

National Documentation and Coding Practices of Noncompliance: The Importance of Social Determinants of Health and the Stigma of African-American Bias

Joseph M. Geskey, DO, MBA, MS-PopH¹, Jodi Kodish-Wachs, MD¹, Heather Blonsky, MAS¹, Samuel F. Hohman, PhD, MS-HSM^{1,2}, and Steve Meurer, PhD, MBA, MHS^{1,2}

Abstract

Patient records serve many purposes, one of which includes monitoring the quality of care provided that they can be analyzed through coding and documentation. Z-codes can provide additional information beyond a specific clinical disorder that may still warrant treatment. Social Determinants of Health have specific Z-codes that may help clinicians address social factors that may contribute to patients' health care outcomes. However, there are Z-codes that specify patient noncompliance which has a pejorative connotation that may stigmatize patients and prevent clinicians from examining nonadherence from a social determinant of health perspective. A retrospective cross-sectional study was performed to examine the associations of patient and encounter characteristics with the coding of patient noncompliance. Included in the study were all patients >18 years of age who were admitted to hospitals participating in the Vizient Clinical Data Base (CDB) between January 1, 2019 and December 31, 2019. Almost 9 million US inpatients were included in the study. Of those, 6.3% had a noncompliance Z-code. Use of noncompliance Z-codes was associated with the following odds estimate ratio in decreasing order: the presence of a social determinant of health (odds ratio [OR], 4.817), African American race (OR, 2.010), Medicaid insurance (OR, 1.707), >3 chronic medical conditions (OR, 1.546), living in an economically distressed community (OR, 1.320), male gender (OR, 1.313), nonelective admission status (OR, 1.245), age <65 years (OR, 1.234). More than 1 in 15 patient hospitalizations had a noncompliance code. Factors associated with these codes are difficult, if not impossible, for patients to modify. Disproportionate representation of African-Americans among hospitalizations with noncompliance coding is concerning and urgently deserves further exploration to determine the degree to which it may be a product of clinician bias, especially if the term noncompliance prevents health care providers from looking into socioeconomic factors that may contribute to patient nonadherence.

Introduction

Factors related to noncompliance reflect characteristics of the patient, their disease, providers/health care system, and socioeconomic variables.¹ These same factors influence health care outcomes. For example, the COVID-19 pandemic has highlighted disproportionate higher rates of infection, hospitalizations, and

COVID-19-related mortality in non-Hispanic White populations.² These disparities may be impacted by underlying differences in the burden of chronic diseases and the presence of adverse social determinants of health (SDOH) between various racial and ethnic groups.³ Additionally, patients who live in less affluent zip codes experience worse clinical outcomes than those who live in more affluent ones.^{4,5} Medical documentation and coding can capture social and economic barriers patient experience which may allow for better identification and tracking of inequities and health outcomes.⁶

How care is delivered by providers is an important component of achieving equity if bias exists. Health care providers may attribute negative characteristics disproportionately to certain racial and ethnic groups.⁷ In one study, psychiatrists and medical students were more likely to pair African-American faces with words such as noncompliance.⁸ If these implicit associations

¹Vizient, Inc., Chicago, IL

²Rush University, Chicago, IL

Corresponding Author:

Joseph M. Geskey, DO, MBA, MS-PopH, 9314 Tartan Ridge Boulevard, Dublin, OH 43017.

American College of Medical Quality 2023 Vol. 38(2) 87-92

© The Authors 2023.

This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

DOI: 10.1097/JMQ.0000000000000112

impact physician behavior, this might contribute to disparities in outcomes between different racial and ethnic groups if physicians have a different understanding than patients toward improving adherence.⁹ Furthermore, if health care providers attribute non-compliance to patients it may lead to devaluation of the patient and lead to worse outcomes, especially if the reasons for nonadherence have not been systematically addressed.¹⁰⁻¹² Unfortunately, even if providers are aware of the negative associations with noncompliance and instead are trying to indicate nonadherence, current coding terminology does not substitute nonadherence for noncompliance.

