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Adjusting for Patient Economic/Access Issues in a Hypertension Quality Measure

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Abstract

Introduction: The American Heart Association and American College of Cardiology have proposed adjusting hypertension-related care quality measures by excluding patients with economic/access issues from the denominator of rate calculations. No research to date has explored the methods to operationalize this recommendation or how to measure economic/access issues. This study applied and compared different approaches to populating these denominator exceptions.

Methods: Electronic health record data from 2019 were used in 2021 to calculate hypertension control rates in 84 community health centers. A total of 10 different indicators of patient economic/access barriers to care were used as denominator exclusions to calculate and then compare adjusted quality measure performance. Data came from a nonprofit health center–controlled network that hosts a shared electronic health record for community health centers located in 22 states.

Results: A total of 5 of 10 measures yielded an increase in adjusted hypertension control rates in ≥50% of clinics (average rate increases of 0.7–3.71 percentage points). A total of 3 of 10

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measures yielded a decrease in adjusted hypertension control rates in >50% of clinics (average rate decreases of 1.33–13.82 percentage points). A total of 5 measures resulted in excluding >50% of the clinic's patient population from quality measure assessments.

Conclusions: Changes in clinic-level hypertension control rates after adjustment differed depending on the measure of economic/access issue. Regardless of the exclusion method, changes between baseline and adjusted rates were small. Removing community health center patients experiencing economic/access barriers from a hypertension control quality measure resulted in excluding a large proportion of patients, raising concerns about whether this calculation can be a meaningful measure of clinical performance.

INTRODUCTION

As value-based payment models expand, healthcare delivery organizations are increasingly being held accountable for patient outcomes rather than service delivery. However, the shift toward value-based payments has occurred in the context of growing recognition that health outcomes are shaped by individual and community-level structural and social risk factors—many of which are not directly addressable by healthcare systems.[1–3] This has contributed to a national debate about whether and how to avoid penalizing healthcare organizations serving socially disadvantaged groups, particularly by adjusting payments on the basis of population-level social risk.[4–6] Several recent publications have explored whether to include social data in performance measure calculations, questioning whether adjustments might mask poor healthcare quality. There is not yet a consensus on the impact of or optimal methodology for social risk adjustment.[5,7–9]

As a common medical condition closely associated with SES, hypertension offers an interesting case study to explore the strategies for operationalizing social risk–related quality performance adjustments. Patients with lower SES are more likely to have high blood pressure (BP), have uncontrolled BP, and die from BP-related comorbidities.[10–14] Socioeconomic disparities in hypertension outcomes stem from a wide range of social factors, including healthcare access, food insecurity, and ability to afford medications as well as the stress associated with financial insecurity.[11,15–17] On the basis of consistent and compelling evidence that social conditions are associated with hypertension outcomes, in a 2019 guideline, the American Heart Association and American College of Cardiology (AHA/ACC) proposed a strategy to avoid penalizing delivery settings by adjusting hypertension-related care quality measures by excluding patients with economic/access issues from the denominator of certain performance measures for adults with high BP.[18] However, the guidelines do not define economic/access issues, which contributes to ambiguity around how to operationalize this exclusion. Since the interpretation of this exclusion could impact reported rates of hypertension control/performance, measure specification has immediate relevant implications.

Social risk–related quality performance adjustments are particularly relevant to safety-net community health centers (CHCs) that provide care to low-income, uninsured, and other underserved patients regardless of their ability to pay. CHCs are at the forefront of efforts to shift toward alternative payment models that reward quality over quantity of services and

thus are likely to be affected by the proposed social risk adjustment models.[19,20] Using data from an integrated electronic health record (EHR) platform that serves a national network of CHCs, different measures of patient economic/access issues were explored to create performance measure denominator exceptions and then examined the impacts of these different approaches on hypertension performance.

METHODS

All data are from OCHIN (not an acronym), a nonprofit health center–controlled network that hosts a centrally managed instance of Epic EHR for 882 CHC clinics across 22 U.S. states. CHCs in the OCHIN network are primarily Federally Qualified Health Centers (FQHCs) or FQHC Look-Alikes, which provide comprehensive primary care for populations with low income and other access barriers. In 2019, OCHIN CHCs provided care for close to 3 million patients; 57% of these patients had income under the federal poverty line; 50% were on Medicaid, and 23% were uninsured.

