JAMA Surgery | Original Investigation

Association of Rectal Cancer Accreditation with Patient Volume and Procedural Trends in the US

Anthony Loria, MD, MSCI; Yusheng Jia, MS; Ronald J. Weigel, MD, PhD; Steven D. Wexner, MD; Ingrid M. Lizarraga, MBBS; Samantha Hendren, MD, MPH; Yue Li, PhD; Fergal J. Fleming, MD, MPH

IMPORTANCE Hospital accreditation programs aim to improve quality of care and patient outcomes but often require substantial institutional investment in staffing, infrastructure, and regulatory compliance. Despite these costs, the broader institutional impact of accreditation, particularly on patient volumes and care patterns, are poorly understood.

OBJECTIVE To evaluate whether National Accreditation Program for Rectal Cancer (NAPRC) accreditation is associated with changes in rectal cancer patient volume, stage-specific procedural volumes, and care fragmentation.

DESIGN, SETTING, AND PARTICIPANTS This cohort study used a quasi-experimental difference-in-differences design. A total of 316 US Commission on Cancer–accredited (COC) hospitals, including 80 that received NAPRC-accreditation and 236 matched nonaccredited centers. Participants included adult patients diagnosed with primary rectal adenocarcinoma between 2010 and 2022 from the National Cancer Database. These data were analyzed from April 2025 to August 2025.

EXPOSURE Hospital-level NAPRC accreditation, which requires adherence to multidisciplinary rectal cancer care standards, external audits, and specialized training.

MAIN OUTCOMES AND MEASURES Annual hospital-level rectal cancer patient volume, stage-specific procedural volumes (stage I and stage II/III), and care fragmentation. Care fragmentation was defined as any case in which the diagnosis and first-course treatment (or decision not to treat) were not completed at the reporting COC-accredited facility. Outcomes were assessed using linear fixed-effects multivariable regression models.

RESULTS Prior to matching, 1336 COC-accredited facilities were identified, including 80 that achieved NAPRC accreditation and 1256 that never attained accreditation. After propensity score matching, the final analytic sample included 316 hospitals: 80 NAPRC-accredited and 236 nonaccredited facilities. NAPRC accreditation was associated with a mean annual increase of 4.3 patients with rectal cancer per institution (β = 4.29; 95% CI, 0.55-8.03; P = .03). Sensitivity analyses demonstrated increases beginning in the first postaccreditation year, with larger point estimates in subsequent years, though later estimates were not statistically significant. Accreditation was associated with an increase in stage I procedural volume (β = 1.01; 95% CI, 0.016-1.99; P = .05), but not stage II/III surgical volume. No significant changes in care fragmentation were observed.

CONCLUSIONS AND RELEVANCE In this study, NAPRC accreditation was associated with increased institutional rectal cancer patient volumes and higher procedural volume for early-stage disease without evidence of increased care fragmentation. These findings suggest that accreditation may promote institutional growth while preserving care continuity, offering a potential strategic incentive for hospitals to pursue NAPRC accreditation beyond quality improvement alone. Understanding these dynamics may inform hospital investment decisions, payer strategies, and policy efforts to support high-quality oncologic care delivery.

JAMA Surg. doi:10.1001/jamasurg.2026.1259
Published online May 6, 2026.

Supplemental content

Author Affiliations: Surgical Health Outcomes Research Enterprise (SHORE), University of Rochester Medical Center, Rochester, New York (Loria, Jia, Li, Fleming); Department of Public Health Sciences, University of Rochester Medical Center, Rochester, New York (Jia, Li); Department of Surgery, University of Iowa Carver College of Medicine, Iowa City (Weigel, Lizarraga); Department of Colorectal Surgery, Medstar Georgetown University Health, Washington, DC (Wexner); Department of Surgery, Indiana University, Indianapolis (Hendren).

Corresponding Author: Anthony Loria, MD, MSCI, Surgical Health Outcomes Research Enterprise (SHORE), University of Rochester Medical Center, 601 Elmwood Ave, Box Surg, Rochester, NY 14620 (anthony_loria@urmc.rochester.edu).

Institutional quality plays a role in patient outcomes, particularly in cancer care. Accreditation programs have emerged as structured mechanisms to promote quality improvement, requiring hospitals to meet established care standards, engage in continuous quality monitoring, and adopt evidence-based clinical pathways.[1] For rectal cancer, the National Accreditation Program for Rectal Cancer (NAPRC), administered by the American College of Surgeons, aims to improve outcomes by standardizing multidisciplinary care, including diagnostic staging, tumor board review, synoptic reporting, and treatment planning.[2] Although these standards are designed to enhance care quality, their financial implications remain uncertain, as accreditation requires investment in infrastructure, staffing, and compliance audits.[3-5]

The resource intensive nature of the NAPRC is a major barrier to seeking accreditation,[3] yet many institutions pursue accreditation under the premise that it may confer institutional advantages beyond care quality, such as improved reputation, preferred payer status, or increased patient volume.[6] Prior studies suggest that patients consider accreditation status and hospital reputation when selecting cancer care facilities, with preferences for National Cancer Institute (NCI) or Commission on Cancer (COC)–accredited hospitals.[7,8] Additionally, hospital accreditation has been associated with improved safety culture, patient satisfaction, and communication,[9] factors that may influence referral patterns and institutional growth.[10] Despite these observations, evidence regarding whether accreditation confers measurable institutional benefits, particularly increases in patient volume sufficient to offset the associated financial and operational investments remains limited.

