

SPARK CASE

2025-2026

Technology for Rural Healthcare Access in Clearwater Ridge

Situation Overview

In January 2026, Clearwater Ridge experienced an unusually severe winter storm that forced the closure of the only highway connecting the community to the nearest major hospital for more than five days. During this period, residents were unable to travel to medical appointments, including follow-ups and specialist consultations that had already been delayed for several months due to the disorganized and incohesive nature of the medical system in Clearwater Ridge.

One incident, in particular, drew attention across the community. An elderly resident with a known heart condition missed a cardiology follow-up appointment due to poor communication around rescheduling options. With no systematic way to track the missed referral, the appointment was never rebooked. Two weeks later, the individual was airlifted to the hospital following an avoidable medical emergency.

In the wake of this incident, community leaders and healthcare providers agreed that it was time to fix the healthcare infrastructure of Clearwater Ridge. Although the highway closure was the catalyst for the breakdown, the issue lied in the fact that the current system did not have the flexibility to respond to such a disaster, leading to immediate danger to the wellbeing of residents.

Community Overview

Clearwater Ridge is a remote northern Canadian community with a population of approximately 1800 residents, located several hours from the nearest urban centre. The demographic is composed of a high proportion of seniors, Indigenous families, and seasonal workers employed in forestry and mining. Many households rely on fixed or seasonal incomes, making affordability an ongoing concern.

Healthcare services in Clearwater Ridge are limited. The village operates one single nursing station staffed by registered nurses, supported by two rotating family physicians who visit the community twice per month. Residents requiring more advanced care are required to travel to a hospital located 110 km away, primarily accessible by a single highway.

As a result, many healthcare interactions involve referrals and services outside the community. These referrals are currently managed through a combination of phone calls, paper forms and basic spreadsheets, with limited ability to cohesively track whether appointments have been scheduled, attended or followed up.

Communication between providers, patients and community support services is often fragmented and relies heavily on manual effort.

Transportation presents another major challenge. A small network of volunteer drivers and community vans assist residents travelling to medical appointments, but coordination is often informal and inconsistent. Ride requests are currently handled by phone or text message, making it difficult to manage last-minute cancellations or conflicting plans. Missed or delayed transportation often results in missed appointments among other complications.

Mental health support is another area of growing concern. Community leaders and healthcare workers report increasing rates of depression, anxiety and substance abuse, particularly within the youth and older adults. While remote mental health services exist at the provincial level, awareness, access, and follow-up remain inconsistent. Concerns around privacy and stigma further limit adoption of regular support.

Problem Statement

Residents face increasing missed appointments, untreated mental health concerns, and avoidable emergency hospitalizations. Information gaps, manual referral tracking, and unreliable transportation coordination are just some of the many issues created by systemic failures in care continuity. You have been hired by the Clearwater Ridge Community Health Council to design and build a codable technical solution that improves healthcare coordination so patients can receive the care and support that they need.

Community Trends

Virtual Care and Hybrid Delivery is becoming baseline

Across Canada, healthcare delivery is increasingly shifting toward virtual appointments and hybrid care models, especially for rural and northern regions where specialist access is limited and travel is expensive, unreliable, or seasonally unsafe. In fact, virtual visits accounted for ~33% of all patient-reported healthcare visits in Canada between January 2021 and March 2022, showing that virtual care is now a core part of the healthcare system rather than a temporary workaround. During this period, virtual care represented 38% of family doctor visits and 27% of specialist visits, highlighting its role in both primary care and specialty follow-ups. For Clearwater Ridge, this trend is especially critical because winter storms and highway shutdowns can cut the community off from external services for extended periods, meaning the community needs tools that can support follow-ups, check-ins, and specialist continuity even when travel becomes impossible.

Care Coordination Is the Primary Failure Point in Rural Health Systems

Healthcare outcomes in rural regions are increasingly shaped not only by staffing shortages, but by breakdowns in coordination, especially when referrals, appointments, and follow-ups are tracked manually. Nationally, delayed or incomplete referrals remain a serious challenge, with wait times for specialist referrals averaging approximately 30.0 weeks across Canada, and longer delays often occurring in northern communities. As a result, health systems are investing in tools that ensure continuity of care by connecting referrals, appointment status updates, missed visit tracking, and automated follow-up workflows. Clearwater Ridge mirrors this issue directly because the community currently relies on phone calls, paper forms, and spreadsheets, making it easy for missed appointments to go untracked or unresolved. Closed-loop care models are becoming standard practice, meaning every referral should be resolved through completion, rescheduling, or escalation rather than being lost in the system.

Transportation Is Being Treated as Healthcare Infrastructure

In rural healthcare, transportation is increasingly treated as a core determinant of health access rather than a separate logistics issue, because access to care often depends on physically reaching diagnostic tests, specialist appointments, and hospital services. Many rural regions are now using tools that centralize ride requests, reduce scheduling conflicts, handle cancellations, and prioritize urgent medical travel, since unreliable transport directly increases missed appointments and worsens outcomes. Clearwater Ridge faces this challenge clearly: ride coordination is informal and inconsistent, and requests occur via scattered calls and texts, making it difficult to manage timing changes, no-shows, or conflicting plans. With the nearest hospital located 110 km away, a single missed ride can translate into a missed referral, delayed treatment, or preventable escalation. A healthcare coordination solution that includes transportation planning as a built-in component will better reflect modern rural health system design and will produce a direct impact on appointment attendance and continuity.

