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Statistics and Analysis From the Hospital Industry Data Institute

JANUARY 2020 ■ Z Codes for Social Determinants of Health

Z Codes for Social Determinants of Health: *Which hospitals are most likely to use them and for which patients?*

In its September 2018 report Decoding Social Determinants of Health, the Missouri Hospital Association published research on an emerging source of exceptionally granular data on patient-level social determinants of health. A scan of the current policy and care delivery landscape alludes to myriad direct and indirect benefits for providers that systematically screen for and capture ICD-10 Z codes for SDOH on uniform billing and claims records. The research first found that the use of Z codes for SDOH increased significantly among Missouri hospitals since the implementation of ICD-10 in October 2015. Second, despite the increased use and associated benefits for patients and providers, a comparison of rates of SDOH code assignment to rates of poverty and payer mix suggested ample room for improvement in the consistent application of the codes by hospitals. At the same time, despite inconsistencies in the use of SDOH codes, bivariate and multivariate testing revealed that the Z codes have exceptional predictive ability in health outcomes modeling.

To improve the consistent use of the codes at Missouri hospitals, this follow-up study explores both patient and provider characteristics that contribute to the likelihood of identification and capture of ICD-10 SDOH Z codes during an inpatient hospitalization or emergency department visit.

Background

Identifying and treating nonmedical social factors is an increasingly important strategy in the delivery of patient-centered, value-based health care. Individual and population health is determined by the complex interaction of five factors, including policies, health services, behaviors, genetics and social circumstances.[i] Among these, health services are thought to account for 10% to 20% of the modifiable factors that influence population health outcomes. Social determinants of health, or the conditions in which people are born, grow, live, work and age,[ii] account for the remaining 80% to 90%.[iii]

The multidimensional nature of SDOH reach far beyond poverty, requiring a systemic approach to effectively moderate their adverse effects on health outcomes. The nonexhaustive list of SDOH include socioeconomic factors such as income, education and employment; exposure to inequality arising from religion, race, ethnicity, gender identity and sexual orientation; access to health-enabling amenities such as food, water, transportation, recreation and health care; environmental context such as neighborhood characteristics, housing, air quality and crime; as well as psychosocial support structures such as family, childhood experiences, civic engagement and communal inclusivity.[iv, v] The criteria used to identify SDOH include factors that have a defined association with health outcomes, exist before the delivery of care, and are not readily modifiable by health care providers or the quality of care rendered.[v]

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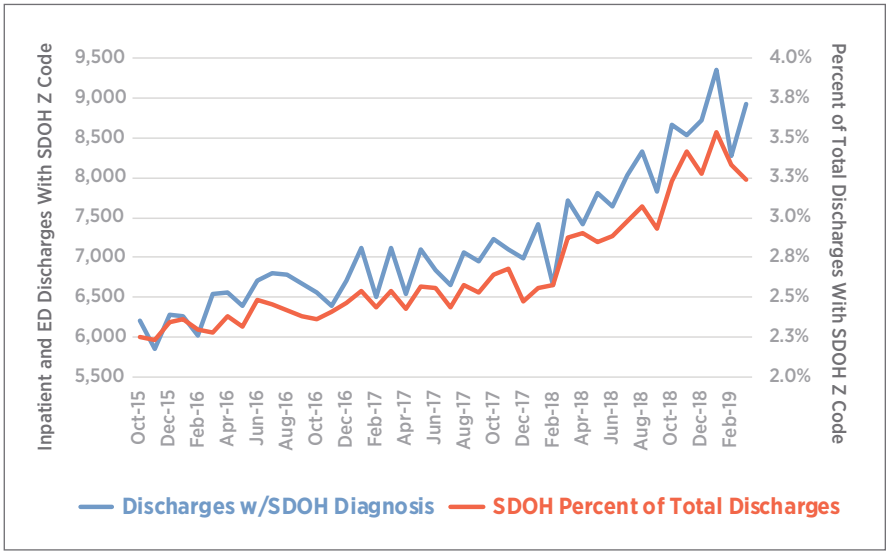
The Affordable Care Act's emphasis on population health and value-based reimbursement is widely credited for inducing a paradigm shift among health care providers toward allocating interventional resources to address SDOH.[iv] At the same time, the ACA's performance incentive payment mechanisms neglect to directly risk adjust or otherwise compensate for treating SDOH, despite a large and growing body of research supporting the association of upstream social factors and downstream health outcomes, including readmission and mortality.[vi]

Meaningful data are the cornerstone of programs designed to moderate the adverse effect of SDOH on patient and population health outcomes; yet, widely available, standardized and detailed sources of information on individual social circumstances remain elusive. Traditional sources of data on social complexity, such as dual-eligibility for Medicaid and Medicare, are subject to noise from interstate variation in eligibility standards and fail to matriculate nuanced social needs below an arbitrary level of the federal poverty guidelines. While area-level measures of SDOH are widely available and incredibly useful in disentangling environmental social risk factors, they also are circumscribed to ecological fallacy, or the false assumption of homogeneity for populations living within the same geographic units.

Highly detailed information on patient-level SDOH routinely are collected in electronic medical record systems with customized modules and validated tools, such as the Protocol for Responding to and Assessing Patients' Assets, Risks and Experiences (PRAPARE) and the Accountable Health Communities instruments; however, these data rarely are available outside of the setting in which they originally were generated.[vii]

Figure 1: Monthly Frequency of ICD-10 SDOH Z Code Use at Missouri Hospitals, Oct. 2015 - March 2019 (n=301,275 SDOH, 11,366,941 Total)



Emerging Data on SDOH

Another source of standardized, yet detailed data on patient-level SDOH are becoming widely available through administrative claims that are submitted by health care providers to insurance carriers across settings — primary to quaternary. Claims data are near universally aggregated in centralized clearinghouses by organizations including individual health plans, the Centers for Medicare & Medicaid Services, all-payer claims databases, and commonly by state hospital associations.

