 1: Chicago’s BEI**

*Bicycle Equity Index*

BEI is a composite score of 5 indicators of transportation disadvantage. Areas with higher percentiles indicate areas with higher concentrations of disadvantaged populations.
Figure 2: Chicago’s Minority Population

*Environmental Justice Indicators*

Minority is defined as non-white and/or Hispanic/Latino. Areas with higher z-scores have higher concentrations of minority populations.
**Figure 3: Chicago’s Low Income Population**

*Environmental Justice Indicators*

Low income is defined as people living at or above the poverty line. Areas with higher z-scores have higher concentrations of poverty.

Source: American Community Survey, 2009-2013 5-year estimates
Projection: NAD_1983_StatePlane_Illinois_East_FIPS_1201_Feet
Figure 5: Chicago’s Elderly Population

Transit Dependent Indicators

Elderly is defined as people 65 and older. Areas with higher z-scores have higher concentrations of elderly.

Percent 65 and over

z-scores

- < -1.5
- -1.5 - -0.5
- -0.5 - 0.5
- 0.5 - 1.5
- > 1.5

Source: American Community Survey, 2008-2013 5-year estimates
Projection: NAD_1983_StatePlane_Illinois_East_FIPS_1201_Feet

Access Coverage Overlay
Figure 6: Chicago’s Youth Population

Transit Dependent Indicators

Youth is defined as people under the age of 18. Areas with higher z-scores have higher concentrations of youth.