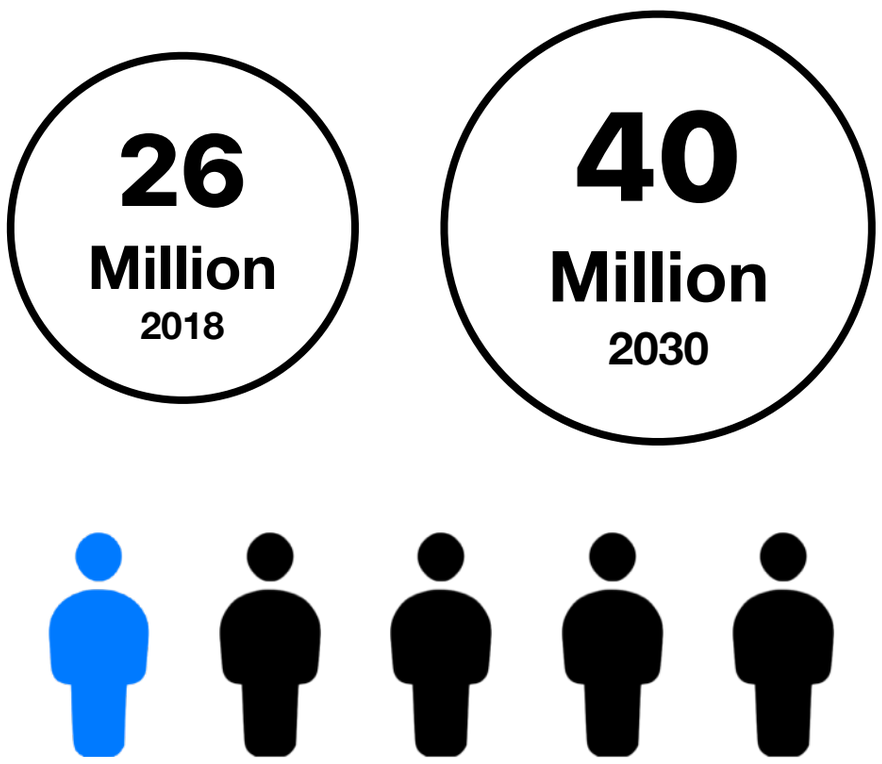
Linda

A personal assistant to reduce the burden of chronic heart failure

Overview



Chronic Heart Failure is a widespread medical issue that
affects more than 26 million people globally, with numbers rising by the year (projected to 40M patients in 2030).

Currently at 40 years of age the lifetime risk of developing CHF
is one in five.

Low therapy adherence and insufficient monitoring
that result in late intervention on complications
heavily increase the cost of treatment and mortality.

Current problems

Chronic heart failure **therapy is complex** and difficult to manage.

Identification of complications and clinical worsening is usually late.

The patient doesn’t feel involved in the therapeutic process and can’t be assisted real time.

There is no way for a physician to have a complete vital history (day by day) of each patient.

Most attempts for a solution **lack in simplicity** and ease of use, which are essential for an aging population.

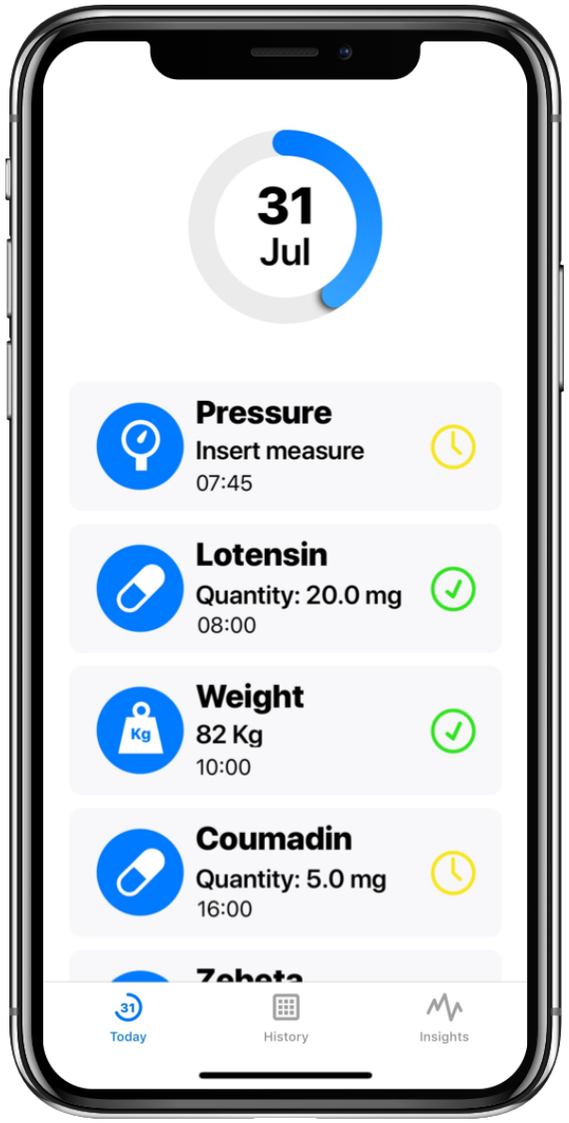
Solution

An iOS app that functions as a supportive medical tool with a simple and easy to use design.