As health systems increasingly emphasize high-value, coordinated cancer care, understanding the real-world institutional effects of accreditation is essential.[11,12] Using data from the National Cancer Database (NCDB), this study evaluates whether NAPRC accreditation is associated with changes in rectal cancer patient volume and care fragmentation. We hypothesize that accreditation is associated with increased patient volume without exacerbating care fragmentation.

Key Points

Question Is National Accreditation Program for Rectal Cancer (NAPRC) accreditation associated with changes in rectal cancer patient volume, procedural volume, and care fragmentation at accredited hospitals?

Findings In this difference-in-differences study, NAPRC accreditation was associated with a statistically significant increase of approximately 4 additional patients with rectal cancer per year at accredited centers compared with nonaccredited centers. Procedural volumes for early-stage (stage I) rectal cancer significantly increased, whereas procedural volumes for locally advanced (stage II/III) disease did not change, a pattern consistent with national treatment trends; accreditation was not associated with increased care fragmentation.

Meaning In this study, NAPRC accreditation was associated with increased overall patient and early-stage procedural volumes without worsening care fragmentation, supporting its potential institutional and clinical value in rectal cancer care.

Methods

Study Design

We conducted a retrospective cohort study using a quasi-experimental difference-in-differences design with propensity score–matched controls to compare changes in patient and procedural volumes at NAPRC-accredited hospitals and nonaccredited institutions. This study followed Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guidelines.[13] All data were deidentified, so institutional review board approval and informed consent were not required.

Setting

The study used data from hospitals participating in the NCDB, a nationwide oncology registry jointly sponsored by the American Cancer Society and the COC of the American College of Surgeons.[14] The NCDB is a hospital-based registry that captures incident cancer cases from approximately 1500 COC-accredited facilities. It is not a probability sample and does not use sampling weights. Participating hospitals, which account for over 70% of annual incident colorectal cases in the US, are typically larger academic or comprehensive community cancer programs.[15]

Population

We included adult patients (≥18 years) diagnosed with primary rectal adenocarcinoma between 2010 and 2022. Patients were assigned to hospitals based on the reporting facility of the analytic case. Facilities that achieved NAPRC accreditation at any point during the study period comprised the treatment group, while facilities that never achieved accreditation served as controls.

Data Collection

Patient-level and facility-level data were obtained from the NCDB Participant Use Files. Information on hospital NAPRC accreditation status and year of accreditation was obtained through a special NCDB data request. The NCDB systematically captures all eligible cancer cases at COC-accredited hospitals using standardized definitions and coding rules specified in the Standards for Oncology Registry Entry.[14,16] Data are abstracted from medical records by Certified Tumor Registrars and undergo routine electronic validity checks, regular audits, and triennial site reviews to ensure data quality. The analytic dataset in this study included only facilities with complete data on key variables (NAPRC status, year of accreditation), so missingness in core registry variables was minimal.

Measurements

The primary exposure was hospital-level NAPRC accreditation status and the facility-specific year of accreditation. Beginning in 2017, hospitals seeking 3-year accreditation were required to demonstrate compliance with rectal cancer care standards for at least 12 months prior to accreditation. Requirements include a dedicated program coordinator, stan-

dardized multidisciplinary tumor board reviews with complete staging, synoptic reporting, postoperative case discussions, annual audits, and required staff training. Accreditation involves compliance tracking, web-based and in-person training, and an onsite review, with corrective action required for identified deficiencies.

Facility-level covariates included facility type, US geographic region, and aggregated patient-level characteristics, including insurance status, income quartile, educational attainment quartile, Charlson-Deyo Comorbidity Index scores, clinical stage at diagnosis, and the year of diagnosis. Categorical variables were summarized as percentages, and continuous variables as facility-level means.

Outcomes

The primary outcome was annual rectal cancer patient volume at NAPRC-accredited or nonaccredited institutions. Secondary outcomes included procedural volumes and care fragmentation. Procedural outcomes included annual volumes of stage I procedures (surgery or local excision) and stage II/III surgeries. We defined no care fragmentation as cases in which diagnosis and the first-course cancer treatment (or a decision not to treat) occurred within a single COC-accredited facility (eTable 1 in Supplement 1).

Statistical Analyses

We used a difference-in-differences framework to estimate the effect of NAPRC accreditation on hospital-level outcomes. Prior to our difference-in-differences analysis, facilities were matched using propensity scores to ensure parallel preaccreditation trends in annual rectal cancer patient volume from 2010 through 2016.[17] Propensity scores were estimated using logistic regression to predict the likelihood of a facility becoming NAPRC accredited, incorporating annual rectal cancer patient volume, year, and their interaction terms. NAPRC accredited facilities were matched to nonaccredited facilities using nearest-neighbor matching with a caliper of .01, and retaining only nonaccredited facilities with overlapping propensity scores. Prior work has demonstrated that combining difference-in-differences analyses with propensity score matching improves the accuracy of causal effect estimates, particularly when accreditation may be correlated with preaccreditation outcome levels or trends.[18]

Following facility-level matching, we estimated difference-in-differences effects using separate linear fixed-effects regression models, modeling each outcome on the indicator of accreditation status, the indicator of postaccreditation period, their interaction (of which the coefficient represents the difference-in-differences effect), facility and year fixed effects, as well as time-variant facility covariates. Facility covariates included facility-level composition (proportions of male, White, Hispanic, uninsured, Medicaid, Medicare patients, the average patient age), and socioeconomic indicators (proportion of patients with metropolitan residency, educational attainment, low-income). Standard errors were clustered at the facility level to account for within-facility correlations. To further evaluate possible short-term vs longer-term effect of accreditation, we conducted sensitivity analyses estimating the difference-in-differences effects for several postaccreditation years (years 1, 2, and 3 or more). Stata MP 19.5 (Stata Corp) was used for data analysis.

Results

Prior to matching, 1336 COC-accredited facilities were identified, including 80 that achieved NAPRC accreditation and 1256 that never attained accreditation. After propensity score matching, the final analytic sample included 316 hospitals: 80 NAPRC-accredited and 236 nonaccredited facilities (**Table 1**).

After facility-level propensity score matching, during the preaccreditation period (2010-2016) accredited and nonaccredited hospitals managed similar annual rectal cancer volumes (35.8 vs 31.8 patients; $P = .18$) and had comparable geographic distributions and facility types (Table 1). For stage I disease, accredited facilities performed a mean of 5.3 procedures per year compared with 4.6 at nonaccredited facilities, while for stage II/III disease accredited facilities performed a mean of 21.6 surgeries, while nonaccredited hospitals performed 18.8. The proportion with no care fragmentation was slightly lower in future NAPRC hospitals (39.7% vs 38.9%; $P = .05$).

Patient Volume Growth

In difference-in-difference analyses, NAPRC accreditation was associated with a significant increase in rectal cancer patient volume. On average, accredited facilities evaluated 4 more patients per year compared with matched nonaccredited hospitals (β = 4.29; 95% CI, 0.06-8.03; $P = .03$) (**Table 2**). The Accreditation Status Year interaction was not significant ($P = .34$), indicating this increase was not driven by broader secular trends (**Figure 1** and eTable 2 in Supplement 1). No demographic or socioeconomic covariates were significantly associated with patient volume (eTable 2 in Supplement 1).

Sensitivity analyses demonstrated that volume increases emerged in the first year after accreditation (β = 3.86; 95% CI, 0.69-7.03; $P = .02$), and increased in magnitude in subsequent years, although later estimates were not statistically significant (Table 2 and eTable 3 in Supplement 1).

Procedural Volumes

NAPRC accreditation was associated with an increase of in stage I procedural volume, corresponding to approximately 1 additional case per facility per year (β = 1.01; 95% CI, 0.02-1.99; $P = .05$) (Table 2). The Accreditation Status Year interaction was not significant ($P = .55$), suggesting no differential time trends between accredited and non-accredited centers (**Figure 2**A; eTable 2 in Supplement 1). Sensitivity analyses indicated that this effect was most pronounced in the first postaccreditation year (β = 1.14; 95% CI, 0.22-2.07; $P = .02$) (Table 2), with smaller, nonsignificant effects thereafter (eTable 3 in Supplement 1).

In contrast, NAPRC accreditation was not associated with changes in stage II/III surgical volume (β = 0.76; 95% CI, −0.84 to 2.33; $P = .36$) (Table 2) and no significant temporal or co-

Table 1. Characteristics of Hospitals From 2010 Through 2016 That Achieved National Accreditation Program for Rectal Cancer (NAPRC) Accreditation Compared With Nonaccredited (Control) Hospitals After Propensity Score Matching

Variable	No. (%)			*P* value
	Overall cohort (n = 316)	Never accredited (n = 236)	NAPRC accredited (n = 80)	
Patients with rectal cancer per facility, mean (SD)	229.5 (162.5)	222.3 (165.6)	250.8 (152.0)	.18
Average No. of patients per facility per year	32.79	31.76	35.82	NA
Age of patients, y, mean (SD)	61.7 (13.4)	62.4 (2.8)	62.3 (2.4)	.04
Patient sex				
Male	42 804 (59.0)	30 778 (58.7)	12 026 (59.9)	.002
Female	29 726 (41.0)	21 690 (41.3)	8036 (40.1)	
White race	59 067 (81.4)	42 250 (80.5)	16 817 (83.8)	<.001
Hispanic ethnicity	5269 (7.3)	4291 (8.2)	978 (4.9)	<.001
Uninsured patients	8863 (12.2)	6705 (12.8)	2158 (10.8)	<.001
Medicare insurance	27 841 (38.4)	20 151 (38.4)	7690 (38.3)	.85
Medicaid Insurance	2828 (3.9)	2268 (4.3)	560 (2.8)	<.001
Metropolitan residing patients	57 488 (79.3)	41 654 (79.4)	15 834 (78.9)	.17
Patients with lowest quartile education	13 478 (18.6)	10 479 (20.0)	2999 (14.9)	<.001
Patients with lowest quartile income	12 114 (16.7)	9295 (17.7)	2819 (14.1)	<.001
Patients with stage I rectal cancer undergoing procedures	12 967 (17.9)	9319 (17.8)	3648 (18.2)	.18
Patients with stage II/III rectal cancer undergoing surgery	25 524 (35.2)	18 215 (34.7)	7309 (36.4)	<.001
Patients without care fragmentation	28 620 (39.5)	20 821 (39.7)	7799 (38.9)	.05
Facility region				
New England[a]	14 (4.6)	10 (4.4)	4 (5.1)	.96
Middle Atlantic[b]	42 (13.8)	29 (12.8)	13 (16.7)	
South Atlantic[c]	73 (23.9)	54 (23.8)	19 (24.4)	
East North Central[d]	59 (19.3)	44 (19.4)	15 (19.2)	
East South-Central[e]	21 (6.9)	17 (7.5)	4 (5.1)	
West North Central[f]	18 (5.9)	14 (6.2)	4 (5.1)	
West South-Central[g]	27 (8.9)	19 (8.4)	8 (10.3)	
Mountain[h]	14 (4.6)	12 (5.3)	2 (2.6)	
Pacific[i]	37 (12.1)	28 (12.3)	9 (11.5)	
Facility type				
Community cancer program	1 (0.3)	1 (0.4)	0	.96
Comprehensive community cancer program	100 (31.6)	74 (31.4)	26 (32.5)	
Academic/research program	118 (37.3)	88 (37.3)	30 (37.5)	
Integrated network cancer program	86 (27.2)	64 (27.1)	22 (27.5)	
Not available	11 (3.5)	9 (3.8)	2 (2.5)	

Abbreviation: NA, not applicable.

[a] Includes Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island, and Vermont.

[b] Includes New Jersey, New York, and Pennsylvania.

[c] Includes Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, Washington, DC, and West Virgina.

[d] Includes Illinois, Indiana, Michigan, Ohio, and Wisconsin.

[e] Includes Alabama, Kentucky, Mississippi, and Tennessee.

[f] Includes Iowa, Kansas, Minnesota, Missouri, North Dakota, Nebraska, and South Dakota.

[g] Includes Arkansas, Louisiana, Oklahoma, and Texas.

[h] Includes Arizona, Colorado, Idaho, Montana, New Mexico, Nevada, Utah, and Wyoming.

[i] Includes Alaska, California, Hawaii, Oregon, and Washington.

variate effects were observed (Figure 2B, Table 2, and eTable 3 in Supplement 1).

Care Fragmentation by Accreditation Status

NAPRC accreditation was not associated with changes in care fragmentation (β = 0.006; 95% CI, −0.031 to 0.043; *P* = .75) (Table 2 and **Figure 3**). The Accreditation Status Year interaction was not statistically significant (*P* = .75), suggesting no differential time trends between accredited and nonaccredited centers. Sensitivity analyses examining postaccreditation years individually similarly showed no significant associations (eTable 3 in Supplement 1).

Among covariates, a higher proportion of White patients was associated with lower care fragmentation (β = −0.088; 95% CI, −0.16 to −0.015; *P* = .02), and older patient age was associated with improved continuity of care (β = 0.003; 95% CI, 0.00-0.01; *P* = .04) (eTable 2 in Supplement 1). No other demographic or socioeconomic factors were significantly associated with care fragmentation (eTable 2 in Supplement 1).

Discussion

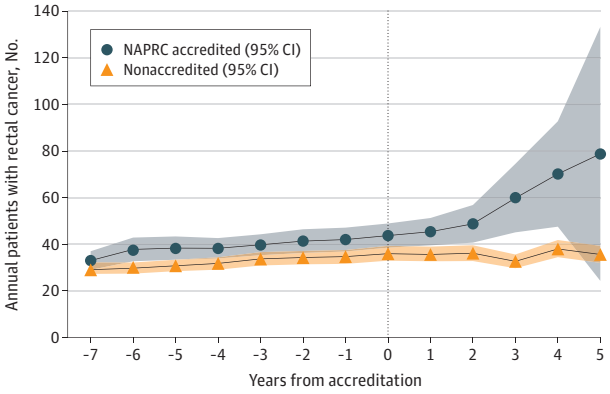
There are 3 major findings from this quasi-experimental study assessing the causal impact of NAPRC accreditation on rectal cancer patient volumes and care patterns. First, NAPRC-accredited centers experienced a significant increase in rectal cancer case volume, a trend not observed in matched

Table 2. Mean Difference-in-Differences Effect of National Accreditation Program for Rectal Cancer Accreditation on Rectal Cancer Volumes

Effect	Annual No. of patients with rectal cancer	Annual No. of patients with stage I rectal cancer undergoing procedures	Annual No. of patients with stage II/III rectal cancer undergoing surgery	Proportion of patients with No. of care fragmentation
Primary model				
Overall accreditation effect	4.29 (0.55 to 8.03)[a]	1.01 (0.016 to 1.99)[a]	0.75 (−0.84 to 2.33)	0.006 (−0.031 to 0.043)
P value	.03	.05	.36	.75
Sensitivity analysis				
Accreditation effect: year 1	3.86 (0.69 to 7.03)	1.14 (0.22 to 2.07)	0.75 (−0.80 to 2.31)	0.004 (−0.030 to 0.037)
P value	.02	.02	.34	.82
Accreditation effect: year 2	5.11 (−0.77 to 10.99)	0.62 (−0.96 to 2.20)	1.33 (−0.94 to 3.59)	0.031 (−0.031 to 0.094)
P value	.09	.44	.25	.32
Accreditation effect: year ≥3	7.51 (−2.65 to 17.67)	0.35 (−2.19 to 2.88)	−0.92 (−3.24 to 1.39)	−0.035 (−0.10 to 0.031)
P value	.15	.79	.43	.30

[a] *P* < .05.

Figure 1. Graph of Mean Institutional Annual Number of Rectal Cancer Patients by National Accreditation Program for Rectal Cancer (NAPRC) Accreditation Status Relative to Year of Accreditation



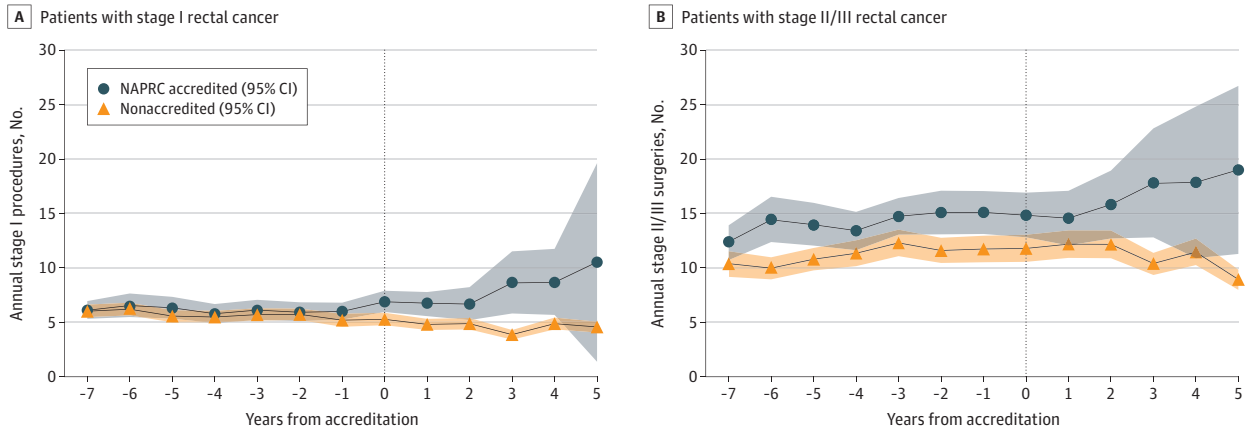
Mean annual rectal cancer volumes are shown for NAPRC-accredited hospitals (n = 80) and matched nonaccredited hospitals (n = 236) from 7 years before to 5 years after accreditation. Shaded bands denote 95% CIs. The vertical dashed line at year 0 marks NAPRC accreditation.

nonaccredited institutions. Second, this increased patient volume was associated with an increase in procedural volume for early-stage disease, without a corresponding rise in surgical volumes for locally advanced rectal cancer, a pattern consistent with broader national trends. Lastly, accreditation did not appear to exacerbate care fragmentation, suggesting that NAPRC centers provide coordinated, comprehensive care rather than merely serving as sites for second opinions. These results underscore the potential value of accreditation programs in not only enhancing care standards but also influencing institutional patient flow and service utilization.

Although hospital accreditation programs have been associated with improvements in safety culture, process-related performance measures, efficiency, and patient experience, their relationship to patient volume changes is largely unexplored.[1,19,20] In this study, NAPRC accreditation was associated with an average annual increase of approximately 4 additional rectal cancer patients per center, with sensitivity analyses indicating that this increase emerged in the first year of accreditation and generally persisted thereafter, although estimates beyond the second year were not statistically significant, likely reflecting limited sample size. Across the 80 NAPRC accredited centers, this corresponds to an estimated annual patient volume increase of approximately 1% to 19%. From an institutional perspective, even modest volume gains may have meaningful financial implications, as the cost of treating a single patient with locally advanced rectal cancer in the US ranges from $73 000 for Medicare insured to more than $180 000 for privately insured patients.[21] These potential benefits must be weighed against the substantial resources required to pursue and maintain accreditation, which programs cite as a major barrier.[3] NAPRC specific data are limited, but a 2023 study estimated that quality metric reporting at a single academic center required approximately $5.6 million annually, underscoring the scale of infrastructure often needed to support accreditation-related activities.[12] Beyond financial considerations, accreditation may also function as a quality signal that shapes patient choice and referral patterns. Prior studies have shown that NCI centers experience sustained growth in patient volumes over time.[8] The observed increase in rectal cancer volume after NAPRC accreditation may similarly reflect enhanced institutional visibility, strengthened referral networks, and increased patient trust. These findings suggest that accreditation can serve not only as a mechanism for improving care standards but also as a driver of institutional growth and service utilization.

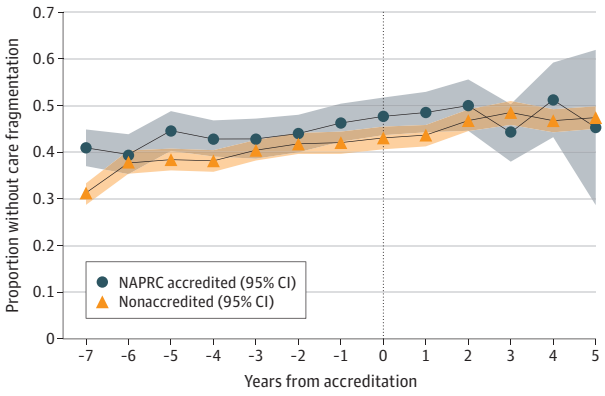
When examining procedural volumes, our findings reveal a nuanced impact of accreditation that aligns with evolving national trends in rectal cancer management.[22] Nationally, there has been an increasing trend for proctectomies in stage I rectal cancer, while rates for stage II/III disease are decreasing, likely attributed to the proliferation of

Figure 2. Graphs of Mean Annual Institutional Procedural Volumes Relative to Year of Accreditation



A, Mean annual numbers of patients with stage I rectal cancer undergoing procedures are shown for National Accreditation Program for Rectal Cancer (NAPRC)–accredited hospitals (n = 80) and matched nonaccredited hospitals (n = 236) from 7 years before to 5 years after accreditation. B, Mean numbers of stage II/III rectal cancer patients undergoing surgery. Mean annual numbers of patients with stage II/III rectal cancer undergoing surgery are shown for NAPRC-accredited hospitals (n = 80) and matched nonaccredited hospitals (n = 236) from 7 years before to 5 years after accreditation. Shaded bands denote 95% CIs. The vertical dashed line at year 0 marks NAPRC accreditation.

Figure 3. Graph of Mean Annual Institutional Proportion of Patients With No Care Fragmentation



Mean annual number of patients without care fragmentation at National Accreditation Program for Rectal Cancer (NAPRC)–accredited hospitals (n = 80) and matched nonaccredited hospitals (n = 236) from 7 years before to 5 years after accreditation. Shaded bands denote 95% CIs. The vertical dashed line at year 0 marks NAPRC accreditation.

organ-preserving nonoperative management. As these multidisciplinary treatment approaches and surveillance programs are central to NAPRC standards,[23] our models demonstrate that accreditation is associated with a significant increase in the annual number of patients with stage I rectal cancer undergoing surgery or local excision. Conversely, for patients with stage II/III disease, there was no significant change in surgical volume postaccreditation. These findings suggest enhanced institutional capacity to deliver improved and coordinated multidisciplinary care which is demanded by accreditation. In turn, this multidisciplinary care may increase the delivery of organ-preserving multimodal therapies that are the cornerstone of contemporary management of all stages of rectal cancer.

Our findings suggest that NAPRC accreditation does not exacerbate care fragmentation, alleviating concerns that higher-volume centers might attract second-opinion consultations without providing integrated care.[24] Instead, the observed increases in patient volume appear to reflect comprehensive treatment within accredited programs. This supports the notion that accreditation is compatible with care continuity, even though care fragmentation remains a persistent challenge in colorectal cancer care.[25] Prior studies, including one assessing institutional readiness for NAPRC accreditation, raised concerns that such programs may inadvertently worsen access disparities and potentially contribute to fragmented care.[26] While we did find that NAPRC accredited facilities had higher baseline rates of fragmentation, accreditation itself was not directly associated with increased fragmentation in our analysis. Although accreditation is widely considered to improve quality of care and reduce care fragmentation, as suggested by other studies, our study's results do not directly support a reduction in care fragmentation due to accreditation. Nevertheless, our findings indicate that the increased patient volumes attributable to NAPRC accreditation do not undermine care continuity. Still, persistently high rates of fragmentation across the cohort reiterate the need to address broader systemic barriers and disparities in care delivery.

