Racial and Ethnic Differences in Utilization of Health Services in Patients with Diabetes Enrolled in Medicaid

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Abstract: We evaluated racial and ethnic differences in use of medical care between patients with diabetes enrolled in Medicaid and explored whether differences varied by state Medicaid program. Using data from 137,006 patients we created a multivariable Poisson regression model to examine the effect of race on ambulatory care visits, emergency ward visits, and hospitalization rates for patients with diabetes mellitus enrolled in three state Medicaid programs. We found significant differences in service use between groups, which varied depending on state. For example, black patients compared with whites had significantly fewer outpatient visits but more hospitalizations in New Jersey; by contrast, blacks had higher outpatient visit rates and lower hospitalization rates in Georgia. Racial and ethnic differences in health service use among Medicaid enrollees were not consistent across states, suggesting that local factors, including varied Medicaid policies, may affect racial and ethnic differences in use of health care services.

Key words: Diabetes, health service utilization, Medicaid, race, ethnic groups, ambulatory care, emergency service, hospitalization, disparities, geographic variation.

Reducing racial and ethnic disparities in diabetes-related morbidity and mortality in the United States has been identified as an important goal for the nation's health.[1] Patients with diabetes who receive appropriate medical care have a lower risk of subsequent poor health outcomes.[2–4] Although Medicaid provides health benefits to all enrollees, significant racial and ethnic differences in utilization of medical care have been found among enrollees.[5–7] Examining potential variation in these differences across state Medicaid programs may help to identify factors that contribute to or reduce racial and ethnic disparities in diabetes-related morbidity and mortality.

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Almost 6% of the United States population has diabetes and, despite effective therapies, diabetes is the seventh leading cause of death and the leading cause of blindness and end-stage renal disease.[8] Hispanics, Native Americans, and non-Hispanic blacks have higher rates of diabetes than whites in the United States.[9] Hispanic and non-Hispanic black Americans with diabetes also have higher rates of diabetes-related mortality and complications.[9–16] Some of these diabetes-related morbidity and mortality rates are in excess of the higher prevalence of diabetes in the black and Hispanic populations.[10,11,17,18]

Studies of disparities in medical care have consistently found racial and ethnic differences in access to and use of medical care, especially for subspecialty interventions, services at later stages of disease, and care of elderly patients.[10,19–23] Less is known about racial and ethnic differences in outpatient chronic disease care, particularly for younger adults. Studies examining racial and ethnic differences in diabetes care have not yielded consistent results. Some studies of ambulatory care visits and laboratory testing have shown no racial or ethnic differences for patients with diabetes.[24–26] Others have found that black patients received fewer outpatient visits, ophthalmology visits, and appropriate laboratory tests than whites.[27–29] However, these studies are limited by recall bias, a focus on elderly populations, or an inability to account for variations in patient comorbidities or geographic location.[16,24–29]

Our study examines racial and ethnic differences in care within Medicaid, the nation's largest single benefits program.[30] Medicaid insures 19% of black, 16% of Hispanic, 7% of Asian/Pacific Islander, and 6% of white persons under age 64 in the United States.[17] Few studies have examined to what degree racial and ethnic disparities exist across Medicaid plans.[6] Our goal was to examine racial and ethnic differences in utilization of health services in a population of patients with diabetes enrolled in Medicaid. We asked three questions: (1) Does enrollment in Medicaid eliminate racial and ethnic differences in use of outpatient care visits, emergency ward visits, and inpatient hospitalizations for patients with diabetes? (2) If differences are found, do they vary across state Medicaid programs? and (3) Does risk adjustment explain these differences?

Methods

Patient Selection. We used State Medicaid Research Files (SMRF) from the Health Care Financing Administration, now the Centers for Medicare and Medicaid Services. Data were obtained through the Research Data Assistance Center (ResDAC) © 2003, Regents of the University of Minnesota. Detailed information on the collection of this data can be obtained by contacting ResDAC (http://www.resdac.umn.edu/). This data set contains demographic files, enrollment information, and claims records for all outpatient and inpatient services and prescription drugs reimbursed by Medicaid. We analyzed SMRFs from California, Georgia, and New Jersey for 1994 and 1995. These states broadly represent U.S. geographic regions. They were also chosen on the basis of completeness of data and lower managed care penetration rates than other states available in the SMRFs. Because individuals enrolled in capitated managed care plans do not have claims

we excluded patients with managed care identifiers to eliminate enrollees without service claims. We retained records only for people aged 18 to 64 enrolled for at least 3 months in 1994 or 1995. We also limited our analysis to those who were eligible for Medicaid because of disability or eligibility for Aid to Families with Dependent Children (AFDC), now known as the Temporary Aid to Needy Families program.

