



# Surgical Task-Sharing in the Western Canadian Arctic: A Networked Model Between Family Physicians with Enhanced Surgical Skills and Specialist Surgeons

Ryan Falk<sup>1,2</sup> · Dawnelle Topstad<sup>3</sup> · Laura Lee<sup>1,4</sup>

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## Abstract

**Background** With the loss of generalism in the surgical specialties, there has been a move in Canada to train family physicians in enhanced surgical skills (FP-ESS) to address the surgical needs of rural and remote populations. This research project sought to describe one network integrating FP-ESS and specialist surgeons, focusing on the role of FP-ESS and their relationship with specialist surgeons, in the surgical care of the Beaufort Delta Region of the Northwest Territories of Canada.

**Methods** Using a participatory approach, semi-structured interviews were conducted with 22 stakeholders within the surgical system. Interviews were transcribed and reviewed, then imported into NVivo 12 for analysis. First-level coding was performed based on both deductive and inductive reasoning in an iterative fashion during interview collection to develop and refine the codebook. This was followed by second-level categorizing.

**Results** The FP-ESS physicians provide cesarean section services to maintain a local obstetrics program, to provide gastrointestinal endoscopy, and to provide emergency on-call support, as described by one stakeholder. FP-ESS work together with specialist surgeons through an informal network keeping surgical care as close to home as possible. FP-ESS within this health regions were seen as “a really big gain to the system.”

**Conclusions** This study deepens our understanding of rural surgical service delivery, in particular where FP-ESS and specialist surgeons function collaboratively. It also contributes to strengthening rural surgical systems in Canada and therefore to addressing the health gap between rural/remote/indigenous and urban populations.

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✉ Ryan Falk  
rgfalk@gmail.com

<sup>1</sup> Branch for International Surgical Care, UBC Branch for International Surgical Care, Vancouver General Hospital, University of British Columbia, 2775 Laurel St, Vancouver, BC V5Z 1M9, Canada

<sup>2</sup> Department of Family Medicine, UBC Branch for International Surgical Care, Vancouver General Hospital, University of British Columbia, 2775 Laurel St, Vancouver, BC V5Z 1M9, Canada

<sup>3</sup> Department of Surgery and Family Medicine, University of Calgary, PO Box 68243, Crowfoot, Calgary, AB T3G 3N8, Canada

<sup>4</sup> Research and Innovation, The Institute for International Child Rights and Development, PO Box 35039, Hillside, Victoria, BC V8T 5G2, Canada

## Introduction

While the rise of “global surgery” has led to an increased awareness of surgical conditions as an underfunded public health priority in low–middle-income countries, it also draws attention to inequities in care for rural and remote regions within high-income countries [1]. In Canada, changes in the health care system over the past few decades have led to the attrition of many of these rural surgical programs [2, 3]; for example, half of the rural surgical programs closed in British Columbia between 2000 and 2010 [4]. Such closures result in “even greater challenges for smaller satellite communities that naturally drain into these small hospitals” [2], compounding issues of access for an already disadvantaged rural and often indigenous population. One contributing factor is the trend toward subspecialization within surgery, which has resulted in few general surgery graduates today “who can provide the wide range of surgical procedures required in rural Canada” [5].

One response to the diminishing rural surgical workforce in Canada, Australia, and the USA has been the training of family physicians to perform a limited set of surgical procedures at rural first-level hospitals, a form of task-sharing in a high-income country setting (see Table 1). In Canada, the focus has shifted to a formalized networked model of care integrating rural surgeons (generalist general surgeons or FP-ESS) with secondary referral and tertiary services [6–9]. The underlying principles include functional referral patterns with improved communication and educational and professional support.

