

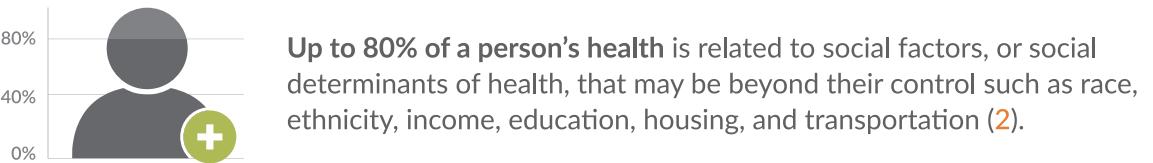
# Neighborhood-Level Health Outcomes and Social Determinants of Health in Colorado:

COMPARING URBAN AND RURAL AREAS USING A PUBLIC INTERACTIVE DATA TOOL

## Background

### Defining Health Equity & Social Determinants of Health

The Centers for Medicaid & Medicaid Services defines health equity as “the attainment of the highest level of health for all people... regardless of ... factors that affect access to care and health outcomes”(1).



### Health Equity Frameworks

- Health equity frameworks use social determinants of health and health care outcomes to attempt to explain health disparities.
- Guidelines and proposed frameworks for health equity and improving health outcomes suggest addressing social determinants of health (3–6).

### The Health Equity Analysis

The Center for Improving Value in Health Care (CIVHC) and Human Services Research Institute (HSRI) developed an interactive Health Equity Analysis tool to make information about social determinants of health and health care measures in Colorado publicly available to help policy makers, providers, public health entities and communities answer questions like:

?

Which social determinants impact my neighborhood or community most?

?

Which social determinants in my neighborhood or community are most related to poor health access that can impact health outcomes?

### Urban vs. Rural Neighborhoods

- Individuals in rural and urban neighborhoods differ in the way they are impacted by various social factors and how they are able to access health care services (7).
- Urban and rural neighborhoods have different relationships with health care access, quality, cost and utilization (8–14).

Urban areas experience issues related to crowded housing and health care cost (11–14).

Rural areas generally experience lower access to and quality of health care, especially for vulnerable populations (8–11).

Each neighborhood faces their own unique challenges related to social factors and utilization of health care services, therefore, further exploration of correlations between social determinants and health care measures in census tract-level urban and rural areas is warranted.

## Objectives

- Understand what, if any, correlation exists between social determinants of health and health care measures in urban and rural neighborhoods.
- Compare correlations in urban and rural neighborhoods.
- Characterize differences between urban and rural neighborhoods.

## Methods

To compare social determinants of health and health care measures, five social determinants were obtained from public data sources and six health care measures were developed from the Colorado's All Payer Claims Database (CO APCD).

### Social Determinants of Health

Five social determinants of health were chosen to look at a variety of social factors that could impact health care use:

- Income

Percent below Poverty Line\*
- Education

Percent Without High School Diploma\*
- Employment

Percent Unemployed\*
- Housing/Transportation

Crowded Housing and/or With No Vehicle\*\*
- Race/Ethnicity/Language

People of Color and/or Limited English\*\*

\* obtained from the American Community Survey (ACS) published by the US Census Bureau  
\*\* obtained from the Social Vulnerability Index (SVI) published by the Center for Disease Control (CDC)

### Health Care Measures

Six health care measures were developed using the CO APCD and designed to represent four health care themes:

- Access\*
- Quality
- Cost
- Utilization
- \*Measures were calculated as lack of access to care, so a lower value is better.

For methodology notes, refer to the "Measure Definitions" button on the Health Equity Analysis tool: [Health Equity Analysis - CIVHC.org](#)

### Tableau Dashboard

A web-based interactive dashboard was developed to enable comparison of the social factors to the health care measures at the neighborhood (census tract) level.

### Population Studied

Health outcome measures were calculated using claims information in the CO APCD.

#### What's in the CO APCD

- Over 1 Billion Claims (2013-2022)
- 40 Commercial Payers, + Medicaid & Medicare\*
- 5.5+ Million Lives\*, Including 1M (50%) of self-insured
- Over 70% of Covered Lives (medical only, 2021)

Trend information (2013-Present)

#### What's not in the CO APCD

- Federal Programs - VA, Tricare, Indian Health Services
- Majority of ERISA-based self-insured employers
- Uninsured and self-pay claims
- Supplemental Info (incomplete)

\*Reflects 2022 calendar year only

Addresses in the CO APCD were geocoded so health care measures could be analyzed at the census tract (neighborhood) level.

