



Unlocking the
power of data to
improve health
outcomes: five
trends to watch

Executive summary



Pamela Spence

**EY Global Health Sciences
and Wellness Industry Leader**

pspence2@uk.ey.com

+44 207 951 3523

Twitter: @pamelaspence_EY

In ***Progressions 2018 – Life Sciences 4.0: securing value through data-driven platforms***, we explored how scientific advances and rising customer expectations make it possible to reimagine health care. These advances are closely linked to changes associated with what the World Economic Forum calls the “Fourth Industrial Revolution,” a transformation driven not by any single technology, but by the ability to marry the physical, the biological and the digital to drive exponential change across entire industries.

Each of the previous industrial revolutions was associated with a critical accelerant: the steam engine became the literal and figurative engine of mechanical production; electricity powered the assembly lines necessary for mass production; and semiconductors unleashed the computing age.

Data is the driving force underpinning the Fourth Industrial Revolution, fueling the emergence of new business models, which are being enabled by other technology advances such as cloud computing and fifth generation wireless (5G). No single data stream will propel this modern era; what counts is the multiplicity of data captured from businesses, individuals and the surrounding environment that can be analyzed using sophisticated algorithms.

In health care, the goal is to use those data to deliver interventions more proactively and in more personalized ways, resulting in improved outcomes and an ability to prevent, not just treat, disease. Different stakeholders will define these outcomes differently, using clinical, quality and cost metrics. They may also use measures that are more intangible, such as improved patient quality of life or societal benefits.

In this paper, we articulate five key trends that signal the rise of a new, data-centric approach to health care, where data accelerate new innovations and generate new value based on the outcomes achieved.

Medicine isn't a clinical science; it's a data science. Success requires investing in the right data strategy based on the business model.

TREND 1
Data will be better connected, combined and shared across the health ecosystem.

Health data are siloed across many organizations. ▶ Success isn't about data monetization but collaborations that deliver personalized outcomes. ▶ Stakeholders must partner with a variety of organizations for these data.

04

TREND 2
Nanomedicine, sensors and artificial intelligence will be recognized as the nervous system driving innovation.

New technology decouples data collection from the care visit, allowing real-time data capture. ▶ Algorithms process data rapidly, enabling behavior change and better clinical decisions. ▶ These tools can deliver more precise interventions to treat or prevent disease.

08

TREND 3
A "digital backbone" will emerge across the industry ... but who will own it?

The infrastructure to connect and share data at scale has yet to emerge. ▶ Early efforts are point solutions based on specific stakeholder needs, lacking interoperability. ▶ Companies must participate in digital backbones that are flexible and convenient.

12

TREND 4
The patient-consumer will demand increasing power and influence over other stakeholders.

Patients want the health care experience to be simpler and are demanding changes. ▶ As consumers are empowered by data they are increasingly influencing clinical decisions. ▶ Personalized services that are easy to use are also a priority.

14

TREND 5
Therapeutic focus and the adoption of specialized business models will position companies to outperform.

As the cost of capital increases, companies must decide what differentiates them and disproportionately invest. ▶ Companies must align their data strategy to the business model. ▶ First movers will become preferred partners for consumers and companies.