The conversion of diagnostic coding from the ninth to the 10th revision of the International Classification of Diseases in October 2015 created an opportunity for health care providers to identify, diagnose and document patients with social complexity in a uniform diagnostic and billing data system. The ICD-10 coding schema includes an SDOH-designated array of 87 Z codes (Z55-Z65) that are designed to identify patients with social circumstances, such as housing instability, problems related to education and employment, psychosocial surroundings, and socioeconomic status, in addition to problems related to family and upbringing. An additional array of 13 Z codes (Z911-Z914) capture other personal risk factors related to SDOH, such as difficulty with adherence to prescribed medical regimens and additional psychosocial circumstances, including patients who are forced to ration medications due to financial hardship or who have experienced adult abuse and neglect. Importantly, these codes can be identified and documented by nonphysician providers, such as social workers, case managers, discharge planners and community health workers.[viii]

Earlier research from MHA found that SDOH Z codes are highly predictive of multiple health outcomes, are useful in risk stratification applications, are increasingly relevant in both policy and reimbursement applications, and are growing in frequency of use among Missouri hospitals. At the same time, the research found that the codes are used inconsistently by hospitals, including several that do not use the codes at all.[ix]

Considering the potential of these codes to advance the field of both socially informed care and reimbursement policies, and in light of known limitations surrounding their use, the aim of this research brief is to identify patient and provider characteristics that increase the likelihood of SDOH Z code assignment to inpatient and ED claims submitted by Missouri hospitals during 2018.

Data and Analysis

Hospital inpatient and ED claims data submitted by Missouri hospitals to HIDI were used to inform this analysis. Claims with one or more SDOH Z codes indicated in any diagnosis field were flagged for use in the evaluation as the primary variable of interest. These claims were categorized into five subgroups using combinations of three-character ICD-10 diagnostic categories. The SDOH subcategories used in this analysis include problems related to the following.

- adherence with prescribed medical regimens
- housing stability
- socioeconomic circumstances including education, employment and legal difficulty
- upbringing, family or primary support group
- psychosocial circumstances

A full list of the Z codes, including SDOH subcategory assignment and frequency of use across Missouri hospitals during inpatient and ED visits in 2018, is included in Appendix Table 1.

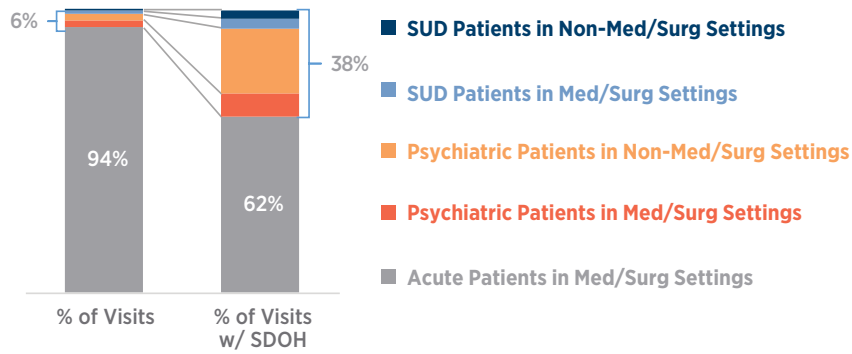
Hospital settings were categorized as acute medical or surgical versus nonmedical or surgical care using acute medical/surgical or emergency room compared to other place of service codes, which predominantly were represented by psychiatric units and facilities. Patient types were categorized as medical/surgical, psychiatric or substance use disorder using major diagnostic category and place of service codes. Psychiatric patients were identified using MDC 19 (mental diseases and disorders), SUD patients were identified using MDC 20 (alcohol/drug use and induced organic mental disorders), and medical or surgical patients were identified using acute medical/surgical or emergency room place of service codes as well as MDC codes other than 19 and 20.

Missouri hospital inpatient and ED claims data for residents of any state were evaluated for the frequency of SDOH Z code assignment between October 2015 and March 2019 to ascertain trends in the use of the codes. The same data for calendar year 2018 were used to conduct bivariate comparative analyses on use of the codes by patient type, hospital setting, SDOH category, provider type and principal diagnosis categories for inpatient and ED visits with and without SDOH Z code assignment.

CY 2018 data also were used to conduct multivariate analyses designed to detect patient- and provider-level characteristics that contribute to the probability of SDOH Z code assignment using hierarchical generalized logistic regression methods.

Figure 2: Distribution of Inpatient and ED Visits at Missouri Hospitals With and Without SDOH Z Codes by Patient Type and Setting, 2018 (n=3,111,122)

		Acute Med/Surg Setting	Non-Med/Surg Setting
Acute Care Patients	**Total**	**2,923,207**	**0**
	SDOH	57,353	0
	SDOH %	2.0%	0.0%
Psychiatric Patients	**Total**	**79,660**	**61,869**
	SDOH	7,525	21,325
	SDOH %	9.4%	34.5%
SUD Patients	**Total**	**38,877**	**7,509**
	SDOH	3,231	2,675
	SDOH %	8.3%	35.6%



Acute care settings were categorized as place of service acute medical/surgical unit or emergency room, and non-acute care settings were categorized with other place of service codes. Psychiatric patients were identified using Major Diagnostic Category code 19, Mental Diseases and Disorders. Substance Use Disorder patients were identified using MDC code 20, Alcohol/Drug Use and Induced Organic Mental Disorders.

