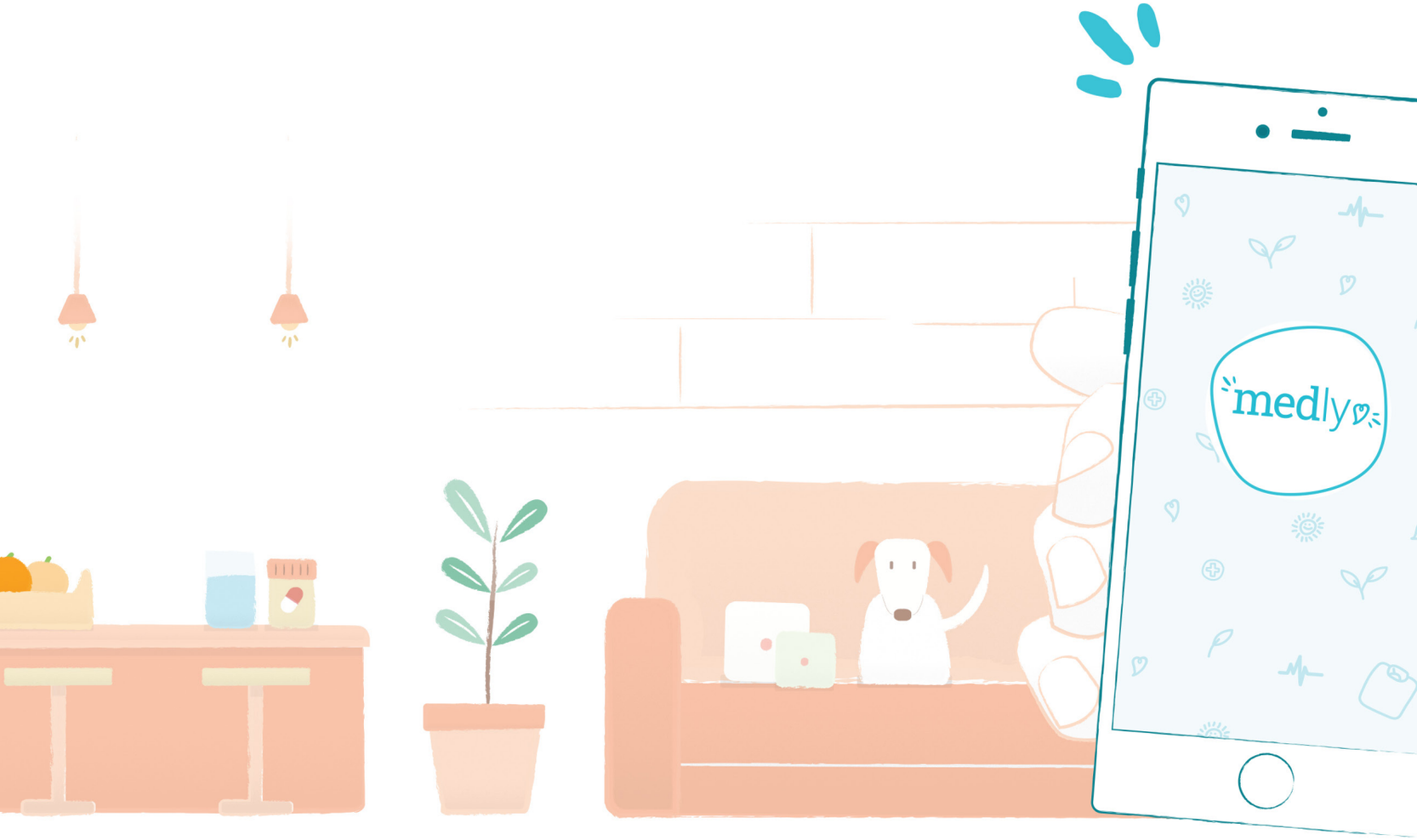
medly

a companion for heart care.