We identified persons with diabetes using either *International Classification of Disease, Ninth Revision, Clinical Modification* (ICD-9-CM) diagnosis codes for diabetes mellitus in any position on physician or hospitalization claims, or National Drug Codes (NDC) for sulfonylureas, metformin, or insulin on outpatient pharmacy claims. Because we relied on physician, hospital, or pharmacy claims, we missed persons with diabetes who neither sought nor received services. This strategy initially allowed us to identify 172,493 persons across the three states. Roughly 20% met only the NDC criteria, with the remainder having ICD-9-CM diabetes codes.

We eliminated all persons with missing or unknown race or ethnicity (9% in California, 6% in Georgia, and 10% in New Jersey). Because of sample size concerns, we also eliminated persons whose racial or ethnic identification constituted less than 2% of subjects in each state: Native Americans from all states; Asian/Pacific Islanders from New Jersey and Georgia; and Hispanics from Georgia. We excluded pregnant women based on ICD-9-CM diagnosis codes and procedure codes indicating labor and delivery to eliminate women with gestational diabetes and newborn services that may have been billed under the mother's Medicaid identification number. Our final sample consisted of 137,006 nonpregnant patients with diabetes.

We examined three services: outpatient office physician visits, emergency ward visits, and hospitalizations. We identified physician visits using Current Procedural Terminology (CPT-4) codes for evaluation and management (E&M) services provided in outpatient or ambulatory care settings. Emergency ward visits were defined by CPT-4 codes for E&M services in emergency departments. We validated both sets of E&M codes using a place-of-service identifier in the Medicaid database. We identified unique hospitalizations using Medicaid admission and discharge dates and eliminated hospitalizations for which a patient was admitted and discharged the same day. We linked counts of each type of service to unique records for individual study subjects.

Independent Variables. When recipients enroll in Medicaid, they identify their race and ethnicity. SMRF categories include white not of Hispanic origin; black not of Hispanic origin; American Indian or Alaskan Native; Asian or Pacific Islander; Hispanic; and unknown. Additional independent variables included demographic (age, gender), administrative, and clinical characteristics. We grouped people into five age categories (18–24, 25–34, 35–44, 45–54, and 55–64 years). The administrative variables were Medicaid enrollment duration (3–24 months) and two eligibility categories: disability and AFDC.

As a measure of overall health status, we used relative weight (compared with 1.0) from the Diagnostic Cost Group (DCG) risk adjustment methodology. This relative weight is derived from ICD-9-CM codes, which are in turn used to create

clinical categories that reflect an individual patient's disease burden. As described in detail elsewhere,[31] the DCG algorithm takes all diagnosis codes from physician and hospital claims to predict risk, or likelihood, of resource consumption in the current year based on health conditions. We used a version of DCG software calibrated to Medicaid data.[31] In addition, we repeated all analyses using two other risk adjustment methods that were also calibrated specifically for Medicaid populations, the Adjusted Clinical Groups (ACG)[32] and the Chronic Illness and Disability Payment System (CDPS).[33]

Analysis. Because outcomes represented counts for each service, we modeled rates of service use with Poisson regression. To adjust for overdispersion, we included deviance divided by degrees of freedom as a dispersion parameter. The race indicators were the independent variables of primary interest. To adjust for factors possibly associated with utilization that may differ among racial groups, we also included age, gender, eligibility category, and DCG risk weight. We report risk-adjusted rate ratios based on the Poisson regression models and associated 95% confidence intervals (CI). All analyses were performed using the GENMOD procedure in SAS statistical software version 8.[34]

Results

Demographics. Across the three states, 137,006 patients with diabetes met the study criteria. Distributions of race and ethnicity varied by state (Table 1). For all groups, the mean age was 46 years and women outnumbered men in all racial and ethnic groups. Higher percentages of black and white patients than patients in other racial and ethnic groups had Medicaid because of disability; Hispanic patients and Asian/Pacific Islander patients were more likely than others to be eligible for AFDC.