Study Sample

This analysis included data from all OCHIN clinics providing primary care to >500 patients with documented hypertension in 2019. Relevant clinical visits and hypertension diagnoses were defined using the Current Procedural Terminology and the Healthcare Common Procedure Coding System codes provided in the National Committee for Quality Assurance Clinical Quality Measure Controlling High Blood Pressure (quality identification number 236 [NQF 0019]).

The baseline rate of controlled hypertension at each clinic was calculated as of December 31, 2019, according to the National Committee for Quality Assurance technical specifications for patients aged 18–85 years. A patient was considered to have hypertension if they had any preventive care visit in 2019 and an active diagnosis of essential hypertension within the first 6 months of 2019. Blood pressure control was determined using the most recent BP documented in the measurement year and considered controlled at <140/<90 mmHg. Data from 2019 rather than from 2020 were used on the basis of the recognition that care patterns changed dramatically in early 2020 because of the coronavirus disease 2019 (COVID-19) pandemic.

Measures

Economic/access issues were identified using 4 measures: patient-reported financial insecurity, percentage of federal poverty level (FPL), insurance status, and census tract–level Social Deprivation Index (SDI). Patient-reported financial insecurity was operationalized as any positive response to EHR-integrated screening questions on food insecurity, trouble paying for child care, trouble paying utilities, housing instability, or transportation access barriers. These data came from social determinants of health (SDH) documentation functions added to the OCHIN EHR in 2016.[21] Percentage of FPL is based on patient-reported annual household income and family size at the time of clinic registration and then annually. FQHCs collect these data to meet federal reporting requirements. The percentage of FPL indicating economic/access issues was categorized either as 0% (no reported income)

or as ≤100% FPL (both 50% FPL and 138% FPL were assessed; because only minor differences were found between the various cut offs, only 0% and 100% are presented here for brevity). Insurance status was extracted at every encounter and applied using 2 approaches, tested separately: always uninsured (i.e., did not have insurance at any visit during the measurement period) and sometimes uninsured (i.e., at least 1 visit without insurance). Finally, patient address information was linked to a census tract–level indicator of financial insecurity—the SDI.[22] The SDI is an area-level composite measure of 7 neighborhood demographic characteristics collected in the American Community Survey.[23] SDI is scaled from 0 to 100 and represents nationwide percentiles; for example, an SDI value of 75 indicates that a patient lives in a census tract that is worse off than 75% of census tracts nationally. For this study, SDI cut offs of 50, 75, and 90 from the 2017 SDI data were used to indicate that the patient might have economic/access issues on the basis of the census tract in which they lived.

These 4 variables also were combined into a composite variable that reflected any indication of economic/access issues. Two versions of this variable were created. In one, the most restrictive classification was used, which included the 0% FPL cut off (no income), any positive patient-reported financial insecurity, the SDI cut off of 90, and the never insured flag. In a second, the most inclusive classification was used, which included the 100% FPL cut off, any positive patient-reported financial insecurity, the SDI cut off of 50, and the sometimes uninsured flag. This project was approved by the Kaiser Permanente Northwest IRB.

Statistical Analysis

Patients with hypertension were identified at each clinic, their most recent BP values were extracted, and these data were then linked with the 4 measures of economic/access issues. Clinic-based demographic summaries were created. Baseline hypertension control rates with no exclusions were calculated for the entire patient population and stratified by clinic. The rates of patients with controlled hypertension were then recalculated, excluding those with documented economic/access barriers, using each of the indicators described earlier. Finally, each clinic's baseline hypertension control rate was compared with the adjusted rates to determine whether an increase or decrease in hypertension control was observed because of each exclusion method. The clinics for which adjusted hypertension control rates improved, worsened, or did not change after denominator exclusions were calculated as well as the average difference in control rates per clinic.

Insurance status and SDI data were available for most patients, whereas SDH screenings and FPL were available only for a smaller subset. When no data were available for a certain indicator, that patient remained in the exclusion-based rate calculation. For both SDH screenings and FPL exclusions, a secondary analysis was added to calculate baseline and adjusted rates restricted to those patients for whom these data were available.

