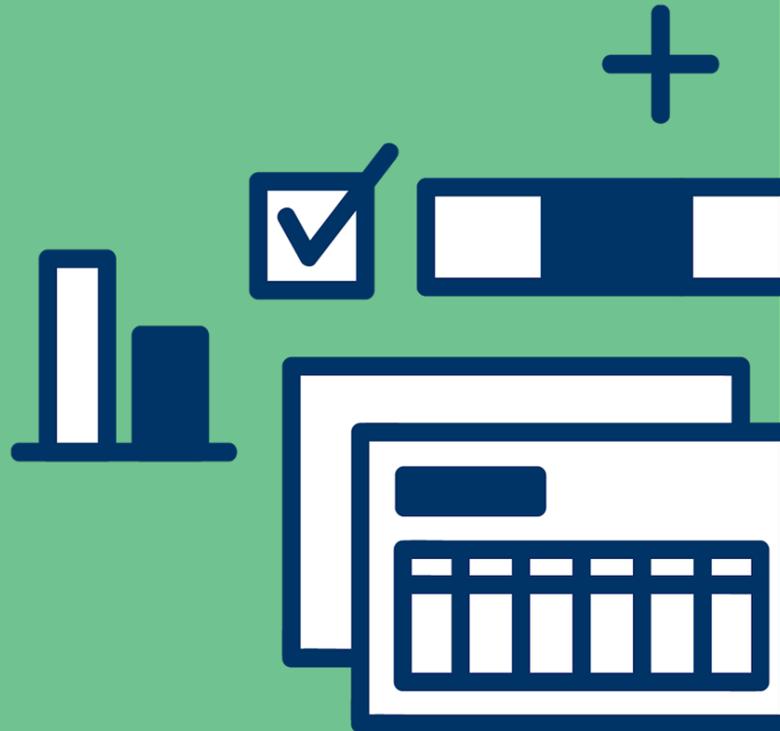


The Big Tech In Pharma Report:

How Amazon, Microsoft, Apple, And Google Are Capitalizing On The Digital Transformation



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[Tech Market Map Report – Pharmaceutical Supply Chain in Healthcare](#)

[Digital Therapeutics Outlook: The Tech Transforming The Way We Treat And Manage Disease](#)

[100+ Mental Health Tech Companies Transforming Access & Care Delivery](#)

[Unbundling Epic: How The Electronic Health Record Market Is Being Disrupted](#)

[State of Healthcare Q2'21 Report: Investment & Sector Trends To Watch](#)

[State of Telehealth Q2'21 Report: Investment & Sector Trends To Watch](#)

[Pharmaceutical Last-Mile Delivery In Healthcare – ESP Vendor Matrix](#)

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Contents

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Summary of Findings	Market Drivers	Big Tech Moves: An Overview	Amazon	Microsoft	Apple	Google

Summary Of Findings

Overview of big tech's activities, 2020 – 2021 YTD (9/30/21)

Big tech made pharma-relevant acquisitions worth nearly \$22B since 2020...

- Microsoft's bolstered its healthcare SaaS solutions by acquiring Nuance Communications for \$19.7B.
- Google completed its purchase of FitBit for \$2.1B in January 2021 and has since added new capabilities to the devices.
- Verily Life Sciences, an Alphabet subsidiary, entered the remote clinical trial management space by acquiring clinical trials platform SignalPath.

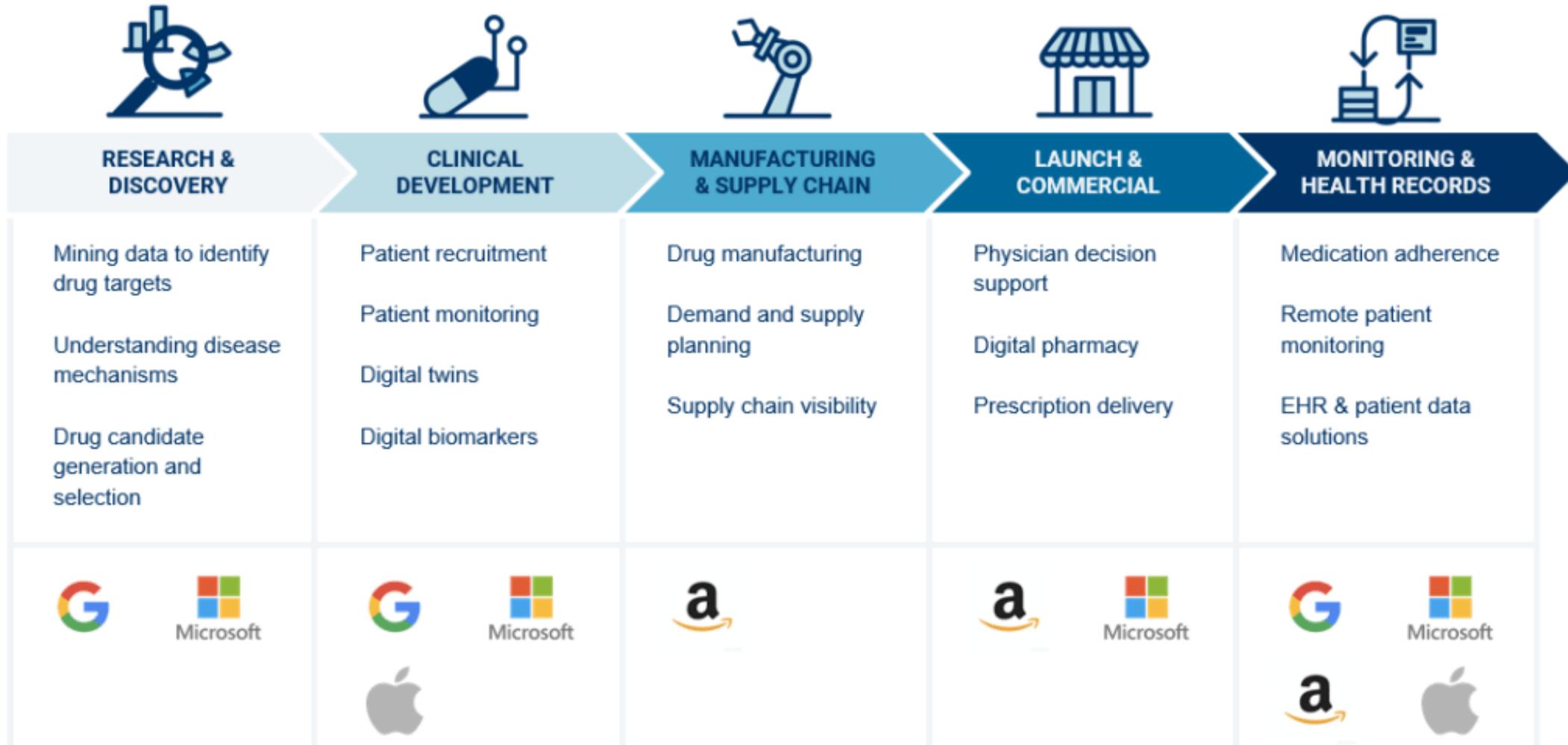
...as Big Tech upped its investments to record levels, backing biopharma equity deals worth over \$3.6B to date.

- This total already exceeds equity deals in 2020.
- Google leads big tech in deals (22) in 2021.

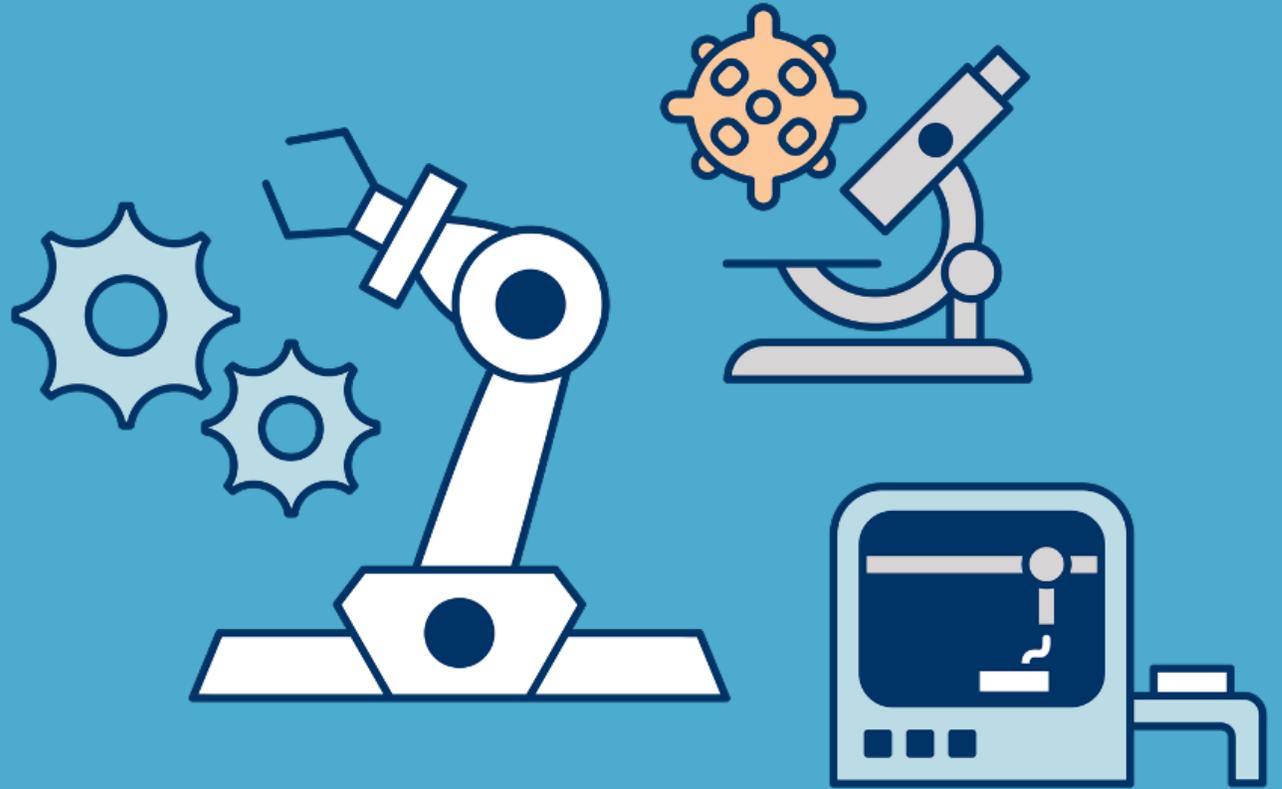
What's next?