18

Conclusion 21
Acknowledgments 22
Contacts 23

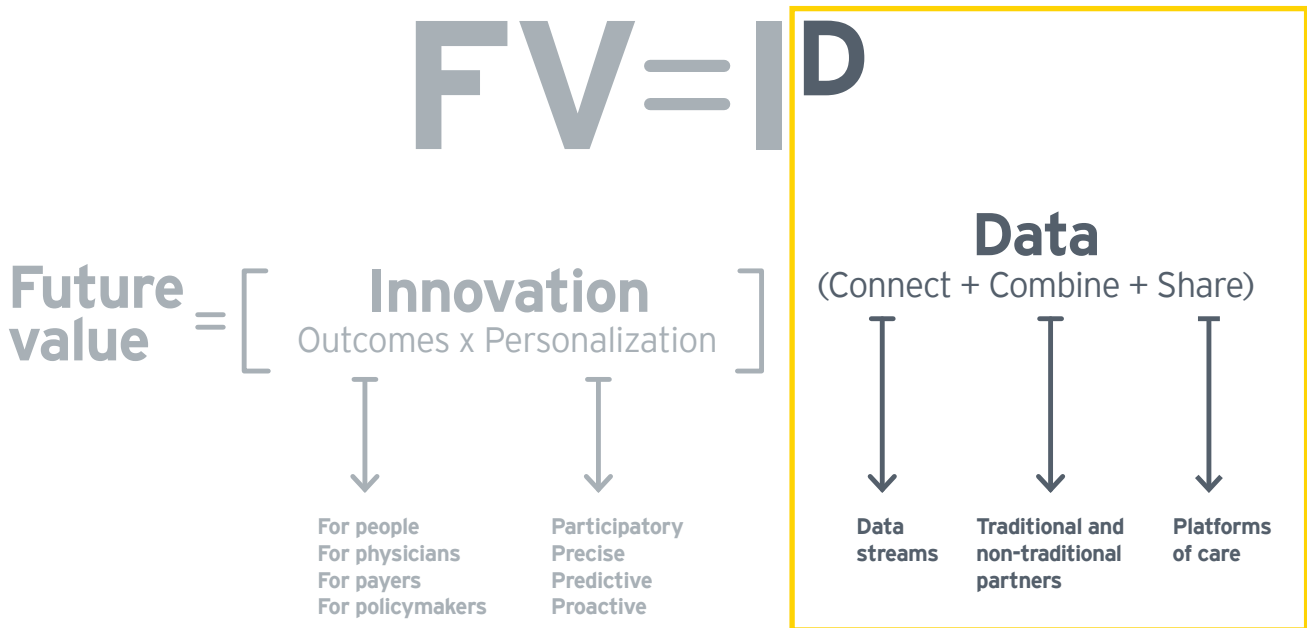
TREND 1

Data will be better connected, combined and shared across the health ecosystem

In this new age, where data are being democratized, every health company is a data company. As a result, the ability to generate value depends on how effectively organizations across the health ecosystem can unlock the power of data to fuel innovation and drive better health outcomes. Unlocking this power means generating insights by more effectively connecting, combining and sharing data - and at greater scale - than ever before. (See Figure 1.)

Figure 1. A new equation for delivering value in the health ecosystem

Future value (FV) is driven by innovation (I) that focuses on outcomes with a high degree of personalization and, critically, is fueled by unlocking the power of data (D).



Source: EY

In 2013, a *Foreign Affairs* article coined the term “datafication”: “the ability to render into data many aspects of the world that have never been quantified before.”¹ Connected devices and an explosion of other data-generating technologies mean the datafication of health care is now a reality. However, the ultimate goal must not simply be to measure and quantify, but to *fully use* these data to drive actions that lead to improved health outcomes - whether those outcomes are better clinical outcomes, more efficient care delivery or lower

health care costs. In short, with the means to gather and analyze data, now is the time to prioritize results from emerging insights.

Today, health data are split between too many organizations to achieve usable insights. As the range and reach of health data expands, the organizations that hold potentially useful data sources have also multiplied. Unfortunately, the traditional lack of transparency in health care leads stakeholders to go too far in restricting data sharing,