Limitations

Some limitations merit consideration. First, the NCDB is a hospital-based registry limited to COC-accredited facilities, which may limit generalizability to non-COC accredited institutions, some Veterans Affairs hospitals, or smaller centers.[27] However, given that NAPRC-accreditation requires

prior COC accreditation, the NCDB remains a robust and appropriate dataset for evaluating NAPRC centers relative to peer institutions. Second, the observational design precludes definitive causal inference. Although we used propensity score matching and a difference-in-differences framework to account for preaccreditation trends and facility-level characteristics, unmeasured confounding may persist. For example, the NCDB does not capture hospital-level changes, such as surgeon or oncologist recruitment, expansion of outpatient services, or population growth in surrounding areas, which could independently influence patient volume. Third, our analysis primarily reflects the early impact of NAPRC accreditation. Because the program launched in 2017 and adoption occurred in a staggered fashion through 2022, few centers have accrued more than 3 years of follow-up. As a result, estimates for later postaccreditation periods are based on fewer facility years, limiting statistical power contributing to the lack of statistical significant observed for the estimated 7.5 patient increase in year 3 and beyond. Nevertheless, the direction and magnitude of the point estimates, and their consistency with visual trends in Figure 1, suggest a continued upward trajectory. Definitive assessment of longer-term effects will require additional follow-up data as more centers accrue extended postaccreditation experience.

Conclusions

In conclusion, this study provides evidence that NAPRC accreditation is associated with increased rectal cancer patient volumes and procedural volume, particularly for early-stage disease, without exacerbating care fragmentation. These findings suggest that accreditation offers a pathway for institutions to enhance their visibility, foster comprehensive multidisciplinary care, and strategically grow their cancer programs while maintaining patient care continuity. The implications of these findings are significant for institutions, policymakers, and payors. For institutions, the demonstrated association between NAPRC accreditation and increased patient volume highlights the importance of investing in accreditation infrastructure and multidisciplinary care models. Policymakers should recognize that such programs can serve as catalysts for institutional growth and quality improvement, potentially justifying support through funding and regulatory frameworks. Payors, in turn, may consider incorporating accreditation status into network design and reimbursement incentives to promote high-value, standardized cancer care. Ultimately, these programs hold the potential to contribute to improved patient access, institutional reputation, and care outcomes in complex oncologic care settings.

ARTICLE INFORMATION

Accepted for Publication: March 15, 2026.

Published Online: May 6, 2026. doi:10.1001/jamasurg.2026.1259

Author Contributions: Dr Loria and Ms Yusheng had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.
Concept and design: Loria, Wexner, Lizarraga, Hendren, Li, Fleming.
Acquisition, analysis, or interpretation of data: Loria, Jia, Weigel, Hendren, Li, Fleming.
Drafting of the manuscript: Loria.
Critical review of the manuscript for important intellectual content: All authors.
Statistical analysis: Jia, Li.
Administrative, technical, or material support: Loria, Weigel, Wexner, Hendren, Fleming.
Supervision: Loria, Wexner, Li, Fleming.

Conflict of Interest Disclosures: Dr Wexner reported personal fees from Activ Surgical, Arthrex, Baxter, Becton Dickinson, Intuitive Surgical, Ostomy Cure, Takeda, Virtual Ports, Polypid Chair, Karl Storz Endoscopy America, and Unique Surgical Solutions and stock options from GI View, Virtual Ports, and Ostomy Cure outside the submitted work. Dr Fleming reported author royalties from Uptodate outside the submitted work. No other disclosures were reported.

Data Sharing Statement: See Supplement 2.

REFERENCES

1. Hussein M, Pavlova M, Ghalwash M, Groot W. The impact of hospital accreditation on the quality of healthcare: a systematic literature review. *BMC Health Serv Res*. 2021;21(1):1057. doi:10.1186/s12913-021-07097-6

2. Monson JRT, Dietz DW, Boughey JC, You YN. Improving rectal cancer outcomes through advocacy, education, and research: the OSTRiCh Consortium and the new NAPRC. *Bull Am Coll Surg*. 2016;101(11):45-46.

3. Kapadia MR, Senatore PJ, Messick C, et al. The value of national accreditation program for rectal cancer: a survey of accredited programs and programs seeking accreditation. *Surgery*. 2024;175(4):1007-1012. doi:10.1016/j.surg.2023.12.005

4. Blanchfield BB, Demehin AA, Cummings CT, Ferris TG, Meyer GS. The cost of quality: an academic health center's annual costs for its quality and patient safety infrastructure. *Jt Comm J Qual Patient Saf*. 2018;44(10):583-589. doi:10.1016/j.jcjq.2018.03.012

5. Chen LM, Rein MS, Bates DW. Costs of quality improvement: a survey of four acute care hospitals. *Jt Comm J Qual Patient Saf*. 2009;35(11):544-550. doi:10.1016/S1553-7250(09)35074-6

6. Kehl KL, Liao KP, Krause TM, Giordano SH. Access to accredited cancer hospitals within federal exchange plans under the Affordable Care Act. *J Clin Oncol*. 2017;35(6):645-651. doi:10.1200/JCO.2016.69.9835

7. Fong ZV, Lim PW, Hendrix R, et al. Patient and caregiver considerations and priorities when selecting hospitals for complex cancer care. *Ann Surg Oncol*. 2021;28(8):4183-4192. doi:10.1245/s10434-020-09506-2