For the Beaufort delta region (BDR) of the Northwest Territories, FP-ESS providers based in Inuvik and specialist surgeons based in Yellowknife and Edmonton provide surgical care to a rural and remote circumpolar population (Fig. 1). As noted by Chatwood, “it is clear that more northern-specific evidence is needed” [10] in terms of an understanding of circumpolar health in general, let alone how best to deliver surgical services. This project sought to understand what the role is of FP-ESS compared with specialist surgeons in the delivery of surgical services to this circumpolar region, including how care is integrated between these two types of surgical providers. In this paper, we will demonstrate the importance of a positive working relationship between FP-ESS and specialist surgeons, allowing for more patient care to be delivered closer to home for residents of the Beaufort Delta Region.

**Table 1** Surgical procedures provided by FP-ESS in the Beaufort Delta Region\*

<i>Obstetric/gynecologic surgical skills</i>
Cesarean section (emergency and elective)
Dilation/curettage
3rd and 4th degree tear repairs
Endometrial ablation
Tubal ligation (laparoscopic, post-partum)
Salpingectomy (laparoscopic, open; elective for family planning, emergency for ectopic pregnancy)
<i>General surgical skills</i>
Appendectomy (open and laparoscopic)
Hernia repair (inguinal, umbilical, epigastric)
Colonoscopy
Gastroscopy
PEG tube insertion
Laparotomy (damage control in trauma)
Fasciotomy
<i>Other surgical skills</i>
Tonsillectomy/adenoidectomy
Carpal tunnel release
Trigger finger release
Soft tissue masses
Digit amputations
Varicose vein surgery (greater saphenous vein stripping)
hydrocelectomy
Vasectomy
Circumcision

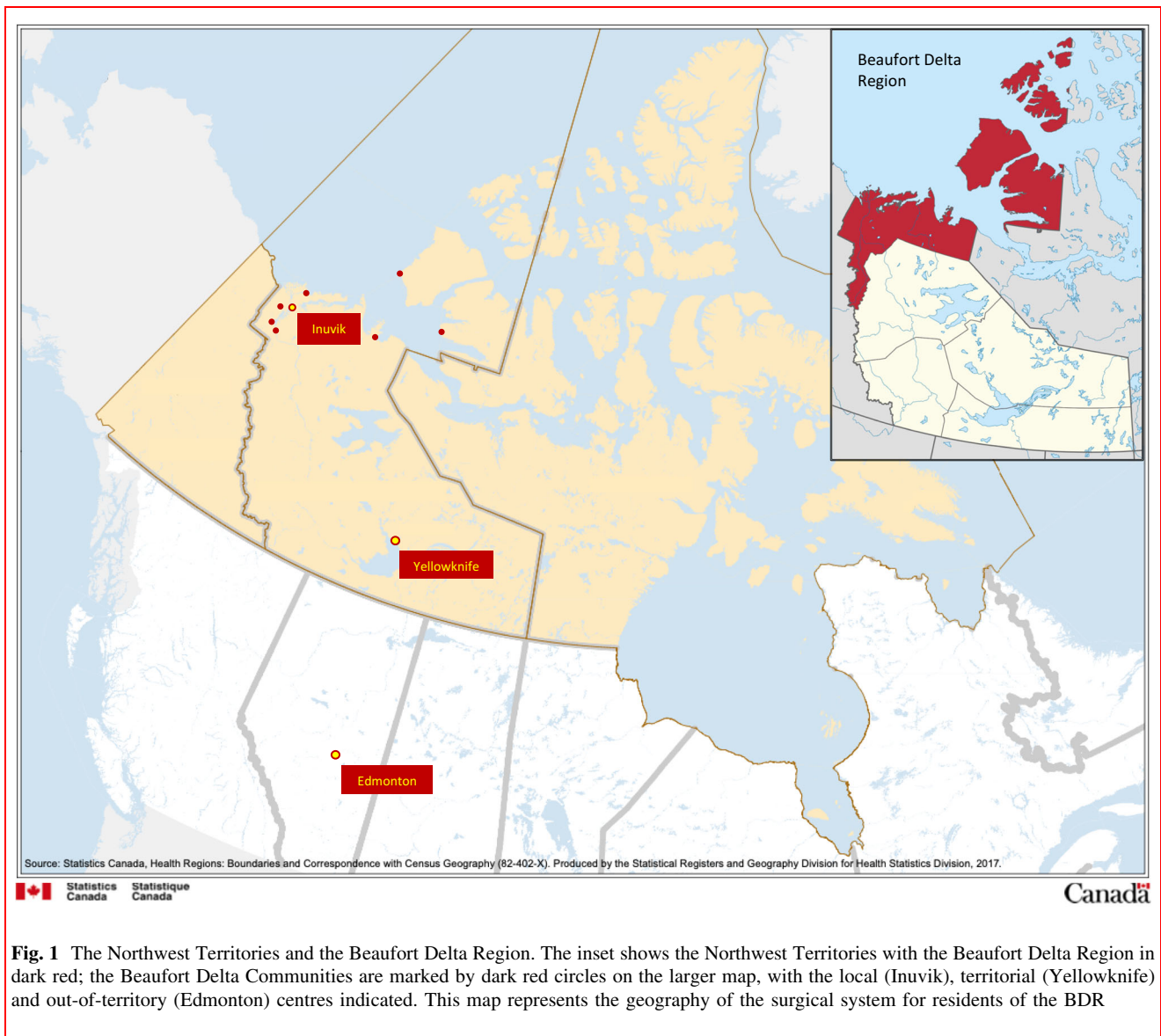
\*This list reflects a composite of the main privileges of current FP-ESS physicians in the BDR and excludes surgical or other procedures that would be considered part of the skill-set of a rural generalist physician (ie: chest tube insertion, small soft tissue/skin excisions, closed reduction of fractures and casting, low risk intrapartum obstetrics including vacuum-assisted delivery, bedside ultrasound, etc.). For further details about these procedures and Rural Generalist Medicine, please refer to the following:

