

ORIGINAL ARTICLE

Do state-level cultural competency educational mandates influence patient experience?

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ABSTRACT

Objective: We examined whether state cultural competency educational mandates are associated with patient-reported Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores.

Methods: Analyzing data from 2018 and 2023 HCAHPS surveys, we compared state-level scores from 48 states and the District of Columbia (DC). Five states with cultural competency mandates (California, Connecticut, New Jersey, Oregon, Washington) were compared against five matched states and 38 remaining states with DC.

Results: Paired *t*-tests revealed mandated states achieved significant improvements in doctor communication ($p < .001$), communication about medicines ($p < .05$), and discharge information ($p < .05$). Mandated states experienced significant declines in nurse communication ($p < .05$) and overall hospital ratings ($p < .05$). Matched states showed significant improvement only in discharge information ($p < .05$) and significant decline in overall hospital ratings ($p < .05$). The remaining states showed significant improvements in doctor communication ($p < .001$), communication about medicines ($p < .001$), discharge information ($p < .001$), willingness to recommend ($p < .001$), and summary star ratings ($p < .05$), while experiencing significant declines in nurse communication ($p < .05$), staff responsiveness ($p < .01$), and overall hospital ratings ($p < .01$). All groups experienced declines in overall hospital ratings. A direct between-group comparison of the change from 2018 to 2023 found no measure on which mandate states improved more than comparison states; on overall hospital rating, mandate and matched states declined more than the remaining states, and mandate and matched states did not differ from each other.

Conclusions: These exploratory, associational findings do not support expanding cultural competency mandates; further research using hospital-level designs and broader outcomes is needed.

Key Words: Continuing education, Cultural competency, HCAHPS, Health policy, Patient experience, Patient satisfaction, US hospitals

1. INTRODUCTION

In our diverse society, healthcare providers have recognized that patient-centered care and cultural competency are essential for quality healthcare. However, navigating this landscape requires specialized knowledge, forward-thinking, meaningful community engagement, and an understanding

of America's changing demographics. Hospitals and health systems face complex challenges, including connecting with vulnerable populations, building and maintaining a culturally competent workforce, and adapting to evolving regulations. Delivering high-quality care goes beyond general cultural awareness; it requires cultural sensitivity based on a specific

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understanding of different communities' values, beliefs, and practices. In other words, developing a high level of cultural competence within healthcare organizations is essential.

The importance of cultural competency in the United States has come a long way from its origins in the 1960s and 1970s, when the civil rights movement focused on racial and ethnic inequalities with an ultimatum for respect of all cultures. The seminal text *Crossing the Quality Chasm* defined patient-centered care as 'providing care that is respectful of, and responsive to, individual patient preferences, needs, and values, and ensuring that patient values guide all clinical decisions.'^[1] This was followed shortly thereafter by the Office of Minority Health in the Department of Health and Human Services (DHHS) laying the foundation to address diverse populations with the development of the Culturally and Linguistically Appropriate Services (CLAS) standards in December 2000.^[2] The standards encompass governance, leadership, and workforce; communication and language assistance; and engagement, continuous improvement, and accountability. These standards are rooted in culturally competent care that is seen as a basis for reducing disparities.^[2,3] In 2009, the National Quality Forum issued a consensus report presenting a comprehensive framework and preferred practices for measuring and reporting cultural competency across healthcare organizations.^[4] Cultural differences represent a significant and ongoing challenge for healthcare providers striving to deliver high-quality, equitable care. These disparities are often viewed as race or ethnicity; however, the range is much broader to include gender, race, social, cultural, gender identity and orientation, religion, disability, and linguistic barriers.^[5]

These policy efforts underscore a growing recognition that health equity cannot be achieved without intentional strategies to acknowledge and address cultural differences through education, workforce development, and systemic change. Culturally responsive education and training are essential as the U.S. healthcare system becomes more inclusive and patient-centered. Equipping healthcare professionals with the knowledge, skills, and attitudes necessary to navigate cultural diversity is critical to reducing disparities, improving communication, building trust, and enhancing health outcomes for marginalized and vulnerable populations.

Recently, laws and new mandates related to cultural competency training for healthcare professionals have been enacted. For example, effective January 1, 2025, cultural competency training of healthcare providers in Illinois commenced. Other states, such as California, Connecticut, and New Jersey, al-

ready had mandatory cultural competency training. Cultural competence is widely promoted as a strategy to reduce health inequities, and training has accordingly become a central policy lever in healthcare organizations.^[6] A systematic review of thirty-four provider education interventions found consistent beneficial effects on patient satisfaction, though evidence for downstream health outcomes was limited.^[7]

This research examines healthcare organizations in states that have enacted cultural competency education legislation. We compare patient satisfaction data (i.e., Hospital Consumer Assessment of Healthcare Providers and Systems [HCAHPS] scores) before and after implementing the education mandates. In addition, to provide a broader and more balanced perspective, the research includes a comparative analysis against two groups of states without cultural competency education legislation: five matched comparison states and the remaining states. This dual approach assesses the association between cultural competency training mandates and patient satisfaction.

1.1 Cultural competency education legislation

This study focused on five states that have enacted cultural competency education mandates for healthcare providers: California, Connecticut, New Jersey, Oregon, and Washington. Although all five states had cultural competency training mandates, their scope and implementation methods differed (see Table 1); Table 2 details each statute's citation, the professions covered including whether registered nurses are included, the continuing-education framework, required hours, and enacted and effective dates. The following provides an overview of the five states' cultural competency legislation and training mandates.

California's Implementation of the Cultural Competency Education Mandate California implemented its cultural competency educational mandate through Assembly Bill 1195, established in 2005, which required continuing medical education (CME) courses to include a curriculum on cultural and linguistic competency.^[8] This legislation was substantially strengthened in 2019 through Assembly Bill 241, which expanded requirements to include implicit bias training for healthcare providers.^[9] Rather than creating standalone training programs, California incorporated cultural competency requirements into established CME frameworks. This approach effectively made cultural competency a mandatory component for license renewal.^[8] The state defined cultural competency as integrated attitudes, knowledge, and skills enabling healthcare professionals to care effectively for patients from diverse cultures.