### Pearson Correlation

To achieve the purpose of this specific analysis, Pearson correlation coefficients (Pearson's r), were calculated for the following groups:

- a All census tracts
- b Urban census tracts
- c Rural census tracts

Correlations were then classed according to the following criteria:

- a Very strong relationship: 0.70-1.0
- b Strong relationship 0.40-0.69
- c Moderate relationship 0.20-0.39
- d Weak or no relationship 0-0.19

## Principal Findings

Across all of Colorado, access to care in adults and potentially preventable Emergency Department visits are strongly correlated with social determinants of health. The other health care measures are weak-to-moderately correlated with social determinants of health.

STATEWIDE Relationship Table	Social Factors				
	Income	Education	Employment	Housing/Transportation	Race/Ethnicity /Language
Health Care Measures					
Access to Care: Children & Adolescents	●	●	●	●	●
Access to Care: Adults	●	●	●	●	●
Follow-Up After ED Visit for Mental Health	●	●	●	●	●
Cost of Care per Person per Year	●	●	●	●	●
Potentially Preventable ED Visits	●	●	●	●	●

### Urban Neighborhoods

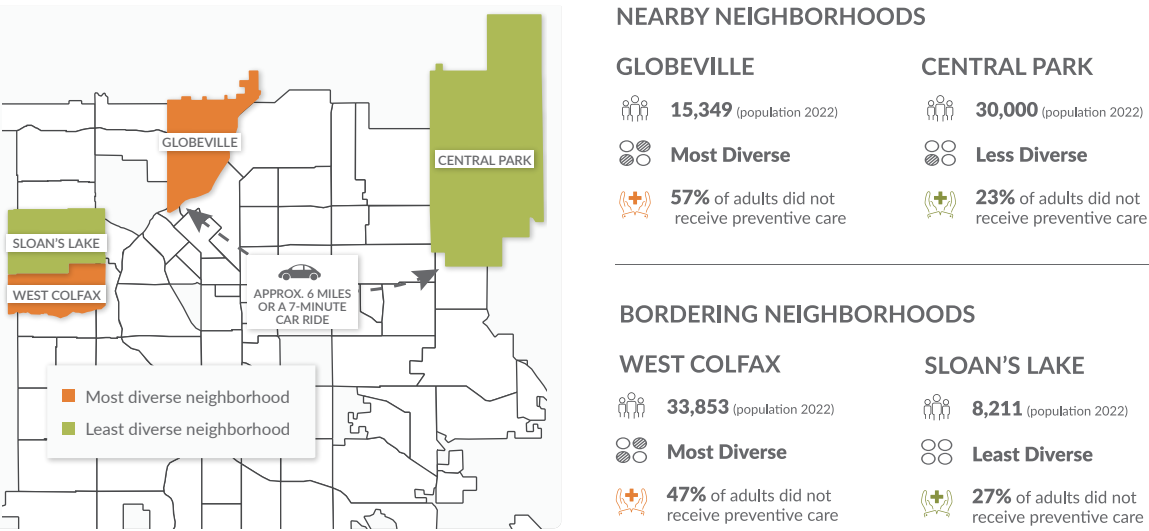
- Urban census tracts make up most of the census tracts in Colorado but make up the minority of the land mass.
- Urban correlations are very similar to the overall correlations, although they were very slightly stronger in some cases.

### Rural Communities

- Rural communities display similar correlations as urban areas, but they are not as strong.
- Higher diversity in race, ethnicity, and language is moderately related to better access to care in children and adolescents in rural counties (-0.27), but not urban counties (0.13).
- Follow-up after a Mental Health related ED visit is moderately related to housing and transportation in urban census tracts (0.25), but not in rural census tracts (0.06), where employment is moderately related instead (0.28).
- Income is moderately negatively related with cost in rural areas (-0.2), but not urban census tracts, where race, ethnicity, and language is moderately negatively correlated with cost instead (-0.2).

### Neighborhood Case Study

Highlights how neighborhoods in close proximity and even those that border each other can have very different health care utilization depending on social factors.



## Discussion

- This analysis:
  - Explores correlations between social determinants of health and health care measures
  - Displays results comprehensively with urban and rural differences
  - Increases public availability of key information on health equity
- Some social factors are moderately to strongly related to health care measures in urban census tracts but were not as strongly related in rural census tracts.
- Many differences in the correlations between social determinants and health care measures in urban vs. rural settings were expected, including differences in how housing and transportation and income related to health care outcomes.
- Correlation differences between health care measures and employment, and race/ethnicity/language in rural vs. urban were not anticipated.
- One notable relevant limitation of Pearson correlation coefficients is the assumption of a normal distribution. While much of these data are normally distributed, not every possible filter of the dashboard is normally distributed.

## Takeaways

- Some social determinants of health are moderately to strongly related to health care measures in urban census tracts but were not as strongly related in rural census tracts.
- More research is needed to determine appropriate social determinants to target in rural areas.

## References

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