Using Aggregate Data to Proxy Individual-Level Socioeconomic Characteristics in Research on Medication Adherence: 9-Digit ZIP Code vs. Census Block Group

Background

- Socioeconomic characteristics of patients, or Social Determinants of Health (SDH), are receiving increased emphasis in research on healthcare processes and outcomes, including medication adherence in Medicare Advantage (MA) plans.
- The use of aggregate proxy data, where SDH characteristics of residential areas are mapped to the individual and used for risk adjustment, is common in research on social factors.
- A variety of different methodologies, not only from each other, but also from different surveys, exist to calculate these proxies.
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Results

- For each response variable, the set of ZIP9 and CBG predictors were analyzed separately, and their parameter estimates, standard errors, and significance levels were compared.
- The results suggest that finer granularity groupings (9-digit ZIP code) of SDH can provide a more precise measurement of the sociodemographic differences.
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Objective

To compare proxies for individual-level SDH drawn from two different neighborhood sizes, CBG vs. ZIP, in modeling health outcomes, specifically 3 standard MA measures.

Methods

Study Population and Data Sources

- A cohort of Medicare Advantage beneficiaries, continuously enrolled in 2015, extracted from a national claims database.
- Based on their residence, beneficiaries were matched to household-level variables from:
  - The American Community Survey, aggregated at the CBG level (approximately 220,000 areas)
  - A commercial market research database drawn from multiple, comprehensive individual and household databases (e.g., public records, buying activity, financial behavior, and aggregated at the 9-digit ZIP code level as in 5 categories: lower-income, middle-income, higher-income, and highest income)

Variables

- Demographic (zip code), socioeconomic (CBG), utilization (CBG), and outcomes, specific to Medicare Advantage plans.

Statistical Analysis

- A series of linear mixed model regressions were used to model the relationships between the response variables and the predictor variables separately.
- A random effect for Medicare Advantage organization was included to account for the non-independence of data from members of the same health plan.
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Key Findings

- The results suggest that finer granularity groupings (9-digit ZIP code) of SDH can provide a more precise measurement of the sociodemographic differences.
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Discussion

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Conclusions

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References