RESULTS

In 2019, 84 OCHIN clinics served >500 patients with hypertension with a median of 4,947 patients per clinic (Table 1). The median patient age was 47.4 years, 21.9% were Hispanic/

Latinx, 16.1% were non-White, 60.7% were female, and 70.8% indicated English as a preferred language. The median proportion of patients with EHR-based SDH screens was 1.7%, the median number at or below 100% FPL was 56.6%, the median proportion of uninsured visits was 18.7%, and the median proportion of patients with hypertension was 17.2%. Median SDI was 73.9. Overall, the median proportion of patients with controlled hypertension in the measurement period was 64.2% (range across clinics: 49.5%–79.0%, SD: 7.1).

Patient-reported SDH screening data were available for 18.7% (n=13,507) of 72,375 patients with hypertension (Table 2). Of these, 5,631 (41.7% of those with screens, 7.8% of total) had screenings indicating financial insecurity. Removing these patients from the hypertension performance measure calculation resulted in an adjusted population hypertension control rate of 64.2%, no change from the baseline value. FPL data were available for 55,843 (77.2%) patients. Using a cut off of 0% FPL (no income), 11,318 patients were removed from the calculation, resulting in an increase in hypertension control of 0.5 percentage points (64.7%); using a cut off of 100% FPL, 36,580 patients were removed, resulting in an increase in hypertension control of 0.2 percentage points (64.4%).

Because SDH screening data and FPL data were not available for all patients, hypertension control performance was recalculated, limited to patients with these data documented (Table 3). Of the 13,507 patients with documentation of SDH screening, 5,631 (41.7%) screened positive for financial insecurity and were excluded from the performance measure calculation; after removing these patients from the denominator, the adjusted hypertension control rate was 64.9% (vs 64.2% in primary analysis). Of the 55,843 patients with FPL information, 11,318 (20.3%) were removed using 0% FPL, and 36,580 (65.5%) were removed using 100% FPL. These changes led to adjusted hypertension control rates of 65.2% and 65.4%, respectively (compared with 64.2% baseline value).

All patient records included data on insurance status. Using any uninsured visit in the measurement year removed 14,398 (19.9%) patients from the measure calculation; using always uninsured removed 10,816 (14.9%) patients (Table 2). Doing so resulted in population-wide adjusted hypertension control rates of 64.9% for each exclusion type, which reflected a 0.7 percentage point increase from the baseline value.

These analyses assessed the impact of removing patients living in more vulnerable census tracts from measure performance calculations. More than 99% of patients had valid address information and were assigned census tract–level SDI data (Table 2). Using an SDI cut off of 90 (i.e., excluding those who lived in the most vulnerable 10% of census tracts nationally) removed 25,202 (34.8%) patients from the performance measure calculation, resulting in a 0.3 percentage point increase in the adjusted hypertension control rate (from 64.2% to 64.5%); using a cut off of 75 (i.e., those living in the most vulnerable quartile of census tracts nationally) removed 41,544 (57.4%) patients, resulting in an increase of 0.8 percentage points (from 64.2% to 65.0%); and using a cut off of 50 (i.e., those living in the most vulnerable half of census tracts nationally) removed 58,788 (81.2%) patients, resulting in an increase of 1.4 percentage points (from 64.2% to 65.6%).

Next, the composite economic/access issues variables were applied to the rate calculations (Table 2). Using the most restrictive version of the combined variable (0% FPL cut off, any positive patient-reported financial insecurity, SDI 90 cut off value, and the never insured flag) removed 40,429 (55.9%) patients from the performance measure calculation, resulting in an increase of 1.3 percentage points in the observed hypertension control rate (65.5%). Using the least restrictive version of this variable (100% FPL cut off, any positive patient-reported financial insecurity, SDI 50 cut off value, and the sometimes uninsured flag) removed 66,799 (92.3%) patients, resulting in an increase of 1.7 percentage points in the observed population-level hypertension control rate (65.9%).

Of the 10 measures examined, 5 yielded an increase in hypertension control rates in ≥50% of study clinics (Table 4). For example, removing patients using the SDI 50 cut off led to an improved performance measure in 51% of clinics, with an average increase of 3.8 percentage points per clinic, and removing patients using never insured led to improved performance in 77% of clinics, with an average increase of 2.3 percentage points. The most inclusive composite measure showed the most change, with an average adjusted hypertension control estimate of 11.5 percentage points higher than the unadjusted rate. Notably, whereas some clinics' adjusted hypertension control rates improved using these exclusions, others saw declines. For example, even though the SDI 50 cut off resulted in an increase in hypertension control rates in 51% of clinics, the other 49% saw a decrease. For 3 exclusion strategies, 100% FPL, SDI 75 cut off, and the less restrictive composite measure of any marker, there was a decrease in hypertension control rates in >50% of clinics.

