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EXPERIENCE REPORT

Learning Health Systems

Leveraging public health cancer surveillance capacity to develop and support a rural cancer network

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Abstract

Introduction: As the rural–urban cancer mortality gap widens, centering care around the needs of rural patients presents an opportunity to advance equity. One barrier to delivering patient-centered care at rural hospitals stems from limited analytic capacity to leverage data and monitor patient outcomes. This case study describes the experience of a public health cancer surveillance system aiming to fill this gap within the context of a rural cancer network.

Methods: To support the implementation of a novel network model intervention in Iowa, the Iowa Cancer Registry began generating hospital-specific and catchment area reports. Then, the Iowa Cancer Registry supported adapting the network model to fit the context of Iowa's cancer care delivery system by performing data monitoring and reporting functions. Informed by a gap analysis, the Iowa Cancer Registry then identified which quality accreditation standards could be achieved with public health surveillance data and analytic support.

Results: The network intervention in Iowa supported 5 rural cancer centers across the state, each concurrently pursuing quality accreditation standards. The Iowa Cancer Registry's hospital and catchment-specific reports illuminated the cancer burden and needs of rural cancer centers within the network. Our team identified 19 (of the 36 total) quality standards that can be supported by public health surveillance functions typically performed by the registry. These standards encompassed data-driven quality improvement, patient monitoring, and reporting guideline-concordant care standards.

Conclusions: As rural hospitals continue to face resource constraints, multisectoral efforts informed by data from centralized public health surveillance systems can promote quality improvement initiatives across rural communities. While our work remains preliminary, we predict that analytic support provided by the Iowa Cancer Registry will enable the rural network hospitals to focus their capacity toward developing the infrastructure necessary to deliver high-quality care and serve the unique needs of rural cancer patients.

KEYWORDS
cancer, networks, quality, rural, surveillance

1 | INTRODUCTION

As cancer mortality continues to decline in the United States, over the past decade the mortality gap between rural and urban patients with cancer has grown.[1] As of the 2018–2022 time period, the cancer mortality rate in rural populations (RUCC = 4–9) was 14% higher than the cancer mortality in urban populations (RUCC = 1–3) in the United States (Figure 1). In Iowa, a rural state with the second highest cancer incidence in the United States, the difference in the rural versus urban cancer mortality rates have begun to widen (Figure 1). Evidence suggests that the rural–urban cancer mortality gap could be mitigated with more equitable delivery of patient-centered care.[2–4] However, delivering patient-centered cancer care at each phase of the cancer care continuum, from diagnosis to treatment, through survivorship to palliative and end-of-life care has proved challenging for low-resourced cancer centers in rural Iowa.[5] One challenge facing rural cancer centers is how to prospectively track patient care given their limited capacity to collect data, monitor patient outcomes, and analyze information related to care delivery processes.[6,7] Thus, independent data-driven quality improvement efforts have largely been out of reach for rural cancer centers. To fulfill standard reporting functions, these small rural hospitals have relied on the infrastructure and expertise of Iowa's central cancer registry. The comprehensiveness of Iowa's cancer registry data, which includes patient treatment and outcome measures, presented an opportunity to alleviate data capacity barriers to delivering patient-centered cancer care in rural Iowa.[8]

1.1 | Context

For the purposes of this intervention, we defined "rural cancer center" as a hospital located in a Rural–Urban Continuum Code of 4–9 that diagnosed and/or treated ≥100 cancer patients in 2019 and offered surgical, chemotherapy, and radiation services for their cancer patients. The four largest rural cancer centers meeting these criteria were located between 1.5 and 4.5 h from Holden. Two of the hospitals employ one oncologist, one employs two oncologists, and one contracts with two oncologists (on a part-time basis) from a private group. Each serves a catchment area ranging from 1 to 8 rural counties, and all or part of their catchment areas were designated as healthcare professional shortage areas. These four rural cancer centers became the initial affiliate members of the Iowa Cancer Affiliate Network (I-CAN) intervention.

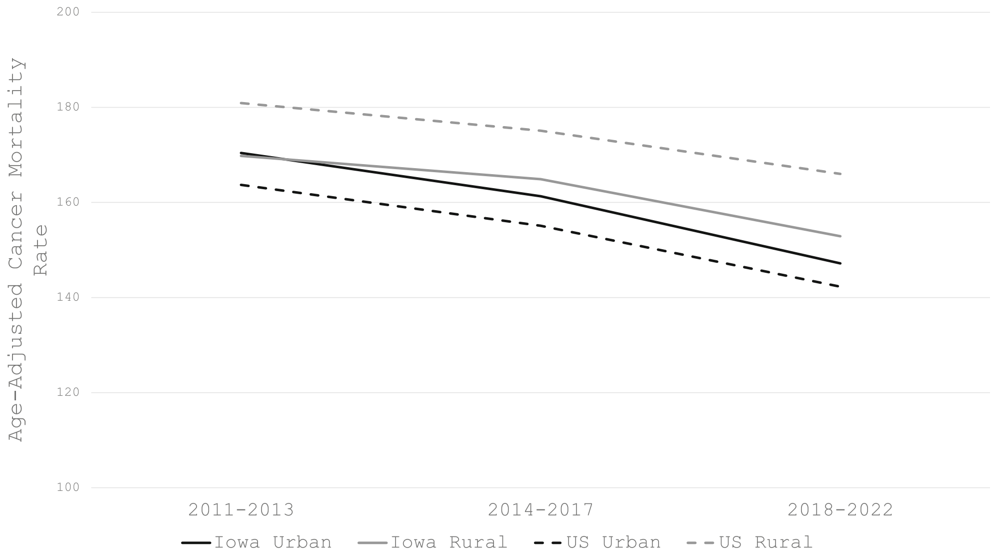

FIGURE 1 Cancer mortality rates, rural and urban (Iowa and United States). Rural and urban age-adjusted cancer mortality rates, Iowa vs. United States, 2011–2022. Rural status based on county-level Rural–Urban Continuum Code (Urban = RUCC 1–3; Rural = RUCC 4–9). Rates are reported per 100 000 population. Population Adjustment>—Linked To County Attributes—Total United States, 1969–2022 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, released April 2024. Underlying mortality data provided by NCHS (www.cdc.gov/nchs). Surveillance Research Program, released June 2022. Underlying mortality data provided by NCHS (www.cdc.gov/nchs).

Despite the lack of specialized, high-volume healthcare professionals, physicians in rural areas often provide treatment locally and maintain unique referral patterns with larger health systems. This is especially true in Iowa, where providers often refer patients to larger cancer centers in and outside of the state, and not necessarily to the state's sole National Cancer Institute (NCI) designated cancer center (Holden). Rather than leveraging the network to drive referrals to Holden, we envision a regional approach, where Holden offers access to specialized treatment and services not typically available locally (e.g., genetic counseling), expertise and training (e.g., collaborative care consults), and clinical trial participation. However, even with support from a network of rural peer cancer centers and a large NCI-designated cancer center, questions remain about whether and how best to support a network of rural cancer centers in Iowa.

1.2 | Questions of interest

The overarching goal of our intervention is to increase the delivery of high-quality across the cancer continuum in rural Iowa and ultimately reduce the rural–urban cancer mortality gap. Funded by an NCI research grant at the University of Iowa, we are evaluating whether implementing an adapted network affiliate model improves cancer care at four rural cancer centers. Part of the evaluation involves assessing how this network facilitates progress toward achieving standards, as set forth by the American College of Surgeons Commission on Cancer (CoC).[9–11] This novel rural cancer network leverages the Iowa Cancer Registry to support rural hospitals in achieving CoC accreditation standards.

2 | METHODS

2.1 | Research team and grant support

The team includes a diverse group of researchers and stakeholders with a range of backgrounds and perspectives. The team is co-led by the director of the Iowa Cancer Registry who is a cancer epidemiologist, and by a surgical oncologist who also serves as the CoC State Chair for Iowa. The registry and research team included an interdisciplinary group of professionals and scholars with expertise in cancer registry operations, implementation science, health economics, business administration, epidemiology, health services research, and cancer surveillance/registration. The Iowa Cancer Affiliate Network would not be possible without guidance from MCCAN's leadership at the University of Kentucky, institutional support from the University of Iowa Holden Comprehensive Cancer Center and University of Iowa College of Public Health, and the commitment from multiple administrators and oncologists at each affiliated hospital (Figure 2).

The assembly of our interdisciplinary team and our resulting work was supported by funding from a large research grant from the NCI with the goal of improving the reach and quality of cancer care in rural, underserved populations (RFA-CA-19-064). Our primary aims to adapt, implement, and evaluate a novel cancer network intervention in Iowa uniquely fit this opportunity.

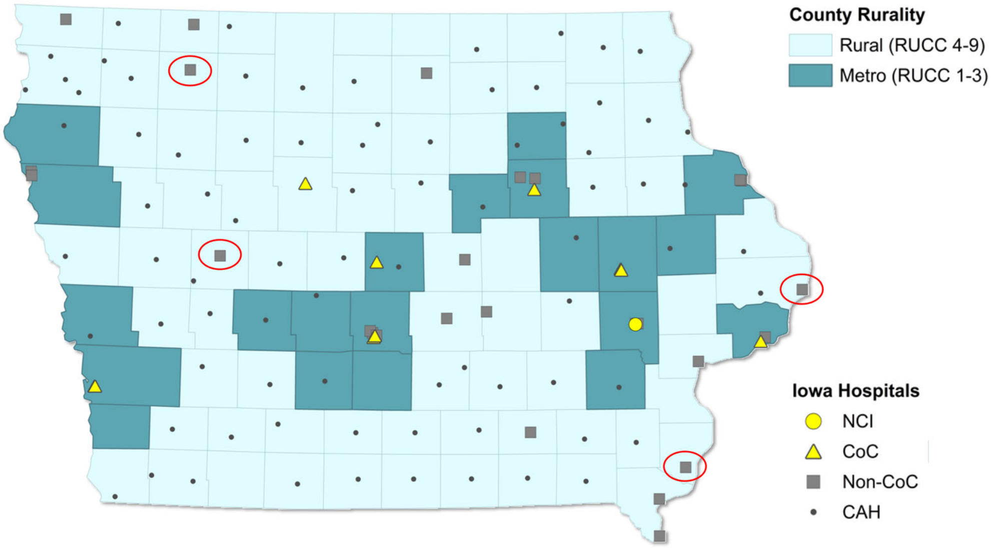

FIGURE 2 Map of Iowa hospitals. County map of Iowa and all hospitals within the state. Hospitals are grouped by accreditation status: NCI (National Cancer Institute), CoC (Commission on Cancer), non-CoC (not accredited by Commission on Cancer), and CAH (Critical Access Hospital). County rurality determined by Rural Urban Continuum Codes (RUCC). NCI = Holden NCI Designated Comprehensive Cancer Center. CoC = Hospitals with cancer centers accredited by the Commission on Cancer. Non-CoC = Hospitals with cancer centers that are not accredited by the Commission on Cancer and not designated as Critical Access Hospitals. CAH = Critical Access Hospitals (<25 beds). Red circles identify the original I-CAN affiliate hospital sites. U.S. Department of Agriculture, Economic Research Service. Rural–Urban Continuum Codes. January 2013.

2.2 | Outcome measures

Our overall project has a number of outcomes to assess the effectiveness of our network intervention. First, we hypothesized that the network intervention would result in improvement in selected CoC disease-specific quality measures. To evaluate our main hypothesis, our research team will use Iowa Cancer Registry data to approximate selected CoC quality measures and compare them between affiliate sites and comparable control hospitals, before and after network initiation. These outcomes will include compliance with guideline-concordant care at the hospital level, such as timely radiation treatment after breast cancer surgery, prompt adjuvant chemotherapy, and removal of >12 regional lymph nodes for patients with colon cancer. At baseline, rural cancer centers that were not accredited by the CoC had lower rates of these measures compared to the rest of the state.[12]

We are also assessing the number of CoC standards met (Table 1). Similar to how patients experience cancer across a continuum, these standards encompass institutional commitment, governance structures, facility resources, personnel and service delivery, patient care, data and quality improvement, education, and access to clinical trials. Iowa Cancer Registry data will be used to support compliance with a number of these standards as described in this case study.

Finally, we also aimed to assess the determinants of successful implementation and evaluate the implementation of outcomes including acceptability, adaptability, and feasibility (including costs) from the affiliate hospital perspective. We also aim to identify internal (i.e., hospital size, culture, and structure) and external (i.e., patient needs and health system resources) determinants to successful implementation. These outcomes, while not within the scope of this case study, will promote our ability to understand how networks can drive quality improvement and enhance our ability to scale our intervention beyond this R01 grant.

2.3 | Case study

The statewide Iowa Cancer Registry has participated in the NCI's Surveillance, Epidemiology, and End Results (SEER) program since 1973.[13] Many small rural hospitals in Iowa diagnose and treat cancer patients, yet these rural hospitals lack the infrastructure necessary to collect, report, and most importantly, act upon their own data. The Iowa Cancer Registry assisted rural hospitals by collecting cancer data on their behalf. While this helped rural hospitals meet state reporting mandates, hospitals still lacked the capacity to analyze and act upon their cancer data. To promote data-driven quality improvement, the Iowa Cancer Registry began reporting cancer data back to hospitals that provide oncology services in a user-friendly format. Since 2019, the Iowa Cancer Registry has generated 66 unique reports for 35 hospitals that detailed the cancer incidence, staging, and mortality burden of patients treated at their hospital.

The data generated while creating these reports showed that patients treated in rural hospitals not accredited by the CoC received significantly less guideline-concordant care than rural counterparts treated at CoC-accredited hospitals.[12] Hospital and population-based cancer research typically involves databases with significant limitations regarding the quality of care delivered in non-CoC accredited hospitals. For example, the CoC's National Cancer Data Base (NCDB) excludes patients receiving care at facilities without CoC accreditation, and the information that is made widely available to researchers via SEER lacks information about hospitals where patients were treated.[14] Thus, our work illuminating the disparities in the quality of care received by patients treated in non-CoC accredited rural Iowa hospitals was only possible by directly accessing Iowa Cancer Registry data.[12]

This disparity ultimately informed a successful R01 research grant from the NCI, which assembled a team of researchers to adapt, implement, and evaluate a novel cancer network (Iowa Cancer Affiliate Network or I-CAN) in Iowa. The following describes how we at the Iowa Cancer Registry supported each phase of the I-CAN research team's intervention.

2.3.1 | Adaptation

By analyzing hospital data and disseminating valuable reports back to hospitals, the Iowa Cancer Registry bolstered its relationships with rural hospital administrators and clinicians. These relationships marked the beginning of I-CAN. To inform the development of I-CAN, the research team interviewed administrators and clinicians from a model network: the University of Kentucky Markey Cancer Center Affiliate Network (MCCAN). MCCAN has effectively facilitated progress toward CoC accreditation and improved care quality in community hospitals, including several in rural areas.[15,16] The research team then interviewed administrators and clinicians at four Iowa hospitals that were targeted for recruitment into I-CAN, with the goal of identifying strategies to adapt MCCAN's successful model to meet the unique needs of Iowa's rural cancer patients.[17]

A core function of MCCAN is promoting a culture of data-driven quality improvement.[17] By providing rural cancer centers with data about their own patients—data that unaccredited facilities often do not have access to—the Iowa Cancer Registry has helped I-CAN demonstrate the value of patient-centered data.

2.3.2 | Implementation

As a precursor to pursuing CoC accreditation standards within the network model, the research team led several meetings with hospital leadership, staff, and clinicians at each I-CAN hospital. These meetings constituted a “gap analysis” measuring pre-implementation progress toward CoC standards (Table 1). Achieving CoC accreditation can seem herculean, particularly for smaller hospitals with limited resources. The I-CAN research team supported this pursuit by clarifying the resources and changes needed for each hospital to meet the standards and creating personalized CoC accreditation guides, which helped leaders at affiliate hospitals understand the

TABLE 1 Baseline affiliate hospital compliance with CoC standards.

			Hospital compliance with standard[a]			
	Standard	**Requirements for compliance**	**A**	**B**	**C**	**D**
1.1	Administrative Commitment	Letter of authority for the current survey cycle.				
2.1	Cancer Committee	Establish/state required members and coordinators with alternates.				
2.2	Cancer Liaison Physician Responsibilities	Report/present NCDB data twice annually with preference to areas of concern and/or where benchmarks are not being met.				
2.3	Cancer Committee Meetings	Establish meeting schedule for at a minimum, one meeting per quarter.				
2.4	Cancer Committee Attendance	State 75% requirement of required members/alternates.				
2.5	Multidisciplinary Case Conference	1. Policy to govern tumor board. 2. Annual report from the Cancer Conference Coordinator.				
3.1	Facility Accreditation	Facility is accredited or licensed by a recognized federal, state, or local authority.	X	X	X	X
3.2	Evaluation & Treatment Services	The program provides diagnostic imaging services, radiation oncology services, and systemic therapy services on-site or by referral.	X	X	X	X
4.1	Physician Credentials	Present roster of physician members & board certification status.		X	X	X
4.2	Oncology Nursing Credentials	Phase In Standard: Roster of nurses with certification status for all. Policy on nursing competency.	X	X		
4.3	Cancer Registry Staff Credentials	1. Current CTR credentials for all certified cancer-registry staff. 2. Plan for CTR supervision on non-credentialed staff. 3. Documentation of cancer-related CE for non-credentialed staff.				
4.4	Genetic Counseling & Risk Assessment	1. Policy for providing cancer risk assessment, genetic counseling, and genetic testing services. 2. Choose cancer site annually. 3. Develop a process for the specific site chosen. 4. Annual evaluation and report.	X	X		
4.5	Palliative Care Services	1. Palliative care services are available to cancer patients either on-site or referral. 2. Policy in place. 3. Annual report.				X
4.6	Rehabilitation Care Services	1. Policy defining services that are on-site and by referral. 2. Annual review of the services.	X	X	X	X
4.7	Oncology Nutrition Services	1. Policy defining services that are on-site by a Registered Dietitian Nutritionist(s) and by referral. 2. Annual review of the services.	X	X		
4.8	Survivorship Program	Phase In Standard: 1. Policy defining the survivorship program requirements. 2. Choose three services offered annually. 3. Annual review of the program.	X			
5.1	College of American Pathologists Synoptic Reporting	90% of eligible pathology reports are formatted using the synoptic reporting format.		X	X	X
5.2	Psychosocial Distress Screening	1. Policy for informing patients on how to access services that are on-site or by referral. 2. Policy outlining the screening process. 3. Annual coordinator summary	X	X		
5.3	Breast Sentinel Node Biopsy	Operative reports for patients with breast cancer of epithelial origin who underwent nodal staging in a curative setting.				
5.4	Breast Axillary Dissection	Operative reports for patients with breast cancer of epithelial origin who underwent axillary dissection with diagnostic or therapeutic intent.				
5.5	Primary Cutaneous Melanoma	Operative reports for patients who underwent a curative local excision for primary cutaneous melanoma.				
5.6	Colon Resection	Operative reports for patients who underwent resection for colon cancer.				
5.7	Total Mesorectal Excision	Pathology reports for rectal cancer patients with middle and low rectal cancers.				
5.8	Pulmonary Resection	Pathology reports for curative intent pulmonary resections.				
6.1	Cancer Registry Quality Control Policy	1. Policy for quality control that includes the process for resolving conflicts identified. 2. Annual quality control evaluation.				

(Continues)

TABLE 1 (Continued)

			Hospital compliance with standard[a]			
	Standard	**Requirements for compliance**	**A**	**B**	**C**	**D**
6.4	Rapid Quality Reporting System (RQRS) Participation	Data are submitted as required.				
6.5	Follow-Up of Patients	1. 80% follow-up rate is maintained for all eligible analytic cases from the registry reference date. 2. PCP facilities maintain a 60% follow-up rate from the registry reference date. 3. 90% follow-up rate is maintained for all analytic cases diagnosed within the last 5 years or from the cancer registry reference date, whichever is shorter.				
7.1	Accountability & Quality Improvement Measures	The expected Estimated Performance Rate (EPR) is met.				
7.2	Monitoring Concordance with Evidence-Based Guidelines	Report of the in-depth analysis with all required elements.				
7.3	Quality Improvement Initiative	Perform a study and improvement following all requirements.				
7.4	Cancer Program Goal	Determine the cancer program goal & the progression of the goal throughout the year.				
8.1	Addressing Barriers to Care	Review and analyze the strengths & barriers of the cancer program using approved resources. A barrier must be chosen, and a process developed and implemented.	X			
8.2	Cancer Prevention Event	Recommended to partner with a community organization, hold a prevention event, and present a summary to the cancer committee.	X	X		
8.3	Cancer Screening Event	Recommended to partner with a community organization, hold a screening event and present a summary to the cancer committee	X			
9.1	Clinical Research Accrual	Policy and procedure in place that includes all required elements. The required percentage of patients is accrued to cancer-related clinical research studies each calendar year. The Clinical Research Coordinator report. Tracking documents with required information.	X			
9.2	Commission on Cancer Special Studies	The program participates in special studies as selected by the CoC.				

Note: The R01 research team created this 2020 CoC Standards Manual template for each I-CAN affiliate hospital gap analysis. A–D represent de-identified I-CAN affiliate hospitals.

[a] X = resources or processes are in place that partially address the CoC standard.

commitment required to pursue CoC accreditation while relieving the effort of identifying the path toward accreditation. Accreditation support is also provided in the form of training and mentoring of staff, provision of documentation templates, networking opportunities and sharing of resources from the NCI-designated cancer center.

As part of accreditation, the CoC requires hospitals to identify, implement, and evaluate quality improvement (QI) interventions. These projects, while common in larger health systems, can be difficult to scale for smaller rural hospitals with limited QI experience. QI projects require both data and commitment to the culture of data-driven QI. Through I-CAN, the research team plans to support potential QI projects for the participating affiliates by training hospital staff on all aspects of QI, from resource development to conducting needs assessments and leveraging ICR data to support these projects.

2.3.3 | Evaluation

ICR data will be used to evaluate hospital performance on individual disease-specific CoC quality measures at baseline and following the intervention. Progress toward the individual standards will also be assessed for each hospital, as will the barriers and facilitators to achieving them.

3 | RESULTS

3.1 | Lessons learned

Table 2 summarizes our team's lessons learned during the initial phase of our broader intervention and specifically, challenges facing public health surveillance systems aiming to leverage analytic data capacity to support system-level interventions in rural communities.

3.1.1 | Institutional buy-in

To successfully implement the cancer center network model and facilitate CoC accreditation among affiliate sites, the research team needed buy-in from diverse stakeholders (administrators, oncologists, and surgeons) at multiple institutions (small rural hospitals, critical access hospitals, large academic medical centers, and large affiliate

TABLE 2 Lessons learned from the research team.

Lessons learned
• The Commission on Cancer reports that over 70% of cancer patients receive care at accredited facilities, yet this statistic obscures significant rural–urban disparities: 71% and 79% of urban colorectal and breast cancer patients respectively receive care at a CoC-accredited facility, compared to just 52% and 61% of their rural counterparts in Iowa. More research analyzing cancer registry data are needed to understand how this rural–urban disparity varies by state. • Treating between 130 and 560 cancer cases each year, the small size of each rural cancer center participating in I-CAN proved to be a strength, whereas the registry may not have been able to support the data needs of larger hospitals. • In the coming years, the Iowa Cancer Registry will have a better sense of how well the network affiliate model facilitates access to patient-centered care. Until then, we will continue to use our data-driven approach to help rural hospitals shift their quality improvement initiatives from understanding the cancer burden of their patient population toward interventions that improve patient-centered outcomes in their hospitals and communities. • Research grants do not continue in perpetuity. As the end of grant funding for I-CAN draws near, the registry will examine how their support can sustain rural hospital progress toward delivering patient-centered care. • Each rural cancer patient has unique needs. So too do rural cancer care systems. Implementing a health system intervention requires paying attention to contextual differences between settings. Rural health systems, in particular, have distinct features (i.e., cancer burden, resource constraints, and innovative staffing/reimbursement models) that require careful consideration. Our capacity to analyze and disseminate detailed cancer registry data will promote the flexibility needed to adapt this network intervention to the specific needs of each rural cancer center; a necessary component for sustaining progress toward better patient cancer care in rural Iowa.

health systems). These stakeholders needed to agree to collaborate, share resources, and most importantly dedicate time to the network and accreditation processes. This commitment carried few guarantees of success or return on investment. The research team found that the recurring meetings and ongoing, timely support toward achieving these standards helped alleviate concerns.

3.1.2 | Registry capacity

By monitoring and abstracting data on behalf of I-CAN affiliate hospitals, the Iowa Cancer Registry removed a considerable barrier to CoC accreditation. However, SEER reporting requirements differ from those of the CoC/National Cancer Database (NCDB). To address this, the Iowa Cancer Registry trained registry staff to collect and analyze the additional required elements in CoC-compliant software.

3.2 | Adaptation results

A key feature of the MCCAN model is supporting the role of an Oncology Data Specialist (ODS) to lead patient surveillance and quality improvement initiatives.[17] In MCCAN, many rural hospitals employed or contracted their own ODS who prospectively and continuously tracked patient care. Because the Iowa Cancer Registry had historically been conducting abstracting services for rural hospitals, I-CAN affiliates lacked the capacity to achieve this critical network function. To achieve the key feature outlined by MCCAN, the Iowa Cancer Registry contracted out members of their ODS staff to the affiliates to perform cancer data abstraction and quality assurance services while also working with cancer center administrators to identify potential staff who could be trained by the Iowa Cancer Registry to perform these functions in the long term.

3.3 | Implementation results

For each rural hospital participating in I-CAN, the Iowa Cancer Registry can support achieving at least part of 19 of the 36 CoC standards (Figure 3). These 19 standards encompass diverse domains, each emphasizing the importance of data-driven quality improvement in tracking care and patient outcomes. For the standards specific to data collection and submission to the NCDB, the ICR can if needed, meet all the requirements, replacing the need for the hospital to hire an ODS or contractor. At least in the initial years of I-CAN, the Iowa Cancer Registry will provide staff to function as the ODS of record for each affiliated hospital and perform annual review and reporting requirements (Standards 2.2 and 4.3). The Iowa Cancer Registry can also perform CoC quality control and data auditing services for patient follow-up (Standards 6.1, 6.4, 6.5, 7.1, and 7.2). Ultimately, shifting the administrative burden of CoC reporting requirements to the Iowa Cancer Registry allows the affiliate hospitals to direct their capacity and resources toward patient care.

For the non-registry standards, ICR data are used to support planning, assessment, and tracking. Hospital reports on the volume of most prevalent cancer types, stage at presentation, and treatments received help inform priorities for survivorship and psychosocial services, and identify targets for screening and prevention efforts, ICR data are also used to identify and track appropriate quality improvement projects and showcase the importance of data-driven, quality improvement initiatives to hospital leadership. Data provided by the Iowa Cancer Registry will serve as a valuable starting point for these rural affiliate hospitals, as geographic catchment area reports by the registry can inform future community health needs assessments and clarify barriers to care. The detailed hospital reports created by the cancer registry encompass patient outcomes across the cancer care continuum, including not only data on regional cancer rates but also local screening and risk behavior trends collected from other sources which help to identify opportunities to reduce the cancer burden in rural communities.

The CoC requires that hospitals meet minimum thresholds for delivering quality care standards such as genetic testing, palliative care services, and psychosocial distress screening. Additionally, surgeons have specific procedural and reporting requirements for six cancer operations: Breast Sentinel Node Biopsy, Breast Axillary Dissection, Primary Cutaneous Melanoma, Colon Resection, Total Mesorectal

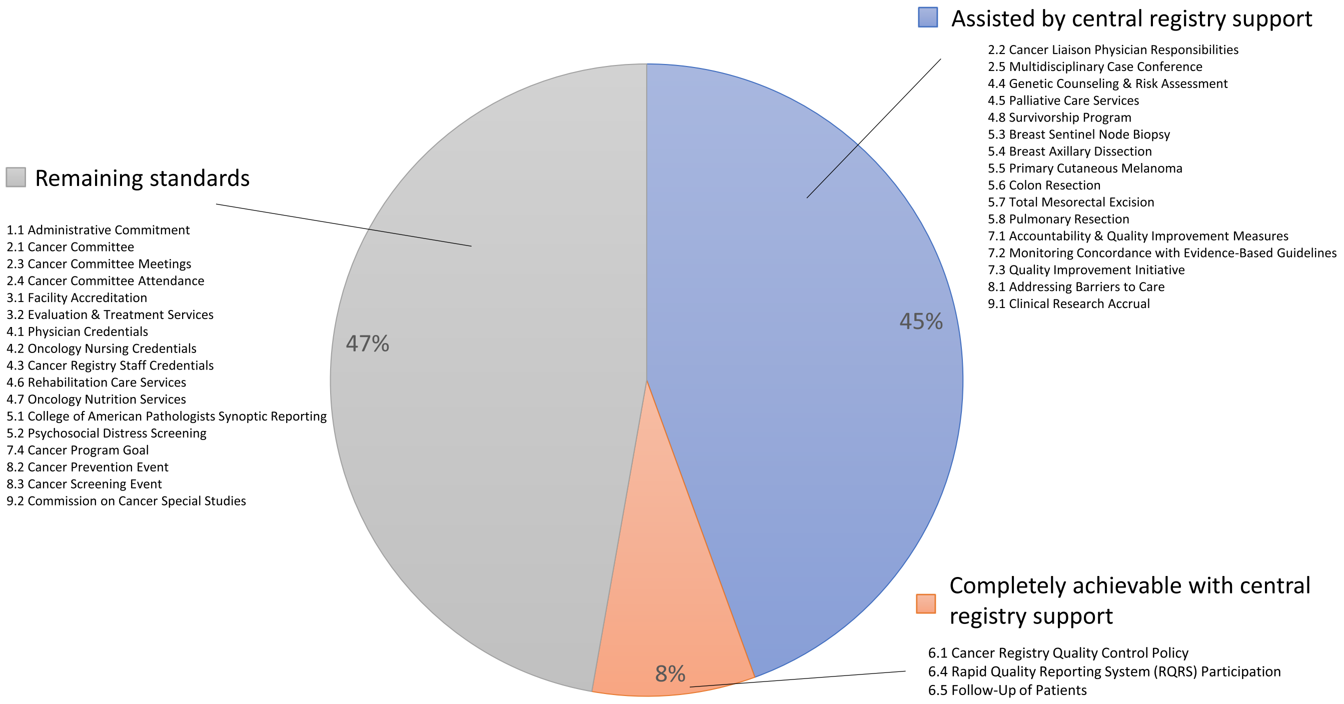

FIGURE 3 Central Registry Role in Supporting CoC Accreditation. Among the 36 required standards for achieving CoC accreditation, our gap analyses revealed that the Iowa Cancer Registry can directly support each affiliate hospital's pursuit toward achieving 19 (53%) of the standards. The registry can completely support achieving 3 standards (8%) and assist in supporting 16 standards (45%).

Excision, and Pulmonary Resection (Standards 5.3–5.8).[18–25] Delivering high-quality care is one aspect of these standards; reporting compliance is another. ICR data are critical for identifying eligible patients for these standards to assist with auditing and reporting. Finally, although performance on disease-specific quality measures is a critical part of data-driven quality improvement, this is typically not accessible to hospitals until they become accredited and can submit their data to the NCDB. Using ICR data to approximate and report these measures to individual hospitals will be invaluable for demonstrating to their leadership and clinicians the power of data collection and objective analysis in providing high-quality patient care.

3.4 | Evaluation Results

Three of the four hospitals completed the gap analysis and elected to proceed with implementation, which is ongoing. In the personalized accreditation plans, the standards selected for early implementation included those related to patient care (rehabilitation, genetic counseling, psychosocial distress screening, nutrition, and oncology nursing) and governance (cancer committee and tumor board). Two of the three programs have successfully developed cancer committees and tumor boards, and all programs have made progress toward the patient care standards, including developing new procedures and policies and adding resources such as a dietician (1 program) and social worker (2 programs). Supported by ICR data, one hospital has launched a quality improvement project to increase colorectal cancer screening rates. Additionally, all are participating in educational webinars and networking opportunities provided. Assessment of performance on the quality standards will be a key component of late implementation activities.

4 | DISCUSSION

4.1 | Case study summary

To the best of our knowledge, Iowa is among the few centralized cancer registries performing such detailed reporting services for rural hospitals. However, little is known about how other cancer registries serve rural hospitals within their catchment area, and we acknowledge that some large health systems may have the capacity to collect and report data to rural hospitals owned by the system. We hope this study motivates greater awareness of opportunities for cancer registries to support rural cancer care, while also connecting registry leaders to enhance the dissemination of our work. All states have at least one central cancer registry. While our work supporting the capacity of smaller hospitals in Iowa is unique, other registries collect similar cancer data and could provide various levels of technical support. The first step is relationship building. Cancer registries provide a public good, but most of their benefits have traditionally supported surveillance and research activities. By establishing partnerships, cancer registries can gain a better sense of how their data could be used to improve care delivery in rural or low-resource hospitals. As more registries provide innovative support to their communities, the network model facilitates shared learning and best practices.

To support a rural hospital's pursuit of the CoC's standards, the registry first needs a trusting relationship with a hospital committed to investing the resources necessary to conduct quality improvement initiatives and expertise in the CoC accreditation standards and accrediting process. Additionally, depending on the level of involvement, the registry will also need the capacity to fulfill any number of CoC standards related to monitoring and reporting patient outcomes. Again, this need not be as extensive as our support for I-CAN hospitals but could range from preliminary data reporting functions to serving roles directly meeting CoC standards.

4.2 | Health system challenges

Unlike randomized clinical trials or field experiments, this health system intervention did not occur in a controlled setting. This complicated the intervention and its evaluation. Most I-CAN hospitals have undergone significant leadership and clinician changes since joining the network which has resulted in multiple pauses during the gap analysis process for some affiliates. However, 3 of the 4 I-CAN hospitals have been able to complete the gap analysis process despite these changes.

While the intervention began with four affiliate hospitals, there are now six affiliate hospitals in I-CAN. Having heard about the benefits of I-CAN supporting achieving CoC accreditation, two additional hospitals were asked to join the network. One of these new hospitals was significantly smaller than other I-CAN affiliates, which creates additional adaptation work for sustaining our network intervention. We predict, however, that this small hospital's pursuit toward CoC accreditation standards will inform future efforts to expand the reach of quality accrediting organizations in rural communities.

Finally, we cannot assume that our intervention is the only major change being implemented in any given health system. After completing the gap analysis for one affiliate, their leadership reprioritized institutional capacity toward pursuing broader hospital-level designation requirements. While likely lucrative for the affiliate, without conflicting with the CoC process, this hurdle served as a reminder that our intervention is not occurring in a vacuum. While patience is key, our commitment to the autonomy of rural cancer centers in pursuing their unique goals should help sustain our state's progress toward improving the quality of cancer care delivered in rural communities.

4.3 | Next steps

4.3.1 | Looking forward

Building upon the successful partnership and engagement activities between the Iowa Cancer Registry and hospitals throughout the state, we expect our results to inform future research initiatives bolstering and sustaining I-CAN within the state and scaling our intervention beyond Iowa's borders. Throughout this process, we also aim to create new relationships with other networks and central cancer registries to share best practices and develop a learning community dedicated toward leveraging data and quality improvement processes to improve cancer outcomes in rural communities across the country.

4.3.2 | The future of I-CAN

Since the intervention began, we have observed progress toward achieving CoC standards at affiliate hospitals. Two hospitals have started a cancer committee and tumor board, one hospital has hired a dietician, and multiple hospitals have developed protocols for clinical services (i.e., rehabilitation, nutrition, and survivorship). We are exceedingly hopeful for continued progress in the next 1–2 years.

At the onset, I-CAN included four rural hospitals. Having added a fifth, small rural Critical Access Hospital to our network, I-CAN now comprises five affiliates. But we are only just beginning to grow. Over the next 5 years, we expect to add an additional 10 affiliate hospitals to our network. In many areas of the state, this process has already begun, as news of our work is reaching administrators at rural hospitals across the state. Even hospitals with fewer than 125 analytic cases that offer chemotherapy, but not radiation services, have expressed interest in joining the network.

In addition to growing the size of our network, we also plan to expand the services and supportive resources offered by our academic medical center. Some of these new offerings include exploring the feasibility of telehealth modalities (e.g., collaborative care consultation processes and molecular tumor boards), and disseminating best practices for delivering high-quality cancer survivorship programs locally. To grow and continue our work, our leadership at the registry has begun sustainability development efforts in partnership with Holden administrators. Our goal is for these efforts to yield enough resources to fund dedicated staff beyond the R01 grant, which ends in 2026. In addition, we are using the lessons learned throughout this process to develop our next large NCI rural cancer care quality research grant proposal.

4.3.3 | Rural cancer quality research beyond iowa

Our initial grant was motivated by the successful implementation of a network model in Kentucky, which we adapted to Iowa's unique context. We now want to assess whether this process can be replicated in other rural states, with a slight modification. One of the key outcomes in Kentucky and Iowa was the successful pursuit of standards and accreditation by the CoC. Even with network and registry support, many of these standards appear difficult to achieve in small rural cancer centers. Thus, in addition to testing the implementation of affiliate networks paired with central cancer registry support in other states with large rural populations, we also want to assess which of the CoC standards are most important for driving quality improvement in rural cancer centers. While this project is still in a preliminary phase, we envision informing future accreditation standards with an eye toward advancing rural cancer and place-based equity.

4.3.4 | A Learning collaborative of cancer registries

Whether other states have a central cancer registry with the capacity to support rural cancer centers' data collection, monitoring, and analysis functions is unclear. Cancer registries serve a critical public health surveillance function, and there is much we can learn from each other. Moving beyond informal partnerships and engagement strategies, we aim to establish more formal connections between registries serving large populations of rural cancer patients and survivors. Such a learning collaborative could bolster our collective capacity to meet the unique needs of a population experiencing a growing, disproportionate burden of cancer in the United States.

5 | CONCLUSION

As rural hospitals continue to face financial challenges and resource constraints, system-level efforts informed by data from centralized public health surveillance systems provide an opportunity to promote quality improvement initiatives across rural communities. While our work is in its preliminary stages, we predict that the analytic support provided by the Iowa Cancer Registry will allow rural network hospitals to focus their capacity toward developing the structures and processes necessary to deliver high-quality care and serve the unique needs of rural cancer patients. Cancer registry data will be instrumental in evaluating the impact of our network intervention on compliance with guideline-concordant care.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to declare.

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