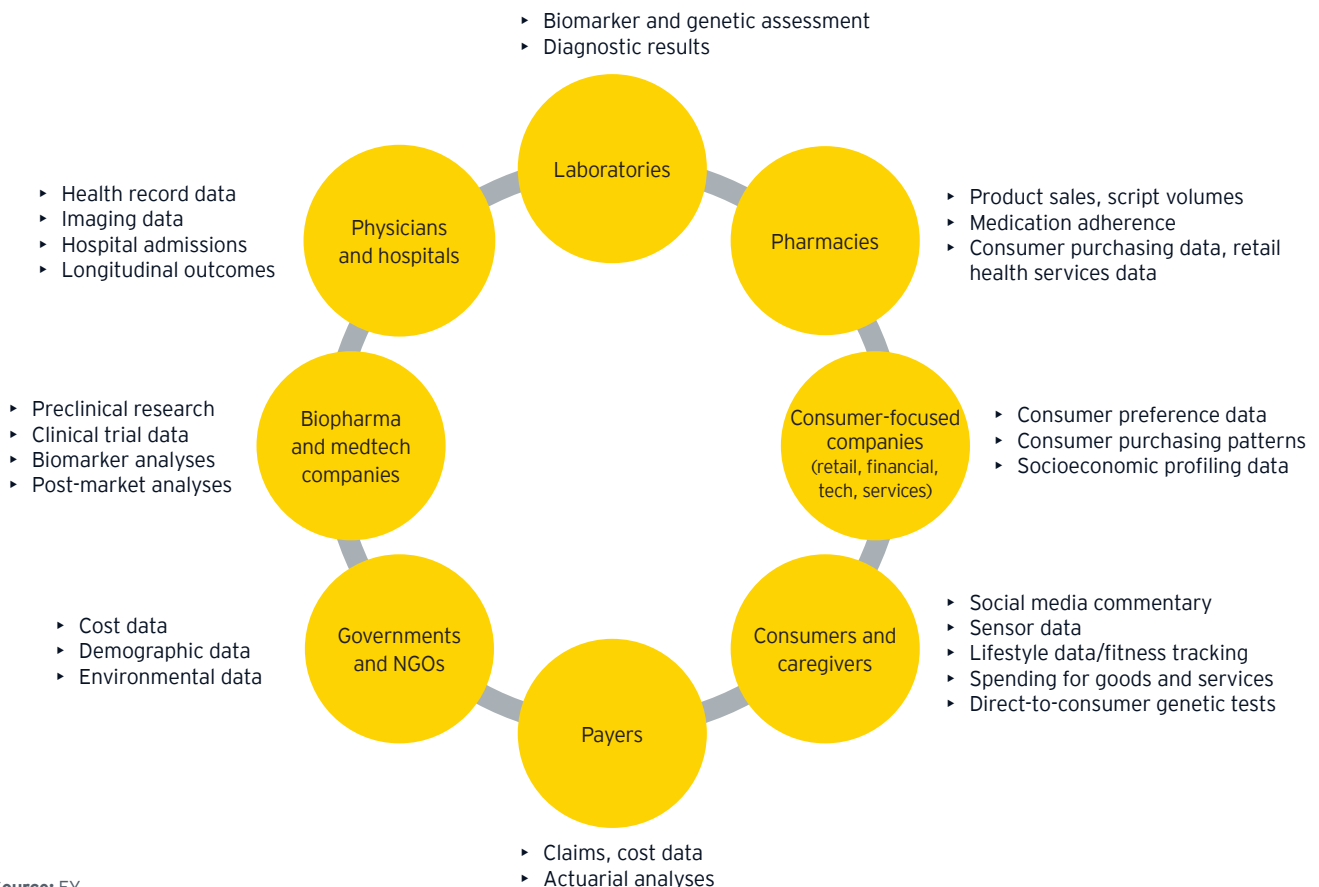
either from conservative attitudes to risk based on current regulations or from perceived self-interest. Because companies equate data with intellectual property, they treat data as a proprietary asset and resist wider disclosure unless regulatory necessity demands it.

As shown in Figure 2, many data sources have potential value. The issue is no single company, government agency or public health entity has access to the totality of relevant data that could improve

¹ Kenneth Neil Cukier and Viktor Mayer-Schoenberger, “The Rise of Big Data,” *Foreign Affairs*, May/June 2013.

Figure 2. Data are siloed across stakeholder groups and within organizations

One key challenge for improving outcomes: accessing and integrating different data, which are stored in multiple locations across the health sciences and wellness ecosystem.



Source: EY

health outcomes. That means organizations must identify not only what data they need but also which organizations have it, and are therefore potential partners. In parallel, companies need to invest in, or partner to access, the analytics capabilities that will turn the data into information that can be used at the point of care or in real life to drive economic outcomes.

One positive first step: there are multiple early signs that companies are looking beyond their historical focus areas to seek new data alliances. Take Roche, which has collaborated with GE Healthcare and acquired Flatiron Health and Foundation Medicine to gain access to data that improve care delivery. Ultimately, these collaborations need to happen at much greater scale to have a transformative impact on health.

The ability to translate data into actionable information that results in smarter product development or better care delivery isn't a pipe dream. It's already happening. (See Figure 3.)

However, the impact has been blunted because most stakeholders are reluctant to freely share their data. Limitations imposed by regulatory frameworks such as the European Union's 2016 General Data Protection Regulation (GDPR) or the 1996 US Health Insurance Portability and Accountability Act (HIPAA) also discourage data sharing.

These barriers can be overcome, but only if stakeholders can minimize risk and realize mutual benefits from their data collaborations. Transparency linked to data usage is an important part of the equation. So are the right incentives, regulations and protections. Many people will readily share data if that information directly benefits them in the form of financial or health benefits. However, they do need to feel confident that their data aren't being misused or accessed under false pretenses.

