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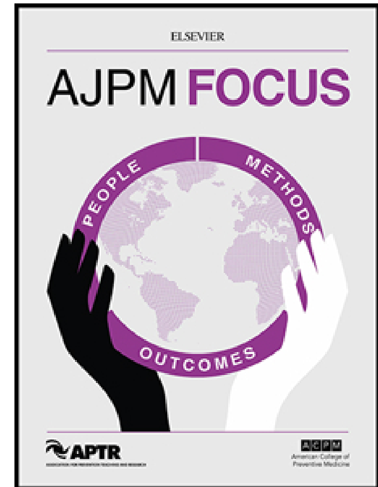

Social Determinants of Health-Related Z Codes and Health Care Among Patients With Hypertension

Jun Soo Lee PhD , Kara E. MacLeod DrPH ,
Elena V. Kuklina MD, PhD , Xin Tong MPH ,
Sandra L. Jackson PhD

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Highlights

- We examined ICD-10-CM SDOH-related Z codes (Z55–Z65) among adults with hypertension.
- Documentation of SDOH-related Z codes was less than 4% for all 3 insurance groups.
- Documentation was higher among inpatient claims for all 3 insurance groups.
- Those with SDOH-related Z codes had more chronic conditions.
- Medical expenditures were more than 1.5 times higher for those with SDOH-related Z codes.

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Social Determinants of Health-Related Z Codes and Health Care Among Patients With Hypertension

Jun Soo Lee, PhD[1*], Kara E. MacLeod, DrPH[1, 2*], Elena V. Kuklina, MD, PhD[1], Xin Tong, MPH[1], Sandra L. Jackson, PhD[1]

[1] Division for Heart Disease and Stroke Prevention, Centers for Disease Control and Prevention, Atlanta, GA

[2] ASRT, Inc., Atlanta, Georgia, USA

* Joint first authorship.

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Corresponding author:
Jun Soo Lee, PhD
Division for Heart Disease and Stroke Prevention
Centers for Disease Control and Prevention
4770 Buford Hwy, Building 107
Atlanta, GA 30341
Tel: +1 770-488-8978
Email: PQA2@cdc.gov

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ABSTRACT

INTRODUCTION: Tracking social needs can provide information on barriers to controlling hypertension and the need for wraparound services. No recent studies have examined ICD-10-CM SDOH-related Z codes (Z55–Z65) to indicate social needs with a focus on patients with hypertension.

METHODS: Three cohorts were identified with a diagnosis of hypertension during 2016–2017 and continuously enrolled in fee-for-service (FFS) insurance through June 2021: (1) commercial, age 18–64 (n=1,024,012); (2) private insurance to supplement Medicare (Medicare Supplement), age 65+ (n= 296,340); and (3) Medicaid, age 18+ (n=146,484). Both the proportion of patients and health care encounters or visits with a SDOH-related Z code were summarized annually. Patient and visit characteristics were summarized for 2019.

RESULTS: In 2020, the highest annual documentation of SDOH-related Z codes was among Medicaid beneficiaries (3.02%, 0.46% commercial, 0.42% Medicare supplement); documentation was higher among inpatient than outpatient visits for all insurance types. Z63 (related to primary support group) was more common among commercial and Medicare Supplement beneficiaries, and Z59 (housing and economic circumstances) was more common among Medicaid beneficiaries. The 2019 total unadjusted medical expenditures were 1.85, 1.78, and 1.61 times higher for those with a SDOH-related Z code than those without for commercial, Medicare Supplement, and Medicaid, respectively. Patients with a SDOH-related Z code also had higher proportions of diagnosed chronic conditions. Among Medicaid beneficiaries, differences in the presence of a SDOH-related Z code by race or ethnicity were observed.

CONCLUSIONS: Although currently underreported, SDOH-related Z codes provide an opportunity to integrate social and medical data and may help decision makers understand needs for additional services among individuals with hypertension.

