EXECUTIVE BRIEFING

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Tech Giants Race to Fix Health Care

What Apple, Google, and Amazon's visions mean for medical affairs

Part 2: Six ways Google will move into health care in the next five years care

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Executive summary

Technology keeps creeping further and further into our lives. It's changing everything—especially how we connect. For health care, that means transformational opportunities to predict, measure, and communicate the value of medicine.

Trend-setting technology innovators will create opportunities for medical affairs leaders to do their jobs better: understand customers, generate meaningful evidence, and communicate value to key stakeholders. Apple will facilitate direct connections with patients to generate real-time, patient-reported outcomes and expedite care management. Google will enable use of nontraditional sources of health data to predict and demonstrate meaningful real-world clinical effectiveness. Amazon will provide insight into how large employers will influence product adoption and utilization. The company will also disrupt the health care supply chain in major ways—changing which stakeholders medical affairs might prioritize.

Read on to learn how investments from tech giants today might shape the future health care landscape. Our observations will help you plan for opportunities and challenges your medical affairs organization will face in the next five years.

Visions for the **future of health care**

Part 1: Five ways **Apple** is transforming health care

- Let patients connect their iPhones directly to their providers' EHRs
- Help providers monitor their patients' health in new ways
- Help researchers recruit hundreds of thousands of study participants—in a snap
- Allow users to monitor their health via Apple devices (and convince health insurers to foot the bill)
- Pioneer a wellness-based approach to employee health care

Part 2: Six ways **Google** will move into health care in the next five years

- Store your health care data
- Crunch all that data
- Diagnose diseases better than human doctors
- Build "smart" health products, with or without industry partners
- Sell Internet of Things (IoT) devices for your home—and nursing homes
- Cut the burden of clinical documentation

Part 3: What **"Amazon health care"** could look like in five years

- Employer aggregator
- Next-generation retail pharmacy
- Global health care logistics specialist
- Consumer-focused technologies
- Primary care operator

Six ways

Google will move into health care

in the next five years

Do you think you understand the full scope of Google's ambitions in health care?

Think again. The tech giant's health efforts—through its own projects and those of its parent company, Alphabet—are so far-reaching and ambitious that almost no one can keep track of them all.

Google's array of health care programming is vast.

There's Google Brain, focused on deep learning; Google Fit, dedicated to wearables; and Nest, a home automation brand. Then there are the independent teams within Alphabet, such as anti-aging company Calico, life-sciences research arm Verily, and data-storage platform Google Cloud—all of which have aspirations in health care.

And that's not all. GV, Alphabet's venture capital arm formerly called Google Ventures, has backed nearly 60 health-related companies—including big names such as 23andMe, Oscar Health, and Doctor on Demand. Alphabet has filed hundreds of patents related to health care—186 just between 2013 and 2017. And various Google and Alphabet teams are working on partnerships with major providers such as Stanford Medicine, Cleveland Clinic, and Mayo Clinic.

And believe it or not, that's *still* not all. Did you know the company offers a spoon for people with movement disorders, or that it's working on a mosquito-fighting technology to prevent Zika?

It's a lot—more than could possibly be covered in a single report. So rather than offering a comprehensive, and overwhelming, list of Google's projects, let's take a step back and ask a bigger question: What's the endgame for all of these ambitious, but seemingly disconnected, health care ventures?

> We've highlighted six themes uniting Google's health care projects—and inherent within them, six visions for the future of "Google health care."

1 Google wants to store your health care data (lots and lots of data).

Perhaps the most natural fit for Google in health care is the storage and management of big data. They've invested heavily in making their data warehousing, machine learning, and even G Suite tools (Google Docs, Google Sheets, etc.) HIPAA-compliant.

Google Cloud's recent partnership with NIH on the STRIDES Initiative has made its storage, computing, and machine learning capabilities available to 2,500 research institutions across the country. And Google Cloud added former Cleveland Clinic CEO Toby Cosgrove as an advisor, suggesting that it has bigger aspirations to target providers.

