



Original Research

A systems perspective on rural and remote colorectal cancer screening access



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ABSTRACT

Introduction: Disparities in colorectal cancer outcomes and screening rates exist between rural and urban populations as well as indigenous and non-indigenous patients. While screening access is a strategic health priority, various health system complexities impede screening access. Understanding the health system complexities is a necessary first step for system transformation to enable increased screening access to improve cancer outcomes. **Methods:** Semi-structured interviews with health care providers (N = 29) involved in colorectal cancer screening were performed from September to December 2015. A framework integrating Collaborative Information Behaviour (CIB) and Continuity of Care (COC) was designed to conceptualize and understand health system complexity within colorectal cancer screening in order to inform screening access solutions.

Results: Eighteen different models of colorectal screening access were identified after which access problems were identified and characterized as high or low complexity. We also identified a set of contextual factors that influence complexity.

Conclusions: Colorectal cancer screening in remote regions is a complex health systems problem. It is important to distinguish high and low complexity issues as they require different approaches to solving the issues. Contextual factors such as social determinants of health and locum based practice must also be considered. Ultimately, solutions for colorectal cancer screening access in sociocultural diverse remote regions will require a balance between high and low system complexity.

1. Introduction

Disparities in colorectal cancer outcomes and screening rates exist between rural and urban populations as well as indigenous and non-indigenous patients around the world, including the US and Canada [1–6]. Multiple contextual and sociocultural barriers to screening have been identified, calling for the development of more culturally responsive health systems [1,2,5,7–12]. The Northwest Territories (NWT) is a rural and remote region of Canada with a population of approximately 45,000 people spread across 33 communities within a geographic area of 1.6 million square kilometers [13]. The current NWT colorectal cancer screening guidelines recommend annual Fecal Immunochemical Test (FIT) screening for average risk patients between the ages of 50–74, with follow up colonoscopy for positive results, and colonoscopy screening for individuals at increased risk for colorectal cancer on the basis of family history, a known genetic syndrome, or a history of inflammatory bowel disease [14]. Despite the guidelines,

NWT has a higher incidence of colorectal cancer and lower screening rates compared to the rest of Canada. [13,15]. Colorectal cancer is the most common cancer diagnosis in small communities. While screening access has been identified as a strategic health care priority, complexity and contextual issues often impede screening access [16].

While we need better screening to improve cancer outcomes [17], healthcare systems are recognized as complex adaptive systems (CAS) with many components and interrelationships between them, making it difficult to achieve change [18–21]. While colorectal cancer screening access among marginalized populations is a prime example of a CAS leading to inequitable health care access and poor patient outcomes, the actual mechanisms of CAS induced health inequities are poorly understood [7,8]. Health system modelling is a crucial first step in understanding and subsequently managing complex health system problems such as screening access [19,20].

Understanding health system complexity in contextual and socio-cultural diverse settings such as the NWT can support health system

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transformation to enable increased screening access and improve cancer outcomes. This paper addresses that need by conceptualizing the health system complexity of colorectal cancer screening needed to inform health system transformation to improve screening access. We describe low and high complexity screening issues as well as contextual factors that influence them. We then discuss implications of the findings on colorectal cancer screening in sociocultural diverse settings.

2. Methods

Semi structured interviews with health care providers involved in colorectal cancer screening across the NWT (N = 29) were undertaken from September to December 2015. Participants included primary care providers (Family Physicians, Nurse Practitioners, Community Health Nurses), endoscopists (General Surgeons, Gastroenterologists, Family Physicians with Enhanced Surgical Skills), and endoscopy scheduling providers. Interview content was guided by a conceptual framework informed by Collaborative Information Behaviour (CIB) to conceptualize multidisciplinary health care processes and Haggarty's Continuity of Care (COC) framework to conceptualize access to care over time [22,23].

A subset of interview transcripts (N = 21) encompassing all health care provider groups within four of the eight NWT health authorities were selected for in-depth qualitative analysis as a representative sample of colorectal cancer screening access across the NWT. Qualitative content analysis of transcripts directed by the CIB-COC framework was conducted by the research team through a combination of independent coding by team members (CC, CK, GGA) and consensus team meetings [24,25]. Coded interview transcripts were analyzed and used to develop system models to identify screening access problems. Findings were reviewed and validated by study participants and health system stakeholders through a combination of review documents and community presentations. IRB approval was obtained prior to commencing the study.

