



INTRODUCTION

In January 2016, Massachusetts Governor Charlie Baker, Boston Mayor Martin J. Walsh, Speaker Robert A. DeLeo and executives from MACP joined leaders from across state government, healthcare, and the technology sector to announce a comprehensive public-private partnership designed to accelerate the competitiveness of the Commonwealth's digital healthcare industry—The Massachusetts Digital Health Initiative.

The initiative was created to bring public, private, academic, and healthcare leaders together to build a stronger and more connected statewide digital health ecosystem. The ultimate goal of the initiative is to make Massachusetts the leading global Digital Health ecosystem, in turn driving economic growth and improving healthcare outcomes and efficiency. To support digital health startups, the City of Boston, MeHI, MACP, and MassChallenge established the digital health innovation hub PULSE@MassChallenge.

A core element of the PULSE model is collaboration. We believe that when entrepreneurs and the community come together to solve problems we will accelerate innovation and transform healthcare. Our community comprises startups, Champions, business mentors, medical healthcare professionals, digital health enthusiasts, and people passionate about our shared mission of improving health through entrepreneurship.

With a broad mandate, we built PULSE to match startups with industry partners to solve healthcare's greatest challenges. In January 2016, 31 startups entered the program. 94% of the startups completed the program and at least 15 engaged in some form of pilot or implementation activity with one or more

Champions. We also observed positive indications for our secondary and tertiary goals of improving patient lives and more broadly improving healthcare. Several startups impacted real patient lives, helping them lose weight, plan for end-of-life, seek early diagnosis, or receive timely care. More impacted healthcare by saving millions of dollars annually by improving the efficiency and experience of delivering care, patient experience, and patient outcomes. Others developed digital diagnostics or medical devices that show tremendous potential, but are at earlier stages of deployment.

For a first year program, the preliminary results appear to validate our core model of collaborative partnership-driven programming. We plan to double-down on this approach as it not only generated partnerships, but led to the expansion of startup company teams, funding, and revenues while also yielding patient and healthcare outcomes.

We look forward to many more years of helping digital health entrepreneurs by developing a sustainable program, but success will hinge on the continued support of the community. We ask you to provide feedback and we encourage you to get more involved. There can be no shortage of good people trying to do good things for this world. Help us make healthcare a better place by helping entrepreneurs win.



MISSION

PULSE brings a startup-friendly approach to accelerating the development of new digital health innovations. We believe that when digital health startups win, patients win, and when they win, we transform healthcare.

At PULSE, we:

Help Startups Grow their Businesses

- Collaborate with industry-leading partners on a demonstration project
- Source through a competition model
- Target high-potential, high-impact, later-stage startups
- Award equity-free cash prizes
- Provide office space centrally located in Boston healthcare community

Activate Community

- Leverage diverse community mentors and experts
- Seek new talent aligned with strategic challenges
- Act as central hub for the digital health community

Support Statewide Digital Health Initiative

- Promote statewide efforts to bolster ecosystem
- Partner and collaborate with industry experts, supporting and attending events statewide

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“The most valuable part of PULSE is how startups and Champions are partnered together to jointly solve specific problems and bring new solutions to market. This focused approach is what makes PULSE a very successful program that I recommend to everyone in the digital health space.”

ALAINA ADAMS, CEO, Healthimation

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PROGRAM

PULSE matches startups with prominent strategic partners, also known as Champions. PULSE requires its Champions to submit three to five strategic initiatives that our process converts into challenges. PULSE exposes these challenges to the community, bringing transparency and focus to what the industry aims to address in the coming year. PULSE then sources applications with help from the community to address these challenges, aiming to attract and vet the world's best and brightest digital health startups. Finally, the PULSE application season culminates with in-person matchmaking, a process where the top rated applicant-startups (evaluated by impartial expert judges) and Champions establish partnership relationships.