Findings

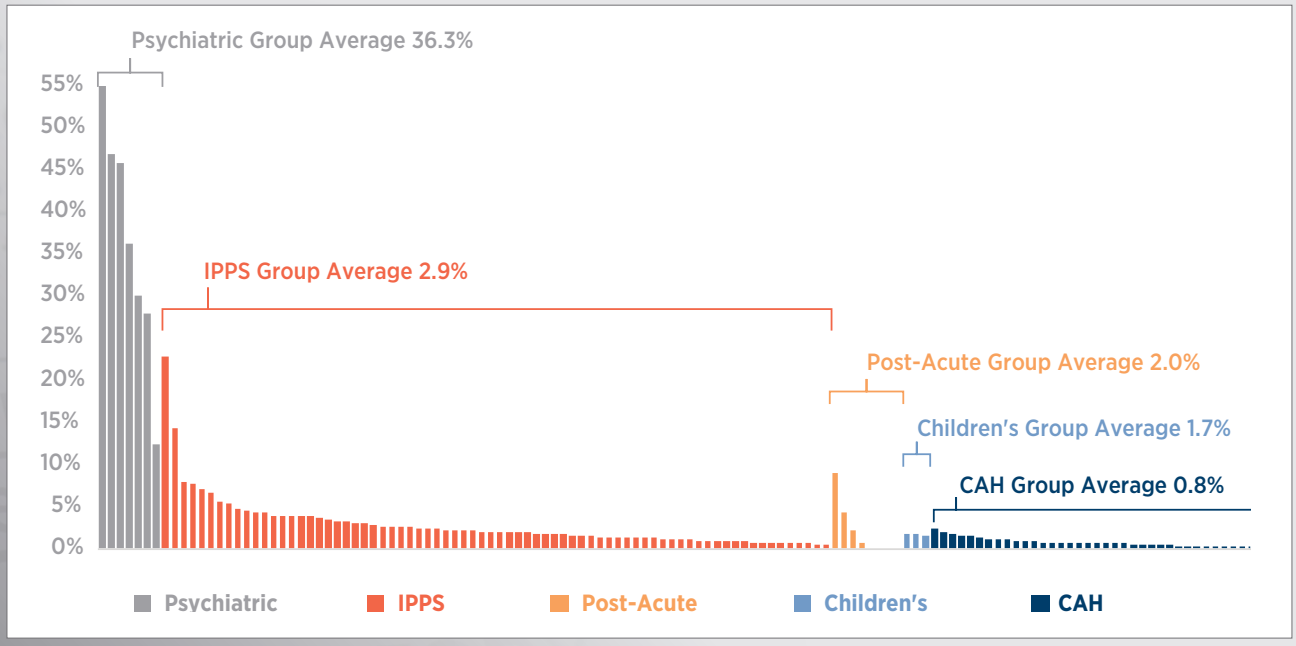
Continued Improvement: Since the original MHA research that evaluated use of the SDOH Z codes in Missouri hospital claims data through March 2018, the awareness and use of the codes has continued to grow (Figure 1). During the first quarter of 2018 — the last three months included in the original study — the average number of monthly inpatient and ED claims from Missouri hospitals with one or more of the SDOH Z codes assigned to the record was 7,264, or 2.7% of all discharges. During the same period in 2019, the monthly average grew to 8,851, which was 3.4% of all discharges. This marked a 12-month increase of 22% in the number of claims with one or more SDOH Z code assigned, and a 26% increase as a percentage of total discharges.

Person and Place Matters: During 2018, acute care patients in medical/surgical care settings accounted for 94% of the total inpatient and ED claims evaluated, but just 62% of claims with one or more SDOH Z codes assigned (Figure 2). Out of 2.9 million discharges, 2% of acute care patients in medical/surgical care settings were assigned one or more SDOH Z codes. More than three quarters of these claims were generated during treat and release ED visits (n=2,215,591), of which less than 1% of patients were identified as having a social risk factor (n=20,364) despite 46% of these patients having a primary expected payer of Medicaid or self-pay/charity care (n=591,935 and 424,680, respectively). The Medicaid and uninsured payer mix in treat and release ED visits is significantly higher than in inpatient settings, which may indicate that shorter periods of interaction between providers and patients are less likely to result in the identification of social risk factors.

Psychiatric and SUD patients are four-to-five times as likely to have one or more SDOH Z codes identified during a hospital visit in an acute medical/surgical care setting, and more so in nonmedical/surgical care settings where 34.5% of psychiatric patients and 35.6% of SUD patients are assigned one or more SDOH Z codes. This is 17.6 and 18.2 times the rate of social factor identification for acute care patients in medical/surgical care settings. Combined, psychiatric and SUD patients in both acute medical/surgical and other settings accounted for 6% of all inpatient and ED visits at Missouri hospitals during 2018, but they accounted for 38% of all visits with one or more SDOH Z code assigned to a claim (Figure 2).

