



RESEARCH ARTICLE

The Organisational Infrastructure of a Canadian Rural Health Network: A Four-Year Longitudinal Survey Study

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Received: 28 April 2024 | **Revised:** 25 November 2024 | **Accepted:** 20 December 2024

Funding: The study received funding from the British Columbia Joint Standing Committee on Rural Issues (grant number GR005415; awarded to J.K.).

Keywords: health services | network organisation | networks | organisational performance

ABSTRACT

Background: Formal networks are increasingly being used as a strategy to address complex health system issues. This study aimed to understand the organisational performance of a novel network, the Rural Surgical and Obstetrical Networks (RSON) in the Canadian province of British Columbia, as it developed and grew over four years.

Methods: Between 2019 and 2022, we administrated an annual 37-item survey on network organisational aspects with RSON leaders. We calculated the percentage of favourable ratings (four or five rating out of five) for each survey item and used a two-tailed Wilcoxon Mann-Whitney rank sum test to compare ratings over time. Key themes in respondent comments were described narratively.

Results: Over four years, we distributed 114 survey invitations to RSON leaders and received 77 responses. From 2019 to 2022, 24 out of 37 survey items (65%) had a statistically significant increase in ratings. Ratings and comments indicated that RSON could have improved its function by (a) including more peripheral network members in decision-making and (b) formalising structures and processes for some network areas. Findings also indicate the presence of three network tensions within RSON: inclusiveness versus efficiency, stability versus flexibility, and network operations versus health system operations.

Conclusion: Study findings validate and build on existing network theories and provide practical learnings for other jurisdictions interested in implementing a network like RSON. Among the tensions identified within RSON, the network operations versus health system operations tension, specific to a healthcare delivery setting, has not been well described previously.

1 | Introduction

1.1 | Networks and RSON

A network, a collaboration of three or more organisations working together to achieve a common goal, can be an effective way to solve a complex issue [1]. The numerous and varied potential benefits of a network include increased efficiency, enhanced learning, better client services, and improved ability to address challenges [2–4]. Networks are increasingly being

formed by partners in the publicly funded Canadian healthcare system as a way to improve healthcare quality [5].

Informal regional surgical networks in the province of British Columbia (BC) use a ‘hub-and-spoke’ model of service delivery. A hub is a central site that provides a fuller array of services including advanced services while spokes are secondary sites that provide more basic services [6]. Lower acuity services for low-risk patients are distributed across a network, resulting in the bulk of basic care needs being met locally. Patients requiring

Summary

- A new rural health network improved its performance in various key organisational aspects over four years.
- Increased clarity in network decision-making and greater formalisation of some network structures and processes may have enhanced the network's function.
- Feedback from network members indicated the presence of three tensions within the network.
- The tension between network operations and health system operations is a tension unique to health services networks.

care falling outside the scope of local services are routed to a referral hospital (a hub).

In BC, closures of rural surgical spokes over the past three decades [7] have diminished the robustness of regional surgical networks. This has been in large part due to the centralisation of surgical services in BC. Other factors that make rural surgical services vulnerable to closure include challenges in recruiting and retaining health care providers, low procedural volume, and scepticism from specialists about the quality of care provided by family physicians with enhanced surgical skills [8, 9].

While the majority of childbearing people give birth vaginally, some require timely access to Caesarean section, a surgery that needs to be done in an operating room. Due to the difficulty of sustaining perinatal services in the absence of local obstetrical capacity, surgical service closure in a rural BC community has usually been closely followed by the closure of the local maternity service [10]. To prevent more such closures in rural BC, the Joint Standing Committee on Rural Issues—a partnership between the Doctors of BC and the BC Ministry of Health—provided \$CDN25 million in funding for a 5-year (2018–2023) Rural Surgical and Obstetrical Networks (RSON) initiative. RSON aimed to strengthen and sustain surgical and obstetrical services in rural BC hospitals with small volume operating rooms (< 700 procedures per year).

During data collection for the current study, 10 rural hospitals in four geographical Health Authorities (HAs) within BC were participating in RSON (Figure 1). Each province/territory in Canada has a separate public healthcare insurance plan that is funded by provincial/territorial and federal governments [11]. Under BC's insurance plan, each of five geographical HAs is responsible for planning, delivering, and governing healthcare in its area [12].

Rural hospitals participating in RSON, hereafter referred to as 'RSON hospitals,' received support in five 'pillar' areas that are described in more detail elsewhere [8, 13–16]: (1) clinical coaching, including by specialists from referral hospitals, to enhance skill and confidence among RSON hospital care providers, (2) infrastructure to support local continuous quality improvement (CQI) such as funding for part-time CQI nursing positions, (3) increasing the number of operating days to at least three per week, facilitated by increasing the scope of operating

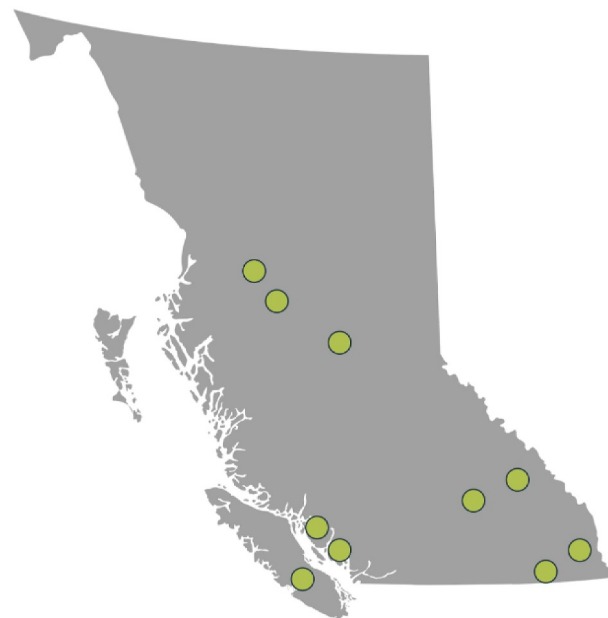


FIGURE 1 | Province of British Columbia (total area: 922,503 square kilometres)—Locations of rural hospitals participating in the RSON programme.

room procedures performed by local and/or outreach care providers, (4) supporting the use of remote presence technology to virtually connect care providers at RSON hospitals with those at referral centres during clinical coaching (e.g., simulation) and clinical scenarios in which specialist consult is needed, and (5) a comprehensive evaluation of network activities and outcomes such as network member experience, network costs and consequences, and patient health outcomes. Local RSON Working Groups were formed at each RSON hospital, supported by RSON Local Community Coordinator positions, and opportunities for inter-hospital networking were created. RSON represented a highly articulated and connected system with defined generic activities and accompanying interactions, resulting in system elements that affected each other continuously, directly, and immediately [17].

