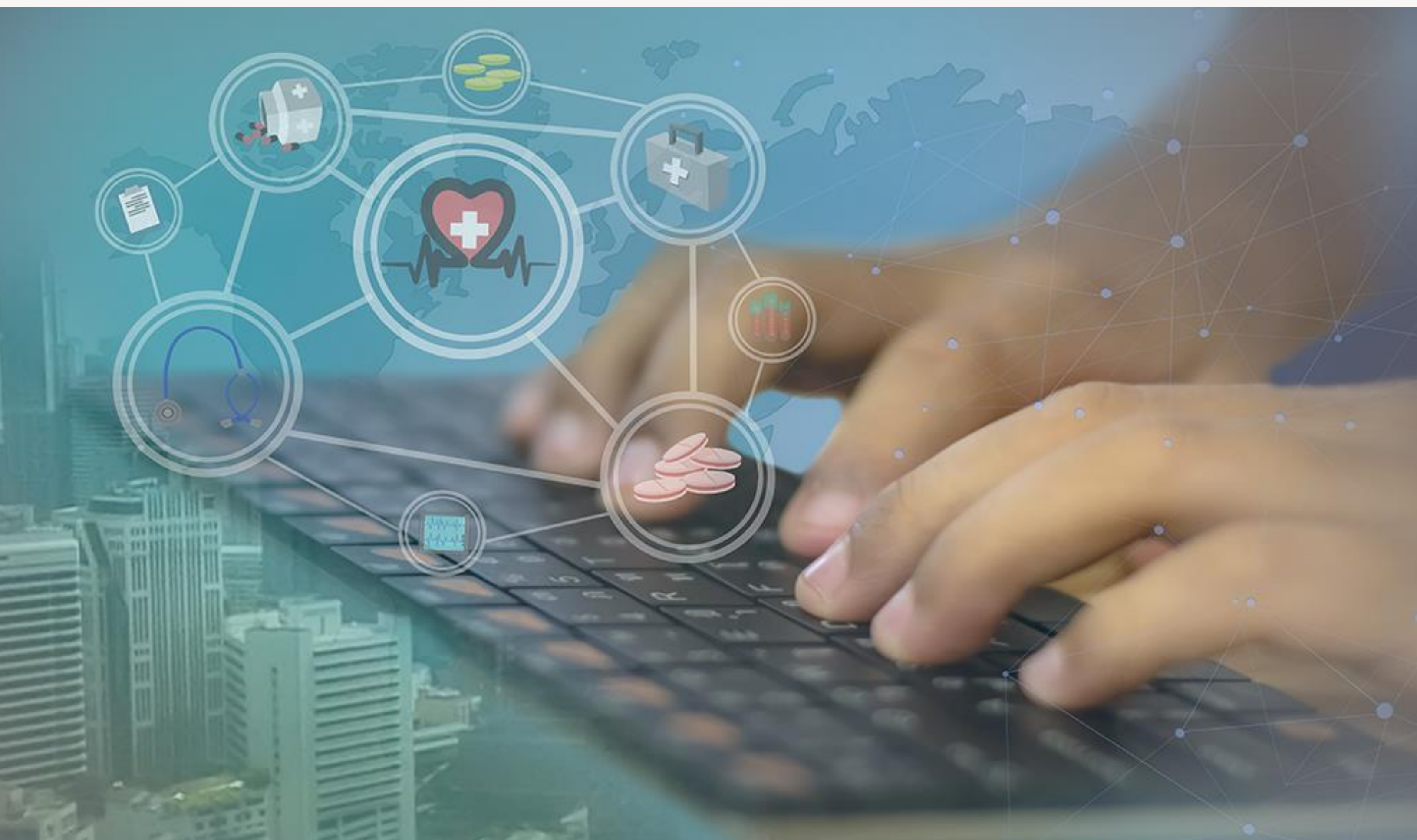
NORC at the University of Chicago

Use of ICD-10-CM Z Codes in 2018 Medicaid Claims and Encounter Data



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NORC at the University of Chicago

Executive Summary

Use of ICD-10-CM Z Codes in 2018 Medicaid Claims and Encounter Data

MARCH 2022

Documentation of social need in Medicaid data using ICD-10-CM Z codes is low; in 2018, only **1.42 percent of Medicaid enrollees had at least one social need documented on their claims or encounter data.** Accurate and high-quality data and documentation is critical to understanding Medicaid enrollees' social needs to better inform the development and implementation of policies and interventions.

INTRODUCTION

NORC assessed the extent to which social need is documented in 2018 Medicaid claims and encounter data.

Medicaid enrollees face many challenges due to social risk factors that lead to poorer health care outcomes and higher health care costs. Providers are increasingly encouraged to document patient social needs in health records, including using ICD-10-CM Z codes. However, limited information is available on the extent to which Z codes are used in Medicaid claims and encounter data to document enrollee social need.

METHODOLOGY

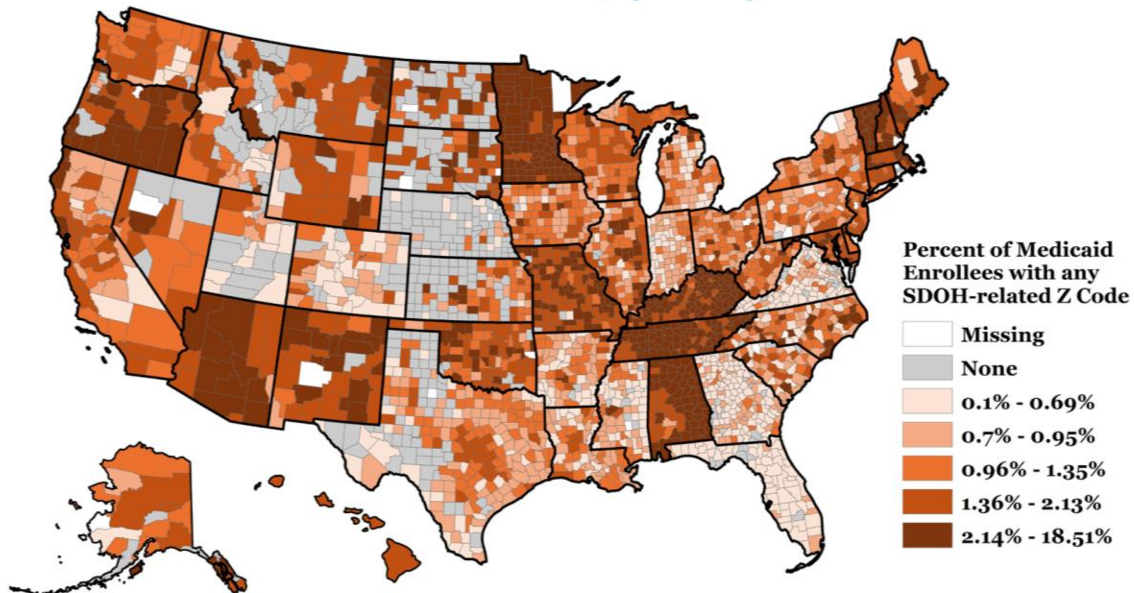
DATASET	CASES	Z-CODES
2018 Transformed Medicaid Statistical Information System (T-MSIS) Claims and encounter data	Individuals enrolled in Medicaid at any time in 2018 (de-duplicated cases)	At least one claim or encounter record contained at least one of 9 ICD-10-CM Z codes (Z55-Z65)

Limitations: Data quality and completeness vary by variable and submitting state; data quality and completeness concerns around location data and race and ethnicity data.

DOCUMENTATION OF SOCIAL NEED IN 2018 MEDICAID DATA

Documentation of social need using Z codes is low; **only 1.42 percent of Medicaid enrollees** have at least one social need documented in their 2018 Medicaid claims or encounter data.