Fowler N, Wyman R, eds. Residency training profile for family medicine and enhanced skills programs leading to certificates of added competence. Mississauga, On: college of family physicians of Canada; 2021. (*The procedures generally expected of a rural generalist physician include those listed under both “Training expectation” and Supplemental“ in the sections Procedure Skills in Family Medicine and Emergency; the core procedures of Enhanced Surgical Skills are also listed in their own section.*)

Available at: <https://www.cfpc.ca/CFPC/media/Resources/Education/Residency-Training-Profile-ENG.pdf>

Position statement: Rural generalist medicine and ensuring safe, quality care for rural and remote communities. Australian college of rural and remote medicine; April 2018

Available at: [https://www.acrrm.org.au/docs/default-source/all-files/position-statement-rural-generalist-medicine.pdf?sfvrsn=74ecdb13\\_22](https://www.acrrm.org.au/docs/default-source/all-files/position-statement-rural-generalist-medicine.pdf?sfvrsn=74ecdb13_22)



**Fig. 1** The Northwest Territories and the Beaufort Delta Region. The inset shows the Northwest Territories with the Beaufort Delta Region in dark red; the Beaufort Delta Communities are marked by dark red circles on the larger map, with the local (Inuvik), territorial (Yellowknife) and out-of-territory (Edmonton) centres indicated. This map represents the geography of the surgical system for residents of the BDR

## Methods

To address our research question, a mixed methods (qualitative and quantitative) approach was taken, as part of a larger program planning and evaluation project. This paper explores part of the qualitative methods and findings, focusing on a subset of the data from the larger study that pertains to the role of and interaction between FP-ESS and specialist surgeons (SS) in the provision of surgical care to this region. A participatory approach was taken, whereby local stakeholders are integrated into the process and “become the beneficiaries of the initiative’s interventions” [11].

