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Brief Report

Cost Burden of Cancer Screening in Kansas by Region and Rural/Urban Designation

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ABSTRACT

Introduction. In 2022, the U.S. healthcare expenditure totaled $4.5 trillion, representing 17.3% of its gross domestic product. Despite this, 26 million Americans remain uninsured, often relying on out-of-pocket payments for essential services like cancer screenings. Kansas, with its high uninsured rate, faces unique challenges, emphasizing the need to analyze the cost burden of these critical yet repeatable interventions.

Methods. Authors of this cross-sectional study analyzed hospital pricing transparency data for breast, lung, and colon cancer screening costs across 124 Kansas hospitals. Data on self-pay costs were collected and compared between urban and rural regions, as well as geographic price variations. Statistical analyses included measures of central tendency, Kruskal-Wallis tests, and Mann-Whitney U tests to evaluate differences.

Results. Pricing disparities were evident across Kansas. Urban hospitals charged higher prices for chest computed tomography (CT) scans, while rural hospitals had elevated costs for colonoscopies and mammograms. Notable price variation included Northeast Kansas colonoscopy prices, which ranged from $595 to $11,684. Rural residents faced a greater financial burden, spending 7% of their income on screenings compared to 6% for urban residents. Median screening prices statewide were $2,247 for colonoscopies, $1,109 for chest CT scans, and $228 for mammograms.

Conclusions. These disparities call for targeted policy interventions, such as Medicaid expansion, standardized pricing regulations, and increased support for low-cost clinics. Enhanced hospital pricing transparency is critical for empowering patients and reducing financial burdens. This study highlights the urgent need for equitable access to cancer screenings in Kansas.

INTRODUCTION

In 2022, the U.S. was estimated to have spent nearly 4.5 trillion dollars on healthcare, equating to roughly 17.3% of U.S. gross domestic product.[1] Despite the huge costs spent on healthcare, the U.S. remains one of the few countries in the developed world without a nationalized health service that provides a public option to all citizens. The vast majority of individuals living in the U.S. do carry insurance (92.1%), most of whom utilize private, employer-based health plans (54.2%), with the other biggest suppliers being government backed Medicaid (18.8%) and Medicare (18.7%) services.[2] However, there are still 26 million Americans who are uninsured and must pay their hospital bills out of pocket (7.9%).[2] The cost incurred from paying medical services out of pocket can be extensive.

A commonly seen cost associated with healthcare in the U.S., which is conducted multiple times over one's lifetime, is cancer screenings. A colonoscopy is one such procedure that must be conducted every 10 years, starting at the age of 45, for colorectal cancer screening.[3] Other methods exist for colon cancer screening, including tests like Cologuard; however, colonoscopy has remained the most used screening mechanism.[4] Breast cancer is another such malignancy that is screened for, and bilateral breast mammography is typically utilized for screening starting at the age of 40 and continuing each year until age 75.[5] Finally, another commonly performed screening procedure is low dose chest computed tomography (CT) scan for lung cancer. This is recommended in adults aged 50 to 80 years who have at least a 20 pack per year smoking history and currently smoke or have quit within the past 15 years and must be performed every year in those who qualify.[6]

The costs incurred from screening tests can be extensive for uninsured individuals, especially considering the costs must be paid in multiple instances over a lifetime. Differing hospitals and health systems charge varied prices for certain services. This can make it very difficult for an individual without health insurance to navigate what costs they might incur as a cash-pay patient. Kansas ranks in the top half of states with the most uninsured individuals, leaving a significant portion of the population vulnerable to the complex financial burden of cancer screening.[7] We sought to analyze cash costs for cancer screening services between rural and urban hospitals in Kansas and the differing costs incurred by geographic region at hospitals in designated regions of the state.

METHODS

For this cross-sectional cost analysis study, we utilized hospital pricing transparency data to collect charges associated with specific current procedural terminology (CPT) codes for cancer screening tests across all Kansas hospitals. The screenings analyzed included colon cancer (colonoscopy, CPT code 45378), lung cancer (chest CT scan without contrast, CPT code 71250), and breast cancer (bilateral screening mammography, CPT code 77067).