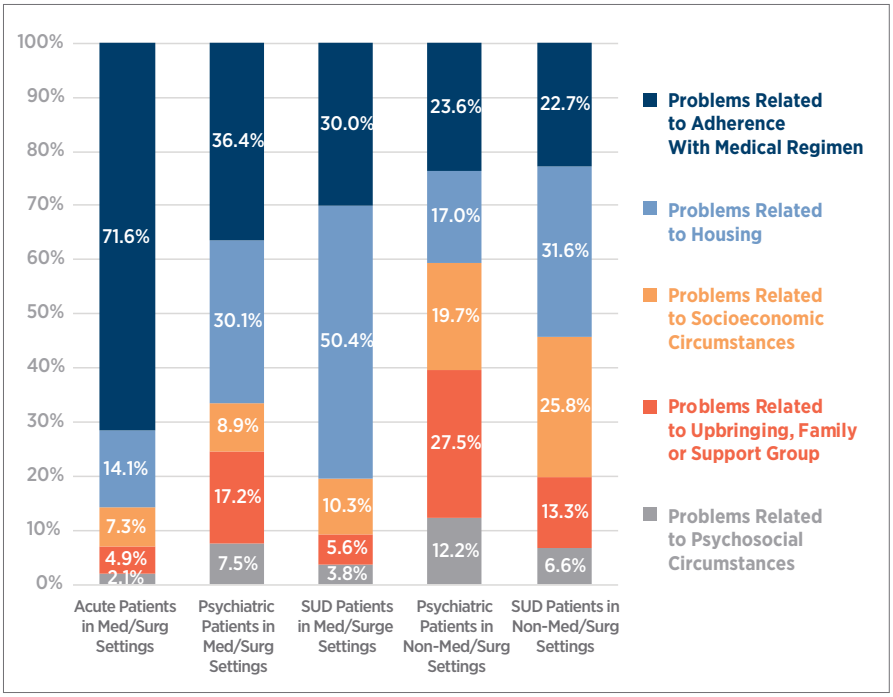
As a group, 36.3% of patients treated at Missouri's inpatient psychiatric facilities during 2018 were assigned one or more SDOH Z codes. This was compared to 2.9% at Inpatient Prospective Payment System hospitals and less than 1% at critical access hospitals (Figure 3). This again might signal the relationship between length of stay and identification of social risk factors, as well as the impact of standardized evaluations for these patients that capture both social and clinical risk factors.

Figure 3: Frequency of Inpatient and ED Visits at Missouri Hospitals With SDOH Z-Codes by Hospital and Type, 2018 (n=3,111,122)



Among acute care patients treated in medical/surgical care settings and assigned one or more of the SDOH Z codes, 71.6% were identified as having problems related to adherence with the medical regimen ordered by a physician.

Figure 4: Distribution of SDOH Z Code Types Assigned During Inpatient and ED Visits at Missouri Hospitals by Patient Type and Setting, 2018 (n=92,109)



Differences in Social and Clinical Risk Factors: Out of 3.1 million inpatient and ED visits at Missouri hospitals during 2018 that were evaluated for this study, 3% (n=92,109) were identified with social risk factors by the assignment of one or more SDOH Z codes. The types of social factors identified varied widely by both patient type and the setting in which they received care.

Among acute care patients treated in medical/surgical care settings and assigned one or more of the SDOH Z codes, 71.6% were identified as having problems related to adherence with the medical regimen ordered by a physician (Figure 4). The same category was most dominant among psychiatric patients treated in acute medical/surgical care settings; however, this was followed closely by problems related to housing stability, which largely is reflective of homelessness (Appendix Table 1). Regardless of setting, problems related to housing also was the dominant category for SUD patients who were assigned one or more SDOH Z codes during 2018.

For psychiatric patients in nonmedical/surgical settings who were identified with social risk, more than one out of four were coded with problems related to upbringing, family or primary social support group (Figure 4). The majority of these patients experienced physical, sexual or emotional abuse in childhood, or were placed in welfare custody (Appendix Table 1).

Significant differences in the principal reason for the visit also were observed between patients with and without SDOH Z code assignment and patient type. At 5.2% of all inpatient and ED visits during 2018, type 2 diabetes mellitus was the most common principal diagnosis for acute medical/surgical patients with one or more SDOH Z codes assigned to the record. Type 1 DM accounted for another

3.2% of visits from these patients. Compared to less than 1% for other patients, DM accounted for 8.5% of principal diagnoses for acute medical/surgical patients with one or more SDOH Z codes assigned to an inpatient or ED claim at a Missouri hospital during 2018 (Figure 5, top panel).

Compared to those without, psychiatric patients with an identified social risk factor during the visit were significantly more likely to have a principal diagnosis of chronic major depressive disorder, bipolar disorder, schizophrenia or schizoaffective disorders (Figure 5, middle panel).

Among SUD patients, those with one or more SDOH Z codes assigned to the record during an inpatient hospitalization or ED visit at a Missouri hospital during 2018 were more likely to have a principal diagnosis related to other stimulants, psychoactive substances, opioids and cocaine. SUD patients without an SDOH Z code identified were most likely to be treated for alcohol-related disorders (Figure 5, bottom panel).

Patient- and Provider-Level Predictors of SDOH Z Code Assignment: A hierarchical generalized logistic regression model was fit to 2018 inpatient and ED claims data from Missouri hospitals to assist in determining which hospital and patient characteristics contribute most to the probability a visit will result in the assignment of one or more SDOH Z code. Differences in the frequency and effects of patient-level risk factors for predictors included in the model are presented in Table 1.