2017 SELECTION AND OFFER CRITERIA

The PULSE program accepts startups that have:

1. A technologically enabled health (digital health) solution
2. A product or deployable prototype
3. Raised less than \$5M in funding and less than \$5M in revenue (pre-Series B)

To be admitted to the program, each of the 31 startups in the 2017 PULSE cohort needed to receive and accept a partnership offer from at least one Champion. Startups received over 80 partnership offers.

In 2017, Champions supported PULSE startups in one or more of the following ways:

- Dedicated Advisor – Met regularly to improve the business or product to hit the startup's key business milestones
- Co-developer – Worked together to create something new, leveraging existing capabilities or expertise from each respective organization
- Product Validator – A non-clinical pilot focused on demonstrating a product's ability to operate as described in the real-world
- Clinical Validator – A clinical pilot focused on demonstrating a product's ability to improve outcomes
- Customer – Planned to purchase the startup's solution with minimal additional adjustments or validation required to do so
- Strategic Investor – Planned to invest capital or resources into the startup

Application and Matchmaking Statistics

439

APPLICANT STARTUPS

20+

COUNTRIES REPRESENTED

30+

STATES REPRESENTED

80+

STARTUP-CHAMPION
PARTNERSHIPS GENERATED

31

STARTUPS ACCEPTED INTO
PROGRAM

7%

ACCEPTANCE RATE

PULSE 2017 COHORT

STARTUP	ABOUT
<u>3Derm</u>	Optimizes the dermatology care process
<u>ACT.md</u>	Offers a better, safer, less expensive, and more flexible approach to managing healthcare's complex tasks and achieving your goals
<u>Cake</u>	Makes it easier to discover, share, and store your end of life preferences
<u>Care Thread, Inc.</u>	Provides secure mobile messaging and team-based collaboration solutions that empower hospital providers to deliver more efficient patient care, improve patient outcomes, and shorten time to discharge
<u>ConquerX</u>	Develops a game-changing approach to cancer diagnostics and screening by leveraging a new class of biomarkers to earlier detect up to eighteen types of cancer in one accurate, cost-effective blood test
<u>EDI Institute, Inc.</u>	Promotes recovery and emotional resilience through the imagery people create on their mobile devices
<u>Emerald Innovations</u>	Modern fall detection for caregivers
<u>Gain Life</u>	Develops digital therapeutics to help individuals change the behaviors that hold them back from the life they want
<u>Healthimation</u>	Takes on massive health challenges like obesity by blending evidence-based clinical programs with digital health technology, entertainment-grade animation, personal human interaction, and interactive learning
<u>Herald Health</u>	Makes healthcare safer by offering clinicians realtime access to clinical data exactly when and how they want it
<u>Hey,Charlie</u>	Develops a minimally-invasive tool for those suffering from opioid use disorders
<u>Human Resolution Technologies</u>	<i>Stealth</i>
<u>Insightfil</u>	Delivers the first-ever comprehensive medication delivery, education and adherence platform solution
<u>LifeGuard Games, Inc.</u>	Leverages games to empower kids to cultivate healthy lifestyle habits
<u>Medumo</u>	Enables healthcare organizations to guide patients using automated just-in-time instructions and checklists pre, peri, and post-procedure
<u>Meetcaregivers</u>	Unique online platform that uses video technology to help families safely find and connect with qualified caregivers for their aging parents
<u>MobioSense</u>	Provides instant & affordable heart disease monitoring
<u>Neopenda</u>	Engineers healthcare solutions that give newborns in low-resource settings the healthy lives they deserve
<u>Neuroelectrics</u>	Innovates at the intersection of neuroscience, physics, machine learning, and hardware
<u>QueueDr</u>	Develops a schedule automation product that seamlessly integrates into your EMR to optimize your schedule
<u>Redox</u>	The modern API for EHR integration, bringing health systems to the cloud and back
<u>Remedy Labs, Inc.</u>	Medical insurance service that prevents excessive billing/charges and negotiates with hospitals and doctors to save you money
<u>Rendever</u>	Delivers affordable, customized virtual reality experiences for people who receive and provide eldercare
<u>Spring Care, Inc.</u>	Data-driven treatment selection for depression
<u>STATech</u>	Cuffless wearable blood pressure monitor
<u>SyncThink</u>	Overcomes the limitations of traditional cognitive testing to provide an easy-to-use, rapid, objective tool for initial screening and recovery monitoring
<u>THINKMD</u>	Global healthcare innovation company developing solutions that expand quality healthcare coverage for everyone, anywhere in the world
<u>TORq Interface, LLC</u>	Elevates the mode in which hospitals and medical device companies collaborate by leveraging the FHIR API and developing a scalable and secure platform for efficient communication
<u>Twiage</u>	Advanced cloud-based platform that uses best-in-class security technology to put telemedicine at the fingertips of emergency first responders and physicians to accelerate live-saving patient care
<u>VIT</u>	Uses smart technology to track, evaluate and improve physical wellness
<u>VRPhysio</u>	Develops VR tele-rehabilitation platform that gamifies physical therapy and makes it fun and easy to monitor

