Measuring Care Utilization and Quality for Those with Chronic Kidney Disease by Payer and Community Vulnerability

Measurement Years – 2019 - 2021

CMS Qualified Entity (QE) Program Public Report

August 3, 2023

What We Do and Who We Serve

Vizient, Inc. is the nation's leading healthcare performance improvement company. As the largest member-owned health care company in the United States, Vizient understands what members need to deliver exceptional, cost-effective care. We work with a wide range of health care organizations to ensure that our innovative practices, knowledge base and expertise reach across communities and the care continuum. Vizient's diverse membership includes academic medical centers, pediatric facilities, community hospitals, integrated health delivery networks and non-acute health care providers. These members are interested in learning from our trusted experts, accelerating performance and improving care. Membership gives these organizations access to the many ways we optimize each interaction along the continuum of care.

In 2022, Vizient, Inc. obtained certification from the Centers for Medicaid and Medicare Services (CMS) to become a Qualified Entity (QE), allowing us to receive 100% of Medicare claims from all 50 states and the District of Columbia. As part of this certification, Vizient has published its first public report utilizing this data, in combination with other Vizient data resources, to provide metrics of healthcare quality. The analyses and reporting have been developed to help achieve CMS' objective of improving quality of care.

What We are Measuring

Chronic Kidney Disease (CKD) is a common and costly chronic disease in the US that can lead to End-Stage Renal Disease (ESRD). In 2021, 37 million US adults had CKD and 786K had ESRD[1]. Management of CKD and ESRD requires multidisciplinary care involving nephrologists, primary care providers, nurses, and other healthcare providers. The quality of care provided to CKD and ESRD patients reflects the healthcare system's ability to coordinate and deliver comprehensive care. Additionally, the staging of CKD allows for the classification of patients based on the severity of their disease. By analyzing quality measures across the six stages of CKD, we can identify variations in care, outcomes, efficiency, and cost for more precise groups of patient populations and tailor interventions accordingly.

The following three standard measures were selected to quantify variations in healthcare resource use for CKD populations across payer types:

1. NQF 2158: Medicare Spending per Beneficiary (MSPB)
2. NQF 2503: Hospitalizations per 1,000 Medicare fee-for-service (FFS) Beneficiaries
3. NQF 1789: Hospital-Wide All-Cause Unplanned Readmissions (HWR)

The following two alternative measures were selected for this report to compare CKD prevalence, screening, and outcomes within high and low social need communities:

1. Vizient Vulnerability Index: The patent pending Vizient Vulnerability Index (VVI) is a quantification of neighborhood resources and obstacles to care based on public data including US Census American Community Survey, USDA Food Research Atlas, Housing and Urban Development Comprehensive Housing Affordability Strategy data, EPA Environmental Justice data, FBI violent crime statistics, HRSA provider shortages, and tuned to Life Expectancy at Birth at the census tract level. This index summarizes the overall community-level social need at the zip code level, as well as in nine domains: economic, education, health care access, neighborhood resources, housing, social resources, clean environment, transportation, and public safety.

   Within a community, there are many ways that social determinants of health may be driving health outcomes for the CKD population. Limited resources and infrastructure may result in a lack of healthcare facilities offering specialized kidney care, leading to delayed diagnosis, limited treatment options, or reduced access to transplantation services. Inadequate access to nutritious food options can contribute to unhealthy diets, which are known to exacerbate CKD progression. Limited access to reliable and affordable transportation can hinder individuals' ability to access regular medical appointments, including nephrologist visits and dialysis treatments, leading to delayed or inadequate care, poor disease management, and increased risk of complications. The data-driven insights contained in this report enhance our understanding of the complex interactions between community-level social needs and CKD rates and outcomes, enabling evidence-based decision-making and promoting health equity.

2. Percent of Hypertension, CKD, and Diabetes Patients Receiving Kidney Health Evaluation: This measure is an expansion of the standard measure stewarded by the National Committee for Quality Assurance (NCQA) "Percent of Diabetes Patients Receiving Kidney Health Evaluation" to also include those with Hypertension and CKD in the denominator. This measure captures the proportion of patients with these diagnoses who receive recommended kidney health evaluations, which involve assessing kidney function, monitoring blood pressure, and assessing protein levels in urine. Regular kidney health evaluations are essential as they help identify potential kidney damage in its early stages when interventions can be most effective. Since diabetes, hypertension, and CKD often coexist and share common risk factors, incorporating hypertension and CKD in the definition allows for a more comprehensive assessment of the healthcare systems' efforts to prevent and manage CKD among populations at risk of developing the disease or increasing disease severity.

Data source: The administrative data that are used in calculating the measures evaluated in this report come from an integrated data set containing claims from Medicare FFS and a Proprietary Sg2 All-Payer Claims data set which contains data for Medicare Advantage, Commercial, and Medicaid payers. This robust combination of data provided a large population of eligible patients so that we could stratify measures by CKD stage and payer type. The period evaluated includes a three-year trend from 2019-2021.

Executive Summary

The purpose of this report is to help achieve CMS' objective of improving quality of care by reporting all-payer measures of quality and resource utilization. The analysis conducted sheds light on the impact of chronic kidney disease (CKD) on the healthcare system, revealing higher spending and poorer outcomes among individuals with CKD. Furthermore, the data demonstrates higher costs and worse outcomes as the severity of CKD progresses. This evidence underscores the importance of preventing CKD progression among individuals at risk by implementing recommended screening protocols. However, our data shows that the burden of CKD is not experienced by all communities equally. We see a stark contrast between high and low social need communities when looking at prevalence of CKD, rates of screening and rates of dialysis indicating a correlation between community-level social determinants of health and outcomes. By providing data that uncovers these disparities, we aim to support targeted interventions that can advance health equity and improve the quality of care for patients diagnosed with CKD.