Next, we describe the three related theoretical network frameworks that guided this study, including during the interpretation of survey results.

1.2 | Network Governance

Networks, particularly goal-directed ones, need to develop a governance structure to ensure that members engage in collective action in a mutually supportive way and use network resources effectively and efficiently [18]. Network planners need to design intricate organisational aspects such as finance, leadership, and decision-making in a way that provides direction but also encourages innovation [1]. A governance structure that is heavily and centrally controlled, typical of traditional hierarchical organisations, goes against the collaborative and distributed nature of a network [1]. RSON built a unique hybrid network governance structure: a network administrative organisation (NAO) was formed and integrated into pre-existing self-

governing regional networks of rural and referral hospitals that collaborate to provide regional services. This collaboration includes rural hospitals referring local patients to higher levels of care at referral hospitals and providers regularly travelling to rural hospitals to provide outreach services that would otherwise not be available locally. RSON enhanced these regional relationships through network activities that facilitated cross-hospital communication and collaboration beyond immediate patient care needs. RSON also connected small volume rural hospitals provincially across different regions. Before RSON, these cross-regional relationships either did not exist or were underdeveloped (see Figure 2).

An NAO, a separate administrative body with network staff, plays a key role in coordinating and managing the network [18]. The central node of the RSON NAO was at the Rural Coordination Centre of BC (RCCbc) from where a network director and a network project manager (RSON Coordinator) provided general networkwide leadership and oversight (see Figure 2). Pillar groups, with members based at various organisations, worked collaboratively with other network members to set up the structure for pillar-specific activities across the network. Directors of surgical services or maternal/newborn health at HAs (i.e., HA leaders) participated in network planning processes and provided oversight on network activities involving HA operations such as increasing the number of operating room days in a hospital.

At an RSON hospital level, network leadership was provided by a Clinical Lead and a Local Community Coordinator whose duties included co-facilitating monthly meetings with an RSON Local Working Group comprised of local surgical and maternity care providers and administrators. The Clinical Lead was a local

maternity and/or surgical care provider. Local Community Coordinators, who communicated regularly with RCCbc, pillar groups, and other Local Community Coordinators, acted as major connectors between RSON hospitals and the rest of the network. Most network activities took place at the local hospital level where teams worked together collaboratively to develop and implement local initiatives, for example, quality improvement projects. The overall network also had a Clinical Advisory Committee that met regularly.

1.3 | Network Evolution

Network evolution can be thought of as having four stages, beginning with formation (stage one) and ending with death and transformation (stage four) [1]. Data for this study were collected during the middle two stages of RSON: development and growth (stage two), and maturity, sustainability, and resilience (stage three). Popp et al. [1] have identified key themes in each network evolutionary stage. A crucial network process in stages two and three is the development of trust between network members, a precursor to most network activities. Trust has been defined as “the willingness to accept vulnerability based on positive expectations about another’s intentions or behaviours” [19, p. 92] Repeated reciprocal interactions that demonstrate good intentions, competency, and follow-through engender trusting relationships [1].

For a network to be sustainable (stage three), it must develop and maintain both internal and external legitimacy [1]. A new network should focus on demonstrating network value to internal members first [1, 20]. Over time, as levels of trust increase between network members, they can work together on

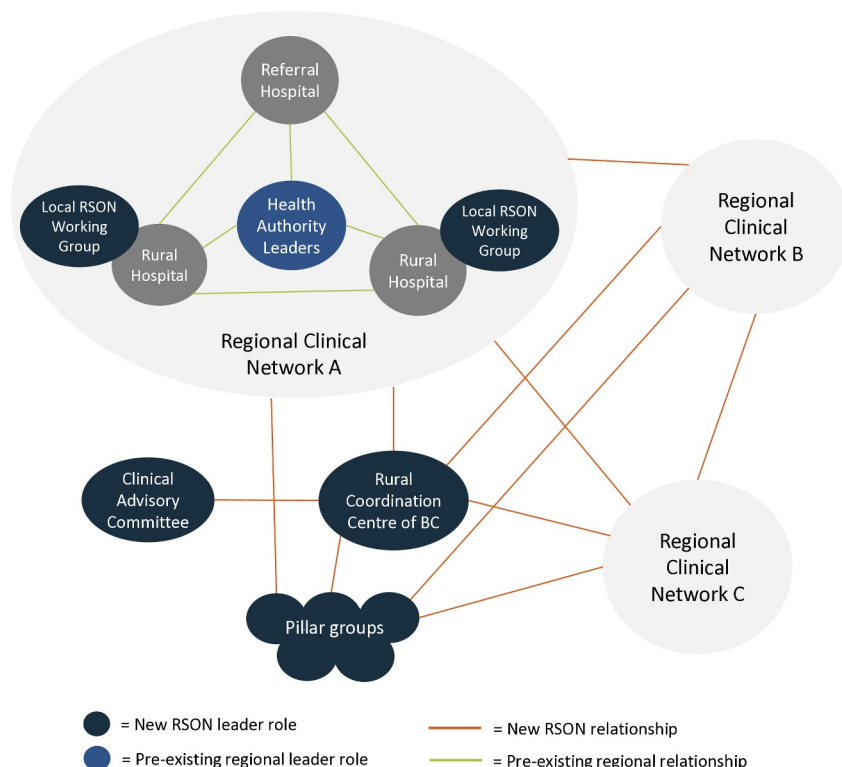


FIGURE 2 | Leaders within RSON’s governance structure (not all regional clinical networks depicted).

progressively more ambitious activities to achieve network goals [21], enabling external legitimacy. Another characteristic of mature networks in stage three is the formalisation of some structures and processes [1]. This ‘institutionalisation’ fosters stability and longevity but can hinder innovation and change. Ideally, a mature network minimises rigidity and change resistance while capitalising on the benefits of institutionalisation, such as when engaging in systematic problem-solving and dealing with external pressures [22].