Unadjusted Service Utilization Rates. Table 2 shows mean numbers of outpatient visits, emergency ward visits, and hospitalizations per year for each group by state, accounting for variations in enrollment duration. On average, Medicaid recipients in California had more outpatient visits than those in New Jersey; patients in Georgia had the lowest number of outpatient visits, averaging less than one visit per year. Across all states and racial and ethnic groups, patients averaged less than one emergency ward visit and hospitalization per year. Table 3 shows unadjusted rate ratios and 95% CI for each type of service for black, Hispanic, and Asian/Pacific-Islander patients using white patients as the reference group.

Adjusted Service Utilization Rates. For all three services, we then calculated rate ratios adjusting for age, gender, Medicaid eligibility, and DCG relative weight, controlling for months of enrollment. White patients were the reference group for all analyses (Table 4). Groups with higher outpatient visit rates generally had lower hospitalization rates and groups with lower outpatient visit rates had higher hospitalization rates.

Racial and Ethnic Differences by State. Racial and ethnic differences in service use were not consistent across states (see Table 4). In addition, groups with lower outpatient visit rates had a tendency to have higher hospitalization rates as indicated by the slanted lines in Figure 1.

Table 1.

BASELINE CHARACTERISTICS

Characteristic	New Jersey ($n = 15,661$)			Georgia ($n = 25,200$)		California ($n = 96,145$)			
Race/ethnicity	Black	Hispanic	White	Black	White	Black	Hispanic	Asian	White
Number (%)	6,761 (43)	2,370 (15)	6,530 (42)	16,044 (64)	9,156 (36)	18,098 (19)	30,400 (32)	5,781 (6)	41,866 (44)
Mean age (y)	48	43	48	46	48	49	45	48	50
Female (%)	76	76	65	81	68	67	66	58	60
Months enrolled[a]	16	14	16	17	16	17	15	16	17
AFDC (%)[b]	29	70	18	34	21	26	86	84	24
Risk weight[c]	2.0	1.1	2.0	0.8	1.0	2.4	1.4	1.3	2.5

[a]Total months enrolled during 1994 and 1995.
[b]Eligibility category AFDC; if not AFDC, then eligible because of disability.
[c]DCG relative risk weight.
Abbreviations: AFDC, Aid for Families with Dependent Children; DCG, Diagnostic Cost Group..

Table 2.

MEAN OUTPATIENT VISITS AND HOSPITALIZATIONS PER PERSON PER YEAR[a]

Characteristic	New Jersey			Georgia		California			
Race/ethnicity	Black	Hispanic	White	Black	White	Black	Hispanic	Asian	White
Outpatient visits	3.73	4.90	3.84	0.81	0.56	6.98	6.84	9.65	6.71
Emergency ward visits	0.68	0.48	0.60	0.74	0.77	0.93	0.60	0.26	0.88
Hospitalizations	0.71	0.37	0.61	0.54	0.77	0.52	0.27	0.18	0.46

[a]These results account for enrollment duration.

Table 3.

UNADJUSTED SERVICE UTILIZATION SHOWN AS RATE RATIOS TO WHITE PATIENTS' SERVICE USE (WITH 95% CONFIDENCE INTERVALS)[a]

Patient race/ethnicity	New Jersey	Georgia	California
Black			
Outpatient	0.96 (0.92–1.01)	1.46 (1.38–1.54)	1.04 (1.02–1.06)
Emergency	1.13 (1.06–1.19)	0.97 (0.93–1.01)	1.07 (1.04–1.10)
Hospital	1.15 (1.10–1.21)	0.70 (0.68–0.73)	1.15 (1.12–1.18)
Hispanic			
Outpatient	1.27 (1.19–1.35)	—	1.04 (1.02–1.06)
Emergency	0.80 (0.73–0.88)	—	0.68 (0.66–0.70)
Hospital	0.60 (0.55–0.66)	—	0.58 (0.56–0.60)
Asian/Pacific Islander			
Outpatient	—	—	1.44 (1.41–1.48)
Emergency	—	—	0.29 (0.28–0.32)
Hospital	—	—	0.39 (0.36–0.42)

[a]These models account for enrollment duration.