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Keywords: Z codes, social determinants of health, hypertension, ICD-10-CM, delivery of health care

INTRODUCTION

Social determinants of health (SDOH) refer to the social and economic conditions of daily life that can result in more social needs and, therefore, affect a range of health and life outcomes. Many health systems are screening and addressing patients' social needs as part of broader strategies to improve health.[1--6] The lack of standardized, national data on social needs linked to health care encounters is a barrier to understanding the patterns and impacts of health system efforts.[7] In late 2015, SDOH-related V codes in the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) system were converted to SDOH-related Z codes in the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) code system to indicate social and economic circumstances that are tied to social needs. Z55 (problems related to education and literacy) through Z65

(problems related to other psychosocial circumstances) are standardized for documenting considerations related to SDOH.[8-11]

In 2019, the American Hospital Association (AHA) Coding Clinic recommended also using notes from nonphysician providers (e.g., community health workers) for documenting SDOH-related Z codes at hospitals and health systems.[12] Nonphysician providers can document using SDOH-related Z codes during any type of encounter.[9] SDOH-related Z codes can be an efficient and lower-cost way to share information through medical records and insurance claims among clinicians, hospitals, and health plans. The AHA and multiple professional healthcare organizations promote screening and documenting using SDOH-related Z codes in medical records.[13]

There are few studies examining patterns of SDOH-related Z codes or the associations of SDOH-related Z codes with outcomes using large hospital discharge, Medicaid, or Medicare fee-for-service (FFS) data.[5, 7, 14-17] Several studies including 2 or more years of data reported increasing trends of SDOH-related Z codes over time. Nevertheless, the presence of SDOH-related Z codes (~2% or lower) was limited in all of these studies.[7,17] In addition, few studies have focused on specific electronic health record systems.[18-20]

Hypertension is a significant public health problem; approximately 50% of adults in the United States have hypertension.[21] Attributable to high blood pressure, the death rate increased by 34.2% and the number of deaths increased by 65.3% from 2009 to 2019.[22] Timely diagnosis and adequate blood pressure treatment are essential for preventing adverse outcomes of hypertension, including stroke and associated disability and death.[22, Error! Reference source not found.]

In a Centers for Medicare & Medicaid Services (CMS) study of Medicare FFS beneficiaries in 2017, hypertension was the most common condition (72%) reported among 467,136 beneficiaries with a SDOH-related Z code.[16] The results of the CMS study indicate a need to consider social needs and health and that hypertension may be a particularly relevant chronic condition. No recent SDOH-related

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Z code studies have focused solely on patients with hypertension to better understand patterns. The present study updates the literature by year and beneficiary type and by focusing on a specific chronic condition. We examined the presence of SDOH-related Z codes among patients with hypertension enrolled in commercial, Medicare Supplement, or Medicaid insurance plans and their health care encounters from January 1, 2018, to June 30, 2021. This research may inform larger efforts to track social need barriers to hypertension control and for providing wraparound services to improve patient care and well-being.[24,25] To expand the literature on this topic we:

1) explored whether documentation of SDOH-related Z codes increased over time by encounter setting;[7,17]
2) described what SDOH-related Z codes were documented; and
3) described patterns of health care use and patient characteristics associated with the presence of an SDOH-related Z code.[5, 14, 15] To avoid associations with the COVID-19, this analysis was conducted for 2019 as it was the most recent year prior to the pandemic.

METHODS

Data Source

We used the MarketScan® Research Databases: Commercial Claims and Encounters (CCAE), Medicare Supplement, and Medicaid from January 1, 2016, to June 30, 2021. The CCAE contains inpatient, emergency department (ED), and outpatient claims among enrollees and their dependents from employer-sponsored commercial health insurance plans. The CCAE is collected from more than 300 employers, more than 30 health plans, and over 500 hospitals in the United States. The Medicare Claims Database contains claims information for retirees with employer-sponsored supplemental health plans. The Medicaid data represents beneficiaries from 5–8 de-identified states (states varies by year). We accessed all data through Treatment Pathways (TxP), a tool to extract data through a cloud-based online

query.[26] All data were de-identified, and this study was exempt from review by the Institutional Review Board of the Centers for Diseases Control and Prevention.