## Setting

The BDR is in the northwest corner of the Northwest Territories (NWT) (see Fig. 1). Most of the population is indigenous. Inuvik, with a population of 3400, serves as the primary surgical care center for 7 more remote communities; the entire region has a population of 6931 [12–14]. These 7 remote communities may access Inuvik by all weather road, ice road, or flight; the mode of travel depends on the community and time of year and is weather-dependent [15, 16].<sup>1</sup>

<sup>1</sup> These 7 remote communities may access Inuvik by all weather road, ice road, or flight; the mode of travel depends on the community and time of year and is weather-dependent; the closest community is approximately 1.5 h by car, the furthest 1.5 h by small aircraft. By commercial jet (Boeing 737), Yellowknife is approximately 2.5 h

## Recruitment method

Key stakeholders were purposively identified based on the researchers' experience working within the NWT and by discussion with Medical Directors and other health authority staff. These key stakeholders were initially contacted via electronic mail in August 2020. Of 35 individuals contacted, 22 consented to interview, representing family physicians with enhanced skills (3 ESS, 2 FPA), Specialist Surgeons (7), OR nursing (2), family physicians (1), nurse practitioner and community health center nursing (1), Physician-Administration (3), Public Health (1), and Senior Administration (2). Members of the local Regional Wellness Council, representing indigenous leaders from each of the BDR's communities, were also invited to participate but none were available during the time frame of this study. Interviews were conducted between August and October 2020.

## Data collection method

A semi-structured one-on-one interview was designed [17], conducted, and audio-recorded by the primary author.<sup>2</sup> Due to COVID-19-related restrictions, most interviews were conducted by phone or by videoconferencing; several were in person (for Inuvik-based stakeholders, the community in which the primary researcher lived). Interviewees were designated by initials representing their role (i.e., ESS1 for the first interviewed FP-ESS; GS1 for the first interviewed general surgeon; Admin 1 for the first interviewed administrator). Interviews were then transcribed using the Otter platform online (otter.ai) and reviewed for accuracy by the primary author.

## Data analysis

Grounded theory was selected as the analysis method in this study to permit themes to emerge from the data [18]. This form of analysis was ideal in this setting as it required the researcher to compare and reflect on the data during the collection process, in an iterative and evolving fashion, rather than uniformly applying the same survey to all participants. Transcripts were imported into NVivo 12 for analysis by the primary author. First-level coding was

Footnote 1 continued

flying time from Inuvik (1103 km direct; driving distance is 3765 km) and Edmonton is a further 2 h from Yellowknife (922 km direct; driving distance is 1453 km).

<sup>2</sup> In the initial project design, an initial focus group at each territorial hospital site was planned, followed by in-person interviews and a follow-up focus group after data analysis. Given travel restrictions within the health authority due to the COVID-19 pandemic, the focus groups were dropped from the study design.

performed based on both deductive (framed by the key research questions, Table 2) and inductive reasoning and in an iterative fashion during interview collection to develop and refine the codebook. This was followed by second-level categorizing [19]. Data pertaining to the delivery of surgical services to the Beaufort Delta Region, in particular ESS and SS provider relationships, are the focus of this paper.

## Ethics

Research Ethics Board approval was granted from the University of British Columbia and from the Aurora College.

## Results

In the BDR, surgical care providers include the includes the Community Health Nurses (CHN) at the community health center; the Family Physician (FP) and the Family Physician with Enhanced Skills (Enhanced Surgical Skills and Anaesthesia, FP-ESS and FPA) at the primary level (Inuvik Hospital), and Specialist Surgeon (SS) at the secondary (Yellowknife) and tertiary care levels (out-of-territory, most often Edmonton). Figure 1 illustrates the geographic locations where these surgical care providers work. The interactions between these key providers are represented schematically in Fig. 2.

### The role of FP-ESS physicians within the system

Given the remote location and a population too small to support full-time surgical specialists, FP-ESS act as the primary surgical providers for the population of the Beaufort Delta Region, with the Inuvik Hospital serving as the first-level hospital for the surgical care of this rural and remote region. (Table 1 lists common procedures performed by FP-ESS in the BDR.) As described by one of the stakeholders, the primary purposes of FP-ESS within the Beaufort Delta are cesarean section services to maintain a local obstetrics program, to provide gastrointestinal endoscopy, and to provide emergency on-call support.

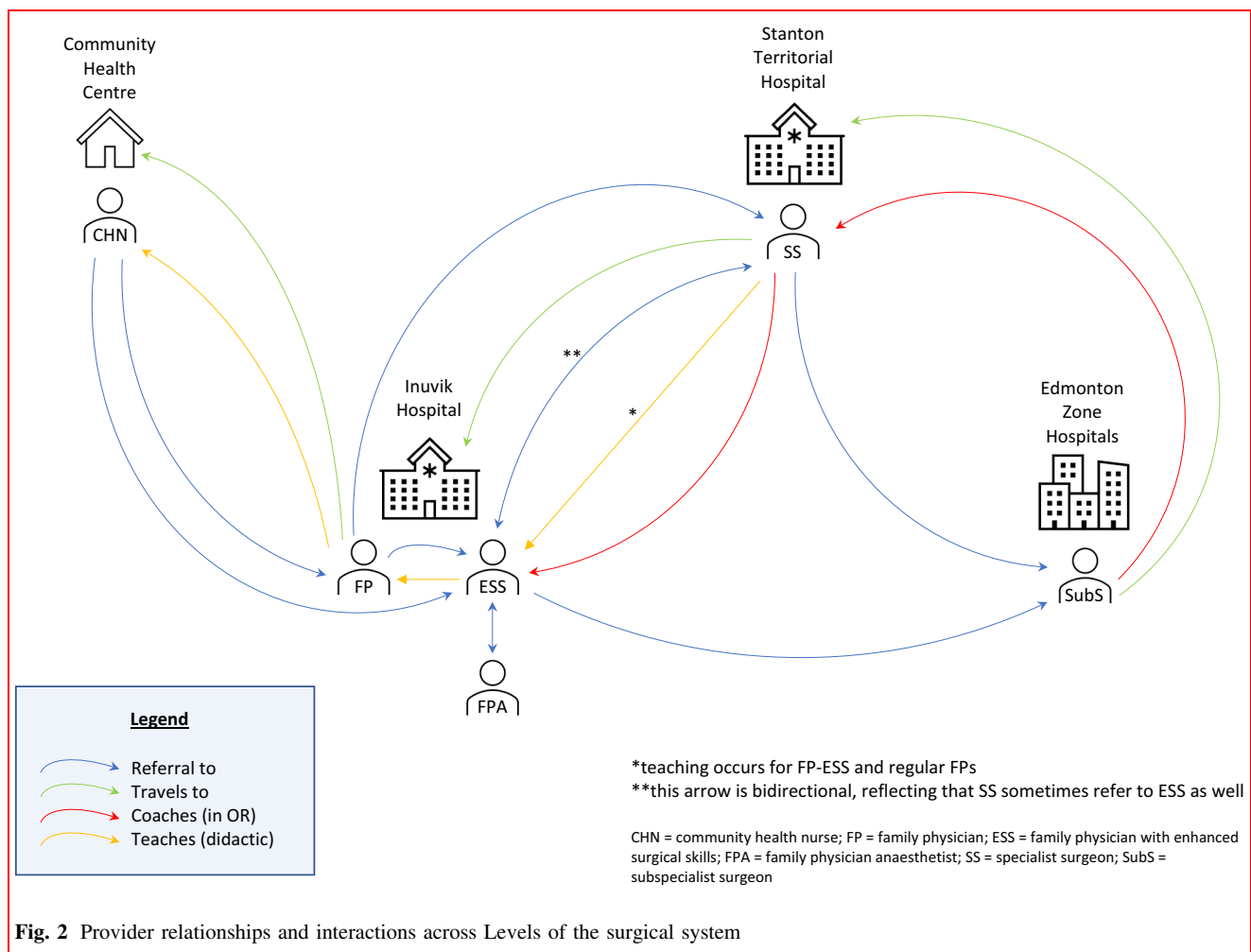
### The role of specialist surgeons within the system

Depending on the nature of the referral, the ESS physicians may manage the patient either independently or with specialist support. Any referrals outside of their scope of practice are referred on to the relevant surgical specialty in Yellowknife or Edmonton. These patients may be seen in consultation in Yellowknife, or in Inuvik during a visiting travel clinic, requiring ongoing collaboration with