DISCUSSION

The national conversation about social risk–based quality adjustments has moved from largely theoretical to practical. This is exemplified in the AHA/ACC guidelines for reporting performance on BP control that suggest removing patients facing economic barriers from the quality measure numerator and denominator. This method of risk adjustment raises important questions, including how to identify patients with economic barriers and what it means to remove them from quality and performance measures, especially in clinics that primarily serve low-income patients. Previous research suggests that adjusting for community-level socioeconomic context may improve assessed diabetes control quality measures for some providers in CHC settings.[24] This analysis adds to the literature by assessing the impact of applying different patient- and community-level measures of economic/access barriers as exclusions for hypertension control performance calculations. These findings have important implications for ongoing debates about social risk adjustment.

First, in clinics serving populations with low SES, removing patients experiencing economic/access barriers from the denominator results in excluding a large portion of a clinic's patient population from the hypertension control calculation. For example, in these analyses, 81% of patients with hypertension lived in neighborhoods with SDI over the national median of 50, and >65% reported household incomes <100% of FPL and were therefore removed from calculations when using these methods. Identifying economic/access issues on the basis of responses to social risk screening questions resulted in

removing fewer patients (7.8%) from the denominator, likely because of the relatively low numbers of patients with documented social risk screening data (only 18.7%). Even if they become more commonly and accurately documented in EHRs, novel measures of economic/access issues (such as ICD-10 Z codes used to indicate financial insecurity) would still result in performance assessments that exclude a large proportion of CHC patients with hypertension. This raises new concerns about whether a calculation based on a relatively small fraction of patients can be a meaningful measure of clinical performance and whether different methods are needed to account for patient panel characteristics in quality measure calculations. Other methods, for example, presenting data stratified by financial security or benchmarking against health systems serving similarly disadvantaged populations, may be more helpful for assessing hypertension care quality in CHC populations.[25]

Second, the impact of these patient exclusions on changes in clinic-level hypertension control measures was not clearly meaningful. Although census tract–based SDI data were available for all patients, removing patients using this measure improved the observed hypertension control rates in 45%–51% of clinics; hypertension control performance decreased in others. In clinics where the observed performance improved, changes were moderate, and because many patients were excluded from the calculation, they were based on a relatively small proportion of the original clinic population. Although data on insurance were available for most CHC patients (and may capture a particularly under-resourced group of patients) and hypertension control performance measures improved in 77% of CHCs when patients who were never insured were removed from the quality measure calculation, the average absolute increase was small. To enable standardization, future recommendations on social risk–related adjustments should carefully define populations at risk.

Arguments in support of accounting for social risk factors in value-based payment suggest that this approach could avoid penalizing clinics serving lower-income communities.[5,26] The finding that some clinics showed an increase in their hypertension control rate after adjustments indicates that that may not be true in the CHC context. Regardless, any changes were relatively modest: it is unclear whether they translate to meaningful differences in performance and, in turn, quality payments. Others have warned that adjusting for social risk factors may mask or even increase disparities in care.[7,8,27,28] These findings did not address the differences between clinics that may explain the variation in changes in observed hypertension control rates. This was by design to see how this exclusion would apply in a broad sense but may be important to explore as a next step in understanding when adjustments such as these are most useful.

Limitations

Measures of economic/access issues used for this analysis were limited to those that were readily available in the EHR and may not adequately capture economic/access issues as defined by the AHA/ACC guidelines. It is possible that other, more precise, patient-reported measures (e.g., tax-reported income) would have a different impact on rate calculations. In addition, each of the measures used has limitations; for example, patient-reported outcomes were only available for a subset of this population, and community-level data may not consistently reflect patient-level social conditions.[29] Furthermore, although this work

explores only measures relevant to the AHA/ACC recommendations related to economic/access issues, many other social stressors, including racism and discrimination, contribute to racial/ethnic disparities in hypertension prevalence and control.[30] Future research should focus on identifying accurate indicators of both social risk and patients' experience of financial adversity. Finally, this study was conducted on the basis of data from the EHR data from ambulatory clinics serving primarily low-income populations and may not generalize to other clinical settings or patient populations.