Data Collection. All 124 Kansas hospitals that were part of the Kansas Hospital Association were screened for the self-pay/cash costs of the above procedures, utilizing either hospital provided price estimator tools or hospital standard charge forms.[8] Some hospital websites had nonworking price estimator tools, corrupted standard charge forms, or no identifiable information related to hospital price transparency. As such, hospital charges were included only if pricing was available for at least one of the screening procedures above. Only the self-pay/cash cost of the CPT code charge was included in the data; no other costs related to other providers involved in performing the intervention, such as anesthesia provider charges, were included in our pricing data. Rural vs urban hospitals were defined based on their location within or outside of an urban designated census place of >50,000 people, as outlined by the USDA.[9]

Analysis. Descriptive statistics were used to extrapolate differences between rural and urban hospital cancer screening pricing points and

regional pricing data. Due to the skewed distribution of the data, medians were used for central tendency and Kruskal-Wallis tests and Mann-Whitney U tests were employed to examine statistical differences. Geographic pricing data also were summarized with hospitals grouped into regions based on Kansas Hospital Association district delineations.[10] State per capita income between rural and urban individuals also was gathered to calculate the percentage of income spent on care if all cancer screenings were conducted within a single calendar year.[11]

RESULTS

Sample Data. A total of 111 hospitals had cost data available for the three screenings under review. Table 1 summarizes the median cost of each screening and the breakdown of hospital frequency in rural areas, urban areas, and regionally. Screening procedures were not universally available statewide, resulting in the different sample sizes noted. The geographic region with the most hospitals included in the study was the northeast region with 27 total hospitals. The region with the fewest reporting hospitals was in the southeast region with 11 total hospitals.

Table 1. Median cost of screening and hospital frequency in Kansas.

	Colonoscopy		CT Without Contrast		Bilateral Mammogram	
Median cost statewide	$2,247.28		$1,109.19		$228.00	
Total # hospitals with service statewide	96		106		96	
# Hospitals rural	80	83%	91	86%	81	84%
# Hospitals urban	16	17%	15	14%	15	16%
# Hospitals northwest	15	16%	17	16%	16	17%
# Hospitals north central	10	10%	12	11%	10	10%
# Hospitals northeast	26	27%	27	25%	27	28%
# Hospitals southeast	10	10%	11	10%	9	9%
# Hospitals south central	23	24%	23	22%	21	22%
# Hospitals southwest	12	13%	16	15%	13	14%

Note: CT, Computed Tomography

Rural vs. Urban Pricing. Table 2 shows the breakdown of rural and urban median pricing and the range for all three screening interventions. Cash price screening services were noted to be more expensive in urban areas for chest CT scan, but more expensive rurally for colonoscopy and bilateral mammogram. Mann-Whitney U tests revealed no significant differences between the costs of each screening procedure in rural vs. urban hospitals with a standard $p < 0.05$ threshold.

Table 2. Rural vs. urban screening pricing.

	Colonoscopy	CT Without Contrast	Bilateral Mammogram
Rural hospitals	N=80	N=91	N=81
Median cost	$2,268.50	$1,031.30	$240.35
Minimum cost	$75.60	$120.80	$64.00
Maximum cost	$18,979.38	$3642.50	$596.00
Urban hospitals	N=16	N=15	N=15
Median cost	$1,745.50	$1,647.00	$179.00
Minimum cost	$902.20	$108.53	$63.00
Maximum cost	$14,686.00	$9,051.00	$806.00

*Values denoted in U.S. dollars.
Note: CT, Computed Tomography

Geographic Pricing. Regional hospital pricing data are denoted in Table 3 with the mean charges for each screening noted in U.S. dollars. The most expensive region for cash-pay colonoscopy was northcentral with a median price of $2,935.86. The least expensive region was the northeast at $1,866.33. Screening chest CT was noted to be least expensive in the northwest (median [Md] = $775.00) and most expensive in the southeast region (Md = $1,347.12). Screening mammography was noted to be more expensive in the northcentral region (Md = $270.61) and least expensive in the northeast (Md = $172.15). A Kruskal-Wallis test revealed statistically significant differences between regions for CT without contrast (χ^2 (5, n = 106) = 13.25, p = 0.021) and bilateral mammogram (χ^2 (5, n = 96) = 12.21, p = 0.032). Follow-up Mann-Whitney U tests of four comparisons for each, adjusting p utilizing a Bonferroni correction (p = 0.0125; 0.05/4), revealed the significant differences for CT without contrast were between the southcentral (Md = $1,329.00) and southwest (Md = $801.85) regions. Differences for bilateral mammogram were between the northwest (Md = $270.00) and northeast (Md = $172.15) regions, as well as the northeast and northcentral regions (Md = $270.61).

Rural vs. Urban Income Comparison. In 2021, the median household income in Kansas was $58,924.[11] Rural populations in Kansas have a median income of $51,545. Urban populations had a median yearly household income of $62,267.[11] The total median cash price for all noted services in a calendar year in rural areas was $3,540.15, which is equal to 7% of a rural individual's yearly income. The total median cash price in urban areas is $3,571.50, which is equal to 6% of an urban patient's yearly income.

