

TECH TREND REPORT August 2019

The Future of Digital Health



The pace and scale of digital health technology adoptions have accelerated over the past three years across the value chain. While high-profile setbacks such as Theranos tempered investor sentiment, two digital health startups, California-based diabetes management company Livongo and Utah-based health software firm Health Catalyst, recently made their market debuts in July this year, signaling an end to the three-year IPO drought in digital health.

This report has been created in collaboration with the Plug and Play Health and Insurtech verticals. Our goal is to share some of the most prominent trends we have observed and a sample of the most notable startups that are helping to drive the healthcare transformation. The trends we've highlighted in this report -- Digital Diagnostics, Remote Patient Monitoring, and On Demand Care -- represent areas where we've witnessed significant startup activities, and where our corporate partners have expressed strong interests in exploring.

The convergence of new technologies, value-based payment models, and consumer demand for personalized services are driving healthcare providers and payers to embrace innovation. From on-demand services, digital diagnostics, and patient monitoring, health system leaders are leveraging startups to deliver higher quality care at lower cost to patients, caregivers, and communities. Similarly, advanced analytics, customer insights, and new engagement strategies are enabling insurance carriers to acquire new customers, mitigate risks, and increase customer retention.

Trend

Diagnostics Beyond the Hospital: At-Home Digital Disease Detection & Prevention

Through digital diagnostics, automated health assessments can be done electronically and virtually. This is especially useful in early disease prevention and prediction, with the vision that it won't be too late any more for patients to treat themselves with incurable disease. For instance, nowadays we see a number of digital health startups pioneering research-back mobile solutions to help assess brain health and detect early symptoms of dementia, which is incurable once diagnosed. The cost of healthcare and long-term care for individuals with Alzheimer's disease or other dementias are substantial as \$341,840 in 2018, according to the world Alzheimer report 2018. Many pharmaceuticals have attempted clinical trials on Alzheimer's cure, but no one has seen any luck. Biogen Inc and partner Eisai Co Ltd ended two late-stage trials of their experimental Alzheimer's disease drug aducanumab earlier this year, losing more than \$18 billion of its value on the announcement day.

Digital ways to detect and prevent critical and chronic diseases are going to break geographical barriers, making it possible to diagnose patients even outside of the clinic as early as possible. Today, different companies have developed their respective mobile applications and software programs to make remote diagnostics possible. In the future, it is anticipated that more companies would also create concierge programs to diagnose patients without having to be physically in front of each other. Through AI, we'll be able to do passive diagnostics on the basis of biometric data in the cloud. In different places all over the world, various approaches have been implemented in order to carry out diagnosis in a digital manner.

Here are a few startups in our ecosystem pioneering digital diagnostics:

Featured Startup



MobileODT
Ecosystem Startup

Description:

MobileODT builds visual diagnostic systems that enable every primary care provider to conduct a specialist-level visual examination. MobileODT's Enhanced Visual Assessment (EVA) System is the first product, an FDA and CE approved mobile colposcope powered by an AI validated by the National Cancer Institute of the US to be able to accurately diagnose cervical cancer with greater reliability than Pap cytology (93% vs 71%). EVA has an install base of +1200 Systems across the US, Europe, India, and Africa: used for over 40,000 procedures in 29 countries, for regular use and to support clinical trials for other diagnostics. Building on initial revenues from selling to clinics and hospitals, its pay-per-click services are launching in 2019 to commercialize telemedicine and AI-based diagnostics. It is growing rapidly in new geographies and have in the pipeline additional visual-based applications, including ENT endoscopy, Oral disease, and Skin.

Competitive Advantage

The company has the largest installed base of Internet-connected, smart colposcopes in the world, and a broad array of patents on imaging modalities for data collection. This enables them to maintain their data advantage (our database of cervical cases is unparalleled) and distribute over-the-air our software services to enable point-of-care diagnostics to replace Pap cytology in every place in which our EVA System is in use. They priced their systems at a disruptive price point, and engineered for cost, enabling faster scale and distribution than any other company in the market.

Use Case

A network of women's health care clinics in Alaska (Planned Parenthood of Greater Northwest and Hawaii) recently purchased our EVA System for colposcopy, for use in their main clinic as a replacement for their existing medical device. Immediately they jumped on the telehealth and AI-diagnostic opportunities, and expanded their use from colposcopy to documentation and remote collaboration around pelvic pain, vulvar lesions, and STIs, training NPs and PAs to conduct examinations that used to wait for the Gynecologist to be available.