Figure 5: Top Ten Principal Diagnosis Categories for Inpatient and ED Visits at Missouri Hospitals With SDOH Z Codes Compared to the Larger Population by Patient Type, 2018 (n=3,111,122)

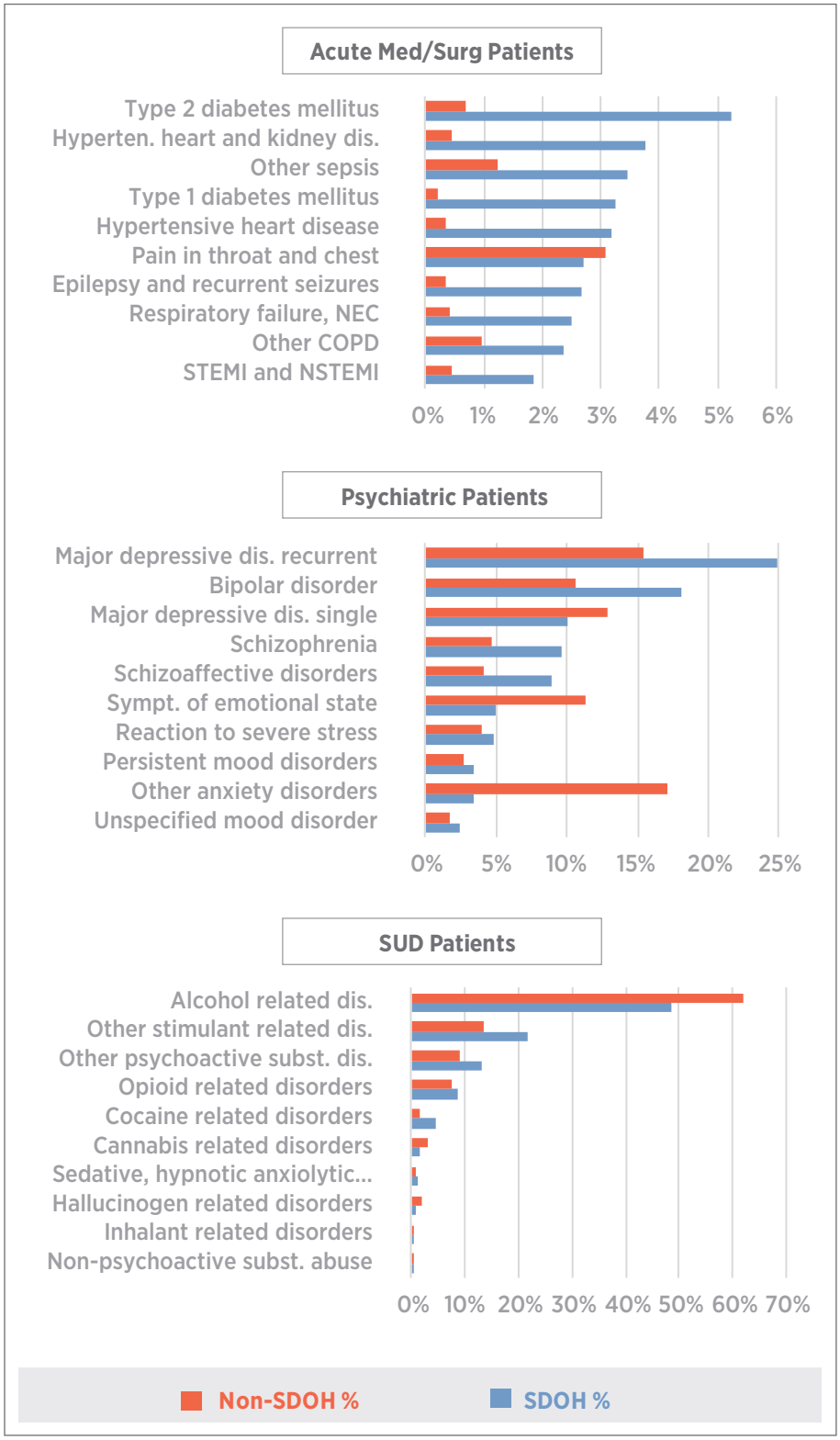


Table 1: Frequency and Effects of Covariates for Inpatient and ED Visits at Missouri Hospitals With and Without SDOH Z Codes, 2018 (n=3,111,122)

	Frequency			Model Results	
	Visits Without SDOH Z Code	Visits With SDOH Z-Code	Relative % Difference	Odds Ratio	P-Value
Visits with SDOH Z-Code	0.0%	100.0%	-	Dependent Variable	
Age Under 11	15.0%	3.2%	-78.3%	Reference Category	
Age 11 to 18	7.4%	7.6%	1.9%	2.570	<.0001
Age 19 to 34	23.9%	23.1%	-3.3%	3.720	<.0001
Age 35 to 64	34.3%	52.0%	51.6%	4.596	<.0001
Age 65 and Over	19.3%	14.0%	-27.5%	1.905	<.0001
Race White	73.1%	65.0%	-11.1%	Reference Category	
Race Black or African American	20.8%	30.2%	45.2%	1.816	<.0001
Other Race	6.1%	4.8%	-20.7%	1.136	<.0001
Female	56.9%	44.0%	-22.6%	Reference Category	
Male	43.1%	56.0%	29.8%	1.461	<.0001
Commercial Primary Payer	30.2%	13.7%	-54.6%	Reference Category	
Medicaid Primary Payer	25.0%	32.5%	30.0%	2.498	<.0001
Self-Pay or Charity Care	16.2%	22.9%	40.9%	3.039	<.0001
Medicare Primary Payer	24.7%	28.4%	14.6%	1.750	<.0001
Other Primary Payer	3.5%	2.4%	-32.4%	1.464	<.0001
High-Deprivation Census Tract	30.5%	40.2%	31.8%	1.217	<.0001
Psychiatric Visit	3.7%	31.3%	739.2%	4.212	<.0001
SUD Visit	1.3%	6.4%	378.2%	2.147	<.0001
ED Visit (0 Day Length of Stay)	75.9%	30.2%	-60.2%	Reference Category	
1 to 2 Day Length of Stay	9.8%	17.7%	80.1%	4.085	<.0001
3 to 5 Day Length of Stay	9.1%	27.1%	198.6%	4.462	<.0001
6 to 10 Day Length of Stay	3.6%	16.9%	373.1%	5.069	<.0001
Over 10 Day Length of Stay	1.6%	8.1%	392.4%	5.566	<.0001
Chronic Comorbidities Diagnosed During Visit	0.95	1.69	77.8%	1.206	<.0001
Psychiatric Comorbidities Diagnosed During Visit	0.22	1.23	444.7%	1.354	<.0001
Behavioral Risk Factors Diagnosed During Visit	0.42	0.91	118.2%	1.344	<.0001
Number of Visits (n)	**3,019,013**	**92,109**	**-**	**3,111,122**	
C-Statistic				**0.87**	
R^2				**0.27**	
Between-Hospital Type Variance				**0.57**	