Documentation of Social Needs Z Codes in 2018 Medicaid Claims and Encounter Data, by County

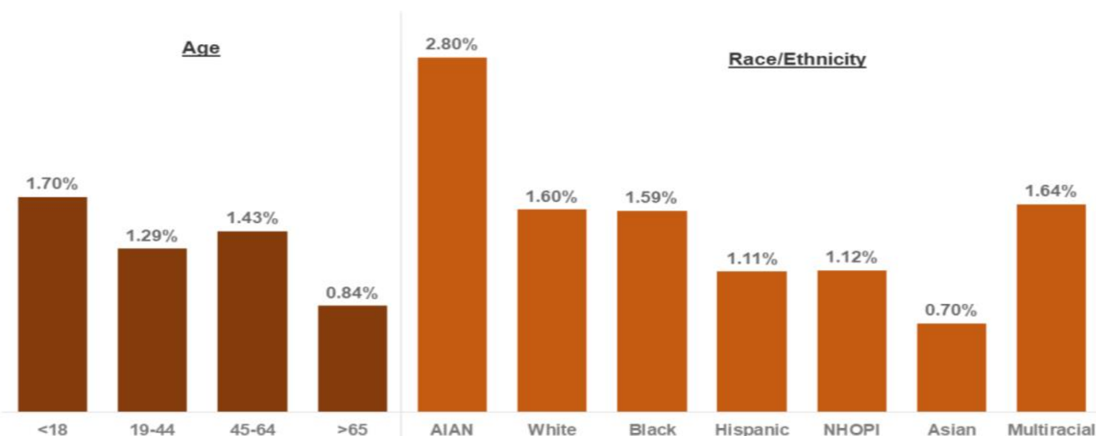


Notes: National county-level map of percentage of Medicaid enrollees with at least one Z55-Z65 code. Distribution of counties is broken into quintiles with the top 20% of counties representing 2.14% to 18.51% of Medicaid enrollees with at least one recorded Z code. Counties without any recorded Z code usage are displayed in grey; counties with missing data are in white. About 5 percent of Medicaid enrollees are missing county-level address information, meaning the data displayed in the map is missing roughly 4.2 million enrollees.

Source: NORC analysis of Centers for Medicare & Medicaid Services (CMS) Medicaid 2018 T-MSIS Analytic Files.

Medicaid enrollees who are younger than 18 and who **identify as American Indian, or Alaska Native** had higher shares of social needs documented using Z codes compared to other age and racial/ethnic groups.

Share of Medicaid Enrollees with Documented Social Needs Z Codes in 2018, by Age and Race/Ethnicity



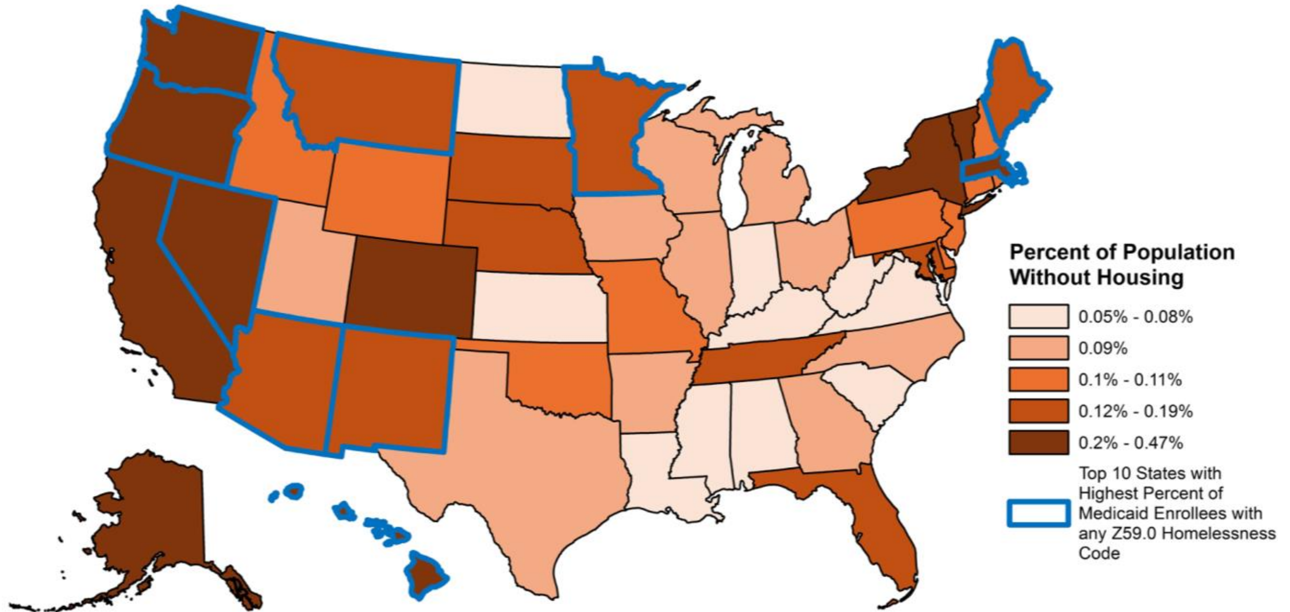
Notes: Medicaid enrollees with any Z55-Z65 code. Persons of Hispanic origin may be of any race; other groups are non-Hispanic. AIAN: American Indian or Alaska Native. NHOPI: Native Hawaiian or Other Pacific Islander. The Medicaid Data Quality Atlas suggests reporting of race/ethnicity data within Medicaid claims and encounter data in 2018 are limited, with at least 22 states receiving reporting classifications either of high concern or of unusable race/ethnicity data. Around 19.8 million Medicaid enrollees (21.19%) missing race/ethnicity data in T-MSIS are not included in the analysis.

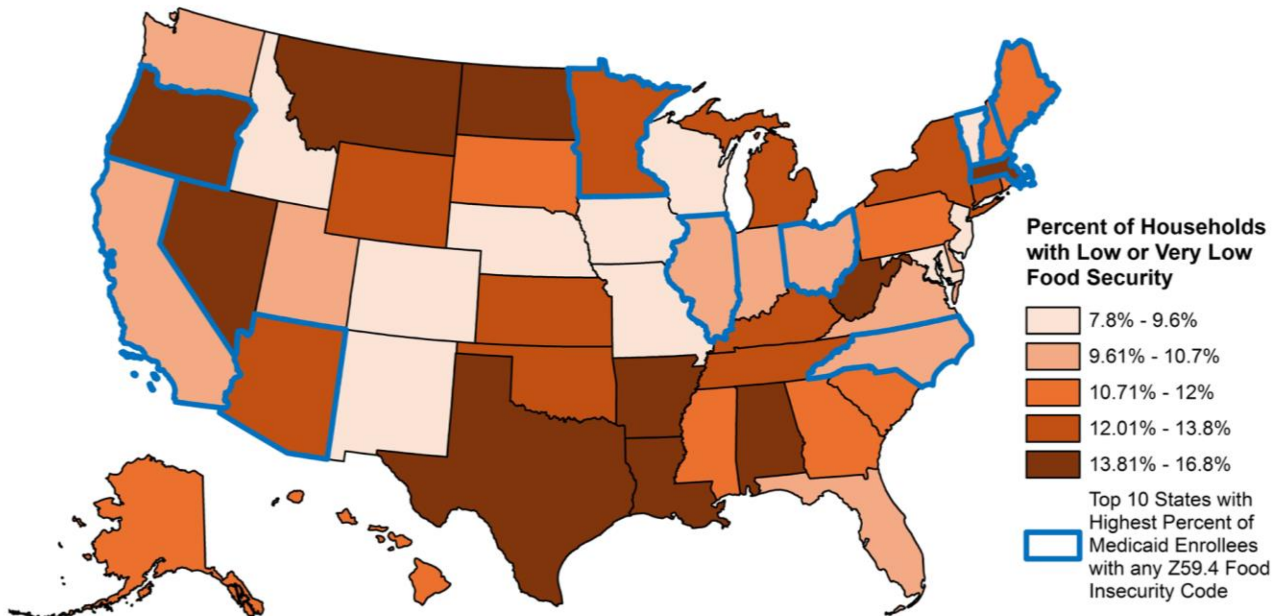
Source: NORC analysis of Centers for Medicare & Medicaid Services (CMS) Medicaid 2018 T-MSIS Analytic Files.

