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Partnering to Reduce Colon Cancer Health Disparities Among the American Indian Population in Michigan

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Abstract

American Indian and Alaska Native people experience higher rates of several cancers, including lung, colorectal, liver, stomach, and kidney cancers, compared to non-Hispanic White people in the United States. Cancer disparities are also prominent among the American Indian population and vary by region. Disproportionately high rates of colon cancer were identified among three tribal communities in Michigan by linking each tribe's enrollment roster to the state cancer registry. In response, in 2015 the Inter-Tribal Council of Michigan received funding from the Office of Minority Health within the U.S. Department of Health and Human Services to work with the three tribes to develop and implement the Tribal Colon Cancer Collaborative Project. The project used a community-based participatory research approach and a learning collaborative model to implement a multipronged initiative intended to improve colon cancer screening rates and outcomes among the three tribal communities. Local tribal coordinators were trained in the use of evidence-based interventions, including patient navigation and quality improvement processes, and implemented activities within their respective tribal health settings. Preliminary findings indicated increased colon cancer screening rates and improved rates of early stage cancer diagnoses. This paper describes the processes involved in implementing the project in collaboration with local tribal coordinators and the details of their journey toward improved colon cancer health outcomes.

Cancer is a public health concern in the United States that disproportionately affects racial and ethnic minority groups (National Cancer Institute, 2019). Rates of cancer are higher among American Indians (AI) than they are among the general population due to inadequate screening, a lack of timely access to affordable care, the unavailability of culturally appropriate treatment, and socio-ecological risk factors (Guadagnolo et al., 2017). Risk factors include historical trauma, low educational attainment, rural and isolated geographical locations, and lack of access to culturally appropriate resources (Substance Abuse and Mental Health Services Administration [SAMHSA], 2014).

American Indians and Alaska Natives (AN) experience higher rates of lung, colorectal, liver, stomach, kidney, and other cancers than do non-Hispanic White or European American individuals in the United States (Melkonian et al., 2019). Disparities in rates of cancer screening, early detection, and treatment underscore the need for systems-level changes to enhance the health of the AI population (Jemal, 2017; White et al., 2014).

The Tribal Colon Cancer Collaborative Project (the Project) was designed based on standard public health practices under the authority of the Inter-Tribal Council of Michigan (ITCM) and the Office of Minority Health within the U.S. Department of Health and Human Services. The overarching goal of the Project was to reduce rates of colon cancer among three federally recognized tribes through the use of evidence-based interventions and a community-based participatory research (CBPR) approach. The independent public health authorities of three tribes participated in the Project. One of the three tribes demonstrated success in the adaptation and use of evidence-based interventions following trainings to increase tribal health providers' knowledge and skills related to colon cancer screening. Here we discuss lessons learned and evaluation results to help inform future efforts to reduce cancer-related health disparities affecting AI communities.

Background

Cancer Disparities in Michigan

In Michigan, cancer remains a public health concern due to disparities in incidence and prevalence rates, including disproportionate rates among AI communities (ITCM, 2015). The cancer mortality rate for Michigan AIs is 227 per 100,000, significantly higher than the 188 per 100,000 mortality rate for all racial and

ethnic groups (Michigan Department of Health and Human Services [MDHHS], 2010). Analysis from the Michigan Cancer Surveillance Program documented higher colon cancer incidence rates among AIs age 59 years and younger than among White or European Americans in the same age group (Roen et al., 2014). Further analysis identified three tribes which experienced higher rates of colon cancer than other tribes in Michigan. These data informed the development of the Project, which was initiated in 2015.

Multilevel Risk Factors for Cancer

Biological, physical, behavioral, and environmental factors, including poor diet, overweight or obese conditions, and smoking, increase an individual's risk of cancer (American Cancer Society [ACS], 2019). These risk factors are directly linked to colon cancer and are prominent in the AI population (ACS, 2019). In 2015, the ITCM published the Michigan Tribal Health Data Report, which compiled several rigorous tribal population–based surveys implemented between 2007 and 2013. Only 2% to 11% of individuals surveyed reported eating the recommended five or more servings of fruits and vegetables per day, 32% met the recommendations for moderate physical activity, and 54% were classified as obese, compared to 31% of the general population (ITCM, 2015). Smoking rates ranged from 34% to 72% across tribal communities, compared to the general population rate of 21.4% (ITCM, 2015).

Health Care–Related Challenges and Promising Approaches for AIs

The Indian Health Services (IHS) system has historically been underfunded; tribes in Michigan have reported being funded at 58% of their need (Abramson & Pingatore, 2015). Many tribes rely on public assistance and grant funding to address this gap. Services administered by the IHS include ambulatory care, immunizations, dental care, vision care, pharmacy services, and preventive health services. Health professional shortage areas (HPSAs) are regions in which there are health care provider shortages in primary care, dental health, or mental health services (Health Resources and Services Administration, 2018). All IHS facilities qualify as HPSAs. Under the IHS Purchased/Referred Care program, patients may be referred to providers outside of their tribal communities for health screenings (e.g., colonoscopies, mammograms), treatment, or other services.

However, poor communication between the tribal clinic and referred care providers can disrupt the coordination and quality of care, a finding that has been documented in recent cancer screening projects (ITCM, 2014)

CBPR approaches. It can be challenging to implement effective interventions for cancer prevention and control among AI communities due to their diversity in culture, traditions, and geographic regions (Buffalo et al., 2019). Approaches that work for one tribe may not be effective in other tribes, thus interventions need to be tailored to the unique languages, beliefs, attitudes, and traditions of different tribes (Buffalo et al., 2019; Jernigan, 2010). CBPR incorporates values and strategies to promote collaborative inquiry based on community-identified issues and equitable partnerships and structures for participation (Simonds et al., 2013). CBPR approaches are a well-recognized method of addressing health disparities among AI communities (Hulan et al., 2019; Jernigan, 2010; Ramos et al., 2013). Capacity building is consistently emphasized as necessary for effective CBPR and sustainable program outcomes (Fletcher et al., 2014; National Institute on Minority Health and Health Disparities, 2020).

The Project adopted a CBPR approach to build capacity for sustained program activities and health-systems change to better meet the IHS parameters and the needs of three tribal communities. The principles of CBPR have been shown to be effective in helping to improve the health of culturally diverse populations. These principles include (a) promoting collaborative and equitable partnerships in all research phases and adopting an empowering power-sharing process, (b) recognizing the community as a unit of identity, (c) building on strengths and resources within the community, (d) facilitating colearning and capacity building among all partners, (e) focusing on problems of relevance to the local community, (f) balancing research and action for the mutual benefit of all partners, (g) disseminating findings and knowledge gained to the broader community and involving all partners in this process, and (h) promoting long-term processes and a commitment to sustainability (Burke et al., 2013).

Consistent with CBPR principles, the ITCM facilitated colearning through a learning collaborative model and provided training to local tribal program coordinators with the goal of building capacity for the implementation of health

strategies and activities within their respective tribal health centers and communities. Local tribal coordinators delivered the following interventions based on their knowledge of the needs of their respective communities.

Patient navigators. AI patient navigators can incorporate cultural norms and beliefs into their navigation services (Burhansstipanov et al., 2015; Guadagnolo et al., 2011; Willging et al., 2018). Patient navigation services were defined by Freeman and Rodriguez (2011) as services focused on breaking down barriers to health care provided by trained professionals. These services may include contacting patients who are due or overdue for screening, helping patients obtain insurance coverage, making appointments, assisting patients with transportation, and helping patients understand medical terminology and test results (Freeman & Rodriguez, 2011). The Project integrated navigation services into its programming and explored opportunities for sustainability and health-systems change.

Quality improvement. Quality improvement (QI) consists of systematic and continuous processes that contribute to measurable improvements in health care services and the health status of targeted patient groups (Health Resources and Services Administration, 2021). Wan (2018) described the importance of institutionalizing continuous QI in any effort to reduce patient dissatisfaction and barriers to care. The Plan-Do-Study-Act cycle of QI is a commonly used methodology for facilitating rapid improvements in health care (Knudsen et al., 2019). Knudsen et al. (2019) highlighted the need for fidelity to this cycle and its steps. In the Project, after completing their training, local tribal coordinators implemented this process in a trial-and-learning approach in which coordinators first considered a recommended solution for improvement, then tested the solution on a small scale, measured its impact, and finally decided whether to institutionalize the solution or try another intervention (Institute for Healthcare Improvement, 2019).

The Current Project

We describe the process involved in implementing the Project in collaboration with three tribal communities as part of their efforts to reduce colon cancer disparities. We give special consideration to how the Project developed local capacity to implement patient navigation and QI processes with the goal of increasing colon cancer screening rates, one of the key objectives of the U.S. Department of Health and Human Service's Healthy People 2020 initiative (Office of Disease Prevention and Health Promotion, 2019). The Project also aligned with national efforts to improve colon cancer screening rates and reduce disparities among different racial and ethnic groups (DeGroff et al., 2018). Lessons learned from this work are expected to inform future public health practices aimed at reducing health disparities that disproportionately affect the AI population.

Methods

The ITCM

The ITCM is a nonprofit public health organization that was established in 1968 as a consortium of Michigan's 12 federally recognized tribes. It is governed by a board of directors comprising the 12 respective tribal chairpersons. The ITCM's mission is to advocate for member tribes in the development of programs and policies that improve the economy, education, and quality of life for Michigan's AIs. It also assists member tribes in the development of tribal regulations, ordinances, and policies applicable to health and human services. There are six departments within the ITCM, including the Department of Health Education and Chronic Disease. Table 1 describes participating organizations and their roles in the Project.

Implementation of the Tribal Colon Cancer Collaborative Project

The Department of Health Education and Chronic Disease implemented the Project in August 2015 to address disproportionately high rates of colon cancer affecting three tribal communities (Tribes A, B, and C). To assess the incidence of colon cancer, the ITCM facilitated the linkage of tribal enrollment rosters to the Michigan cancer registry. This process corrected for racial misclassification, strengthened the quality of data, and provided tribes with a detailed cancer profile (Johnson et al., 2009).

Table 2 displays these individual cancer profiles. Colon cancer was determined to be the first or second most prevalent form of cancer within the three targeted tribal communities, and it was more prevalent in these three communities than in other areas of the state, accounting for approximately 15% of all cancer cases in the three tribes.

Table 1. Participating Organizations and Their Primary Role in the Project

Organization	Role	Activities
Inter-Tribal Council of Michigan (ITCM)	Administer the Tribal Colon Cancer Collaborative Project	• Serve as fiduciary; provide sub-contracts to Tribes A, B, and C • Provide and facilitate technical assistance and training for tribes • Lead and facilitate the learning collaborative • Provide training on evidence-based interventions • Coordinate patient navigation training with the University of Colorado
Tribes A, B, and C	Implement project activities and services within respective tribes, considering local culture, community needs, and resources	• Assign staff to participate in the learning collaborative • Provide input to ITCM and MPHI on project goals, objectives, evaluation measures, and adaptation and use of evidence-based interventions • Recruit training participants • Implement health activities within respective tribes; • Submit quarterly progress reports and measures
Michigan Public Health Institute (MPHI)	Design and conduct project evaluation	• Create evaluation tools and measures • Provide training on evaluation • Gather input from tribal coordinators • Provide technical assistance to support the learning collaborative and QI activities

Table 2. Most Commonly Diagnosed Cancers by Tribal Community According to the 2012 Michigan State Cancer Registry

Tribe A		Tribe B		Tribe C	
Breast	19.9%	Colon	17.2%	Lung	14.0%
Colon	18.7%	Breast	11.1%	Colon	7.0%
Prostate	12.7%	Prostate	9.8%	Brain	3.3%
Cervical	9.6%	Lung	8.6%	Non-Hodgkin's Lymphoma	3.3%
Lung	7.8%	Thyroid	7.4%	Liver	2.9%
Other	31.3%	Other	45.9%	Other	69.5%

Note. Other cancers included bladder, kidney, lymphocytic leukemia, multiple myeloma, myeloid leukemia, other gastrointestinal tract, lip, oral and pharynx, other genital, other central nervous system, other respiratory, and refractory anemia.

Participants

A local tribal coordinator for each tribe was responsible for administering the local interventions, participating in trainings and meetings, and submitting quarterly progress reports to the ITCM project director and evaluators.

Tribe A

This tribe was established in 1864 and has an enrolled membership of 2,757 residents. The tribal clinic serves a patient population of 3,680 residents, 692 of whom are 50 years of age or older and thus were recommended for colon cancer screening. As shown in Table 2, 2012 colon cancer had an incidence rate of 18.7% in Tribe A, just behind the incidence rate for breast cancer (19.9%). Tribe A's primary county has a poverty rate of 27.3%. Additionally, 8% of adults age 25 years and older are without a high school education or equivalent, whereas 29.4% have a bachelor's degree or higher (U.S. Census Bureau, 2010). The tribal health clinic provides direct medical care, preventative medicine, and community health services to residents.

Tribe B

This tribe was established in 1860 and has a total tribal enrollment of 2,067 residents. The tribal clinic serves a patient population of 3,300 residents, 1,302 of whom are 50 years of age or older. Tribe B's clinic is a federally qualified health center and thus receives funds from the Health Resources and Services Administration to provide primary care services to underserved populations. As shown in Table 2, in 2012 the incidence rate for colon cancer in Tribe B was 17.2%, the highest rate across all the cancer types. Tribe B's primary county has a poverty rate of 17%. Additionally, 11% of adults age 25 years and older are without a high school education or equivalent, whereas 20.7% have a bachelor's degree or higher (U.S. Census, 2010).

Tribe C

This tribe was established in 1994 and has a total enrollment of 4,526 residents. The tribal clinic serves a patient population of 2,914 residents, 427 of whom are 50 years of age or older. As shown in Table 2, in 2012 the incidence rate for colon cancer in Tribe C was 7.0%, behind the incidence rate for lung cancer (14.0%). Tribe C's primary county has a poverty rate of 10.7%, with 6% of those age 25 years and older without a high school education or equivalent and 32.9% reporting a bachelor's degree or higher (U.S. Census, 2010).

Providers Who Received Training

Seven providers from all three tribes participated in trainings and program implementation. They primarily identified as AI and included lay health workers, registered nurses, and paraprofessionals with health-related degrees or certifications.

Project Implementation Process

The ITCM's project proposal was funded by the Office of Minority Health within the U.S. Department of Health and Human Services as part of the State Partnership Initiative to Address Health Disparities. Under the CBPR framework, the ITCM provided subcontracts to each of the three tribes to support staff time for local tribal coordinators and necessary expenses associated with project participation.

Logic Model

As shown in Figure 1, a logic model illustrates the Project's inputs, activities, outputs, and corresponding outcomes. This model was developed by the ITCM project director and the lead evaluator from the Michigan Public Health Institute (MPHI) based on a review of relevant research, interviews with tribal organizations that had experience with implementing colon cancer screening programs, and collaborative input from tribal health directors and clinic staff from each of the three tribes in the Project.

Four Key Components

The Project consisted of four key components informed by the literature and overarching goal of the project: (a) a learning collaborative, (b) patient navigation services, (c) QI processes, and (d) colon cancer screening.

Component 1: learning collaborative. A key principle of CBPR is to foster colearning and capacity building (Ahmed et al., 2016). The learning collaborative supports this principle and aligns with recommended QI processes. The Institute for Healthcare Improvement (IHI) was founded in 1991 as part of the National Demonstration Project on Quality Improvement in Health Care to apply QI processes in health care settings. In 1995, the IHI began using a learning collaborative model to improve health care delivery in multiple service settings (e.g., hospitals, community clinics, federally qualified health centers). The learning collaborative creates a structure in which organizations working toward similar goals can learn from each other and from experts in the

Figure 1. Logic Model for the Tribal Colon Cancer Collaborative Project

Inputs/ resources	Activities	Outputs	Outcomes		
			Short-term	Intermediate	Long-term
Funding from U.S. Department of Health and Human Services Office of Minority Health

Tribal health clinic managers and staff (three sites)

Inter-Tribal Council of Michigan (ITCM)

Health Education and Chronic Disease Department staff

Michigan cancer registry to conduct linkages with tribes

Michigan Public Health Institute

University of Colorado School of Public Health Colon Cancer patient navigator training | Formalize the learning collaborative linking ITCM and all three tribes/staff

Conduct quarterly meetings/ webinars and annual face-to-face trainings; provide mutual support and shared learning

Review current screening guidelines

Implement evidence-based interventions

Create and disseminate health disparity profiles on colon cancer for each of the three tribal sites using data from cancer linkages

Conduct training on quality improvement with tribal coordinators and staff

Conduct patient navigation training with tribal coordinators and staff | Number of signed subcontracts with tribes

Number of tribes/ staff who participated in the collaborative meetings and trainings

Number of disparity profiles created

Number of dissemination outlets (e.g., social media, health fairs, community events)

Number of tribal coordinators and staff trained in QI processes

Number of tribal coordinators and staff trained in patient navigation | Increased knowledge and use of evidence-based interventions among tribal coordinators, including small media and client reminders

Increased knowledge and awareness among tribal community members of the need for colon cancer screening

Increased knowledge and skills among tribal coordinators to conduct QI projects aimed to increase colon cancer screening

Increased knowledge and skills among tribal coordinators to implement patient navigation services | Increased demand for screening among tribal community members

Increased use of QI processes to increase colon cancer screening and patient satisfaction; streamlined screening processes

Increased use of patient navigation services, increased patient satisfaction, and reduced no-show rates

Increased colon cancer screening rates | Decreased prevalence of colon cancer among targeted AI communities |

field by discussing lessons learned and effective strategies for addressing common goals.

In the first year of the project, ITCM formed a learning collaborative among the three tribes. The group's leader, the ITCM project director, held quarterly conference calls and webinars with local tribal coordinators to facilitate peer-to-peer learning in the form of sharing program updates, establishing QI projects, and implementing patient navigation services to increase colon cancer screening rates within the respective tribal clinics. Technical assistance was provided by the Michigan Public Health Institute, a contractor with expertise in QI strategies.

Component 2: patient navigation. The ITCM collaborated with the University of Colorado School of Public Health and the Colorado Colon Cancer Screening Program to conduct a 3-day in-person training specific to colon cancer navigation. The training aimed to increase capacity among tribal coordinators and local tribal health staff to implement navigation services within their respective clinics. The training covered (a) assessing patients' risk for colon cancer, (b) screening modalities (including fecal occult blood tests, colonoscopies, and sigmoidoscopies), (c) the process of screening navigation (from identifying those in need of screening to patient outreach, reminders, and health education), (d) educating patients on preparation for a colonoscopy, (e) interpreting and communicating patient colonoscopy results, (f) client communication strategies, (g) assessing patients' readiness to change, (h) motivational interviewing skills, and (i) tailoring health messages to patient needs (e.g., education level).

Local patient navigation services were led by the tribal coordinators and supported by clinic and community health staff who identified and flagged the charts of patients due or overdue for colon cancer screenings. The tribal coordinators sent patient reminder letters and made patient phone calls encouraging them to schedule their appointments. The letters and phone calls included information on colon cancer and the benefits of screening. Clinic staff used motivational interviewing skills (Wahab et al., 2008) as they provided education on colon cancer during health fairs and community events. Ongoing technical assistance and support was provided during learning collaborative meetings.

The Community Preventive Services Task Force was established by the U.S. Department of Health and Human Services to identify scientifically proven population health interventions and make recommendations to public health organizations. The resulting resource is called The Community Guide (Community Preventive Services Task Force, 2019). The recommendations for increasing colon cancer screening rates include deploying client and provider reminders for appointments, reaching patients via small media (e.g., short videos, brochures, and letters), reducing structural barriers to accessing health services, and using provider performance assessments and feedback. The Community Guide was presented to local tribal coordinators during learning collaborative meetings.

Component 3: QI. The ITCM collaborated with staff from the Center for Healthy Communities at the MPHI to hold a 2-day in-person training on QI processes for tribal coordinators and health staff. The training aimed to increase capacity among tribal coordinators and health staff to implement QI processes designed to increase colon cancer screening rates and improve the coordination and quality of care. The training focused on the Plan-Do-Study-Act framework as recommended by the IHI (2019).

The core of each QI team consisted of a tribal coordinator, nurses, a community health educator, and a health information technology specialist. Tribes completed one-page QI story boards that listed the team members, problem and aim statements, a diagram of the current approach, potential reasons for low screening rates, potential solutions to test, results of the test, and whether the staff institutionalized the process or elected to develop a new improvement theory to test. Story boards were displayed in the tribal clinic to inform additional health staff and patients about the Project.

Component 4: colon cancer screening rates. Each local tribal coordinator reported their quarterly colon cancer screening rates via a Microsoft Excel–based dashboard report. Screening rates were pulled from the tribal clinic Resource and Patient Management Systems electronic health record (EHR) system using iCare, a supplemental software program. The dashboard report included the number of patients aged 50 to 75 years who were eligible for colon cancer screening and the total number screened within the reporting time frame. These data were also broken down into the percentages of patients who completed a colonoscopy or fecal occult blood test.

Tribal coordinators implemented evidence-based interventions, QI projects, and patient navigation services aimed at increasing screening rates. Use of these interventions was reported to MPHI and the ITCM project director via quarterly reports. The ITCM project director reviewed the reports and used the information to select topics for the quarterly learning collaborative webinars and to guide additional training during annual face-to-face meetings.

Evaluation

The primary purpose of collecting evaluation data was to assess the Program against its own goals and to use the findings to inform program improvement and protect and promote the health of participants. Data were collected from health providers (including tribal coordinators) in the three tribal communities to assess their health-related knowledge and skills. These internal assessments were administered to participants in person using paper and pencil following the QI and patient navigator training sessions.

Data Collected

A monthly progress report form was designed in REDCap to record activities completed by the three local tribal coordinators, including the use of evidence-based interventions, and to keep track of patient navigation services. QI projects were reported verbally during learning collaborative calls and meetings and documented via the story boards. The story boards were submitted as they were completed.

The three tribal coordinators used the data dashboard to report colon cancer screening data from their EHR systems for patients within their tribes. According to Government Performance and Results Act guidelines, colorectal cancer screening is defined in terms of adult active clinic patients who have undergone (a) a fecal occult blood test or fecal immunochemical test during the report period, (b) a flexible sigmoidoscopy in the past 5 years, or (c) a colonoscopy in the past 10 years. Baseline, quarterly, and annual screening rates were tracked by each tribal coordinator and reported to ITCM and MPHI evaluators over the 5-year Project period.

Posttraining evaluation survey data were also collected from tribal coordinators and health staff from all three tribes who participated in the patient navigation trainings ($n = 7$) and QI training ($n = 12$). The surveys assessed how helpful the training was to them, whether they planned to implement the new knowledge and skills covered in the training, and their overall satisfaction with the training.

In Year 5 of the program, the ITCM facilitated a data linkage between Tribe B and the Michigan Cancer Surveillance Program. Link Plus software was used to link the tribal enrollment roster to the Michigan Cancer Surveillance Program to assess the incidence and stage of diagnosis for all cancers, including colon cancer, compared to baseline measures in Year 1.

Accomplished Goals

The overarching goal of the Project was to reduce the incidence of colon cancer among three federally recognized tribes with disproportionately high rates of colon cancer. Consistent with CBPR principles (Simonds et al., 2013), the Project consisted of trainings to build local capacity among tribal staff to use a comprehensive set of interventions, including patient navigation services and QI processes, with the goal of increasing colon cancer screening rates.

Three tribes participated in the learning collaborative and the patient navigation and QI trainings; however, Tribes A and C experienced challenges related to changing their EHR systems and retaining staff, which interfered with reporting. Tribe B was able to adhere to reporting and has produced successful outcomes related to the use of evidence-based interventions, colon cancer screening rates, incidence rates, and stage of diagnosis.

The three local tribal coordinators generated monthly progress report forms to record their use of evidence-based activities. These data were collected from Years 2 through 4 (for 36 months). Data from Tribe B are presented in Figure 2.

The most common intervention was provider reminders, followed by client reminders. Provider reminder systems alert providers when a patient is due for screening. Client reminder systems identify patients who are due or overdue for screening and encourage them via phone calls, emails, or letters to schedule screening appointments (Community Preventive Services Task Force, 2019). Such client reminders are a component of patient navigation services. Additional patient navigation services are also documented, including assisting patients with scheduling appointments, reminding patients about appointments, educating patients on colonoscopy preparation, and interpreting test results to patients.

Figure 2. Frequency with which Evidence-Based Activities Were Implemented in Tribe B During Years 2–4.
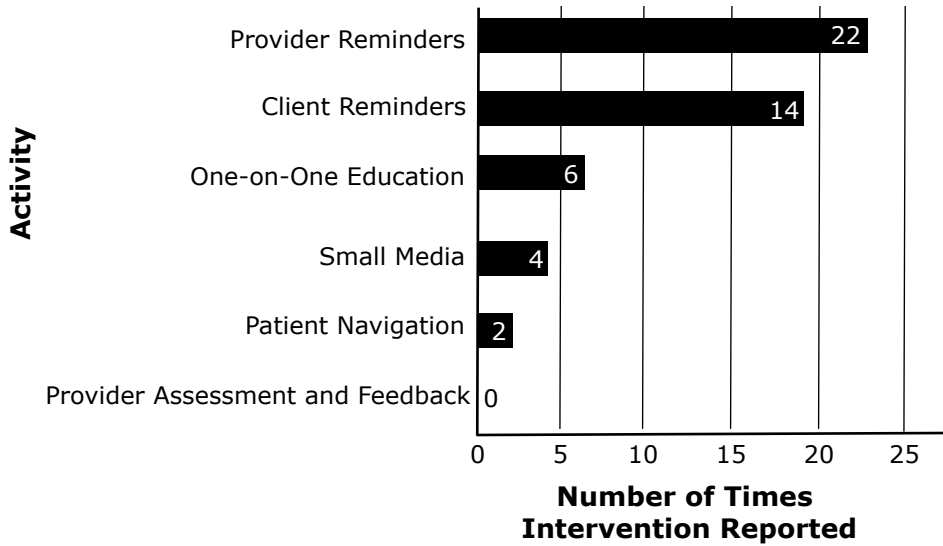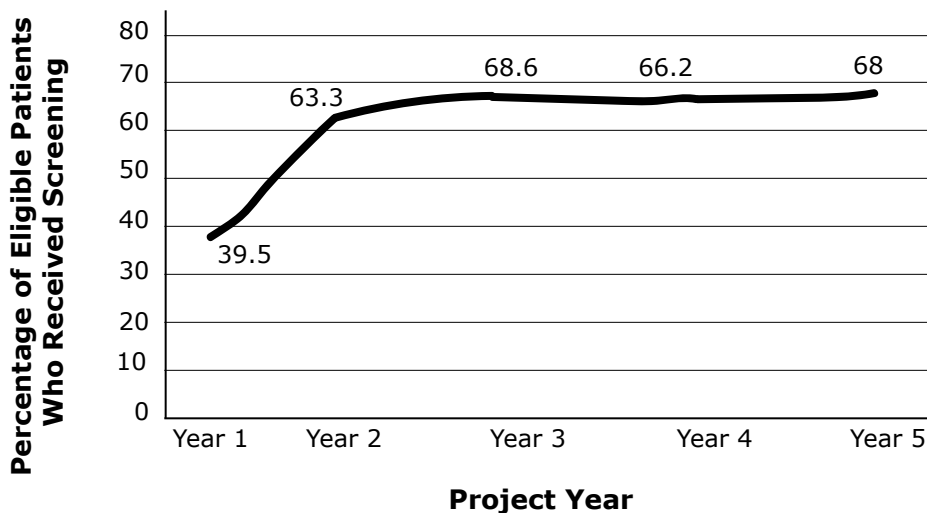