Compared to patients without SDOH Z codes assigned, those with an identified social risk factor were more likely to be African American, male, and between the ages of 35 and 64. Among payer categories, patients with Medicaid and no insurance were 2.5 to 3 times as likely to be identified as having one or more social risk factor (OR = 2.498 and 3.039, respectively, P<0.0001). Psychiatric and SUD patients were 2 to 4 times as likely to be assigned one or more SDOH Z code (OR = 4.212 and 2.147, respectively, P<0.0001).

Supporting earlier observations on the association between providers' time with the patient and probability of identifying a social risk factor, a graded dose-response was observed between length of stay and likelihood of being assigned one or more SDOH Z code during the visit. Compared to ED patients, those with a hospitalization of more than 10 days were 5.6 times as likely to have a social risk factor identified and documented (OR = 5.566, P<0.0001). The presence of physical, psychiatric and behavioral comorbidities also was positively associated with the likelihood of an SDOH Z code being assigned to the claim during the visit.

Differences in the predicted and expected rates of SDOH Z code assignment by hospital type are included in Table 2. Holding constant the patient-level characteristics presented in Table 1, the model suggests that compared to other provider types, children's and psychiatric hospitals in Missouri are using SDOH Z codes at a frequency of 2.1 to 1.56 times higher than expected. Alternatively, critical access and post-acute hospitals are using the codes significantly less frequently than expected. The model estimated 4% undercoding among IPPS hospitals that accounted for 86% of total discharges in 2018. Importantly, these benchmarks are based on averages across all hospitals that previous research suggest to be underreported, meaning the true rates of undercoding may be more pronounced.

Table 2: Predicted and Expected Rates of SDOH Z Coding for Inpatient and ED Visits at Missouri Hospitals by Hospital Type, 2018

Hospital Type	n	Visits With SDOH Z Code	Total Visits	SDOH Percent	Predicted Percent	Expected Percent	P/E Ratio
Children's	3	3,067	177,332	1.7%	1.7%	0.8%	2.115
Psychiatric	7	5,237	15,385	34.0%	34.0%	21.8%	1.560
IPPS	74	81,803	2,668,202	3.1%	3.1%	3.2%	0.960
CAH	36	1,967	249,182	0.8%	0.8%	1.2%	0.642
Post-Acute	8	35	1,021	3.4%	3.6%	8.5%	0.421
Total	**128**	**92,109**	**3,111,122**	**3.0%**	**-**	**-**	**-**

Discussion

A better understanding of the practices used by different types of providers to identify, document and treat social risk factors is an important strategy to improve both the consistency of SDOH data generation and outcomes for socially complex patients. Missouri's psychiatric hospitals identify and diagnose one or more SDOH Z codes for more than one out of every three patients who walk through the door. At Royal Oaks Hospital in Windsor, Mo., nearly half of patients are assigned a social risk code. Several factors are important for acute medical/surgical care providers to better understand these institutional differences, including the following.

1. Which standardized assessment processes do behavioral health providers use to identify SDOH so frequently?
2. How is the social risk information captured through standardized assessments, electronic medical records, physicians' notes and other means matriculated into the ICD-10 Z codes and billing data systems?
3. Most importantly, what value-add is generated by the increased effort to identify and document SDOH, and how do behavioral health providers use this information to improve outcomes?

Several factors help explain the discrepancy in application of the SDOH Z codes between acute medical/surgical and other care settings. Two major factors include time and education. Due to differences in the nature of the reimbursement systems under which providers operate, acute medical/surgical settings tend to focus on stabilization and throughput, while psychiatric care has the advantage of more long-term, whole-person treatment. Behavioral care providers also tend to have additional social workers and other staff trained to focus on SDOH. Additionally, educational and training programs for staff in psychiatric care settings typically center on the whole person and integrated care models.

Another probable reason for the higher use of Z codes among psychiatric providers is due to SDOH being linked more closely to care authorization and reimbursement from payers in behavioral health settings. The standardized criteria used by many insurance companies for payment certification is based on the Length of Care Utilization System for adults and the Child and Adolescent Length of Care Utilization System for patients under age 18. The Dimensional Rating System from LOCUS and CALOCUS serves as the general assessment of determining the intensity and acuity of a patient's needs, which in turn, is used to determine which level of care is needed and recommended to the patient's health plan for authorization. Several of the six dimensions included in LOCUS and CALOCUS include social risk factors, which then inform subsequent clinical assessments and documentation. To be reimbursed fully, behavioral health providers are required to address the patient's deficits, barriers or shortcomings in the Functional Status, Recovery Environment and Treatment History dimensions if any of these areas are contributing to their illness.