They are now restructuring their budget to expand EVA to their 28 clinics across the State of Alaska, to provide point-of-care analysis (same day screening and colposcopy) to women in every location, and ensure immediate expert review of all at-risk cases by their gynecological staff at their central location.

Featured Startup



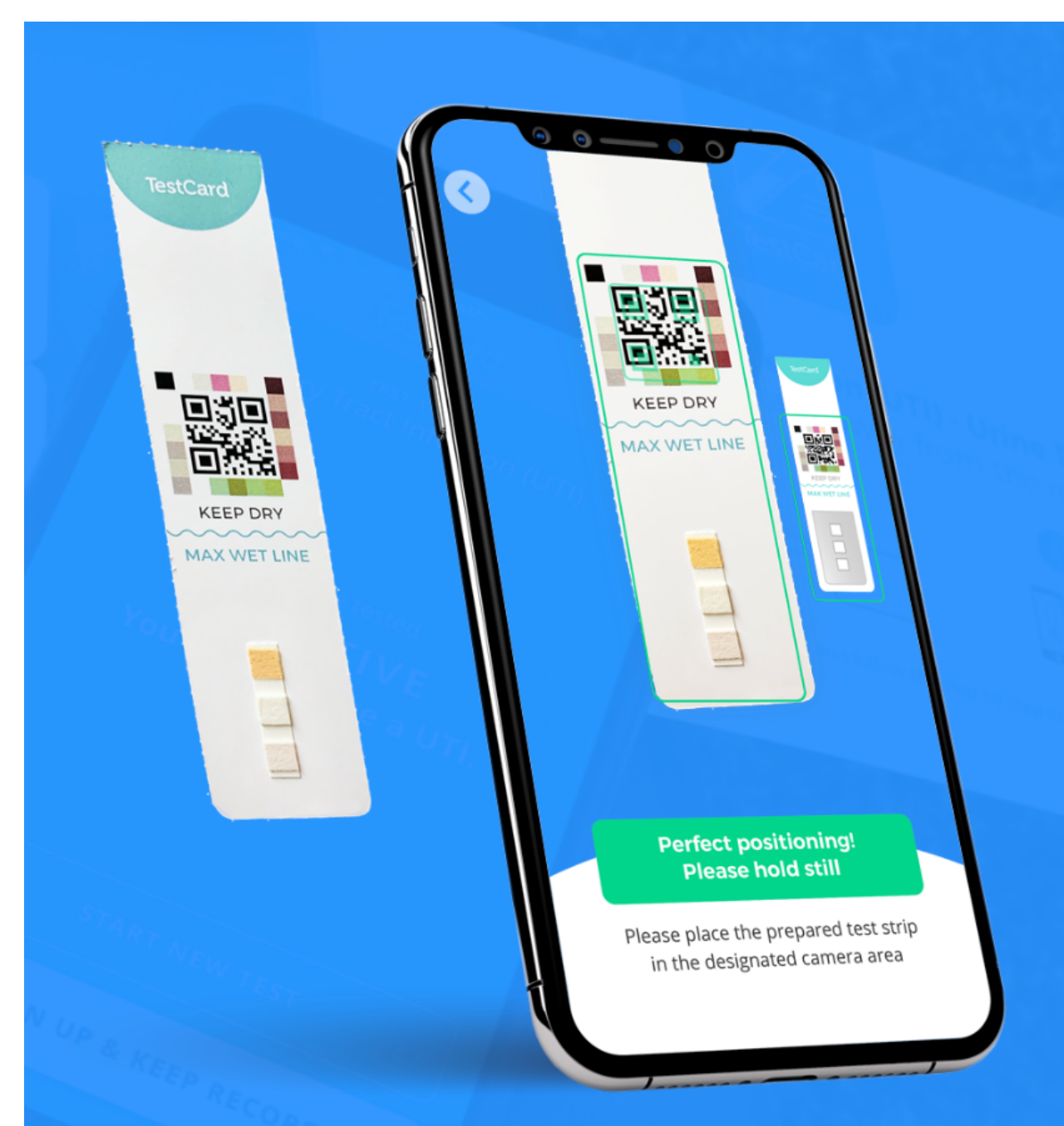
TestCard

Munich Batch 2, Portfolio (in progress)

Description

TestCard.com is a UK domiciled startup revolutionizing the direct to consumer healthcare diagnostics market. The company has innovated a delivery mechanism that allows conditions to be diagnosed immediately in the comfort and convenience of home. TestCard enables an individual to take ownership of their health, making laboratory level information accessible and painless and thus enfranchising the individual and ultimately democratizing healthcare.

The company's innovation is a diagnostic urinalysis (urine test) kit embedded into a postcard. The 'TestCard' and the accompanying TestCard app, are not only a reliable and non-invasive alternative to costly and time-consuming doctor visits; but crucially, serve as an early diagnosis tool that prompts earlier medical intervention and treatment. TestCard is on course to disrupt the global diagnostics market with the launch of its application in February 2017.



Competitive Advantage

TestCard is an at-home testing solution that provides immediate results at a low cost. TestCard is a combination of a non-invasive urine test kit embedded into a postcard, with an accompanying mobile application that turns a mobile phone's camera into a clinical grade scanner.

Use Case

Test card will be launching four products: 1) Abusive Drugs - Top 10 Drugs Screen; 2) Urinary Tract Infection; 3) Pre-diabetes Check; 4) Pregnancy & Ovulation Check

Featured Startup



Altoida

SV Health Batch 8, Munich Batch 2

Description

Altoida built a first in class augmented reality based platform for digital biomarkers measuring real-world outcomes using smartphone sensors. Altoida's first product, Altoida NMI, is an FDA Class II Medical Device for early Alzheimer's Disease detection up to 6+ years pre-symptom with 94% accuracy. After close to two decades of research, Altoida has developed an iOS and Android based Augmented Reality Technology which tests the functional & cognitive aptitude of a patient, via a self-learning (ML) algorithm. This revolutionary assessment test done on an iPad or Tablet, can be taken in the comfort of your home or at the doctor's office. All data is automatically transmitted to the practitioner to aid with diagnosis.

Competitive Advantage:

- High clinical accuracy, sensitivity, specificity
- FDA Cleared (2018), CE Approval (2019)
- Reimbursable in the U.S.
- Seasoned & multidisciplinary team

Use Case:

Using an augmented reality framework that allows testing of complex everyday functions in a gamified and fun way, while directly interacting with a user's environment and thus physically activating them, we are testing three major cognitive areas:

SPATIAL MEMORY

"HIDE-N-SEEK"



- Hide 3 Augmented Reality (AR) items in real-space
- Find them back in a random order
- Avoid environmental distraction



PROSPECTIVE MEMORY

"FIRE EVACUATION DRILL"



- Learn a specific order of 3 evacuation actions using Augmented Reality (AR) items
- Interact with those 3 Augmented Reality (AR) items in real-space



EXECUTIVE FUNCTIONS

"DUAL -TASK CONDITION"



- Instruction to go from point A to point B while interacting with 3 Augmented Reality (AR) items in real-space
- At the same time need to tap the speaker icon at a dynamic rhythm for the executive functions test



Graphics by [Altoida](#)

Featured Startup



Aural Analytics, Inc
Ecosystem Startup

Description

Bringing together experts from neurology, speech, machine learning and business, Aural Analytics is building the world's most advanced multi-modal based brain health analytics engine. Aural Analytics combines speech signal processing and cognitive linguistic analysis together into one powerful set of APIs that are easily extensible across the continuum of care for neurological diseases.

Competitive Advantage

- Disease, location, language, device agnostic
- Real-time, online and easily extensible
- Deployed in 8 languages and on 4 continents
- Clinically validated across multiple disease states

Use Case

Pharmaceutical customers use their technology to validate efficacy of drugs in clinical trials. Aural Analytics builds a custom mobile and cloud based applications based on disease and deploy both in clinic and for patients at home.

Clinicians, principally Speech Language Pathologists, use mobile app of Aural Analytics in their practice to receive real time analytics about their patients. Their patients also download the app and use it at home as needed.