**Table 2** Key research/interview questions

The following provides a sampling of some of the questions asked during the semi-structured interviews, taken from the larger program planning and evaluation project, and which are most related to the qualitative data presented in this paper

- How would you describe the surgical services that are provided to residents of the Beaufort Delta?
- How would you describe the role of the ESS physicians in the overall surgical program for Beaufort Delta Residents?
- How would you describe the role of specialist surgeons based in Yellowknife in the surgical care for residents of the Beaufort Delta?
- How would you describe the relationship between the surgeons in Yellowknife and your colleagues in Edmonton? With the ESS physicians in Inuvik?
- What do you see as your role within the surgical system for residents of the Beaufort Delta?
- How do you think the program is providing culturally competent care? In what ways could this be improved?
- Are there any values underlying how the current surgical program is delivered?



**Fig. 2** Provider relationships and interactions across Levels of the surgical system

Yellowknife-based specialists to streamline surgical care. Yellowknife-based specialist surgeons often provide an evening teaching session during their travel clinics to Inuvik for all physicians, but also provide shoulder-to-shoulder coaching/mentoring in the operating room.

**FP-ESS and SS interactions and support (informal networks)**

FP-ESS in the BDR function within an informal network of surgical care and support, frequently collaborating with specialist surgeons in Yellowknife and Edmonton. From the specialist surgeon perspective, many saw themselves



playing mostly an educational and supportive role through the consultative process. One surgeon talked about the importance of “running something by me, as my partners [in general surgery] do already: think about this, do that, and avoid that,” and how that interaction “affirms your thinking, affirms the treatment plan, and likely increases the efficiency [and] urgency of management.” Within the surgical network linking remote communities to the tertiary care centers, FP-ESS provide a role in patient transitions, both on the way to higher levels of care and on repatriation to home communities. Specialist surgeons often involve FP-ESS in the care of such patients, for example, with routine post-operative follow-ups or surveillance colonoscopies after the resection of a colon cancer.

### The value of FP-ESS in the BDR

FP-ESS often support their family physician colleagues in performing minor procedures, and those family physicians view their FP-ESS colleagues as a valuable resource. The impact of having such a program locally extends beyond patient care and affects the medical, social, and economic well-being of individuals, families, and the community as a whole. One FP-ESS stated that maintaining local surgical services “becomes an economic backbone, supporting young families, teachers” and other professionals to stay in town, while another physician stated the corollary that “if we can’t do safe obstetrics with c-section backup, the whole thing crumbles, including the economic and social impacts on the town.” This emphasizes the importance of surgical care close to home in the sustainability not only of rural hospital-based care, but also in the economic viability of rural communities. One family physician stakeholder also felt that family physicians may be more likely to ask for advice from a fellow family physician “because we all share the same foundation,” but also that the “team dynamics are...more cohesive” when you can include FP-ESS (and FPA).

Specialist physicians in Yellowknife described the impact FP-ESS have on the nature of their own practice. By addressing the surgical conditions within their scope, FP-ESS decrease the referral volume to specialist surgeons and increase the quality of the remaining referrals. One specialist stakeholder described this concept through the principle of subsidiarity, “an organizing principle...which focuses on empowering every member of the team to function to their full capacity” and therefore allows specialist surgeons to “notch it up to a higher level of [their] skill set”.

All the Specialist Surgeon stakeholders supported FP-ESS in the BDR as a “really big gain to the system”. In the personal experience of one general surgeon, who before arriving in the NWT wondered “how on Earth could this be

a thing?...I developed an immense amount of respect for [FP-ESS] and what [FP-ESS does] in the care they provide, and it’s because [they’re] not those people I heard about in my training... When you have those personal interactions, the view of ESS changes dramatically.” Another surgeon expressed a similar view, calling for the support of FP-ESS: “the respect that a GP surgeon needs may be eroded by the people at a higher level of care... [FP-ESS in the BDR] have set a great standard, ... but that needs to be reinforced by the whole system saying, ‘Yes, we need this. This is who these guys are, this is what they can do, and we have to affirm them, we have to build them up’”.

