

# Comparison of social determinants of health in Medicaid vs commercial health plans

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## Abstract

Incorporating the measurement of social determinants of health (SDOH) into health care practice and US health policy reforms is a promising approach to improving population health nationwide. One way health care practitioners have started to incorporate consideration of SDOH in clinical care is by using International Classification of Diseases, Tenth Revision (ICD-10), Z-codes, a set of diagnosis codes spanning a range of social and economic circumstances. Our study summarizes Z-codes used by code type, setting, and patient demographics between Medicaid and commercial insurance to help identify strategies to optimize their use within each program and understand their differences. Overall, Z-code use was highly limited nationwide in Medicaid and commercial insurance between 2020 and 2021. Still, we found notable differences in the use of Z-codes between the programs; Medicaid beneficiaries were more likely to receive Z-codes related to financial and economic issues, while commercially insured beneficiaries were more likely to receive Z-codes indicating problems with social and familial relationships. Policy efforts focused on increasing the rate and ease of patient SDOH screening will potentially expand SDOH measurement and facilitate actions to address patient social needs.

**Key words:** social determinants of health; Medicaid; commercial insurance; Z-codes.

## Introduction

Social determinants of health (SDOH) are a person's social, environmental, and economic conditions that are highly correlated with health outcomes.<sup>1,2</sup> Given this relationship, physicians, researchers, and policy makers have become increasingly interested in developing SDOH-oriented policies and practices.<sup>1-3</sup> This interest has sparked a call for expanded efforts to measure SDOH at the point of care to ensure that SDOH information is incorporated into patient-centered treatment.<sup>4</sup> In response, in 2015, the International Classification of Diseases, Tenth Revision (ICD-10), incorporated a set of diagnosis codes (Z-codes) that can be used to record standardized SDOH information during clinical encounters.

ICD-10 Z-codes are currently distributed across 10 discrete categories: Z55 (education and literacy), Z56 (employment), Z57 (occupational exposure), Z59 (housing and economic circumstances), Z60 (social environment), Z62 (upbringing), Z63 (primary support group), Z64 (psychosocial circumstances), Z58 (physical environment), and Z65 (other psychosocial circumstances). Within each category, there are dozens of more specific codes about the unique lived experiences of patients. However, comprehensive evidence on the uptake and prevalence of Z-codes in clinical practice is understudied, particularly for Medicaid and commercially

insured patients.<sup>5</sup> Prior studies have consistently found that Z-codes are used for between 1% and 2% of patients and admissions.<sup>5-12</sup> Z-codes are most commonly used by large health care systems and hospitals<sup>8</sup> and have been associated with younger patients, more racial diversity, and lower income.<sup>8-10,12</sup> Z-codes characterize an array of differing SDOH, which are likely to be associated with varying patient demographics. To our knowledge, the only study to investigate patient demographics associated with specific Z-code categories was a 2019 report by the Centers for Medicare and Medicaid Services (CMS).<sup>5</sup> The report found that the distribution of patient demographics varied widely depending on the specific Z-code category in question, highlighting the importance of stratifying demographic analysis by specific Z-code category; however, this study only analyzed 2019 Medicare Fee-For-Service (FFS) beneficiaries.<sup>10</sup>

In our study, we characterized the prevalence of specific Z-code categories in a nationwide administrative claims database between 2020 and 2021. We compared characteristics of Z-code use between Medicaid and commercial insurance overall and by patient demographics (age and biological sex) while identifying the most common specific Z-codes among each insurance type. To our knowledge, this is the first nationally representative study on Z-code use in Medicaid and commercial insurance using recent data. Our descriptive landscape study

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aims to assist physicians, researchers, and policy makers in understanding the current utilization trends of Z-codes that can help them develop SDOH-oriented policies and practices. Data on SDOH are being increasingly used to create programs to address the needs of specific populations. Regulatory and private-sector initiatives to ensure that SDOH data are comprehensive across all different types of patients and insurance coverage will be necessary for these programs to be effective.<sup>13,14</sup>

## Data and methods

### Data

We evaluated Z-code use using an administrative claims dataset processed by Kythera Labs, a large health care clearinghouse.<sup>15</sup> The included claims data accounted for billions of inpatient, outpatient, prescription drug, and professional claims nationwide across Medicaid, Medicare, and commercial payors. Information about all patient diagnoses during each inpatient or outpatient visit was captured and analyzed, as well as the basic demographics of each patient for each claim (eg, age, biological sex, insurer type).