In addition, improving health outcomes is a goal shared by all health care stakeholders, whether payers, providers, businesses, patients or care givers. Focusing on measurable health gains as a shared value can point the way to effective collaboration.

In 2018, for instance, the UK National Health Service (NHS) signed an agreement with the health analytics company Sensyne Health to share anonymized, longitudinal data from roughly 300,000 patients.² The data are intended to drive new insights and treatments, and the NHS will benefit in two direct ways. First, because it has an equity stake in the company, the NHS will profit when Sensyne does. Second, the NHS will also receive a share of downstream revenues created by the research.

Call to action

How will your organization unlock the power of data to create future shared value?

- ▶ It's not about monetizing data, but about maximizing health gains by partnering to connect, combine and share data.
- ▶ Future value won't come from data ownership, but from delivering outcomes.

² "Sensyne Health and George Eliot Hospital NHS Trust sign Strategic Research Agreement," *Press release, January 28, 2019.*

“

Improving individual health outcomes is a goal shared by all health care stakeholders, whether payers, providers, businesses, or patients and care givers. Focusing on measurable health gains as a shared value can point the way to effective collaboration.

Figure 3. Data and analytics can create value across the health value chain

Significant innovations in the design and delivery of health interventions will be enabled by the use of data and analytics across the value chain.



Source: EY

TREND 2

Nanomedicine, sensors and artificial intelligence will be recognized as the nervous system driving innovation

Technologies such as nanomedicine, sensors and artificial intelligence (AI) make it possible to decouple data collection from the traditional health care visit and process massive amounts of health data in real time. As such, they represent a new “nervous system” for receiving and transmitting health data that makes it possible to deliver convenient care anytime, anywhere. Health no longer has to be reactionary, with diagnosis delayed until symptoms emerge. (See Figure 4.)



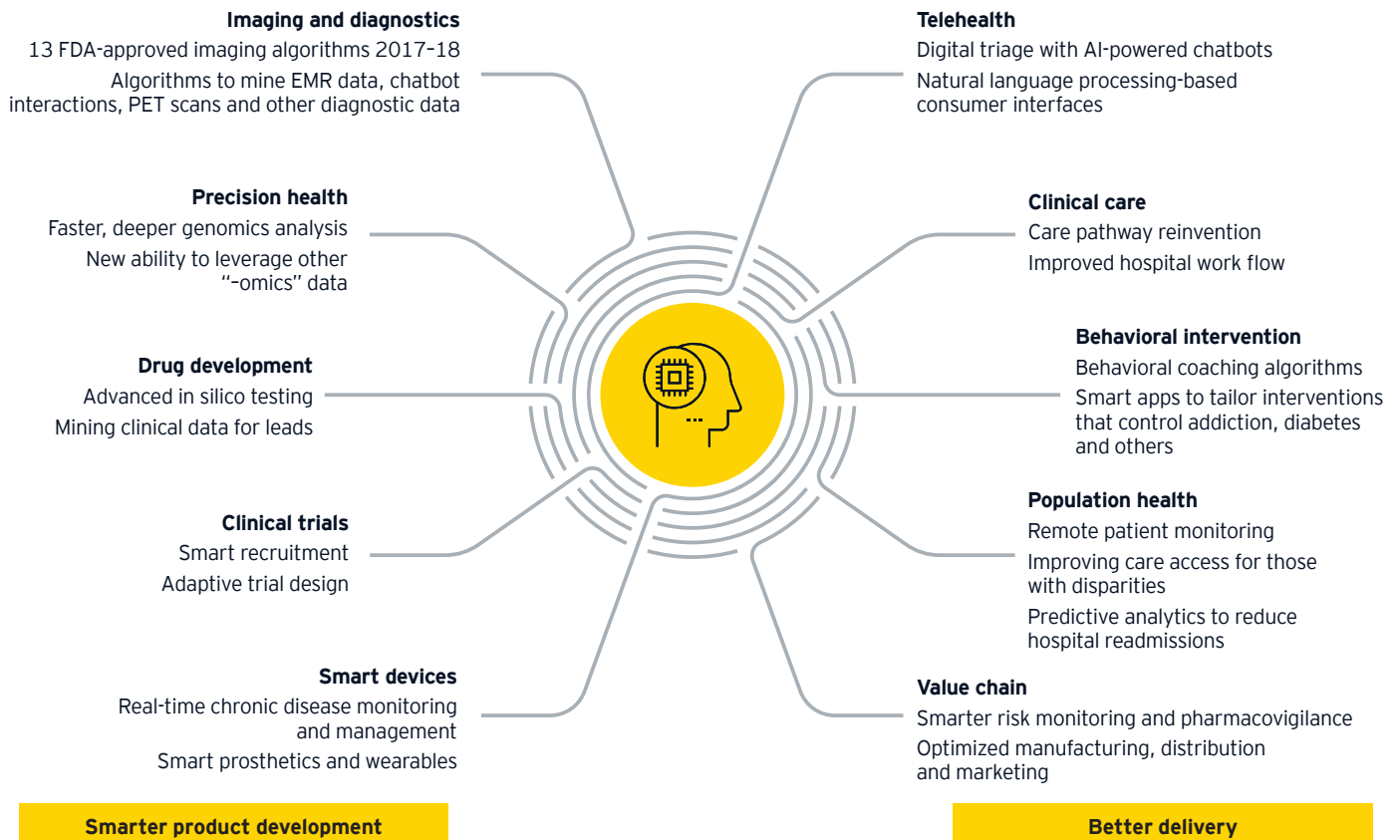
Figure 4. Nanomedicine, sensors and AI are already capturing and analyzing data across the health ecosystem