Since 2016, health care providers in the United States have been able to use Z-codes as part of the International Statistical Classification of Diseases and Related Health Problems 10th Edition (ICD-10) to report on patient-level SDOH as well as noncompliance. Although the assignment of a noncompliance code was associated with adverse renal and cardiovascular outcomes in US veterans,¹³ and only 2% of patients have been reported to have an SDOH Z-code over the period these codes have been available for use,¹⁴⁻¹⁶ there has not been to the authors' knowledge a large US study that examined how frequently the use of noncompliance is being documented along with SDOH Z-codes and other socioeconomic factors that impact adherence. Therefore, this study examines how frequently noncompliance is being coded and assesses what factors influence their usage.

Methods

Authors performed a retrospective cross-sectional study to examine the associations of patient and encounter characteristics with the coding of patient noncompliance. Included in the study were all patients >18 years of age who were admitted to hospitals participating in the Vizient Clinical Data Base (CDB) between January 1, 2019 and December 31, 2019. The CDB is a health analytics platform using administrative claims and billing data that has been cited extensively in industry research and is the improvement data platform in over 1000 hospitals across the United States for the purposes of benchmarking hospital cost, mortality, and length-of-stay.¹⁷ Patients who were admitted under hospice status were not included in the study.

Noncompliance was identified based on the use of ICD-10 diagnosis codes that specify failure to comply with treatment for care (Z91.1x). Patients who had at least one of these codes documented served as the dependent variable for analysis while independent variables of interest included: patient age, gender, race/

ethnicity, principal insurance, presence of chronic/comorbid conditions, coding of any social determinants of health (SDOH-ICD-10 diagnosis codes Z55 through Z65), weekend admission, and the patient's Distressed Community Index (DCI) decile. [Please see Table 1 for specific Z-codes and their associated definitions for both non-compliance and SDOH].

The DCI combines 7 metrics using available census bureau data to assess the economic well-being of communities across the United States into deciles ranging from the most prosperous (1) to the most distressed (10).¹⁸ DCI is assigned based on a patient's residential zip code, and deciles of DCI in this study population were used to compare the percentage of patients with a noncompliance code.

Binary response variables were used for noncompliance and SDOH (presence or absence) and sex was reported as either male or female, so authors further elected to dichotomize all study variables in the following manner: nonelective admission compared to an elective admission; ≥ 1 SDOH compared to no SDOH; > 3 chronic/comorbid conditions compared to ≤ 3 chronic/comorbid conditions since greater use of primary health services is seen in this cohort of patients > 65 years¹⁹; African-American race compared to non-African-American race; age < 65 years compared to age ≥ 65 years; male gender compared to non-male gender; Medicaid insurance status compared to non-Medicaid insurance status; weekend admission compared to non-weekend admission. Descriptive statistics were tabulated and included chi-square or t-test significance results. A *P* value of less than 0.05 was deemed statistically significant. A stepwise logistic regression model was also constructed to determine the strength of association of the independent variable within the context of the other variables (SAS Enterprise Guide Version 7.15).

Because this study involved minimal risk to subjects and protected private health information could not be identified, it was not subject to formal IRB approval.

Results

Nearly 9 million inpatient hospitalizations occurred between January 1, 2019 and December 31, 2019 from the hospitals reporting data to CDB. Fifty-six percent of hospitalizations were female; just over 58% were under the age of 65 years; approximately 18% were African-American and more than 37% had more than 3 chronic/comorbid conditions. Approximately 6.3% (571 584) of the total number of hospitalizations had at least one code of noncompliance. The relationship between the variables

studied and their association with non-compliance can be found in Table 2. All variables had *P* values that were significant at the 0.05 level, and all but one—the presence of a weekend admission—had *P* values <0.0001.

Table 3 presents the odds ratios of the variables included in the regression model. The only variable

that did not have a 95% CI >1 was the day of admission, meaning whether a patient was admitted on a weekend vs a weekday did not influence whether they had a noncompliance code. In decreasing order of the odds of having a noncompliance code were the following variables: presence of at least one SDOH, African-American race, Medicaid insurance status,

Table 1. ICD-10 Codes for Noncompliance and Social Determinants of Health.