COMPARISON WITH EXPECTED NEED

Documentation of social need in 2018 Medicaid claims and encounter data **does not completely align with national benchmarks for social needs,** including measures of food insecurity and homelessness.

State-Level Documentation of Z Codes in 2018 Medicaid Data Compared to Benchmarks of Homelessness and Food Insecurity





Notes: Blue highlighted states represent the top quintile, 10 states, with the highest percent of Medicaid enrollees with any Z59.4 code (food insecurity) and Z59.0 code (homelessness). Food insecurity and homelessness are broken into quintiles, with brown representing the top 20 percent of states with the highest levels of food security and homelessness. Available data sources do not allow us to estimate food insecurity and homelessness among only Medicaid enrollees. Therefore, we are comparing to available state-level data on the total population.

Source: NORC analysis of Centers for Medicare & Medicaid Services (CMS) Transformational Medicaid Statistical Information System (T-MSIS) data from 2018; USDA's Household Food Security in the United States in 2018 Report; and data from the HUD Exchange 2018 Annual Homelessness Assessment Report.

Introduction

Addressing health-related social needs is a critical component of advancing health equity and reducing health disparities. Non-medical factors like economic stability, food and housing security, education access and quality, health care access and quality, neighborhood and built environment, and social and community context play a major role in health outcomes.[1] Nearly 70 percent of an individual's health is driven by social determinants of health (SDOH)—the socioeconomic, cultural, and political factors that influence the health of individuals, families, and communities.[2] As highlighted by the COVID-19 public health emergency, populations in areas with high poverty, with inadequate housing supports and homelessness, and lacking access to healthy foods, along with other socioeconomic and cultural factors, experienced disproportionate impacts of the pandemic on health outcomes.[3]

Definitions

Social Determinants of Health (SDOH): the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life, including economic policies and systems, development agendas, social norms, social policies, and political systems.

Social Risk Factors: adverse social conditions associated with poor health (e.g., food insecurity, housing instability, social isolation).

Social Needs: immediate nonmedical yet health-related needs of individuals, as identified and prioritized by the individuals.

Source: https://www.healthaffairs.org/do/10.1377/hblog20191025.776011/full/

Many Medicaid enrollees experience social risk factors, i.e., adverse social conditions like food insecurity and housing instability, which are associated with poorer health.[2] Employing interventions to address individuals' social needs results in better health outcomes and increased savings in Medicaid.[2,3] Then Secretary of the Department of Health and Human Services (HHS) Alex Azar highlighted in November 2018 the agency's commitment to value-based care approaches, initiatives, and opportunities to impact SDOH through additional program flexibilities in Medicare and Medicaid.[4] In addition, the Biden Administration's American Rescue Plan Act of 2021 includes billions in funding for SDOH, including food insecurity, housing assistance, air pollution, and toxic threats.[5]

Z codes are a subset of International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) diagnosis codes that are based on factors that influence health status and an individual's contact with health services. These codes help identify "persons with potential health hazards related to socioeconomic and psychosocial circumstances."[6] The Z code may be based on any available patient documentation as well as patient self-reporting and can be used in any health setting by any provider.[7] As of February 2018, the American Hospital Association (AHA) Coding Clinic and ICD-10-CM Official Guidelines for Coding and Reporting clarified that any clinicians involved in the care of a patient, including non-physicians, could document patients' social needs using Z codes.[8] The Centers for Medicare & Medicaid Services (CMS) ICD-10-CM Official Guidelines for Coding and Reporting highlight how providers can use Z codes to document Medicaid enrollees' social needs in claim and encounter data.

Limited information is available on use of Z codes in Medicaid claims and encounter data. Several studies have looked at use of Z codes in Medicare fee-for-service (FFS) using Medicare claims and enrollment data[9,10] and within electronic health records (EHRs) for specific health systems.[8,11] These studies find that use of Z codes in claims or admissions data in EHRs and Medicare FFS is low, ranging from <1 percent to about 2 percent. However, no studies have assessed use of Z codes within Medicaid claims and encounter data using Transformed Medicaid Statistical Information System (T-MSIS). NORC at the University of Chicago (NORC) analyzed the extent to which social needs are documented in Medicaid claims and encounter data.

Methods

NORC used 2018 T-MSIS[i] claims (for Medicaid FFS) and encounter (for managed care) data to assess the extent to which nine Z codes, identified by CMS as Z codes related to SDOH,[12] were used. We included in the analysis deduplicated counts of individuals enrolled in Medicaid at any time in 2018. The analysis included Medicaid enrollees only. An enrollee was counted as having a social need if at least one T-MSIS claim or encounter record in 2018 contained at least one of the nine Z codes (Z55, Z56, Z57, Z59, Z60, Z62, Z63, Z64, and Z65, referred to in this study as Z55-Z65). In the literature, housing and food insecurity are among the top identified social needs among Medicaid enrollees and where many Medicaid-related efforts are focused.[13] Thus, we also looked at documentation of social needs for three specific subcodes: homelessness (Z59.0), inadequate housing (Z59.1), and food insecurity (Z59.4). All analyses were performed from September to December 2021. Additional details on methods and limitations are included at the end of this report.

CMS ICD-10-CM Z Codes for Social Needs

Z55 problems related to education and literacy

Z56 problems related to employment and unemployment

Z57 occupational exposure to risk factors

Z59 problems related to housing and economic circumstances

- Z59.0: homelessness
- Z59.1: inadequate housing
- Z59.4: food insecurity

Z60 problems related to social environment

Z62 problems related to upbringing

Z63 other problems related to primary support group, including family circumstances

Z64 problems related to certain psychosocial circumstances

Z65 problems related to other psychosocial circumstances

Source: https://www.cms.gov/files/document/zcodes-infographic.pdf

[i] NORC analysis of Transformed Medicaid Statistical Information System (T-MSIS) data under NORC's CMS Research DUA.

Use of Z Codes to Document Social Needs

1,338,809 (1.42%) of Medicaid enrollees
had at least one social need documented in claims or encounter data in 2018.

Use of Z codes to document at least one social need for enrollees in Medicaid claims and encounter data was low in 2018 (1.42% of Medicaid enrollees).

Of the roughly 93.4 million individuals enrolled in Medicaid at any point and with Medicaid claims or encounter data in 2018, about 1.3 million (1.42%) had any social need documented by a provider using a Z code. Of those, less than one-quarter of one percent had homelessness (0.22% or 204,620 enrollees), food insecurity (0.01% or 12,945 enrollees), or housing insecurity (0.01% or 6,105 enrollees) documented.

Use of Z codes to document social need in Medicaid claims and encounter data: enables systems-wide research on health-related social needs of patients and communities around the country; informs states and the federal government on how to tailor programs and policy to meet those needs; and informs policy and payment reform efforts that incorporate value-based payment and risk-adjustment based on social needs.[14] Without accurate documentation and reporting of this data, it is difficult for state Medicaid agencies to understand the complete picture of population needs and meet those needs.

Few physicians document the social needs of older adults

In September 2021, NORC assessed the documentation of social need within Medicare data. The analysis found that, in 2018, only 1.3 percent of Medicare enrollees had a social need documented.