Population Overview and Demographics

In 2019, the prevalence of CKD per 1,000 beneficiaries across all payers was 46.6 as shown in Table 1. The prevalence decreased to 45.4 in 2020 but increased overall to 48.6 in 2021, likely reflecting the impact of the pandemic on healthcare utilization, not an actual decrease in prevalence in 2020. The trend over the three-year period was consistent among the Medicare FFS and Dual Eligible populations, which had the highest prevalence of CKD across payers at 125.9 and 164.4 per 1,000 beneficiaries, respectively in 2021. Medicare Advantage saw a substantial decrease in prevalence per 1,000 beneficiaries from 2020 to 2021 (70.5 vs. 49.1), likely representative of the increased enrollment in Medicare Advantage plans during this time. Medicaid and Commercial payers saw modest increases in CKD prevalence from 2019-2021.

Table 1. Chronic Kidney Disease Prevalence per 1,000 Beneficiaries by Payer from 2019-2021

Year	All Payers	Medicare FFS	Dual Eligible	Medicare Advantage	Medicaid	Commercial
2019	46.6	115.5	157.7	64.2	15.0	11.0
2020	45.4	110.4	146.2	70.5	16.1	11.1
2021	48.6	125.9	164.4	49.1	16.0	11.5

The average age of beneficiaries with CKD across all payers, shown in Table 2, increased slightly from 2019 to 2021 from 70.9 to 71.2 years. Medicare FFS covers the oldest beneficiaries with CKD (77.8 years in 2021), followed by Medicare Advantage (73.6 years in 2021), Dual Eligible (72.1 years in 2021), and Commercial plans (69.6 years in 2021) while Medicaid covers the youngest beneficiaries with CKD on average (63.3 years in 2021). Notably, Medicaid patients have an average age that is 15-years lower than the Medicare FFS population.

Table 2. Average Age of Beneficiaries with Chronic Kidney Disease by Payer from 2019-2021

Year	All Payers	Medicare FFS	Dual Eligible	Medicare Advantage	Medicaid	Commercial
2019	70.9	77.5	71.9	74.5	62.2	69.3
2020	71.1	77.6	72.0	73.7	62.9	69.5
2021	71.2	77.8	72.1	73.6	63.3	69.6

Average Medicare Spend per Beneficiary

The average Medicare spend per beneficiary (MSPB) refers to the average cost of healthcare services provided to each individual beneficiary enrolled in Medicare. For this analysis, the MSPB methodology was applied to an all-payer population to provide a comparable estimate across payer classes. The MSPB can vary based on the health status and needs of a beneficiary, geographic location and access, types of services available, types of services utilized and overall

efficiency of healthcare delivery. It is calculated by dividing the total expenditure by the number of beneficiaries. Table 3 includes the average MSPB by CKD stage and payer for 2021 (see Table A1 for all three years of data) and shows there is substantially higher cost of providing care to patients as they progress through the stages of CKD. Notably, for Medicare FFS, Dual Eligible, and Medicaid populations, patients with end-stage renal disease have an average MSPB that is approximately ten times that for patients without CKD.

Table 3. Average Medicare Spend per Beneficiary by CKD Stage and Payer, 2021

CKD Stage	All Payers	Medicare FFS	Dual Eligible	Medicare Advantage	Medicaid	Commercial
No CKD	$2,837	$4,716	$7,341	$3,802	$4,998	$1,038
Stage 1	$10,184	$11,496	$17,005	$6,439	$11,203	$9,203
Stage 2	$11,068	$11,820	$16,554	$8,912	$16,203	$9,413
Stage 3	$13,324	$13,777	$19,985	$10,102	$18,902	$11,713
Stage 4	$17,358	$20,303	$25,485	$16,239	$23,415	$14,202
Stage 5	$22,524	$22,683	$27,043	$23,321	$27,222	$20,898
Stage 6- ESRD	$39,023	$46,659	$58,323	$33,713	$54,927	$31,303

Note: The CKD diagnosis was determined using any diagnostic position on the record. In the case that a CKD diagnosis was indicated on a patient's record, but the stage is not specified, the record was excluded from the analysis. Unspecified cases may vary widely in terms of their actual CKD stage, leading to analytical inconsistencies.

Hospitalizations per 1,000 Beneficiaries

The hospitalizations per 1,000 beneficiaries measure provides a standardized comparison of the frequency of hospitalizations across different populations, adjusting for differences in population size. Table 4 includes the hospitalizations per 1,000 beneficiaries by CKD stage and payer for 2021 (see Table A2 for all three years of data). Among Medicare FFS, and Dual Eligible populations hospitalization rates increase substantially as staging of CKD becomes more severe. During pandemic years (2020 and 2021) there was a decline in hospitalizations across payer types, however, the rates of hospitalizations among more severe CKD stages remained consistently higher.

Table 4. Hospitalizations per 1,000 Beneficiaries by CKD Stage and Payer, 2021

CKD Stage	All Payers	Medicare FFS	Dual Eligible	Medicare Advantage	Medicaid	Commercial
No CKD	69.4	115.0	225.6	30.6	43.0	42.2
Stage 1	225.2	339.5	597.5	174.0	171.5	142.0
Stage 2	260.5	383.5	608.5	180.9	190.9	182.4
Stage 3	355.2	488.4	759.6	275.9	269.9	261.9
Stage 4	536.8	838.3	1057.8	382.7	384.8	376.4
Stage 5	584.2	971.7	1174.6	391.0	381.2	395.9
Stage 6- ESRD	692.1	1305.4	1602.5	252.0	518.7	416.2

Note: No hospitalizations were excluded from the analysis based on diagnosis (i.e., includes Covid). No age-based exclusions were applied. CKD diagnosis was determined using any diagnostic position on the record.

