

*Designing the Future of*  
**Healthcare**



## Involution's design practice is dedicated to innovation in healthcare.

Over the past decade, our team has a significant track record of creating beautiful software for patients, clinicians, researchers, and administrators, working with organizations as far-reaching as AstraZeneca, Becton Dickinson, Johnson and Johnson, 3M Health Information Services, the U.S. Department of Health and Human Services, and Walgreens.



We offer the entire gamut of services related to the design and development of health / healthcare software, including:

- Product design
- Product ideation
- Product planning and architecture
- Use case exploration and validation
- User experience research
- User interface design
- User interface engineering
- User testing

Involution Studios is a mission-driven organization made up of expert designers, engineers, researchers, and futurists, founded on the idea of making tangible and positive change in the world.

How can we help you innovate the future of healthcare?

*"With Invo, design wasn't just design. It impacted our IP portfolio. It changed our business."*

Serban Georgescu, MD InfoBionic Director of Clinical Development



## Case Studies



## *CodeRyte and the next generation of coding software*

In order for hospitals to get paid for their services, they must tag patient records with unique diagnosis codes. This manual process, typically completed by an army of “coders” at the hospital, drives billions of dollars in insurance reimbursements.

CodeRyte had a profitable niche providing coding software to hospitals, but they were seen as just another application in an already complicated process. The CodeRyte executive team saw a bigger opportunity—to take over the complete coding experience. They had the industry expertise and know-how, but transforming their application into a best-in-class silver bullet for hospital coding requirements was a massive software challenge. To solve it, they called Involution.

### **The challenge was big, so we started small**

Having designed over 50 major enterprise applications, Involution has a pretty good sense about how deploying great software needs to happen. Rather than crafting a high six or even seven figure engagement, we proposed a proof of concept—eight weeks of a small Invo special forces team going in deep with the core CodeRyte crew. This would breathe life into the idea, get us deeply into the vertical space, and let both sides kick the tires on working together.

*“We needed to make sure we could do this. Invo proved we could. We needed to make sure we could sell this. Invo gave us the tools to do that, too.”*

George Moon, VP of Product, CodeRyte Inc.



When they first saw the results of our work, the CodeRyte executives lit up. They knew this problem could be solved, but the chasm from vision to manifestation can be a daunting one. The future of CodeRyte was no longer just grand ideas. It was this, here: gorgeous screens that solved dozens of problems being faced daily by users.

Home

All 3 Documents

2 Physicians

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**EMERGENCY DEPARTMENT**

- Admission  
Dr Alfred Bosch  
30.Dec.10, 3:45 PM
- Ambulance Note  
Dr Seuss

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**PHYSICIAN ORDERS**

- Progress 11/09/11  
Dr Seuss

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**COMMENTS**

- Yes, add 482.10.  
Cecilia Charles, 28 mins ago
- Cecilia, do you see enough evidence to add 482.10?  
Shawn McGuire, 40 mins ago
- Missing documentation on patients lab reports.  
Shawn McGuire, 41 mins ago

[Add comment](#)

## Emergency Department

### Admission

Dr Alfred Bosch  
30.Dec.10, 3:45 PM

Transcribed Document Print by MRDJFJ at 1/12/2011 11:40:34 AM

(Redacted) 26yo M 12/31/1984 (182.9cm 82.0kg BSA: 2.04m 01/12/11)

HP 12/30/2010 History and Physical

Blood cultures are pending. Urine culture is pending.

IMAGING DATA: Chest x-ray has been done, but there is no report yet.

ALLERGIES: The patient is not allergic to anything.

### ASSESSMENT AND PLAN:

1. New leukemia **208.00**   with hyperleukocytosis. At this point, his hemoglobin is too low to do apheresis. We are going to give him 3 units of blood. I have notified apheresis physician.

2. Hyperleukocytosis **288.60** with tumor lysis syndrome potential. I am ordering every 8-hour labs with lytes on ice, creatinine, phosphorus and uric acid every 8 hours.

3. Potential for disseminated intravascular coagulopathy (DIC). **295.00**   I have ordered coags every 8 hours. Will address his pro time of 20.2 with some FFP and vitamin K.

4. Potential for infection. We are going to continue the above antibiotics and alter them as the cultures come back.

New leukemia process. I have already ordered a bone marrow this morning

Anxiety related to the new admission and leukemia process. A lot of emotional support was provided for his girlfriend,

### Ambulance Note

Dr Seuss  
31.Dec.10, 4:12 PM

Original  
Readable

Back

54687988490

NO - No Physician Orders

Next

## Enter Code

### ICD-9 Diagnoses

#### REASON FOR VISIT

**286.00**

Acute lymphoid leukemia, without mention of having achieved remission

**486**

Pneumonia, organism unspecified

**285.22**

Anemia in neoplastic disease

**288.60**

Leukocytosis, unspecified

**208.00**

Leukemia of unspecified cell type acute without mention of having achieved remission

### CPT Procedures

**96.71**

Continuous mechanical ventilation for less than 96 consecutive hours

**99.25**

Injection of infusion of cancer chemotherapeutic substance

### ICD-9 Procedures

**292.14**

Dementia in conditions classified elsewhere without behavioral disturbance

Shawn McGuire

Submitted 2 mins ago

**CODE** Added 208.00

**STATUS** Active

Shawn McGuire

Submitted 20 Dec. 11 at 3:57 PM

**STATUS** NO - No Physician Orders

**CODE** Deleted 492.00

**DOCUMENT** Un-assigned  
pCR5043725\_0

**CODE** Added 286.00

**CODE** Added 288.60

**CODE** Added 292.14

**CODE** Rejected 285.22

**CODE** Approved 208.00

Cecilia Charles

Submitted 18 Dec. 11 at 10:42 AM

**ROUTE** Routed to SMR queue

Help Feedback

With CodeRyte galvanized behind the project, Involution started a new 12-week engagement to make a working prototype. Not only did this improve the platform for the full design and implementation to come, it gave CodeRyte an exceptional sales tool that reinforced this would be real software—not vaporware. Orders quickly followed.

## Good things come to those who rock it

As design shifted more into engineering and implementation, more than a year passed. The launch was getting close, and the teams at Invo, CodeRyte, and now 250 other major customers were excited: healthcare coding workflow was going to change for the better. But we weren't the only ones watching and excited. So was 3M.

The \$30B company was a partner of CodeRyte's for the past three years. Partnership was fine when CodeRyte was offering a tool that augmented the many things 3M does. But once 3M realized CodeRyte was about to radically change their market, a partnership was no longer enough. So they opened their wallet to the tune of \$146M in order to bring make the 125 person CodeRyte Inc. an integrated part of their global offerings.

## The morning after

About two weeks after launch, CodeRyte got a frantic call from the lead manager at one of their largest customers. CodeRyte had completely stopped working in the middle of the coders' shift: no patients were entering the system to be coded.

Within 30 minutes our team and CodeRyte's discovered the problem: there were no patients left to code. The software worked so well that the backlog of coding was passed, and there was, for a period of time, no more work to do.

Never in the history of this hospital system had this happened. The efficiency of the software turned the bureaucratic quagmire of massive backlogs of patient coding into a just-in-time system that required less manpower and delivered faster results. The hospital system has since been able to change their procedure and conservatively estimates a 200% increase in efficiency in their coding workflow.

Right: Creative Director Eric Benoit sits surrounded by dozens of CodeRyte sketches



# hGraph

*Your health in one picture*

Healthcare data is big, disparate, and often unstructured, making the quick extraction of useful information from health records a significant challenge. In order for patients and healthcare providers to make actionable decisions, they require analytic tools that both collect data and make sense of it.

## An open source design

hGraph is the only open source tool for visualizing a patient's complete range of health metrics. Designed by Involution, this one-of-a-kind visualization approach aggregates health data both on a personal and family level. It provides clinicians with at-a-glance analytics of a patient's overall health, allowing doctors to spot patterns and potential red flags.

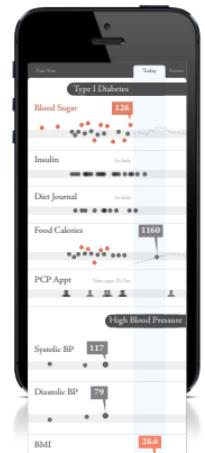
hGraph works by comparing a person's health data against targeted health ranges based on factors like age and gender. Metrics that appear red are either lower or higher than the "good health" range. The hScore is an overall, aggregated score of health (1-100) that represents a person's health status.

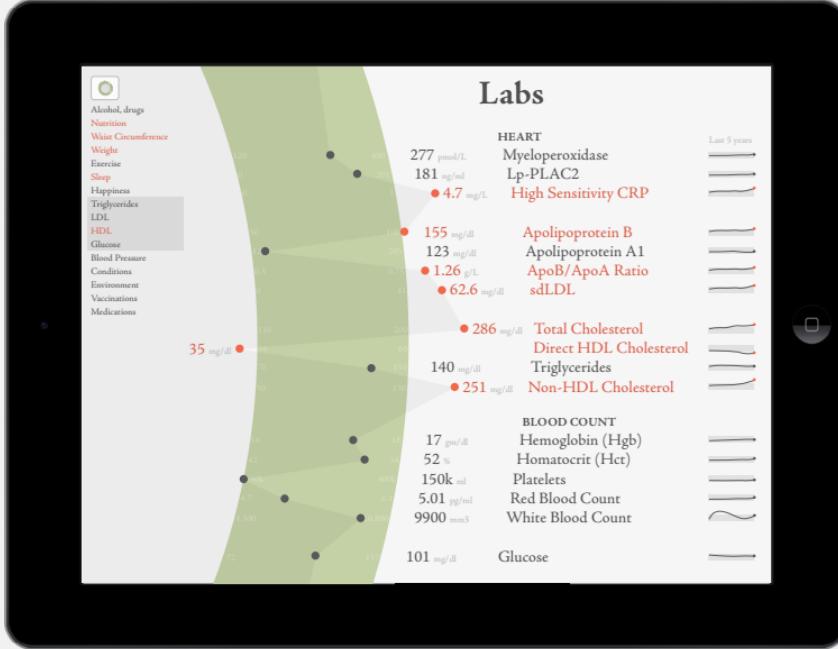
hGraph instantly shows clinicians a patient's leading conditions, allowing them to make faster, smarter life-critical choices. hGraph provides medical professionals with the tools they need to improve the outcome of their patients' health.

## Leading the charge for change

The hGraph project intends to change the way we manage and interact with our health, and in turn help to make the healthcare industry leaner, cheaper, and more effective.

In addition to adoption by patient portals and EHRs as a next generation visualization tool, hGraph has also been utilized in pilot programs

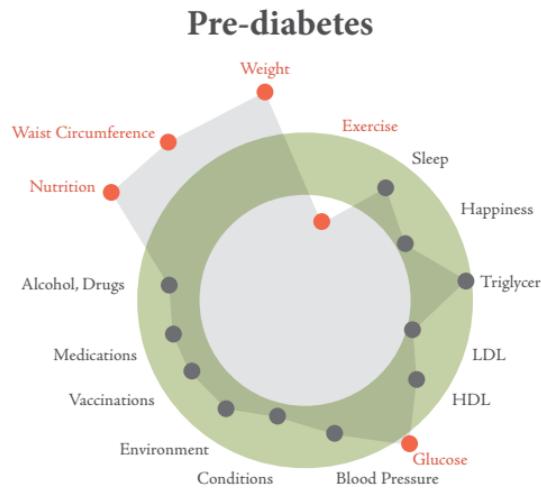




Users can zoom in to inspect each data point or view hGraph on a broader level. Based on an individual's health data, hGraph identifies where an individual's health numbers are, and where they should be.

at a major retail pharmacy and at Facebook's campus health clinic. These companies lead a trend of businesses improving worker productivity and their bottom lines by taking a more active role in monitoring employees' health. Organizations such as these are in need of tools to capture a holistic view of employee health to better integrate and coordinate their health programs with outside health centers.

hGraph has also been featured in WIRED, at Stanford Medicine X, and was a showcased entry in the National Patient Record Redesign.



hGraph displays behavioral patterns as well as test data to give a complete picture of a patient's health. With hGraph a doctor could identify patterns that could eventually lead to conditions like diabetes or hypertension.



**Mount  
Sinai**

# The hunt for genetic heroes starts with eConsent

Stephen Friend, co-Principal Investigator on The Resilience Project, took to the TED 2014 stage to showcase the hunt for unexpected genetic heroes. The Resilience Project is a joint Mount Sinai Hospital and Sage Bionetworks effort to find rare people whose genetic information holds critical clues to unlocking the complex puzzle of disease, its manifestations, and management.

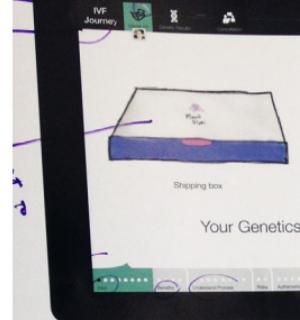
These unique individuals genetically show a condition such as cystic fibrosis, but exhibit none of the physical attributes of the disease. To locate these genetic super heroes, The Resilience Project would sequence 100,000 entire human genomes, a radically innovative mandate.



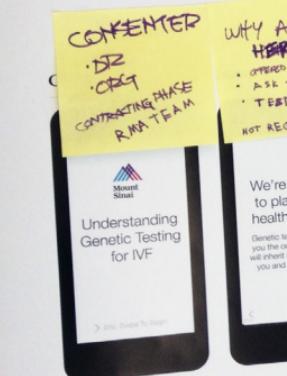
Stephen Friend at TED 2014

Rewind four months: In New York City, the Involution team met with Eric Schadt, director and founder of the Icahn Institute for Genomics and Multiscale Biology, at Mount Sinai Hospital. We were there to discuss Eric's vision for software that would drive genomic research — from genomic prediction modeling to genome/trait visualization to eConsent to dynamic genetic counseling software for patients and clinicians.

An open source platform for electronic consent was quickly selected as the top priority. Such a service would allow patients to digitally decide if they wanted to participate in research studies or release their data to R&D organizations to allow clinicians to test and report on it. Across the planet, the current consent process is a paper-based. A cloud-based, open source, SaaS (software as a service) framework would allow any hospital to transition from the current clumsy, inefficient paper-based process to a hyper-personalized, analytics-driven consent.



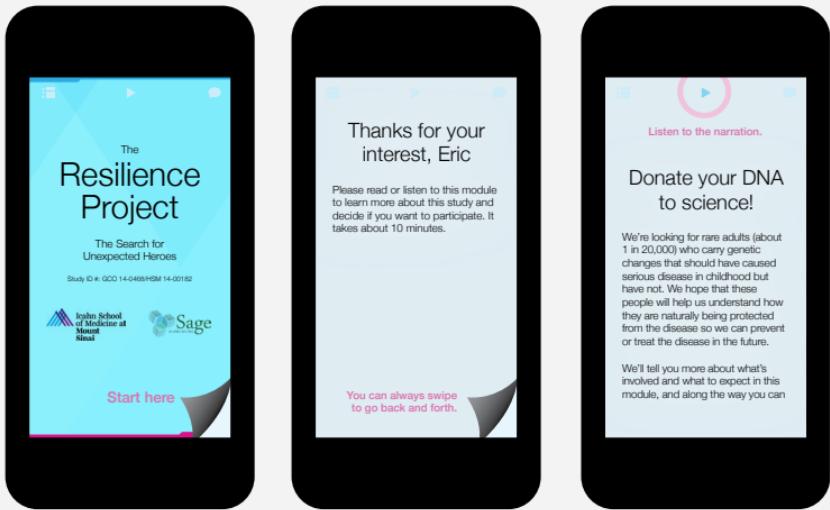
1 STORY BOOK



MINI EDU. GRAPHIC

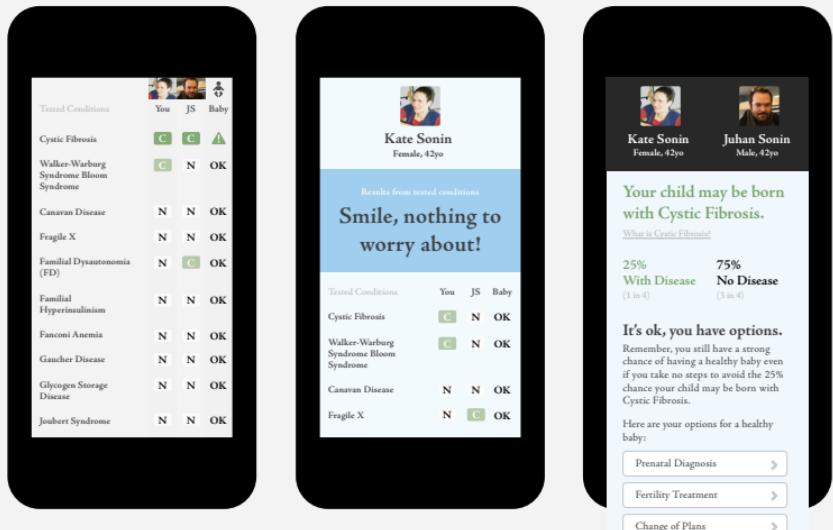
Involution began work on envisioning the ecosystem around eConsent, using genomics testing as our baseline. At Mount Sinai Hospital, genomics testing occurs frequently during the IVF process (in vitro fertilization). Not so coincidentally, in mid-town Manhattan, Dr. Alan Copperman runs one of the busiest and most progressive IVF clinics in the world. He and his team were our early adopters, our clinical feedback loop, and educators.

### eConsent platform, mobile



In a world where 64% of adults in the US own smart phones, the patient-facing eConsent service had to be mobile. It also had to accommodate interactive educational lessons, different learning styles, and adaptive learning content based on the patient's understanding and emotional response. We included a voice user interface, voice signature capabilities, and an expression comprehension service.

### Genetic results, mobile





## The Resilience Project: A Search for Unexpected Heroes



Thank you for your participation in the research study, "The Resilience Project: A Search for Unexpected Heroes". With the help of people like you, we are moving closer to understanding the biology of rare diseases, and hopefully closer towards treatments or even prevention.



Juhani Sonin

42yo Male Study # 100567

### RESULTS

**You do not have the rare mutations.**  
This is good news!  
Since you were not found to have two copies of any of the disease-causing mutations, at this point your participation in this study is complete.

### TESTED

576

Genetic Mutations

136

Genes

106

Inherited Disorders

Results on 12.Mar.14, 3:45 PM from The Icahn School of Medicine at Mount Sinai.

Again, finding people with this is rare, only expected in about 1 in 15,000 people, which is why we are looking at the DNA over 100,000 people. To review the genes and diseases our researchers investigated in this study, turn the page of this report and see the list.

Our database is growing, and thanks to people like you, researchers around the world will continue to benefit. If you have any questions, feel free to contact us at: 800.555.HERO or [resilienceproject@mssm.edu](mailto:resilienceproject@mssm.edu).

Thank you,

The Icahn School of Medicine at Mount Sinai and Sage Bionetworks

## A path for better patient consent

The CaaS (consent as a service) project dovetailed perfectly with Mount Sinai and Sage Bionetworks' efforts on The Resilience Project. The mobile eConsent software would be the driving force in getting willing participants to sign up and allow their genomic data to be used for science.

The success and scale of The Resilience Project hinges on electronic consent. The Mount Sinai team, together with Involution saw a solution to bypass the crazy, analog, and impossible-to-distribute consent process and ultimately give patients an easy-to-understand report on their basic genomic traits and how their genes could impact their potential offspring.

The project is slated to launch in 2015.

Left: Sample genetic report for The Resilience Project.

Outcome





## *The Personal Genome Project gains a new business focus*

The Personal Genome Project (PGP) needed some perspective. Their mission was to sequence and publicize volunteers' genomes for scientific research — to be used to improve the management of human health and disease. But every PGP member saw the organization functioning differently, with different objectives, and in the end, PGP's partners and users were the ones suffering. To help understand how the PGP could better fulfill its goals and serve its members, the organization turned to Involution.