Table 1. Cultural competency training mandate implementation features by state

Implementation Feature	CA	CT	NJ	OR	WA
Integration with continuing education	✓	✓	✓	✓	✓
Specific hour requirements	✓	✓	✓	✓	✓
Recurring requirements	✓	✓		✓	✓
One-time requirement			✓		
Direct tie to licensure	✓	✓	✓	✓	✓
Implicit bias training	✓	✓			✓
Linguistic competency focus	✓			✓	
Social determinants of health focus		✓		✓	✓
Required for medical schools			✓		
Dedicated advisory/oversight body		✓		✓	✓
Registry of approved programs				✓	✓
Multiple education pathways	✓	✓		✓	✓
System-level intervention focus		✓		✓	✓
Applies to all healthcare professionals	✓			✓	✓
Implemented in stages/evolved over time	✓				✓

Note. CA = California; CT = Connecticut; NJ = New Jersey; OR = Oregon; WA = Washington

Meanwhile, linguistic competency focuses on provider-patient communication capabilities.^[10] Implementing the mandate included oversight from the Medical Board of California, which is responsible for developing appropriate standards in collaboration with CME accrediting organizations.^[8] This regulatory approach ensures proper address of limited English proficiency patient needs under federal and state civil rights legislations.^[8]

1.2 Connecticut's implementation of cultural competency education mandate

Connecticut's cultural competency requirements accrued in tiers. For registration periods beginning on and after October 1, 2010, physicians must complete at least one contact hour of cultural competency training during the first renewal period in which CME is required and at least once every six years thereafter (Conn. Gen. Stat. §20-10b, as amended by Public Act 09-232), and for registration periods beginning on and after October 1, 2014, advanced practice registered nurses must include at least one contact hour of cultural competency within the fifty contact hours required every twenty-four months (Conn. Gen. Stat. §20-94d). Public Act 19-117 (2019) extended requirements to community health workers, establishing certification and training in cultural competency, systemic racism, and social determinants of

health.^[11] The legislation created a certification program for community health workers administered by the Department of Public Health, defining these professionals as public health outreach professionals with an in-depth understanding of community experience, language, culture, and socioeconomic needs.^[12] Additionally, the mandate required certified community health workers seeking license renewal to complete a minimum of thirty hours of continuing education, including two hours specifically focused on cultural competency, systemic racism or systemic oppression, and two hours on social determinants of health.^[12] The implementation included establishing a Community Health Worker Advisory Body within the Office of Health Strategy to guide requirements for diverse representation, including members from communities experiencing health disparities.^[11] Connecticut's implementation approach aligned cultural competency requirements with broader healthcare reform efforts, including value-based payment methodologies for hospitals participating in the Connecticut Medicaid program.^[13,14]

1.3 New Jersey's implementation of cultural competency education mandate

New Jersey implemented its cultural competency educational mandate through Senate Bill 144, which established cultural competency training as a requirement for physician licen-

sure.^[15] The mandate made cultural competency training mandatory for medical professionals.^[8,16] New Jersey established a one-time requirement of six hours in cultural competency training, developed and supervised by the State Board of Medical Examiners, at initial licensure for all physicians to standardize expectations for medical professionals seeking to practice in the state.^[15] The mandate also incorporated educational integration by requiring each medical school in the state to include instruction in cultural competency focusing on race and gender disparities, developed in

consultation with the Association of American Medical Colleges.^[16,17] The implementation was grounded in research demonstrating healthcare disparities, citing studies showing physicians were less likely to refer Black patients and women than white men with identical complaints to cardiac specialists.^[15] The state recognized that culturally competent healthcare requires individual skill development and organizational change, emphasizing how culturally competent health workers respect cultural differences and incorporate them into patient care and program planning processes.^[18]

Table 2. Cultural competency mandate details by state (statute, timing, scope, and RN coverage)

State	Statute & Citation	Year Enacted	Effective Date	Professions Covered	RNs Included?	CME/CEU Framework	Required Hours	Content Focus	Oversight Body
CA	AB 1195 (2005), Cal. Bus. & Prof. Code §2190.1 AB 241 (2019), §2736.5 (RN implicit bias) / AB 1407 (2021), §2811.5 (new-RN implicit-bias hour)	2005; 2019	July 1, 2006 (AB 1195) / Jan 1, 2022 (AB 241: physician CME course content; nursing CE provider compliance Jan 1, 2023) / Jan 1, 2023 (AB 1407 new-RN hour)	Physicians (full curriculum) RNs, PAs (implicit bias only)	Yes, via AB 241 (§2736.5), not the 2005 law; implicit-bias content only.	CME (physicians) CE (RNs, via Board of Registered Nursing)	No separate hours for physicians or existing RNs; implicit-bias content is embedded in existing CME/CE courses (AB 241). Newly licensed RNs: 1 hour of direct-participation implicit-bias CE within the first 2 years of licensure, from Jan 1, 2023 (AB 1407, §2811.5)	Cultural and linguistic competency (AB1195) Implicit bias (AB241)	Medical Board of California Board of Registered Nursing
CT	Conn. Gen. Stat. §20-10b (physician CME; cultural competency added by P.A. 09-232) / Conn. Gen. Stat. §20-94d (APRN CE) / Public Act 19-117 (2019) (CHW certification)	2009 (physicians); 2014 (APRNs); 2019 (CHWs)	Oct 1, 2010 (physicians) / Oct 1, 2014 (APRNs) / 2019 (CHW certification)	Physicians (MD/DO); APRNs; certified community health workers	No (APRNs only among nurses)	CME (physicians); CE contact hours (APRNs); CE (CHWs)	Physicians: 1 contact hour in the first CME renewal period and at least once every 6 years thereafter, within 50 hrs/24 months. APRNs: at least 1 contact hour within 50 hrs/24 months. CHWs: 30 hrs/renewal incl. 2 hrs cultural competency/systemic racism and 2 hrs SDOH	Cultural competency (statutory CME/CE topic for physicians and APRNs); cultural competency, systemic racism, SDOH (CHWs)	CT Dept. of Public Health; Connecticut Medical Examining Board; CT Board of Examiners for Nursing
NJ	Cultural competency: P.L. 2005, c.53 (S144); N.J.S.A. 45:9-7.2, 45:9-7.3; N.J.A.C. 13:35-6.25 / Perinatal implicit and explicit bias: P.L. 2021, c.79 (S703); N.J.S.A. 26:2H-12.108	2005; 2021	2005 (initial licensure, physicians) Enacted 5/11/2021 (perinatal law)	Physicians (one-time, initial licensure) Perinatal-care providers incl. CNMs, RNs/LPNs, physicians, PAs	Partially	One-time CME at initial licensure (physicians) One-time CE credit tied to perinatal-care licensure period	6 hrs one-time (physicians) 1 credit per renewal period (perinatal-care providers)	Cultural competency, race/gender disparities (SB144) Implicit/explicit bias in perinatal care (2021 law)	NJ State Board of Medical Examiners NJ nursing/midwifery oversight bodies for perinatal law
OR	HB 2011 (2019), amending ORS 676.850 OAR 943-090	2013 (HB2611, framework) 2019 (HB2011, made mandatory)	Operative July 1, 2021	All professions regulated by boards listed in ORS 676.850, including physicians, RNs/LPNs/APRNs, PAs, and others	Yes, directly and explicitly	CE, uniform across professions	2 hrs every 48 months	Broadly defined: self-awareness, knowledge, skills, specific educational approaches	Oregon Health Authority, Office of Equity and Inclusion Individual boards (e.g., Board of Nursing)
WA	ESSB 5229 (2021), RCW 43.70.613 WAC 246-12-800 to -830	2006 (initial curriculum-integration law) 2021 (ESSB 5229)	July 1, 2008 (initial law) Jan 1, 2024 (ESSB 5229 operative)	All healthcare professionals credentialed under Title 18 RCW, explicitly including RNs/LPNs (RCW 18.79), physicians, PAs, and others	Yes, directly and explicitly	CE, DOH sets minimum standards; boards may exceed	2 hrs every 4 years minimum	Health equity: implicit bias, structural drivers of inequity, individual and system-level interventions	WA Dept. of Health WA State Board of Nursing