Hospital-Wide All-Cause Unplanned Readmissions

Hospital-Wide All-Cause Unplanned Readmission Rates refer to the share of patients who are readmitted to the hospital for any reason, excluding planned readmissions, within 30 days of their initial hospitalization. This metric is used to evaluate the quality of care provided by hospitals and can serve as an indicator of the effectiveness of care transitions, post-discharge management, and overall patient outcomes. Table 5 includes the Hospital-Wide All-Cause Unplanned Readmission Rates by CKD stage and payer for 2021 (see Table A3 for all three years of data). This analysis found that unplanned readmission rates prior to the pandemic (2019) were higher for those with CKD and increased as stage severity increased for all payers. In the pandemic years (2020 & 2021) this association continued for all payers, except for commercial. Commercial represents the largest payer segment in our all-payer database, representing over 50% of all unique beneficiaries and has a much younger patient population (the average age of inpatient admission for commercial is 29 years younger than Medicare Advantage and 31 years younger than Medicare FFS).

Table 5. Hospital-Wide All-Cause Unplanned Readmission Rates by CKD Stage and Payer, 2021

CKD Stage	All Payers	Medicare FFS	Dual Eligible	Medicare Advantage	Medicaid	Commercial
No CKD	7.3%	8.0%	10.6%	6.9%	8.8%	5.9%
Stage 1	9.1%	10.8%	13.0%	8.0%	9.2%	7.5%
Stage 2	9.7%	10.7%	12.9%	8.1%	11.4%	8.1%
Stage 3	10.3%	11.4%	12.5%	8.5%	11.6%	8.8%
Stage 4	12.1%	14.0%	14.0%	9.8%	18.8%	9.2%
Stage 5	14.0%	15.3%	15.5%	10.0%	22.5%	11.3%
Stage 6- ESRD	16.8%	17.9%	19.9%	11.2%	24.1%	14.3%

CKD Prevalence and Community Social Need Using the Vizient Vulnerability Index

This report includes evidence that individuals in more advanced stages of CKD experience notably higher costs and poorer outcomes, highlighting the need to prioritize the prevention of CKD progression for at-risk individuals. Using data, we aim to uncover the upstream factors that impact patients at various stages of CKD by focusing on the social determinants of health that drive health outcomes within a community. The Vizient Vulnerability Index (VVI) measures the social needs of communities as it relates to the life expectancy of a population using factors such as poverty, unemployment rate, educational levels, access to healthcare, and other socio-economic community-level factors. For this analysis, the index was separated in deciles from low social need to high social need.

Table 5 includes the CKD Prevalence per 1,000 Beneficiaries by VVI Decile and Payer for 2021. The dual-eligible and Medicaid payer types have a strong association between the CKD prevalence and VVI Decile, but not as large as the other payers. Researchers commonly use Medicaid and Dual-eligible payers as a proxy for socio-economic vulnerability, however, the smaller ratio of high social need to low social need communities for these two payer segments points to the reality of economic disparities even in the wealthier and low social need communities.

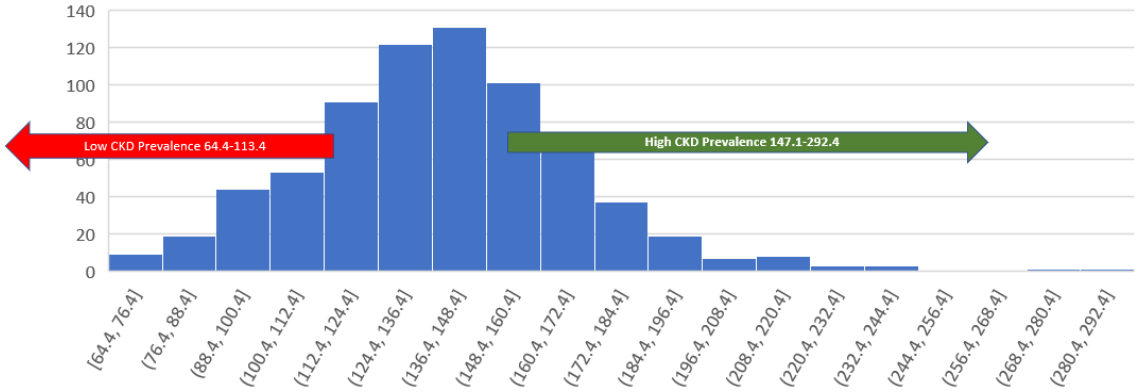
Table 6. CKD Prevalence per 1,000 Beneficiaries by VVI Decile by Payer, 2021

VVI Decile	All Payers	Medicare FFS	Dual Eligible	Medicare Advantage	Medicaid	Commercial
1-Low Social Need	39.4	104.5	160.7	28.1	12.8	7.2
2	43.8	116	164.5	35.9	15	8.7
3	45.2	119.7	161.4	40.5	14.4	9.6
4	47.8	123.8	159.8	47	16.6	11.6
5	50.4	128.2	162.7	50.8	17.8	13.4
6	49.9	129.1	161	53.8	15.6	12.5
7	52.6	134.8	161.4	55.4	19.1	14.1
8	54	138.3	166.3	65.9	17.7	13.7
9	54.3	140.4	168.8	64.4	14.3	14.1
10-High Social Need	53.4	141.9	172.2	57.5	14.5	12.1
Ratio High/Low	1.4	1.4	1.1	2.0	1.1	1.7

Using quartiles of CKD prevalence, communities were grouped based on CKD prevalence per 1,000 beneficiaries (Figure 1).

- Low CKD prevalence (lowest quartile) have a range of 64.4-113.4 per 1,000 beneficiaries
- Moderate CKD prevalence (middle 2 quartiles) have a range of 113.5-147.0 per 1,000 beneficiaries
- High CKD prevalence (highest quartile) have a range of 147.1-292.4 per 1,000 beneficiaries

Figure 1. Distribution of Communities Grouped by CKD Prevalence per 1,000 Beneficiaries