- **Big tech cos will pursue more patient data.** Amazon, Microsoft, Apple, and Google are collecting patient data through digital solutions, from medication adherence tech to wearables. The value of real-world evidence for pharmaceutical applications is growing. Expect big tech cos to continue their focus on patient data, as it will build a competitive moat and power pharmaceutical tech solutions.
- **Big tech cos will double down on wearables, as healthcare use cases emerge.** Amazon, Apple, and Google each own wearable technology (Amazon Halo, Apple Watch, Google Fitbit). Improved measurement technology will enable data collection with healthcare use cases. Already, Apple Watch and Fitbit can collect ECG data, which is critical for remote patient monitoring.

Where big tech is developing solutions in pharma



Market Drivers



What's driving big tech activity in pharma?



Decreasing ROI for drug R&D

Return on investment for drug R&D has declined by over 80% in the past decade. Pharma is partnering with big tech companies to improve drug discovery, enable faster clinical trials, and improve distribution models.



Explosion in real-world evidence

The amount of patient data available has skyrocketed in the past few years. Big tech is using this data to identify drug targets, predict real-time medication demand, and build patient monitoring and health records technologies.



Pharma's digital transformation

Mobile communications, the cloud, artificial intelligence, and IoT technology are disrupting the pharmaceutical industry. Big tech is using its data, software, and AI expertise for solutions across the pharmaceutical value chain.

MARKET DRIVER #1: DECREASING ROI FOR DRUG R&D

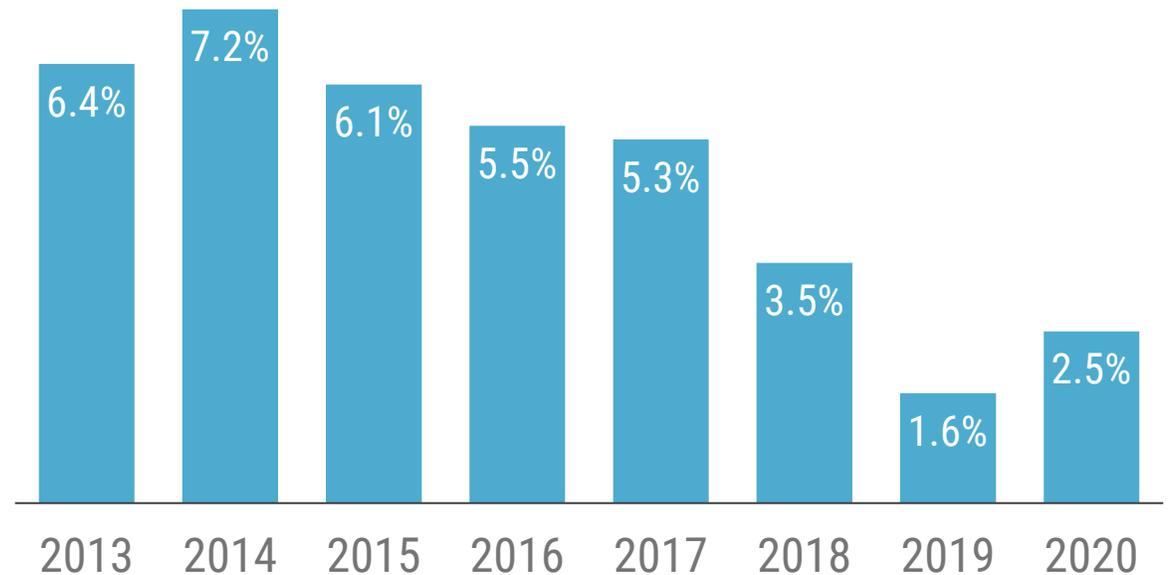
Drug development isn't working as well anymore

Pharma's R&D returns have dropped by 65% over the past 6 years.

Last year saw an uptick for the first time since 2014, suggesting that digital transformation initiatives may be taking hold.

Big tech companies are leveraging their software, data, and AI expertise to capitalize on opportunities across the value chain.

 **Pharmaceutical R&D return on investment**
IRR based on projected sales, 2013 – 2020



MARKET DRIVER #2: EXPLOSION IN REAL-WORLD EVIDENCE

The amount of patient data has skyrocketed

The quantity of patient data housed in clinical systems grew nearly 500% from 2016 to 2020.

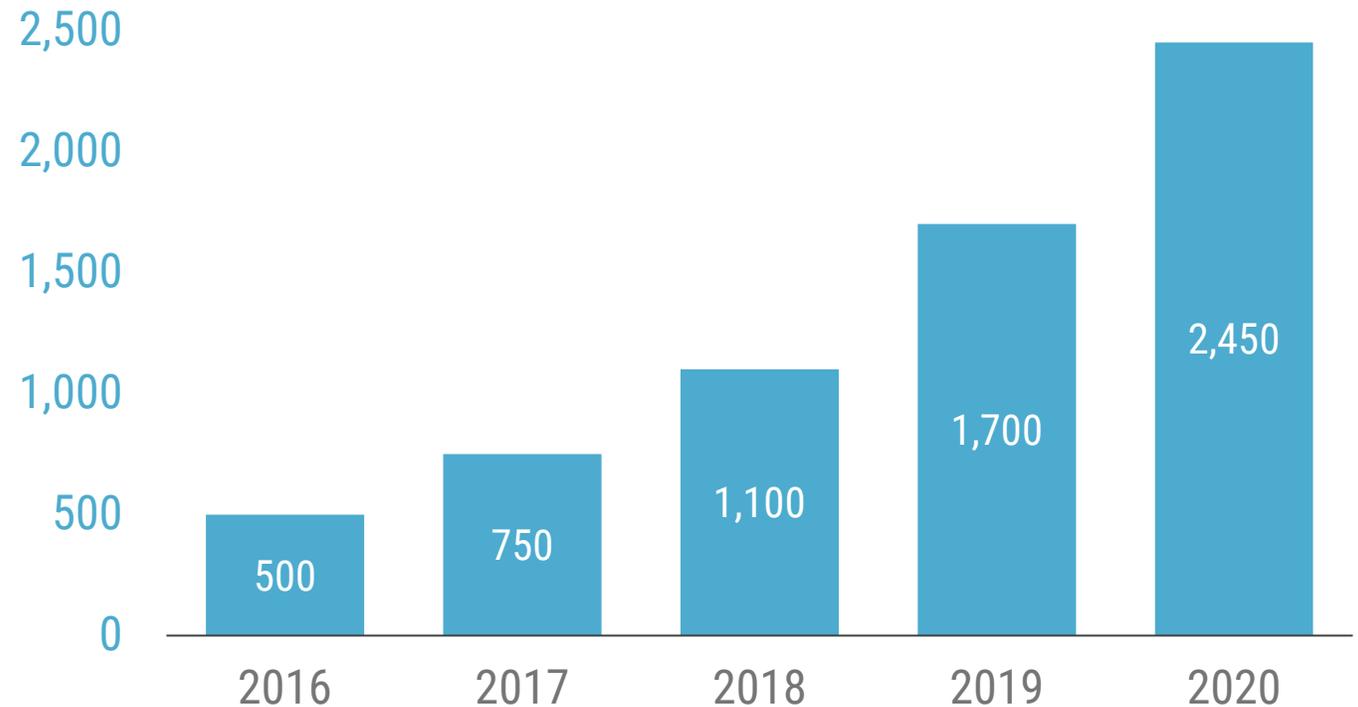
This data is particularly valuable as “real-world evidence” (RWE) for drug discovery and clinical trials.

Big tech is using this data to identify drug targets, predict real-time medication demand, and build patient monitoring and health records technology.



Quantity of digital information in clinical systems

Extabytes, 2016 – 2020



AI for drug discovery leads the way

With massive amounts of available data, drug discovery is a rapidly growing opportunity for digital solutions in pharma.

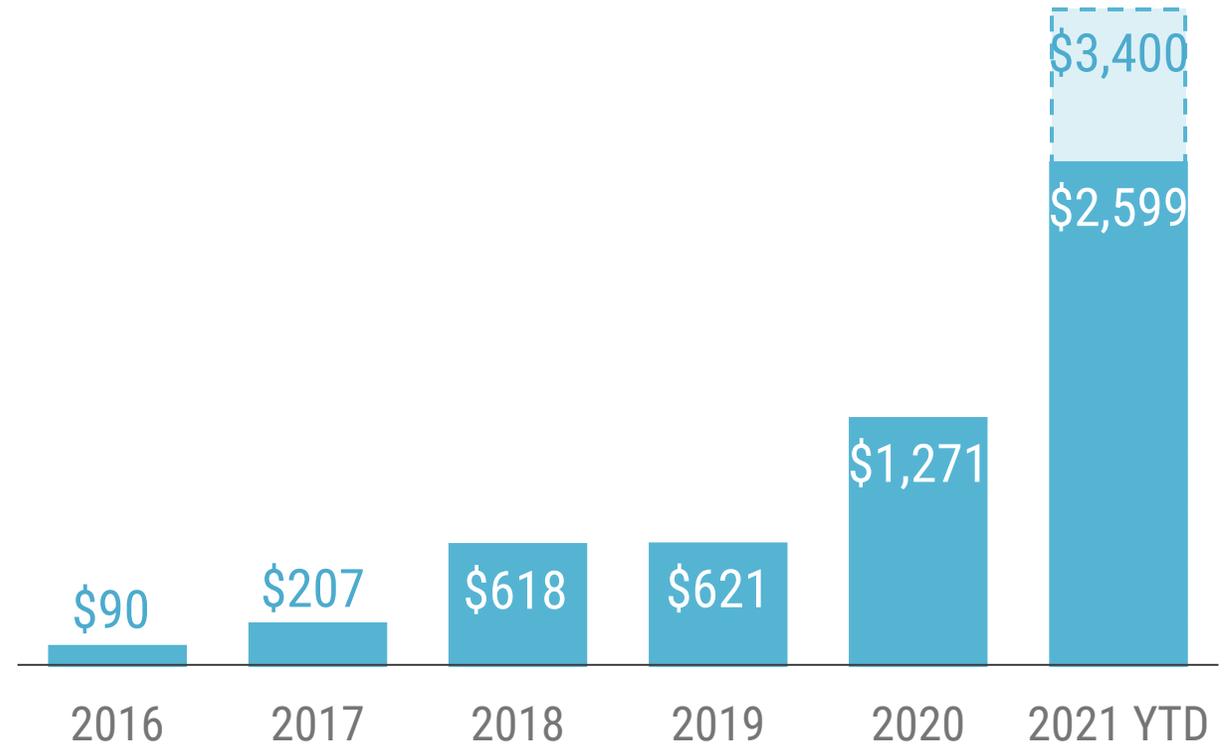
Funding to AI drug discovery companies hit a record high in 2020, with nearly \$1.3B invested.