### Study population

From 2020 to 2021, there were 409.7 million Medicaid claims (48.9 million patients) and 2.1 billion commercial claims (203.9 million patients) in our dataset. Patients from all states and the District of Columbia were represented in Medicaid and commercial claims, making this a nationally representative population for each insurance type. Our analyses focused on patients receiving 1 of 9 unique Z-codes, as Z58 (problems related to physical environment), the tenth Z-code, was not approved for use until October 1, 2021 (ie, the end of our study period).<sup>16</sup>

### Statistical analysis

We compared Z-code use between Medicaid and commercial insurers overall (ie, the total number of claims and proportion of claims with 1 or more Z-codes present), by provider type (ie, professional vs facility), service setting (ie, inpatient, outpatient, or other), and clinical/specialty setting (eg, pediatrics, community behavioral health center, etc). We also highlighted the most used Z-codes among commercially insured patients and patients insured by Medicaid. We then reviewed the age and biological sex distribution of Z-codes by Z-code category among Medicaid and commercially insured patients. All analyses were conducted using SAS version 9.4 (SAS Institute).

## Results

Among the 409.7 million Medicaid claims and 2.1 billion commercial claims, 3.5 million claims (0.8%) and 9.4 million claims (0.5%), respectively, had 1 or more Z-codes included as any diagnosis. A total of 0.76 million Medicaid patients (1.6%) and 2.05 million commercially insured patients (1.0%) received 1 or more Z-code diagnoses.

Table 1 summarizes Z-code use overall, by provider type, service setting, and clinical setting in Medicaid and commercial insurance. It also lists the top 5 most-used Z-codes in Medicaid and commercial insurance. Z-code use was more than 50% more prevalent among Medicaid beneficiaries than commercially insured beneficiaries (0.8% of all Medicaid claims vs 0.5% for all commercial claims). For both Medicaid and commercial programs, approximately 85% of Z-code claims were

included in professional claims (15% for facility claims). Z-codes were predominantly identified in inpatient settings, with slightly higher rates for commercially insured patients than Medicaid patients (ie, 53.7% commercial insured vs 45.8% Medicaid insured). However, Z-code use was more common in the outpatient setting among Medicaid patients (ie, 20.0%) than the commercially insured patients (ie, 14.8%). In Medicaid, Z-code diagnoses primarily originated from community/behavioral health (7.8%), pediatrics (7.1%), mental health clinics (5.6%), psychiatry (5.4%), and emergency medicine settings (5.0%). In commercial insurance, Z-codes were most commonly used for patients receiving care from clinical social work (7.5%), psychiatry (7.0%), mental health counseling (6.7%), professional counseling (6.0%), and pediatrics (5.3%). In addition, commercially insured patients were most likely to receive codes designating issues with spousal/partner relationships (11.3%), parent–child conflict (7.0%), personal history of sexual abuse (5.3%), other primary support issues (4.6%), and low income (4.5%). For Medicaid patients, the most common Z-codes indicated low income (7.4%), parent–child conflict (6.2%), unemployment (5.6%), other primary support issues (5.4%), and homelessness (5.0%).

Figure 1A shows the distribution of Z-code usage by category for Medicaid and commercial insurance. Three Z-code categories—housing and economic issues, primary support issues, and upbringing—accounted for approximately two-thirds of all Z-code claims among both insurance types. Housing and financial problems were more prevalent among Medicaid patient claims than commercial patient claims (28.2% vs 18.5% of SDOH claims), while limited primary support was less frequently used for Medicaid patients (18.0% vs 26.8% of SDOH claims). Overall, social environment, employment, and other psychosocial circumstances were the most common categories and had similar usage between patients with either insurance type. Occupational exposure was the least common category among Medicaid and commercial insurance beneficiaries.

