

Use of Z-Codes to Record Social Determinants of Health Among Fee-for-service Medicare Beneficiaries in 2017

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INTRODUCTION

Social determinants of health are increasingly recognized as important contributors to individual health, population health, and healthcare spending.¹ In high-income countries, their inclusion in risk-adjustment models matters.² US adoption of ICD-10-CM diagnosis codes in 2015 introduced “Miscellaneous Z-Codes” that permit clinicians to record important social determinants or “factors influencing health status.” These codes include, for example, education and literacy status or employment status. Identifying and recording such conditions will be key to their future inclusion in risk-adjustment models. We examined Miscellaneous Z-Code use among Medicare fee-for-service (FFS) beneficiaries and compared characteristics of beneficiaries with and without Z-Codes. Recognizing the relationship between mental health and social determinants of health,³ we explored how Z-Codes were used among beneficiaries with diagnosed psychiatric conditions.

METHODS

Among Medicare beneficiaries continuously enrolled in FFS Medicare Parts A and B throughout 2017, we identified those with and without a Z-Code diagnosis and compared their demographics, Medicaid enrollment, residential ZIP Code median household income, hierarchical condition category (HCC) scores, and 2017 Medicare Part A and B expenditures. For beneficiaries with a psychiatric diagnosis (one or more ICD-10-CM F-Codes), we calculated odds of receiving a Z-Code and, within psychiatric diagnosis categories, examined the prevalence of specific Z-Codes including: education and literacy

(Z55), employment and unemployment (Z56), occupational risk factors (Z57), housing and economic circumstances (Z59), social environment (Z60), upbringing (Z62), and primary social support group (Z63). We used SPSS v25 (2017, Armonk, NY: IBM Corporation) for statistical analyses.

RESULTS

In 2017, 0.96% of our cohort had a Z-Code recorded; those with a Z-Code were younger, more likely to be male, black, and Medicaid-enrolled than those without one (Table 1). Compared with those without Z-Codes, beneficiaries with them lived in ZIP Codes with lower median household incomes and had higher HCC scores. Mean per capita Part A and B spending was \$26,852 (SD \$39,287) among beneficiaries with Z-Code diagnoses and \$9,530 (SD \$22,031) among those without them.

Z-Codes were more commonly recorded among beneficiaries with a psychiatric diagnosis: beneficiaries with alcoholism, drug disorders, and psychotic disorders were most likely to have a Z-Code recorded (Table 2). Among beneficiaries with Z-Code diagnoses, those with dementia had more recorded problems with the social environment, those with substance use and psychotic disorders had more recorded problems with employment and housing and economic circumstances, and those with mood and anxiety disorders had the highest prevalence of primary social support group problems.

DISCUSSION

In 2017, Z-Codes were recorded in less than 1% of the Medicare FFS population, an astoundingly low proportion of the population (given the well-understood association between socioeconomic status, health, and health services utilization).¹

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Table 1 Comparison of Medicare Fee-for-service Beneficiaries With and Without Z-Code Diagnoses 2017, Demographics, Illness Burden, Prevalence of Psychiatric Conditions, and Per Capita Medicare A and P Expenditures for Those With and Without a Z-Code

Variables	Z-Code recorded		p value
	No	Yes	
Number of Medicare FFS beneficiaries	30,523,773	297,110	
Percent	99.04%	0.96%	
Age			<i>p</i> < 0.0001
< 18	0.5%	0.4%	
18–45	4.2%	14.3%	
46–64	12.0%	26.0%	
65+	83.3%	59.3%	
Sex			<i>p</i> < 0.0001
Male	54.9%	59.9%	
Race			<i>p</i> < 0.0001
White	84.6%	80.6%	
Black	9.3%	13.1%	
Hispanic	2.0%	2.8%	
Other	4.1%	3.4%	
Medicaid enrolled	18.4%	43.3%	<i>p</i> < 0.0001
Median household income (\$)	61,679	58,512	<i>p</i> < 0.0001
STDEV	25,848	24,295	
Hierarchical condition category score	1.04	1.35	<i>p</i> < 0.0001
STDEV	1.03	1.28	
2017 per capita Medicare Part A and B expenditures (\$)	9350	26,852	<i>p</i> < 0.0001
STDEV	22,031	39,287	