Table 3. Regional hospital screening pricing.

		Colonoscopy	CT Without Contrast	Mammogram
Northwest hospitals	N	15	17	16
	Median	$2,571.43	$775.00	$270.00
	Range	$1,639.80-$5,930.37	$187.60-$2,010.00	$97.00-$472.83
North central hospitals	N	10	12	10
	Median	$2,935.86	$1225.00	$270.61
	Range	$1,549.00-$6,978.60	$702.60-$2,525.70	$150.00-$397.10
Northeast hospitals	N	26	27	27
	Median	$1,866.33	$1,104.38	$172.15
	Range	$595.00-$1,1684.00	$108.53-$4,429.00	$63.00-$806.00
Southeast hospitals	N	10	11	9
	Median	$2143.90	$1347.12	$197.00
	Range	$75.60-$4,314.88	$610.00-$2,328.85	$100.00-$581.73
South central hospitals	N	23	23	21
	Median	$2142.83	$1329.00	$246.00
	Range	$980.00-$18,979.38	$387.00-$9,051.00	$73.00-$596.00
Southwest hospitals	N	12	16	13
	Median	$2,101.76	$801.85	$202.30
	Range	$1,100.00-$3,966.36	$430.50-$3,642.50	$125.00-$358.10

Note: Values denoted in U.S. dollars. CT, Computed Tomography

DISCUSSION

Our study highlights that cash pricing for cancer screening services in Kansas varies significantly based on the rurality of the hospital and the geographic location where the service is received. Additionally, the percentage of annual income spent on these services differs between rural and urban populations. These disparities pose significant challenges, particularly for uninsured patients and those who must travel long distances to access care.

In 2024, the uninsured rate in Kansas reached 8.4%, representing 240,302 individuals.[12] Historically, uninsured rates have been higher in rural counties compared to urban ones.[13] Furthermore, uninsured patients tend to have lower annual incomes than their insured counterparts.[14] With rural residents also having lower median incomes than urban residents, these factors exacerbate the cost burden of cancer screening for uninsured individuals in rural areas.

Expanding Medicaid is one potential solution to reduce the financial burden of cancer screenings. Despite data demonstrating Medicaid's vital role in ensuring rural populations, Kansas has not adopted Medicaid expansion.[15] Rural hospitals, which already face higher rates of uncompensated care compared to urban hospitals, are disproportionately affected.[16] Most states with the highest levels of uncompensated care have similarly chosen not to expand Medicaid.[17]

Beyond Medicaid expansion, additional measures to address care costs for uninsured patients could include legislation to establish standardized pricing for self-pay patients and increased funding for free or low-cost clinics offering cancer screenings. Public education on the stark pricing variations between hospitals and the factors influencing these differences also are essential.

Our data revealed significant price discrepancies for identical services. For instance, the cash price for a colonoscopy in Northeast Kansas ranged from $595 to $11,684. Such variation is likely due to multiple factors, including negotiated reimbursement rates with insurers, hospital operating costs, and cross-subsidization, where profitable services offset the costs of less profitable ones. These findings underscore the importance of pricing transparency from hospitals, enabling patients to make informed decisions about where to receive care.

Limitations. This analysis is not without limitations, as not all hospitals had usable or accessible pricing transparency data. Furthermore, many patients may elect to have their screening tests done at outpatient surgery centers or in other clinic sites across the state, and the pricing in these locations may be different than from the testing received in community or tertiary care hospitals.

CONCLUSIONS

The cost of cancer screenings in Kansas poses a significant financial challenge for many individuals, particularly the uninsured. Expanding Medicaid could be a key intervention to reduce these costs, ensuring that uninsured residents gain access to necessary care regardless of their ability to pay. By extending coverage to all uninsured Kansans, Medicaid expansion could make cancer screenings more accessible and affordable.

Other viable strategies to address the high costs of cash-pay care include setting standardized price points for self-pay services, increasing funding and support for free and low-cost clinics, and educating the public about the significant price variations between hospitals. These efforts could empower patients to make informed decisions while alleviating financial barriers.

Additionally, factors such as negotiated reimbursement rates with insurers, hospital operating costs, and cross-subsidization likely contribute to the wide range of screening costs across the state. Addressing these underlying causes may further improve affordability. Given the substantial return on investment for preventive care, exploring these interventions is both practical and essential for promoting equitable healthcare access in Kansas.

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