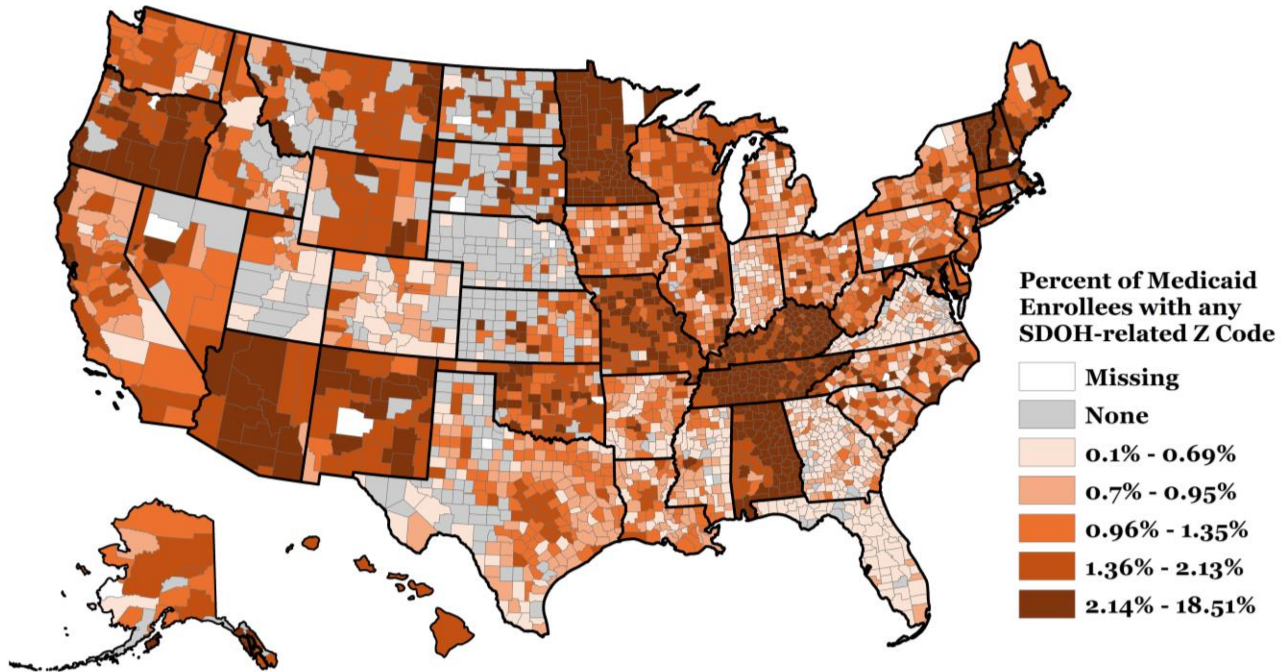
Despite low documentation in 2018, as federal and state focus on addressing SDOH increases, Z code use has been growing and will likely continue to grow. For example, a study of Z codes in a clinical data research network found that their use increased between 2015 and 2018.[8] In addition, a recent CMS analysis of the use of Z codes in Medicare FFS found that though still underutilized, documentation of social needs increased from 1.3 percent in 2016 to 1.6 percent in 2019.[10] We expect documentation in Medicaid data to also increase over time.

Use of Z codes to document social need was uneven across the United States in 2018.

One county in Minnesota (Mahnomen County) had the highest documentation of at least one social need (18.51% of Medicaid enrollees in the county had at least one documented Z code) followed by Wabash County in Illinois (9.21% of Medicaid enrollees in the county). In contrast, 388 counties in 34 states did not have any enrollees with a documented Z code in 2018 (Figure 1). It is likely that variation at the county level reflects varying degrees of health system efforts around documentation of the

social needs of enrollees. This report does not describe variations in policy at the county level; however, an accompanying report on the role of state Medicaid policy explores how variation in state Medicaid policy may contribute to variations in documentation across states.

Figure 1: Documentation of Social Needs Z Codes in 2018 Medicaid Claims and Encounter Data, by County



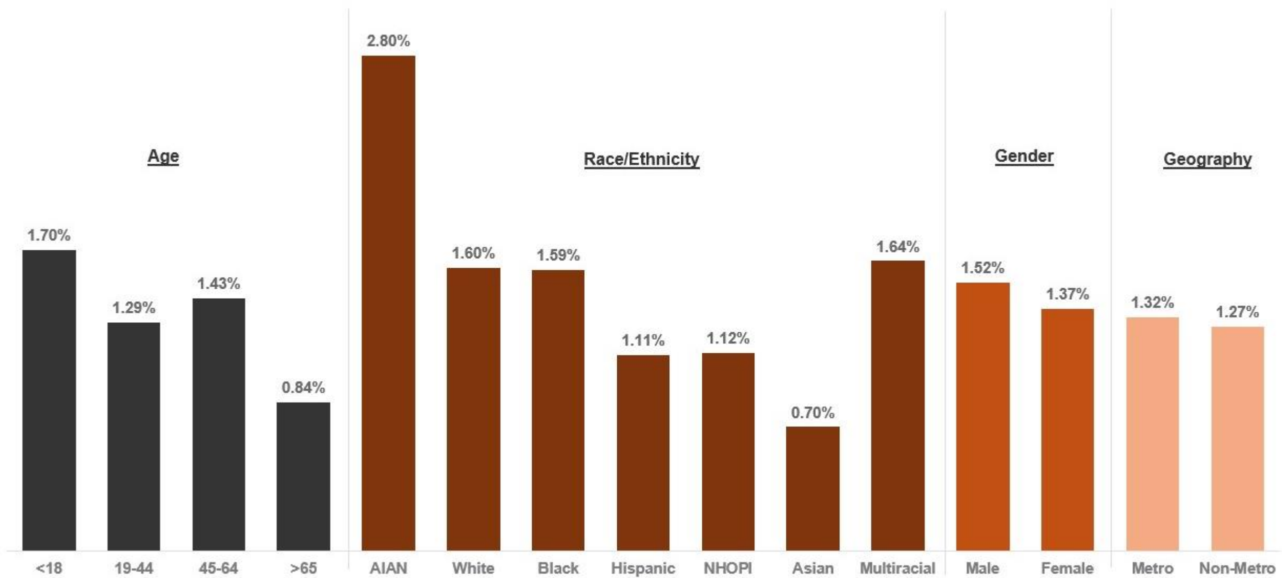
Notes: National county-level map of percentage of Medicaid enrollees with at least one of any Z55-Z65 code. The distribution of counties with any recorded Z code usage is broken into quintiles with the top 20% of counties representing 2.14% to 18.51% of Medicaid enrollees with at least one recorded Z code. Counties without any recorded Z code usage are displayed in grey, while counties with missing data are displayed in white. About 5 percent of Medicaid enrollees are missing county-level address information, meaning the data displayed in the map is missing roughly 4.2 million enrollees.

Source: NORC analysis of Centers for Medicare & Medicaid Services (CMS) Medicaid 2018 T-MSIS Analytic Files.

Medicaid enrollees who are younger than 18 and those who identify as American Indian or Alaska Native had higher shares of social needs documented in their 2018 claims or encounter data using Z codes.

Some demographic groups had higher shares of social needs documented in Medicaid claims or encounter data than did others, despite overall limited documentation (Figure 2). Medicaid enrollees aged 18 and under had the highest share of reported social needs (1.70%) compared to other age groups. American Indian or Alaska Native enrollees had a higher share of documented social needs (2.8%) compared with other racial or ethnic groups. Minimal differences were observed in documentation of social needs between male (1.52%) and female (1.37%) enrollees and between enrollees residing in metropolitan (1.32%) and non-metropolitan (1.27%) counties.

Figure 2: Share of Medicaid Enrollees with Documented Social Needs Using Z Codes in 2018, by Demographic Characteristics



Notes: Includes Medicaid enrollees with any Z55-Z65 code.

Persons of Hispanic origin may be of any race; other groups are non-Hispanic. AIAN: American Indian or Alaska Native. NHOPI: Native Hawaiian or Other Pacific Islander. The Medicaid Data Quality Atlas suggests reporting of race/ethnicity data within Medicaid claims and encounter data in 2018 are limited, with at least 22 states receiving reporting classifications either of high concern or of unusable race/ethnicity data. Around 19.8 million Medicaid enrollees (21.19%) were missing race and ethnicity data in T-MSIS and for this reason are not included in the analysis.