CONCLUSIONS

In these analyses, no single measure of economic/access issues emerged as the most appropriate or accurate to use as a denominator exclusion for hypertension control quality measures. Findings underscore the complexity and nuance of quality measure exclusions, specifically, and risk adjustment more generally, showing that within the context of CHCs —where many patients experience financial insecurity—most methods result in removing large portions of the patient population from performance assessment. More robust evidence on different methods that account for the effects of patients' social risk factors on clinic performance is clearly needed.

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Table 1.

Clinic Characteristics of Adult Patients

Clinic characteristics	Clinics represented	Median	Lower quartile	Upper quartile
Number of adult patients	84	4,947	3,187	6,495
Median adult patient age	84	47.4	44.8	49.9
Hispanic patients, %	84	21.9	8.5	62.6
Non-White patients, %	84	16.1	6.7	38.8
Female patients, %	84	60.7	57.7	63.5
English-language preference patients, %	84	70.8	47.8	92.1
Patients with EHR-based SDH screen,[a] %	84	1.7	0.1	31.0
Patients with ≤100% FPL,[b] %	84	56.6	30.0	70.3
Patients with uninsured visit, %	84	18.7	8.9	35.9
Median SDI, percentage[c]	84	73.9	65.9	82.4
Patients with hypertension, %	84	17.2	12.2	22.1
Number with HTN	84	758	622	1,009

Note: The table includes all patients with at least 1 visit at the clinic in 2019 who were aged ≥18 years as of December 31, 2019.

[a]Presence of any response to EHR-embedded screening questions on food insecurity, trouble paying for child care, trouble paying utilities, housing instability, or transportation access barriers.

[b]Percentage of FPL; 0 represents no reported household income, and ≤100 includes all of those with a family income at or below the FPL.

[c]The SDI is an area-level composite measure of 7 neighborhood demographic characteristics collected in the American Community Survey and reported at the census tract level, measured as a percentage. For example, ≥90 represents patients living in census tracts worse off than 90% of census tracts nationally.

EHR, electronic health record; FPL, federal poverty level; HTN, hypertension; SDH, social determinants of health; SDI, Social Deprivation Index.

Table 2.

BP Control Adjusted by Excluding Patients With Various Markers of FI, OCHIN Community Health Centers, 2019

Adjustment approach	Denominator: HTN patients with FI marker available	Baseline BP control rate, %	Denominator: patients removed using marker	% Removed from denominator	Denominator: patients after adjustment	Numerator: patients with controlled BP after adjustment	BP control rate, after adjustment, %
Base – rate with no adjustment	72,375	64.2	—	—	72,375	46,460	—
Financial insecurity SDH[a]	13,507	64.2	5,631	7.8	66,744	42,840	64.2
FPL = 0 (no income)[b]	55,843	64.2	11,318	15.6	61,057	39,482	64.7
FPL ≤100%[b]	55,843	64.2	36,580	50.5	35,795	23,045	64.4
Sometimes uninsured[c]	72,375	64.2	14,398	19.9	57,977	37,635	64.9
Always uninsured[c]	72,375	64.2	10,816	14.9	61,559	39,924	64.9
SDI ≥90th percentile[d]	72,053	64.2	25,202	34.8	47,173	30,410	64.5
SDI ≥75th percentile[d]	72,053	64.2	41,544	57.4	30,831	20,034	65.0
SDI ≥50th percentile[d]	72,053	64.2	58,788	81.2	13,587	8,914	65.6
Any marker (most restrictive)[e]	72,375	64.2	40,429	55.9	31,946	20,918	65.5
Any marker (least restrictive)[e]	72,375	64.2	66,799	92.3	5,576	3,672	65.9

[a]Presence of a positive response to EHR-embedded screening question to food insecurity, trouble in paying for child care, trouble in paying utilities, housing instability, or transportation access barriers.

[b]Percentage of FPL; 0 represents no reported household income, and ≤100 includes all of those with a family income at or below the FPL.

[c]Insurance status at clinic visits in 2019.

[d]The SDI is an area-level composite measure of 7 neighborhood demographic characteristics collected in the American Community Survey and reported at the census tract level, measured as a percentage. For example, ≥90 represents patients living in census tracts worse off than 90% of census tracts nationally.

[e]Composite measures reflecting any measure of financial insecurity. Most restrictive applies to patients meeting ≥1 of these criteria: 0% FPL, any positive patient-reported financial insecurity, SDI ≥90th percentile, always uninsured. Least restrictive applies to patients meeting ≥1 of these criteria: ≤100% FPL, any positive patient-reported financial insecurity, SDI ≥50th percentile, sometimes uninsured.