But Google doesn't just want to store your data; it wants to make your data interoperable and accessible. In 2016, Google spent $625 million to acquire Apigee, which helps companies design application programming interfaces (APIs) to manage data. A number of hospitals and health systems are already using Apigee's platform, including Cleveland Clinic, Kaiser Permanente, and Rush University Medical Center, as well as other industry players such McKesson and Walgreens.

2 Google wants to help you crunch all that data too.

Google can do more than just store tons of data. They also have machine learning capabilities to analyze and gain insights from all that information.

One of Google's most intriguing products is BigQuery, a HIPAA-compliant, server-less data warehouse that enables providers to combine and analyze patient records with other massive data sets. For instance, the Colorado Center for Personalized Medicine at the University of Colorado has used BigQuery to construct a genomics database for nearly six million patients. Their project fuses genomics data from the center with EHR records from the University of Colorado system and external insurance claims, public health data, and environmental data to develop personalized therapies for patients.

Google is also working on new ways to crunch difficult-to-standardize patient information, such as X-rays and physician notes, via pilot partnerships with UC San Francisco, Stanford Medicine, and University of Chicago Medicine.

Finally, Google wants to use their data analytics to revamp clinical trials. Verily recently announced strategic partnerships with Novartis, Sanofi, Otsuka, and Pfizer that aim to make it easier for patients to enroll and participate in clinical trials. For instance, if someone searches ways to relieve asthma symptoms, they could receive targeted ads about asthma-related trials. Verily is exploring trial opportunities in cardiovascular disease, oncology, behavioral health, dermatology, and diabetes. They also want to simplify aggregation of clinical data from different sources, like EHRs and wearables.

3 "Dr. Google" may someday diagnose diseases better than human doctors.

Google also is building algorithms to diagnose various clinical conditions—sometimes more successfully than human doctors.

For instance, one Google-created algorithm was shown by Stanford researchers to diagnose skin cancer as well as a dermatologist, while another algorithm was as effective at diagnosing certain eye diseases as ophthalmologists. Yet another showed 99% accuracy at detecting breast cancer in lymph node biopsies.

Google has stressed that such tools are not intended to replace doctors' clinical decision-making. Instead, in the example of the lymph node biopsy algorithm, Google says it should "naturally complement pathologists' workflow." It's important to note that before any of these machine learning tools could be used more widely, they would have to undergo extensive testing, especially to ensure that developers can deconstruct the "black box" assumptions that drive the models' conclusions.

4 Google wants to build "smart" health products—with or without industry partners.

Google is exploring a range of consumer-focused health products—particularly through Verily, which has focused especially on the 30 million Americans with diabetes. One product, created in partnership with the medical device company Dexcom, is a small continuous glucose monitor that has been submitted to FDA for approval. Verily is also building a disposable glucose sensor that would be worn like a bandage for up to 14 days and would require no finger stick calibrations.

Verily also has its own answer to the Apple Watch, called the Study Watch. It isn't on sale to the public yet, but it's being used to study predictors of heart disease in a partnership with Stanford Medicine and Duke University called Project Baseline. Further, the FDA recently cleared the Study Watch's electrocardiogram feature, which could be a step toward wider sales.

And that's not all: Google has also teamed up with Fitbit to wade into the wearables market, aiming to unite patient-generated wearables data with patient EHRs.

5 Google wants to sell Internet of Things (IoT) devices for your home—and nursing homes.

Google's home automation subsidiary, Nest, is designing products with an emphasis on meeting the needs of older Americans. CNBC reports that the company has approached senior living facilities to pitch its products, recommending the use of its motion sensor to automatically turn on the lights when seniors get up in the middle of the night. More than a million Americans live in assisted living facilities, which means this could be a ripe market.

Google's home devices could also help consumers access the vast store of patient-facing health information available via Google's ubiquitous search engine. Since 2015, Google has partnered with Mayo Clinic and Harvard Medical School to provide disease, symptom, and treatment information for common conditions via web search. In the future, that information may be delivered via voice assistants or other home devices that could also track medication adherence, support disease management, or detect medical anomalies.