The assessment of metropolitan versus non-metropolitan at the county-level only assesses 95 percent of the data due to 5 percent of Medicaid enrollees missing county-level address information.

Source: NORC analysis of Centers for Medicare & Medicaid Services (CMS) Medicaid 2018 T-MSIS Analytic Files.

Use of Z codes to document homelessness, inadequate housing, and food insecurity was disproportionate by race and/or ethnicity.

There are some noticeable differences in the levels of documentation of homelessness, inadequate housing, and food insecurity across groups identified by race and ethnicity despite limited overall documentation (Figure 3). Black Medicaid enrollees had higher levels of documentation for all three categories compared to their representation in the total Medicaid population. American Indian or Alaska Native and White Medicaid enrollees also had higher levels of documentation for homelessness and inadequate housing compared with their representation in the total Medicaid population.

Figure 3: Share of Documented Homelessness, Inadequate Housing, and Food Insecurity Needs, by Race/Ethnicity, 2018

Race/ Ethnicity	Share of Medicaid Enrollees	Any Z Code (Z55-Z65)		Homelessness (Z59.0)		Food Insecurity (Z59.4)		Inadequate Housing (Z59.1)	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
White	42.15%	495,194	47.25%	88,486	51.79%	2,787	30.13%	1,952	44.77%
Hispanic	28.74%	235,243	22.45%	25,090	14.69%	2,323	25.12%	546	12.52%
Black	21.28%	248,559	23.72%	47,695	27.92%	3,657	39.54%	1,577	36.17%
Asian	5.36%	27,683	2.64%	3,023	1.77%	245	2.65%	88	2.02%
AIAN	1.62%	33,374	3.18%	5,265	3.08%	130	1.41%	170	3.90%
NHOPI	0.61%	5,053	0.48%	994	0.58%	91	0.98%	27	0.62%
Multiracial	0.25%	2,966	0.28%	299	0.18%	16	0.17%	0	0.00%
Total	**73,590,652**	**1,048,072**		**170,852**		**9,249**		**4,360**	

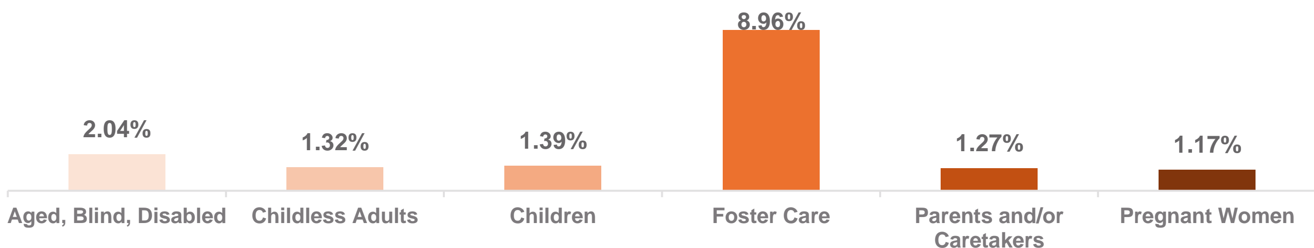
Notes: Persons of Hispanic origin may be of any race; other groups are non-Hispanic. AIAN: American Indian or Alaska Native. NHOPI: Native Hawaiian or Other Pacific Islander. The Medicaid Data Quality Atlas suggests reporting of race/ethnicity data within Medicaid claims and encounter data in 2018 are limited, with at least 22 states receiving reporting classifications either of high concern or of unusable race/ethnicity data. Around 19.8 million Medicaid enrollees (21.19%) are missing race and ethnicity data in T-MSIS and for this reason are not included in the analysis.

Sources: NORC analysis of Centers for Medicare & Medicaid Services (CMS) Transformational Medicaid Statistical Information System (T-MSIS) data from 2018.

Medicaid enrollees with eligibility through foster care were more likely to have at least one social need documented in their 2018 health care claims or encounters using Z codes; remaining Medicaid eligibility categories were similar in the level of documented social need.

A higher proportion of Medicaid enrollees with eligibility through foster care had a documented Z code (8.96%) compared with other eligibility categories (Figure 5). Minimal differences were perceived in documentation of a social need between individuals identified as dual-eligible (1.47%) and non-dual-eligible (1.47%). Only 0.32 percent of restricted-benefit dual enrollees had documented Z codes.

Figure 5: Share of Medicaid Enrollees with Documented Social Need Z Codes, by Medicaid Eligibility



Notes: This analysis of Medicaid eligibility assesses Medicaid enrollees with any Z55-Z65 code. Please see the Methods and Limitations section for a detailed description on the eligibility breakdowns of each aggregate category.

Source: NORC analysis of Centers for Medicare & Medicaid Services (CMS) Transformational Medicaid Statistical Information System (T-MSIS) data from 2018.

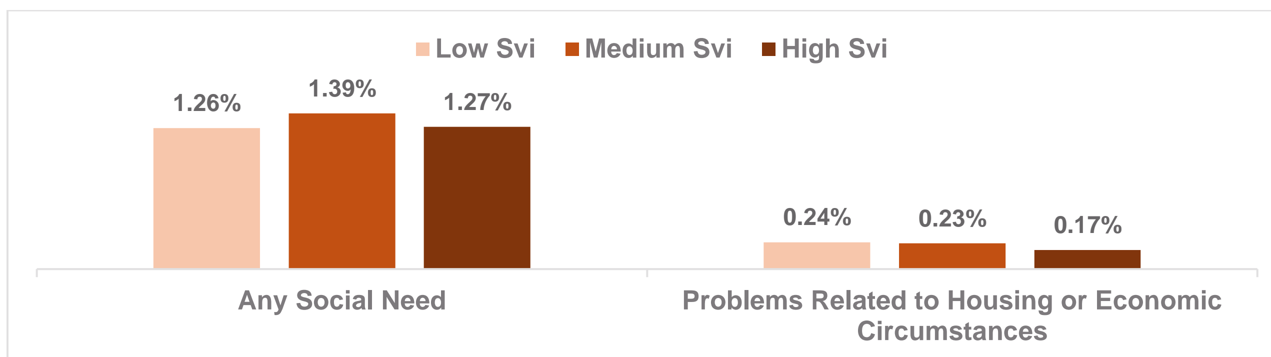
Comparison with Expected Need

True prevalence of social need among Medicaid enrollees is unknown; however, 1.42 percent is likely to be extremely low compared with actual need. NORC assessed how documentation of social needs in Medicaid claims and encounter data compared with expected need based on other publicly available data sources. These include the CDC Social Vulnerability Index (SVI), the U.S. Department of Agriculture (USDA) 2018 Food Security Supplement, and the U.S. Department of Housing and Urban Development (HUD) Exchange 2018 Annual Homelessness Assessment Report. These benchmarks are not a perfect match to extent of social needs among Medicaid enrollees; however, they provide proxies for potential gaps in documentation in Medicaid claims and encounter data using Z codes, compared with benchmarks.

Documentation of social needs in Medicaid claims and encounter data did not vary by social vulnerability of counties.

Documentation of any social needs Z code use did not appear to vary at the aggregate county-level relative to social vulnerability (Figure 6). Using CDC SVI rankings, we identified counties with the highest, medium, and lowest SVI. Use of any Z55-Z65 code remained between 1.26 percent and 1.39 percent for all three levels of social vulnerability. Similarly, there is low reporting across levels of social vulnerability of counties when assessing Z59 code use, which assesses problems related to housing or economic circumstances. It is possible that this lack of alignment between Z code prevalence and social vulnerability is due to overall limited Z code use in 2018 as well as such factors as geographic, health care market, and state-level policy differences.