This record has already been shattered in 2021, with \$2.6B raised to date.

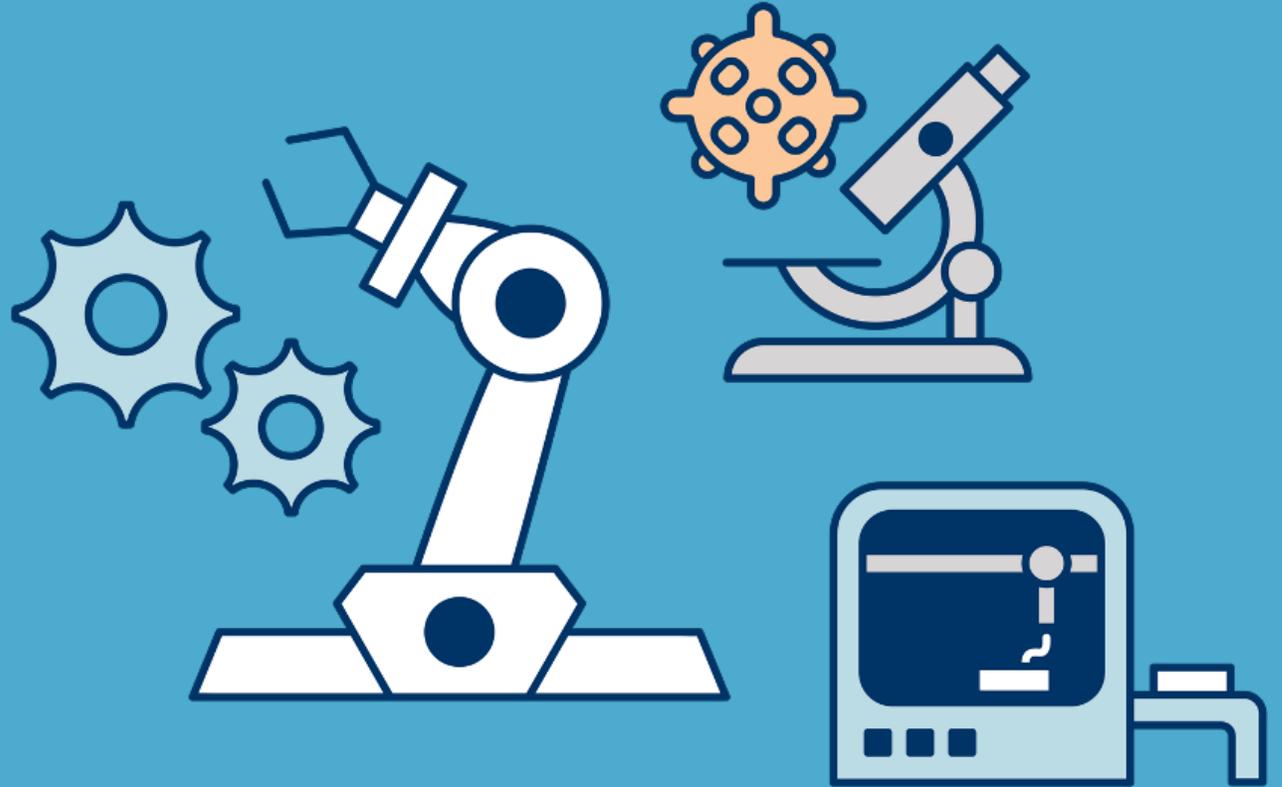


AI drug discovery funding is on a record pace

Disclosed equity funding (\$M), 2016 – 2021 YTD (10/7/21)



Where Big Tech Is Making Moves



How big tech is transforming pharma



Apple is using its hardware and user base to its advantage as it aims to build a secure and centralized location for patient health data. It is creating hardware to collect patient data and is building a developer ecosystem – similar to its strategy with the iPhone and the App Store.



Microsoft launched its healthcare SaaS solutions, leveraging its experience as an enterprise software company. It is entering the pharmaceuticals market through partnerships with existing players. Microsoft's enterprise software products collect patient data, which is then used to build clinical trials and drug discovery solutions.



Google is collecting patient data through its devices and organizing the data into secure patient health records. What differentiates it from other big tech companies is how Google is using AI expertise to build in-house drug R&D capabilities.

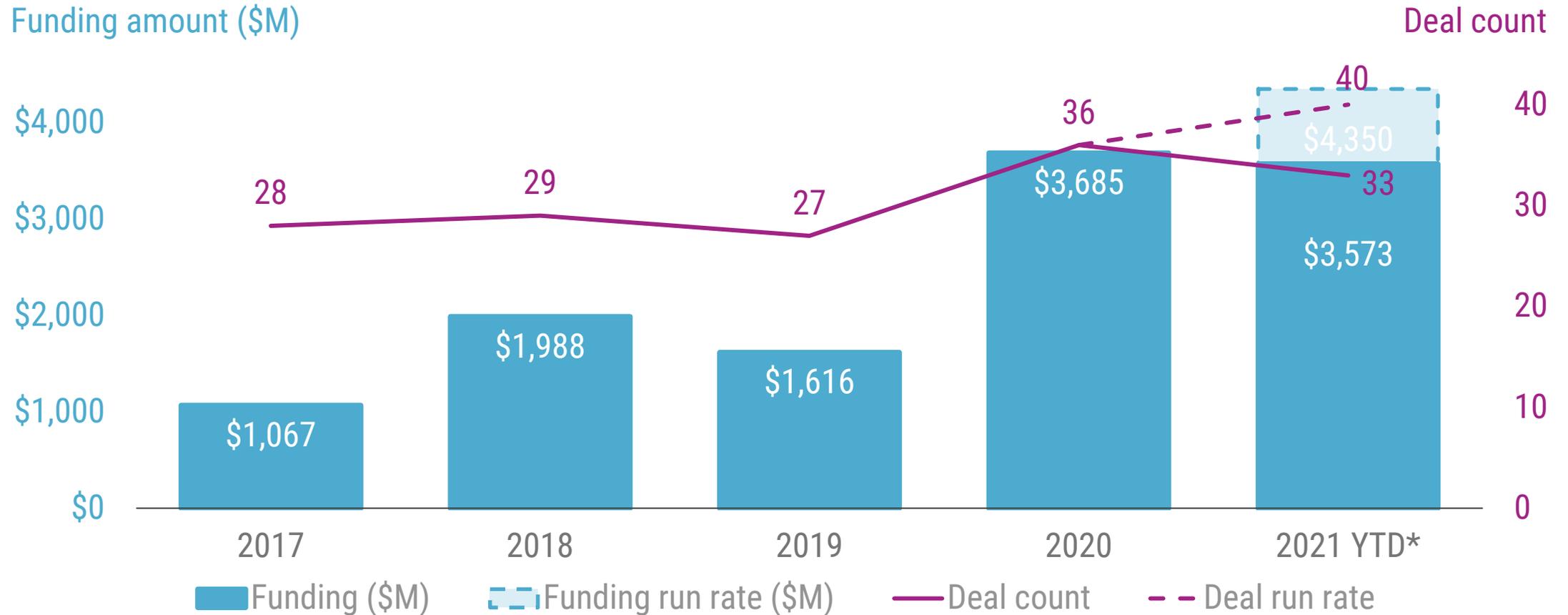


Amazon is building the pharmacy of the future by using its existing supply chain to create a customer experience on par with its e-commerce business. It is scaling remote patient monitoring (RPM) solutions to create a unified experience from prescription to delivery to follow-up.

INVESTMENT TRENDS

Big tech is increasing its pharma investments

Pharma equity deals where at least 1 big tech company participated (9/30/21)



INVESTMENT TRENDS

Big tech is investing in therapeutics startups

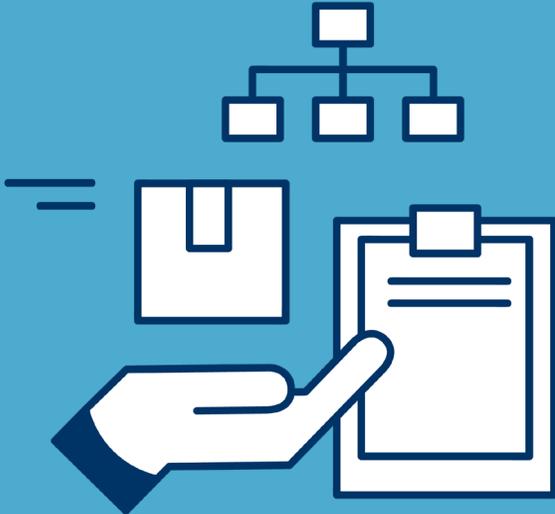
Company	Deal date // Amount raised (\$M)	Total disclosed funding (\$M)	Select investors	Description
 SONOMA BIOTHERAPEUTICS	Aug '21 // \$265M	\$335M	Google	Sonoma Biotherapeutics develops adoptive Treg therapies cell for autoimmune and degenerative diseases.
 nautilus biotechnology	Jul '21 // \$14.7M	\$103.2	Amazon	Nautilus Biotechnology is developing a platform for analyzing and quantifying the human proteome.
 DYNO THERAPEUTICS	May '21 // \$100M	\$109M	Google	Dyno Therapeutics applies AI and quantitative high-throughput in vivo experiments to optimize gene therapy delivery.
 insitro™	Mar '21 // \$400M	\$643M	Google	Insitro leverages machine learning and high-throughput biology to discover and develop novel therapeutics.
 Adaptive biotechnologies™	Jun '19 // \$300M	\$460.55M	Microsoft	Adaptive Biotechnologies uses sequencing to integrate immune system data into the diagnosis, prognosis, and monitoring of cancer patients.