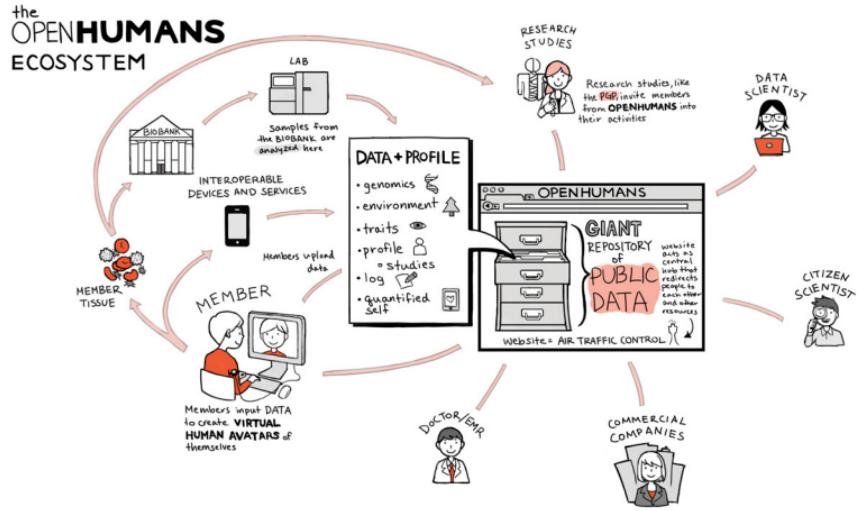
### **Mapping the problem**

The PGP sought out Involution for the healthcare design studio's reputation of creating adaptable user experiences that meet both current

and future needs. Involution's team met with the PGP's staff to map the company's ecosystem, in order to visually understand how the organization was functioning in conjunction with its users. Jason Bobe, Director of Community, of the PGP, believes the workshop gave his team a forum to tease out their big ideas as well as their roles within the organization. "It was time for us to step back and talk about what that overarching goal was and we did that through this workshop. It was very helpful."

Through a meticulous experience mapping exercise, the PGP finally saw their organizational model through the lens of the many different users they were serving.





The PGP understood that their voluntary members—those who were donating their genome and medical histories—were the type of people who were willing to take on great potential risk to help advance scientific discovery. They had done a good job of educating their members on the possible risks associated with publishing their data for the world to see. However, the members received little to no feedback on if their information was being used, how it was being used, or the potential impact of their contributions. The PGP needed to find a way to better nurture their member relationships so the project could continue striving toward its goal of 100,000 participants.

## The birth of Open Humans

The outcomes from the workshop and mapping exercise were astounding: What resulted was a complete re-imagining of the PGP's organizational model to separate their member recruitment efforts from the data collection and sequencing, and truly focus on their relationships with participants.

The idea for Open Humans emerged from this new vision of the PGP, as a separate digital service that connected people with innovative research studies and, in return, gave users access to the data these studies produced. With Open Humans, members would be able to see how their data was being used to contribute to the advancement of science and medicine.

*"We really needed a mutual third-party like Involution. With Involution's insight, the PGP saw how it was functioning and where it was suffering."*

Jason Bobe, Director of Community, Personal Genome Project



By providing the PGP with the design tools and consulting expertise, Involution was able to serve as the catalyst for a new organizational model. Not long afterward, the PGP received \$1 million in grant funding for the Open Humans project from the Robert Wood Johnson Foundation and the Knight Foundation.

# Care Cards

*Healthy behavior  
change*

Juhan Sonin, Involution's director, was trying to live a healthier life. While he discovered an abundance of tips and resources on the Internet, they were far-flung and temporal. And while his doctor offered advice, that also proved impermanent, consumed by the frenetic pace of everyday life. The Care Cards were born from this need to take healthful tips and make them habits, incorporating them into daily routine in a lasting way.

The Care Cards highlight habits to improve your health and well-being. On the front of each is a beautiful illustration reminding you of a specific, healthful axiom. On the back are essential insights and tips that help you bring that axiom into your everyday life.