Acknowledging the current lack of generalist general surgeons who can provide a wide range of essential surgical procedures, one stakeholder commented that “that general surgeon doesn’t exist anymore.” They see the capacity to provide local obstetrical care of critical importance, as well as the provision of emergency surgical skills, especially when the transport time to Yellowknife or Edmonton would negatively impact the patient outcome. One general surgeon commented on the benefit of having endoscopy performed by FP-ESS in the BDR in terms of improved attendance and trust in the medical system. Another stakeholder viewed FP-ESS care as a complement to specialist care, often with quicker access and the ability to also co-manage aspects of patient care.

From an ESS perspective, the specialist roles of educator, consultant, and coach were identified as the most important for sustainability of services in the BDR.

### Discussion

In the Canadian context, research has tended to focus on ideas around the training and scope of practice of FP-ESS, as well as theoretical frameworks for a networked model of surgical care [6, 9, 20–22]. Specific examples of such networks are lacking. This study provides insight into how one rural and circumpolar surgical system functions with the informal networking of FP-ESS and specialist surgeons. As noted by Kornelsen: “a good generalist-specialist relationship may be as important as a good patient-provider relationship in terms of the quality of care, outcomes, and healthcare system efficiency” [2]. The findings of the present study give context to this statement.

While previous studies have described the scope of practice of FP-ESS, this study has demonstrated the role of FP-ESS within a specific region. Also demonstrated is the role that FP-ESS play in supporting their family physician colleagues and in decreasing the volume and increasing the quality of referrals to specialist colleagues. By functioning within a collaborative network, FP-ESS physicians are supported in their practice, can provide better care, and

gain the trust of their specialist colleagues. The ability to maintain local surgical services, in particular for surgical obstetrics and endoscopy, was seen by specialist surgeons as a “really big gain to the system”; specialist surgeons within the BDR system also acknowledged that the generalist specialist surgeon does not exist anymore. In rural and remote communities where the population is too small to support a full-time specialist surgeon, FP-ESS have a role to play through surgical task-sharing to maintain surgical care close to home and to provide a local link to those specialist services at secondary and tertiary levels of the healthcare system.

### Limitations and validity

Bias could be introduced by the researcher, who is an FP-ESS living in the BDR. It is also possible that the engagement of stakeholders was influenced by their relationship with the researcher. Negative interactions with FP-ESS could be underestimated. Edmonton-based views are not represented, as only one consenting stakeholder was based out-of-territory. Although the Regional Wellness Council was approached to include community representation, none of its members were available for interview. Any future projects to improve the understanding of this surgical system could incorporate those perspectives, but also those of any other pentagram partners (patients/communities, care providers, administrators, researchers, and policymakers) [23].

The validity of the study is increased by selecting a variety of stakeholders who would contribute different perspectives and using an iterative, grounded theory approach to semi-structured interviews and data coding/analysis. Data sources were triangulated by using primary data through interviews, eliciting feedback from stakeholders on the analyzed results, and incorporating secondary data (published literature and government documents).

### Conclusion

This project provides an example of how FP-ESS and specialist surgeons can collaboratively work together within a networked model to provide surgical care to a rural and remote region. Furthermore, it provides insight into what stakeholders within the system value about the way in which this model functions. By better understanding such systems and their impact on the surgical needs of indigenous, rural, and remote populations, we can strengthen rural surgical systems in Canada and address the health gap between rural/remote/indigenous and urban

populations and contribute to the long-term well-being of such communities.

### Declarations

**Conflict of interest** Ryan Falk: no financial conflict; RF works as an FP-ESS within the system under study, Dawnelle Topstad: no financial conflict; DT works as a specialist surgeon within the system under study, Laura Lee: none to declare.

**Informed consent** Informed consent was obtained from all individual participants included in the study.

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