1.4 | Network Tensions/Paradoxes

Provan and Kenis [18] describe three inherent tensions/paradoxes in networks that need to be actively managed by network managers. (1) Efficiency versus inclusiveness—Administrative efficiency, measured by the ratio of outputs to inputs, is always a desired organisational outcome. In networks, member involvement in decision-making is also a desired outcome but can be resource-intensive and time-consuming, and lead to member burnout. (2) Flexibility versus stability—Stability, which is linked to institutionalisation, allows for efficient network management and consistency of responses. However, networks need to always be ‘light on their feet’ [23]. This flexibility allows networks to respond to threats and opportunities quickly, giving them an advantage over highly bureaucratic traditional organisations. (3) Internal versus external legitimacy—Both network members and external stakeholders need to perceive that network efforts are appropriate and beneficial. External legitimacy can help to reinforce internal legitimacy, but the legitimacy needs of the two groups can differ, making it challenging to attend to both simultaneously. Networks with an NAO like RSON tend to favour efficiency and stability, and address internal and external legitimacy needs sequentially [18].

1.5 | Aim

To our knowledge, RSON was the first formal network in Canada to provide support across five key areas to strengthen and sustain rural surgical and obstetrical services. A similar framework has been developed in the province of Alberta [24]. Our longitudinal survey study aimed to (1) understand RSON’s performance on key network organisational aspects as it developed and matured over four years and (2) generate evidence for rural health leaders in other jurisdictions interested in implementing a similar network.

2 | Methods

2.1 | Survey Tool

The Rural Health Network Profile Tool (RHNPT) survey was developed by the Networking for Rural Health Project and the National Rural Health Resource Centre, organisations based in the United States [25]. Network executives and members are meant to use the survey as a self-assessment tool and use findings to identify network strengths and areas needing attention.

The RHNPT asks about eight key network organisational aspects: purpose, governance/decision-making, planning, financing, leadership/management, staffing, communication, and evaluation. We modified the RHNPT to ensure the relevancy of questions to RSON and its stage of network development—we deleted five questions, added two questions, and changed the wording of seven questions (see the Results section). Using a one to five scale with one representing ‘No’ and five representing ‘Yes’, respondents were asked to rate to what extent RSON exhibited each of 37 characteristics across the eight organisational domains. Respondents were able to provide comments at the end of each survey domain to explain or expand upon their ratings.

Starting in 2020, we also asked respondents to describe the factors necessary for long-term network success, relevant to stage three of network evolution. Responses to this question were meant to help RSON leaders as they planned for the long-term continuation of the network. To maintain anonymity among the small group of network leaders and encourage honesty and openness when responding, we did not collect data on respondent characteristics. It should be noted that this study was part of RSON’s evaluation pillar. The evaluation team, which collected and analysed data, had an arm’s length relationship with RSON programme operations, that is, we were not involved in the work of the other network pillars but we did collaborate with members across the network to evaluate RSON.

2.2 | Data Collection

The RHNPT was administered annually from 2019 to 2022 with the following network leaders expected to be familiar with RSON’s organisational infrastructure: RCCbc leaders, pillar groups, Local Community Coordinators, HA leaders, and the Clinical Advisory Committee. These leaders were invited to complete an online anonymous survey on the University of British Columbia’s Qualtrics survey platform. For each survey administration, invitees received an email invitation and two email reminders and had 2 weeks to complete the survey. Over time, as more rural hospitals joined RSON, we invited Local Community Coordinators and HA leaders from a greater number of geographical areas. Data for this study were collected when the network was (a) iteratively developing and implementing its pillars of support and (b) growing its membership, from four rural hospitals in one HA to 10 rural hospitals in four HAs.

2.3 | Data Analysis

As the sample sizes were small each year and data for many survey items were not normally distributed, we report rating frequencies and proportions but not average or median ratings. In this study, we considered a four or five rating to be a ‘favourable’ rating. For the first and last survey years, we report on the percentage of respondents who provided a favourable rating.

To compare ratings over time, we used a two-tailed Wilcoxon Mann-Whitney rank sum test ($p \leq 0.05$). Comparisons were made between sequential survey years and between the first and last survey years. In 2020, we began collecting non-identifiable unique information from each respondent, allowing us to match respondents across survey years. We used a modified Wilcoxon Mann-Whitney rank sum test for partially paired datasets [26], but only for comparisons that did not include 2019 data.

Across survey administrations, between three and 12 survey items had a high percentage of ‘Don’t know/Not applicable’ responses ($\geq 20\%$). These ‘Don’t know/Not applicable’ responses were included in the denominator when calculating the percentage of favourable ratings and excluded from statistical tests assessing changes in ratings over time.

Open-ended comments were reviewed and coded using an abductive approach, a hybrid of deductive and inductive approaches [27]. An a priori deductive codebook consisting of codes for the eight survey domains (e.g., communication), sustainability, network evolution stages, and theories on network tensions was created. During coding, data-driven inductive codes were added as needed for concepts not included in the a priori codebook. Because there was a low total number of comments and each comment was short, only one team member analysed the qualitative data. The most salient themes, determined by the number of relevant comments, are described narratively, and supported by illustrative quotes. Data were analysed in R statistical software and Microsoft Excel.

3 | Findings

Over four years, we distributed 114 survey invitations and received 77 responses, representing a 68% response rate. Table 1 lists the sample size and response rate by survey year. We received a total of 167 comments from 2019 to 2022. Across survey years, between five and 18 respondents provided at least one comment.

3.1 | Survey Domains—Ratings

In 2019, four items received a favourable (four or five) rating from at least 80% of respondents; 21 items achieved this in 2022 (Table 2). In 2022, five items, all from the governance/decision-making or planning survey domains, received a favourable rating from less than 50% of respondents. These items, which also did not have any statistically significant increase in ratings over time, were about the institutionalisation of network structures or processes, for example, distributing a strategic plan. At the other extreme, three items received a favourable

TABLE 1 | Response rate by year.

	2019	2020	2021	2022
Number invited	23	24	35	32
Number responded	15	18	23	21
Response rate (%)	65	75	66	66

rating from 100% of respondents in 2022: (a) receiving regular communication from central network staff (i.e., RCCbc), (b) having the electronic capability of communicating with other members, and (c) having health care providers in network leadership roles.

Table 2 also lists whether each survey item had a statistically significant change in rating between sequential survey years (year-to-year) and from the first to the last survey year. Between 2019 and 2022, there were seven total year-to-year increases in ratings. Five of these increases occurred from 2019 to 2020, all in the communication or evaluation domains. There were also year-to-year rating decreases for three items: having a feasibility and business plan for proposed health service delivery (2019–2020), having a governing board or steering committee that is representative of network members (2021–2022), and having a paid network executive director (2021–2022).

When comparing 2019 ratings to 2022 ratings, 65% of survey items (24/37) had a statistically significant increase. No item had a statistically significant decrease. All items in the finance, communication, and evaluation domains had an increase; in contrast, only one item in each of the purpose, planning, and staffing domains had an increase. The governance/decision-making and leadership domains each had an increase for most items. For many survey items, though smaller year-to-year improvements were not statistically significant, the cumulative longer-term improvement over 4 years was. One respondent from 2021 described their experience with improvements in network structure and function over time:

“A little unclear about the overall picture at times and some hierarchical decisions but improved over last year and see real attempts at expanded communication.” (2021 respondent)

In 2022, seven survey items had a ‘Don’t know’/Not applicable’ response from a high ($> 20\%$) percentage of respondents (Table S1). Six items were from the governance/decision-making, planning, and leadership domains (two items in each domain), and one item was from the evaluation domain. Refer to Table S1 for histograms of ratings in 2019 and 2022 by survey item.

3.2 | Survey Domains—Comments

In their 89 domain-specific comments over four years, respondents described various network successes and challenges and provided suggestions. Network successes included the positive reception of physician network leaders by network members, clear articulation of network plans at pillar and RSON hospital levels, and meeting participation helping to improve clarity about network purpose. Table 3 summarises comments by survey domain.

A recurring challenge across survey domains was a lack of clarity, on aspects such as purpose, decision-making processes, and funding allocations. Frontline health care provider members were thought to have less clarity on network purpose. One

TABLE 2 | Favourable ratings (4 or 5 out of 5) in 2019 and 2022, and changes in rating over time.

Survey item	Favourable (4 or 5) rating-		Statistically significant ($p \leq 0.05$) change in ratings over time, indicated by arrow and p -value ^b			
	n (%) ^a		2019– 2020	2020– 2021	2021– 2022	2019– 2022
	2019	2022				
1. Purpose						
1a. The network's purpose and mission are understood by network members.	11 (73)	17 (81)				
1b. The network's mission is clearly expressed in writing.	12 (80)	15 (71)				
1c. Generally speaking, key leaders in the network service area (i. e., RSON leadership at RCCbc, Health Authority champions) understand the purpose and mission of the network.	12 (80)	19 (90)				↑ (0.04)
2. Governance/decision-making						
2a. The network has a governing board or steering committee.	11 (73)	18 (86)				↑ (0.008)
2b. The governing board or steering committee is representative of the members in the network.	10 (67)	18 (86)			↓ (0.02)	↑ (0.02)
2c. Governance and decision-making processes are stated clearly in writing. ^c	9 (60)	9 (43)				
2d. Network decision-making is inclusive and involves input by key network members.	11 (73)	17 (81)				↑ (0.04)
2e. The network board or steering committee respects governance/administrative boundaries (e.g., of the Health Authorities).	11 (73)	20 (95)				↑ (0.001)
2f. There is a defined network mechanism for resolving internal conflict. ^c	5 (33)	7 (33)				
3. Planning						
3a. There is a defined strategic planning process in place for the network. ^d	11 (73)	18 (86)				
3b. Strategic planning is ongoing with opportunities for member input.	9 (60)	17 (81)				
3c. Information and input has been gathered from key community, government, and care providers in the network service area for consideration in the strategic planning process.	7 (47)	15 (71)				↑ (0.05)
3d. The network's strategic plan has been distributed to all network members. ^c	7 (47)	8 (38)				
3e. Feasibility analyses and business plans are prepared for proposed health service delivery. ^c	11 (73)	9 (43)	↓ (0.01)			
3f. The network's business plan identifies specific services, as well as targeted citizen patient groups.	11 (73)	9 (43)				
4. Financing						
4a. The network has an annual budget that has been developed with the input of network members.	11 (73)	18 (86)				↑ (0.002)
4b. The network follows generally accepted financial management procedures.	11 (73)	17 (81)				↑ (0.04)
4c. Expenditure of network funds are transparent.	10 (67)	18 (86)				↑ (0.03)
4d. Funding to your domain is needs based and adequate for accomplishing required tasks.	9 (60)	18 (86)				↑ (0.005)

(Continues)

TABLE 2 | (Continued)

Survey item	Favourable (4 or 5) rating– n (% ^a)		Statistically significant ($p \leq 0.05$) change in ratings over time, indicated by arrow and p -value ^b			
	2019	2022	2019– 2020	2020– 2021	2021– 2022	2019– 2022
5. Leadership						
5a. The network has a paid executive director.	11 (73)	15 (71)			↓ (0.03)	
5b. The network commits money and time for leadership training and development. ^c	7 (47)	12 (57)				↑ (0.03)
5c. The network executive director has skill and experience in management of collaborative organisations.	10 (67)	17 (81)				↑ (0.01)
5d. Network board members' sometimes conflicting leadership roles - doing what's best for the network versus doing what's best for their individual organisations—is recognized and managed successfully. ^c	9 (60)	11 (52)				↑ (0.03)
5e. Physicians and other key health care providers have active roles in the network leadership.	14 (93)	21 (100)				↑ (0.03)
6. Staffing						
6a. Staffing levels are adequate to carry out network activities.	10 (67)	16 (76)				
6b. Network staff are qualified and contain a mix of senior and junior level professionals.	10 (67)	16 (76)				
6c. Staff have the technology, equipment, and software needed to maximise productivity.	10 (67)	19 (90)				↑ (0.05)
6d. Turnover of key staffing positions has been low.	11 ^e (61)	13 (62)	N/A			
7. Communication						
7a. Central network staff (i.e., RCCbc) communicate regularly with network members.	12 (80)	21 (100)				↑ (0.008)
7b. Network members use the network as a forum both for sharing information and problem solving.	8 (53)	16 (76)		↑ (0.04)		↑ (0.05)
7c. Network members have the electronic capability of communicating with each other.	11 (73)	21 (100)	↑ (0.04)			↑ (0.002)
8. Evaluation						
8a. The network has a defined method of evaluating its performance.	9 (60)	18 (86)	↑ (0.03)			↑ (0.002)
8b. Evaluation is based on the impact of the network on both its members and the communities in its service area.	10 (67)	17 (81)	↑ (<0.001)			↑ (0.002)
8c. Evaluation of the outcomes of network goals and objectives is done at least annually.	7 (47)	19 (90)	↑ (0.02)			↑ (0.001)
8d. Evaluation findings are used to improve network performance, decision making, and strategic planning.	8 (53)	17 (81)				↑ (0.01)
8e. Measurable network outcomes are disseminated in writing to members at least annually.	3 (20)	15 (71)			↑ (0.04)	↑ (<0.001)
8f. Membership satisfaction is assessed at least annually. ^c	4 (27)	11 (52)	↑ (0.01)			↑ (0.003)

^aDon't know/Not applicable responses were included in denominator; these responses were not included in tests examining change in ratings over time.