Psychiatric conditions are measured by presence of ICD-10-CM diagnostic F-codes. STDEV means standard deviation. Median household income is measured at the beneficiary's residential ZIP Code. *p* value tests for statistical difference across columns using Student's *t* test for continuous variables and the chi-square test for categorical variables

This suggests Z-Codes were not being used nearly as often as would likely be appropriate. While beneficiaries with Z-Codes were younger, were sicker, and had annual medical expenditures almost threefold that of beneficiaries without them, the low rate of Z-Code use suggests they constitute a specific, but not sensitive, measure of socioeconomic need. Z-Codes were more commonly recorded among beneficiaries with psychiatric diagnoses; this may represent bias by providers recording these codes. Mental health professionals have a long used a multi-axial diagnostic framework that includes an evaluation of psychosocial and environmental factors that affect global functioning; they may simply be more accustomed to recording social determinants of health.

Our study is limited by its cross-sectional nature and reliance on administrative data. The observed patterns reflect clinician adoption of codes shortly after their introduction; current practice may differ.

Nonetheless, the observed patterns align with expectations: recorded social determinants correlate with indicators of poverty and behavioral health conditions. While we do not know the true prevalence of conditions codified by Z-Codes or the extent to which these conditions are explored by clinicians, the observed prevalence undoubtedly misses the majority of cases. Using natural language processing to extract and code data from electronic medical records⁴ may facilitate recording and categorization of social determinants of health and accelerate their use in population health management and value-based payment models.⁵ More importantly, routinely capturing that information might signal specific, important needs of these patients to care managers, care teams, payers, and policy makers who aim to leverage public resources to optimize healthcare delivery value and improve the population's health.

Table 2 Relationship Between Recorded F-Code Behavioral Health Conditions and Recorded Z-Code “Factors Influencing Health” Diagnoses Among Medicare Fee-for-service Beneficiaries, 2017

Diagnostic category	ICD-10-CM codes	Number of FFS beneficiaries		Odds ratio (95% CI)	Distribution of specific Z-Codes within diagnostic categories (defined as “problems with....”)						
		Without Z-Code	With Z-Code		Z55	Z56	Z57	Z59	Z60	Z62	Z63
					Education and literacy	Employment	Occupational risk factors	Housing and economic circumstances	Social environment	Upbringing	Primary social support group
Any F-Code	F00-F99	11,318,921	244,478	6.65 (6.59-6.71)	1.8%	7.7%	2.8%	44.1%	21.4%	11.4%	47.4%
Dementia	F00-F09	2,168,566	54,832	2.40 (2.38-2.42)	1.5%	6.2%	2.4%	50.1%	33.2%	8.6%	38.0%
Alcoholism	F10	538,741	43,875	8.62 (8.54-8.70)	1.3%	13.8%	1.3%	75.7%	16.7%	19.7%	28.8%
Tobacco dependence	F17	2,513,587	91,122	4.55 (4.52-4.59)	1.8%	11.8%	2.5%	67.9%	17.5%	16.7%	31.0%
Other drug disorders	F11-F16 and F18-F19	830,814	62,683	8.81 (8.74-8.88)	1.2%	14.1%	1.1%	72.8%	14.8%	21.5%	29.6%
Psychotic disorders	F20-F29	725,853	59,805	9.06 (8.98-9.13)	1.4%	16.2%	0.6%	73.9%	19.2%	20.2%	25.6%
Mood disorders	F30-F39	5,353,876	168,955	5.35 (5.32-5.39)	1.5%	8.8%	2.0%	44.6%	20.0%	15.1%	47.6%
Anxiety and other disorders	F40-F99	6,463,304	185,000	5.23 (5.19-5.26)	1.6%	8.2%	2.2%	40.3%	19.5%	13.8%	50.5%

Psychiatric conditions are measured by presence of ICD-10-CM diagnostic F-Codes

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Compliance with Ethical Standards:

CareJourney has IRB approval (“Understanding the drivers of ACO success in achieving low cost and high quality care”; Solutions IRB Study No. 2017/08/15) to study health service utilization using CMS data (CMS DUA 51593) through their Virtual Research Data Center.

Conflict of Interest: The authors declare that they do not have a conflict of interest.

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