Study Population

We derived 3 study cohorts that were based on beneficiaries in different insurance plans: commercial insurance, Medicare Supplemental, and Medicaid. As shown in Figures 1A and 1B, we used data from January 1, 2016, through December 31, 2017, to identify our study cohorts using age and hypertension diagnoses. We used data from January 1, 2018, through June 30, 2021 for additional inclusion and exclusion criteria and for our analyses. We restricted the patients to ages 18–64 years for the commercial cohort, age 65 years or older for the Medicare cohort, and age 18 years or older for the Medicaid cohort. In addition, we included patients with at least one diagnosis of hypertension (International Classification of Diseases, Tenth Revision, Clinical Modification [ICD-10-CM] diagnosis code of I10-I15,[27] (Appendix Table 1) in inpatient, ED, or outpatient claims from January 1, 2016, through December 31, 2017, and continuously enrolled from January 1, 2018, through June 30, 2021, in noncapitated or fee-for-service health insurance. The requirement for continuous enrollment in fee-for-service health insurance was implemented for comparable health care use and cost patterns. Finally, to exclude patients with gestational hypertension and pregnancy-related healthcare, we excluded patients with a pregnancy diagnosis at any point from January 2016 through June 2021 (Appendix Table 2). Our final study cohorts were: commercial (n=1,024,012); Medicare Supplement (n=296,340); and Medicaid (n=146,484) (Figures 1A and 1B).

Essentially, the analysis populations were identified with hypertension January 1, 2016, through December 31, 2017 and their subsequent health care encounters were examined for analysis. Thus, we required continuous enrollment for the entire time period to examine the trends in SDOH-related Z codes. We explored whether documentation increased over time for more recent years.[7,17] To avoid

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associations with the COVID-19 pandemic or COVID-19 related disruptions, some results are presented for 2019, the most recent year prior to the COVID-19 pandemic.

Timepoints for inclusion of patients and analysis:

	January 1, 2016-December 31, 2017	January 1, 2018-June 30, 2021
Inclusion criteria:	Hypertension identified and enrolled	Continued to be enrolled.
Analysis:	Excluded	Included

Study Measures

The following SDOH-related Z codes were included: Z55 (problems related to education and literacy), Z56 (problems related to employment and unemployment), Z57 (occupational exposure to risk factors), Z58 (problems related to physical environment), Z59 (problems related to housing and economic circumstances), Z60 (problems related to social environment), Z62 (problems related to upbringing), Z63 (other problems related to primary support group), Z64 (problems related to certain psychosocial circumstances), and Z65 (problems related to other psychosocial circumstances) (Appendix Table 1).[9]

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Statistical Analysis

First, to explore whether documentation of SDOH-related Z codes increased over time by encounter setting, [7,17] we summarized data over time per patient and per encounter and calculated changes: the proportion of unique patients with any claim with an SDOH-related Z code by insurance type was summarized by quarter from January 2018 to June 2021 (Figure 2); and 2) the proportion of encounters with SDOH-related Z codes by insurance type was stratified by settings and summarized by quarter from January 2018 to June 2021 (Figure 3). Overall differences between groups within insurance type and between insurance type were evaluated using a two-proportion Z-test. To quantify the change over time, the percentage change was calculated for each group and presented with the trends:

pharmacy visits are the average numbers of inpatient, ED, outpatient, and pharmacy visits in 2019. The ICD-10-CM codes to identify the Charlson CI dummy variables are in the Appendix Table 3. All the dummy variables for the diseases were identified as equal one if at least one ICD-10-CM code of the respective ICD-10-CM were identified in any settings. Patients with established hypertension were defined if there were at least one inpatient, emergency department, or outpatient hypertension diagnosis (ICD-10-CM=I10-I15) from January 1, 2016, to December 31, 2017. Dash (-) indicates that data are not available in the respective databases. *P-value<0.05 ** P-value<0.01 *** P-value<0.001.

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CRediT AUTHOR STATEMENT

Jun Soo Lee: Writing- Original draft preparation, Writing- Reviewing and Editing, Formal analysis, Methodology, conceptualization, Software.
Kara E. MacLeod: Writing- Original draft preparation, Writing- Reviewing and Editing, Formal analysis, Methodology, conceptualization.
Elena V. Kuklina: Writing- Reviewing and Editing, conceptualization.
Xin Tong: Writing- Reviewing and Editing, conceptualization.
Sandra L. Jackson: Writing- Reviewing and Editing, conceptualization, Supervision.

All authors approved this manuscript.

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Declaration of interests

☒ The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

☐ The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: