

Why Artificial Intelligence will Revolutionize Healthcare including the Behavioral Health Workforce.

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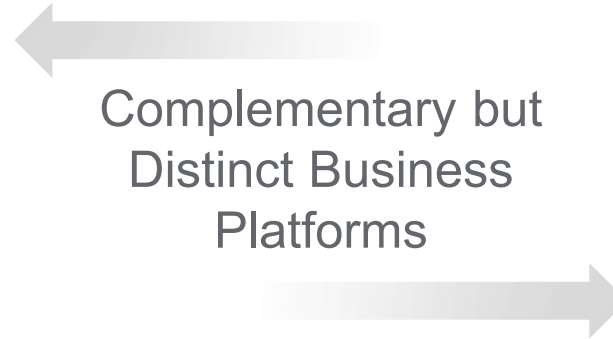
UNITEDHEALTH GROUP

A DISTINCTIVELY DIVERSIFIED ENTERPRISE



HEALTH BENEFITS

Helping People Live Healthier Lives



Complementary but Distinct Business Platforms



HEALTH SERVICES

Making the Health Care System Work Better for Everyone

FOUNDATIONAL COMPETENCIES

Clinical Care Insight

Technology

Data and Information

OUR UNITED CULTURE

Integrity

Compassion

Relationships

Innovation

Performance



Introductory thoughts from Kai-Fu Lee

AI defined

“Artificial intelligence is the elucidation of the human learning process, the quantification of the human thinking process, the explication of human behavior, and the understanding of what makes intelligence possible. It is men’s final step to understand themselves.”

AI’s promise

“The AI revolution will be of the magnitude of the Industrial Revolution—but probably larger and definitely faster. Where the steam engine only took over physical labor, AI can perform both intellectual and physical labor. And where the Industrial Revolution took centuries to spread beyond Europe and the U.S., AI applications are already being adopted simultaneously all across the world.”

AI already supports or delivers behavioral health care



Startups focused on behavioral health raised a record \$273 million during the first half of 2018, according to Rock Health. More than half of these startups have tools that are virtual or on-demand.

More than 30,000 apps available related to mental health, according to an August 4, 2018 article in *Modern Healthcare*.

Most of these are currently **available at little or no cost** offering easy access at the convenience of consumers.

Growing abundance of AI building blocks



Computing power

Today our smart phones hold millions of times more computing power than the cutting edge computers NASA used to send Neil Armstrong to the moon in 1969.

UnitedHealth Group invests more than \$3.3 billion a year in IT and innovation.



Deep learning

A machine learning technique that learns features and tasks directly from data.

UHG has more than 70 experienced AI experts working full time to expand our AI capabilities.



Lots of data

The internet has led an explosion of all kinds of digital data: text, images, videos, clicks, purchases, tweets, etc.

- UHG has health and demographic information on more than 200 million people world wide, for some going back 40 years; data includes: 6.5 billion medical procedures, 18 billion lab results and 6 billion diagnoses.
- UHG processes almost 1 trillion digital transactions a year.
- We manage health benefits for more than 130 million people in 130 countries.
- The UHG workforce includes more than 85,000 clinical professionals.

Younger generations prefer tech enabled health care

Health care consumers are relying less on primary care physicians (PCPs) and more on digital technology, other clinical professionals and convenience care to manage their health.

*The **younger** people are, the less they depend on a PCP, signaling a new future for primary care and most other health care professionals.*

Who has a PCP?

Silent Generation
BORN 1928–1945

92%

Gen Xers
BORN 1965–1980

73%

Baby Boomers
BORN 1946–1964

82%

Millennials
BORN 1981–1997

57%



Reliance on professionals



Reliance on devices

Baby Boomers

91%

9%

Gen Xers

75%

25%

Millennials

63%

37%

Source: Accenture September 2018 Survey

Millennials are the largest generation in the U.S. labor force



56 million Millennials, representing **35%** of the U.S. labor force, were working or looking for work.

That was more than the **53 million Generation Xers**, who accounted for **33%** of the labor force.

And it was well ahead of the **41 million Baby Boomers**, who represented **25%** of the total.

Millennials surpassed Gen Xers in 2016.

The Silent/Greatest Generation represented **2%** and Post-Millennials were at **5%**.

Source: Pew Research Center; U.S. Labor Force Composition as of 2017.

Examples of Optum digital health platforms



Optum Ventures

Optum Ventures' focus

Human health is a critical value we all share. And yet our health care system is expensive, inefficient, confusing and inequitable. We see this as a major opportunity. We look for exceptional teams with data-driven technologies and services that are poised to deeply disrupt the status quo. We have a goal to connect, accelerate and grow the incredible ideas developed by our portfolio companies with the key health care players that need them most.