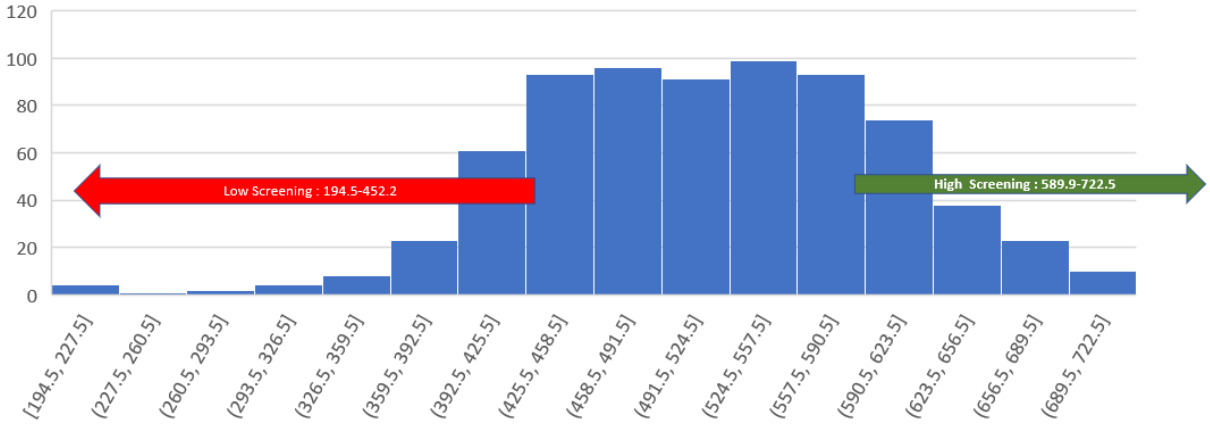


Kidney Health Screenings per 1,000 Beneficiaries with Diabetes, Hypertension and Chronic Kidney Disease

The most effective strategy for prevention is to implement the recommended screening protocol for individuals at risk of developing CKD, including those with diabetes and hypertension, as well as those who already have CKD and are at risk of advancing to a higher disease stage[3]. Unfortunately, a large percentage of patients aren't diagnosed with CKD until they are admitted for inpatient care or land in the Emergency Room[2,3]. For this reason, we've created a metric that tracks Kidney Health screenings for patients with Hypertension, Diabetes and Chronic Kidney disease done in a physician's office or in outpatient clinics. Rates of screening per 1,000 beneficiaries were grouped in quartiles to benchmark communities with low, moderate or high screening rates in these outpatient venues.

- Low Screening Communities (lowest quartile) have a range of screening of 194.5-452.2 per 1,000 beneficiaries
- Moderate Screening Communities (middle 2 quartiles) have a range of screening of 452.3-589.8 per 1,000 beneficiaries
- High Screening Communities (highest quartile) have a range of screening of 589.9-722.5 per 1,000 beneficiaries

Figure 2. Distribution of Communities Grouped by Kidney Health Screenings per 1,000 Beneficiaries with Diabetes, Hypertension and CKD



To evaluate the relationship between rates of CKD screening and rates of initiating dialysis treatments, we merged community-level data on screening and the prevalence of chronic kidney disease (CKD) across 722 geographic communities. By categorizing these communities into quartiles based on screening rates (low=1st quartile, moderate=2nd/3rd quartiles, high=4th quartile), we calculated the proportion of CKD patients receiving dialysis within each subgroup. This approach allowed us to estimate whether screening was associated with a slower rate at which patients progress to higher severity stages, necessitating dialysis treatments either at home or in clinics.

Data presented in Table 6 reveals that communities with low screening exhibit the highest rates of dialysis. Looking at communities with a high prevalence of CKD, there were 5.1 dialysis patients per 1,000 beneficiaries in low screening communities compared to 2.9 in high screening communities. A similar pattern is observed in neighborhoods with moderate and low CKD prevalence, suggesting a correlation between the level of screening in a community and the incidence of dialysis cases.

Table 6. Dialysis Patients per 1,000 CKD Beneficiaries by Community-Level CKD Prevalence

	Communities with High Prevalence of CKD (N=180)	Communities with Moderate Prevalence of CKD (N=360)	Communities with Low Prevalence of CKD (N=182)
Low Screening Communities (<25th percentile)	5.1	4.3	3.4
Moderate Screening Communities (25th-75th percentile)	4.2	3.2	2.0
High Screening Communities (>75th percentile)	2.9	2.5	1.1

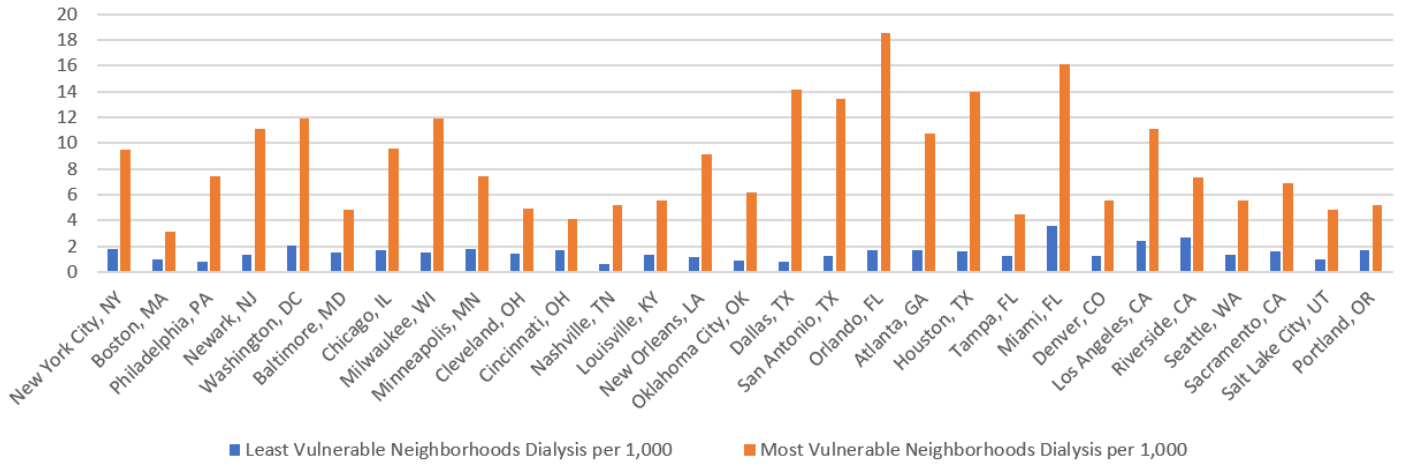
The low screening rates of certain communities may be attributable to local health-related social needs, including for example limited access to preventive care due to transportation barriers, among other social determinants of health. In Table 7, we examined the prevalence of dialysis per 1,000 beneficiaries categorized by VVI deciles. The results highlight a stark contrast between high and low social need communities. In the high social need communities, the number of patients on dialysis per 1,000 beneficiaries is seven times higher compared to the low social need communities (8.9 vs. 1.2). Furthermore, the average age of individuals on dialysis highlights a significant disparity. In the high social need communities, the average age of a person on dialysis is nine years younger than those in the low social need communities.