^bUpward arrow indicates an increase in rating and downward arrow indicates a decrease in rating.

^c≥20% 'Don't know/Not applicable' responses in 2022.

^dFull form of survey item: There is a defined strategic planning process in place for the network that includes gathering information, assessing needs, setting goals and action strategies, allocating resources, assigning responsibilities for carrying out activities, and evaluating outcomes.

^e2020 data. Survey item was asked for the first time in 2020.

respondent described an “us and them” feeling in the network due to separate communication forums for central and more peripheral network members. Likewise, a respondent reported more clarity on how funding is allocated at an RSON hospital level than at central RSON and HA levels. Another finance-related confusion was why budgets were not adjusted for inflation and increased scope of work. A respondent described uncertainty about member roles and responsibilities, an organisational aspect not included in any RHNPT domain:

“I realize that this is a large scale project with many different members and stakeholders, but there certainly seems to be a lack of clarity when it comes to the dispersal of responsibility. Sometimes I feel like I know exactly what I am doing, and other times I am at a complete loss as to whether something falls under my jurisdiction or not.” (2021 respondent)

Suggestions to improve clarity for network members included regular articulation of network purpose, particularly in the context of staff turnover, and discussion and documentation of organisational aspects such as decision-making processes.

“Some confusion about what takes primacy - top down or bottom up approach and needed dialogue between the two.” (2019 respondent)

Several respondents perceived that central network leadership did not include all key network members in all decision-making processes and expressed a desire to be more involved. Limited involvement of RSON hospitals in decision-making was mentioned by some, with one 2020 respondent stating that “*much of it [decision-making] seems to be happening far above the local site level.*” A few respondents identified short time-frames and potential negative impacts on efficiencies as barriers to increased inclusivity.

“As not part of the [central] leadership team, I wish there were more opportunities for my input into strategic planning, but also recognise this requires a different management structure which may not be efficient.” (2020 respondent)

Relatedly, one respondent suggested more training for network leaders to support the “tricky” transition from leading in a highly hierarchical healthcare system to leading in a distributed network.

Respondents also described the experience of implementing RSON within existing HA governance and operational structures. RCCbc network leaders were praised for respecting HA boundaries while also challenging them to implement RSON. Challenges of working within HAs as described by respondents included understanding HA constraints, relinquishing control of some budgets to HAs, and accessing HA data for CQI and evaluation activities. For some respondents, other initiatives such as HA surgical strategies with similar goals and activities made some parts of RSON feel redundant; there was a suggestion to streamline staff and processes across these similar initiatives.

Several respondents commented on the flexibility of budgets. RSON hospital-level budgets were perceived to be more flexible than central and HA-level budgets, yet there was some perception of inconsistency in expenditure flexibility across hospitals. Another identified issue was hospitals not always spending all their allocated funds for a given year. Sharing of surplus funds between hospitals was suggested as a strategy to (a) prevent having to return unspent hospital level funds and (b) provide additional funds to hospitals needing it.

3.3 | Network Sustainability

We received 45 comments between 2020 and 2022 about factors necessary for the long-term success of a network like RSON. In 2020, the most commonly identified factor was communication, specifically open communication and collaborative interactions to support the development of trusting relationships.

“Communication is paramount for all aspects of the network function in which I am involved. Process transparency would be helpful in terms of knowing who knows what and what appropriate avenues exist for discussion.” (2020 respondent)

Relationships were again mentioned in later years; one 2021 respondent stressed that long-term continuation of the network is needed to build upon RSON’s successful engagement with key partners and relationship building. Buy-in from HAs was also identified as an important factor by some 2020 respondents, with elaborations in later years about needing support from senior-level HA management and access to HA infrastructure.

In 2021, respondents began describing resource-related factors. Funding was recognized as a key resource, including compensation for (fee-for-service) physicians for time spent on network activities. Other identified requirements for health care provider participation in the network were sufficient levels of baseline staffing, manageable workloads, and dedicated time for network activities. According to one respondent, in the rural context of heavy clinical workloads, many health care providers needed to see the benefits of RSON before buying into the network:

“Due to heavy workload in the rural communities, it can be very hard to have big interest in coaching activities, but the small continual successes we have is adding up into faith in the programme and seeing benefit of RSON.” (2021 respondent)

In 2022, when there was only one year left in the first iteration of RSON, many respondents highlighted the need for dedicated network administrative support at an RSON hospital level. Local Community Coordinators were perceived to be crucial network members who reduce the administrative burden for both hospital and HA-level network members. Clinical and administrative hospital staff were described as not having the capacity to

TABLE 3 | Summary of respondent comments (2019–2022).

1. Purpose (*n* = 12)

Successes

- Purpose has become clearer over time.
- Meetings have helped to clarify network purpose.

Challenges

- Understanding of network mission is lower among frontline staff compared to central network leadership.
- RSON hospitals may use RSON funding for routine activities when this funding should be used to build new skills and services.

Suggestions

- Regularly articulate and re-emphasise purpose, especially in the context of staff turnover.
- Improve integration of obstetrics into the network (see comment below).

“Strong focus on developing surgery through all pillars with weak integration with obstetrics. It’s like obstetrics is the child in the parent’s shadow exclaiming ‘don’t forget me!’” (2019 comment)

2. Governance/decision-making (*n* = 15)

Successes

- Network leaders have respected but also challenged HA boundaries in pursuit of network goals.

Challenges

- Short timeframes have restricted inclusive decision-making.
- All network members, including Health Authority and local representatives, are not always included in decision-making.
- Lack of clarity around decision making processes and responsibility (e.g., budgets), and when network members can provide input (see comment below).
- Health Authority related challenges: Differences between RSON and Health Authority leadership in accountability and reporting. Difficulty understanding the boundaries and constraints of Health Authority operations, e.g., collective agreements for staff.

Suggestion

- Conversations about and documentation of governance processes would promote clarity and collaboration.

“It remains somewhat unclear how exactly the project leaders and the Health Authority are making decisions surrounding RSON funding and initiatives, and much of it seems to be happening far above the local site level.” (2020 comment)

3. Planning (*n* = 15)

Successes

- Consultation has been regular and broad across the network.
- Articulation of pillar and community specific plans.

Challenges

- Have not seen a business plan beyond the original RSON proposal.
- Uncertain to what extent stakeholder engagement informed plans for RSON originally and throughout the five-year programme.
- Although RSON leadership has a clear idea of specific RSON services and target groups, up-to-date business or strategic plans have not been articulated.
- Overlap between RSON and Health Authority surgical strategy makes some components of RSON redundant.

Suggestions

- Provide opportunities for non-central network members to give input during strategic planning (see comment below).
- As network relationships strengthen over time, implementation of strategies will improve.

(Continues)

TABLE 3 | (Continued)

“As not part of the leadership team, I wish there were more opportunities for my input into strategic planning, but also recognise this requires a different management structure which may not be efficient.” (2020 comment)

4. Financing (*n* = 15)

Success

- Plentiful and well-managed funds.

Challenges

- Lack of budget adjustments for inflation and increased scope of work.
- For some pillar areas, the budget is mostly controlled by Health Authorities (see comment below).
- Lack of clarity/transparency on how funding is allocated at different levels. More clarity at a community level and less clarity at central network and Health Authority levels.
- Not all members understand budgetary planning processes and reporting.
- Not all RSON hospitals are spending all their allocated funding. Some inconsistency across RSON hospitals in expenditure flexibility.

Suggestions

- Ability to share surplus funds between RSON hospitals.
- Focus on long-term network financial sustainability post-RSON.

“This is the biggest area of challenge. The network only controls the budget for RPT [remote presence technology] and clinical coaching. That has caused frustration among non-HA members.” (2019 comment)

5. Leadership (*n* = 10)

Success

- Health care providers as network leaders has been well received at RSON hospitals.

Challenges

- Confusion around whether RSON is using a top-down or a bottom-up approach, and which takes primacy.
- The lack of targeted leadership development has made transitioning into network leadership roles challenging.
- Design of RSON is too physician centric.

Suggestions

- Discussions between central network leadership and RSON hospitals about decision-making structures.
- More training on leading within a network environment (see comment below).

“I think it is very tricky to come from an institutional/hierarchical organisation to a distributed network. More support and training for this transition might have been helpful.” (2021 comment)

6. Staffing (*n* = 9)

Success

- Staffing issues at RSON hospitals have improved.

Challenges

- Multiple simultaneous initiatives occurring at RSON hospitals.
- Limited resources and staff turnover at RSON hospitals (see comment below).

Suggestion

- Streamline structures and processes, including staffing and hiring, for RSON and other similar initiatives.

“Health Authority employees working for the network are often pulled to clinical duties and cannot attend QI [quality improvement] meetings, for instance. This reflects inadequate resources at the HA level, with the spillover impacting the RSON work.” (2021 comment)

TABLE 3 (Continued)

<p>7. Communication (n = 9)</p> <p>Successes</p> <ul style="list-style-type: none"> – Communication improving over time. – Great advocacy by and support from RCCbc staff. The network coordinator at RCCbs plays a key communication role. <p>Challenges</p> <ul style="list-style-type: none"> – Despite trying out different electronic communication platforms, adoption and participation by network members is an ongoing challenge. – Separate central and hospital level communication processes (see comment below). – Technological platforms are not used to problem solve. <p>Suggestion</p> <ul style="list-style-type: none"> – An asynchronous tech-enabled communication platform that network members can access at any time. <p>“There is an “us and them” to the network wherein RCCbc central has an internal forum and the network communities have a different forum for sharing information and problem solving.” (2021 comment)</p>	
<p>8. Evaluation (n = 14)</p> <p>Success</p> <ul style="list-style-type: none"> – Robust network area. <p>Challenges</p> <ul style="list-style-type: none"> – Access to data at a Health Authority level (see comment below). – Because evaluation data were not collected at the very beginning of RSON, the evaluation does not reflect the first few years of the network. – Slow utilization of evaluation findings. <p>Suggestions</p> <ul style="list-style-type: none"> – More collaboration and sharing between evaluation and other pillars around data and reporting. – Increase frequency and consistency of evaluation reporting. <p>“Accessing outcome [s] and data ... has been a major obstacle in [Health Authority name redacted]. This is in spite of financial support from the network to assist in this process. Significant systems issues requiring manual data extraction seem to be a contributing factor (i.e., lack of EMR, archaic database interface).” (2021 comment)</p>	
<p>take on Local Community Coordinators' administrative duties such as organising regular meetings, coordinating activities, and holding network members accountable.</p> <p>“Local [network] staff to organise and coordinate [network] activities. Physician participants enjoy participating in the network but because of their other responsibilities do not take the time to organise network events.” (2022 respondent)</p> <p>Although the survey did not ask about this aspect, several respondents provided additional comments at the end of the survey describing the positive impact of RSON.</p> <p>“RSON has been absolutely critical to maintaining a small town functional OR [operating room] and building a highly valued OR team!” (2022 respondent)</p>	<p>4 Discussion</p> <p>In this section, we interpret survey findings using theoretical frameworks on network governance, evolution, and inherent tensions. Network theory stresses the foundational nature of trust. Because a network cannot function well or achieve much in the absence of trust, networks need to focus on building and maintaining trust during their developmental and maturation stages [1]. Communication, described as the ‘lifeblood’ of a network, is a key building block for trust [28]. Effective communication is particularly important for a geographically dispersed network like RSON where unique communication barriers can act as significant barriers to cohesiveness [29, 30]. RSON improved on all three communication domain items over time and achieved a favourable rating from 100% of respondents for two of these items in 2022. The one item that did not achieve this was using the network for information sharing and problem-solving.</p>

Because trust may decrease over time as members recognise differences and experience conflict, trust does not immediately or naturally follow the formation of relationships [31]. Working through differences in a constructive manner is an effective way to build trust [1]. Conflict exists on a spectrum of severity, with most starting as milder tension. If left unresolved, previously inconsequential conflicts can grow large enough to damage relationships and have disastrous performance consequences [32]. One of the consistently lowest performing RHNPT items for RSON was having a defined mechanism for resolving internal conflict. Although respondents did not describe any instances of major conflict within RSON in their comments, there were descriptions of various tensions. A considerable tension was between RSON hospitals and regional HAs in how funds for the increased scope and volume pillar would be spent. HAs controlled most of the funds for this pillar. Clarity at a hospital level about funding allocation improved when hospital administrators began participating in relevant HA meetings and acting as a bridge between RSON hospitals and HA leaders.

Organisations can draw on multiple strategies to manage or prevent conflict [33]. One strategy is to hold space in routine team meetings to discuss and address disputes and contentious matters as they arise. Another strategy is to formalise and disseminate operational principles and organisational guidelines in areas for which there is a risk of information barriers leading to or exacerbating disputes. This second strategy not only prevents disputes arising from differences in understanding but also helps to build a culture of information sharing, which can break down barriers between individuals and challenge a major contributing factor to conflict: a lack of trust [33]. Information sharing can also help to produce insight and clarity, which in turn, increase trust and operational effectiveness [34].

Despite RSON being a highly articulated network with defined high-level activities and accompanying interactions, or perhaps because of it, many respondents did not have clarity on various network organisational aspects. Respondents, who perhaps understood that a highly articulated system like RSON has few alternative pathways for activities and interactions [17], may have desired more clarity on RSON's structure and function to be able to participate in the network more effectively. This may have been complicated by considerable flexibility at a local level in some network areas such as CQI projects. The solution to a lack of network member clarity is not simply to share a lot of detailed information constantly as this can lead to information overload among recipients [34]. Central network leaders need to identify which individuals will receive information, what information is relevant to which group, when to share information, and how to make information accessible for a particular group [35, 36].

A key channel for communication within RSON was the Local Community Coordinator role. In addition to meeting regularly with their RSON Local Working Group, each Coordinator met regularly with the central RSON Coordinator and other Local Community Coordinators. In this way, Local Community Coordinators connected their local hospital to other RSON hospitals and to central network administration. CQI nurses across RSON hospitals also met regularly to share local quality

improvement updates and ideas. General meetings for all network members, held once per year in-person or virtually, were another important communication channel. Activities during these meetings included reviewing and updating network objectives and sharing network successes and learnings.

Respondent comments indicate that network members had developed good working relationships, arguably the most important legacy of a network. These relationships will likely endure and can be leveraged to continue with network activities long-term [1, 37]. Trusting relationships will be even more important in the second iteration of RSON, which has significantly less funding. As a network's financial resource base decreases, reliance on informal cooperation and member commitment and goodwill increases [38].

RHNPT findings indicate the presence of two of the three inherent network tensions/paradoxes described by Provan and Kenis [18]. Central network leaders could have involved network members in decision-making to a greater extent as some respondents desired, but this increased inclusiveness requires more time and resources, decreasing network efficiency. Networks with an NAO like RSON tend to favour efficiency over inclusivity [18]. The ambitious nature of RSON objectives combined with the relatively brief period in which funds for the first iteration of RSON needed to be used may have resulted in an even greater favouring of efficiency. Although survey items about seeking input from key network members during decision-making, strategic planning, and annual budget development improved over time for RSON, several respondents commented that they would have liked to be more involved in these processes.

Networks with an NAO have an advantage in managing the efficiency-inclusiveness tension: network staff can handle routine administrative burdens and invite representative network members for decision-making on key strategic issues [18]. However, some respondents found a mixed approach with both centralised and decentralised decision-making processes difficult to comprehend, hence the need for clear communication from central network leaders on this aspect.

Networks with an NAO tend to favour stability over flexibility [18]. RHNPT ratings indicate that RSON had well-defined and understood systems in some areas such as communication but could have increased formalisation in other areas such as decision-making. More stability via institutionalisation was needed to achieve the clarity that some respondents expressed needing. At the same time, increased flexibility was desired by some respondents, in the areas of RSON hospital budget allocations and opportunities for participation in strategic planning and decision-making. Networks need to be both stable and flexible, with more stability at the core and more flexibility at the periphery, a delicate balance that can be challenging to achieve [20]. For example, Kornelsen et al. [14] found that RSON hospitals appreciated the flexibility to tailor CQI projects to their local context but some found the lack of structure and direction challenging to navigate, such as when deciding which area to focus on and how to use data collected to plan for improvements.

Survey findings do not indicate any tension between internal and external legitimacy for RSON. Instead, it appeared at the time of data collection that RSON had largely achieved internal legitimacy and could focus more on external legitimacy, a prerequisite for partner support and funding for the second iteration of RSON.

A tension described by RHNPT respondents but not included in Provan and Kenis' [18] list of tensions, perhaps because it is specific to a healthcare delivery setting, is the tension between network operations and health system operations (Figure 3). RSON is much less bureaucratic and hierarchical than HAs, resulting in a flexibility/stability sub-tension between the two systems as they collaborated to build the network and implement pillar interventions. The accountability structures and major objectives of the two systems also differ considerably, which made integration of RSON and HA systems challenging in the early stages of RSON. Another sub-tension was between providing patient care and participating in network activities. Health care administrators and providers will want to prioritise the former if workload is high and staffing levels are inadequate, scenarios not uncommon in rural hospitals [9]. For example, nurses at RSON hospitals funded to work on CQI part-time reported experiencing internal conflict when engaging in 'future forward' CQI activities to improve patient care during periods of short staffing. These nurses felt pressure to assist with more immediate needs on the floor and worried that others would perceive they were not contributing sufficiently to the team for clinical care. Internal legitimacy gained through small network successes seems to have helped with this second sub-tension for RSON. Members of Child Health Networks in Canada have also noted difficulties reconciling organisational cultures between their traditionally hierarchical home organisations and the network [39].

This study found the organisational infrastructure of RSON to improve overall from its early beginning when it was figuring out how to operationalise a rough network plan to a mature network with defined systems, roles, and processes. Improvements in key organisational aspects such as communication, clarity on funding allocations, and inclusive decision-making likely enabled RSON's numerous achievements through improved network function. A key network achievement, as identified by respondents in the current study, was strengthened relationships, both a precursor to and outcome of many network activities. Repeated positive interactions among network members allowed for the development of trust, enabling members to collaborate effectively in increasingly complex ways. In a similar reinforcing and cyclical way, member buy-in to the network

increased as they observed small network 'wins', further increasing their engagement and enabling bigger 'wins'.

Relationships within RSON hospitals, across RSON hospitals, and between RSON and referral hospitals all improved. At a local RSON hospital level, inter-disciplinary collaboration during network activities such as simulations, quality improvement initiatives, and Local RSON Working Group meetings led to an improvement in team function, including during patient care [16]. For instance, several RSON hospitals reported a reduction in the 'decision to incision' time for caesarean section, that is, the time from the decision to perform an urgent caesarean delivery to the first incision [13].