Table 4.

ADJUSTED SERVICE UTILIZATION SHOWN AS RATE RATIOS TO WHITE PATIENTS' SERVICE USE (WITH 95% CONFIDENCE INTERVALS)[a]

Patient race/ethnicity	New Jersey	Georgia	California
Black			
Outpatient	0.91 (0.87–0.95)	1.47 (1.39–1.55)	1.02 (1.00–1.04)
Emergency	1.07 (1.01–1.13)	0.96 (0.91–1.00)	1.04 (1.01–1.06)
Hospital	1.15 (1.10–1.19)	0.81 (0.78–0.84)	1.18 (1.16–1.21)
Hispanic			
Outpatient	1.14 (1.07–1.22)	—	0.88 (0.86–0.90)
Emergency	0.79 (0.72–0.87)	—	0.68 (0.66–0.70)
Hospital	0.95 (0.87–1.03)	—	1.09 (1.05–1.12)
Asian/Pacific Islander			
Outpatient	—	—	1.26 (1.23–1.30)
Emergency	—	—	0.33 (0.31–0.36)
Hospital	—	—	0.76 (0.72–0.81)

[a]Model is adjusted for age, gender, eligibility, risk weight, and enrollment duration. All models shown use DCG-based risk weight.

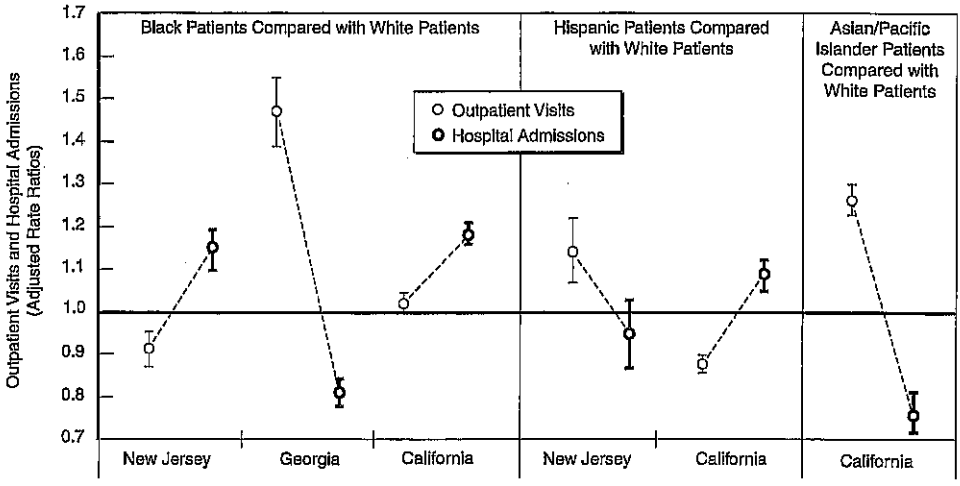

Figure 1. State level comparisons of racial and ethnic differences in outpatient visit rates and hospital admission rates. Rates are shown as adjusted rates ratios with white patients as the referent group. The ⌶ bars represent 95% confidence intervals.

Blacks Compared With Whites. In New Jersey, black patients had an outpatient visit rate that was significantly (9%) lower than white patients after adjustment and a hospitalization rate that was significantly (15%) higher. In Georgia, the opposite was true: black patients had 47% percent more outpatient visits and 19% fewer hospitalizations; both of these differences were also statistically significant. In California, black patients had no significant difference in outpatient visits and a significantly (18%) higher hospitalization rate than whites. There was little difference in emergency ward use between black and white patients across all three states.

Hispanics Compared With Whites. In New Jersey, Hispanic patients had 14% more outpatient visits after adjustment than white patients, but no significant difference in hospitalizations. In contrast, in California, Hispanic patients had 12% fewer outpatient visits and 9% more hospitalizations than white patients. In New Jersey, Hispanic patients had 21% fewer emergency ward visits than white patients; in California, Hispanics had 32% fewer emergency ward visits than white patients.

Asian/Pacific Islanders Compared With Whites. In California, Asian/Pacific-Islander patients had 26% more ambulatory care visits and 24% fewer hospitalizations than white patients. Asian/Pacific-Islander patients' emergency ward visit rate was 67% lower than that of white patients.