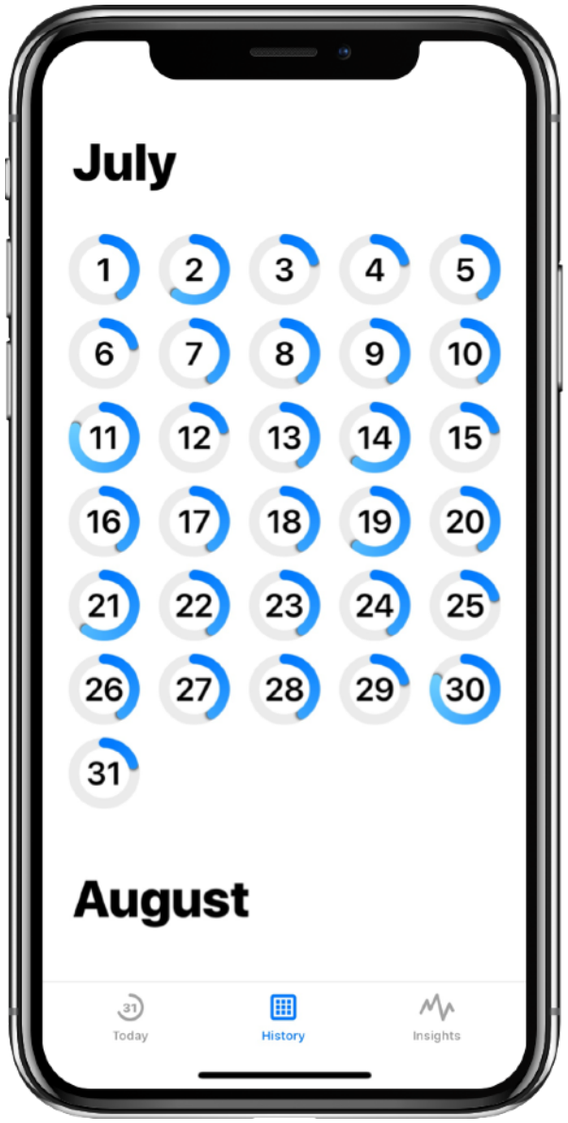
A non-invasive personal assistant that helps the patient manage his own therapeutic process by providing daily reminders and a clear overview of his status.

Passive data collection and continuous monitoring of the patient's vitals, analyzing symptom progression silently.

Adherence to therapy



Clear vision of therapeutic schedule and today’s progress



Historic view of therapy compliance

Effective reminders for each scheduled step

Alert and monitoring

Predictions of health deterioration alert the patient to seek further medical evaluation

Clear and complete overview of the patient's therapeutic history available real time for the physician.

Edema prevention through weight analysis.

Autonomous nervous system assessment via heart rate variability.

Tachycardia alert through Heart Rate monitoring.

Hypotension/hypertension alert via blood pressure analysis.

Business Model

Key Partners	Key Activities	Value Propositions	Customer Relationships	Customer Segments
• Physicians and Health clinics • Universities • Pharmaceutical companies • Investors	• Big Data Analysis • Research • Maintenance of IT system • Marketing	• Easy therapy management system • Continuous monitoring of patients' vitals • Adaptive alert system for health deterioration • Remote review tool for Physicians	• Self-service • Automated service • Community	• Patients with chronic heart failure • Physicians and Health clinics
	Key Resources • User Generated Data • Algorithms and Analytics • Platform Architecture		**Channels** • Mobile App (iOS) • Smartwatch App (watchOS) • Web Application for Physicians	

Cost Structure	Revenue Streams
• Maintenance of IT system • Research and development cost	• Creating new services enabled by machine learning and data mining • Creating and selling data

Roadmap to scalability

Chronic heart failure is the endpoint of many diverse diseases, each requiring different clinical and pharmacological approaches.
The diversity of data acquired by Linda raises the value of potential future analyses.

Collecting accurate and reliable medical-grade patient data on drug consumption, biometrics and vitals is essential for our cause.

Through proper analysis we can:

Increase the efficacy of the therapeutic process

Increase accuracy of marketing and create partnerships

Innovate and revolutionise the healthcare industry even outside of chronic heart failure

A concrete example: innovation on atrial fibrillation

Atrial Fibrillation is a dangerous medical condition that carries great risks, such as stroke and ischemia. There is currently no simple and reliable way of detecting it outside the clinical setting.

Every individual over 50 years of age has the potential of developing Atrial fibrillation, with more than a million people dying of the disease each year. More than 30% of chronic heart failure patients have atrial fibrillation

How can Linda help us? Linda is the engine behind the innovation in this sector: thanks to her data we can split the entire chronic heart failure population in AF/ non-AF patients using warfarin consumption as the differentiator. Using machine learning techniques we can predict early signs of atrial fibrillation and possibly extend the results to the general population.

This non-invasive solution has the potential of saving more than a Million lives a year.

Team and motivation

The multidisciplinarity of our team is an essential asset.
We believe that the value of our project lies in the combination of our medical and technological knowledge.
Winning the Novartis challenge would make us grow as people through
the development of a potentially game-changing project.

Andriy Melnyk

Medical student at the University of Padua

Visiting student at the Oncological Institute of Veneto (IOV)

Andrea Agostini

M.Sc. Student in CS and engineering at Politecnico di Milano

Research activity at the National University of Singapore on a smartwatch-based system for acute medical settings.

Lorenzo Bernaschina

Software Engineer at Cefriel - Politecnico di Milano

WWDC17-18 Scholarship Recipient