6 Google wants to cut your clinical documentation burden.

The health care industry is working hard to reduce demands on physicians, and Google wants to help. The company has developed a system that automatically transcribes conversations between physicians and patients. As of 2017, it had a roughly 20% error rate. Google is planning to soon launch a pilot study on this technology with Stanford Family Medicine.

The company is also building a model to auto-complete and detect errors in doctors' notes—in addition to other, more secretive, moves in this space. "We are on a path right now to building very powerful tools that require the practitioner to move from their traditional screen to some smartphone or some app," said former Executive Chairman of Alphabet Eric Schmidt at last year's HIMSS conference. He added, "We're much closer than you think we are."

So Google has big ambitions. But are they actually going anywhere?

Google has gained a reputation for investing in health care "moonshots," many of which have misfired. (Remember their tricorder project, which promised to use nanoparticles and magnets for early disease detection?) But the company's recent strategy appears more focused on incremental developments built through industry partnerships, which could prove to be more successful.

Still, succeeding in health care will require Google to fundamentally change its business model. Traditionally, Google has made most of its money by selling consumer data to advertisers—which could make patients hesitate before handing the tech giant their private health data.

Perhaps surprisingly, Google seems to be doing better than other tech companies at building patient trust. In a recent Rock Health survey, 60% of consumers who were willing to trust Big Tech with their data said they would be willing to share their data with Google, compared with 53% for Amazon and 49% for Apple. But since only 11% of respondents on the survey in general were willing to share their data with Big Tech, Google faces an uphill battle.

To succeed in any of the areas discussed above, Google will have to prove its value proposition in a competitive market in the face of constant competition from other big tech vendors. Still, the fact that the company is investing so heavily in so many simultaneous projects means the potential for success—at least in one of these main areas—is huge.

Our recommendations

Prepare to prove value with 'Google health care' data and AI.

An accessible health data ecosystem and intelligent analytics will demonstrate unmet needs and validate patient outcomes in real time.

Google's unparalleled ability to amass, structure, and mine data will help standardize the use of real-world data in health care. Moreover, the potential to integrate biometric monitoring and behavioral support with a connected and digitally controlled environment will revolutionize how individuals manage their health. Not only will Google data tell us more about patients, it will tell us about health care providers—their preferences, concerns, and digital influence.

We've seen tech giants begin to use web search histories to uncover patterns about diseases. In 2017, Microsoft scientists analyzed large samples of search engine queries to successfully identify internet users suffering from pancreatic cancer—before they received a diagnosis. Although Google's 2013 collaboration with the CDC failed to predict regional flu outbreaks based on Google search terms, the sheer data running through their servers signals opportunity for generating insights. Google receives more than one billion health questions each day.

As providers, payers, regulators, and life science firms are all working toward a shared consensus on the utility—and credibility—of RWE, medical affairs leaders can actively pilot studies for value end points needed three to five years from now.

Questions
to take back to your team

- What are two or three ways you can use web search data to learn about patients? What about health care providers? What other sources of Google data could give you insight on these customers?
- Emerging data will support clinical, medical, and commercial teams. Who should lead efforts to purchase and house this data? How should you prioritize accessing emerging data vs. finding smarter ways to leverage existing data (e.g., patient website, IITs, and traditional pre- and post-launch trials) with AI tools?
- What are two or three conditions addressed in your pipeline with outcomes that are difficult to measure today? How might biometric or other environmental indicators captured by wearables, Nest, Google Home, or other connected devices in the home and in clinical facilities help measure those end points?
- How will societal attitudes and regulations impact the role that data privacy and security has on our ability to access and use patient data under "Google health care"? How will regulations like HIPAA need to adapt to accommodate new "health" data?

This is just one part of an **ongoing series**.

To learn more about what other tech giants are doing in the health care space in the next five years, reach out to us at advisory.com/medaffairs.

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Page 8: "Microsoft Finds Cancer Clues in Search Queries," *The New York Times*, June 2016; "Dr Google will see you now: Search giant wants to cash in on your medical queries," *The Telegraph*, March 2019.

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