Recent investments include:

Apervita platform empowers health enterprises to build, deploy and exchange analytic and data applications easily and affordably in order to get paid, improve performance and provide better care.

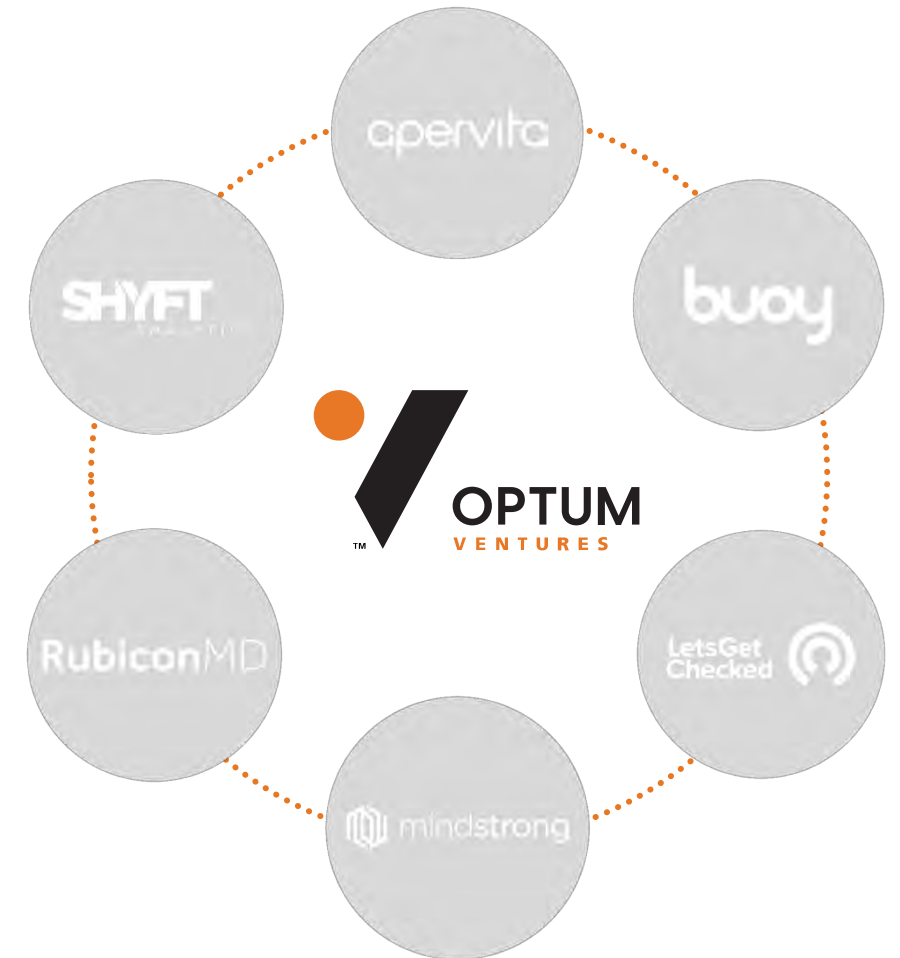
Buoy Health provides digital health technology that allows a consumer to know what to do from the moment they feel sick. With an intuitive design, users can easily check symptoms and know what to do next.

LetsGetChecked: This technology platform links customers to regulated laboratory testing to better manage and control their personal health.

Mindstrong Health is reimagining how care providers will diagnose and manage neurological brain disorders.

RubiconMD's platform enables primary care providers to submit eConsults and receive same-day insights from top specialists across more than 150 specialties.

Shyft Analytics offers a cloud-based PaaS service to build, deliver and scale health analytic and data applications.



OptumLabs

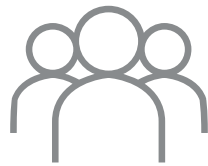
OptumLabs is a scientific research collaborative and co-innovation center.

We accelerate research, innovation and translation by giving our partners access to the largest U.S. linked patient database, world-class thought leaders and the power of multi-partner collaboration.



Data Expertise

Partners gain access to a world-class linked data set of de-identified claims, clinical and consumer information and the support to use it.



Convening Health Care & Technology Leaders

We bring health industry leaders across all sectors together to share ideas, and accelerate innovation and discovery.



Data Science

We use our experience with advanced analytics and data visualization to uncover actionable insights and generate new applications.