Preventable Emergencies Are Driving System Reform and Funding

Healthcare reform and funding are increasingly focused on reducing avoidable emergency department visits and preventable escalations, since these events drive high costs and worsen patient outcomes. Across Canada, 15% of emergency department visits between April 2023 and March 2024 were for conditions that could potentially have been managed in primary care, highlighting the scale of avoidable escalation when access and continuity break down. At the same time, hospital care remains expensive, with CIHI's Cost of a Standard Hospital Stay ranging roughly from \$5,000 to \$15,000 among teaching hospitals depending on specialty and case mix, reinforcing the value of prevention and follow-up continuity. This has led to a shift toward early-warning models such as risk flagging, missed appointment triggers, and proactive outreach protocols to ensure patients receive timely follow-up before their conditions worsen.

Clearwater Ridge's cardiology incident reflects this pattern, since a missed follow-up was not tracked, no rescheduling workflow existed, and the breakdown ultimately led to an avoidable emergency escalation.

Mental Health Support Is Shifting Toward Privacy-First Access and Follow-Up

Mental health needs continue to rise across Canada, but rural communities face higher barriers due to limited local services, stigma, and inconsistent access to ongoing support. Nationally, youth mental health has measurably worsened in recent years. Statistics Canada longitudinal data shows that about one in five youth who felt their mental health was “good” or better in 2019 no longer felt that way in 2023, demonstrating real deterioration over time. Because of this, rural mental health delivery is shifting toward private self-screening tools, discreet referral pathways, and structured follow-up models that encourage continued engagement rather than one-time crisis response. In small communities like Clearwater Ridge, concerns over visibility and stigma can significantly reduce adoption, so solutions must be privacy-first and low-friction. Clearwater Ridge would benefit from a mental health pathway integrated into broader care coordination, allowing residents to access provincial support while maintaining confidentiality and ensuring consistent follow-up.

Financials

The Clearwater Ridge Community Health Council has allocated a maximum first-year budget of \$60,000 CAD for the development and deployment of a care coordination solution. Ongoing operating costs must remain below \$25,000 per year to ensure long-term sustainability.

Estimated cost ranges for key components include:

- Software development or platform integration: \$10,000–\$45,000
- Hardware (tablets, devices): \$500–\$800 per unit
- Cloud hosting, security, and maintenance: \$15,000–\$25,000 per year
- From a system perspective, missed appointments cost an estimated \$200 per occurrence, while preventable emergency hospitalizations can cost \$8,000–\$12,000 each. Emergency medical airlifts may cost approximately \$15,000 per incident.

Proposed solutions will be evaluated based on their ability to operate within budget constraints while demonstrating clear potential to reduce high-cost emergency events and improve care continuity. Teams are not expected to produce formal financial statements. Instead, proposals should include a clear budget allocation, an explanation of ongoing operating costs, and a rationale for how the solution reduces high-cost healthcare failures.

Deliverables

Teams are required to submit both a **functional prototype and a presentation** that clearly demonstrate how their solution improves one defined breakdown in care coordination within Clearwater Ridge (e.g., referrals, follow-ups, reminders, or transportation).

1. Technical Prototype (Required)

Teams must design and build a technical prototype that demonstrates core functionality related to the chosen breakdown in care coordination.

Prototype Requirements:

- Must be original and created by the team, and **MUST be created within the 38 hour block** (cannot start before the hacking start time, or you will not be considered)
- Does not need to be fully production-ready, but must go beyond static mockups
- Should clearly show how the solution would be used by real users (e.g., nurses, patients, coordinators)

Submission Format:

- Submit your project through **Devpost** (link will be provided in Slack)

2. Presentation Deck (Required)

Teams must submit a presentation deck that explains the journey from problem identification to solution design. In your Devpost submission, under “About the Project”, please create a new heading titled **## Slide Deck and link your deck there**. Please make sure to make it public, or your slides may not be considered. An example slide deck is provided on Slack to help guide your structure, level of detail, and overall presentation style.

3. Presentation (Required)

On presentation day, teams will deliver:

- A 7-minute presentation, including a walkthrough of the prototype
- Followed by a 3-minute Q&A session

Teams should be prepared to:

- Explain how their solution works in practice
- Justify design and scope decisions
- Discuss feasibility, scalability, and impact

Teams are **not expected to solve all healthcare challenges in Clearwater Ridge**; instead, each team must select one clearly defined breakdown in care coordination (such as referrals, follow-up, reminders, or transportation) and build a technical solution that meaningfully improves it.

Voices Side Prompt: Cold Weather Resilience

Background Information

Winter conditions in Clearwater Ridge are severe and unpredictable. This often results in power outages, heating fuel shortages, road closures and periods of isolation. During winter months, these disruptions affect nearly every aspect of daily life, especially for seniors and families with limited resources.

Problem Statement

While extreme cold is expected in Clearwater Ridge, the community currently lacks coordinated tools to prepare for and respond quickly to winter disruptions. This lack of coordination increases safety risks and makes winter events more dangerous and costly than they need to be.

Your Task

Build a technical solution that improves Clearwater Ridge's coordination and response during extreme cold or winter storms in Clearwater Ridge.

Your solution should:

- Improve the **community's resilience to unpredictable winter weather** in a meaningful and impactful way
- Be practical and realistic to implement in a small community

Accepted solutions include but **are not limited to**:

- A web application
- A mobile application
- A backend service or API
- Interactive dashboard/admin tool