Program Overview



Designed and created by:

UHN

eHealth INNOVATION

TED ROGERS CENTRE FOR HEART RESEARCH

UHN Peter Munk Cardiac Centre

HEALTHcare HumanFACTORS

Heart Failure Affects One Million Canadians

The growing burden of heart failure requires us to adapt to address this challenge.

Heart failure is a complex chronic condition that occurs when the heart is unable to pump enough blood to meet the body's needs. It is the most rapidly rising cardiovascular disease in Canada, with more than 50,000 new diagnoses each year, and affects over one million Canadians[1,2]. With recurring exacerbations, heart failure is the single most common reason for hospital admission and readmissions in Canada[1]. Thus, it is a major driver of rising health care utilization, costing the health system approximately $482 million in 2013[3]. Due to advancements in the clinical management of heart failure, more Canadians are living with heart failure and other comorbid conditions, further adding to the burden of heart failure on the Canadian health system. With projected costs of heart failure-related hospitalization increasing to over $722 million by 2030, the need to curb the use of acute health services is more critical now than ever[4].

Patients with heart failure need greater support.

Patients with heart failure experience symptoms such as swelling in the lower extremities, fatigue, and shortness of breath, which can limit their ability to function and impacts their quality of life. Alongside guideline-directed medical care, heart failure management requires patients to take an active role in their care by maintaining a low-sodium diet, restricting fluids, and taking their medication as prescribed[1]. Heart failure self-management is often complicated by a lack of access to heart failure specialists and the actionable information needed to most effectively manage their condition[1,5].

Clinics are challenged with high patient volumes and prioritizing the urgency of patient needs.

Numerous studies have demonstrated the efficacy of heart failure specialty clinics, in particular for patients recently hospitalized with heart failure or those at a high risk for exacerbations[6]. Given the chronic and deteriorating nature of heart failure, typical management occurs on an ongoing basis post-discharge. With the growing prevalence of the condition, heart failure clinics are facing a serious capacity challenge. A new framework for heart failure management is needed to deal with these large volumes and to ensure that the appropriate resources remain accessible and provide patients with continuity of care during times of high acuity as well as periods of stability.

Telemonitoring enables effective heart failure management in the home and community.

Critical heart failure management goals such as preventing unnecessary hospitalizations, improving survival rates, and improving patient quality of life can be achieved through appropriate self-management and optimized clinical management[7]. Heart failure telemonitoring interventions challenge traditional care delivery models and have been shown to reduce mortality and hospitalizations as well as improve patient quality of life[8-10]. Clinical studies have demonstrated that telemonitoring can support the transformation of fragmented care into an integrated delivery model that ensures greater continuity of care.

However, traditional telemonitoring interventions lack the technical and clinical sophistication to provide a scalable solution capable of addressing the burden of heart failure across Canada.

What is Medly?

The Medly telemonitoring program for heart failure management was developed at the University Health Network (UHN) to assist patients and clinicians with the management of heart failure.

The program consists of two key components:

i) ***The Medly System:*** The core technology components that support the active monitoring of patients.

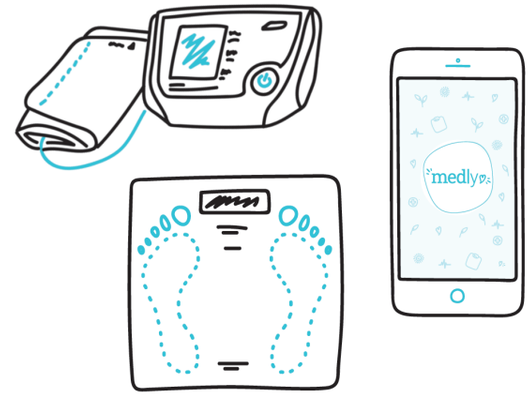
ii) ***The Medly Service:*** The key people, processes and tools required to operationalize the *Medly* System.