Table 7. Prevalence of Dialysis and Average Age of Dialysis Patients by VVI Decile

VVI Decile	# Patients on Dialysis per 1,000 Beneficiaries	Average Age of Dialysis Patients
1-Low Social Need	1.2	68.2
2	2.4	66.3
3	3.5	64.1
4	4.8	64.3
5	5.4	63.5
6	6.8	62.8
7	7	62.3
8	8.1	61.1
9	8.6	60.8
10-High Social Need	8.9	59.4

Furthermore, the prevalence of dialysis patients per 1,000 beneficiaries varies considerably within major cities, depending on the level of social need experienced in a particular community. Figure 3 shows the prevalence of dialysis in both the highest and lowest social need communities within a sample of U.S. cities. In the highest social need communities, the prevalence of dialysis patients is found to be 3 to 21 times higher compared to the lowest social need communities within the same city.

Figure 3. Dialysis Patients per 1,000 Beneficiaries in Lowest and Highest Social Need Communities within Sample US Cities



We examined whether there was a correlation between community social need and the share of patients receiving a kidney transplant. Table 8 presents the findings, indicating minimal variation in the share of patients on the transplant waitlist who ultimately receive a kidney transplant across VVI deciles. Similarly, the percentage of patients with stage 4 CKD who are on the waitlist for a kidney transplant also demonstrated no significant variance based on VVI deciles.

We also compared urban and rural communities and found that the rate of receiving a kidney transplant was slightly lower for the rural group compared to the urban group; however, this difference was not statistically significant (data not shown).

Table 8. Percent of Patients Overall and with Stage 4 CKD on the Kidney Transplant Wait List by VVI Decile

VVI Decile	Percent of Patients on Wait List Receiving Transplant	Percent of Patients with Stage 4 CKD on Wait List
1 – Low Social Need	28.4	2.5
2	30.0	2.8
3	28.8	2.8
4	30.6	2.9
5	29.4	2.6
6	29.5	2.7
7	28.7	2.8
8	31.0	2.6
9	29.3	2.4
10 – High Social Need	29.6	2.6

Discussion of Findings

The purpose of this report is to help achieve CMS' objective of improving quality of care by reporting all-payer measures of quality and resource utilization. Vizient has combined the 100% of Medicare FFS claims data received from CMS as part of the Qualified Entity program with a Proprietary Sg2 All-Payer Claims set containing data for Medicare Advantage, Commercial, and Medicaid payers to provide comprehensive insights that can drive improvement and advance health equity. In this analysis, we focus on those with chronic kidney disease (CKD). CKD is a common and costly chronic disease that can lead to ESRD and requires multidisciplinary care involving various specialized providers. The quality of care provided to these patients reflects the healthcare system's ability to coordinate

and deliver comprehensive care. Also, the staging of CKD diagnoses allows for a detailed look at how measures of efficiency and quality vary across six stages of disease severity.

We evaluated several standard measures of resource use and efficiency stewarded by CMS and applied these to an all-payer population. The Medicare Spend per Beneficiary (MSPB) measure was used to quantify the financial cost associated with CKD stage severity. Hospitalizations per 1,000 Medicare fee-for-service (FFS) Beneficiaries and Hospital-Wide All-Cause Unplanned Readmission Rates (HWR) were used to quantify the demand this population has for care in the inpatient setting, how frequently they are returning to the inpatient setting within 30 days of discharge as well as to further explain the causes for the significantly higher spend for these patients.

The data shows there is a substantially higher burden on the healthcare system as patients progress through the stages of CKD concerning cost, utilization and outcomes. If CKD can be identified and managed while in an earlier disease stage, then we would expect costs to be lower and patients' lives to improve. However, a large percentage of patients aren't diagnosed with CKD until they are admitted for inpatient care or land in the Emergency Room. For this reason, we've created a measure that tracks Kidney Health screenings for patients with Hypertension, Diabetes and Chronic Kidney disease done in Physician office or in outpatient clinics to better understand how screening for CKD is implemented in communities and estimate whether screening was associated with slowing the rate by which patients who are moving to higher severity stages require dialysis treatments at home or in clinics.

The Vizient Vulnerability Index (VVI) was utilized to identify community-level variation in screening rates and outcomes related to CKD. What we found was that the burden of CKD disproportionately affects communities with the highest level of social need, leading to lower rates of CKD screening as well as more, younger, beneficiaries being on dialysis in these areas. Within the same city, we provide evidence of substantial variation between outcomes in the highest and lowest social need communities. Specifically, the prevalence of dialysis per 1,000 beneficiaries is 3 to 21 times higher in the high social need communities compared to the low social need communities within the same city. Notably, there was not a significant correlation observed between community social need and the share of patients receiving a kidney transplant.

References

1. Centers for Disease Control and Prevention. Chronic Kidney Disease in the United States, 2023. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention; 2023.
2. Maciejewski, M, Onstad, K, and Tamayo, L. Chronic Kidney Disease Often Undiagnosed in Medicare Beneficiaries. CMS OMH Data Highlight No.20. Baltimore, MD: CMS Office of Minority Health 2020.
3. National Institute of Diabetes and Digestive and Kidney Diseases. Identify & Evaluate Patients with Chronic Kidney Disease, 2023. https://www.niddk.nih.gov/health-information/professionals/clinical-tools-patient-management/kidney-disease/identify-manage-patients/evaluate-ckd

.