"It's difficult to understate the importance of research that moves us closer to the goal of orienting our health care system toward seeing and treating patients as multifaceted, complex, biopsychosocial beings. At Compass Health Network, we regularly conduct needs assessments across our 46-county service area. As a full continuum behavioral health service and support organization, we focus on characterizing the health, sociodemographic and social determinants of health profiles of the populations in our regions.

It could be possible that behavioral health providers are, perhaps by virtue of training and enculturation, more attuned to the importance of SDOH as predictors of who shows up for treatment, who stays in treatment and who does well in treatment. The patients we see in our treatment facilities and hospitals are at much greater risk of morbidity and mortality from both organic pathophysiology and behavioral health factors than the general population. And, we've been sensitized to the fact that SDOH can either be risk or protective factors, and that if we don't find better ways and means of addressing them, we may fail to make much progress in improving and maximizing the impact of the care we provide. Taken as a whole, behavioral health providers are more likely to consider a wraparound approach to services, which views human beings and families as complex systems – and which may seek to replace a broken refrigerator, or provide respite care or food, as strategies for keeping a youth with a psychiatric diagnosis in the home, preventing an unnecessary psychiatric hospitalization."

Paul Thomlinson, Ph.D., Clinical Psychologist and Executive Director of the Compass Health Research Institute

SDOH also can share a causal role with chronic and acute mental illness. Patients living with environmental exposure to toxic stress; physical, emotional or sexual abuse; or drug and alcohol use disorders have a higher propensity for developing behavioral health problems because of these environmental factors. Similarly, patients with housing instability, uncertainties with food or other financial stressors face additional barriers to accessing health care services and are more likely to experience psychiatric emergencies. Socially complex patients also are less likely to adhere to prescribed medications and outpatient treatment following hospitalization for a mental health crisis. Failure to adhere to prescribed psychotropic and other medications results in a high likelihood of regression in a person's mental illness. As a result, many behavioral health practitioners and clinicians are trained to document the known barriers and limitations from both a clinical and nonclinical perspective that contribute to adverse outcomes for the patient.

Conclusions

The SDOH Z codes included in the ICD-10 clinical modification present an opportunity for hospitals and health systems to identify and diagnose patients with highly detailed social risk factors that can have a profound impact on health. While previous research has found inconsistent use of the codes across providers, this research finds that patient- and provider-level characteristics largely determine the likelihood of SDOH Z code assignment during a hospital encounter. Several factors, including the amount of time the patient spends at the hospital, significantly increase the odds a social risk factor will be identified and documented during the visit. Additionally, compared to just 2% of acute patients in acute medical/surgical care settings, more than one in three psychiatric and SUD patients in nonmedical/surgical care settings have one or more of the SDOH Z codes included on the discharge record. Understanding how social risk factors are identified, used to inform care and captured in uniform billing claims data by behavioral health care providers in particular, may be helpful in improving the standardized use of the codes by acute medical/surgical care providers, and more importantly, in improving outcomes for patients with nonclinical social complexities.

Appendix Table 1: Frequency of SDOH Z Codes Assigned During Inpatient and ED Visits at Missouri Hospitals, 2018

ICD-10 SDOH Z Code	Problems Related To:	Description	Count	Percent of SDOH	Rate per 10,000 Discharges
z9114	Adherence with Medical Regimen	Patient's other noncompliance with medication regimen	26,101	23.1%	83.90
z9119		Patient's noncompliance with other medical treatment and regimen	19,764	17.5%	63.53
z91128		Patient's intentional underdosing of medication regimen for other reason	6,094	5.4%	19.59
z91120		Patient's intentional underdosing of medication regimen due to financial hardship	2,133	1.9%	6.86
z9111		Patient's noncompliance with dietary regimen	1,957	1.7%	6.29
z9115		Patient's noncompliance with renal dialysis	1,852	1.6%	5.95
z91138		Patient's unintentional underdosing of medication regimen for other reason	1,143	1.0%	3.67
z91130		Patient's unintentional underdosing of medication regimen due to age-related debility	46	0.0%	0.15
z590	Housing	Homelessness	18,795	16.6%	60.41
z593		Problems related to living in residential institution	148	0.1%	0.48
z591		Inadequate housing	111	0.1%	0.36
z592		Discord with neighbors, lodgers and landlord	39	0.0%	0.13
z639	Psychosocial Circumstances	Problem related to primary support group, unspecified	1,895	1.7%	6.09
z91410		Personal history of adult physical and sexual abuse	1,566	1.4%	5.03
z638		Other specified problems related to primary support group	1,540	1.4%	4.95
z658		Other specified problems related to psychosocial circumstances	568	0.5%	1.83
z91411		Personal history of adult psychological abuse	324	0.3%	1.04
z659		Problem related to unspecified psychosocial circumstances	245	0.2%	0.79
z91419		Personal history of unspecified adult abuse	86	0.1%	0.28
z91412		Personal history of adult neglect	11	0.0%	0.04
z9149		Other personal history of psychological trauma, not elsewhere classified	7	0.0%	0.02
z644		Discord with counselors	6	0.0%	0.02