Note. Source: CA: Cal. Bus. & Prof. Code section 2190.1 (leginfo.ca.gov); AB 241 (2019) bill text, section 2736.5; AB 1407 (2021), section 2811.5. CT: Conn. Gen. Stat. sections 20-10b, 20-94d, 20-94e (cga.ct.gov). NJ: P.L. 2005, c.53 (S144); N.J.S.A. 45:9-7.2, 45:9-7.3; N.J.A.C. 13:35-6.25 (njleg.state.nj.us); P.L. 2021, c.79 (S703); N.J.S.A. 26:2H-12.108. OR: ORS 676.850; OAR 943-090; Oregon State Board of Nursing, "Cultural Competency Continuing Education" (oregon.gov/osbn). WA: RCW 43.70.613; WAC 246-12-800 to -830; Washington State Department of Health, "Health Equity Continuing Education." RN= Registered Nurse; CME/CEU = Continuing Medical Education / Continuing Education Unit; DOH = Department of Health

1.4 Oregon's implementation of cultural competency education mandate

Oregon implemented its cultural competency educational mandate through House Bill 2011 (2019), requiring all persons authorized to practice health professions regulated by Oregon State Professional Boards to complete cultural competency continuing education as a condition for licensure.^[19] The Oregon Health Authority (OHA), through its Office of Equity and Inclusion, was designated as the primary implementing agency to provide educational resources and support to healthcare provider boards for improving the cultural competence of professionals.^[20] The implementation included establishing a formal definition of cultural competency as a life-long process of examining values and beliefs, followed by developing and applying an inclusive approach to health care practice in a manner that recognizes the context and complexities of provider-patient communication and interaction and preserves the dignity of individuals, families, and communities.^[20] A central element of Oregon's implementation strategy involved creating a registry of approved continuing education opportunities to make it easier for practitioners to identify appropriate training opportunities.^[20] The mandate recognized multiple developmental pathways, including courses delivered in person or electronically, and experiential learning such as cultural or linguistic immersion.^[21] The implementation included establishing a diverse advisory committee with representatives from Oregon federally recognized tribes and members of communities experiencing health disparities.^[20] While maintaining centralized oversight through the OHA, profession-specific requirements were established, requiring all licensed Occupational Therapists and Occupational Therapy Assistants to complete at least one hour on Cultural Competency per renewal period.^[22] Oregon established rigorous quality assurance standards to certify that cultural competency training programs met high-quality thresholds with thorough vetting processes.^[20]

1.5 Washington's implementation of cultural competency education mandate

Washington State implemented its cultural competency educational mandate through a two-phase approach, beginning with legislation in 2006 and substantially expanding requirements through Engrossed Substitute Senate Bill (ESSB) 5229 in 2021.^[23,24] The initial framework required all professions regulated by the Washington State Department of Health to integrate multicultural education into their basic curriculum by July 1, 2008.^[23] Washington substantially strengthened its mandate through ESSB 5229, requiring all healthcare professionals credentialed under Title 18 RCW to complete health equity continuing education training.^[24] The updated mandate required healthcare professionals to complete two

hours of health equity continuing education at least once every four years, beginning January 1, 2024.^[24] The implementation included specific content requirements focused on skills to address structural factors such as bias, racism, and poverty that manifest as health inequities.^[24] The mandate established minimum standards for health equity continuing education training courses, where individual healthcare profession boards and commissions can adopt rules exceeding these minimum standards.^[24] While offering flexibility in delivery methods, Washington established criteria for approved courses, including "Improving Cultural Competency for Behavioral Health Professionals" and "Washington Implicit Bias in Healthcare" that meet state requirements.^[23,24] Washington's requirement is therefore broader in scope and on a later timeline than the other mandate states, with its principal compliance date (January 1, 2024) falling after the study window; a sensitivity analysis excluding Washington is reported with the main results.

2. METHODS

To answer our research question, "*Do patients receiving care in hospitals in states with a cultural competency educational mandate report greater improvement in HCAHPS scores between 2018 and 2023 compared to states with no mandate for cultural competency training?*" We employed the 2018 and 2023 HCAHPS surveys. The final sample consisted of state-level HCAHPS scores from 48 states (Nevada and New Mexico were excluded; see narrative below) in the United States and the District of Columbia for 2018 and 2023. To do this, we examined changes in the state-level star ratings between 2018 and 2023 for nine HCAHPS measures of patient experience using *t*-tests.