As presented in Figure 1B, differences in patient age by Z-code category were minimal between Medicaid and commercial claims, but Medicaid tended to skew younger than commercial insurance. Patients receiving Z-codes were younger than nonrecipients for Medicaid and commercial insurance.

Age and female presentation varied across Z-code categories, as evidenced by Figure 1C, but there were minimal differences by insurance type within Z-code category. Education and literacy, employment, housing, economic, other psychosocial, and occupational exposure issues tended to skew more toward males than the average non-Z-code claim. In contrast, upbringing, primary support group, and psychosocial problems were more likely to be used for female patients. Interestingly, psychosocial issues were almost entirely delivered to female patients among both insurance groups. This is likely related to Z64.0, problems related to unwanted pregnancy, which represented the most frequently used code in that category.

## Discussion

Our study shows that diagnosis codes developed to track SDOH more carefully among patients were widely underutilized by health care professionals serving Medicaid and commercial insurance beneficiaries between 2020 and 2021. There were, however, some notable differences in the receipt of Z-codes between Medicaid and commercially insured

**Table 1.** Characteristics of Z-code usage in Medicaid and commercial insurance by provider type, service setting, and clinical setting and the most common individual Z-codes utilized.

	Medicaid	Commercial
Total claims	409 681 117	2 078 346 830
Z-code claims	3 470 118 (0.8%)	9 430 744 (0.5%)
Description of Z-code claims		
Provider type (%)		
Professional	85.3%	86.6%
Facility	14.7%	13.4%
Service setting (%)		
Inpatient	45.8%	53.7%
Outpatient	20.0%	14.8%
Other	34.2%	31.5%
Major Z-codes (%)		
Z596: Low-income	7.4%	Z630: Relationship with spouse or partner 11.3%
Z62820: Parent–child conflict	6.2%	Z62820: Parent–child conflict 7.0%
Z560: Unemployment, unspecified	5.6%	Z62810: Personal history of physical and sexual abuse in childhood 5.3%
Z638: Other specified problems related to the primary support group	5.4%	Z638: Other specified problems related to primary support group 4.6%
Z590: Homelessness	5.0%	Z596: Low-income 4.5%
Clinical setting (%)		
Community/behavioral health	7.8%	Clinical social worker 7.5%
Pediatrics	7.1%	Psychiatry and neurology psychiatry 7.0%
Mental health clinic/center	5.6%	Mental health counselor 6.7%
Psychiatry and neurology psychiatry	5.4%	Professional counselor 6.0%
Emergency medicine	5.0%	Pediatrics 5.3%