ACQUISITION TRENDS

Big tech acquisitions focus on patient data

Company	Deal date // Amount raised (\$M)	Total disclosed funding (\$M)	Acquirer	Description
 PillPack	Jun '18 // \$1B	\$118.32M	Amazon	PillPack fills, sorts, and delivers medications in personalized packets based on when they need to be taken. The company's service helps users take the right meds at the right time.
 NUANCE	Sep '16 // \$625M	\$69.46M	Microsoft	Nuance Communications provides voice interface software platform that makes the information and services of enterprises accessible from any telephone.
 TUEOHEALTH	May '19 // N/A	\$1.5M	Apple	Tueo Health is developing a system to help parents monitor asthma symptoms in sleeping children.
 fitbit	May '20 // \$2.1B	\$66M	Google	Fitbit creates web-enabled wearable fitness sensors that automate the collection of health data and provide motivation through entertaining user interfaces and peer competition.
 SIGNALPATH	Aug '21 // N/A	\$35.46M	Google (Verily Life Sciences)	SignalPath is designing software for clinical research sites. The company focuses on enabling efficient, collaborative, timely execution of trials to make research an enjoyable, cost-effective endeavor.

Amazon

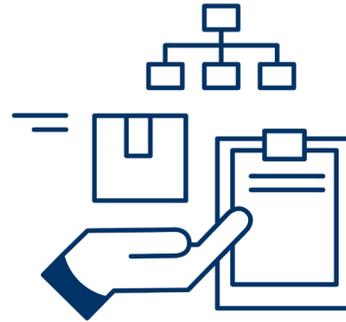


WHERE AMAZON IS FOCUSING



THEME 1

Building a digital pharmacy



THEME 2

Developing pharma supply chain expertise



THEME 3

Personalizing healthcare through IoT devices and data



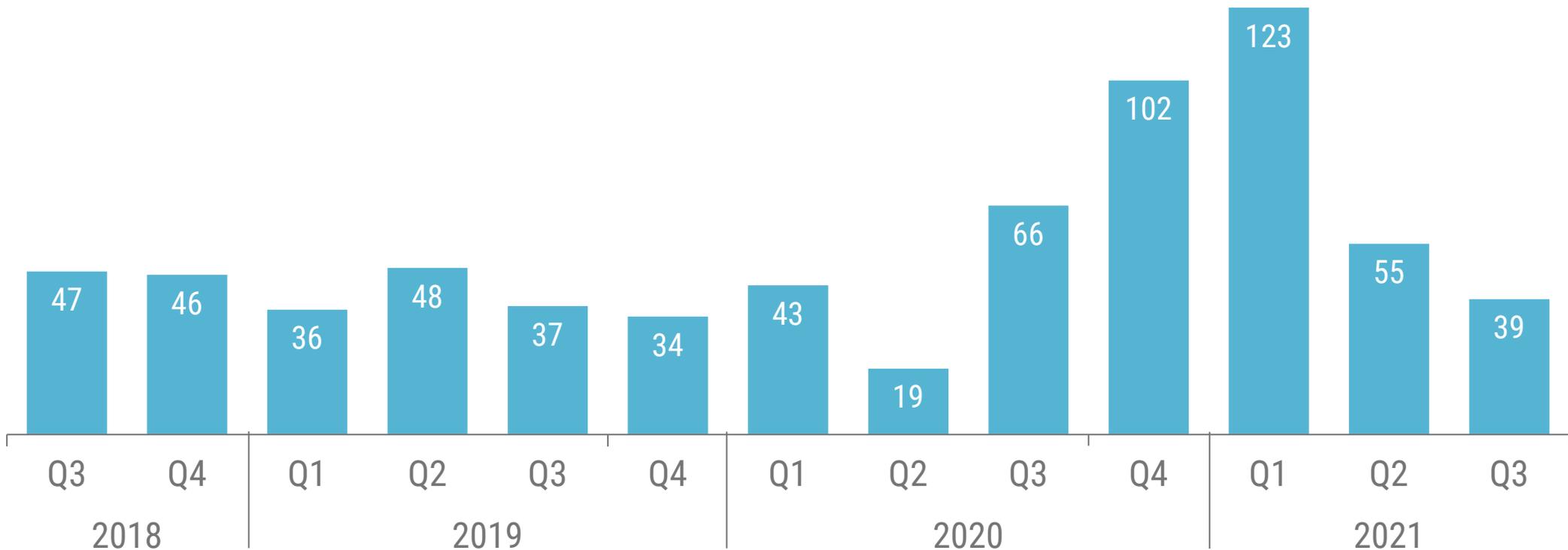
PHARMACY

Theme 1: Amazon is building a digital pharmacy

THEME #1: AMAZON IS BUILDING A DIGITAL PHARMACY

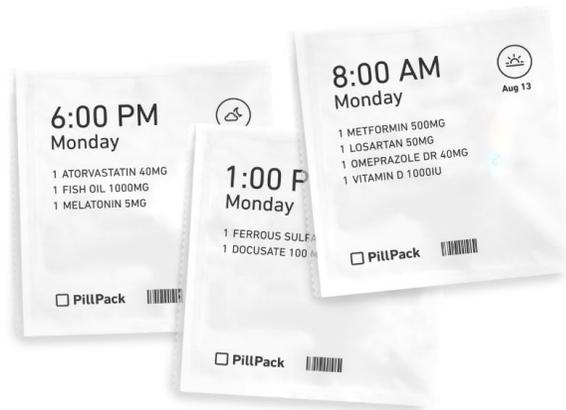
Interest in Amazon's digital pharmacy grew with Covid-19 pandemic but has since cooled off

News mentions of Amazon's digital pharmacy, quarterly, Q1'18 – Q3'21



Amazon continues to build through acquisitions and partnerships

PILLPACK



Latest round: Acquired **Amount:** \$1B

About: PillPack's online pharmacy, mail-order prescriptions, and user-friendly packaging aim to improve medications adherence for patients with chronic conditions.

PHARMAPACKS



Latest round: Private Equity (11/12/2019) **Amount:** \$250M

About: Pharmapacks sells over-the-counter (OTC) products online. Amazon partnered with the company to expand its digital pharmacy offerings.



SUPPLY CHAIN

Theme 2: Amazon is developing its pharma supply chain expertise

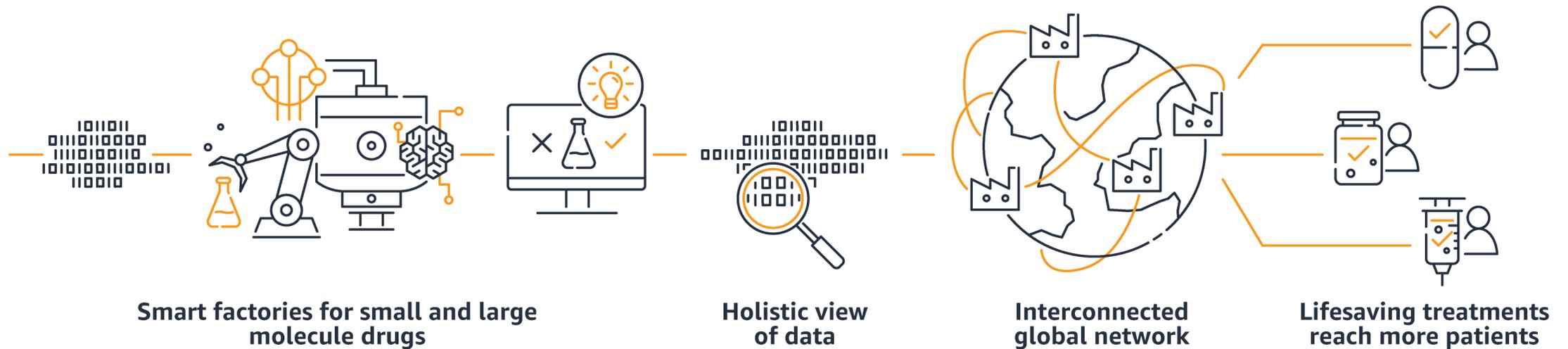
THEME #2: AMAZON IS DEVELOPING ITS PHARMA SUPPLY CHAIN EXPERTISE

Pharma logistics is a hot space...

Company	Deal date // Amount raised (\$M)	Total disclosed funding (\$M)	Select investors	Description
	Aug '21 // \$30M	\$85M	King River Capital, Founders Fund, Pegasus Tech Ventures, Alpha Intelligence Capital, Peter Thiel, Mark Cuban, Scott Banister	Osaro uses AI to provides perception and control software for industrial scale robotic systems (ASRS systems, auto manufacturing, food prep, and e-commerce).
	Jun '21 // \$270M	\$497.19M	Green Pine Capital Partners, Ivy Capital, Fosun International, Co-Power Capital Management, Tiger Global Management	Yaoshibang is provides mobile apps that allow patients to order and receive medicine from pharmacies directly, with guaranteed next-day delivery in major cities in China.
	Jun '21 // \$41.9M	\$118.49M	Shasta Ventures, Base10 Partners, Google Ventures, ACME Capital, VMG Partners, George Ruan, Coatue Management	Pill Club is an online birth control prescription and delivery service, offering more than 150 brands of birth control pills, NuvaRing, and emergency contraception.
	Jun '21 // \$35M	\$64.26M	Abbey International Finance, Edison Partners, Macquarie Capital and Avanta Ventures	Overhaul is a supply chain company that allows shippers to connect disparate sources of data into a fully transparent situational analysis engine designed for the logistics industry.
	Jun '19 // \$56M	\$109M	Uncork Capital, Crosslink Capital, Eniac Ventures, SV Angel, GreatPoint Ventures, Silicon Valley Bank, Warburg Pincus	Phil offers pharmaceutical manufacturers a modern direct access to patients and medication delivery, with improved affordability for patients.

...and Amazon is quietly building expertise through pharma partnerships

The **\$482B generic drugs market** provides an opportunity for Amazon to manufacture drugs in-house – which would reduce prices and improve delivery times for customers. The company is developing its expertise by helping **Novartis** digitize its pharmaceutical manufacturing, supply chain, and delivery operations.