HCAHPS scores are calculated based on the quarterly patient survey responses and are reported at the hospital, state-wide, and national level.^[25] We used state-level HCAHPS for the current analysis. Each hospital's score in each state on a particular measure is averaged, and a state HCAHPS score for that measure is then calculated.^[26] The study examined nine HCAHPS measures of patient experience. These measures were chosen as they are more direct representatives of culturally competent care. The other components of HCAHPS include ratings on factors such as cleanliness and noise, which are less impacted by cultural competence. This selection aligns with the provider-focused nature of cultural competency mandates across all five states, which primarily targeted individual healthcare professionals' training rather than institutional or environmental factors. The reliability and validity of each care composite measure have been extensively evaluated in prior research.^[26,27]

As noted above, consistent with the original study design,

Nevada and New Mexico (which adopted mandates in 2005 and 2007) were excluded from all groups. We divided the remaining 48 states and the District of Columbia (DC) into three groups: five focal states that have enacted cultural competency training mandates (California, Connecticut, New Jersey, Oregon, and Washington; enacted and effective dates in Table 2), hereafter the mandate states, five states that were matched to the five cultural competency training mandated states based on similarity index scores (New York, Delaware, Illinois, Minnesota, Michigan), and the remaining 38 states and the District of Columbia. The comparison states were selected at the study's inception as a group, rather than through one-to-one pairing, with reference to the State Similarity Index, a publicly available composite that equally weights demography, culture, politics, infrastructure, and geography.^[28] The five were judged collectively similar to the mandate states as a set, and pair-level index values were therefore not part of the design. The adequacy of the grouping is further evaluated empirically, through the baseline equivalence tests reported below and through an alternative matching. Each mandate state was matched to one comparison state, without replacement, by the assignment minimizing total Euclidean distance on six standardized covariates measured at or nearest the 2018 baseline: hospital beds per 1,000 population (2018), the for-profit share of community hospitals (2018), urban population share (2020 census), Medicaid expansion status in effect on January 1, 2018, per-capita personal health care spending (2020), and the 2018 HCAHPS overall star rating. The candidate pool comprised the 42 eligible non-mandate states, excluding Nevada and New Mexico per the original design, the District of Columbia, and Illinois given its 2025 mandate. The resulting pairs are California-Rhode Island, Connecticut-Delaware, New Jersey-Maryland, Oregon-Hawaii, and Washington-Michigan. All analyses were repeated with this alternative matched group as a sensitivity analysis. We employed paired *t*-tests to assess whether each group's state-level star ratings changed significantly between 2018 and 2023. To compare groups directly, we also estimated a one-way ANOVA on the percent change in each measure across the three groups, with Bonferroni-corrected pairwise contrasts and Holm correction across the nine measures. Kruskal-Wallis tests were estimated as distribution-free robustness checks. Because HCAHPS star ratings are normed to national performance, we repeated the between-group comparison using top-box and linear-mean scores. Group-level results are presented in Table 3, and between-group results in Table 4. Sensitivity analyses excluding Washington and excluding Illinois, and

analyses across alternative year-windows, assessed robustness.

3. RESULTS

Table 3 presents the results of the paired *t*-tests evaluating changes in HCAHPS between 2018 and 2023 for each group. For all HCAHPS measures, increases in star ratings represent improvements in patient experience while decreases represent declines in performance. Among the five mandate states, there were significant increases in their star ratings for doctor communication ($p < .001$), communication about medicines ($p < .05$), and discharge information ($p < .05$). The doctor communication improvement in mandated states paralleled improvements in the remaining states. However, mandated states experienced significant declines in nurse communication scores ($p < .05$) and overall hospital ratings ($p < .05$). No significant changes were observed in staff responsiveness, care transition, willingness to recommend, or summary star ratings, with the latter maintaining complete stability (3.01 to 3.01).

A one-way ANOVA of the percent change from 2018 to 2023 across the three groups (see Table 4) showed no measure on which mandate states improved more than comparison states. Overall hospital rating declined more in the mandate and matched groups than in the remaining group [$F(2,46) = 7.18$, $p = .002$, surviving Holm correction]; nurse communication showed the same direction ($F = 4.57$, $p = .015$) but did not survive family-wise correction. Mandate and matched groups did not differ on any measure. Because star ratings are normed nationally, the comparison was repeated on top-box and linear-mean scores (see Table 5), which confirmed the pattern on overall hospital rating (top-box $F = 6.72$, $p = .003$; linear-mean $F = 10.74$, $p < .001$). The overall-rating result was robust to excluding Washington and to excluding Illinois on all three metrics, while the nurse-communication star contrast attenuated without Washington (see Table 6); on the absolute metrics, the overall-rating difference was significant in all four year-windows examined (see Table 7). Baseline (2018) levels did not differ significantly across groups (see Table 8). Under the covariate-based alternative match, whose pairs, distances, and covariates are reported in Table 9, the between-group results were unchanged in structure and modestly stronger: the overall-rating contrast persisted [$F(2,46) = 6.56$, $p = .003$, surviving Holm correction], the nurse-communication contrast now also survived family-wise correction ($F = 6.72$, $p = .003$, Holm $p = .025$), and mandate and alternative-matched states differed on no measure (see Table 10).

Table 3. Paired *t*-tests of state-level HCAHPS star ratings, 2018 vs. 2023, by group, with mean change, 95% confidence intervals, and effect sizes

Measure	Group	2018	2023	Change	95% CI	t	p	Cohen dz
Nurse Communication	Mandate	3.35	2.95	−0.39	[−0.71, −0.08]	3.45	.026*	−1.54
	Matched	3.55	3.22	−0.33	[−0.84, +0.18]	1.77	.151	−0.79
	Remaining	3.52	3.43	−0.09	[−0.16, −0.02]	2.44	.019*	−0.39
Doctor Communication	Mandate	2.83	3.22	+0.40	[+0.35, +0.45]	21.90	< .001***	9.80
	Matched	3.10	3.34	+0.24	[−0.07, +0.56]	2.14	.099	0.96
	Remaining	3.25	3.64	+0.39	[+0.33, +0.45]	12.23	< .001***	1.96
Staff Responsiveness	Mandate	3.02	2.94	−0.08	[−0.25, +0.09]	1.35	.249	−0.60
	Matched	3.43	3.16	−0.27	[−0.59, +0.05]	2.34	.080	−1.05
	Remaining	3.47	3.39	−0.08	[−0.13, −0.03]	3.08	.004**	−0.49
Communication about Medicines	Mandate	3.00	3.08	+0.08	[+0.01, +0.15]	3.32	.029*	1.49
	Matched	2.96	3.06	+0.11	[−0.15, +0.36]	1.16	.310	0.52
	Remaining	3.22	3.39	+0.17	[+0.13, +0.22]	8.09	< .001***	1.30
Discharge Information	Mandate	3.13	3.30	+0.17	[+0.06, +0.28]	4.20	.014*	1.88
	Matched	3.23	3.36	+0.14	[+0.003, +0.27]	2.85	.047*	1.27
	Remaining	3.26	3.46	+0.20	[+0.14, +0.26]	6.83	< .001***	1.09
Care Transition	Mandate	2.85	2.78	−0.07	[−0.17, +0.03]	1.88	.134	−0.84
	Matched	3.01	2.89	−0.12	[−0.38, +0.14]	1.31	.259	−0.59
	Remaining	3.18	3.18	−0.00	[−0.05, +0.05]	0.03	.976	−0.00
Overall Hospital Rating	Mandate	3.17	2.91	−0.26	[−0.49, −0.04]	3.21	.033*	−1.43
	Matched	3.21	2.92	−0.29	[−0.52, −0.06]	3.51	.025*	−1.57
	Remaining	3.37	3.29	−0.08	[−0.13, −0.03]	3.46	.001**	−0.55
Willingness to Recommend	Mandate	3.13	3.15	+0.02	[−0.19, +0.23]	0.31	.772	0.14
	Matched	3.08	3.06	−0.02	[−0.17, +0.14]	0.28	.790	−0.13
	Remaining	3.29	3.42	+0.14	[+0.09, +0.19]	5.69	< .001***	0.91
Summary Star Rating	Mandate	3.01	3.01	+0.00	[−0.15, +0.16]	0.09	.933	0.04
	Matched	3.13	3.15	+0.02	[−0.08, +0.12]	0.64	.556	0.29
	Remaining	3.34	3.39	+0.05	[+0.01, +0.09]	2.51	.016*	0.40

