

# Modeling Disparities in Cost of Care Based on CMS Coverage Options and Social Determinants of Health

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## Background & Objectives

Research shows that social determinants of health (SDOH) are associated with a considerable proportion of geographic variation in healthcare spending.<sup>1</sup> To assess the efficacy of the health insurance marketplace program, it is critical to consider whether healthcare coverage, utilization, and spending is equitable across populations. We examined health equity through the lens of patient cost of care using two analytic models:

**Analysis 1:** Are there disparities in cost of care for marketplace enrollees as a function of SDOH factors or availability of plan options?

**Analysis 2:** Do county-level SDOH factors and marketplace enrollment saturation predict breast cancer cost of care?

## Data Sources

- CMS.gov** Marketplace plan enrollment, plan attributes, service areas (2023)
- American Community Survey** county-level data (2017-2021)
- Change Healthcare** medical claims (2018-2023)

## Leveraging the Power of Real-World Data

**280M Lives**

reflected in a medical claims database

**1.65M Patients**

with claims indicating breast cancer as the primary diagnosis

**25M Claims**

submitted for breast cancer treatment

## Methods

**Analysis 1:** Multiple linear regression using **number of marketplace plans**, proportion of enrollees by **metal level**, and **sociodemographic** factors to predict average premiums of marketplace enrollees.

**Analysis 2:** Multiple linear regression to estimate the **cost of treatment** as a function of **marketplace coverage**, calculated as the percentage of county residents enrolled in a marketplace plan, **economic factors** (income and poverty) and **social factors** (race and education) of all county residents.

**HHI Machine Learning Engine**  
Accenture's Human Health Insights (HHI) platform integrates multiple large real-world data sets into a machine learning workbench to leverage advanced analytics for robust health equity insights.

**Interactive Dashboard Visualization**  
Data and model insights are connected to dynamic, customizable user-facing health equity dashboards.

## Analysis & Results

**Analysis 1:** Our analysis found that counties with a **higher number of marketplace plan options also had higher average premiums**. Further, counties with a higher proportion of white or Asian consumers had higher premiums, whereas **counties with more Black consumers had lower premiums**. These results are suggestive of potential disparities in the quality of healthcare coverage, or differences in consumer choice driven by their economic status.

**Analysis 2:** Our analysis found that **counties with more consumers enrolled in marketplace insurance plans had lower direct patient costs**. We observed decreased costs in counties with higher poverty rates, possibly suggesting marketplace plan coverage lessens patient burden for medical costs, or that there are significant treatment differences across socio-economic strata.

## Next Steps: Digging Deeper with Real-World Data

Accenture's HHI platform leverages **real-world data** and an **advanced analytics workbench** to enable better insights into health equity related to CMS programs. Combining payer and provider data with individual social factors and population level information provides an **unprecedented view** into the healthcare landscape and impact of CMS programs and policies.

As demonstrated, costs are determined by a complex interaction of social and economic variables, marketplace plan availability, and plan usage. Future work should **assess the mechanics of cost disparities** (e.g., the role of preventive screenings or access to care), and seek to optimally **match patients to appropriate plans**, finding the correct balance between premiums and copays.

Analysis 1	Analysis 2
<b>Outcome:</b> Average premiums of marketplace enrollees	<b>Outcome:</b> Total cost of care for breast cancer diagnosis
<b>Predictors:</b> Number of plan options**	<b>Predictors:</b> Marketplace insurance coverage**
<b>Enrollee age</b> < 18 18-25 26-34** 35-44 45-54** 55-64** 65+	<b>Population age</b> 18-25 26-34 35-44 45-54 55-64 65+
<b>Enrollee metal level coverage</b> Catastrophic Bronze Silver** Gold** Platinum	<b>Population below poverty line*</b>  <b>Median household income</b>  <b>Population w/o health insurance</b>
<b>Enrollee sex (proportion male)</b>	<b>Education</b> < High school* Some college** Associate's degree* Bachelor's degree Graduate degree
<b>Enrollee race</b> White** Hispanic * American Indian / Alaskan Native Asian**	<b>Race</b> Black/African American** Asian Hispanic or Latino

Positive predictor  
Negative predictor

\*p < .05; \*\*p < .01

<sup>1</sup>Zhang, Y., Li, J., Yu, J., Braun, R. T., & Casalino, L. P. (2021). Social determinants of health and geographic variation in Medicare per beneficiary spending. *JAMA Network Open*, 4(6)