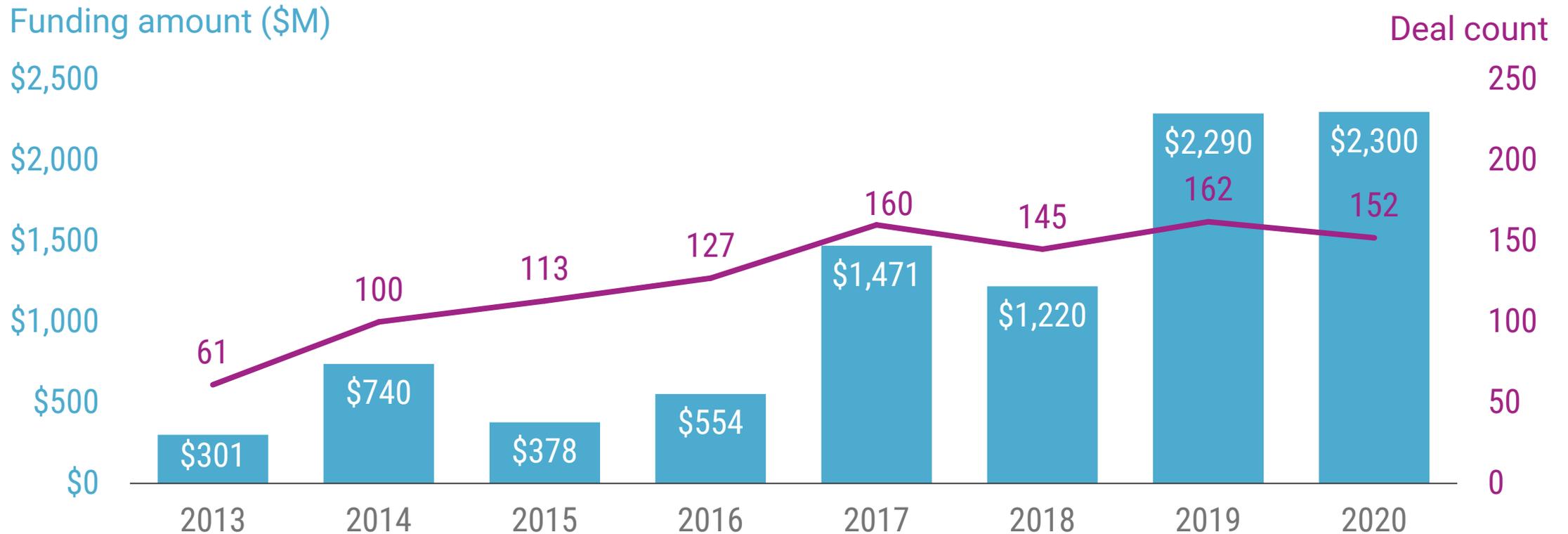
IOT DATA

Theme 3: Amazon is personalizing healthcare through IoT devices and data

THEME #3: AMAZON IS PERSONALIZING HEALTHCARE THROUGH IOT DEVICES AND DATA

Amazon has a massive head start in RPM, with Alexa already in 40M US households

Disclosed deals & equity funding for remote monitoring & diagnostics (\$M), 2013 – 2020



It's building a competitive advantage through integrations and partnerships

Nurx teams up with Amazon Alexa on birth control reminders and sex education

September 28, 2021 | 

Amazon Halo can now share heart rate data with third-party apps and equipment

August 5, 2021 |  

Amazon partnered with Cerner to let patients share their Halo wearable data with providers

September 1, 2020 | 

NHS partners with Amazon to provide health information through Alexa

July 11, 2019 | 

KEY TAKEAWAYS & IMPLICATIONS

Amazon's plans point to key trends for 2022



Digital Pharmacy



Generic Drugs



Biosensors and Wearables

Theme

Takeaways

Amazon's e-commerce infrastructure and PillPack acquisition enable consumers to easily order and manage medications.

Amazon has an opportunity to reduce drug prices by integrating generics manufacturing with its existing supply chain.

Amazon's existing IoT solutions (i.e., Alexa and Echo) enable integration into remote patient monitoring and care delivery.

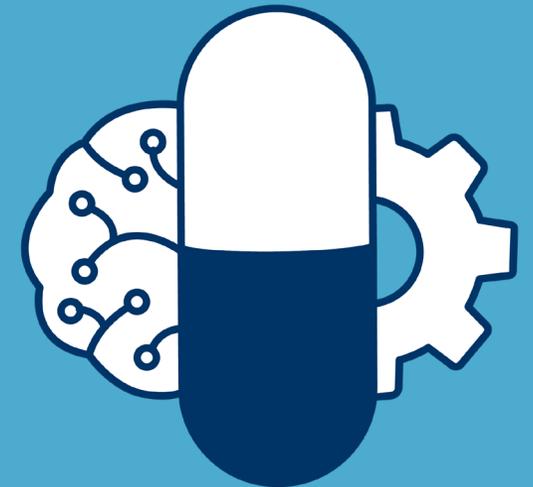
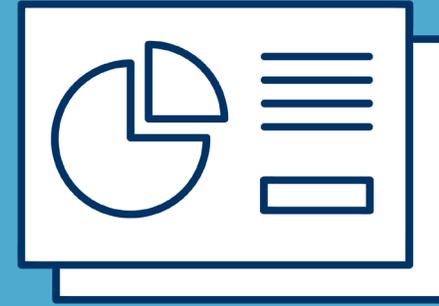
Implications

Expect Amazon leverage its existing supply chain to ramp up its digital pharmacy efforts.

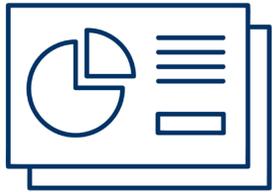
Due to synergies with its e-commerce business, **anticipate Amazon building a pharmaceutical manufacturing unit.**

Consider that Amazon may be after more than consumer purchasing data.

Microsoft



WHERE MICROSOFT IS FOCUSING



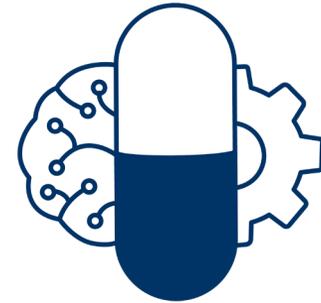
THEME 1

SaaS solutions for
healthcare enterprises



THEME 2

Using patient data to
build clinical trials tech



THEME 3

Helping big pharma
discover new drugs

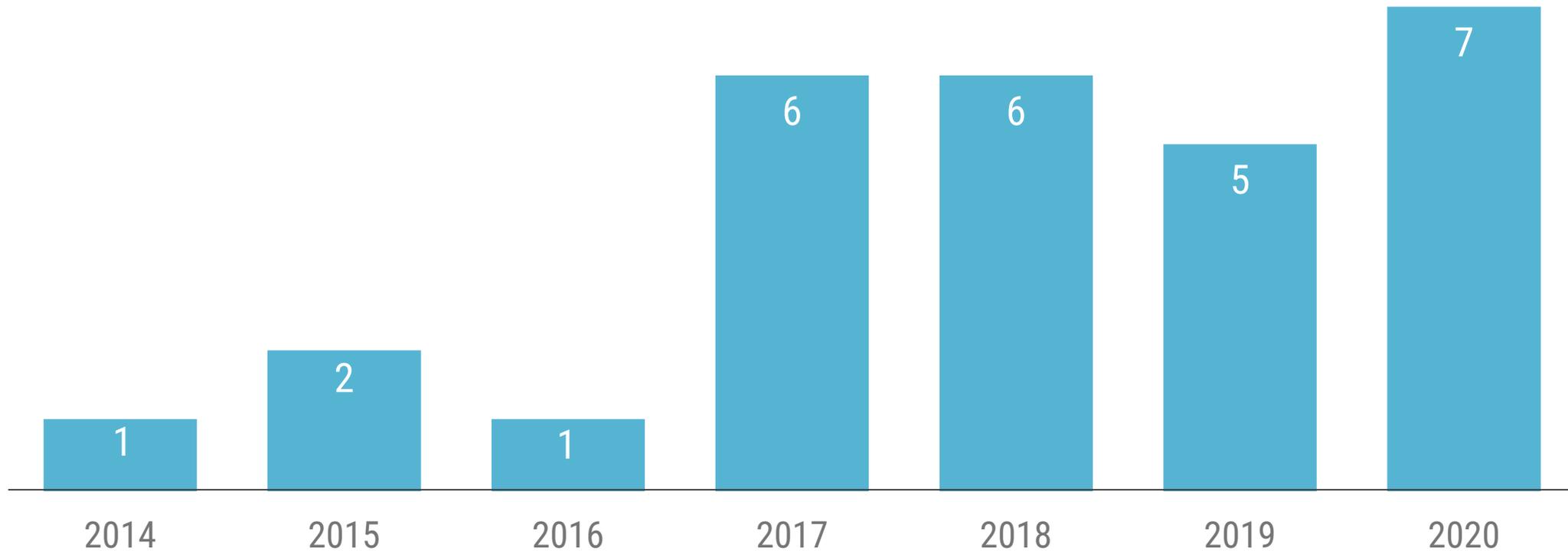


HEALTH SAAS

Theme 1: Microsoft launches SaaS solutions for healthcare enterprises

Microsoft has stepped up its healthcare SaaS partnerships in recent years...

Disclosed business relationships, 2014 – 2020



...and now is growing its own business through acquisitions and product launches

Microsoft Cloud for Healthcare
Announces “Azure Healthcare APIs”

August 6, 2021

Microsoft Acquires Nuance to Enhance
Healthcare AI, Cloud Strategy

April 12, 2021 |  NUANCE

Microsoft to add Epic integration, remote-
monitoring tools to healthcare cloud

February 24, 2021 | 

Providence St. Joseph & Microsoft Form
Alliance to Deliver Healthcare Innovations