Health Care Intelligence

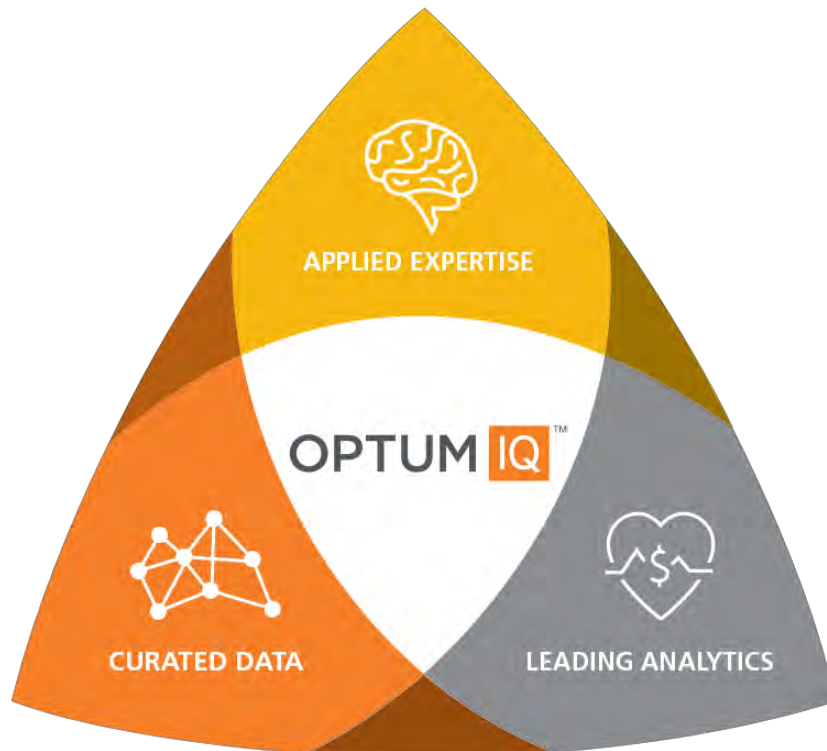
We are passionate about solving health care's greatest challenges. Deep health system knowledge sets us apart, guiding passion into action.

OptumLabs partners

OptumIQ

HEALTH CARE INTELLIGENCE



Curated Data

Build a common language

Standardize, link and integrate data from many disparate sources



Leading Analytics

Innovate with purpose

Transform data into insight with industry-leading, dynamic models and innovation in AI.

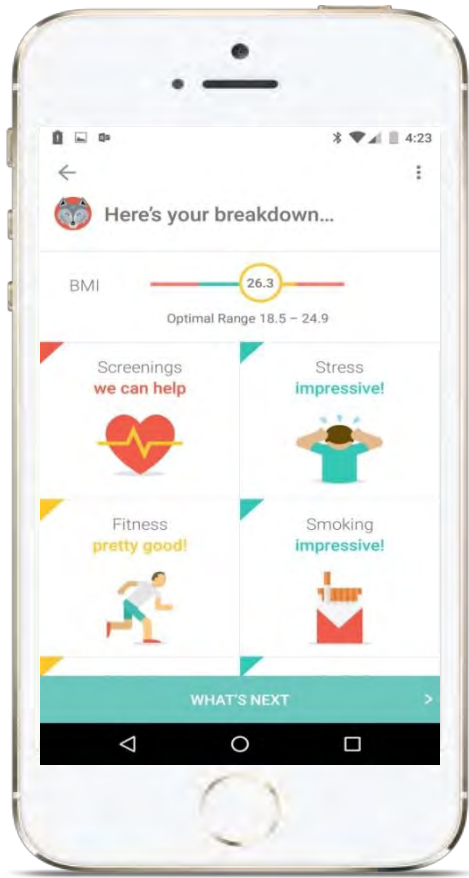


Applied Expertise

Guide action for success

Collaborate for the right action, applying predictive insights and expertise

Rally Health



The Rally mission

To be effective, health care needs to be simpler. Our goal is to break down complex topics and ideas into actions, empowering consumers to take control of their health before facing crisis or injury. And should they become injured, quickly finding the right doctor and getting upfront costs should be easy.

As a digital health experience, we are focused on members' overall health. Personalized daily goals, recommendations, and rewards are key for prevention and transparency, and access to information is crucial when it comes to care.

What Rally does

Rally® is an easy-to-use integrated platform that makes complex benefit options understandable. Our products guide users through the process of evaluating, choosing, enrolling in, and using the benefits that best meet their specific needs.

Rally® behavioral and data scientists work with medical experts to build apps that engage, retain, and guide our members step by step to better health.

Our chief medical officer and user experience design teams work together to develop user-friendly products that truly work. Rally's executives and employees come from both the health care and software industries, bringing a unique set of skills to the creation of digital experiences that can transform health care.



Final thoughts from Kai-Fu Lee

“We stand at the precipice of a new era, one in which machines will radically empower and/or violently displace human beings.”

“Part of why predicting the ending to our AI story is so difficult is because this isn’t just a story about machines. It’s also a story about human beings, people with free will that allows them to make their own choices and to shape their own destinies. Our AI future will be created by us, and it will reflect the choices we make and the actions we take. In that process, I hope we will look deep within ourselves and to each other for the values and wisdom that can guide us.”

Thank you.

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