Results From Risk Adjustment. Risk adjustment with DCGs did not explain identified differences by race and ethnicity in service use within states. We also repeated all analyses using relative weights computed with the ACG and CDPS risk adjustment methods. Results for both ACG and CDPS were generally comparable to those from the DCG. The only meaningful difference involved the model using CDPS relative weights: the adjusted rate ratio (95% CI) for hospitalizations for Hispanics in California was 0.96 (0.93–0.99). This association was in the opposite direction from the 1.18 (1.15–1.22) and 1.09 (1.05–1.12) adjusted rate ratios for ACG and DCG models, respectively. Of the 18 rate ratios compared in our analysis,

this was the only instance where using different risk adjustment produced an inverted rate ratio.

Racial and Ethnic Differences Within Eligibility Category. In our models, a patient's eligibility (AFDC or disability) was the strongest individual predictor of service use. Because these variables represent two very different populations, we performed separate analyses of all outcomes for these two groups.

In models containing only AFDC-eligible black patients, emergency ward use rates compared with whites were 18% and 14% lower in Georgia and California, respectively. Black patients eligible for AFDC in California had no significant difference from their white counterparts in hospitalization rates, and AFDC-eligible Hispanic patients in California had 7% fewer hospitalizations than white patients.

In general, the models containing patients enrolled because of disability produced similar results to those of the models with both groups. There were two exceptions: New Jersey Hispanics had no significant difference in outpatient visit rates compared with white patients, and Asian/Pacific-Islanders in California had no difference in hospitalization rates compared with white patients.

Discussion

We found significant racial and ethnic differences in health service utilization for adult Medicaid recipients with diabetes. These differences generally varied by state Medicaid program. We also found that groups with lower rates of outpatient visits had higher rates of hospitalizations. Risk adjustment did not explain the observed differences. All of these findings highlight the need to understand why patients of different races and ethnicities who have the same health benefits package differ substantially in health service use. This is of particular concern for diabetes, a disease for which routine medical care is a particularly crucial component of management.

Higher rates of outpatient visits have been shown to be correlated with better quality of care for patients with diabetes.[29] In our study, racial and ethnic differences in outpatient visit rates were inversely related to differences in hospitalization rates for most groups, suggesting that increased hospitalization rates may result from inadequate outpatient care. Our results are also consistent with an analysis of hospital discharge data that showed variation between state Medicaid plans in racial and ethnic differences in preventable hospitalizations among Medicaid beneficiaries. In that study, blacks in New Jersey and California had higher hospitalization rates, but blacks in South Carolina had lower rates compared to whites.[6]

Variation in state Medicaid policies could be responsible for some of the differences in health service use found here. During the time of our analysis, all states were required to offer core sets of services; however, each state also chose to provide or withhold several optional services.[35] Examples of optional services include case management and diagnostic, preventive, and screening services. In the year just before our analysis, New Jersey was the only state in our study that did not cover case-management services.[35] Previous studies have shown that access to case management services improves access to medical care.[36,37] During the same period, Georgia did not cover diagnostic, preventive health, and screening services.[35] This

discrepancy may account for Georgia's low rates of overall outpatient visits relative to other states.

State Medicaid programs also vary in provider payment rates. Differences in the local availability of providers may also have contributed to our observed state Medicaid program variations. Local health care resources, such as availability of clinicians accepting Medicaid, may disproportionately affect geographically isolated racial and ethnic groups. For example, relatively low rates of outpatient visits for whites in Georgia may be related to more white Medicaid enrollees living in rural areas, where access to providers is limited.

Other potential causes for state-level variation in racial and ethnic differences in service use include heterogeneity within racial and ethnic categories. Considering all persons who identified themselves as Hispanic as one group masks important differences by country of origin and level of English-language proficiency.[38] For example, in the National Health Interview Survey, Cuban, Puerto Rican, and Mexican ethnic subgroups reported significant differences in health service utilization and health status.[39] Predominance of Hispanics from Cuba and Puerto Rico in New Jersey and Hispanics from Mexico and Central America in California may contribute to the observed differences in utilization rates across these two states.