8. Del Vecchio NJ, Askelson NM, Carter KD, Chrischilles E, Lynch CF, Charlton ME. Patterns and characteristics of patients' selection of cancer surgeons. *Am J Surg*. 2021;221(5):1033-1041. doi:10.1016/j.amjsurg.2020.09.041

9. Bergholt MD, Falstie-Jensen AM, Brink Valentin J, et al. Patients experience more support, information and involvement after first-time hospital accreditation: a before and after study in the Faroe Islands. *Int J Qual Health Care*. 2021;33(4):mzab149. doi:10.1093/intqhc/mzab149

10. Gao X, Schroeder MC, Lizarraga IM, Tolle CL, Mullett TW, Charlton ME. Improving cancer care locally: study of a hospital affiliate network model. *J Rural Health*. 2022;38(4):827-837. doi:10.1111/jrh.12639

11. Jha AK. Accreditation, quality, and making hospital care better. *JAMA*. 2018;320(23):2410-2411. doi:10.1001/jama.2018.18810

12. Saraswathula A, Merck SJ, Bai G, et al. The volume and cost of quality metric reporting. *JAMA*. 2023;329(21):1840-1847. doi:10.1001/jama.2023.7271

13. Vandenbroucke JP, von Elm E, Altman DG, et al; STROBE Initiative. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE): explanation and elaboration. *Epidemiology*. 2007;18(6):805-835. doi:10.1097/EDE.0b013e3181577511

14. Bilimoria KY, Stewart AK, Winchester DP, Ko CY. The National Cancer Data Base: a powerful initiative to improve cancer care in the United States. *Ann Surg Oncol*. 2008;15(3):683-690. doi:10.1245/s10434-007-9747-3

15. Murillo A, Romatoski KS, Chung SH, et al. Adjusting for population differences in the National Cancer Database to better represent United States cancer cases: a reference tool for researchers. *Ann Surg Oncol*. 2025;32(7):4604-4615. doi:10.1245/s10434-025-17285-x

16. Palis BE, Janczewski LM, Browner AE, et al. The National Cancer Database conforms to the standardized framework for registry and data quality. *Ann Surg Oncol*. 2024;31(9):5546-5559. doi:10.1245/s10434-024-15393-8

17. Ryan AM, Kontopantelis E, Linden A, Burgess JF Jr. Now trending: coping with non-parallel trends in difference-in-differences analysis. *Stat Methods Med Res*. 2019;28(12):3697-3711. doi:10.1177/0962280218814570

18. Ryan AM, Burgess JF Jr, Dimick JB. Why we should not be indifferent to specification choices for difference-in-differences. *Health Serv Res*. 2015;50(4):1211-1235. doi:10.1111/1475-6773.12270

19. Brady JT, Bingmer K, Bliggenstorfer J, et al; Consortium for Optimizing the Treatment of Rectal Cancer (OSTRiCh). Could meeting the standards of the National Accreditation Program for Rectal Cancer in the National Cancer Database improve patient outcomes? *Colorectal Dis*. 2023;25(5):916-922. doi:10.1111/codi.16503

20. Andres EB, Song W, Song W, Johnston JM. Can hospital accreditation enhance patient experience? Longitudinal evidence from a Hong Kong hospital patient experience survey. *BMC Health Serv Res*. 2019;19(1):623. doi:10.1186/s12913-019-4452-z

21. Grass F, Merchea A, Mathis KL, et al. Cost drivers of locally advanced rectal cancer treatment—an analysis of a leading healthcare insurer. *J Surg Oncol*. 2021;123(4):1023-1029. doi:10.1002/jso.26390

22. Loria A, Tejani MA, Temple LK, et al. Practice patterns for organ preservation in us patients with rectal cancer, 2006-2020. *JAMA Oncol*. 2024;10(1):79-86. doi:10.1001/jamaoncol.2023.4845

23. Hilty Chu BK, Loria A, Dhimal T, et al. Challenges of surveillance in implementing nonoperative management for rectal cancer. *JAMA Netw Open*. 2024;7(12):e2448682. doi:10.1001/jamanetworkopen.2024.48682

24. Greenfield D, Lawrence SA, Kellner A, Townsend K, Wilkinson A. Health service accreditation stimulating change in clinical care and human resource management processes: a study of 311 Australian hospitals. *Health Policy*. 2019;123(7):661-665. doi:10.1016/j.healthpol.2019.04.006

25. Justiniano CF, Xu Z, Becerra AZ, et al. Long-term deleterious impact of surgeon care fragmentation after colorectal surgery on survival: continuity of care continues to count. *Dis Colon Rectum*. 2017;60(11):1147-1154. doi:10.1097/DCR.0000000000000919

26. Antunez AG, Kanters AE, Regenbogen SE. Evaluation of access to hospitals most ready to achieve national accreditation for rectal cancer treatment. *JAMA Surg*. 2019;154(6):516-523. doi:10.1001/jamasurg.2018.5521

27. Boffa DJ, Rosen JE, Mallin K, et al. Using the National Cancer Database for outcomes research: a review. *JAMA Oncol*. 2017;3(12):1722-1728. doi:10.1001/jamaoncol.2016.6905