continued ▶

ICD-10 SDOH Z Code	Problems Related To:	Description	Count	Percent of SDOH	Rate per 10,000 Discharges
z599	Socioeconomic Circumstances	Problem related to housing and economic circumstances, unspecified	1,503	1.3%	4.83
z602		Problems related to living alone	1,352	1.2%	4.35
z609		Problem related to social environment, unspecified	1,129	1.0%	3.63
z608		Other problems related to social environment	591	0.5%	1.90
z598		Other problems related to housing and economic circumstances	575	0.5%	1.85
z597		Insufficient social insurance and welfare support	212	0.2%	0.68
z596		Low income	129	0.1%	0.41
z603		Acculturation difficulty	112	0.1%	0.36
z604		Social exclusion and rejection	69	0.1%	0.22
z600		Problems of adjustment to lifecycle transitions	15	0.0%	0.05
z605		Target of (perceived) adverse discrimination and persecution	12	0.0%	0.04
z594		Lack of adequate food and safe drinking water	8	0.0%	0.03
z595		Extreme poverty	8	0.0%	0.03
z559	Socioeconomic Circumstances (Education)	Problems related to education and literacy, unspecified	123	0.1%	0.40
z558		Other problems related to education and literacy	116	0.1%	0.37
z554		Educational maladjustment and discord with teachers and classmates	48	0.0%	0.15
z550		Illiteracy and low-level literacy	28	0.0%	0.09
z553		Underachievement in school	27	0.0%	0.09
z552		Failed school examinations	15	0.0%	0.05
z551		Schooling unavailable and unattainable	1	0.0%	0.00

continued ►

ICD-10 SDOH Z Code	Problems Related To:	Description	Count	Percent of SDOH	Rate per 10,000 Discharges
z560	Socioeconomic Circumstances (Employment)	Unemployment, unspecified	4,460	3.9%	14.34
z569		Unspecified problems related to employment	209	0.2%	0.67
z566		Other physical and mental strain related to work	101	0.1%	0.32
z575		Occupational exposure to toxic agents in other industries	91	0.1%	0.29
z563		Stressful work schedule	67	0.1%	0.22
z5689		Other problems related to employment	56	0.0%	0.18
z574		Occupational exposure to toxic agents in agriculture	43	0.0%	0.14
z578		Occupational exposure to other risk factors	38	0.0%	0.12
z5731		Occupational exposure to environmental tobacco smoke	33	0.0%	0.11
z572		Occupational exposure to dust	32	0.0%	0.10
z562		Threat of job loss	19	0.0%	0.06
z561		Change of job	16	0.0%	0.05
z564		Discord with boss and workmates	15	0.0%	0.05
z579		Occupational exposure to unspecified risk factor	13	0.0%	0.04
z571		Occupational exposure to radiation	8	0.0%	0.03
z5739		Occupational exposure to other air contaminants	6	0.0%	0.02
z5681		Sexual harassment on the job	4	0.0%	0.01
z576		Occupational exposure to extreme temperature	4	0.0%	0.01
z565		Uncongenial work environment	3	0.0%	0.01
z5682		Military deployment status	1	0.0%	0.00
z570		Occupational exposure to noise	0	0.0%	0.00
z577		Occupational exposure to vibration	0	0.0%	0.00
z653	Socioeconomic Circumstances (Legal)	Problems related to other legal circumstances	862	0.8%	2.77
z651		Imprisonment and other incarceration	341	0.3%	1.10
z652		Problems related to release from prison	49	0.0%	0.16
z654		Victim of crime and terrorism	15	0.0%	0.05
z655		Exposure to disaster, war and other hostilities	6	0.0%	0.02
z650		Conviction in civil and criminal proceedings without imprisonment	3	0.0%	0.01

continued ▶

ICD-10 SDOH Z Code	Problems Related To:	Description	Count	Percent of SDOH	Rate per 10,000 Discharges
z62810	Upbringing, Family or Support Group	Personal history of physical and sexual abuse in childhood	5,765	5.1%	18.53
z62811		Personal history of psychological abuse in childhood	1,997	1.8%	6.42
z6221		Child in welfare custody	1,687	1.5%	5.42
z630		Problems in relationship with spouse or partner	1,386	1.2%	4.45
z634		Disappearance and death of family member	1,357	1.2%	4.36
z62820		Parent-biological child conflict	949	0.8%	3.05
z635		Disruption of family by separation and divorce	893	0.8%	2.87
z6379		Other stressful life events affecting family and household	751	0.7%	2.41
z62819		Personal history of unspecified abuse in childhood	381	0.3%	1.22
z62812		Personal history of neglect in childhood	341	0.3%	1.10
z6372		Alcoholism and drug addiction in family	131	0.1%	0.42
z62898		Other specified problems related to upbringing	67	0.1%	0.22
z636		Dependent relative needing care at home	64	0.1%	0.21
z62891		Sibling rivalry	55	0.0%	0.18
z62821		Parent-adopted child conflict	48	0.0%	0.15
z631		Problems in relationship with in-laws	45	0.0%	0.14
z641		Problems related to multiparity	43	0.0%	0.14
z6332		Other absence of family member	38	0.0%	0.12
z62890		Parent-child estrangement NEC	35	0.0%	0.11
z62822		Parent-foster child conflict	31	0.0%	0.10
z6229		Other upbringing away from parents	15	0.0%	0.05
z620		Inadequate parental supervision and control	13	0.0%	0.04
z6222		Institutional upbringing	11	0.0%	0.04
z629		Problem related to upbringing, unspecified	9	0.0%	0.03
z640		Problems related to unwanted pregnancy	6	0.0%	0.02
z6331		Absence of family member due to military deployment	2	0.0%	0.01
z621		Parental overprotection	1	0.0%	0.00
z6371		Stress on family due to return of family member from military deployment	1	0.0%	0.00
z623		Hostility toward and scapegoating of child	0	0.0%	0.00
z626		Inappropriate (excessive) parental pressure	0	0.0%	0.00
na	**na**	**Total**	**113,121**	**100.0%**	**363.60**

Suggested Citation

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