Figure 6: Share of Medicaid Enrollees with Documented Social Needs Z Codes, by Social Vulnerability Index (SVI)



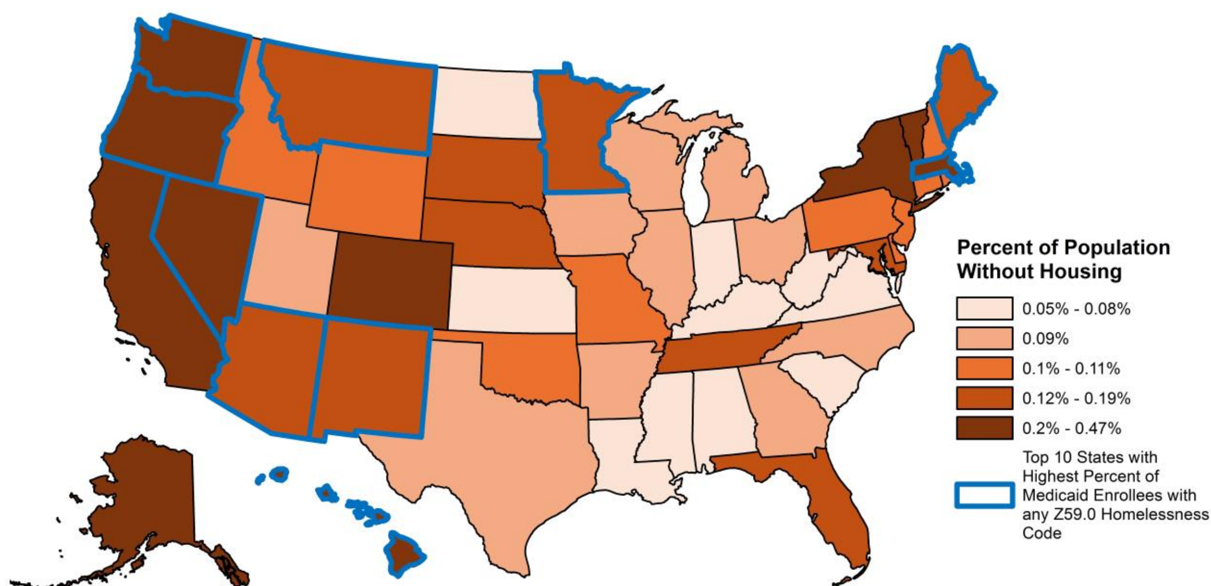
Notes: Low SVI was determined as the lowest third of county-level SVI scores, medium SVI as the middle third, and high SVI as the highest third of county-level SVI scores. Any social need is defined as Medicaid enrollees with any Z55-Z65 code. Problems related to housing or economic circumstances is defined as Medicaid enrollees with any Z59 code. Available data sources do not allow us to estimate social vulnerability among only Medicaid enrollees. Therefore, we were able to use county- and state-level data only on the total population to compare rates of Z code usage to approximate social needs.

Source: NORC analysis of Centers for Medicare & Medicaid Services (CMS) Transformational Medicaid Statistical Information System (T-MSIS) data from 2018 and CDC/ATSDR Social Vulnerability Index.[15]

Documentation of food insecurity in 2018 Medicaid data does not always align with national benchmarks of homelessness and food insecurity.

In 2018, 0.22 percent of all Medicaid enrollees (204,620 people) had Z59.0 documenting homelessness and 0.01 percent (6,105 people) had Z59.1 documenting housing insecurity. According to HUD, nearly 1.4 million people use a homeless shelter or transitional housing each year; these numbers are likely to be disproportionately low-income populations.[19] When compared with data in the 2018 Annual Homeless Assessment Report,[20] half of the states in the highest quintile for percent of population without housing aligned with states in the highest quintile for percent of Medicaid enrollees with any Z59.0 code: Hawaii, Massachusetts, Nevada, Oregon, and Washington.

Figure 7: State-Level Comparison of Homelessness Needs Z Code Reported in 2018 Medicaid Claims and Encounter Data and in the 2018 Annual Homelessness Assessment Report



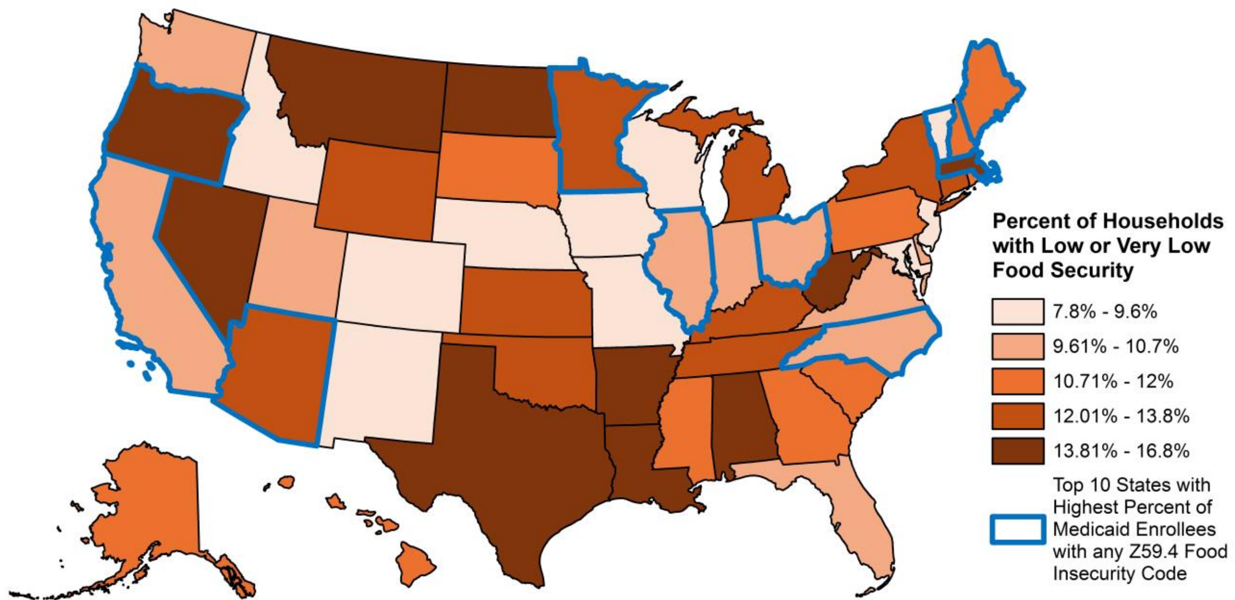
Notes: Blue highlighted states represent the top quintile, 10 states, with the highest percent of Medicaid enrollees with any Z59.0 code (homelessness).

Homelessness levels are broken into quintiles, with brown representing the top 20 percent of states with the highest levels of homelessness. Available data sources do not allow us to estimate homelessness among only Medicaid enrollees. Therefore, we are comparing available state-level data on the total population to compare to rates of Medicaid Z code usage.

Source: NORC analysis of Centers for Medicare & Medicaid Services (CMS) Transformational Medicaid Statistical Information System (T-MSIS) data from 2018 and data from the HUD Exchange 2018 Annual Homelessness Assessment Report.[20]

Food insecurity is defined as the disruption of food intake or eating patterns because of lack of money and other resources.[16] In 2018, 0.01 percent of all Medicaid enrollees (12,945 people) had a documentation of Z59.4, documenting food insecurity. However, according to the USDA Economic Research Service, 11.1 percent of households were food insecure for some period in 2018;[17] this share is likely higher among Medicaid enrollees.[2] When compared with data in the USDA's 2018 Food Security Supplement,[18] states with the highest quintile of low or very low food security aligned only for two states within the highest quintile of any Z59.4 code: Massachusetts and Oregon (Figure 7).

Figure 8: State-Level Comparison of Social Needs Z Codes Reported in 2018 Medicaid Claims and Encounter Data and in the USDA Food Security Supplement



Notes: Blue highlighted states represent the top quintile, 10 states, with the highest percent of Medicaid enrollees with any Z59.4 code (food insecurity).

