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. ¹ 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



Marketplace plan enrollment, plan attributes, service areas (2023)



American Community Survey county-level data (2017-2021)



Change Healthcare medical claims (2018-

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

¹Zhang, Y., Li, J., Yu, J., Braun, R. T., & Casalino, L. P. (2021). Social determinants of health and

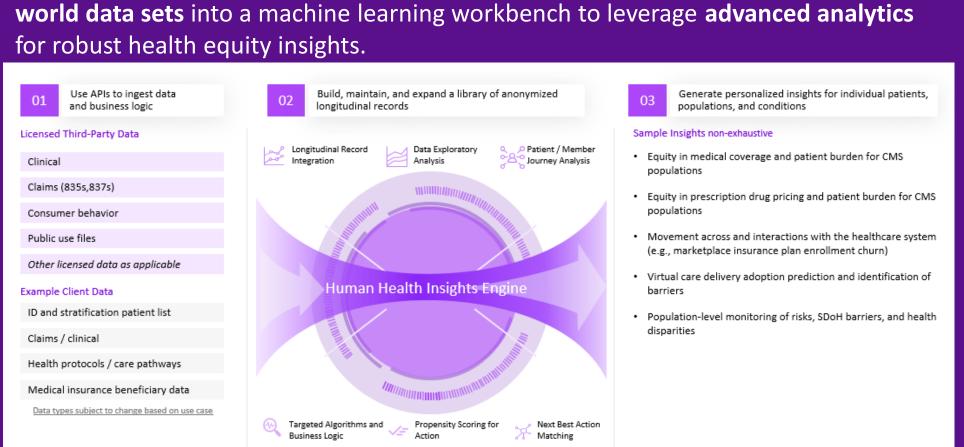
Methods

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.

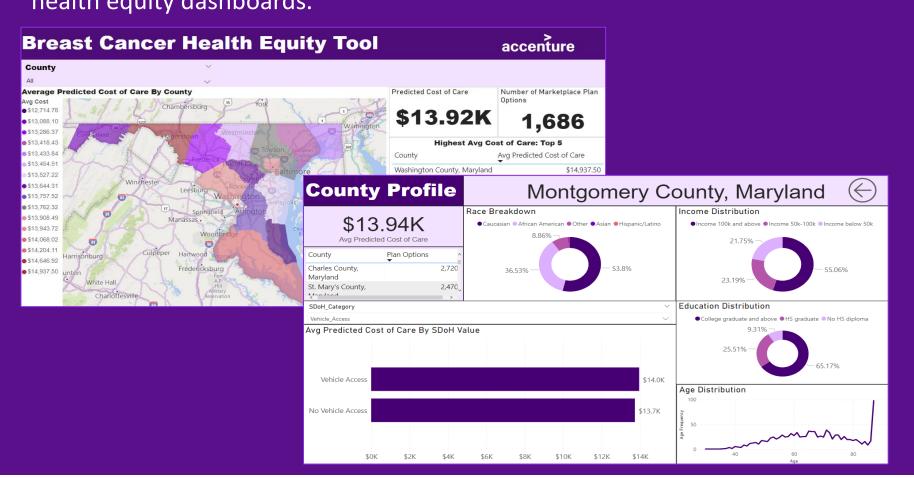
HHI Machine Learning Engine

Accenture's Human Health Insights (HHI) platform integrates multiple large realworld data sets into a machine learning workbench to leverage advanced analytics



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 unprecedent 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
Outcome: Average	Outcome: Total
premiums of	cost of care for
marketplace	breast cancer
enrollees	diagnosis
Predictors:	Predictors:
Number of plan	Marketplace
options**	insurance
	coverage**
Enrollee age	
< 18	Population age
18-25	18-25
26-34**	26-34
35-44	35-44
45-54**	45-54
55-64**	55-64
65+	65+
Enrollee metal level	Population below
coverage	poverty line*
Catastrophic	
Bronze	Median
Silver**	household
	income
Gold**	
Platinum	Population w/o
	health insurance
Enrollee sex	
(proportion male)	Education
	< High school*
Enrollee race	Some
	college**
White**	Associate's
	degree*
Hispanic *	Bachelor's
	degree
American Indian	Graduate
/ Alaskan Native	degree
Asian**	3.38.33
- 40-0-1	Race
Black/African	Black/African
~ . ~ viy / til 19011	American
Δmerican**	
American** Unknown**	
American** Unknown**	Asian Hispanic or

Positive predictor **Negative predictor**

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