Term	ICD-10 Z-codes	Definition/category
Noncompliance	Z91.1	Noncompliance with medical treatment and regimen
	Z91.11	Noncompliance with dietary regimen
	Z91.12	Intentional underdosing of medical regimen
	Z91.120	Noncompliance due to financial hardship
	Z91.128	Noncompliance for other reason
	Z91.13	Unintentional underdosing of medication regimen
	Z91.130	Unintentional underdosing of medication regimen due to age-related debility
	Z91.138	Unintentional underdosing of medication regimen due to other reason
	Z91.14	Patient's other noncompliance with medication regimen
	Z91.15	Patient's noncompliance with renal dialysis
Social determinants of health	Z91.19	Patient's noncompliance with other medical treatment and regimen
	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
	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

Table 2. Noncompliance Study Cohort Adult Hospitalizations in CY 2019.

Variable	Compliant		Noncompliant		Total		<i>P</i> value	
	8340	256	571	584	8911	840		
Admit status- non-elective	6340	612	541	194	6881	806	77.2%	<0.001
≥1 Social determinant of health	210	887	69	622	280	509	3.1%	<0.001
>3 chronic/comorbid conditions	3116	298	330	215	3446	513	38.7%	<0.001
Race/ethnicity – African-American	1426	342	196	486	1622	828	18.2%	<0.001
Age <65	4786	334	404	858	5191	192	58.3%	<0.001
Gender – male	3594	488	323	455	3917	943	44.0%	<0.001
Payer – Medicaid	1520	436	177	845	1698	281	19.1%	<0.001
Distressed Community Index decile >4	3681	201	333	070	4014	271	45.0%	<0.001
Weekend admission	1685	432	133	907	1819	339	20.4%	0.02

Table 3. Odds Ratio Estimates.

Odds ratio estimates

Variables	Point estimate	95%		Odds ratio
		confidence interval		
Presence of at least one SDOH vs none	3.535	3.501	3.570	4.817
African-American vs non-African-American race	1.934	1.922	1.946	2.010
Medicaid vs non-Medicaid insurance status	1.374	1.365	2.333	1.707
Presence of >3 chronic medical conditions vs not having >3 chronic medical conditions	2.319	2.305	1.946	1.546
Distressed Community Index >4 vs not >4	1.260	1.253	1.268	1.320
Male vs female gender	1.531	1.523	1.540	1.313
Non-elective vs elective admission	4.063	4.015	4.112	1.245
Age <65 vs not <65 years	1.853	1.841	1.866	1.234
Weekend vs non-weekend admission	0.992	0.986	0.999	1.159

greater chronic disease burden, living in a relatively more economically distressed community, male gender, nonelective admission status, and patients <65 years of age.

Figure 1 demonstrates the association between economic insecurity and the likelihood of having a noncompliance code. For example, in the most affluent decile within the United States, only one out of approximately 26 hospitalizations had a noncompliance code compared to the most impoverished decile where one out of 9 hospitalizations had a noncompliance code. Only 12.2% of the 571 584 hospitalizations had a noncompliance code in the study period and had at least one documented SDOH.

Discussion

This study suggests that coding of noncompliance is associated with factors that are difficult for patients to modify. Additionally, despite the subjective nature of what noncompliance may mean to individual practitioners (ie, health care providers may have different operational thresholds of what causes them to document noncompliance) use of the term may stigmatize patients because of the perception that nonadherence is a direct patient behavior meant to ignore recommendations that practitioners believe is in their patients' best interest.²⁰ Yet, it has been known for decades that patients take great efforts to manage their health despite individual beliefs, preferences, and decisions

when making health-related decisions while navigating the complexity involved in managing multiple chronic conditions.^{21,22} Despite this, the current study found that hospitalized patients with >3 comorbid and/or chronic medical conditions were more than twice as likely to be coded as noncompliant.

The use of the term noncompliance, without screening for SDOH, can lead to potential bias while missing important social factors that have been demonstrated to impact health outcomes.²³⁻²⁷ Hospitalized patients with an SDOH code in this study were more than four times likely to be associated with the coding of noncompliance and may offer a better explanation for nonadherence than a deliberate decision made by the patient. Unfortunately, only 12% of hospitalized patients had an associated SDOH coded in this study which suggests that SDOH screening may not be a uniform practice within hospitals. If it is occurring, the results are not being reflected by contemporary coding practices. It cannot be excluded that documentation of the noncompliance code is meant to explain why a patient is nonadherent. For example, Z91.120 (noncompliance due to financial hardship) could match a similar SDOH Z-code (Z59-problems related to housing and economic circumstances). However, a cross-sectional study of US hospitals and physician practices reported that approximately 24% of hospitals and 16% of physician practices are screening for food insecurity, housing instability, utility needs, transportation needs, and