Medly System

The **patient-facing technology** includes the *Medly* smartphone app and peripheral devices (weight scale and blood pressure monitor) which enable patients to measure and record their weight, blood pressure, heart rate, and symptoms. Patients take these readings daily and receive automated phone calls as regular reminders. The recorded measurements are immediately analyzed by the *Medly* algorithm, a proprietary rule-based expert system within *Medly* which was developed, refined, and vetted by heart failure clinicians from the Ted Rogers Centre for Heart Research at the Peter Munk Cardiac Centre[11]. The *Medly* system is Bluetooth-enabled for patients to benefit from automatic data transfer wirelessly from the devices to the app.

The ***Medly* algorithm** automatically generates self-care feedback messages based on personalized thresholds and treatment plans (i.e. prescribed medications) set by a patient's clinician at the time of program enrollment. Examples of patient self-care feedback include advising when they are within or outside their personalised normal range thresholds, instructing them to take their prescribed medication, and suggesting when to contact their heart failure clinic or go to the emergency department. Parameters that fall outside the personalized thresholds also simultaneously trigger an alert for the *Medly* clinicians on the patient's care team.

The **clinician-facing technology** is the web-based *Medly* Dashboard that enables clinicians to rapidly assess a patient's health status and respond to patients who have alerted through the *Medly* app. The patient summary feature is a compilation of relevant patient-level information for heart failure management, including a current medication list, heart failure-related laboratory data, and historical trends displayed graphically to support clinicians with timely clinical decision-making. Through the alerts centre feature, clinicians are provided a summary of the most recent patient alerts, including the patient parameters which triggered the alert and the specific self-care feedback message provided to the patient. Finally, patient profiles are accessible, offering the ability to easily adjust or add to patient-specific thresholds, medications and laboratory data from any location.



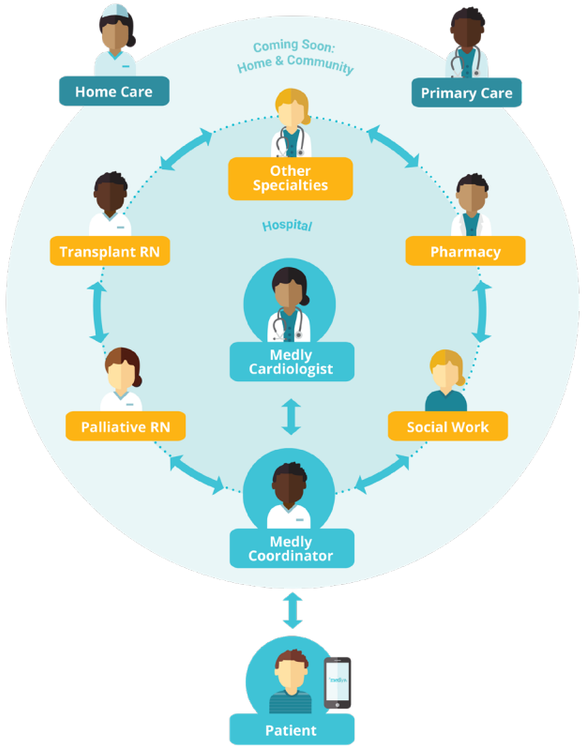
Medly is a Class II Medical Device as classified by Health Canada. Our engineers and designers work hand-in-hand in an agile development process to incorporate user feedback, realities of clinic workflow, and patient safety considerations in the development of the system. *Medly* product development follows the ISO 13485 Medical Device Quality Management System, ensuring that *Medly* consistently meets the evolving quality standards of the medical device industry.

Medly Service

Through our innovative model of care delivery, one *Medly* Nurse is able to provide comprehensive care for up to 300 complex chronic patients.

As a single point of contact for patients, the coordinator is able to build trust with patients & caregivers, understand patients' comprehensive needs & medical history, and support them with care navigation. A tight network of healthcare providers within the hospital enables the coordinator to collaborate with all providers in the patients' circle of care through a shared digital record and secure email. This allows for more cohesive care management, and smoother transitions between clinical services. The *Medly* application and clinician dashboard help foster communication between patients & providers, and create efficiencies in clinical workflows.

The *Medly* team has developed flexible options for patients to acquire the devices needed for the *Medly* program[12]. These range from a full-kit model (the program provides all required devices) to the bring-your-own (BYO) model (the patient uses their own devices). When a patient is onboarded, the *Medly* Coordinator reviews these options with the patient and their MRP to determine the best fit, enabling a better patient experience.



Medly Program Development

The *Medly* program was developed by an integrated public sector team of heart failure specialists, researchers, engineers, designers and human factors experts. As such, the program is not only evidence-based, it is infused with the practical clinical knowledge and processes of Canada's leading cardiac care centre. In addition, the *Medly* program continues to be rigorously evaluated, enabling the continuous deployment of clinically-valid and user-tested enhancements to both the system and delivery models.

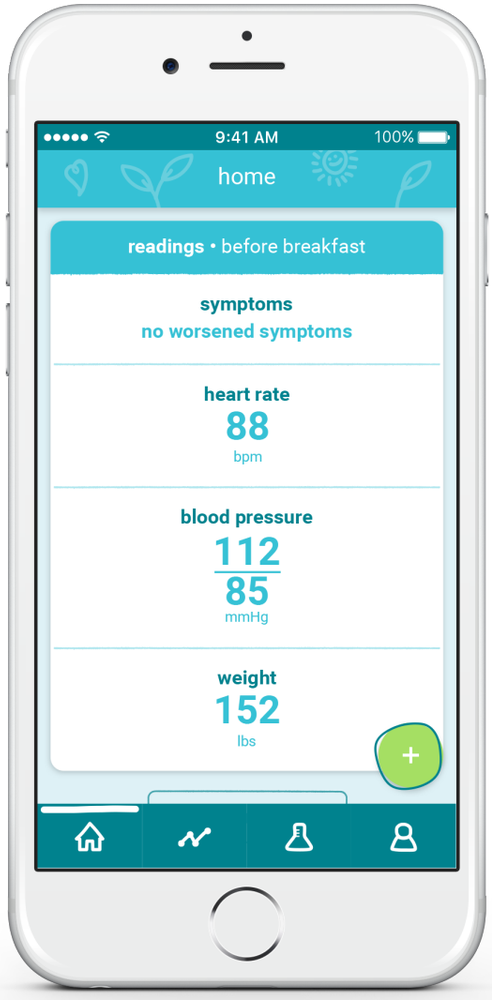
Recently, the team at UHN has sought to marry fundamental techniques of Service Design with the field of Implementation Science to ensure that all deployments of the *Medly* program achieve a high level of integration success in a range of cardiac care settings. [12,13]

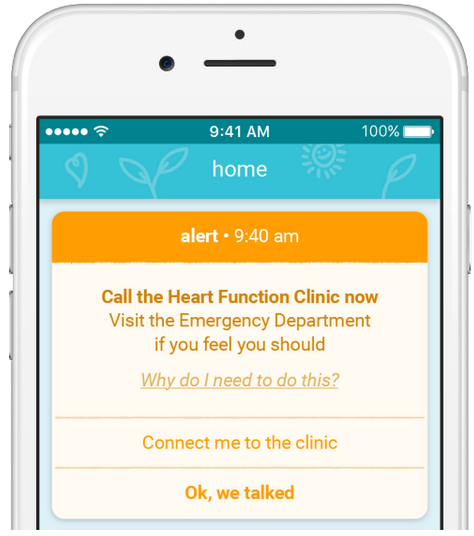
Understanding that each site is unique - including the services rendered, clinicical workflows, and patient populations - the *Medly* program roles and deployment models are reviewed and customized on a clinic-by-clinic basis to fit the needs and goals of each site.

Patients, providers and clinics will all benefit from a solution designed by the Canadian health system.

Why Medly?

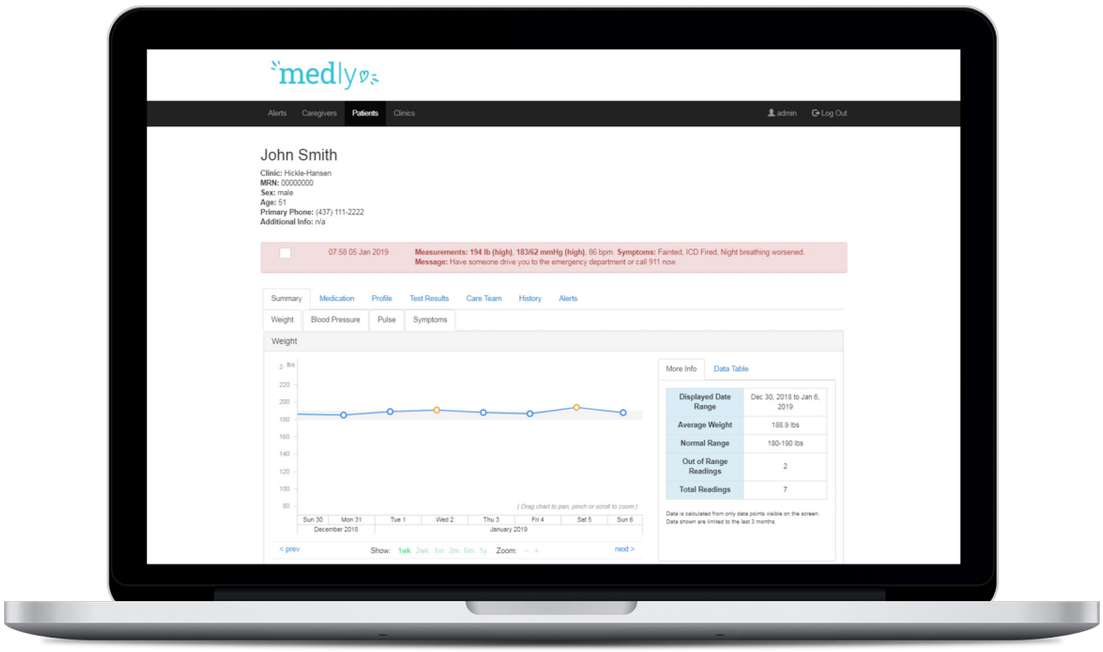
Patients gain peace of mind and improved quality of life from the ***Medly*** algorithm's real-time actionable feedback.

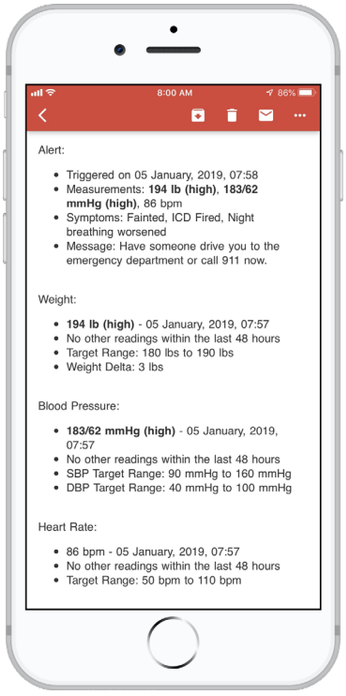




The *Medly* program empowers patients with the tools to self-manage their heart failure. Through the morning task cards and the automated phone call reminder system, patients develop the habit of taking their important readings on a daily basis. The instant actionable feedback that they receive upon taking their readings enables patients to feel more confident in their self-management abilities. Patients have profound peace of mind knowing that all readings are sent to the *Medly* coordinator and at that a member of their care team can act immediately at the first sign of trouble.

Clinicians can rapidly assess patients' health status through the ***Medly*** Dashboard and automated email alerts.



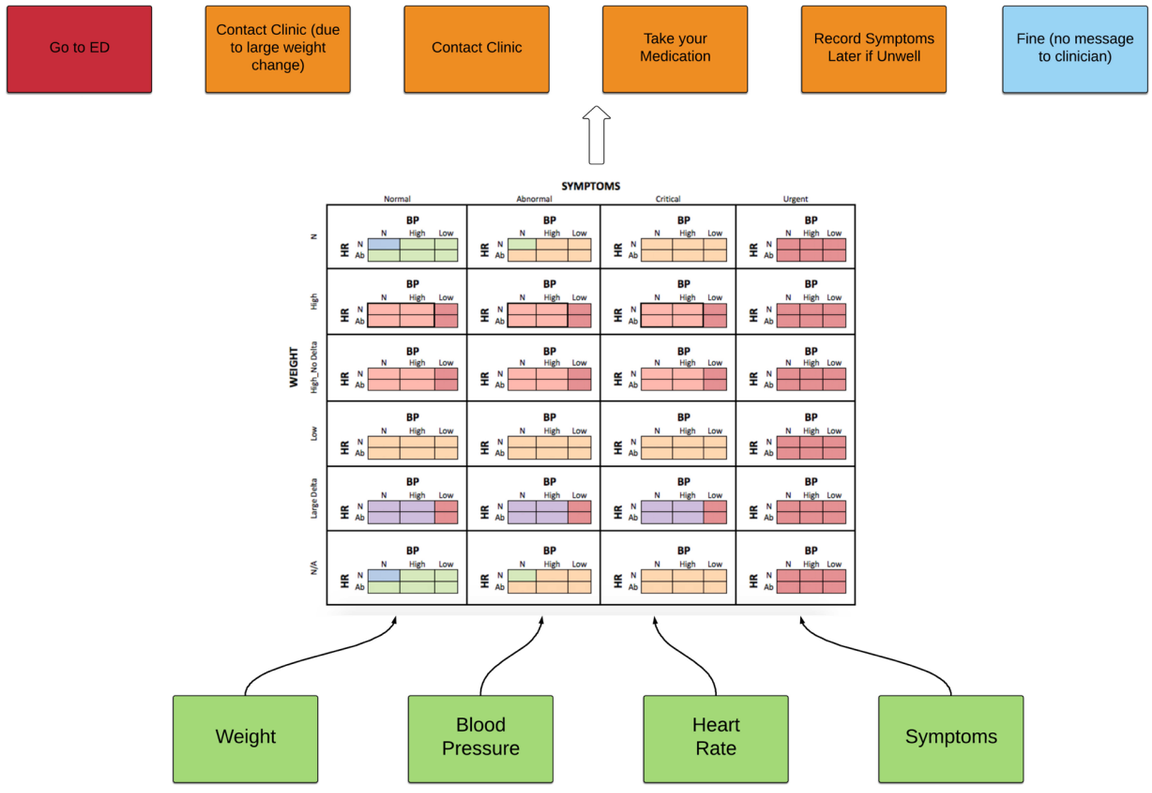


The *Medly* Dashboard provides clinicians with a holistic picture of their patients' clinical status and recent symptoms consistent with acute exacerbations, by compiling patient readings and alert history, recent lab results, and current medication list. Importantly, this data is contextualized thanks to the *Medly* algorithm, to truly support clinical decision-making. Understanding that clinicians often need to respond to patients rapidly and on-the-go, the *Medly* Dashboard offers clinicians the ability to receive all or only the most critical patient alerts and relevant data via secure email. Thus clinicians have the comfort of knowing they are offering the best care possible, wherever they are.

Clinics benefit from the ***Medly*** program's optimized clinician-patient ratio.

The heart of the *Medly* program is the *Medly* algorithm, which optimizes human resources by enabling the frontline *Medly* coordinator to manage up to 300 patients daily. Unlike other telemonitoring systems, patient data that would typically require a human response are outsourced to the expert-system algorithm; freeing up clinician time to deal with the most critical alerts without compromising the benefits of daily monitoring for both parties.

	PROVIDER	PATIENT
Conventional	1	25 to 100
medly	1	300



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