USDA low and very low food security is broken into quintiles, with brown representing the top 20 percent of states with the highest levels of low or very low food security. Available data sources do not allow us to estimate food insecurity among only Medicaid enrollees. Therefore, we are comparing available state-level data on the total population to compare to rates of Medicaid Z code usage.

Source: NORC analysis of Centers for Medicare & Medicaid Services (CMS) Transformational Medicaid Statistical Information System (T-MSIS) data from 2018 and USDA's Household Food Security in the United States in 2018 Report.

While these measures of social needs are only proxies of expected need, they still demonstrate a gap between documentation of need in Medicaid data and estimates of actual need experienced by Medicaid populations.

Conclusion

Documentation of social need using Z codes is low. Accurate and high-quality data and documentation in Medicaid are critical to understand Medicaid enrollees' social needs to inform development and implementation of policies and interventions.

Only 1.42 percent of Medicaid enrollees had at least one social need documented in their claims or encounter data using Z codes in 2018. Despite the low documentation, Medicaid enrollees who are younger than 18 and those who identify as American Indian or Alaska Native had higher shares of social needs documented in their 2018 health care claims or encounter data compared with other age and racial/ethnic groups. Documentation of social needs in 2018 Medicaid claims and encounter data does not always align with national benchmarks for social needs, including measures of social vulnerability, food insecurity, and homelessness. While these benchmarks are only proxies of expected need, they may demonstrate a gap in the documentation of social need using Z codes.

Further research is needed to understand how existing documentation of ICD-10-CM Z codes is occurring, barriers to documentation, and trends over time.

Future analyses should consider the following:

- Changes in data quality are expected to reflect state-level priorities. State priorities and federal guidance can influence challenges and facilitators to documenting social needs in Medicaid encounter data. To understand this effect, further research is needed, including using qualitative data collection (e.g., interviews) with state Medicaid program staff and representatives from health systems, providers, and MCOs to understand their experiences with use of ICD-10 Z codes and in reporting social needs data to state Medicaid agencies.
- It is important to understand which types of providers are more likely to document social needs in Medicaid data and to understand the health status and outcomes of enrollees who have documented social needs, to consider how to best address those needs. In addition, it is important to understand if there are differences in documentation across Medicaid and CHIP enrollees.
- As the federal and state policy landscape continues to become more supportive of identifying, addressing, and reimbursing for social needs interventions, and as updated data become available, it will be important to track and report whether documentation of social needs in Medicaid claims and encounter data using Z codes has increased over time. It will also be critical to understand the role of COVID-19 on the identified social needs of Medicaid enrollees in 2020 and 2021 data, given the disproportionate impact of the pandemic on low-income and underserved populations.
- Further research is needed on how social needs data are shared among health care providers, health plans, and payers like state Medicaid agencies. The focus of our analysis is on how social needs data flows from providers and MCOs into the Medicaid data systems using Z codes. However, we did not conduct an environmental scan to examine the state of social needs information being exchanged among health care providers, health plans, and state Medicaid agencies.

Methods and Limitations

This analysis used 2018 Transformed Medicaid Statistical Information System (T-MSIS) claims and encounter data. All Medicaid enrollees in the T-MSIS enrollment file with at least one day of Medicaid eligibility in 2018 were included in the analysis—a total of 93.4 million enrollees. Enrollees with CHIP-only eligibility were excluded from this analysis given our focus is on Medicaid enrollees. Enrollees were noted as having Z codes when at least one claim had an ICD-10-CM Z code at any point in 2018. All Z55, Z56, Z57, Z59, Z60, Z62, Z63, Z64, and Z65 codes were included in the analysis.

Due to CMS suppression guidelines, for demographic and definitional breakdowns, any cell with a value less than 11 was suppressed in output.[21] All statistical analyses were conducted in SAS Studio between September and December of 2021. Mapping was conducted in ArcGIS 10.8.1. Top 5 percent and 10 percent cut-offs points were used for the mapping of national-level county maps, while quintile categories were used for national-level, state, and individual state-level county maps.

County-Level Data. For county-level analyses, we used enrollee state and county codes, derived from home or mailing addresses. This enrollee county-level location data was also used for the metropolitan versus non-metropolitan comparison. County-level assignments were made using the 2013 Rural-Urban Continuum Codes (RUCC) from the U.S. Department of Agriculture's Economic Research Service. For this analysis, metropolitan was defined as RUCC codes 1-3 and non-metropolitan was defined as RUCC codes 4-9.

Demographic Categories. Predefined categories in the T-MSIS Analytic File Demographic and Eligibility File were used for age,[22] dual eligibility,[23] eligibility group,[24] gender,[25] and race and ethnicity.[26] For race and ethnicity, if an enrollee was Hispanic, their reported race and ethnicity was Hispanic. All other categories were non-Hispanic.

Medicaid eligibility groups[24] were grouped into six categories. Aged, Blind, Disabled includes individuals receiving supplemental security income (SSI); aged, blind, and disabled Individuals in 209(b) states; blind or disabled individuals eligible in 1973; disabled widows and widowers ineligible for SSI due to increase in old age, survivors, and disability insurance program; disabled widows and widowers ineligible for SSI due to early receipt of social security; working disabled under 1619(b); disabled adult children; aged, blind or disabled individuals eligible for but not receiving cash assistance; individuals eligible for cash assistance except for institutionalization; individuals receiving home and community based services under institutional rules; optional state supplement recipients - 1634 states, and SSI criteria states with 1616 agreements; optional state supplement recipients - 209(b) states, and SSI criteria states without 1616 Agreements; institutionalized individuals eligible under a special income level; individuals participating in a program of All-Inclusive Care for the Elderly Program under institutional rules; individuals receiving hospice care; poverty level aged or disabled; work incentives eligibility group; ticket to work basic group; ticket to work medical improvements group; Family Opportunity Act children with disabilities; individuals eligible for home and community-based services; individuals eligible for home and community-based services – special income level; medically needy

aged, blind or disabled; medically needy blind or disabled individuals eligible in 1973; and qualified disabled children under Age 19.

Childless adults include individuals above 133 percent of the federal poverty level (FPL) under age 65; adult group - individuals at or below 133 percent FPL, ages 19-64, newly eligible for all states; adult group - individuals at or below 133 percent FPL, ages 19-64, not newly eligible for non- 1905z(3) states; and adult group - individuals at or below 133 percent FPL, ages 19-64, not newly eligible nonparent/ caretaker-relative(s) in 1905z(3) states. Parents and/or caretakers include parents and other caretaker relatives; optional coverage of parents and other caretaker relatives; medically needy parents and other caretakers; adult group - individuals at or below 133 percent FPL, ages 19-64, not newly eligible; and parent/caretaker-relative(s) in 1905z(3) states. Pregnant women include pregnant women; medically needy pregnant women; and coverage from conception to birth.

Children include deemed newborns; infants and children under age 19; reasonable classifications of individuals under age 21; children with non-IV-E adoption assistance; optional targeted low-income children; medically needy children under age 18; medically needy children aged 18 through 20; targeted low-income children; children ineligible for Medicaid due to loss of income disregards; and children with access to public employee coverage. Foster care includes children with Title IV-E Adoption Assistance, foster care or guardianship care; former foster care children; and independent foster care adolescents.

Benchmark Comparison Analysis. The Social Vulnerability Index (SVI), a CDC-created aggregate score, uses 15 U.S. Census variables grouped by four themes: socioeconomic status, household composition and disability, minority status and language, and housing type and transportation. To compare Z code prevalence with expected social vulnerability, county-level SVI scores were used. County SVI scores were divided into tertiles (low, medium, and high). For comparisons to expected need for food insecurity and homelessness, we used data from two reports—the USDA Household Food Security in the United States (2018) and the Annual Homelessness Assessment Report (2018).