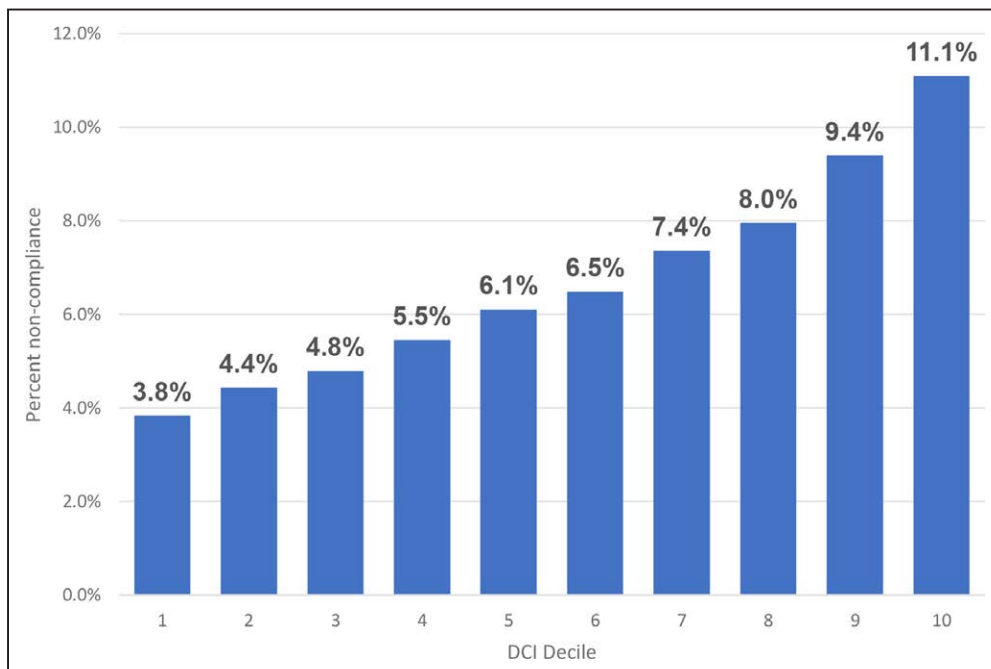


Figure 1. Percentage of hospitalizations coded as noncompliant vs DCI decile*. *indicates P value <0.001 for hospitalizations coded noncompliant in DCI decile >4 vs DCI decile < 4. DCI, Distressed Community Index.

interpersonal violence.²⁸ In one study among Medicare and Medicaid beneficiaries, 56.9% of patients had at least one health-related social need, which suggests further studies are needed to examine whether a more robust capture of SDOH can influence noncompliance documentation.²⁹

The finding of the African-American race being associated with noncompliance confirms other studies that have reported racial bias in 2 single institutions' research articles that examined negative patient descriptors.^{30,31} Even if providers did not intend to document noncompliance but a potentially less pejorative term such as nonadherence, if it is not otherwise paired with a reason for nonadherence, it may lead to negative stereotypes. Pejoratively associated terms such as noncompliance, especially when it is disproportionately applied to African-American patients, may contribute to mistrust and contribute to health inequities. A recent review of 58 studies suggested that mistrust may explain medication nonadherence in African-American patients.³² It is important to state that the variable of race should not be understood to signify physiological differences that lead to health inequities but an indication of how social and structural determinants disproportionately impact non-White patients.³³

An additional strength of this study was the ability to correlate patient zip code data with economic data to highlight the association of lower-income communities with the coding of noncompliance which further suggests that nonadherence may not indicate a deliberate action on behalf of the patient but rather his or her attempts at prioritizing a myriad of expenses—health care, food, housing, transportation—to be able to maintain basic social needs. The DCI has been shown to improve surgical risk adjustment in health outcomes in disadvantaged communities^{4,5,34,35} along with demonstrating higher COVID-19 cases and mortality rates which may also assist hospitals and health care systems to prioritize screening for social needs in economically disadvantaged neighborhoods.³⁶

