

Using Social Determinants of Health (SDOH) ICD-10 Z-codes to Identify Non-Medical Factors among Asthma Hospitalizations in the United States, 2016–2022

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Background/Objective

- Currently, asthma affects **25 million** Americans and every year approximately **100,000 asthma-related hospitalizations** occur¹
- Limited national-level data describe the social determinants of health (SDOH) that may relate to these hospitalizations²
- SDOH are nonmedical factors such as safe housing, education, and job opportunities that can affect health outcomes where people are born, live, learn, work, play, worship, and age
- This work examines the prevalence and predictors of SDOH-related International Classification of Diseases, Tenth Revision (ICD-10) Z-code documentation among U.S. asthma hospitalizations

- **From 2016–2022, only 1.57% (n=3,149) of asthma hospitalizations in the U.S. had documented SDOH Z-codes**
- **Housing and economic circumstances are the most documented SDOH Z-codes (nearly 50%) in the study population (Z59; n=1,072)**

Methods

- Dataset: 2016–2022 National Inpatient Sample
- Study sample: 200,452 weighted U.S. hospitalizations with a primary asthma diagnosis (ICD-10 code J45)
- Outcome: Any SDOH Z-code (ICD-10 codes Z55–Z65)
- Analysis: Descriptive statistics and multivariable logistic regression to calculate adjusted odds ratios (ORs) and 95% confidence intervals (95% CIs) for associations between patient- and hospital-level characteristics and the documentation of SDOH Z-codes in asthma hospitalizations

Results

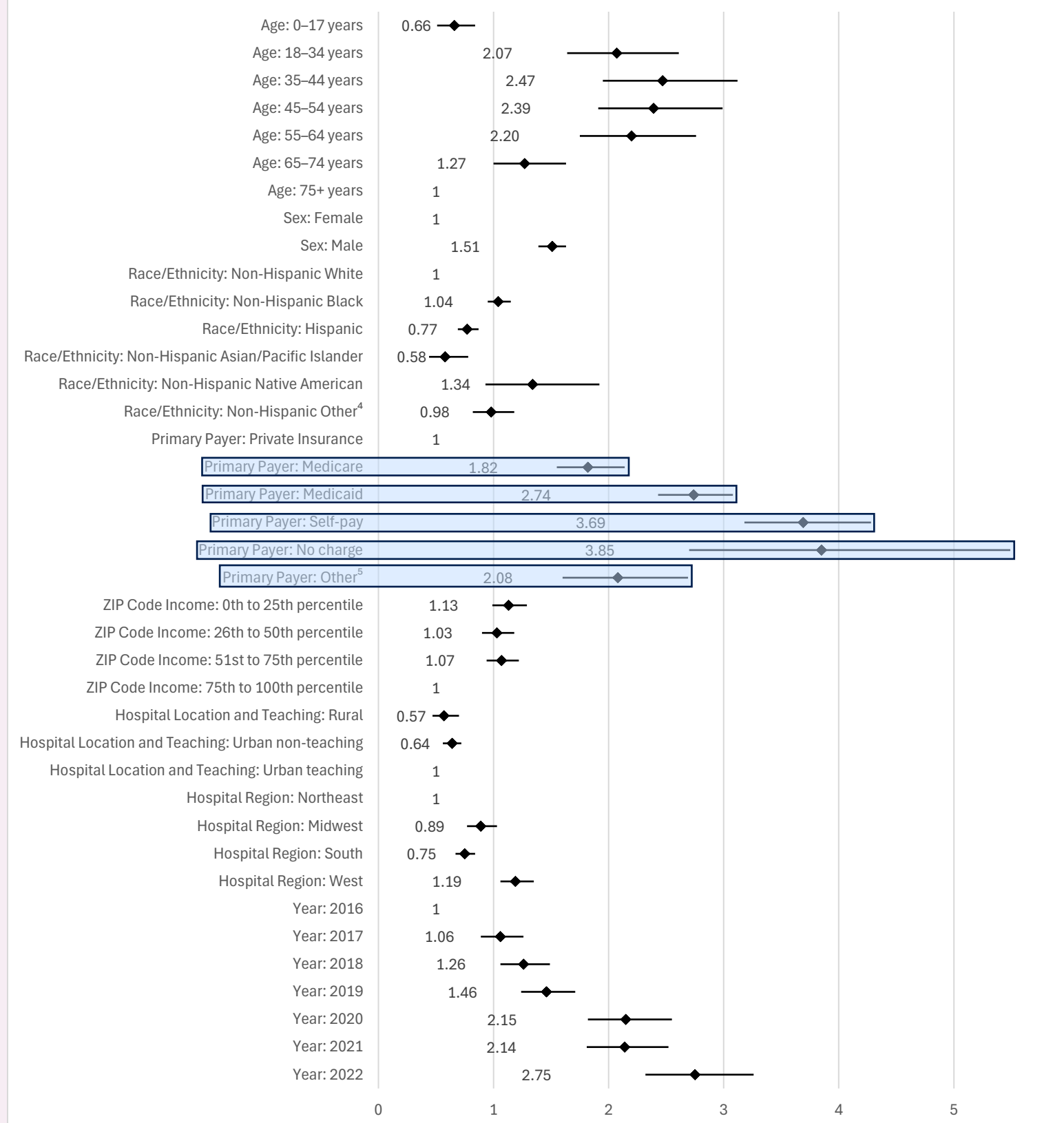
- **SDOH documentation is rare:** In unweighted analyses, 3,149 (1.57%) asthma hospitalizations had ≥ 1 SDOH Z-code
- Out of 3,413 documented SDOH Z-codes, almost half (49.87%) were related to housing and economic circumstances (Table 1)
- Adjusted odds of SDOH Z-code documentation were higher for asthma hospitalizations involving patients with Medicaid (aOR: 2.74; 95% CI: 2.43–3.08) or Medicare (aOR: 1.82; 95% CI: 1.55–2.14) compared to private insurance (Figure 1)
- Asthma hospitalizations at rural hospitals had lower adjusted odds of SDOH Z-code documentation (aOR: 0.57; 95% CI: 0.47–0.70) compared to urban teaching hospitals (Figure 1)

Table 1. Unweighted Frequencies of Social Determinants of Health-Related Z-codes Among Asthma Hospitalizations with These Z-codes, by Z-code Category National Inpatient Sample, 2016–2022

Social Determinants of Health Z-code and Description	Z-code Category Counts (%) (N=3,413) ³
Z55 - Problems related to education and literacy	22 (0.64%)
Z56 - Problems related to employment and unemployment	359 (10.52%)
Z57 - Occupational exposure to risk factors	206 (6.04%)
Z59 - Problems related to housing and economic circumstances	1,702 (49.87%)
Z60 - Problems related to social environment	315 (9.23%)
Z62 - Problems related to upbringing	415 (12.16%)
Z63 - Other problems related to primary support group, including family circumstances	302 (8.85%)
Z65 - Problems related to other psychosocial circumstances	92 (2.70%)

SDOH Z-code Z59, related to housing and economic circumstances such as **homelessness and low income**, was the most documented SDOH Z-code for asthma hospitalizations

Figure 1. Adjusted Odds Ratios of Documented SDOH Z-codes in Asthma Hospitalizations— National Inpatient Sample, 2016–2022



Patients whose primary payers was **not private insurance** had higher adjusted odds of SDOH Z-code documentation than patients whose primary payer was **private insurance**

Conclusions

- Despite their high relevance to asthma hospitalizations, **SDOH Z-codes are underused**, indicating a missed opportunity for intervention
- SDOH Z-code documentation patterns varied by age, insurance type, and hospital setting
- Housing and economic circumstances represent high-impact, actionable intervention targets
- Increased use of SDOH Z-codes can help providers/public health officials more easily identify needs and provide support to patients with recent asthma-related hospitalizations
- Without SDOH data, cost models may underestimate the burden and potential value of targeted interventions

Limitations

- We cannot infer causality between asthma hospitalizations and SDOH Z-codes from the cross-sectional design
- The National Inpatient Sample does not have data from all U.S. hospitals and may underrepresent specialty hospitals such as psychiatric hospitals

Footnotes

- ¹Centers for Disease Control and Prevention. Most Recent National Asthma Data
- ²Truong HP et al. Utilization of Social Determinants of Health ICD-10 Z-Codes Among Hospitalized Patients in the United States, 2016–2017.
- ³The total number of asthma hospitalizations with SDOH Z-codes is 3,149. There were 3,413 total SDOH Z-codes documented since some hospitalizations have multiple SDOH Z-codes documented
- ⁴Non-Hispanic Other is defined as anyone who reports a race/ethnicity that does not fit in the preceding categories
- ⁵Other primary payers include Worker's Compensation, CHAMPUS, CHAMPVA, Title V, and other government programs

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