Black and white patients used emergency ward services at similar rates, but rates of use by Asian/Pacific Islanders and Hispanics were consistently lower than the rate of use by either of these two groups. In an insured population, groups with language barriers may be more likely than others to use outpatient services with familiar providers or translation services and may also be reluctant to use emergency wards, where these providers and translation services may not be readily available. This may explain the large differences in emergency ward use observed between Asian/Pacific Islanders and Hispanics compared with whites and blacks.

Our findings diverge from studies that detected no racial or ethnic differences in overall service use for adults with diabetes.[24–26] The analysis of the National Health Interview Survey[25] could not examine state-specific racial and ethnic variations in service use and relied on patients' recall of visits. Because we used claims data, recall bias is precluded. Studies that showed no difference in physician practices and laboratory testing required patients to have had at least one visit to be included in the study; thus, these analyses could not account for patients without outpatient visits during the study period.[24,26] Our study avoided these limitations in addition to accounting for a patient's insurance coverage and socioeconomic status.

Our study has several strengths. Because we examined Medicaid recipients exclusively, our analyses controlled not only for health insurance status but also for socioeconomic status: by definition, all Medicaid recipients live in or near poverty. Therefore, racial and ethnic differences in financial resources are unlikely to explain our findings. Other studies controlling for insurance status have typically assessed Medicare beneficiaries,[10,20,21] generally an elderly population. By studying younger adults, we avoided potential selection bias caused by lower life expectancy in minority populations.[40,41]

Our study had important limitations relating to our data source. There are no perfect risk adjusters for this type of analysis. We chose three risk adjusters that are

used widely by Medicaid programs. Our comorbidity and health status measures (DCG, ACG, and CDPS relative weights) also required services with specified diagnosis codes. The outpatient, emergency ward, and hospitalization claims had limited slots for coding diagnoses (one or two, depending on the source and state), and, as is the case for all administrative data, diagnosis coding could be inaccurate.[42] In addition, we identified only persons with diabetes who had claims for health care services or prescription drugs, not persons who did not receive any care or who were in prepaid managed care plans. In 1995, 23% of enrollees in California, 12% in Georgia, and 12% in New Jersey were enrolled in managed care programs.[43] However, our study did not include patients enrolled in managed care plans because of our reliance on claims data for many of our variables.

Some studies suggest that managed care enrollment of Medicaid recipients does not affect service use for African Americans,[5] whereas others suggest that managed care enrollment decreases African Americans' use of physician services.[44] As the enrollment of Medicaid recipients in managed care has increased, the impact of managed care on racial and ethnic differences in service use deserves further study. Our study was also limited by the use of data from 1994–1995, but it should be noted that this represented the most current data available at the time of the analysis.

Despite these limitations, our findings strongly suggest that services for diabetes differed across racial and ethnic groups and that these discrepancies vary by state Medicaid program. Lower use of outpatient care seems to be related to higher hospitalization rates, possibly reflecting differences in quality of care. Good outpatient care serves a crucial preventive role; it provides opportunities to identify complications before patients become acutely ill, reduce chronic debility, and better educate patients to control their disease. Although comprehensive outpatient care will not prevent all hospitalizations, certainly it should reduce admissions. Although we cannot prove that lower rates of outpatient care have long-term negative consequences, some patient populations may have higher risk of complications than others.

Studies have shown that state-level policy differences are associated with state-level differences in health outcomes.[45] Despite federal mandates of uniform benefits, the Center for Medicare and Medicaid Services' Health Insurance Flexibility and Accountability initiative permits Medicaid programs more flexibility in limiting previously guaranteed benefits for enrollees.[46,47] In addition, state revenue shortfalls have intensified reductions to health benefit packages for Medicaid enrollees.[48] The impact of these modifiable policy factors on racial and ethnic disparities in health deserves further study.

Medicaid is the largest health insurance program in the United States.[30] Roughly one out of five African Americans and one out of six Hispanics in the United States are covered by this program.[17] Understanding patterns of care in Medicaid programs, and potential discrepancies in quality, is crucial for ensuring equity across racial and ethnic groups. Our analysis identified racial and ethnic differences in diabetes care for Medicaid enrollees, but these differences were not consistent across states. As state Medicaid programs become more disparate, understanding how these changes affect racial and ethnic disparities in service use and health outcomes is an essential consideration for policy makers.

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