One of the weaknesses of this study is that inpatient codes of noncompliance were examined. It is possible that primary care physicians with established outpatient relationships may not document and code noncompliance as frequently. Second, there may be differences between the inpatient population captured in the CDB versus the total of hospital inpatients. Third, the administrative collection of data could have misclassification of race and other variables due to differences in documentation and coding practices across the United States, but the national nature of this study and the strength of associations

in the findings make this seem less likely. Fourth, medication data were not analyzed to determine if there was an association between the number of medications and noncompliance since there are Z-codes related to medication nonadherence. Also, the authors did not examine whether coding for noncompliance has changed in hospitals over a longer period of time or whether these patients persist in having this code over time. Finally, documentation and coding may not reflect true provider attitudes about why patients may fail to adhere to treatment recommendations.

In conclusion, the coding of noncompliance is associated with disease burden, nonelective hospital admissions, and nonmodifiable patient factors such as sex, age, race, the presence of SDOH, zip code of residence, and insurance status. These data might accelerate future quality improvement work and advance health equity by identifying those patients who are currently coded as “non-compliant” and focus on that subset of patients by performing SDOH screening and implementing equity-promoting interventions for those who screen positive. Further studies should examine whether coding of noncompliance, even if they contain the reason for nonadherence, lead to stigmatization of patients and inequitable outcomes and whether substituting SDOH codes in lieu of noncompliance codes lead to less stigma while reducing inequitable health outcomes.

References

1. Steiner JF. Rethinking adherence. *Ann Intern Med.* 2012;157:580–585.
2. Mackey K, Ayers CK, Kondo KK, et al. Racial and ethnic disparities in COVID-19–related infections, hospitalizations, and deaths: a systematic review. *Ann Intern Med.* 2021;174:362–373.
3. Bambino DBG, Shah A, Doubeni CA, et al. The disproportionate impact of COVID-19 on racial and ethnic minorities in the United States. *Clin Infect Dis.* 2021;72:703–706.
4. Mehaffey JH, Hawkins RB, Charles EJ, et al. Distressed communities are associated with worse outcomes after coronary artery bypass surgery. *J Thorac Cardiovasc Surg.* 2020;160:425–432.e9.
5. Mehaffey JH, Hawkins RB, Charles EJ, et al. Socioeconomic “Distressed Communities Index” improves surgical risk-adjustment. *Ann Surg.* 2020;271:470–474.
6. Jacobs ZG. Codifying social determinants of health: a gap in the ICD-10-CM. *J Gen Intern Med.* 2021;36:3205–3207.
7. Hall WJ, Chapman MV, Lee KM, et al. Implicit racial/ethnic bias among health care professionals and its influence on health care outcomes: a systematic review. *Am J Public Health.* 2015;105:e60–e76.