Across RSON hospitals, regular and formal communication between Local Community Coordinators and CQI nurses provided a space for sharing between hospitals that previously did not communicate or communicated in a limited way. Hospitals were able to learn from the experiences of similar small hospitals from across a geographically large province and adopt or adapt innovations implemented at other sites [14]. For example, one RSON hospital adapted new national guidelines for postpartum haemorrhage to the rural context. These guidelines were shared with other RSON hospitals that then adopted them.

Relationships between health care providers at RSON and referral hospitals also improved, mainly through clinical coaching activities [15]. The increased trust between the two groups had several downstream positive effects. Specialists' confidence in the clinical capabilities of family physicians with enhanced surgical skills increased, resulting in more collegial and supportive relationships between the two groups. Immediate benefits of this for rural physicians included increased comfort to reach out to coaches with clinical questions or to ask coaches for assistance in the operating room (i.e., 'tag team'). There were also reports of specialists increasing their collaboration with RSON hospitals such as by requesting rural physician support during human resource shortages at referral sites and bringing patients from referral communities to RSON hospitals to provide more expedient care or free up operating room time in referral hospitals for larger surgeries. Significant for small volume ORs, specialists also became more likely to increase their participation in regular outreach care at RSON hospitals. Outreach care is key for maintaining sufficient volumes in rural ORs and supports skills maintenance and development among rural providers. Another benefit of clinical coaching was rural providers sharing their coaching learnings with their peers, which not only strengthened clinical skills more broadly at RSON hospitals but also improved local team cohesion.

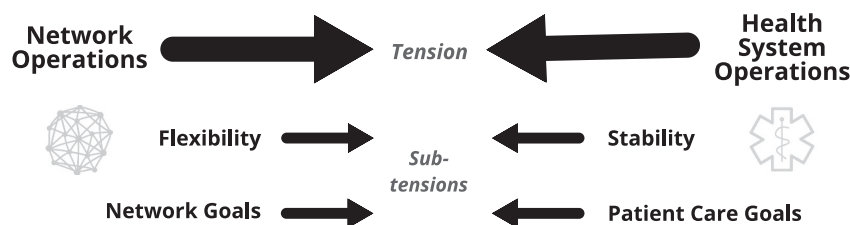


FIGURE 3 | RSON tension—Network operations versus health system operations.

RSON members have reported numerous and varied other positive outcomes of RSON [13–16]. Examples include local CQI projects improving team function and patient care, additional operating room resources such as equipment enabling increased scope and volume, and increased staffing leading to improved emergency operating room coverage. Thus, in many ways, RSON achieved its goal to strengthen small volume rural surgical and obstetrical services and make them more sustainable, an achievement that would not have been possible without a strong network organisational infrastructure.

4.1 | Practical and Research Implications

Our study describes the organisational successes and challenges of a new provincial network that aimed to increase the quality of rural health services and reduce rural-urban health inequities. We offer several recommendations that are based on our study's findings. RSON, a large complex network, was formed in a relatively brief period. The flexibility that a network structure afforded allowed RSON to quickly build and grow, but there are potential drawbacks to this approach. Network leaders should check in with network members to ensure that the network has a sufficient level of stability, and members have enough clarity on key network aspects. This involves identifying the information needs of members and disseminating relevant operational principles and organisational guidelines, keeping in mind that needs may vary by network role. These facilitation and management skills could be included in training and development sessions for network leaders.

A formal hierarchy with centralised decision-making is the most stable and efficient but is incompatible with the collaborative intent of the network form [18]. We recommend that networks relying on some centralised decision-making identify the key strategic issues for which network members would like to provide input. Otherwise, the perception of inappropriate hierarchy in a network may alienate members and decrease their commitment to the network [18]. Because communities are typically able to generate the most effective solutions for the problems they are facing, another benefit of inclusiveness is the increased quality and relevance of solutions [40, 41].

To reconcile differing governance styles and organisational goals between a network and a healthcare system, we recommend identifying the health system components that intersect with the work of a network and mapping the corresponding challenges, constraints, and opportunities. Then, to develop strategies for addressing constraints and challenges, such as by extending timelines to allow for health system operational processes and even challenging constraints if necessary. A potential challenge is turnover in health system leadership. When this occurs, network leaders need to spend time and effort to develop relationships with new leadership and obtain their buy-in to the network. Until this is achieved, the network's stability may be compromised, and its growth may be impeded. As there is a dearth of literature on the network-healthcare system tension, we recommend conducting studies to further explore this area.

5 | Conclusion

This study investigated a new provincial health network's performance on key organisational aspects as it developed and matured over four years. Study findings both reinforce and extend existing theories on network structure and function. Findings indicate that RSON created a generally effective organisational infrastructure that improved over time but that it could have paid more attention to network stability and inclusiveness, outcomes that promote clarity and trust among network members. This study also identified a tension between network operations and health system operations that is a result of differing governance styles and organisational goals.

6 | Limitations

Several limitations should be considered when reviewing study findings. We chose a survey tool developed by the National Rural Health Resource Centre, an organisation with more than 25 years of experience supporting rural health system enhancements across the United States [42]. We modified the survey tool to ensure relevance to the RSON context by deleting, adding, and editing items. Respondents helped to fill in any conceptual gaps by describing, through comments, network areas that our modified survey tool did not ask about, such as member roles and responsibilities and tensions between RSON and HAs. Still, there may have been key RSON organisational structures or processes that the current study did not capture.

There are several other methods related limitations. Firstly, because we did not collect data on respondent characteristics, we do not know if all types of leaders and all HAs are represented in the data. Secondly, due to the small size of the RSON leader group, it was not possible to achieve a high yearly sample size. This combined with the non-parametric statistical tests used made it more difficult to detect differences in survey ratings over time. Compared to parametric tests, non-parametric tests have less power to detect differences [43]. The third limitation, which may be counteracted by the second limitation, is that we did not apply a correction for the number of statistical tests performed, increasing the chance of a false positive. Nonetheless, the trend of higher ratings from 2019 to 2022 for a majority of survey items supports the conclusion that RSON's organisational infrastructure improved over time. Lastly, we conducted psychometric analyses and found items in RHNPT domains to only have internal consistency in 2019. This was probably due to small sample sizes and the increasing diversity of RSON leader respondents over time [44]. Thus, we did not report composite ratings by survey domain.

Acknowledgements

The authors would like to gratefully acknowledge Abdo Souraya for research support.

Ethics Statement

This study received ethical approval from the University of British Columbia's Behavioural Research Ethics Board (ID: H18-01940).

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Research data are not shared.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.