Trend

Remote Patient Monitoring

Before Remote Patient Monitoring (RPM), nurses were responsible for checking in on their patients, in person and often, leading to higher costs and inefficiency. However, with the help of new technologies, this process has improved. RPM allows physicians to keep an eye on their patient's symptoms while empowering patients to take charge of their own health. This is part of a shift in culture, moving from merely focusing on caring for the sick to overall prevention of disease.

Though this technology seems great, how easily is it adopted or integrated? In 2018, Current Procedural Terminology (CPT) codes were released in order to incentivize providers to adopt RPM. These codes are used to report procedures and services to physicians and health insurance companies. According to Propeller, “the new CPT codes are better suited to reimburse for the realities of current technology and staffing models.”

CPT Code 99457	CPT Code 99091
Requires 20 minutes of professional time per calendar month	Requires 30 minutes of professional time per 30 day period
Reimburses for time spent by physicians, QHCPs or clinical staff	Reimburses only for physicians or QHCPs
Requires an interactive communication between provider and patient or caregiver	No communication required

Image: A few of the new CPT codes. Source:<https://www.propellerhealth.com/2019/04/09/your-guide-to-the-new-cpt-codes-for-remote-patient-monitoring/>

How RPM works:

RPM uses a wide range of technology such as video calls, data collection, and virtual monitoring to keep track of the progress of patients. This technology results in more frequent and seamless communication between health providers and patients, improving the health of patients and facilitating better treatment.

Benefits of RPM:

- ***Decrease costs:*** RPM has the potential to “save \$200 billion in healthcare costs globally” according to a pilot done by CHRISTUS RPM pilot. Because of increased and improved communication between their healthcare provider, patients also save money and have improved health in the long run.
- ***Saves time:*** By collecting data ahead of time, in person appointments can be more efficient, leading to lower costs. RPM also eliminates unnecessary visits, saving time for both the health provider and the patients.
- ***Early Detection + Reduced ReAdmittance Rates:*** Early prediction through the use of RPM is crucial because it decreases readmittance rates. In fact, the University of Pittsburgh Medical Center reduced the risk of readmission by 76% by using RPM technologies. But why is reducing readmittance rates so important? Firstly, according to studies published by the US National Library of Medicine, “the cost of readmissions to the healthcare system is substantial, accounting for an estimated \$17.4 billion in spending annually by Medicare alone.” For this reason “new financial penalties for institutions with high readmission rates” were created in order to incentivize hospitals to decrease these rates. This is where RPM’s ability for early detection can help.

In the next few pages, we list some startups that are developing RPM technology to help bring about change in the healthcare industry.

Featured Startup



Harmonize Health *Ecosystem Startup*

Description:

Harmonize Health sells health outcomes directly to customers, and handles all the technological overhead needed to do so. For customers, they manage their patients with minimal disruption to their daily workflows. For patients, their technology is best-in-class: often one tap, once per day, and that's it.

Competitive Advantage:

They sell health outcomes directly to customers, and don't require them to build internal infrastructure to use us. Harmonize Health produce results with minimal burden required on customers.

Since Harmonize Health is a complete end-to-end product with great pilot results (50% reduction in utilization costs for high risk patients), they are able to adopt a cost-savings revenue model. This means that customers can pay little money up front, but they will then charge them a percentage of the cost savings they experience while using Harmonize Health.

Use Case

Converted 1200 high risk patient pilot (age 65+, 2+ comorbidities) into a real customer.

So far: \$90 per patient per month, \$50 per patient activation, up to 27,000 patients.

Another cohort within these 27,000 patients will be subject to shared cost savings. This means the monthly fee is reduced to \$45, but we will obtain 15% of the cost savings every 6 months (customer has agreed to open medical claims data to us for audit).



Harmonize Health's patient facing platform is designed to operate out of the box with no setup required.

