Learnings from Linking Closed Claims Patient Cohorts with Consumer SDOH Data

Pamela Landsman-Blumberg[1] , Kathy Schulman[2], Jessica Duchen[1]

[1]Magnolia Market Access, [2]Schulman Consulting

Introduction

- Social determinants of health (SDOH) are the conditions in which people are born, live, work, and age.
- SDOH factors are estimated to drive up to 80% of health outcomes and drive health inequities.[1]

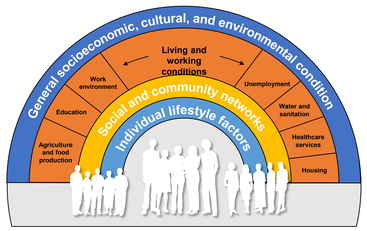


Figure 1. Social Determinants of Health.

Objectives

- Link individual and household-level SDOH characteristics to select closed claims (CC) disease cohorts
  - Human immunodeficiency virus (HIV)
  - Chronic kidney disease (CKD)
  - Heart Failure (HF)
  - Type 2 Diabetes (T2DM)
  - Metastatic prostate cancer (mPCA)
- Identify traditionally unavailable SDOH measures for inclusion in real-world data analysis

Methods

- Closed claims from commercially insured enrollees between 01/01/2016 and 12/31/2021 and SDOH factors for calendar year 2022 including demographics, socioeconomic, and household information, were used.[2]
- Both data sources are HIPAA compliant and linked by a unique anonymized identifier.
- Patients aged 18+ with evidence of HIV, chronic kidney disease (CKD), heart failure (HF), type 2 diabetes (DM2), and metastatic prostate cancer (mPC) were identified using ICD-10-CM diagnosis codes on closed claims before linking to SDOH data.
- Descriptive statistics of SDOH measures were evaluated for age, sex, race, and custom-defined composite measures for household status (marital status; household size; children in the home) and household economic status (economic stability indicator (ESI), household income).
  - ESI ranges from 0-30 with higher numbers indicating less economic stability.

Results

Table 1. Overlap between CC and SDOH by Disease Cohort.

	CC # Patients	Overlap w/SDOH # Patients	Overlap %
Dx Prior to 1/1/2022*			
CKD, Any	919,836	353,963	38.5%
Stage 1 or 2	372,609	134,694	36.1%
Stage 3 or 4	623,552	219,269	35.2%
Advanced	105,661	33,246	31.5%
Diabetes Type 2	4,429,921	1,588,646	35.9%
Heart Failure	786,272	252,692	32.1%
HIV	173,037	69,897	40.4%
Met Prostate CA	5,658	1,709	30.2%

- Highest overlap among patients living with HIV, lowest among mPCA patients.
- HIV patients were the youngest (44.4 (±12.6) years), while mPCA patients were the oldest (61.9 (±6.5) years).
- The majority of CKD, T2DM, and HF patients were female.
- HIV patients had the greatest racial diversity, while mPCA and HF patients had the least.

Figure 3. Race/Ethnicity by Disease Cohort. Racial Diversity was greatest among patients with HIV.

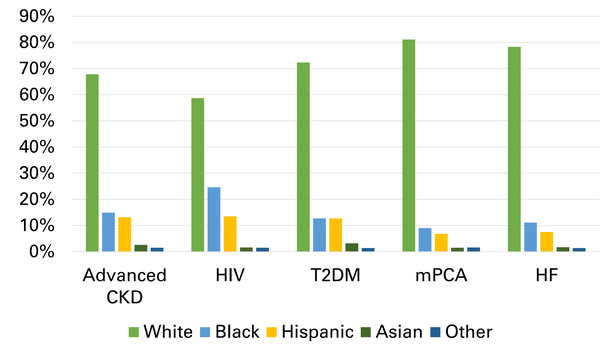
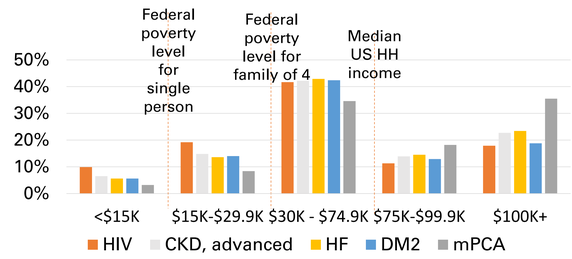


Table 2. Economic Stability Indicator by Disease Cohort.

ESI	HIV N= 68,738	Advanced CKD N= 32,750	HF N= 249,213	DM2 N= 1,566,671	mPCA N=1,681
High Prime (ESI scores 1-5)	9.5%	18.2%	20.8%	20.0%	34.6%
Near Prime (ESI scores 6-9)	9.9%	15.3%	16.6%	16.6%	21.0%
Sub Prime (ESI scores 10-30)	80.6%	66.5%	62.6%	63.4%	44.4%

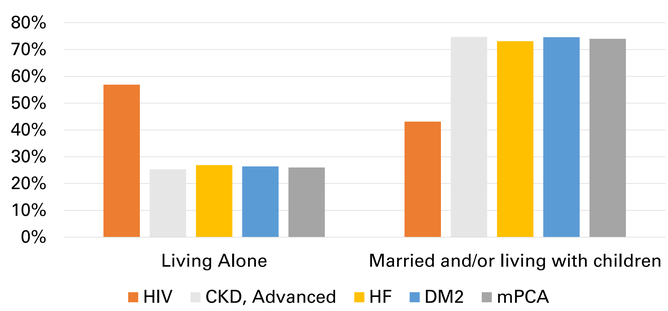
- Although all patients were commercially insured, 75% lived in households with annual incomes below the US median ($75,000).
- Of those with household incomes above the median, 58.1% HIV, 37.9% DM2, 36.3% HF, 33.9% CKD, and 25.0% mPCA patients had ESI values >10, indicating low economic stability relative to household income

Figure 3. The majority of patients have a household income below the median US income, across all disease cohorts.



- T2DM and CKD patients were most likely to have children in the home, and the largest mean household size.
- HIV patients are most likely to be single living in a household without children.
- HF and mPCA patients are most likely to be aged 65+ and living alone.

Figure 2. Household Constellation by Disease Cohort.



Conclusions

- Linking CC data with person-level SDOH data provides new insights into disease-specific cohorts beyond standard demographics.
- Including patient/household level rather than geographic level SDOH measures may also remove variability and bias when measuring health outcomes and costs.
- Composite measures and interactions can be derived to provide deeper insights into SDOH factors that may influence care patterns and outcomes.
- Can be included in propensity score models to remove biases or included as independent variables in analytic models to measure association with measure of interest.
- As with analysis of any real-world data source, critical to understand the underlying population represented to put findings into the correct context.

References

[1]Greer ML, Garza MY, Sample S, Bhattacharyya S. Social Determinants of Health Data Quality at Different Levels of Geographic Detail. *Stud Health Technol Inform*. 2023;302:217-221. doi:10.3233/SHTI230106

2. Sprague, C., & Simon, S. E. (2021). Ending HIV in the USA: integrating social determinants of health. *The Lancet*, *398*(10302), 742-743.

3. CHRONOS. 2017-2023. Forian, Inc., Newtown, PA. https://forian.com