Note: PULSE cannot disclose who received offers from which organization without the consent of the Champions or startups—some view the secrecy of their partnerships as a strategic competitive advantage.

STARTUP AND ENTREPRENEUR DEMOGRAPHICS

FOUNDER BREAKDOWN

42%

FEMALE FOUNDED
STARTUPS

29%

OF STARTUPS WERE IN A
PREVIOUS MASSCHALLENGE
COHORT

EDUCATION OF COHORT

71%

OF FOUNDERS
HAVE A MASTERS
DEGREE

35%

OF FOUNDERS
HAVE AN MBA

16%

OF FOUNDERS
ARE MDS

23%

OF FOUNDERS
HAVE A PHD

LOCATION



23/31

BASED IN MA OR LOCATED
IN MA FOLLOWING
ACCEPTANCE TO PULSE



COHORT BY SPECIALTY

17%

DATA & ANALYTICS

24%

DIGITAL MEDICAL DEVICES

28%

HEALTHCARE CONSUMER
ENGAGEMENT

10%

PERSONALIZED MEDICINE

14%

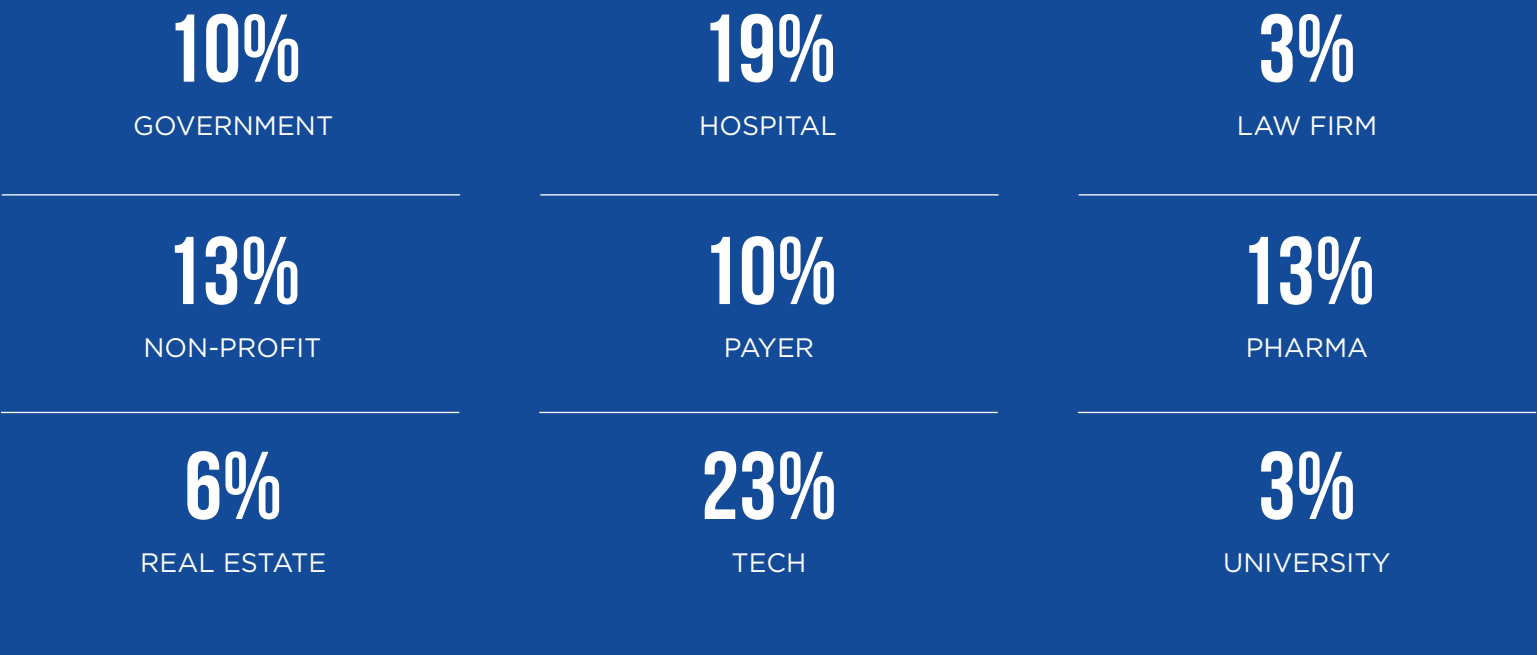
TELEMEDICINE

7%

POPULATION HEALTH
MANAGEMENT

2017 PULSE CHAMPIONS

CHAMPION AND PARTNER BREAKDOWN BY SECTOR



2017 CHALLENGES SUBMITTED BY PULSE CHAMPIONS:

- Access & Referral Management
 - Aging
 - Behavioral or Psychiatric Condition Support
 - Best in Digital Health
 - Biosensors
 - Care Coordination
 - Caregiving
 - Chronic Disease Management
 - Clinical Trial Recruitment
 - Clinician Collaboration & Communication
 - Concierge Medicine
 - Connected Devices
 - Cybersecurity
 - Data Analytics / Big Data
- Data to Understand Disease Progression
 - Global Sexual Health
 - Holistic Health
 - Home Health Care
 - Improving the Patient-Provider Experience
 - Interoperability
 - Neurological Solutions
 - New Care Delivery Models
 - Nutrition
 - Oncology
 - Opioid Abuse Support & Prevention
 - Patient Education & Self-Management
 - Patient Engagement
- Patient Monitoring
 - Patient Personalization
 - Patient Transportation
 - Rare Diseases
 - Readmission Prevention
 - Reduce Administrative Burden
 - Reduce Healthcare Costs
 - Remote Clinical Trial Management
 - Scheduling & Slot-Utilization
 - Social Media
 - Specialty Pharmacy
 - Telehealth
 - Wearables
 - Wellness
 - Women's Health

PROGRAM RESULTS

Through a structured Goals and Milestones project management process facilitated by PULSE, startups and Champions worked together throughout the five-month program (January 2017 to May 2017) to address the challenges within the constraints of their offers. The startups saw measurable growth in revenue, funding, and employee size.

