

# Cardiac Arrhythmia Network of Canada—Better Clinical Care and Research Workflows

CASE STUDY



# Cardiac Arrhythmia Network of Canada (CANet) Enables Better Clinical Care and Research Workflows

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Using Smile CDR significantly reduced development time, enabling and accelerating the Cardiac Arrhythmia research study to readiness and use.

**CANet is a multidisciplinary, multi-sectoral research and development network** of over 100 investigators, well-positioned industry partners, patients, and healthcare providers focused on arrhythmia research and commercialization activities.

CANet brings together healthcare professionals, academia, government, industry, not-for-profit organizations, and patients to support new ideas and groundbreaking research. By putting the right tools in the right hands at the right time, CANet aims to empower people to manage their own health, empower caregivers to improve patient care at home and in the community, and empower the healthcare system to provide timely, effective, and efficient services to people and populations.

## Strategic Objectives and Directions

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### VIRTUES Patient-Centered Care will:

- enhance personalized education materials for each patient's medical condition
- improve care planning tools and care pathways for the management of arrhythmias
- enable research to further technology development.

VIRTUES (Virtual Integrate Reliable Transformative User-Driven E-health System) provides personalized healthcare delivery, empowerment, and ownership for each patient to co-manage their health. Resources, including health education, are uniquely tailored to the individual.

VIRTUES was designed, developed and implemented with the essential involvement of patients, the on-going expertise of healthcare leaders from CANet's pan-Canadian network of investigators and clinicians, and the fundamental support of academic, industry and government partners from provinces and territories across Canada.

Patients with arrhythmia conditions will receive on-demand virtual care using state-of-the-art Canadian-made biosensor-driven diagnostics and health informatics, integrated with cutting-edge digital technologies, advanced analytics and wireless connectivity.

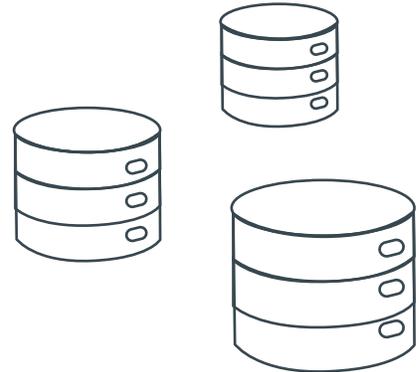
VIRTUES delivers the most efficient, effective, and accessible healthcare, on-demand and tailored to the specific needs of each arrhythmia patient.

## Primary Challenges

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### Data Silos

One of the hurdles that CANet faces is the challenge of accessing data generated in silos. This increases the workload for clinicians and researchers, who must first identify what data are generated and then how it can be assessed for analysis. The effort in creating the governance and tools to retrieve the siloed data increases complexity and costs. The siloed data are also not easily accessible by patients.

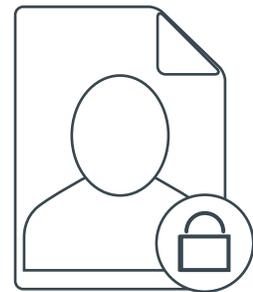


### Healthcare Systems Interoperability

Transmitting interoperating patient's data via biosensor technology with provider data across multiple data platforms is a challenge because of the different data models and standards used. To further complicate the problem, all the data must also be combined with CANet clinical studies findings to further develop and react to patient's care plans. The platform must have the capability to support these various data sets in order to provide the expected outputs.

### Privacy and Security

VIRTUES must embrace the law, ethical principles, and societal considerations. There must be mechanisms to control the access and use of personal information for both clinical and research use.



### Research and Clinical Applications

Clinical and research applications are like "Yin and Yang". The clinical applications are responsible for the delivery of care to specific patients, containing their clinical data and care teams, whereas the research applications are responsible for analyzing large anonymized data sets, typically from clinical applications. The two are responsible for different outputs but often rely on the same data set. For CANet, the use of the patient's arrhythmia data is important not just to manage the virtual care of the patient, but also to further advance research.

## The Solution Design

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Through CANet research, they selected Fast Healthcare Interoperability Resources (FHIR) as the standard that the platform will leverage. FHIR is flexible and adaptive, and thus accelerates development and focuses efforts on interoperability.



CANet's goals and commitments focus on finding innovative solutions to reduce premature death and suffering caused by arrhythmias. Similarly, from the outset of the VIRTUES design CANet looked for innovative solutions that could help achieve their vision of the future. CANet did not want to proceed down a 'do-it-yourself' software approach as this would be more expensive, and take valuable time away from the critical work of researchers and clinicians.

## Smile CDR Stepped Up

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Knowing that FHIR would be the standard behind VIRTUES, CANet searched for a FHIR-based repository. They took this approach because they wanted to fully leverage the data model and extensibility that FHIR offers. FHIR's comprehensive and growing data model, APIs and profiles directly support CANet's needs, eliminating the transformations and customization common to other standards-based and bespoke implementations. It didn't take long for CANet and Smile CDR to cross paths.

An industry leader in FHIR, Smile CDR is a FHIR-based repository. Furthermore, Smile CDR is responsible for managing and maintaining the HAPI-FHIR Library that is the open-source reference implementation of the FHIR specification in Java. Implementers can leverage HAPI-FHIR to shorten development cycles and quickly apply the standard instead of spending efforts trying to build from scratch.



CANet selected Smile CDR to provide products and services related to implementing a FHIR back end in order to support multiple pilots and clinical studies on VIRTUES. Smile CDR will form the backbone of VIRTUES underlying data architecture, facilitating the multitude of studies to be conducted. Mobile applications will be developed using SMART on FHIR; these apps are essentially thin clients that will integrate with the Smile CDR back end.

With the data in Smile CDR, CANet will deliver a world class knowledge base of arrhythmia cases and be a foundational, interoperable system for investigators, industry partners, patients, and healthcare providers. The services that Smile provides to CANet include the following:

- Implementing and maintaining cloud-hosted instances of Smile CDR for development and testing purposes.
- Configuring Smile CDR to support multiple FHIR endpoints and associated persistence modules to support the clinical studies and mobile app developer
- Mapping CANet's data model to the FHIR specification to support the various studies
- Services for managed hosting as well as migration from a development to a production environment

## Benefits Achieved

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## Next Steps

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With Smile CDR fully deployed, CANet's focus will be to implement new studies using wearable devices to monitor arrhythmia patients' care.



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