**Remote patient
monitoring
simplified**

Featured Startup



HealthBeats

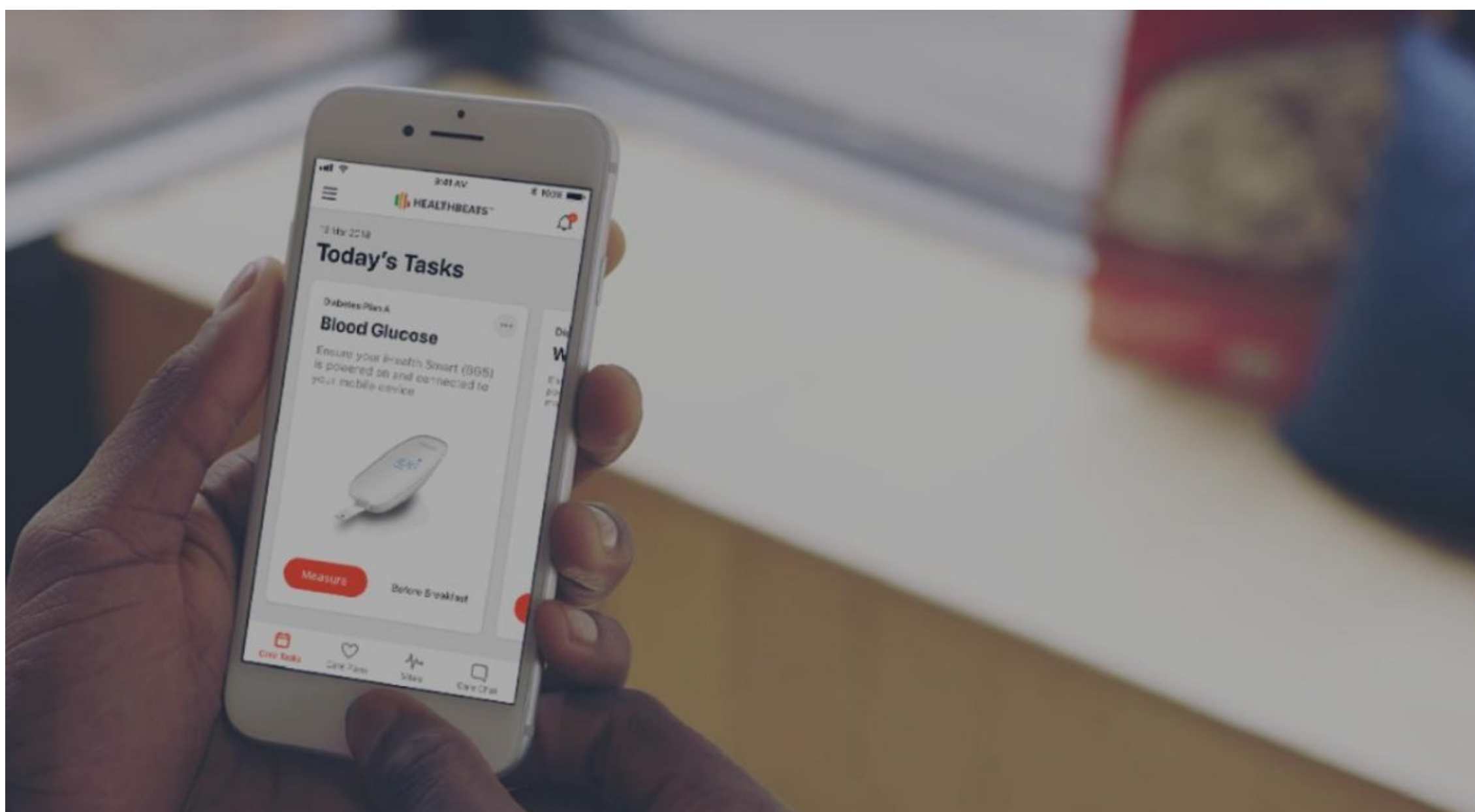
SV Health Batch 9

Description:

HealthBeats is a remote patient monitoring platform offering simple-to-use, simple to deploy and simple business model to health providers and patients. Healthbeast focuses on patients and providers by providing a one touch patience experience, a paperless process, as well as a subscription model.

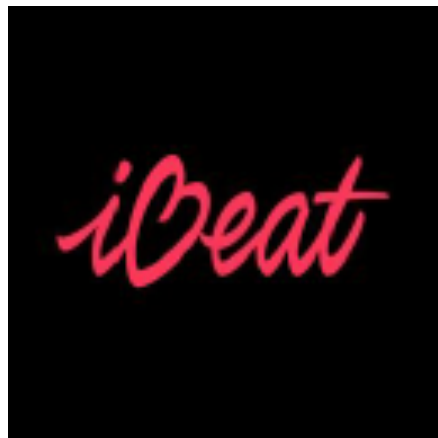
Competitive advantage:

Health Beats built a simple product that would allow for regular monitoring outside of healthcare which would in turn lead to better health for patients. The team's extensive experience in healthcare allows them to work through the complexities in order to bring simple solutions to both participants and providers alike. It is all about simplicity.