**Figure 3.** Colonoscopy Screening Rates for Tribe B (Years 1-5).

In terms of QI, Tribe B completed two Plan-Do-Study-Act cycles early in the Project to address patients' fears associated with colon cancer screening. During the first cycle, the QI team sent 40 educational letters to patients who were due or overdue for screening. The letters included a $25 incentive that aimed to reduce structural barriers to care, such as the cost of transportation to obtain screening. Of the 40 patients, 12.5% ($n = 5$) responded with a request for colon cancer screening, of whom 40% ($n = 2$) completed screening within the 3-month testing timeframe. The second cycle focused on delivering educational letters to patients to address screening-related questions and concerns. These letters described screening options available (e.g., colonoscopy, fecal occult blood testing) and included a prepaid, stamped, and addressed response card allowing the patient to request a follow-up appointment or simply ask for more information. Out of the 61 patients who received letters, 19.7% ($n = 12$) responded to schedule screenings, which increased their screening rate by 2.6% within a 3-month period.

Screening Rates

As shown in Figure 3, colonoscopy screening rates for Tribe B increased from 39.5% at Year 1

Figure 4. Comparison of Percentage of Patients Diagnosed with Colon Cancer by Stage of Diagnosis and Year.
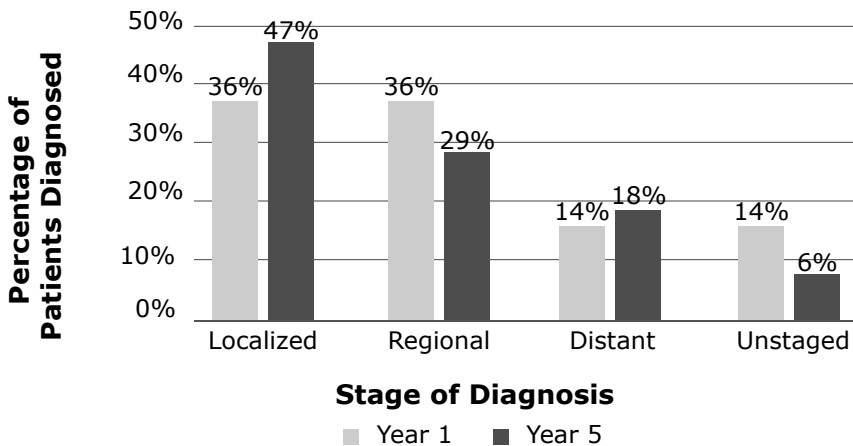
to 68.0% at the beginning of Year 5. The screening rate rose steadily from Years 1 to 3 before slightly dipping in Year 4 and then increasing again in Year 5. Slight increases in the number of patients receiving fecal occult blood tests or fecal immunochemical tests also occurred, with the percentage rising from a baseline of 1.8% to 3.1% early in Year 5.

Incidence Rates and Stage of Diagnosis

During Year 1, at baseline, the incidence rate for colon cancer was 17.2% in Tribe B. By Year 5, the incidence rate for colon cancer rose to 21.2%. The increase corresponds with increased screening rates. Cancer incidence is predicted to increase when cancer screening increases (Marcus 2019). There were also improvements in the stage at which new cases of colon cancer were diagnosed. As shown in Figure 4, during Year 1, 36% of cases were diagnosed at the localized stage. This value rose to 47% early in Year 5. This improved stage of diagnosis was higher than the state average (i.e., 36% of all colon cancer in the state of Michigan was diagnosed at the localized stage; MDHHS, 2017).