8. Londono Tobon A, Flores JM, Taylor JH, et al. Racial implicit associations in psychiatric diagnosis, treatment, and compliance expectations. *Acad Psychiatry*. 2021;45:23–33.
9. Brundisini F, Vanstone M, Hulan D, et al. Type 2 diabetes patients' and providers' differing perspectives on medication nonadherence: a qualitative meta-synthesis. *BMC Health Serv Res*. 2015;15:516.
10. Wollny A, Pentzek M, Herber OR, et al. General practitioners' attitudes towards patients with poorly controlled type 2 diabetes: a qualitative study. *BMC Fam Pract*. 2018;19:49.
11. Wexler R, Elton T, Taylor CA, et al. Physician reported perception in the treatment of high blood pressure does not correspond to practice. *BMC Fam Pract*. 2009;10:23.
12. Rätsep A, Oja I, Kalda R, et al. Family doctors' assessment of patient- and health care system-related factors contributing to non-adherence to diabetes mellitus guidelines. *Prim Care Diabetes*. 2007;1:93–97.
13. Gosmanova EO, Molnar MZ, Alrifai A, et al. Impact of non-adherence on renal and cardiovascular outcomes in US veterans. *Am J Nephrol*. 2015;42:151–157.
14. Truong HP, Luke AA, Hammond G, et al. Utilization of social determinants of health ICD-10 z-codes among hospitalized patients in the United States, 2016–2017. *Med Care*. 2020;58:1037–1043.
15. 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 (Baltim)*. 2020;99:e23818.
16. Weeks WB, Cao SY, Lester CM, et al. Use of Z-Codes to record social determinants of health among fee-for-service Medicare beneficiaries in 2017. *J Gen Intern Med*. 2020;35:952–955.
17. CDB/Healthcare Analytics Platform for Clinical Benchmarking [Internet]. Available at: <https://www.vizientinc.com/our-solutions/clinical-solutions/clinical-data-base>. cited 2022 February 17.
18. The Economic Innovation's Group Distressed Communities Index--2014-2018.* Available at: <http://eig.org/dci>.
19. Barrio-Cortes J, Castaño-Reguillo A, Beca-Martínez MT, et al. Chronic diseases in the geriatric population: morbidity and use of primary care services according to risk level. *BMC Geriatr*. 2021;21:278.
20. Russell S, Op't Hoog C, Daly J, et al. Nurses and "difficult" patients: negotiating non-compliance. *J Adv Nurs*. 2003;43:281–287.
21. Stamer M, Schmacke N, Richter P. Noncompliance: a never-ending story. Understanding the perspective of patients with rheumatoid arthritis. *Forum Qual Sozialforschung/ Forum Qual Soc Res*. 2013;14.
22. Wakai E, Ikemura K, Kato C, et al. Effect of number of medications and complexity of regimens on medication adherence and blood pressure management in hospitalized patients with hypertension. *PLoS One*. 2021;16:e0252944.
23. Marmot M. Social determinants of health inequalities. *Lancet*. 2005;365:1099–1104.
24. Cole MB, Nguyen KH. Unmet social needs among low-income adults in the United States: Associations with health care access and quality. *Health Serv Res*. 2020;55(Suppl 2):873–882.
25. Li Y, Jasani F, Su D, et al. Decoding nonadherence to hypertensive medication in New York City: a population segmentation approach. *J Prim Care Commun Health*. 2019;10:2150132719829311.
26. Beltrán S, Arenas DJ, López-Hinojosa IJ, et al. Associations of race, insurance, and zip code-level income with nonadherence diagnoses in primary and specialty diabetes care. *J Am Board Fam Med*. 2021;34:891–897.
27. Todor L, Dougherty S, Hohmeier KC, et al. Factors associated with medication nonadherence among Medicare low-income subsidy beneficiaries with diabetes, hypertension, and/or heart failure. *J Manag Care Spec Pharm*. 2021;27:971–981.
28. Frazee TK, Brewster AL, Lewis VA, et al. Prevalence of screening for food insecurity, housing instability, utility needs, transportation needs, and interpersonal violence by US physician practices and hospitals. *JAMA Netw Open*. 2019;2:e1911514.
29. Holcomb J, Highfield L, Ferguson GM, et al. Association of social needs and healthcare utilization among Medicare and Medicaid beneficiaries in the Accountable Health Communities Model. *J Gen Intern Med*. 2022.
30. Sun M, Oliwa T, Peek ME, et al. Negative patient descriptors: documenting racial bias in the electronic health record. *Health Aff (Millwood)*. 2022;41:203–211.
31. Himmelstein G, Bates D, Zhou L. Examination of stigmatizing language in the electronic medical record. *JAMA Netw Open*. 2022;5:e2144967.
32. Yudell M, Roberts D, DeSalle R, et al. 70 signatories. NIH must confront the use of race in science. *Science*. 2020;369:1313–1314.
33. Hall GL, Heath M. Poor medication adherence in African Americans is a matter of trust. *J Racial Ethn Health Disparities*. 2021;8:927–942.
34. Charles EJ, Mehaffey JH, Hawkins RB, et al. Investigators for the Virginia cardiac services quality initiative. Socioeconomic distressed communities index predicts risk-adjusted mortality after cardiac surgery. *Ann Thorac Surg*. 2019;107:1706–1712.
35. Mehaffey JH, Hawkins RB, Charles EJ, et al. Socioeconomically distressed communities associated with long-term mortality after bariatric surgery. *J Surg Res*. 2019;243:8–13.
36. Hawkins RB, Charles EJ, Mehaffey JH. Socio-economic status and COVID-19-related cases and fatalities. *Public Health*. 2020;189:129–134.