Note. Star ratings from the manuscript state panel. Change = 2023 minus 2018 state-average star rating; negative values are declines. Changes are computed from unrounded values and may differ from the difference of the rounded means by ± 0.01 . Cohen $dz = t / \sqrt{n}$. Group sizes: Mandate $n = 5$ (CA, CT, NJ, OR, WA); Matched $n = 5$ (NY, DE, IL, MN, MI); Remaining $n = 39$ (38 states and DC). NV, NM, PR, and VI excluded. * $p < .05$; ** $p < .01$; *** $p < .001$ (two-sided)

Table 4. One-way ANOVA of percent change in HCAHPS star ratings, 2018–2023, across mandate, matched, and remaining states

Measure	Mandate % (SD)	Matched % (SD)	Remaining % (SD)	<i>F</i> (2,46)	<i>p</i>	Holm <i>p</i>	η^2
Nurse Communication	−11.94 (7.06) ^a	−9.51 (11.33) ^{ab}	−2.64 (7.22) ^b	4.57	.015*	.124	0.17
Doctor Communication	+14.32 (2.73) ^a	+8.37 (8.93) ^a	+12.79 (8.62) ^a	0.76	.474	1.000	0.03
Staff Responsiveness	−2.51 (4.85) ^a	−7.79 (7.45) ^a	−2.83 (6.60) ^a	1.31	.279	1.000	0.05
Communication about Medicines	+2.80 (2.20) ^a	+3.73 (8.12) ^a	+5.36 (4.15) ^a	0.91	.410	1.000	0.04
Discharge Information	+5.19 (2.58) ^a	+4.09 (3.00) ^a	+6.08 (5.85) ^a	0.33	.720	1.000	0.01
Care Transition	−2.09 (2.43) ^a	−3.75 (7.82) ^a	+0.16 (4.69) ^a	1.71	.191	1.000	0.07
Overall Hospital Rating	−8.64 (5.84) ^a	−9.20 (6.26) ^a	−2.50 (4.47) ^b	7.18	.002**	.017	0.24
Willingness to Recommend	+0.70 (5.06) ^a	−0.67 (4.27) ^a	+4.10 (4.62) ^a	3.21	.049*	.346	0.12
Summary Star Rating	+0.03 (3.63) ^a	+0.78 (2.54) ^a	+1.62 (3.83) ^a	0.47	.626	1.000	0.02

Note. Percent change = $(2023 - 2018) / 2018 \times 100$ in state-average star ratings (manuscript panel). Holm p = Holm step-down adjustment of the nine nominal p values. Group means in the same row sharing a superscript letter do not differ at Bonferroni-adjusted $p < .05$; means with different letters do. No measure shows the mandate group improving more than either comparison group, and mandate and matched groups do not differ on any measure. Kruskal-Wallis tests on the same contrasts agree (Overall Hospital Rating $p = .007$, Nurse Communication $p = .037$; no other measure $p < .05$). * $p < .05$, ** $p < .01$, *** $p < .001$

Table 5. Between-group ANOVA of percent change, 2018–2023, on top-box, linear-mean, and star metrics computed from identical CMS hospital files

Measure	Mandate %	Matched %	Remaining %	<i>F</i> (2,46)	<i>p</i>	Holm <i>p</i>
Panel A. Top-box percent						
Nurse Communication	−2.33	−2.79	−0.86	7.11	.002**	.014
Doctor Communication	−2.34	−2.74	−1.49	2.54	.090	.217
Staff Responsiveness	−7.61	−7.87	−5.55	2.78	.072	.217
Communication about Medicines	−8.11	−7.69	−5.54	4.19	.021*	.085
Discharge Information	−1.42	−1.23	−0.59	2.43	.100	.217
Care Transition	−4.70	−3.92	−2.02	5.19	.009**	.046
Overall Hospital Rating	−3.66	−3.78	−1.04	6.72	.003**	.017
Willingness to Recommend	−4.89	−4.54	−2.43	7.38	.002**	.014
Panel B. Linear-mean score						
Nurse Communication	−1.02	−1.22	−0.37	8.77	<.001***	.004
Doctor Communication	−1.06	−1.35	−0.73	4.56	.016*	.031
Staff Responsiveness	−3.56	−3.87	−2.59	7.28	.002**	.009
Communication about Medicines	−4.60	−4.76	−3.40	5.85	.005**	.016
Discharge Information	−1.31	−1.56	−0.84	2.73	.076	.076
Care Transition	−1.73	−1.78	−1.15	6.69	.003**	.011
Overall Hospital Rating	−1.42	−1.58	−0.61	10.74	<.001***	.001
Willingness to Recommend	−2.06	−2.35	−1.22	9.16	<.001***	.003
Panel C. Star rating (same files)						
Nurse Communication	−11.07	−8.93	−0.70	7.33	.002**	.012
Doctor Communication	+14.83	+10.08	+14.27	0.67	.518	.610
Staff Responsiveness	−2.13	−7.93	−1.05	3.01	.059	.295
Communication about Medicines	+3.58	+4.41	+7.53	1.92	.158	.610
Discharge Information	+5.77	+3.89	+7.63	1.29	.286	.610
Care Transition	−1.59	−2.30	+2.13	1.96	.153	.610
Overall Hospital Rating	−8.05	−7.65	−0.94	10.27	<.001***	.002
Willingness to Recommend	+1.36	+0.07	+5.98	6.45	.003**	.020