As more cases were diagnosed at the localized stage, fewer cases were diagnosed at the regional stage; 36% of cases were diagnosed at the regional stage in Year 1 as compared to 29% of cases in Year 5. In Year 1, 14% percent of cases were diagnosed at the distant stage, a figure that increased slightly to 18% in Year 5. The percentage of unstaged diagnoses fell from 14% in Year 1 to just 6% in Year

5. The 5-year relative colon cancer survival rate for diagnosis at the localized stage is 90% as compared to 71% at the regional stage and 14% at the distant stage (ACS, 2019). Given this improvement in the percentage of early-stage diagnoses, we can reasonably expect a decrease in long-term mortality rates due to colon cancer within Tribe B. However, this hypothesis needs to be tested in future research. At this time, the tribal population is too small to calculate a mortality rate specifically due to colon cancer.

Health Provider Training

In general, postevaluation survey findings from the patient navigation training were favorable and support the use of didactic patient navigation training curricula and facilitators provided by the University of Colorado School of Public Health's Colon Cancer Screening Program. Overall, training participants reported moderate to high levels of learning, skill development, and satisfaction with the training. In addition, participants reported their intentions to implement their new knowledge and skills within their current practice (ITCM, 2019). Examples included patient communication skills, ways of assessing a patient's readiness to change, and motivational patient interviewing skills (ITCM, 2019). These findings suggest that patient navigation services may have strengthened capacity among tribal health providers and staff to improve colon cancer screening rates among their patients.

Similarly, survey findings from the QI training demonstrated average to high improvements in knowledge and skills among training participants, including their ability to develop a process map and understand the basic principles of QI (ITCM, 2019). Scores increased on Day 2 of the training, suggesting that the knowledge and skills taught on Day 2 effectively built upon the previous day's training and may have contributed to overall satisfaction with the full training (ITCM, 2019).

Lessons Learned and Implications

We applied a set of evidence-based interventions identified by the literature as effective at increasing colon cancer screening rates among AI populations. The set of multiple interventions was intended to yield a high impact in a relatively short amount of time—that is, in less than 5 years among three tribes experiencing higher rates of colon cancer compared to other tribes in the same state. Retrospectively, we have identified several key lessons learned that we hope will be useful in informing future work with tribes seeking to increase cancer screening rates.

Lesson 1

Use of the learning collaborative model combined with training in patient navigation and QI methods provided needed support to local tribal coordinators and health staff as they implemented new knowledge and skills. In past projects, the ITCM had seen little change in practice following individual training sessions. However, when training sessions were combined within a learning collaborative framework, training participants appeared to better apply what they had learned. The learning collaborative framework provided ongoing technical assistance as well as peer support as participants applied techniques and processes from the training into their daily practice. Use of these new skills can lead to improvements in health systems processes, as evidenced by the consistent reported use of newly adopted evidence-based interventions, including patient navigation and QI processes.

Lesson 2

Evidence-based interventions can be used effectively by the AI community when implemented by local tribal coordinators and health staff. All three tribes reported use of evidence-based interventions, suggesting that these specific interventions are applicable to tribal health clinics. Given the reported use of these approaches and

techniques along with the increased screening rates, reduced incidence rates, and improved stage of diagnoses observed among Tribe B, we think that these interventions may have influenced the positive outcomes to some degree.

Lesson 3

The ever-changing use of technology can be a significant challenge to tracking progress in public health programs and clinical services. While all three tribes included in the Project benefited from the provided training, two tribes were unable to document or report their screening rates— rates that may have in fact improved because of their use of evidence-based interventions, patient navigation services, and QI processes. Documentation challenges can pose barriers to health-systems change such as revised protocols and policies to support improvements in patient outcomes. The authors recommend assessing the quality of EHR data and the likelihood of any system changes before implementing a similar project with another group.

Lesson 4

CBPR approaches are effective for the AI community. Consistent with the literature on the use of CBPR approaches with the AI community, the Project successfully built capacity, a key principle of CBPR (Fletcher et al., 2014; National Institute on Minority Health and Health Disparities, 2020). The successful application of CBPR principles allowed local tribal coordinators to own their work and apply their new knowledge and skills from trainings in their unique clinics and population settings as they deemed appropriate. Tribal coordinators led QI teams, chose which interventions to test, assessed their results, and independently decided to either institutionalize the interventions or choose a new theory. The tribal coordinators also adapted their chosen evidence-based interventions based on local capacity and resources. Thus the types of evidence-based interventions used varied across the three tribes. This Project was not a one-size-fits-all approach and instead allowed for tailoring of activities to meet the needs of each tribal clinic and population.

Limitations

The Project was conducted with a small group of tribal communities who operate tribal health clinics in rural areas. Challenges experienced by two of the three tribes limited their ability to provide accurate and consistent reports, therefore

the outcomes are reflective of only one of the three tribes. Thus, these findings are not generalizable to other populations. Future public health programs or formal research studies should be conducted with larger samples and in other geographical settings. Care should be taken to ensure adequate staffing plans and consistent use of one EHR or similar system over the course of the project to allow for reliable reporting and tracking of outcomes.

There were also limitations associated with how the data were collected. The evaluation measures used were developed for the Project specifically and thus may have questionable validity. Data from program evaluation measures were also not collected in a manner that permitted between-tribe or within-person comparisons.

The Project would have also benefited from qualitative data in the form of interviews or focus groups with tribal coordinators. These data would have helped to enrich understanding of providers' experiences with the Project, including what they liked about it and potential areas for improvement.