[www.carecards.me](http://www.carecards.me)

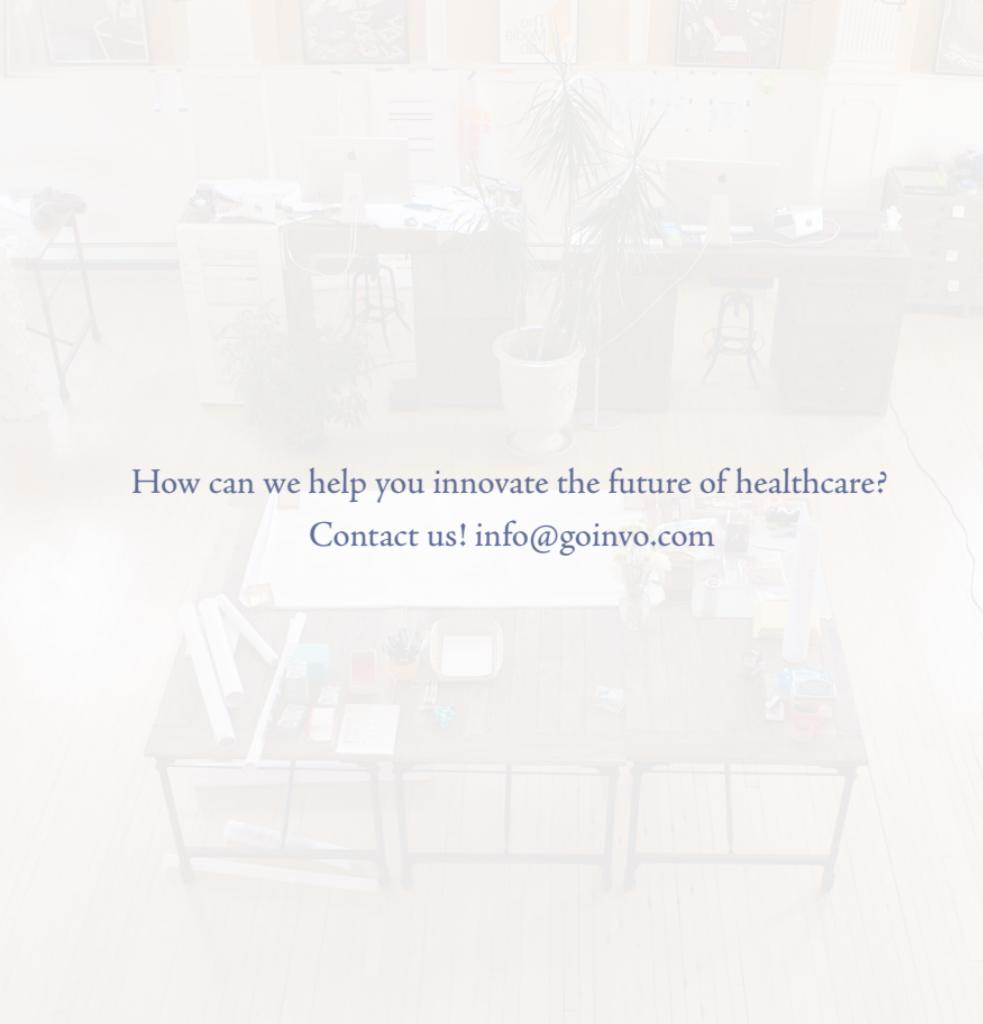
## A healthcare philosophy for the 21st century

We are part of a global movement to shift the healthcare system to:

- Non-invasive personal diagnostics
- Highly specialized clinicians that work closely with patients
- Self-monitoring, self-empowered patients

Realizing these ideals is equal parts smart technology, healthcare reform, and everyday common sense. Living the Care Cards focuses on the common sense part, taking easy-to-understand and realistic-to-implement practices that can become part of our lives in a sustainable way. The outcome directly impacts our health, is smarter for our lives, and is even better for our pocketbooks. It all starts with awareness. And that's where the Care Cards come in.

Released to little fanfare, the Care Cards quickly took off and enjoyed viral success. Featured in media outlets like National Public Radio and talked about by healthcare thought leaders, Care Cards are in use at a variety of hospital settings including in clinics in San Mateo, CA, New York City, and Boston, MA.



How can we help you innovate the future of healthcare?  
Contact us! [info@goinvo.com](mailto:info@goinvo.com)