Health Beats' technology allows users to easily monitor their health.

Featured Startup



iBeat Watch

Description:

Located in the heart of San Francisco, iBeat is a technology company empowering people to live longer lives. The team is currently working on a breakthrough Wearable-as-a-Service™ that perpetually monitors and analyzes users' 24-7 heart activity. In the case of a life-threatening emergency, iBeat will instantly alert the user, their loved ones, and emergency responders in real-time, helping ensure immediate care delivery and potentially saving the user's life.

Competitive Advantage:

iBeat moves away from the previous generation of wearable watches / devices in providing more useful health data, which encourages users to constantly use the device. Competitors include: Life Alert, Phillips Life Alert, PAI health



This smartwatch monitors your heart rate and can potentially save your life.

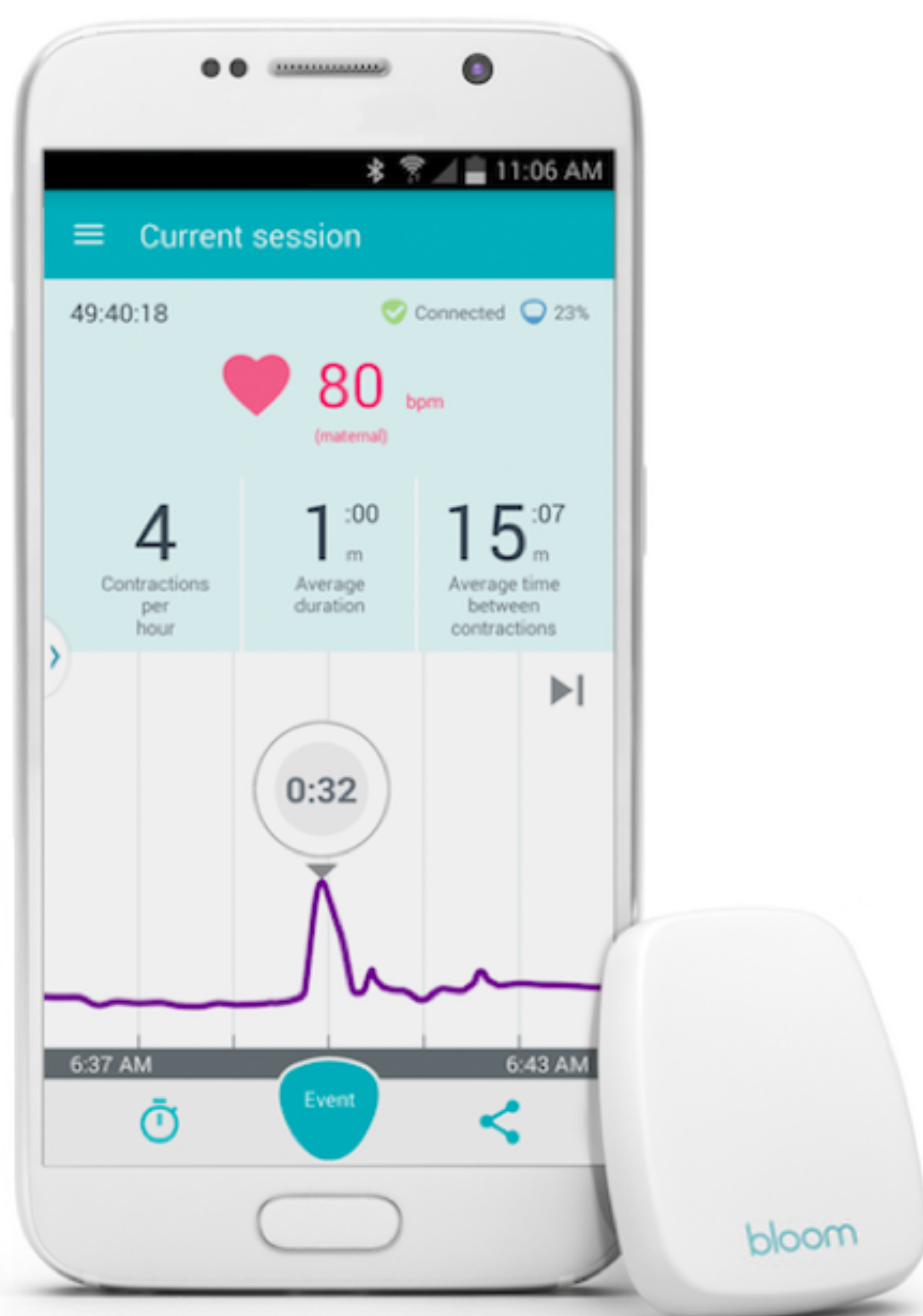
Featured Startup



BloomLife
Portfolio Startup

Description:

BloomLife is a developer of prenatal care solutions designed to improve the health of moms and babies. The company's solutions combine pregnancy specific wearables with data analytics, to reassure mom and to provide doctors with better data to earlier predict and manage pregnancy complications. Their wearable monitor is a lightweight patch that non-invasively tracks important health parameters of mom and baby throughout pregnancy (fetal movement, fetal heart rate, contractions, maternal health). The device connects to a smartphone app and backend cloud analytics, enabling population health management for providers.



Bloomlife's technology is a wearable device that can monitor a mother's contractions and collect other data in order to detect complications.

Featured Startup

VIVALNK
Connected Healthcare Solutions

VivaLNK
SV Health Batch 8

Description:

VivaLNK offers connected healthcare solutions including an IoT medical wearable sensor and data platform that continuously monitors patient vitals and biometrics from any location. Patient monitoring applications built on our platform include chemo treatment, heart failure, and hypertension.

Use Case:

- Had class 2 FDA approval for its remote thermometer device
- ECG sensor battery lasts for up to 3 days
- Insurance use case includes group benefit and corporate wellness cost reduction by adopting their solution
- Raised series B last year with post valuation 70M USD



VivaLNK's wearable device

Trend

Health On Demand

In today's day and age of one-click everything -- shopping, delivery, transportation -- the average consumer has become accustomed to convenience, personalization, and instant service. For anyone who has tried to see a doctor in the last few years, these are not the words you would likely use to describe the experience. A handful of startups are trying to change that. We bucket these startups into what we would call "on-demand healthcare", or in other words, startups that are making healthcare services more accessible, easier to understand, and deliverable in a way that works for each person's day-to-day life. In this section, we explore a handful of these "on-demand" startups to see how they're bridging the gap between today's consumers and traditional healthcare.

Featured Startups



Heal *Portfolio Startup*

Description:

Heal leverages technology and logistics to re-humanize the practice of medicine in a way that is fulfilling for both doctors and patients alike. Heal sends a licensed, background-checked pediatrician or family doctor to its customers, on-demand, on their schedule, for \$159, or for an in-network co-pay with select insurance plans. The startup is live in Los Angeles, Orange County, San Francisco, Silicon Valley, and San Diego from 8AM to 8PM, seven days a week with an eye to expand to additional markets.

Competitive Advantage:

More startups than we can count have used the tagline “We’re the Uber for Healthcare”. It’s a catchy way to conceptualize a business, but more often than not, the logistics and unit economics of healthcare don’t lend themselves to an uber-like model. That being said, Heal is one of the rare startups making it work. With thoughtful geographic expansion and smart partnerships with health plans, Heal is growing a loyal user base that enjoys the convenience and personalized nature of house calls.

Use Case:

Users begin by requesting and scheduling a doctor’s appointment via the Heal app. From there, they can determine whether to use insurance to cover the cost, or pay a flat fee. Heal appointments are appropriate for pediatric care, primary care, some urgent care, and general prevention and wellness. Return users will be able to access their history with Heal via the app, and can request to see the same doctor to facilitate continuity of care.

Featured Startup



Gyant

Portfolio, Cleveland Batch 1

Description:

Gyant helps hospitals, health plans, and pharma companies engage and support patients at scale. Gyant's accessible, chat-based AI takes a medical history and navigates patients to the appropriate next step, including a visit to the doctor, labs, or an efficient telemedicine encounter on Gyant's platform. Proactive check-ins keep patients engaged and supported along the patient journey.