REVENUE

\$4.5M+ CUMULATIVE REVENUE
PRE-PROGRAM

\$13M+ CUMULATIVE REVENUE
POST-PROGRAM

↑ 52%

INCREASE OF CUMULATIVE REVENUE
DURING PROGRAM

FUNDING

\$18.8M+ CUMULATIVE FUNDING
PRE-PROGRAM

\$52M+ CUMULATIVE FUNDING
POST-PROGRAM

↑ 57%

INCREASE OF CUMULATIVE REVENUE
DURING PROGRAM

EMPLOYEES

22%

EMPLOYEE INCREASE
ACROSS THE COHORT

AWARDS GIVEN



\$100,000

Diamond Award
SyncThink



Sunovion Startup's
Choice Award
3Derm

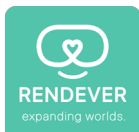


\$60,000

Platinum Award
Twiage



MACP People's
Choice Award
ACT.md



\$40,000

Gold Award
Rendever



PULSE ANECDOTES

CASE 1: HARVARD PILGRIM HEALTH CARE, GAIN LIFE, CAKE, AND THE CITY OF BOSTON

With the objective of adding value for its members, Harvard Pilgrim Health Care (HPHC), a New England based health insurance provider and PULSE Champion, made offers to two startups during matchmaking: Cake and Gain Life. Cake simplifies end-of-life planning. Gain Life uses machine learning and AI to optimize weight loss and enforce positive behavior change. Palliative care and obesity are two high-pain and high-cost areas for HPHC and its members.

Shortly into the PULSE program, HPHC, Cake, and Gain Life decided to validate the startups' products. HPHC would initially implement each technology with its own employees as a benefit before rolling it out to members. However, anticipating that the results would not reach statistical significance, Steve Fink, Director of Business Planning at HPHC, reached out to the PULSE team to see if the City of Boston would serve as a co-Champion for the Cake and Gain Life pilots. The City of Boston agreed to co-Champion the startups because the majority of the City of Boston's employees received health insurance through HPHC, and the city wanted to provide their employees with high quality wellness offerings, such as Cake and Gain Life.

"[For Mayor Marty Walsh,] backing an initiative like MassChallenge and supporting innovation was important," said Fink, who believed this support "motivated people [to get] on board" quickly. The initial meeting between HPHC, Cake, Gain Life, and the City of Boston occurred on March 31st. Within 31 days of this initial meeting with the City of Boston, the pilots were off the ground (May 1st).

"Harvard Pilgrim saw the importance of our goal and wanted to bring it to a larger market, [and help] open doors for our company," says Suelin

Chen, CEO and Co-Founder of Cake. Lizzy Briskin, Customer Operations at Gain Life speaks of her positive experience that "we are excited to have a lasting future with Harvard Pilgrim and the City of Boston. PULSE was in key in finding these connections."

Fink is hopeful for another chance to form a partnership with a PULSE Champion in the future, "it all depends on who the next startups are and what their offerings are. Who knows it could be City of Boston again or a different Champion. We will see."



Suelin Chen, CEO & Co-Founder, Cake



Sean Eldridge, CEO & Co-Founder, Gain Life



Twiage accepting their award at PULSE Finale.

CASE 2: TWIAGE - 2017 PLATINUM AWARD WINNER

Throughout the program, many of the PULSE startups experienced significant business growth. Twiage, which enables lifesaving communications between ambulances and emergency departments is an example of one such startup. During the program, their customer base expanded by eight hospitals across the Northeast. They also increased their patient transports from 3,000 to 5,000 per month.

Their partnership activities with EMS agencies also significantly expanded during the program, as Twiage expanded its footprint into over 30 EMS agencies. Since joining PULSE, Twiage touched the lives of over 20,000 patients. Furthermore, the Twiage team expanded from four full-time employees to seven full-time employees (not including interns or consultants).

They attribute their progress to their participation in PULSE. CEO of Twiage, YiDing Yu says, “being in PULSE definitely gave us credibility as we were talking and negotiating with our expanding client base.”

CASE 3: HERALD HEALTH - AN ENTREPRENEUR’S CHOICE

Brad Diephuis’ passion for technology and his desire to make an impact led him to become an entrepreneur. In addition to his work as a resident at Brigham and Women’s Hospital, he worked to launch a transformative digital health startup, Herald Health to address unwanted information overload for clinicians.

Brad’s firsthand experience as a physician encouraged him to make medicine more effective, efficient, and enjoyable. “I believe technology has the potential to transform the way we deliver medical care. In my time as a provider, I saw first-hand how providers aren’t given the best technology tools to help take the best possible care of patients,” says Diephuis.

Herald Health received offers from multiple Champions during matchmaking and went on to successfully integrate and pilot with them during the program. Brad decided to leave his position at Brigham and Women’s Hospital to work full-time at Herald Health. While he does intend to return to medicine eventually, he will focus primarily on running his startup for now. This was not an easy decision, as he loved working as a clinician, but he felt the importance of improving healthcare through a new technology was ultimately the best way to make a greater impact.

“I found that over the course of the past year, when I was splitting time between residency and the startup, I often had to pick and choose where to focus energy on Herald given limited bandwidth. However, this became increasingly unsustainable as we gained more traction, and decided that our team had proved as much as we could on a part-time basis and needed to move to full-time work to continue moving forward.”

COMMUNITY

To truly disrupt healthcare, it is essential to build a strong coalition of stakeholders that can collaborate together and develop solutions for the most-pressing challenges. In year one, PULSE activated its community through monthly PULSECHECK gatherings—acting as a central hub for convening the digital health community of Boston with an average attendance of over 275 registered guests.

PULSE FINALE – A DIGITAL HEALTH CELEBRATION

On June 13, 2017 PULSE@MassChallenge awarded \$220,000+ in equity-free cash prizes to the highest-impact startups of the 2017 PULSE accelerator program. More than 600 people gathered at the Wilbur Theater to celebrate the PULSE entrepreneurs and Champions. The event showcased the PULSE startups, premiered a behind-the-scenes documentary of the startups' journey, featured leading healthcare organizations and policymakers, including a keynote by Governor Charlie Baker.

Top startups were selected based on their ability to demonstrate impact and meet milestones previously agreed on with Champions. They were evaluated and selected by an impartial panel of expert and executive judges. The first PULSE@MassChallenge award winners are:

- Diamond Award (\$100,000) – SyncThink
- Platinum Award (\$60,000) – Twiage
- Gold Award (\$40,000) – Rendever

In addition to the program winners, the select startups received awards from PULSE@MassChallenge partners. The Sunovion Startup's Choice Award was selected by cohort vote prior to PULSE Finale whereas the MACP People's Choice Award was selected by audience vote at PULSE Finale. The 2017 PULSE Choice Award winners are:

- Sunovion Startup's Choice Award (\$10,000+) – 3Derm
- MACP People's Choice Award (\$10,000+) – Act.md



EVENT STATS

3,200+

PULSECHECKS AND FINALE REGISTRATIONS

275+

AVERAGE REGISTERED GUESTS PER PULSECHECK

20+

INDUSTRY CHAMPIONS

100+

MENTORS

8,000+

SQFT OF OFFICE SPACE IN THE HEART OF LONGWOOD/FENWAY

CONCLUSION AND GOALS

CONCLUSION

The PULSE matchmaking model is a strong model for digital health acceleration. Startups grew cumulative revenues by 52% and funding by 57% over the five-month acceleration period.

GOALS

In 2018, PULSE will focus on the existing program while enhancing its presence in and service to the community:

Programmatic and Operational Excellence

- As a leading digital health accelerator program, it is our duty to make sure the program is effective, valuable, and well-managed
- Building Community and Trusted Partners
- We are nothing without the trust and respect from our community and partners. We look to build collaborative relationships with all who work to improve the lives of patients

Research Data and Resource Creation

- We will invest further in data collection and research to share and test best practices with the community and to evaluate and test the efficacy of our program
- We will develop resources to accelerate the adoption and implementation of technologies that improve patient care



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“I loved the exposure to multiple ideas, and it actually helped me shape some of my own future decisions. It was exciting to see the energy and sacrifice that those entrepreneurs bring to the table every day. That gives me great hope for the future of healthcare and the startup ecosystem in MA. I hope I was able to provide additional support to complement their PULSE experience and build relationships that last beyond their time in [PULSE].”

CHUCK TOYE, *PULSE Mentor*

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BOSTON.MASSCHALLENGE.ORG/PULSE