Nanomedicine will take data gathering to a new level of precision. The data are being captured by a broadening array of sensors transformed into usable insights by the growing power of AI analytics.

Mobile device-based sensors	Wearable/invisible sensors	Nanomedicine
<p>Camera: spatial orientation</p> <p>GPS: daily activity</p> <p>Gyroscope: physical activity</p> <p>Microphone: mood</p> <p>Accelerometer: physical activity</p> <p>Motion coprocessor: physical activity</p> <p>Heart rate monitor: heart rate</p> <p>Light-sensitive photodiodes: solar radiation tracking</p> <p>Pedometer: physical activity</p> <p>In-house motion sensors: movement patterns</p>	<p>Smart contact lenses: blood sugar levels</p> <p>Sensor-embedded clothing: breathing and sleeping pattern</p> <p>“Band-aid-like” sensors: cardiac activity, skin temperature</p> <p>Smart tattoos: blood sugar levels</p> <p>Smart shoes: physical activity</p> <p>Smart pill bottle: adherence</p> <p>Augmented reality glasses: vital signs tracking</p> <p>Smart jewelry: physical activity and sleeping patterns</p> <p>Implantable monitors: cardiac activity</p> <p>Cyber pills: drug-body interactions</p> <p>Implantable chips: blood tests</p>	<p>Nanoelectronic biosensors: internal diagnosis</p> <p>Nanotextured implants: continuous detection/response</p> <p>Nanoparticle contrast agents: enhance imaging</p> <p>Nanowire detectors: point-of-care diagnostics</p> <p>Artificial nanozymes: bioimaging</p> <p>Neurally implanted devices: computer-brain interfacing</p> <p>Medical nanobots: remove bacterial or cancer cells</p> <p>Smart dust: continuous internal monitoring</p>

▲ **Nanomedicine and sensors allow ever more close-up, real-time patient data capture**