Please contact qecpinfo@vizientinc.com for additional information, a deeper look into the data, or an analysis of your organization to improve healthcare delivery and patient outcomes.

Vizient, Inc.
290 E. John Carpenter Freeway
Irving, TX 75062-5146
(800) 842-5146

Vizient, Inc. provides solutions and services that improve the delivery of high-value care by aligning cost, quality and market performance for more than half of the nation's healthcare providers. Vizient provides expertise, analytics, advisory services, and a contract portfolio representing more than $130 billion in annual member purchasing volume, to improve patient outcomes and lower costs.

Appendix

Additional Data Tables

Table A1. Average Medicare Spend per Beneficiary by CKD Stage and Payer from 2019-2021

Year	CKD Stage	All Payers	Medicare FFS	Dual Eligible	Medicare Advantage	Medicaid	Commercial
2019	No CKD	$2,562	$4,274	$6,683	$2,032	$5,103	$987
	Stage 1	$9,756	$10,771	$15,744	$7,136	$12,385	$8,512
	Stage 2	$10,844	$11,983	$16,316	$9,025	$14,899	$9,207
	Stage 3	$12,841	$15,191	$20,476	$9,871	$17,330	$10,543
	Stage 4	$17,268	$22,746	$26,777	$14,933	$22,339	$13,291
	Stage 5	$23,433	$24,791	$28,503	$22,733	$25,902	$21,902
	Stage 6- ESRD	$39,547	$47,340	$60,621	$32,909	$52,197	$32,408
2020	No CKD	$3,753	$3,753	$6,110	$2,072	$5,283	$1,045
	Stage 1	$10,180	$10,180	$16,312	$7,432	$13,074	$8,913
	Stage 2	$11,151	$11,151	$16,370	$9,451	$15,113	$8,979
	Stage 3	$13,760	$13,760	$20,268	$9,790	$18,991	$11,018
	Stage 4	$20,389	$20,389	$25,860	$15,895	$22,102	$13,933
	Stage 5	$22,345	$22,345	$27,015	$19,432	$26,788	$22,844
	Stage 6- ESRD	$46,212	$46,212	$61,179	$31,598	$51,902	$29,098

2021	No CKD	$2,837	$4,716	$7,341	$3,802	$4,998	$1,038
	Stage 1	$10,184	$11,496	$17,005	$6,439	$11,203	$9,203
	Stage 2	$11,068	$11,820	$16,554	$8,912	$16,203	$9,413
	Stage 3	$13,324	$13,777	$19,985	$10,102	$18,902	$11,713
	Stage 4	$17,358	$20,303	$25,485	$16,239	$23,415	$14,202
	Stage 5	$22,524	$22,683	$27,043	$23,321	$27,222	$20,898
	Stage 6- ESRD	$39,023	$46,659	$58,323	$33,713	$54,927	$31,303

Table A2. Hospitalizations per 1,000 Beneficiaries by CKD Stage and Payer from 2019-2021

Year	CKD Stage	All Payers	Medicare FFS	Dual Eligible	Medicare Advantage	Medicaid	Commercial
2019	No CKD	81.8	131.5	250.2	41.7	56.1	50.8
	Stage 1	244.8	378.2	642.6	136.4	202.9	166.9
	Stage 2	319.0	442.0	694.6	155.5	257.0	249.6
	Stage 3	427.6	584.4	878.3	249.3	326.6	338.2
	Stage 4	654.1	981.0	1233.4	357.6	492.4	499.5
	Stage 5	662.4	1119.9	1358.9	305.4	479.9	458.8
	Stage 6- ESRD	813.0	1454.0	1898.0	254.7	667.2	517.0
2020	No CKD	68.9	103.8	199.6	44.1	48.4	44.7
	Stage 1	221.6	331.5	590.2	150.7	165.9	145.6

	Stage 2	271.9	386.3	620.2	173.3	199.7	201.2
	Stage 3	366.6	502.1	781.1	256.3	267.6	280.0
	Stage 4	556.6	847.8	1088.1	363.5	390.7	408.9
	Stage 5	581.1	976.3	1173.9	341.0	381.9	399.1
	Stage 6- ESRD	731.9	1332.5	1747.5	218.5	558.8	462.7
2021	No CKD	69.4	115.0	225.6	30.6	43.0	42.2
	Stage 1	225.2	339.5	597.5	174.0	171.5	142.0
	Stage 2	260.5	383.5	608.5	180.9	190.9	182.4
	Stage 3	355.2	488.4	759.6	275.9	269.9	261.9
	Stage 4	536.8	838.3	1057.8	382.7	384.8	376.4
	Stage 5	584.2	971.7	1174.6	391.0	381.2	395.9
	Stage 6- ESRD	692.1	1305.4	1602.5	252.0	518.7	416.2

Table A3. Hospital-Wide All-Cause Unplanned Readmissions by CKD Stage and Payer from 2019-2021

Year	CKD Stage	All-Payers	Medicare FFS	Dual Eligible	Medicare Advantage	Medicaid	Commercial
2019	No CKD	7.9%	7.8%	10.8%	8.3%	14.2%	5.6%
	Stage 1	10.7%	10.7%	12.1%	8.8%	14.9%	9.2%
	Stage 2	11.0%	10.7%	12.6%	9.2%	14.9%	9.5%
	Stage 3	11.2%	11.4%	12.3%	9.4%	15.1%	9.6%