July 8, 2019 |  Providence
St. Joseph Health

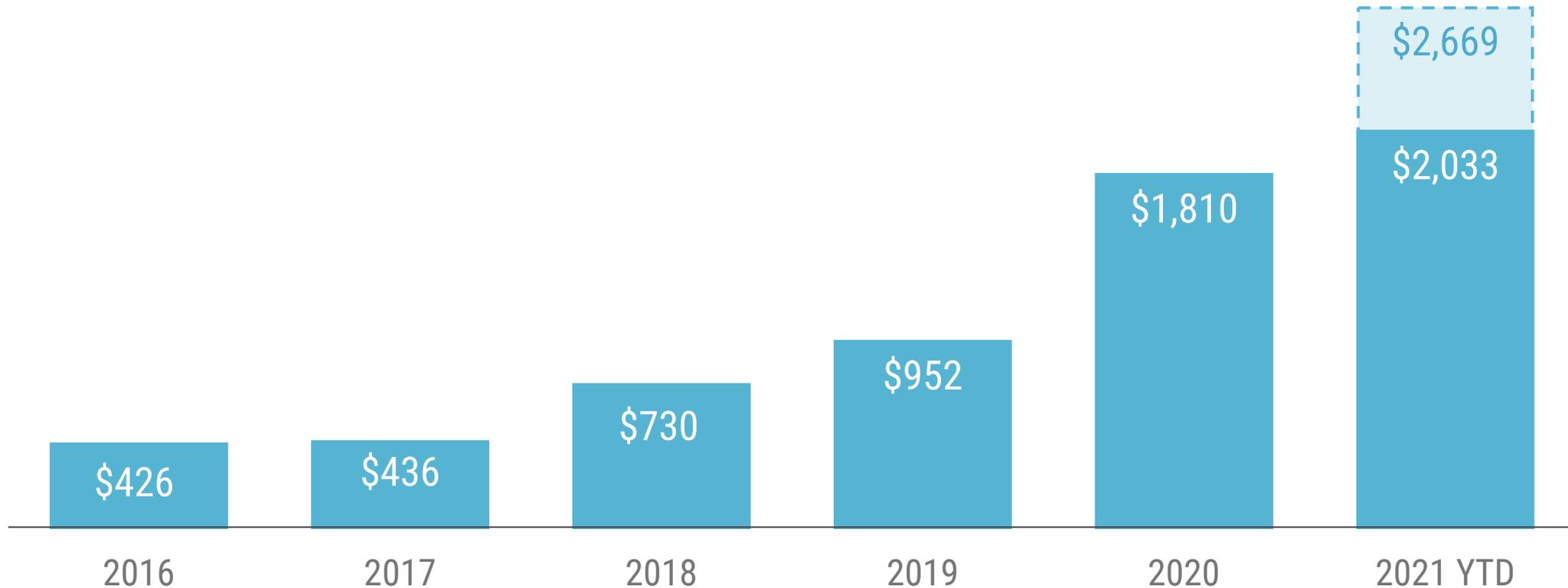


REMOTE TRIALS

Theme 2: Microsoft is using patient data to build clinical trials tech

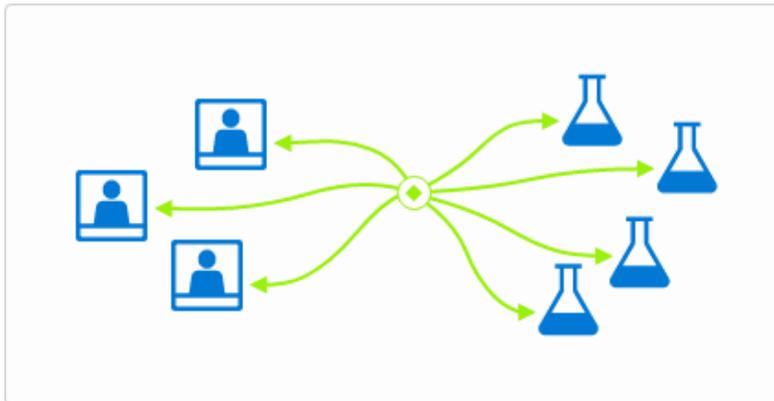
Clinical trials tech startup funding is growing

Disclosed equity funding (\$M), 2016 – 2021 YTD (10/6/21)



Microsoft has a unique advantage with its access to patient data

PROJECT NEW HOPE



About: Microsoft’s Clinical Trials Matching technology uses Natural Language Processing (NLP) tools that understand both the clinical trial protocols and patient health records. The technology helps narrow down and prioritize the set of relevant clinical trials to a smaller set of trials that the patient appears to be qualified for.

ALLSCRIPTS (VERADIGM)



About: Microsoft is working with Allscripts’ life science arm – Veradigm – to create an integrated clinical trial platform, which leverages Allscripts’ EHR data for clinical trial matchmaking. A broader goal is to create a platform to collect and analyze clinical trial data through IoT technology and AI.



DRUG R&D

Theme 3: Microsoft is helping big pharma discover new drugs

Microsoft is discovering drugs with partners

NOVARTIS



About: Over the past few years, Microsoft has established several partnerships focused on drug discovery. For example, it **partnered with Novartis in 2019 to create an AI innovation lab for drug R&D.**

UCB



About: In early 2021, Microsoft entered into an agreement with UCB to create an oral antiviral for Covid-19. By leveraging Microsoft's Azure, **UCB was able screen and design compounds in 3 days – a process that usually takes 6 months.**

THE JACKSON LABORATORY



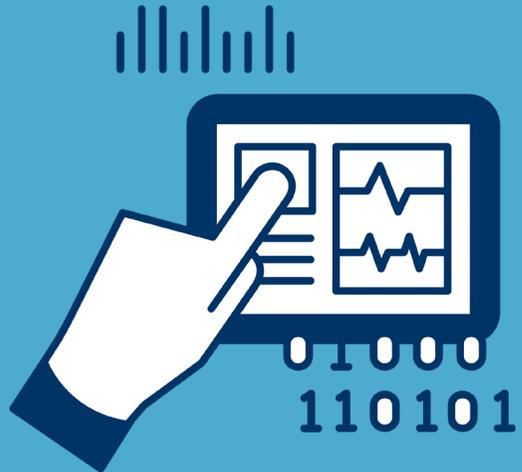
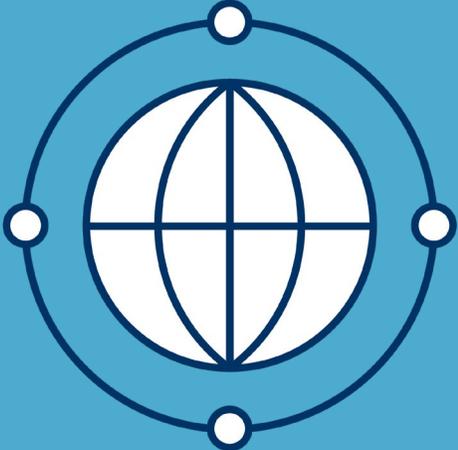
About: Microsoft has also forayed into earlier-stage drug discovery research with The Jackson Laboratory. Project Hanover uses **machine learning to read medical documents to improve precision treatments.**

KEY TAKEAWAYS & IMPLICATIONS

Microsoft plans point to key trends for 2022

Theme	 Healthcare SaaS	 Remote Clinical Trials	 AI for Drug Discovery
Takeaways	In the past year, Microsoft has doubled down on healthcare SaaS offerings through product launches, acquisitions, and partnerships.	Microsoft's access to patient data has increased in the past year, adding fuel to its ongoing clinical trials work.	Microsoft has already had remarkable success helping pharmaceutical partners discover drug candidates.
Implications	Following its healthcare cloud launch and Nuance acquisition, expect Microsoft to invest in its healthcare SaaS business.	Due to Covid-related increase in remote trials, anticipate Microsoft re-focusing on its clinical trials tech.	Consider that Microsoft is well-positioned to build or launch an AI Drug Discovery business unit.

Apple

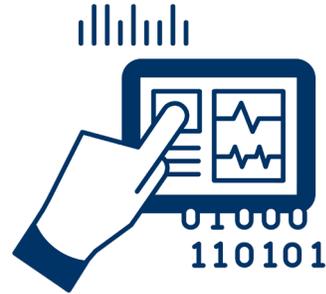


WHERE APPLE IS FOCUSING



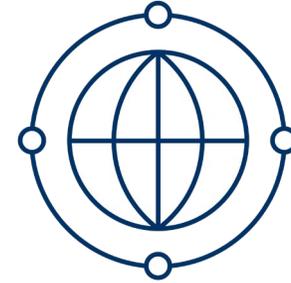
THEME 1

Building hardware to collect patient health data



THEME 2

Developing digital biomarkers



THEME 3

Building a healthcare software ecosystem



HARDWARE

Theme 1: Apple is building hardware to collect patient health data

The iPhone can integrate with medical devices

PORTABLE ULTRASOUND



Latest round: Reverse Merger (2/16/2021)

Valuation: \$1.5B

About: Butterfly Network provides portable point-of-care ultrasounds devices that can be read through a smartphone.

ELECTROCARDIOGRAM (ECG)



Latest round: Series E (11/16/2020)

Valuation: \$425.1M

About: AliveCor offers a mobile ECG solution that can provide instant sinus rhythm analysis and atrial fibrillation detection.

VITAL SIGNS



Latest round: Series B (6/10/2020)

Amount: \$13.5M

About: Binah.ai enables real-time vital signs measurement via smartphone, laptop, or tablet camera.

Apple is also buying complementary hardware

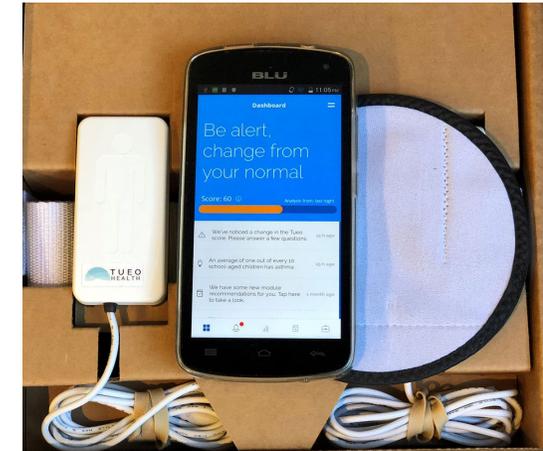
BEDDIT



Latest round: Acquired **Amount:** N/A

About: Beddit provides a sensor that goes under the bedsheet to track sleep time, heart rate, breathing, movement, temperature, and humidity. Although the sensor is no longer available for purchase, Apple may still have plans to integrate this technology into its healthcare offerings.

TUEO HEALTH



Latest round: Acquired **Amount:** N/A

About: Tueo Health provides a non-contact sleep sensor to track breathing in asthmatic children. This technology is applicable across vocal biometrics — a growing segment of remote patient monitoring.