Note. All three metrics are computed from the same CMS hospital-level files (calendar-year reporting windows) with identical state aggregation, so only the metric differs across panels. Star values in Panel C therefore differ slightly from Tables 3–4, which use the manuscript panel drawn from different CMS release snapshots; the difference reflects CMS re-clustering of star thresholds between releases, the norming property addressed by this table. Holm *p* adjusts the eight nominal *p* values within each panel. Top-box and linear mean are absolute (un-normed) scores; their agreement with the star results indicates the observed declines are not artifacts of star norming. * *p* < .05, ** *p* < .01, *** *p* < .001. Source: CMS HCAHPS Star Ratings Technical Notes

Table 6. Sensitivity analyses: excluding Washington and excluding Illinois (star ratings, 2018–2023)

Specification	Measure	<i>F</i>	<i>p</i>	Bonferroni <i>M</i> vs. <i>R</i>
Base model (5/5/39)	Overall Hospital Rating	7.18	.002**	0.029
	Nurse Communication	4.57	.015*	0.042
Excluding Washington (4/5/39)	Overall Hospital Rating	6.33	.004**	0.074
	Nurse Communication	3.84	.029*	0.093
Excluding Illinois (5/4/39)	Overall Hospital Rating	6.39	.004**	0.031
	Nurse Communication	4.32	.019*	0.045

Note. Manuscript-panel star ratings. Washington excluded because its principal requirement took effect in 2024, after the study window; Illinois excluded because it enacted a mandate effective 2025 while serving as a matched comparison state. The overall-rating omnibus persists in every specification; the nurse-communication mandate-vs-remaining pairwise contrast attenuates when Washington is excluded. The corresponding top-box and linear-mean tests remain significant in every exclusion for both measures (*F* = 5.87 to 9.58, all *p* ≤ .006), with no attenuation. * *p* < .05, ** *p* < .01, *** *p* < .001. Source: ESSB 5229, ch. 276, Laws of 2021, WAC 246-12-800 to -830; P.A. 103-0531, 20 ILCS 2105/2105-370 and -375

Table 7. Between-group ANOVA of percent change in overall hospital rating across four year-windows, by metric

Metric	2018–2023	2019–2022	2018–2022	2019–2023
Star rating (manuscript panel)	7.18 (.002)**	2.05 (.140)	3.37 (.043)*	4.70 (.014)*
Top-box percent	6.72 (.003)**	5.72 (.006)**	10.13 (< .001)***	3.21 (.050)*
Linear-mean score	10.74 (< .001)***	10.10 (< .001)***	12.04 (< .001)***	7.19 (.002)**
Star rating (calendar-year files)	10.27 (< .001)***	7.04 (.002)**	9.02 (< .001)***	6.28 (.004)**

Note. Cells report $F(2,46)$ with nominal p in parentheses. The manuscript-panel star result is null in the 2019–2022 window only; the absolute metrics (top-box, linear mean) and the calendar-year-file star ratings are significant in every window, indicating the window sensitivity of the panel star result reflects release-to-release star re-norming rather than the underlying scores. * $p < .05$, ** $p < .01$, *** $p < .001$

Table 8. Baseline (2018) state-average star ratings by group

Measure	Mandate	Matched	Remaining	$F(2,46)$	p
Nurse Communication	3.35	3.55	3.52	0.42	.657
Doctor Communication	2.83	3.10	3.25	1.99	.149
Staff Responsiveness	3.02	3.43	3.47	1.70	.193
Communication about Medicines	3.00	2.96	3.22	1.27	.292
Discharge Information	3.13	3.23	3.26	0.22	.803
Care Transition	2.85	3.01	3.18	1.47	.240
Overall Hospital Rating	3.17	3.21	3.37	0.95	.396
Willingness to Recommend	3.13	3.08	3.29	1.18	.315
Summary Star Rating	3.01	3.13	3.34	1.79	.178

Note. Manuscript-panel star ratings, 2018. No measure differs significantly across groups at baseline; mandate states are numerically lowest on most measures. Group definitions as in Table 3

Table 9. Covariate-based alternative match: pairs and distances

Mandate state	Alternative matched state	Euclidean distance
California	Rhode Island	1.23
Connecticut	Delaware	1.16
New Jersey	Maryland	1.92
Oregon	Hawaii	0.81
Washington	Michigan	1.54

Note. Covariate-based alternative match. Each mandate state was matched to one comparison state, without replacement, by the assignment minimizing total Euclidean distance on six covariates standardized across the 47 units (5 mandate states and 42 eligible candidates): hospital beds per 1,000 population (2018; KFF State Health Facts), for-profit share of community hospitals (2018; KFF), urban population share (2020 decennial census), Medicaid expansion status in effect January 1, 2018 (KFF), per-capita personal health care spending (2020; CMS State Health Expenditure Accounts), and 2018 HCAHPS Overall Hospital Rating star (study panel). Candidates exclude Nevada and New Mexico (original design), the District of Columbia, and Illinois (mandate effective 2025). Lower distance indicates greater similarity. The full covariate table and 5×42 distance matrix, and the complete alternative-match analyses (Supplementary Tables S1–S5), are provided as supplementary material

The five matched states demonstrated significant increases only in discharge information ($p < .05$) and significant declines in overall hospital ratings ($p < .05$). Unlike the states with cultural competency training mandates, the matched states showed no significant changes in nurse communication, doctor communication, staff responsiveness, communication about medicines, care transition, willingness to recommend, or summary star ratings. The remaining 38 states and the District of Columbia showed significant increases in doctor communication ($p < .001$), communication about medicines ($p < .001$), discharge information ($p < .001$), willingness to recommend star ratings ($p < .001$), and summary star ratings ($p < .05$). Similar to mandate states, the remaining states and the District of Columbia had a significant decline in nurse communication ($p < .05$). Additionally, this group experienced significant declines in staff responsiveness ($p < .01$) and overall hospital ratings ($p < .01$). No significant changes were observed in care transition (3.18 to 3.18) in this group.

Notably, willingness to recommend showed divergent patterns across groups: significant improvement only in the remaining states and the District of Columbia ($p < .001$), while both mandated states and matched states showed no

significant change. Similarly, staff responsiveness demonstrated a significant decline only in the remaining states and the District of Columbia ($p < .01$), while mandated and

matched states showed non-significant declines. Care transition demonstrated no significant changes across any of the three groups.