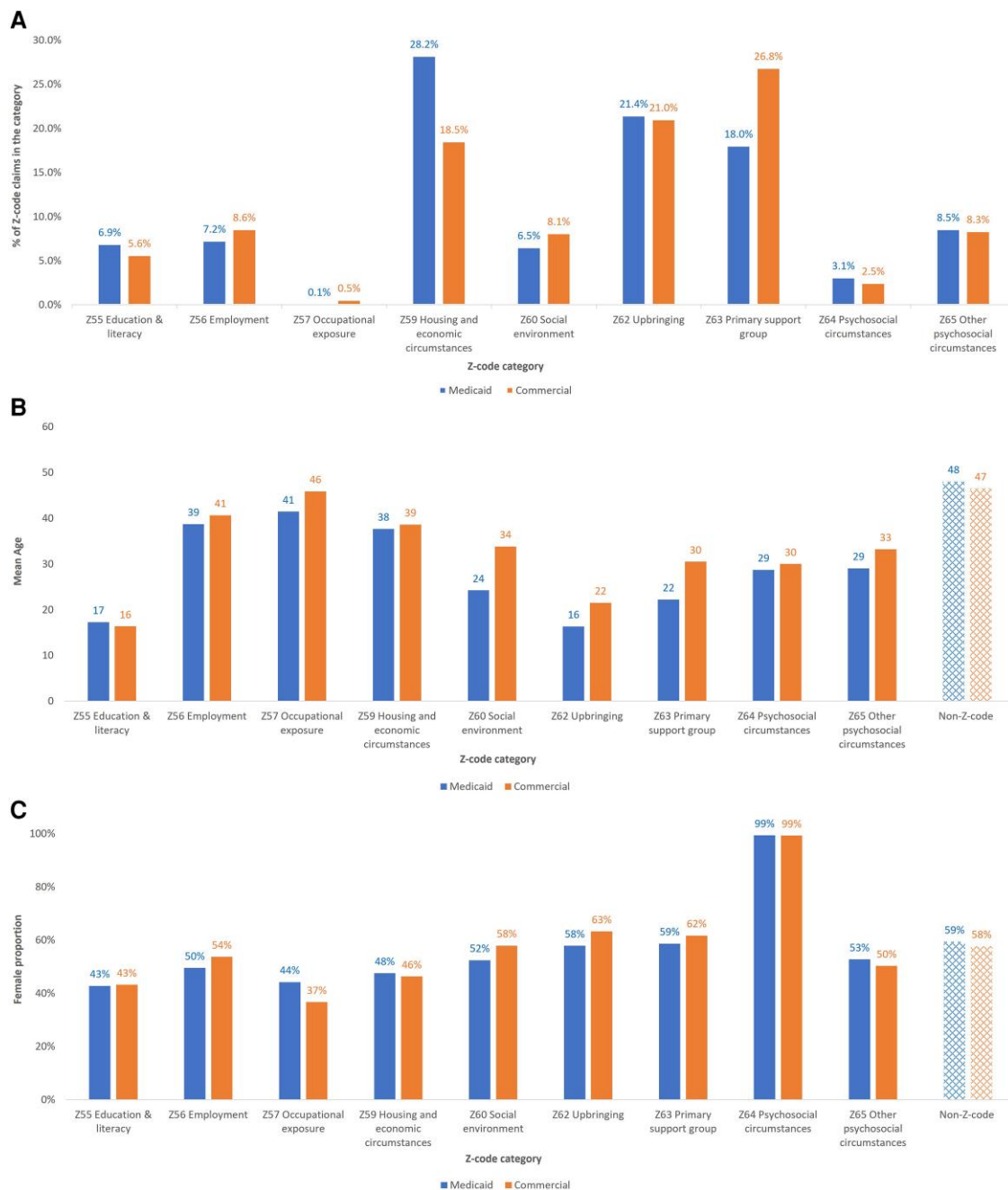
Source: Authors' analysis of Kythera Labs All-Payer-Claims Data 2020–2021. The table shows the proportion of Z-code claims overall and by provider type, service setting, individual Z-codes, and clinical setting. The denominator for the overall proportion is the total number of claims with or without Z-codes. The denominators for the other categories are the total number of Z-code claims. All US states and the District of Columbia were represented. We identified a total of 147 Z-codes in the 9 categories: 11 for Z55, 16 for Z56, 12 for Z57, 26 for Z59, 11 for Z60, 30 for Z62, 25 for Z63, 4 for Z64, and 12 for Z65.