	Stage 4	13.3%	14.0%	13.8%	10.2%	16.2%	11.9%
	Stage 5	14.5%	15.1%	14.7%	11.9%	17.2%	12.9%
	Stage 6- ESRD	20.7%	17.8%	20.4%	15.2%	21.5%	21.1%
2020	No CKD	6.9%	8.0%	10.7%	6.3%	8.2%	5.3%
	Stage 1	9.8%	11.2%	12.2%	7.3%	9.9%	8.7%
	Stage 2	10.1%	10.8%	12.0%	8.1%	11.2%	8.9%
	Stage 3	10.6%	11.6%	12.2%	8.5%	11.5%	9.3%
	Stage 4	12.5%	14.3%	13.9%	8.8%	22.1%	9.4%
	Stage 5	13.3%	15.4%	14.4%	9.7%	23.5%	9.9%
	Stage 6- ESRD	18.7%	18.1%	20.1%	10.4%	23.6%	17.9%
2021	No CKD	7.3%	8.0%	10.6%	6.9%	8.8%	5.9%
	Stage 1	9.1%	10.8%	13.0%	8.0%	9.2%	7.5%
	Stage 2	9.7%	10.7%	12.9%	8.1%	11.4%	8.1%
	Stage 3	10.3%	11.4%	12.5%	8.5%	11.6%	8.8%
	Stage 4	12.1%	14.0%	14.0%	9.8%	18.8%	9.2%
	Stage 5	14.0%	15.3%	15.5%	10.0%	22.5%	11.3%
	Stage 6- ESRD	16.8%	17.9%	19.9%	11.2%	24.1%	14.3%

vizient.

Standard Measures Methodologies

Average Medicare Spend per Beneficiary (MSPB) - Hospital

Why we selected this measure
This is an important metric because it provides insights into the efficiency and cost-effectiveness of healthcare services provided to the beneficiary. Understanding the various venues and cost allocations can shed light on the relationship between healthcare spending and the quality of care delivered. It allows for comparisons between different regions, providers, or interventions that might be indicative of differences in quality or inefficiencies. Patients with Chronic Kidney Disease typically have higher readmissions, cost and emergency department utilization, all leading to higher spend when view longitudinally. By identifying providers that are able to manage these patients with lower costs, we can identify quality and cost factors that might mitigate higher costs and increase patient safety and quality. We like to see overall yearly costs for beneficiary and also DRG-related index admission 30 day PAC costs. This way, we can evaluate providers based on population specific costs for given year and also for providers that are efficient at 30 day PACs. Finding best practices might not always be a provider that has low 30 day PAC costs for a given DRG, if non-inpatient related spend benchmarks high for those in a specific population that have excessive spend in a yearly period.
Description
Total Spend for all Administrative and Part B claims.
Numerator
Total Standardized Spend for all Administrative and Part B claims for Yearly or 30-day index admission PAC constructs
Denominator
Number of Beneficiaries.
Exclusions
For Yearly spend per beneficiary, exclude any beneficiaries that had multiple payers outside of all-payer database or incomplete coverage. For 30-day PAC exclusions, reference the MSPB PAC definitions by ACUMEN in the methodology documents.

Hospitalizations per 1,000 Beneficiaries

Why we selected this measure
Hospitalizations are often associated with substantial healthcare costs. Tracking the number of hospitalizations per patient helping in assessing the financial implications for individuals, providers and healthcare systems. It can guide cost containment efforts, identify opportunities for alternative care settings, or interventions and screenings that reduce hospitalization rates and support the development of value-based care models. Under the quality lens, high hospitalization rates can identify gaps in care delivery, medication and testing adherence, care transitions, or patient education that may contribute to hospital readmissions. For chronic diseases, such as Chronic Kidney Disease, frequent hospitalizations may indicate inadequate management or the need for better outpatient care, prevention measures or care coordination to reduce likelihood of hospital admissions.
Measure Steward
Center for Medicare and Medicaid Services
Description
Number of hospital discharges from acute care hospitals per 1,000 beneficiaries by year.
Numerator
Number of hospital discharges from acute care hospitals
Denominator
Beneficiaries
Exclusions
None

All-Cause Unplanned Hospital-Wide Readmissions (HWR)

Why we selected this measure
Hospital readmissions can be an indicator of potential gaps or shortcomings in the quality of care provided during the initial hospitalization or during transition to post-acute care settings. Monitoring readmission rates helps identify areas for improvement to enhance patient outcomes. Discharge planning management failures, medication management, and post-discharge follow-up are often associated with high readmissions.
Description

The Hospital-Wide All-Cause Unplanned Readmission measure evaluates whether a patient has an unplanned readmission within 30 days of discharge.
Numerator
The numerator includes individuals in the denominator who have a readmission for any cause, except for certain planned readmissions, within 30 days from the date of discharge from an eligible index admission. If a beneficiary has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, the measure only counts one as a readmission. Note that readmissions do not have to be at the same hospital location as the index admission – a beneficiary who is readmitted to any hospital will count as a readmission. This measure looks for a “yes” or “no” outcome of whether each admitted patient had an unplanned readmission within 30 days. However, if health care teams planned the first readmission after discharge, the measure does not count any subsequent unplanned readmission as an outcome for that index admission.
Denominator
The denominator for the Hospital-Wide All-Cause Unplanned Readmission measure includes all beneficiaries aged 18 years and older who are hospitalized and are discharged alive from an acute care hospital.
Exclusions
The exclusions for this measure include patients: • admitted to Prospective Payment System-exempt cancer hospitals • without at least 30 days post-discharge enrollment in Medicare FFS (for Medicare FFS only) • discharged against medical advice • admitted for primary psychiatric diagnoses • admitted for rehabilitation • admitted for medical treatment of cancer

vizient.