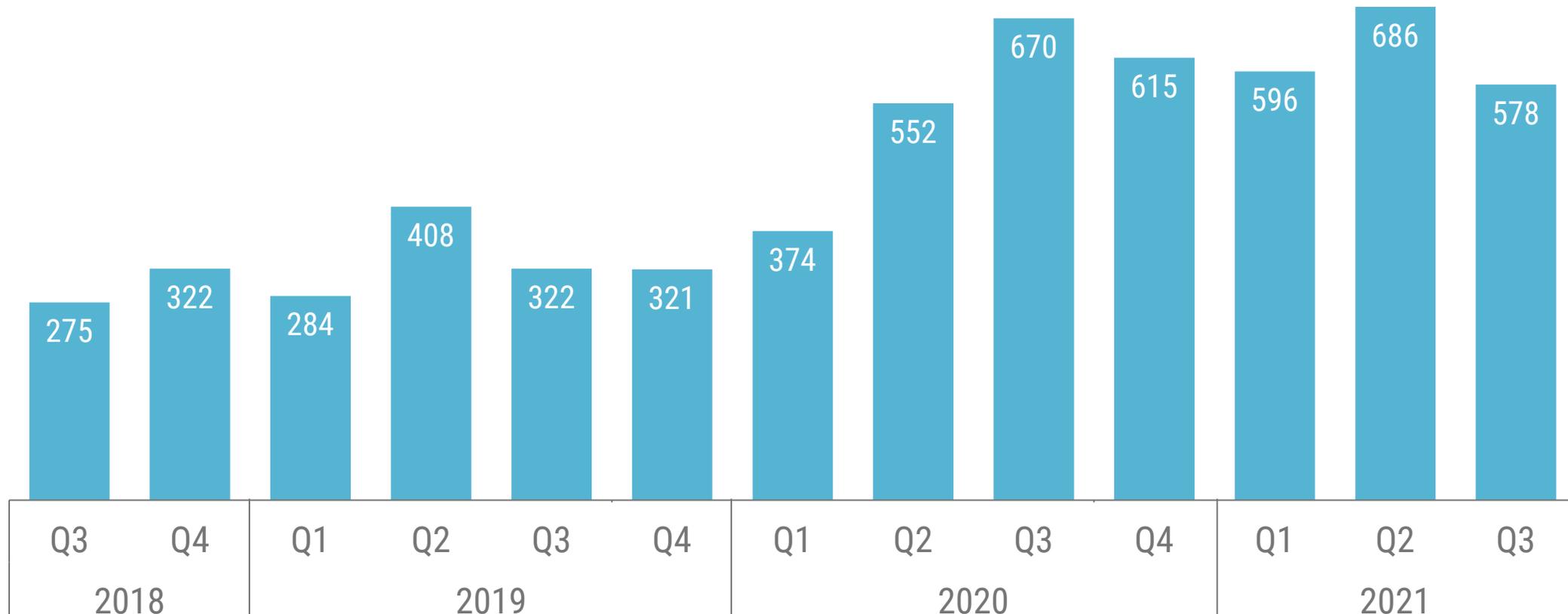
BIOMARKERS

Theme 2: Apple is developing digital biomarkers

THEME #2: APPLE IS DEVELOPING DIGITAL BIOMARKERS

Interest in digital biomarkers is growing...

News mentions of “digital biomarkers,” quarterly, Q1’18 – Q3’21



...and Apple's is in a unique position to capitalize

Biogen, Apple to initiate study to develop cognitive health digital biomarkers

January 11, 2021 |  Biogen

Digital biomarker for asthma indicates Apple Watch move into health tech

December 1, 2020

UCLA collaborates with Apple to develop digital biomarkers for depression

December 1, 2020 

Apple, Eli Lilly, and Evidation present first results from digital Alzheimer's study

August 8, 2019 |   evidation



ECOSYSTEM

Theme 3: Patient health records are at the center of Apple's ecosystem strategy

Apple has created open-source frameworks...

RESEARCH KIT



About: ResearchKit is a tool for medical research that enables consent flows, dynamic tasks, and surveys delivered through developer apps. It gives access to valuable data for research studies, such as step counts, calories, and heart rate.

CARE KIT



About: CareKit helps developers better understand and manage user health by creating dynamic care plans, tracking symptoms, connecting to care teams, and more.

HEALTH KIT



About: HealthKit integrates into health and fitness apps to create a more seamless user experience. It provides access for developers to read and write health and activity data.

...that pharmaceutical companies are using to build health apps

Apple partners with Epic, Mayo on new health app platform

July 21st, 2020 |  

Novartis launches new app, built with Apple's ResearchKit

February 25, 2020 |  NOVARTIS

Apple and Johnson & Johnson team up on new study to see if Apple Watch can reduce risk of stroke

February 25, 2020 | 

New smartphone app may enable lupus patients to report symptoms more easily and accurately

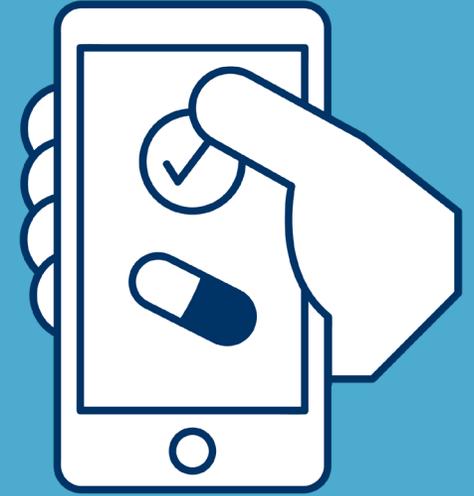
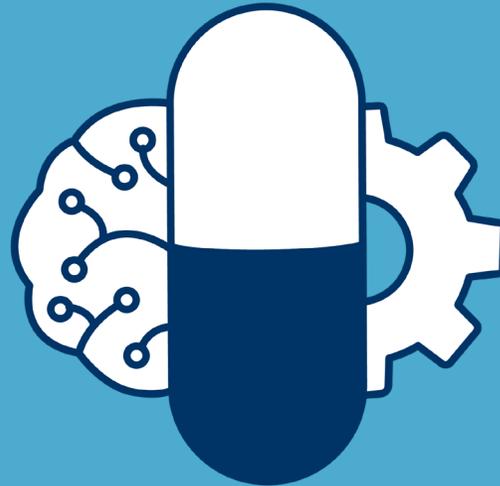
May 9, 2017 | 

KEY TAKEAWAYS & IMPLICATIONS

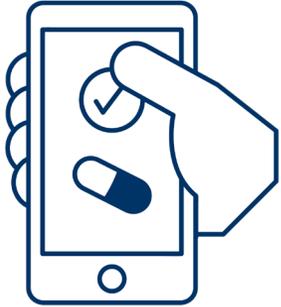
Apple plans point to key trends for 2022

Theme	 Biosensors & Wearables	 Digital Biomarkers	 Digital Health Ecosystem
Takeaways	Apple's DNA as a consumer hardware company serves it well, as it continues to build healthcare-specific biosensors and wearables.	Apple is working with big pharma to use its data for digital biomarkers for cognitive and respiratory health.	Apple's open-sourced software, which is specifically designed for healthcare, has already been used by thousands of patients and multiple pharmaceutical companies.
Implications	Expect Apple to double-down on its wearable devices , particularly improving their capabilities to capture health data.	Consider that Apple is positioned to become a leader in digital biomarkers , with its access to patient health data.	Anticipate that the developer ecosystem surrounding Apple's hardware and health data will grow.

Google



WHERE GOOGLE IS FOCUSING



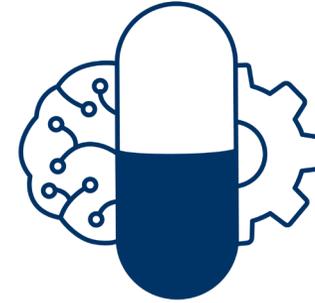
THEME 1

Accessing patient data



THEME 2

Making it easier to
participate in clinical trials



THEME 3

Discovering drugs with AI



PATIENT DATA

Theme 1: Google is focused on accessing patient data

THEME #1: GOOGLE IS FOCUSED ON ACCESSING PATIENT DATA

Google is investing in startups with patient data...

Company	Deal date // Amount raised (\$M)	Total disclosed funding (\$M)	Select investors	Description
	Aug '21 // \$60M	\$120.41M	Google Ventures , Amgen Ventures, Canaan Partners, Illumina Ventures, Flywheel Ventures, Kaiser Permanente Ventures, GE Ventures	Genome Medical's genomic care delivery helps healthcare providers and their patients utilize genetic test results to understand the risk for disease, accelerate disease diagnosis, make informed treatment decisions and lower the cost of care.
TEMPUS	Dec '20 // \$200M	\$1.07B	Google , Novo Holdings, New Enterprise Associates, Franklin Templeton, T. Rowe Price, Lightbank, Revolution Growth	Tempus has built a library of patient data and a corresponding operating system for accessibility and use. It enables physicians to make real-time, data-driven decisions to deliver personalized cancer care for patients.
klara	Aug '20 // \$15M	\$32.04M	Gradient Ventures , Lerer Hippeau, FirstMark Capital, Stage 2 Capital, Atlantic Labs, TA Ventures, Project A Ventures, Partech Ventures	Klara enables healthcare providers across 40 specialties to securely communicate with their patients and with each other, without worrying about HIPAA compliance or losing track of patient information.
	Aug '20 // \$100M	\$806.22M	Google Cloud Platform , Takeda Pharmaceutical, Philips, Teva Pharmaceuticals, Allianz X, Bain Capital Double Impact	AmWell enables providers and insurers to deliver greater access to more affordable healthcare. Its platform supports all telehealth needs from urgent to acute and post-acute care, as well as chronic care management and healthy living.
	May '20 // \$25M	\$74.1M	Google Ventures , F-Prime Capital, Eight Roads Ventures, NJF Capital, Mubadala Capital, Bpifrance, Cathay Innovation, Plug and Play Ventures	Phil offers pharmaceutical manufacturers a modern direct access to patients and medication delivery, with improved affordability for patients.