BP, blood pressure; EHR, electronic health record; FI, financial insecurity; FPL, federal poverty level; HTN, hypertension; SDH, social determinants of health; SDI, Social Deprivation Index.

Table 3.

Blood Pressure Control Using Only Patients With Financial Insecurity Measures Available

Adjustment approach	Patients with HTN with financial insecurity data available	Denominator patients removed using marker	% Removed from denominator	BP control rate, before adjustment, %	BP control rate, after adjustment, %
Financial insecurity SDH[a]	13,507	5,631	41.7	64.70	64.9
FPL = 0 (no income)[b]	55,843	11,318	20.3	64.50	65.2
FPL ≤100%	55,843	36,580	65.5	64.50	65.4

[a]Presence of positive response to EHR-embedded screening questions on food insecurity, trouble paying for child care, trouble paying utilities, housing instability, or transportation access barriers.

[b]Percentage of FPL; 0 represents no reported income, and 100 includes all of those with a family income at or below the FPL.

BP, blood pressure; FPL, federal poverty level; HTN, hypertension; SDH, social determinants of health.

Table 4.

Clinic-Level Blood Pressure Control Rate Differences Using Various Markers of Financial Insecurity, 84 OCHIN Community Health Centers, 2019

Adjustment approach	Clinics with improved BP control rates after adjustment			Clinics with decreased BP control rates after adjustment		
	Count (%)	Avg. rate diff	Range of rate diff (SD)	Count (%)	Avg. rate diff	Range of rate diff (SD)
Financial insecurity SDH[a]	29 (35)	0.27	0.01–0.84 (0.24)	31 (37)	−0.61	−0.001 to −3.62 (0.9)
FPL = 0 (no income)[b]	50 (60)	0.98	0.01–3.34 (0.92)	30 (36)	−0.51	−0.01 to −4.22 (0.87)
FPL ≤100%[b]	41 (49)	2.12	0.04–13.04 (2.39)	43 (51)	−1.33	−0.03 to −7.87 (1.94)
Sometimes uninsured[c]	61 (73)	3.71	0.04–11.75 (3.37)	23 (27)	−0.61	−0.18 to −17.35 (4.4)
Always uninsured[c]	65 (77)	0.70	0.01–2.57 (0.68)	19 (23)	−0.53	−0.02 to −3.75 (0.75)
SDI ≥ 90th percentile[d]	40 (48)	1.95	0.09–6.22 (1.7)	41 (49)	−0.78	−0.04 to −4.66 (1.23)
SDI ≥ 75th percentile[d]	38 (45)	1.23	0.02–5 (1.29)	46 (55)	−1.88	−0.01 to −1.45 (0.44)
SDI ≥ 50th percentile[d]	43 (51)	1.05	0–4.72 (1.07)	41 (49)	−4.34	−0.06 to −1.76 (0.56)
Any marker (most restrictive)[e]	53 (63)	2.27	0.4–7.12 (1.64)	31 (37)	−1.88	−0.07 to −14.38 (2.56)
Any marker (least restrictive)[e]	36 (43)	10.38	0.12–47.88 (11.5)	48 (57)	−13.82	0.001 to −67.35 (13.13)

[a]Presence of positive response to EHR-embedded screening questions on food insecurity, trouble paying for child care, trouble paying utilities, housing instability, or transportation access barriers.

[b]Percentage of FPL; 0 represents no reported household income, and ≤100 includes all of those with a family income at or below the FPL.

[c]Insurance status at clinic visits in 2019.

[d]The SDI is an area-level composite measure of 7 neighborhood demographic characteristics collected in the American Community Survey and reported at the census tract level, measured as a percentage. For example, ≥90 represents patients living in census tracts worse off than 90% of census tracts nationally.

[e]Composite measures reflecting any measure of financial insecurity. Most restrictive applies to patients meeting ≥1 of these criteria: 0% FPL, any positive patient-reported financial insecurity, SDI ≥90th percentile, always uninsured. Least restrictive applies to patients meeting ≥1 of these criteria: ≤100% FPL, any positive patient-reported financial insecurity, SDI ≥50th percentile, sometimes uninsured.

Avg., average; BP, blood pressure; diff, difference; FPL, federal poverty level; HTN, hypertension; SDH, social determinants of health; SDI, Social Deprivation Index.