Table 10. One-way ANOVA of percent change in HCAHPS star ratings, 2018–2023, across mandate, alternative-matched, and remaining states (covariate-based alternative match)

Measure	Mandate % (SD)	Matched % (SD)	Remaining % (SD)	$F(2,46)$	p	Holm p	η^2
Nurse Communication	−11.94 (7.06) ^a	−11.88 (9.56) ^a	−2.33 (7.14) ^b	6.72	.003**	.025	0.23
Doctor Communication	+14.32 (2.73) ^a	+8.60 (8.82) ^a	+12.76 (8.65) ^a	0.69	.509	1.000	0.03
Staff Responsiveness	−2.51 (4.85) ^a	−9.86 (6.40) ^a	−2.56 (6.46) ^a	2.98	.060	.423	0.11
Communication about Medicines	+2.80 (2.20) ^a	+4.67 (7.76) ^a	+5.24 (4.26) ^a	0.65	.527	1.000	0.03
Discharge Information	+5.19 (2.58) ^a	+7.43 (6.06) ^a	+5.65 (5.61) ^a	0.27	.765	1.000	0.01
Care Transition	−2.09 (2.43) ^a	−2.03 (8.57) ^a	−0.06 (4.70) ^a	0.63	.535	1.000	0.03
Overall Hospital Rating	−8.64 (5.84) ^a	−8.86 (6.38) ^a	−2.54 (4.52) ^b	6.56	.003**	.025	0.22
Willingness to Recommend	+0.70 (5.06) ^a	+1.12 (5.44) ^a	+3.87 (4.69) ^a	1.53	.227	1.000	0.06
Summary Star Rating	+0.03 (3.63) ^a	+0.10 (3.05) ^a	+1.71 (3.76) ^a	0.78	.463	1.000	0.03

Note. Percent change = $(2023-2018)/2018 \times 100$ in state-average star ratings (manuscript panel). Holm p = Holm step-down adjustment of the nine nominal p values. Group means in the same row sharing a superscript letter do not differ at Bonferroni-adjusted $p < .05$; means with different letters do. No measure shows the mandate group improving more than either comparison group, and mandate and alternative-matched groups do not differ on any measure. Kruskal-Wallis tests on the same contrasts give Nurse Communication $p = .005$, Overall Hospital Rating $p = .015$, and Staff Responsiveness $p = .041$; no other measure $p < .05$. * $p < .05$, ** $p < .01$, *** $p < .001$.

All three groups experienced declines in overall hospital ratings, with mandated states declining from 3.17 to 2.91 ($p < .05$), matched states from 3.21 to 2.92 ($p < .05$), and the remaining states and the District of Columbia from 3.37 to 3.29 ($p < .01$). Summary star ratings improved significantly only in the remaining states and the District of Columbia (from 3.34 to 3.39, $p < .05$), remained stable in mandated states (3.01 to 3.01), and showed no significant change in matched states (3.13 to 3.15).

4. DISCUSSION

The direct between-group tests reframe the study's central finding. No HCAHPS measure showed mandate states improving more than either comparison group; on overall hospital rating, mandate and matched states declined more than the remaining states, a pattern that held on the absolute top-box and linear-mean metrics, while mandate and matched states did not differ from each other on any measure (see Tables 4 and 5). The differential patterns of improvement across domains and between groups reveal both the potential benefits and limitations of cultural competency mandates.

The significant improvements in doctor communication across mandated states ($p < .001$) and the remaining states and the District of Columbia ($p < .001$), contrasted with non-significant changes in matched states, are consistent with

cultural competency training supporting enhanced physician-patient interactions. The parallel improvements between mandated states and the remaining states indicate that mandated states kept pace with broader national trends in this domain.^[29,30] On the absolute metrics, however, doctor-communication scores declined in all three groups (see Table 5), indicating that the star-rating improvements partly reflect national re-norming of the star scale rather than rising absolute performance.

Mandated states improved significantly in communication about medicines ($p < .05$), while their matched comparison states did not. This gain was not unique to the mandate group, however; the remaining states improved in this domain as well ($p < .001$). Many cultural competency programs emphasize linguistic competency and health literacy,^[10] but the broad improvement across non-mandated states indicates that this gain cannot be attributed to the mandate alone.

The universal improvements in discharge information across all three groups, mandated states ($p < .05$), matched states ($p < .05$), and the remaining states and the District of Columbia ($p < .001$), suggest broader systemic initiatives targeting care transitions and patient education that extended beyond state-level cultural competency policies. However, the magnitude and significance levels varied, with the remaining states showing the strongest improvements ($p < .001$), potentially

reflecting synergies between multiple quality improvement initiatives.

The divergent patterns in willingness to recommend merit particular attention. The significant improvement observed only in the remaining states and the District of Columbia ($p < .001$), with no change in mandated or matched states, suggests that cultural competency mandates alone were not associated with willingness to recommend, which may instead relate to overall service quality, facility amenities, and market competition.^[31]

The universal decline in nurse communication scores, significant in mandated states ($p < .05$) and the remaining states and the District of Columbia ($p < .05$), with non-significant decline in matched states, presents a complex interpretive challenge. This pattern suggests broader systemic challenges in nursing practice during the study period, including workforce shortages, pandemic-related stress, and evolving care delivery models, which are not specific to state-level policy interventions. The non-significant decline in matched states is consistent with regional variation in nursing workforce challenges.^[32] The decline in nurse communication is also difficult to attribute to the mandates themselves, since the mandates reach registered nurses unevenly: California addresses nurses only for implicit-bias content, Connecticut only advanced practice nurses, and New Jersey only perinatal nurses, whereas Oregon and Washington include registered nurses directly and fully (see Table 2). A patient-experience domain driven by bedside nursing would not be expected to respond uniformly to mandates with such heterogeneous nurse coverage.

The decline in staff responsiveness observed only as significant in the remaining states and the District of Columbia ($p < .01$), while mandated and matched states showed non-significant declines, presents an unexpected pattern. This finding suggests that broader systemic factors affecting staff responsiveness may have differentially impacted states based on their size and diversity, with the larger group of remaining states experiencing more pronounced challenges.