...while also acquiring health data directly through EHR partners

Google Cloud to beef up HCA Healthcare's clinical operational data analytics in new multiyear partnership

May 26, 2021 |  HCA Healthcare

Highmark Health inks 6-year partnership with Google sister company Verily

March 2, 2021 |  HIGHMARK HEALTH

Google, Ascension continue EHR collaboration by launching new search tool

February 23, 2021 |  Ascension

Mayo Clinic selects Google as strategic partner for health care innovation, cloud computing

September 10, 2019 |  MAYO CLINIC



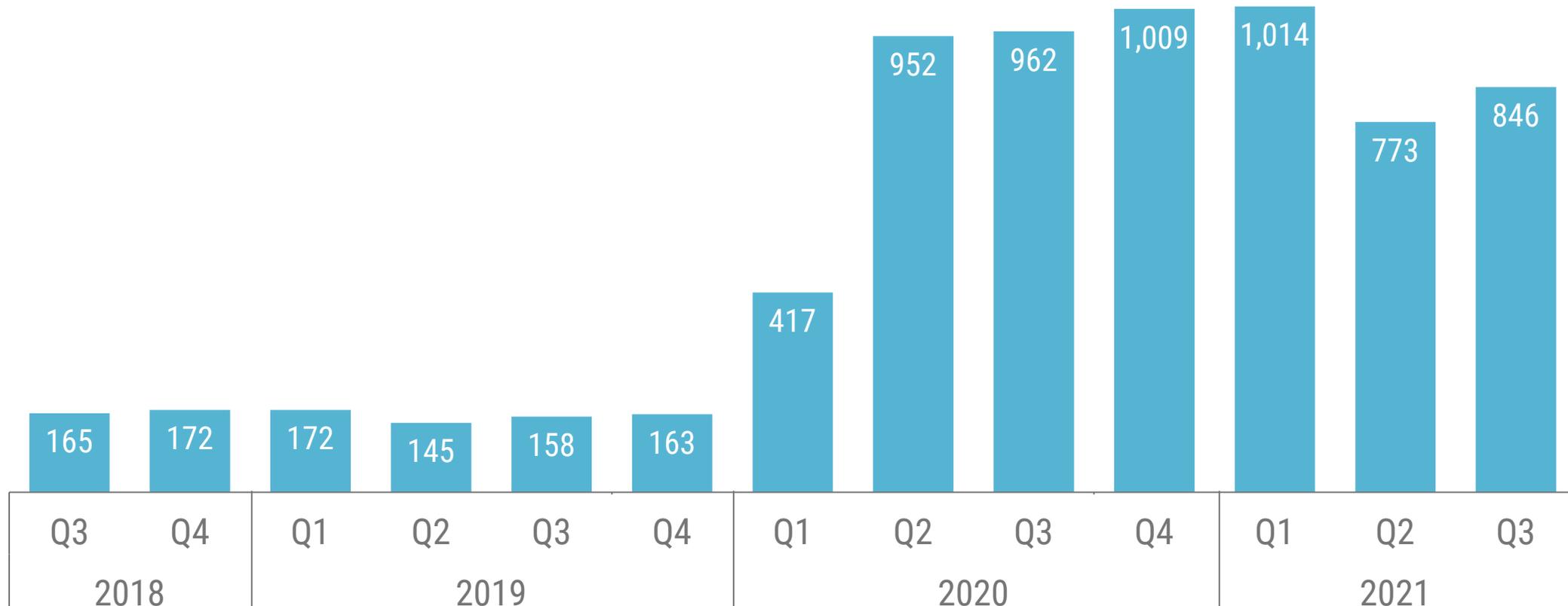
REMOTE TRIALS

Theme 2: Google is making it easier to participate in clinical trials

THEME #2: GOOGLE IS MAKING IT EASIER TO PARTICIPATE IN CLINICAL TRIALS

Interest in remote trials spiked due to Covid-19

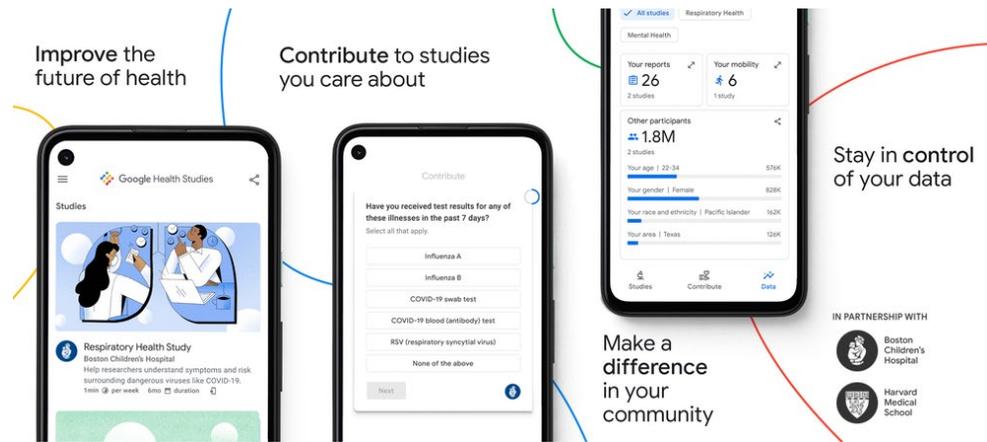
News mentions of “remote clinical trials,” quarterly, Q1’18 – Q3’21



THEME #2: GOOGLE IS MAKING IT EASIER TO PARTICIPATE IN CLINICAL TRIALS

Google responded by launching and acquiring clinical trials tech

GOOGLE HEALTH STUDIES



About: Boston Children's Hospital and Harvard Medical School are partnering with Google to enroll Android users in a 100,000-person study of acute respiratory illnesses. The study is using survey responses and mobility data to analyze diseases, including Covid-19.

SIGNALPATH



SIGNALPATH
RESEARCH • REWIRED

Latest round: Acquired **Amount:** \$165M

About: Verily Life Sciences, an Alphabet subsidiary, entered the remote clinical trial management space by acquiring clinical trials platform SignalPath.



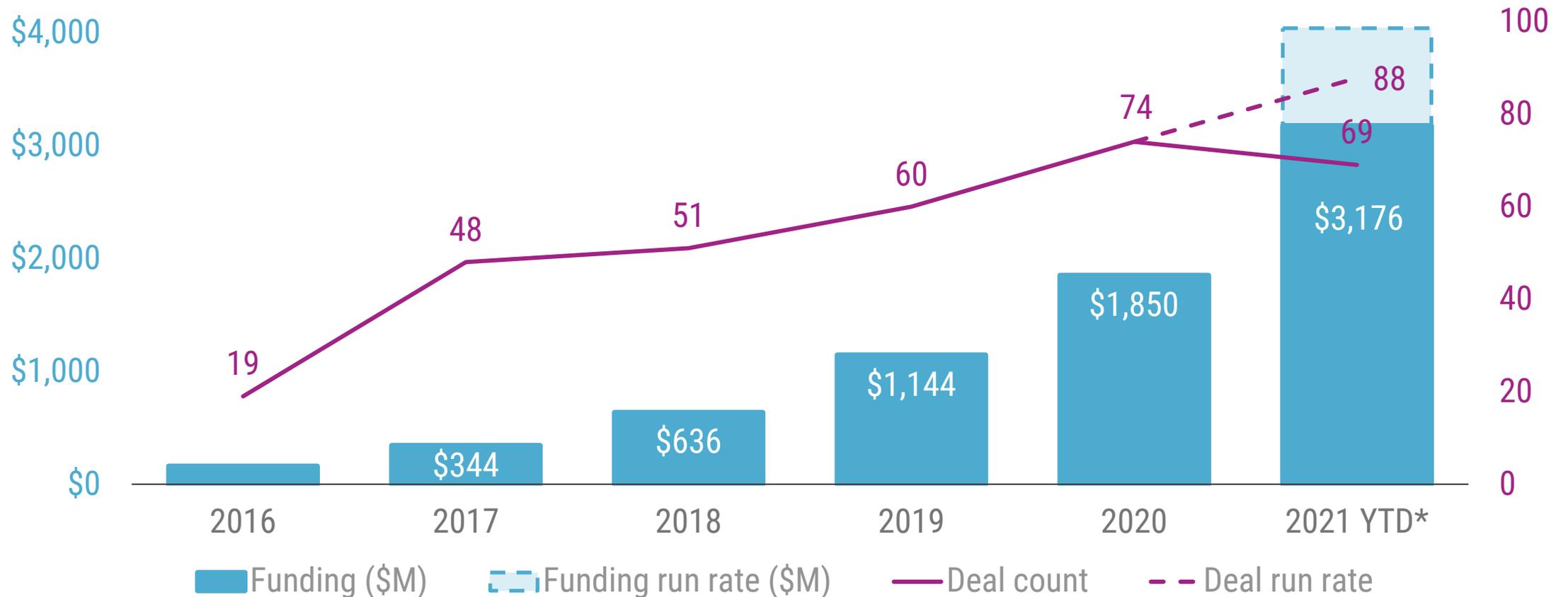
DRUG R&D

Theme 3: Google is discovering drugs with AI

THEME #3: GOOGLE IS DISCOVERING DRUGS WITH AI

AI for drug discovery is taking off..

Disclosed equity funding to AI for drug discovery startups (\$M), 2016 – 2021 YTD (10/18/21)

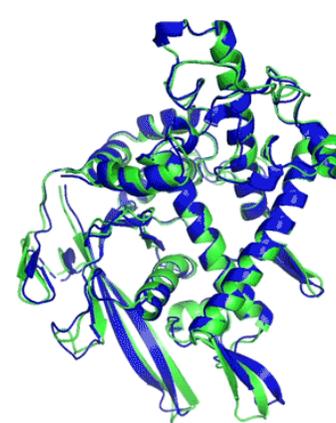


...and Google is leading the way

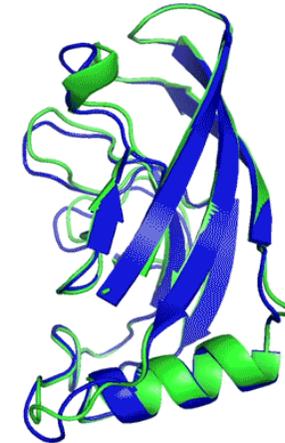
Google's DeepMind division is developing AI for Drug R&D.

AlphaFold – a **protein folding algorithm** – recently released predicted more than 350,000 protein structures, which encompass proteomes for humans and other organisms.

Google's reported quantum supremacy may amplify its drug development capabilities.



T1037 / 6vr4
90.7 GDT
(RNA polymerase domain)



T1049 / 6y4f
93.3 GDT
(adhesin tip)

 Experimental result
 Computational prediction

Calico Life Sciences is working with partners to develop anti-aging drugs

Google-backed Calico doubles down on anti-aging R&D pact with Abbvie

July 27, 2021 | 

Google's Calico used genetic data from Ancestry to study aging

August 1, 2018 | 

Broad Institute and Calico extend collaboration focused on the biology of aging and age-related diseases

October 8, 2019 | 

C4 Therapeutics and Calico enter partnership to discover novel therapeutics based on targeted protein degradation

March 23, 2017 | 

KEY TAKEAWAYS & IMPLICATIONS

Google plans point to key trends for 2022



Remote Clinical Trials



Real-World Evidence



AI for Drug Discovery

Theme

Takeaways

Google's accessible, consumer-facing digital solutions (e.g., Fitbit, mobile app) are enabling wider access to patient participation.

Access to health records data, through partnerships, enables Google to provide real-world evidence solutions for drug development.

Google's AI expertise gives it a unique advantage for discovering drug candidates, both independently through its subsidiaries and in partnership with pharma.

Implications

Expect Google to continue integrating clinical trial enrollment across its consumer-facing solutions, including search.

Consider that Google can amplify the value of health records data by integrating it with consumer search and behavioral data.

Anticipate that Google's subsidiaries will identify and launch drug candidates within the coming years.