Conclusions

The purpose of the Project was to reduce colon cancer among three tribal communities in Michigan with the highest rates of colon cancer. The Project was grounded in CBPR principles and used a learning collaborative model to provide training, ongoing technical assistance, and mutual support to local tribal coordinators as they implemented evidence-based interventions, including patient navigation services and QI processes, aimed at increasing colon cancer screening rates.

In Tribe B, patient navigation services (e.g., identifying those in need of screening, providing patient education, and scheduling appointments) were implemented by existing staff, which led to changes in duties across multiple staff positions. These sustainable changes within the tribal clinic health system seemed to support improved services. This approach was likely more viable than using grant funds to hire a designated patient navigator, whose position would likely have been lost with the end of the grant. Patient navigation services within AI communities have been shown to improve community members' knowledge of cancer and screening behaviors (Krebs et al., 2013). This finding is consistent with the increased screening rates seen in Tribe B.

With regard to QI, Florea et al. (2016) reported an increase in screening, either fecal occult blood tests/fecal immunochemical tests or colonoscopy, of 6.3% to 6.9% when multilevel interventions were applied under the Plan-Do-Study-Act framework in a predominantly White/European American population. In this Project, staff applied QI strategies within the IHS Purchase/Referred Care system, which refers tribal clinic patients to outside colonoscopy screening facilities. Preliminary findings suggest that QI is effective for self-managed tribal health systems at increasing colonoscopy screening rates.

The Project included the measure of stage of diagnosis, which largely seems to be missing from the literature on colon cancer and individual tribal populations. Linking individual tribal data to the state cancer registry should be highlighted as an effective evaluation and surveillance method for future projects. The increase in cancer incidence rate and improved earlier stage of diagnosis are consistent with recent research with non-Hispanic White populations. Levin et al. (2018) reported an initial increase in colon cancer diagnosis incidence rates following the implementation of a community-based colon cancer screening program among a predominantly non-Hispanic White population and suggested that the increase was due to a greater detection of early-stage cancers. Levin et al. (2018) also found that colon cancer incidence rates dropped over the course of the program; therefore, in the context of the Project, it would be beneficial to continue to monitor colon cancer incidence rates for Tribe B.

In Tribe B, the stage of colon cancer diagnosis improved from Years 1 to 5; a higher percentage of colon cancer came to be diagnosed in the localized stage, which is easier to treat than later-stage illnesses. Earlier-stage diagnoses may improve patients' quality of life and help to curb health care–related costs associated with later-stage diagnoses (Loud & Murphy, 2017). Future research with AI communities should examine the health care–related savings associated with earlier-stage diagnoses.

Challenges related to health information technology design and its usability by clinicians are well-documented in the literature. For example, Carayon and Hoonakker (2019) cited the need for health information technology design to better align with human factors and the processes that health providers use when treating patients in order to improve patient care without overburdening clinicians. This misalignment can result in high rates of user errors, which in turn affect data accuracy and, ultimately, quality of care. Tribes A and C experienced similar challenges related to

health information technology, specifically with EHR systems.

Tribe A recently underwent a full transition to a new EHR system and is beginning to make progress with accurate data on cancer screening rates, including colon cancer screening rates. Tribe C has also made great progress to improve data quality within the EHR that is commonly used by the IHS Resource and Patient Management System and iCare software application.

ITCM collaborates with Health Solutions I.Q., an organization with expertise in the use of RPMS and iCare. to hold weekly "office hours" to virtually deliver technical assistance and support to tribal health information managers and clinical staff. Consistent and ongoing training is addressing the health information technology capacity needs of Tribes A and C. The ITCM recently received additional funding to support Tribes A and C in their continued efforts to improve colon cancer screening and expects to see similar results to Tribe B in due time.

The role of the university partner on this project was somewhat unique. Flicker and Nixon (2018) discuss the role of community-engaged researchers in manuscript development, especially with underserved communities who may not see significance in manuscript writing or are intimidated by the process. In American Indian culture, humility is valued in tribes and respected among tribal leaders (Freeman et al., 2019; Kading et al., 2019). Thus, tribal staff and project directors may be hesitant to showcase their work. Flicker and Nixon (2018) further describe the role that researchers can play in empowering tribal members to appropriately share their voices via scholarly manuscripts and, in so doing, add to the body of research necessary to address health disparities.

The Tribal Colon Cancer Collaborative partnered with a Michigan State University–based researcher to assist in writing this manuscript. The role of the researcher was to mentor the project director, who obtained input from the local tribal coordinators as coauthors. The researcher provided guidance for writing each section of the manuscript and reviewed drafts with suggested edits and probing questions for the authors to consider. This process strengthened the article and helped to convey the depth of the work that was accomplished by the project team. With the authentic engagement of the Michigan State University researcher, the tribal staff were able to tell their story and share their perspectives within a scholarly framework suitable for publication.

The role of the university research partner is significant, especially when considering the American Indian population. American Indians have suffered a long history of research misconduct (Chadwick et al., 2019), and this experience can contribute to community members' hesitation to engage with researchers. Thus, it may be helpful for researchers to consider supporting roles, such as involvement in manuscript development, to address health disparities and build trust among the tribal community when possible.

The authors intend for this paper to inform efforts to address colon and other forms of cancer experienced by the AI population. Findings from the Project are promising and suggest that the combined use of evidence-based services, including patient navigation and QI processes within a learning collaborative framework, may help to improve colon cancer detection and diagnosis within a relatively short timeframe.

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