3. Results

3.1. Health system overview of colorectal cancer screening access

System models of colorectal cancer screening access in the NWT demonstrated a highly complex system with a large number of health system components and interrelationships between them. Fig. 1 shows an overall model of the colorectal cancer screening health system with the objective of moving the population status from unscreened to screened. The system models consist of components and interrelationships grouped into patient interactions and information processes to support patient interactions, within sequential primary care and hospital care processes comprising Fecal Immunochemical Test (FIT) screening and colonoscopy screening.

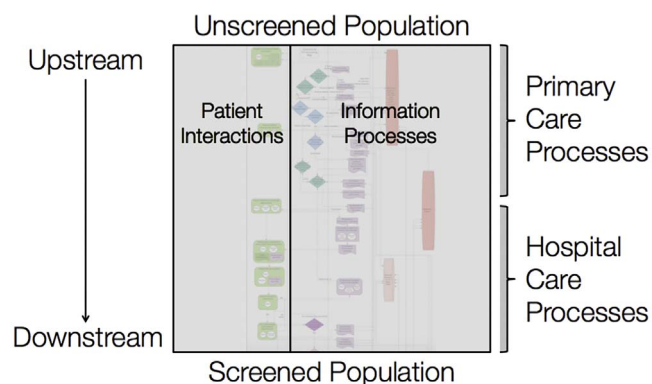


Fig. 1. Health system overview of colorectal cancer screening access.

Our integrated CIB-COC framework was used to conceptualize sequential patient interactions and information processes within the system models to identify upstream and downstream interrelationships within colorectal cancer screening access. For example, in describing health system interrelationships within screening access, study participants described several information behaviours where they accessed, applied, and generated health information during screening to enable patient interactions over time.

Certain information processes and documents were essential for facilitating screening access over time across the health system interrelationships. For example, colonoscopy referral forms generated by primary care providers and colonoscopy follow-up documentation generated by endoscopy providers were identified as critical information links between primary care and hospital care processes.

3.2. Colorectal screening access problems

Using the overall model from Fig. 1 as a starting point, eighteen different models of access patterns of FIT and colonoscopy screening were identified. Common to all systems models was varying degrees of complexity due to health system interrelationships caused by several factors including the availability of health care services, varying provider practices and information resources, and influence of contextual factors. From our analysis, we classified screening access problems as having high or low system complexity.

High complexity screening access problems are poorly defined and have several opportunities for system failure due to multiple information behaviour and patient interaction interrelationships that may evolve over time. In contrast, low complexity screening access problems are well defined but with implementation issues leading to screening disruptions.

3.3. High system complexity screening access problems

High complexity screening access problems included highly complex scheduling, colonoscopy capacity and no-shows, inappropriate or limited FIT initiation, and multiple disconnected patient charts. Colonoscopy scheduling was identified as a highly complex access problem requiring integration of multiple system interrelationships by endoscopy scheduling providers. Patients in smaller communities experienced more complex colonoscopy screening access due to the need for coordination of travel on behalf of the endoscopist or patient, compared to larger communities with local colonoscopy services where travel on behalf of patients or endoscopists was not required. Complexity of colonoscopy access was found to be highest in models where the patient was required to travel on two separate occasions, first for the for initial consultation, and then again for the colonoscopy procedure.

In communities without local endoscopy services, complexity of screening access was lower when endoscopists travelled to provide full outreach services including both consultation and colonoscopy services. Partial outreach services where endoscopists provided community-based consultation services, but patient travel was required for colonoscopy were more complex than in access models where patients leave their community to receive consultation and colonoscopy services within the same visit.

Limited or inappropriate FIT initiation were other factors leading to high complexity. Table 1 quote 1 describes inappropriate FIT screening being initiated for patients who are not eligible or who present with concerning symptoms that should go directly to colonoscopy. Inappropriate FIT screening generates additional information and patient interactions contributing to care delays or requiring unnecessary additional follow up such as colonoscopy. Interestingly, complexity of FIT screening access was reduced in smaller communities, as patients obtained and returned the FIT kit directly through their primary care provider, compared to larger communities where patients were often

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