beneficiaries. Patients receiving Z-codes in Medicaid were more likely to receive Z-codes indicating economic hardship, while patients with commercial insurance were more likely to receive Z-codes representing issues with social relationships. Medicaid patients receiving Z-code diagnoses also tended to be younger than commercially insured patients receiving Z-code diagnoses. Mental health and psychiatric settings were the most common settings where Z-code use was identified in both programs. However, Medicaid patients were more likely to receive Z-code diagnoses in inpatient settings, while commercially insured patients were more likely to receive Z-code diagnoses in the outpatient setting. The modest uptake of Z-codes by health care professionals during the 6–7 years since their introduction hinders efforts to implement payment reforms and other SDOH-related policy initiatives. State Medicaid programs and commercial insurers should work to educate providers on the importance of using Z-codes to measure patient-level SDOH and incentivize active and accurate usage. Health care systems should also work to ensure that their electronic health records (EHRs) integrate Z-codes to streamline the documentation process and facilitate greater use. Greater standardization and interoperability of SDOH codes and definitions may also help to increase their usage across health systems and insurance programs, a focal point of the Gravity project.<sup>17</sup> Clinical decision-support tools that prompt providers to consider SDOH during diagnosis and treatment planning might also be integrated into EHR systems. Evidence suggests that these tools can increase SDOH screening and social-risk-informed care delivery.<sup>18–20</sup> Finally, new quality-improvement programs that link reimbursement to capturing SDOH can influence greater Z-code adoption.

It is also important to consider the unique challenges and concerns during the screening process, which may, in part,

explain a lack of utilization of certain Z-codes identified in our study. For example, there may be inherent biases among providers that impact which populations are screened and the kinds of codes they receive. Provider training or greater clarity in the definitions to ensure equitable delivery of screening and interventions may be needed to reduce inherent and implicit biases.<sup>20</sup> Patients may also hesitate to disclose SDOH-related information, and providers may feel they lack the time or resources to screen and respond to identified social needs. Broader adoption of screening tools that are sensitive to patient privacy concerns and can reduce clinical burden, and establishing referral networks between clinics, health systems, and social service agencies can help alleviate these issues.<sup>20</sup>

Overall, our results support current and future policy efforts in implementing programs that incentivize clinicians to measure and address SDOH. Some programs have recently called for broader SDOH data collection or mandated SDOH screening, including the Hospital Inpatient Quality Reporting Program,<sup>21</sup> the Accountable Health Communities model,<sup>22</sup> and the new CMS AHEAD (States Advancing All-Payer Health Equity Approaches and Development) model.<sup>23</sup> The National Committee for Quality Assurance has also proposed a new Health Effectiveness Data and Information Set measure called the Social Need Screening and Information measure.<sup>24,25</sup> This measure aims to expand the ability of health care systems and regulatory bodies to track ongoing efforts to screen for SDOH and intervene, potentially leading to expanded uptake of SDOH screening and response. At the state level, section 1115 waivers provide states with an opportunity to implement innovative programs to address SDOH, especially for Medicaid enrollees.<sup>26</sup> Finally, considering that health care only affects 10% of the variation in mortality,<sup>27,28</sup> one underexplored option for commercial insurers would be to expand the scope of



**Figure 1.** Z-codes comparison between Medicaid and commercial plans. Source: Authors' analysis of Kythera Labs All-Payer-Claims Data 2020-2021. Panel A shows the percentage of Z-code use by category, where the numerator is the number of claims for that code category and the denominator is the total number of Z-code claims across all categories. Panel B shows the average age of patients receiving a Z-code for each Z-code category. Panel C shows the proportion of female patients receiving a Z-code by category. We identified a total of 147 Z-codes in the 9 categories: 11 for Z55, 16 for Z56, 12 for Z57, 26 for Z59, 11 for Z60, 30 for Z62, 25 for Z63, 4 for Z64, and 12 for Z65.

health savings accounts (HSAs) to cover all SDOH and allow HSAs to receive government subsidies and tax-deductible cash transfers from organizations and individuals. When individuals gain control of their HSAs, they will have the financial flexibility to address SDOH based on their needs.

### Limitations

This study has several limitations. Due to the lack of detailed information on patient and provider characteristics, this study can only explore some desired patient demographics and provider coding behavior, which are important topics for future

research. The generalizability of the results is affected by the nonexhaustive and nonrandom nature of the database. Z-code use may have also changed since the end of 2021, given greater interest in the relationship between SDOH and health in recent years.

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## Supplementary material

Supplementary material is available at *Health Affairs Scholar* online.

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## Conflicts of interest

Please see ICMJE form(s) for author conflicts of interest. These have been provided as supplementary materials.

## Notes

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