Competitive Advantage:

The chatbot landscape is crowded, but Gyant stands out for its superior user experience, and the flexibility of the platform. Gyant's founders come from the gaming world, which is reflected in the quality of the platform. Where other healthcare experiences are typically sterile, dull, or even painful, Gyant brings color, humanity, and joy. Their chatbot is conversational and fun, while still gathering information and moving the user through the encounter. What users don't see is the heavy lifting done by Gyant on the backend. The platform translates the consumer's chat into medically relevant information that is formatted appropriately for both clinicians and any systems that require integration, like EMRs.

Use Case:

Gyant is live in a number of different applications, including triage and follow up following a patient's discharge from hospital. Patients used to receive receive check-in phone calls from nurses after they were discharged from the hospital, but people have stopped answering their phones these days. With Gyant, the hospital can send a text, which patients have been shown to be more likely to answer. Gyant asks patients how they are doing, and can escalate appropriately if a patient needs additional care. This approach is saving health systems time and money, and improving outcomes, too.

Featured Startup



Meru Health

Portfolio, SV Health Batch 9

Description:

Meru health is online digital clinic that offers an app-based treatment program that is supported by licensed therapists. The easy-to-access digital program helps improve the lives of people living with depression and saves on healthcare costs. Meru Health's digital clinic offers an app-based treatment program that is supported by licensed therapists. Meru Health individualizes the program based on patient's personal information and needs.

Competitive Advantage:

Meru differs from other app-based mental health programs in that it is a full-blown digital clinic. Right from the first call until the final week, a licensed Meru Health therapist actively supports participants to become empowered and recover. The program also sets itself apart from other similar offerings because it is both reimbursable via insurance plans, and showing tremendous clinically significant results in published studies.

Use Case:

Currently, a number of large employers are partnered to offer Meru Health as an employee benefit. Employees sign up for the program and are then guided through a 12 week course structured around weekly themes which build upon each other. It includes elements of mindfulness-based, cognitive behavioral, and behavioral activation therapy.

Each of the companies highlighted represents a unique approach to tackling a specific problem, and while they're all having success in their own areas of the market, we'd be happy to discuss further examples to meet your needs. Plug and Play is launching a smart health program to bring pharmaceuticals, hospitals and health insurance providers together to transform the healthcare industry.

Please contact sigi@pnptc.com for more information.



References

“Biogen Halts Study of Alzheimer's Drug, a Blow to Hopes for New Treatment.” *STAT*, 22 Mar. 2019, www.statnews.com/2019/03/21/biogen-eisai-alzheimer-trial-stopped/.

“Biogen Halts Study of Alzheimer's Drug, a Blow to Hopes for New Treatment.” *STAT*, 22 Mar. 2019, www.statnews.com/2019/03/21/biogen-eisai-alzheimer-trial-stopped/.

Frohen, Dan. “Benefits of RPM: Reducing Healthcare Costs.” *Skedulo*, 11 Apr. 2019, www.skedulo.com/blog/benefit-rpm-reduced-healthcare-costs.

Kripalani, Sunil, et al. “Reducing Hospital Readmission Rates: Current Strategies and Future Directions.” *Annual Review of Medicine*, U.S. National Library of Medicine, 2014, www.ncbi.nlm.nih.gov/pmc/articles/PMC4104507/.

Matthews, Melanie. “Infographics: Drivers of Remote Patient Monitoring.” *Healthcare Intelligence Network*, 2017, hin.com/blog/2017/06/21/infographic-drivers-of-remote-patient-monitoring/.

Siwicki, Bill. “At UPM, Remote Patient Monitoring Helps Reduce ER Utilization and Hospital Readmissions.” *Healthcare IT News*, 2018, www.healthcareitnews.com/news/upmc-remote-patient-monitoring-helps-reduce-er-utilization-and-hospital-readmissions.

Steenhuysen, Julie. “Biogen Scraps Two Alzheimer Drug Trials, Wipes \$18 Billion from...” *Reuters*, Thomson Reuters, 21 Mar. 2019, www.reuters.com/article/us-biogen-alzheimers/biogen-scraps-two-alzheimer-drug-trials-wipes-18-billion-from-market-value-idUSKCN1R213G.

“Your Guide to the New CPT Codes for Remote Patient Monitoring (RPM).” *Propeller Health*, 2 Aug. 2019, www.propellerhealth.com/2019/04/09/your-guide-to-the-new-cpt-codes-for-remote-patient-monitoring/.