Limitations. A primary limitation of this analysis is that T-MSIS data quality and completeness varies widely depending on both the variable and the submitting state. In particular, there are data quality and completeness concerns around data on location and on race and ethnicity. ZIP code-level analyses were not possible due to the high level of missing and suppressed data. For county-level data, about 4.2 million Medicaid enrollees (4.5%) have incomplete county code data. Similarly, around 19.8 million Medicaid enrollees (21.2%) are missing race and ethnicity data in T-MSIS. The extent of missing data, together with the data suppression at any cell less than 11, prohibited comparison of results across demographics, such as race and ethnicity versus metropolitan and non-metropolitan areas. As noted above, due to incomplete county-level data, submitter state was used for national state-level analyses; such an approach generates enrollee counts that are double among multiple states. Lastly, available data sources do not allow us to estimate social vulnerability, food insecurity, and homelessness strictly for Medicaid enrollees only. For this reason, we used county- and state-level data on the total population to compare rates of Z code use to estimates of social needs.

References

1. U.S. Department of Health and Human Services O of DP and HP (ODPHP). Social Determinants of Health. Healthy People 2030. Accessed December 12, 2021. https://health.gov/healthypeople/objectives-and-data/social-determinants-health

2. Manatt P& P. *Medicaid's Role in Addressing Social Determinants of Health*.; 2019. Accessed December 12, 2021. https://www.rwjf.org/en/library/research/2019/02/medicaid-s-role-in-addressing-social-determinants-of-health.html

3. Centers for Medicare & Medicaid Services (CMS). CMS Issues New Roadmap for States to Address the Social Determinants of Health to Improve Outcomes, Lower Costs, Support State Value-Based Care Strategies. Published January 7, 2021. Accessed December 12, 2021. https://www.cms.gov/newsroom/press-releases/cms-issues-new-roadmap-states-address-social-determinants-health-improve-outcomes-lower-costs

4. DeSalvo K, Leavitt MO. For An Option To Address Social Determinants Of Health, Look To Medicaid. Health Affairs Blog. Published July 2019. Accessed December 12, 2021. https://www.healthaffairs.org/do/10.1377/hblog20190701.764626/full/

5. *H.R.1319 American Rescue Plan Act of 2021*. 117th Congress (2021-2022); 2021. Accessed March 13, 2022. https://www.congress.gov/bill/117th-congress/house-bill/1319/text

6. ICD10Data. Factors Influencing Health Status and Contact with Health Services Z00-Z99. Accessed December 12, 2021. https://www.icd10data.com/ICD10CM/Codes/Z00-Z99

7. National Center for Health Statistics (NCHS), Centers for Medicare & Medicaid Services (CMS). *ICD-10-CM Official Guidelines for Coding and Reporting FY 2021 - Updated January 1, 2021*.; 2021. Accessed December 12, 2021. https://www.cms.gov/files/document/2021-coding-guidelines-updated-12162020.pdf

8. Guo Y, Chen Z, Xu K, et al. International Classification of Diseases, Tenth Revision, Clinical Modification social determinants of health codes are poorly used in electronic health records. *Medicine (Baltimore)*. 2020;99(52). doi:10.1097/MD.0000000000023818

9. Weeks WB, Cao SY, Lester CM, Weinstein JN, Morden NE. Use of Z-Codes to Record Social Determinants of Health Among Fee-for-service Medicare Beneficiaries in 2017. *Journal of General Internal Medicine*. 2020;35(3):952. doi:10.1007/S11606-019-05199-W

10. Centers for Medicare & Medicaid Services Office of Minority Health. Utilization of Z Codes for Social Determinants of Health among Medicare Fee-for-Service Beneficiaries, 2019. *Data Highlight*. 2021;24. Accessed December 12, 2021. https://www.cms.gov/files/document/z-codes-data-highlight.pdf

11. Truong HP, Luke AA, Hammond G, Wadhera RK, Reidhead M, Joynt Maddox KE. Utilization of Social Determinants of Health ICD-10 Z-Codes among Hospitalized Patients in the United States, 2016-2017. *Medical Care*. 2020;58(12):1037-1043. doi:10.1097/MLR.0000000000001418

12. Centers for Medicare & Medicaid Services (CMS). *Collect SDOH Data Using Z Codes: The Social Determinants of Health (SDOH) Data Journey to Better Outcomes*.; 2021. Accessed December 12, 2021. https://www.cms.gov/files/document/zcodes-infographic.pdf

13. Garfield R, Hinton E, Cornachione E, Hall C. *Medicaid Managed Care Plans and Access to Care: Results from the Kaiser Family Foundation 2017 Survey of Medicaid Managed Care Plans*.; 2018. Accessed December 12, 2021. https://files.kff.org/attachment/Report-Medicaid-Managed-Care-March-Plans-and-Access-to-Care

14. American Hospital Association (AHA). *ICD-10-CM Coding for Social Determinants of Health*.; 2022. Accessed February 18, 2022. https://www.aha.org/system/files/2018-04/value-initiative-icd-10-code-social-determinants-of-health.pdf

15. Agency for Toxic Substances and Disease Registry (ATSDR). CDC/ATSDR Social Vulnerability Index. doi:10.1016/J.IJDRR.2020.101517

16. Office of Disease Prevention and Health Promotion (ODPHP). Food Insecurity. Healthy People 2020. Accessed December 12, 2021. https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-health/interventions-resources/food-insecurity

17. United States Department of Agriculture. Food Security and Nutrition Assistance. Economic Research Service. Published November 8, 2021. Accessed December 12, 2021. https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/food-security-and-nutrition-assistance/

18. Coleman-Jensen A, Rabbitt MP, Gregory CA, Singh A. Household Food Security in the United States in 2018. *Economic Research Service, United States Department of Agriculture*. Published online September 2019. Accessed December 12, 2021. https://www.ers.usda.gov/webdocs/publications/94849/err-270.pdf?v=263.9

19. HUD Exchange. 2017 AHAR: Part 1 - PIT Estimates of Homelessness in the U.S. . HUD Exchange. Published December 2017. Accessed December 12, 2021. https://www.hudexchange.info/resource/5639/2017-ahar-part-1-pit-estimates-of-homelessness-in-the-us/

20. HUD Exchange. 2018 AHAR: Part 1 - PIT Estimates of Homelessness in the U.S. . HUD. Published December 2018. Accessed December 12, 2021. https://www.hudexchange.info/resource/5783/2018-ahar-part-1-pit-estimates-of-homelessness-in-the-us/

21. Centers for Medicare & Medicaid Services (CMS). CMS Cell Suppression Policy. U.S. Department of Health & Human Services (HHS). Published January 1, 2020. Accessed December 16, 2021. https://www.hhs.gov/guidance/document/cms-cell-suppression-policy

22. Research Data Assistance Center (ResDAC). Age Group. Centers for Medicare & Medicaid Services (CMS). Published 2021. Accessed December 16, 2021. https://resdac.org/cms-data/variables/age-group-0

23. Research Data Assistance Center (ResDAC). Medicare-Medicaid Dual Eligibility Code - Latest in Year . Centers for Medicare & Medicaid Services (CMS). Published 2021. Accessed December 16, 2021. https://resdac.org/cms-data/variables/medicare-medicaid-dual-eligibility-code-latest-year

24. Research Data Assistance Center (ResDAC). Eligibility Group Code - Latest in Year. Centers for Medicare & Medicaid Services (CMS). Published 2021. Accessed December 16, 2021. https://resdac.org/cms-data/variables/eligibility-group-code-latest-year

25. Research Data Assistance Center (ResDAC). Sex (Biological) - Latest in Year. Centers for Medicare & Medicaid Services (CMS). Published 2021. Accessed December 16, 2021. https://resdac.org/cms-data/variables/sex-biological-latest-year

26. Research Data Assistance Center (ResDAC). Race and Ethnicity Constructed Code - Latest in Year. Centers for Medicare & Medicaid Services (CMS). Published 2021. Accessed December 16, 2021. https://resdac.org/cms-data/variables/race-and-ethnicity-constructed-code-latest-year