The absence of significant changes in care transition across all groups reveals domains particularly resistant to improvement through current intervention strategies. These findings suggest that neither cultural competency mandates nor other concurrent quality initiatives successfully addressed these aspects of patient experience during the study period. The universal lack of improvement in these domains is consistent with structural healthcare delivery challenges that require more comprehensive system-level interventions.^[33]

The stability of summary star ratings in mandated states,

maintaining identical scores (3.01 to 3.01) during a period that included the COVID-19 pandemic, contrasts with the significant improvement in the remaining states ($p < .05$). This pattern, alongside the non-significant change in matched states, is consistent with mandates providing stability rather than driving improvement, potentially reflecting a floor effect or the challenge of achieving gains in states already focused on cultural competency.^[34]

The decline in overall hospital ratings observed in all three groups, significant in mandated states ($p < .05$), matched states ($p < .05$), and the remaining states and the District of Columbia ($p < .01$), suggests that broader systemic factors affected overall hospital experiences during the study period. The universal nature of these declines suggests that factors beyond cultural competency training shaped overall hospital experiences.^[35]

Counting the number of domains in which each group improved is not a valid basis for comparison, because the remaining group contains far more states and is therefore better powered to reach significance at the same effect size. The appropriate test is the direct between-group comparison reported above, which found no measure on which mandate states improved more than either comparison group. The domain-count difference should therefore not be read as evidence that broader quality initiatives outperform cultural competency mandates.

The implementation variations across mandate states (see Table 1) highlight important differences in how cultural competency training requirements were operationalized. Given the heterogeneity of these mandates in professions covered, hours, content, and timing (see Table 2), and the null mandate-versus-matched contrasts on every measure, the present design cannot attribute outcomes to either the presence or the structure of a mandate. Prior empirical work has linked cultural competence training to improved patient satisfaction at the level of individual provider education;^[7,36] whether that provider-level benefit scales to state-mandated training measured through population-level HCAHPS remains an open question that these findings do not resolve.

Descriptively, the within-group changes in the mandate states were concentrated in provider communication domains, with no change in system-level metrics such as care transition and staff responsiveness, a pattern consistent with the individual-focused nature of most cultural competency training programs, though the between-group tests do not attribute it to the mandates. Without addressing organizational structures and system-level processes alongside individual training, the full potential of cultural competency mandates may not be realized in broader patient experience domains.

4.1 Limitations

Several limitations affect interpretation. First, state-level data may mask hospital-level variations in implementation quality. Second, our study timeframe (2018-2023) included the COVID-19 pandemic period which disrupted both implementation and patient experiences, potentially contributing to the declines observed in overall hospital ratings and nurse communication across all groups. Third, HCAHPS scores, while providing valuable insights, do not fully capture dimensions most directly influenced by cultural competency, like other assessments with a specific focus on cultural domains. Finally, the five mandate states adopted their requirements across a wide span, from 2005 in California and New Jersey to 2021 in Washington with a 2024 compliance date, so the 2018 to 2023 window does not represent a uniform pre- and post-implementation period; this analysis is therefore exploratory and associational and does not estimate the causal effect of mandate adoption.

In addition, the mandate and matched groups contain only five states each, so between-group power is low, non-significant contrasts cannot be read as evidence of equivalence, and very large within-group effect sizes (for example, a doctor-communication d_z near 9.8) reflect five nearly identical state averages rather than precisely estimated effects. HCAHPS star ratings are re-normed to national performance at each release, so star-based changes are relative; the top-box and linear-mean analyses (see Table 5) address this directly, and the year-window analysis (see Table 7) discloses the sensitivity of the star result to the period examined. The comparison states were selected as a group, rather than through individual pairing, on a general-purpose similarity index without healthcare covariates or baseline HCAHPS; baseline equivalence tests (see Table 8) and a sensitivity analysis excluding Illinois, which enacted its own mandate effective 2025 (see Table 6), address this empirically, and a covariate-based alternative match on hospital market characteristics, reported in Tables 9 and 10, now tests it directly. The mandates themselves are heterogeneous in professions covered, hours, content, and timing (see Table 2), which limits the specificity of a pooled comparison. Future research could extend this work using hospital-level panels with adoption-timing designs such as difference-in-differences or event studies, interrupted time series with multiple pre- and post-pandemic years, and outcome sets beyond HCAHPS. Measures more proximate to what cultural competency training targets would be especially informative, including patient reports of feeling understood and respected, patient-reported experience of discrimination, and provider-level knowledge, attitudes, and skills assessed before and after training, alongside health-equity indicators such as disparities in experience

across patient racial and ethnic groups. Prior evaluations linking training to patient satisfaction have operated at the level of individual provider education;^[7,36] connecting that provider-level evidence to population-level mandate effects will require outcomes measured at both levels.

5. CONCLUSION

A direct between-group test found no measure on which mandate states improved more than comparison states. However, universal declines in nurse communication and lack of improvement in staff responsiveness and care transition indicate broader systemic challenges unaffected by cultural competency policies. These exploratory findings indicate that mandates were not associated with better patient experience: mandate and matched states declined similarly, and both declined more than the remaining states. Because HCAHPS is a single patient-experience outcome and the mandate groups are small and heterogeneous, the question merits further study with hospital-level designs and broader outcomes before policy recommendations are made.

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AUTHORS CONTRIBUTIONS

MA: data analysis and interpretation, manuscript preparation, manuscript editing, manuscript review. DU: manuscript editing, manuscript review. RD: conception, manuscript editing, manuscript review. PC: manuscript editing, manuscript review. KRH: statistical analysis, data analysis and interpretation, manuscript review. NB: design, data acquisition, supervision, manuscript review. All authors have given final approval for the version to be published.

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The authors declare they have no conflicts of interest.

INFORMED CONSENT

Not applicable. The study used publicly available, aggregate data and did not involve human subjects.

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The ethical statement is not applicable. This study used publicly available, aggregate data and did not involve human subjects.

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DATA AVAILABILITY STATEMENT

The datasets analyzed during the current study are publicly available: state-level HCAHPS data from the Centers for Medicare & Medicaid Services (CMS); hospital beds, hospital ownership, and health spending data from KFF State Health Facts and the CMS State Health Expenditure Accounts; and urban population data from the U.S. Census Bureau (2020 Census).

DATA SHARING STATEMENT

Derived datasets and analysis code are available from the corresponding author on reasonable request.

AI DISCLOSURE STATEMENT

The authors used (Claude AI) as a language-editing tool to improve grammar, clarity, and readability. The AI tool was not used for data analysis, data generation, image processing, or scientific content creation. All outputs were carefully reviewed and verified by the authors, who take full responsibility for the final content.

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