Alternative Measures Methodologies

Vizient Vulnerability Index (VVI)

Why we selected this measure
The Vizient Vulnerability Index takes into account factors such as poverty, unemployment, low educational attainment, minority status, language proficiency, housing quality and access to transportation and healthcare. By analyzing these factors, the VVI helps identify at-risk communities that may face higher risks and challenges due to socio-economic disparities and structural inequalities. Integrating claims data with this index allows use to understand disease progression and cost of care models with a fairer and more equitable lens.
Description
The Vizient Vulnerability Index is a quantification of neighborhood resources and obstacles to care based on public data including US Census American Community Survey, USDA Food Research Atlas, Housing and Urban Development Comprehensive Housing Affordability Strategy data, EPA Environmental Justice data, FBI violent crime statistics, HRSA provider shortages, and tuned to Life Expectancy at Birth at the census tract level. This has been summarized to the zip code level to summarizing the characteristics of a provider's catchment area in terms of overall vulnerability, as well as in nine domains: economic, education, health care access, neighborhood resources, housing, social resources, clean environment, transportation, and public safety.
Specifications
The Vizient Vulnerability Index is a neighborhood index that provides context to our understanding of the effects of differential neighborhood resourcing. It applies to virtually all zip codes in the United States (more than 99%). The data that comprises the Vizient Vulnerability Index includes public data from the American Community Survey 5-year summaries of 2016-2020, as well as USDA Food Access Research Atlas, HUD CHAS dataset of housing problems, EPA EJScreen data and Drinking Water Safety data, FCC Broadband speeds, FBI Uniform Crime Reporting supplemented by Gun Violence Archive data, HRSA provider shortage areas, CMS hospital location data, CDC Opioid dispensing data, NEPHTN park access data, AHRQ alcohol sales data, Opportunity Atlas incarceration data, NLCD tree cover data, and Harvard Dataverse voting participation data tested against 2015-2019 estimates of life expectancy from the USALEEP project.
Constructing the VVI
The Vizient Vulnerability Index is built from nine domains: Economic, Education, Health Care Access, Neighborhood Resources, Housing, Clean Environment, Social Environment, Transportation, and Public Safety. Each domain is weighted according to the correlation between that domain and life expectancy in a

small geographic area. The weights vary according to their variable correlations to life expectancy in different areas. The composite score is a linear combination of the domains, using the weights as described above for the geographic area in question. Each domain is significant in some parts of the country. Outliers are left in the data with no truncation. High outliers are reported as “high vulnerability” regardless of how high that value is.

Kidney Health Evaluations for Patients with Diabetes, Hypertension, and Chronic Kidney Disease

Why we selected this measure
This screening measure was originally created for diabetes only population and involves assessing the functioning and condition of the kidneys. We felt expanding the denominator to include patients with CKD and Hypertension would allow a more complete evaluation of patients with precursors to end-stage renal disease.
Description
The percentage of members 18–85 years of age with diabetes (type 1 and type 2) who received a kidney health evaluation, defined by an estimated glomerular filtration rate (eGFR) and a urine albumin-creatinine ratio (uACR), during the measurement year.
Numerator
Members who received both of the following during the measurement year on the same or different dates of service: • At least one eGFR. • At least one uACR identified by both a quantitative urine albumin test and a urine creatinine test with service dates four or less days apart. For example, if the service date for the quantitative urine albumin test was December 1 of the measurement year, then the urine creatinine test must have a service date on or between November 27 and December 5 of the measurement year.
Denominator
18–85 years as of December 31 of the measurement year. Report three age stratifications and a total rate: • 18–64. • 65–74. • 75–85. • Total (the sum of the age stratifications.)

Members who met any of the following criteria during the measurement year or the year prior to the measurement year (count services that occur over both years):

• At least one acute inpatient encounter with a diagnosis of diabetes, hypertension or chronic kidney disease without telehealth.

• At least one acute inpatient discharge with a diagnosis of diabetes, hypertension or chronic kidney disease on the discharge claim. To identify an acute inpatient discharge:

1. Identify all acute and nonacute inpatient stays.
2. Exclude nonacute inpatient stays.
3. Identify the discharge date for the stay.

• At least two outpatient visits, observation visits, telephone visits, e-visits or virtual check-ins, ED visits, nonacute inpatient encounters or nonacute inpatient discharges (the diagnosis must be on the discharge claim), on different dates of service, with a diagnosis of diabetes, hypertension or chronic kidney disease. Visit type need not be the same for the two encounters.

Only include nonacute inpatient encounters without telehealth.

Members who were dispensed insulin or hypoglycemics/ antihyperglycemics on an ambulatory basis during the measurement year or the year prior to the measurement year.

Exclusions

Exclude members who meet any of the following criteria:

• Members with evidence of ESRD or dialysis any time during the member's history on or prior to December 31 of the measurement year.

• Members receiving hospice or palliative care during the measurement year.

Exclude members who meet any of the following criteria:

Note: Supplemental and medical record data may not be used for these exclusions.

• Medicare members 66 years of age and older as of December 31 of the measurement year who meet either of the following:

– Enrolled in an Institutional SNP (I-SNP) any time during the measurement year.

– Living long-term in an institution any time during the measurement year as identified by the LTI flag in the Monthly Membership Detail Data File. Use the run date of the file to determine if a member had an LTI flag during the measurement year.

• Members 66 years of age and older as of December 31 of the measurement year (all product lines) with frailty and advanced illness. Members must meet BOTH of the following frailty and advanced illness criteria to be excluded:

1. At least one claim/encounter for frailty (Frailty Device Value Set; Frailty Diagnosis Value Set; Frailty Encounter Value Set; Frailty Symptom Value Set) during the measurement year.
2. Any of the following during the measurement year or the year prior to the measurement year (count services that occur over both years):
– At least two outpatient visits, observation visits, ED visits, telephone visits, e-visits or virtual check-ins, nonacute inpatient encounters or nonacute inpatient discharges (the diagnosis must be on the discharge claim) on different dates of service, with an advanced illness diagnosis. Visit type need not be the same for the two visits.
– At least one acute inpatient encounter with an advanced illness diagnosis.
– At least one acute inpatient discharge with an advanced illness diagnosis on the discharge claim.
• Members 81 years of age and older as of December 31 of the measurement year (all product lines) with frailty during the measurement year.
Optional: Members who do not have a diagnosis of diabetes, in any setting, during the measurement year or the year prior to the measurement year and who had a diagnosis of polycystic ovarian syndrome, gestational diabetes or steroid-induced diabetes, in any setting, during the measurement year or the year prior to the measurement year.
If the member was included in the measure based on claim or encounter data, as described in the event/ diagnosis criteria, the optional exclusions do not apply because the member had a diagnosis of diabetes.