▼ **AI turns data analysis into actionable insights in multiple fields**



Source: EY

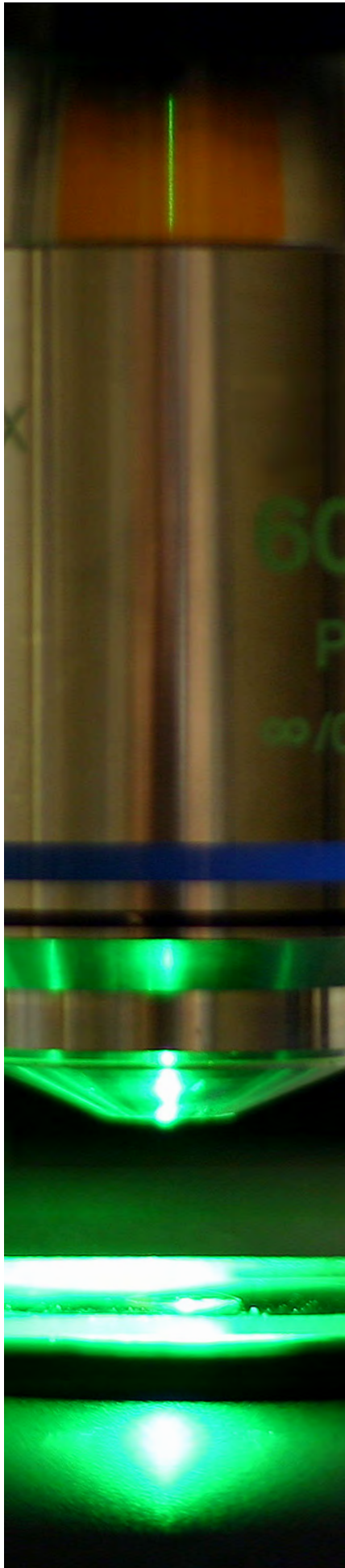


Figure 5. Milestones in nanomedicine, sensors and artificial intelligence (2018-19)

While new wearable sensors and AI algorithms reached the market in 2018-19, powerful new nanomedicine tools achieved proof of concept.

February 2018

Arizona State University/Chinese Academy of Sciences
DNA-based microrobot that can attack tumor tissue

April 2018

IDx: IDx-DR
FDA approval for AI imaging system for diabetic retinopathy

May 2018

Adherium: SmartTouch
First OTC version of sensor-enabled smart inhaler
MC10: BioStamp
FDA approval for reusable adhesive sensor patches for vital signs

June 2018

DreaMed: Advisor Pro
AI decision support for Type 1 diabetes approved by FDA
Senseonics: Eversense
FDA approves first implantable continuous glucose monitor
DyAnsys: Drug Relief
FDA approval for wearable neurotransmitter for opioid withdrawal
UC San Diego
Proof of concept for ultrasound-powered nanobots that can remove bacteria from blood

September 2018

Apple: Apple Watch Series 4
Includes FDA-approved EKG and atrial fibrillation detection

December 2018

Omron: HeartGuide
Wearable blood pressure monitor wins FDA approval

January 2019

EPFL / ETH Zurich
Elastic microbots for drug delivery announced
Empatica: Embrace
Epilepsy smartband approved for use in children

Source: EY, U.S. Food & Drug Administration and company releases. Liezel Labios, "Cell-like Nanorobots Clear Bacteria and Toxins From Blood," *UC San Diego News Center*, May 30, 2018.

“

Wearables have already moved from lifestyle accessories to recognized tools for data capture, with increasing numbers winning US approval as medical devices.

Advances in nanomedicine, which allows systems to be designed and manipulated at the level of individual atoms and molecules, will exponentially increase the opportunities to diagnose and treat disease. Smart dust biosensors, for instance, will capture data on biological processes to inform illness management and prevention, while nanodevices enable more precise treatment modalities.

The development of high-powered, miniaturized sensors, meanwhile, is advancing this health transformation, creating opportunities to passively capture data in the home, the physician's office and in the hospital. Motion sensors and technologies embedded in hospital-based monitoring solutions and smart inhalers or continuous glucose monitors exemplify the trend. But the future is much broader. Wearables have already moved from lifestyle accessories to recognized tools for data capture, with increasing numbers winning US approval as medical devices. The increasingly robust quality of data generated from sensors will make it easier for care providers to trust and use the data.

At the same time, AI is another essential accelerant, allowing organizations to interpret the massive amount of data being generated in a fraction of the time and use it to drive behavior change. (See Figure 5.) One estimate suggests that less than 3% of the 50 petabytes of data generated annually by a single average hospital is ever put to use.³ With AI, for the first time, these data can be made actionable.

As these technologies evolve they will intersect with innovations such as bioelectronics and brain-computer interfaces. In late February 2019, the U.S. Food & Drug Administration (FDA) released draft guidance on how to develop such innovations, which could one day allow individuals to control prosthetic devices with their thoughts.

These developments may still be a decade away, but already the convergence of nanomedicine, sensors and AI is signposting the transformative potential data holds in this sector.

Call to action

How will your organization capture value from data generated by nanomedicine, sensors and AI?

- ▶ It's not just about which organization develops the best-in-class nanodevices, connected devices or algorithms.
- ▶ The organizations that succeed will be the ones that best adapt their business models to these technologies, with an emphasis on interoperability and turning data into actions and economic results.

³ Tom McGuinness, "How AI-powered imaging can help build precision health," *Pulse of the Industry 2018*, EY, September 2018.

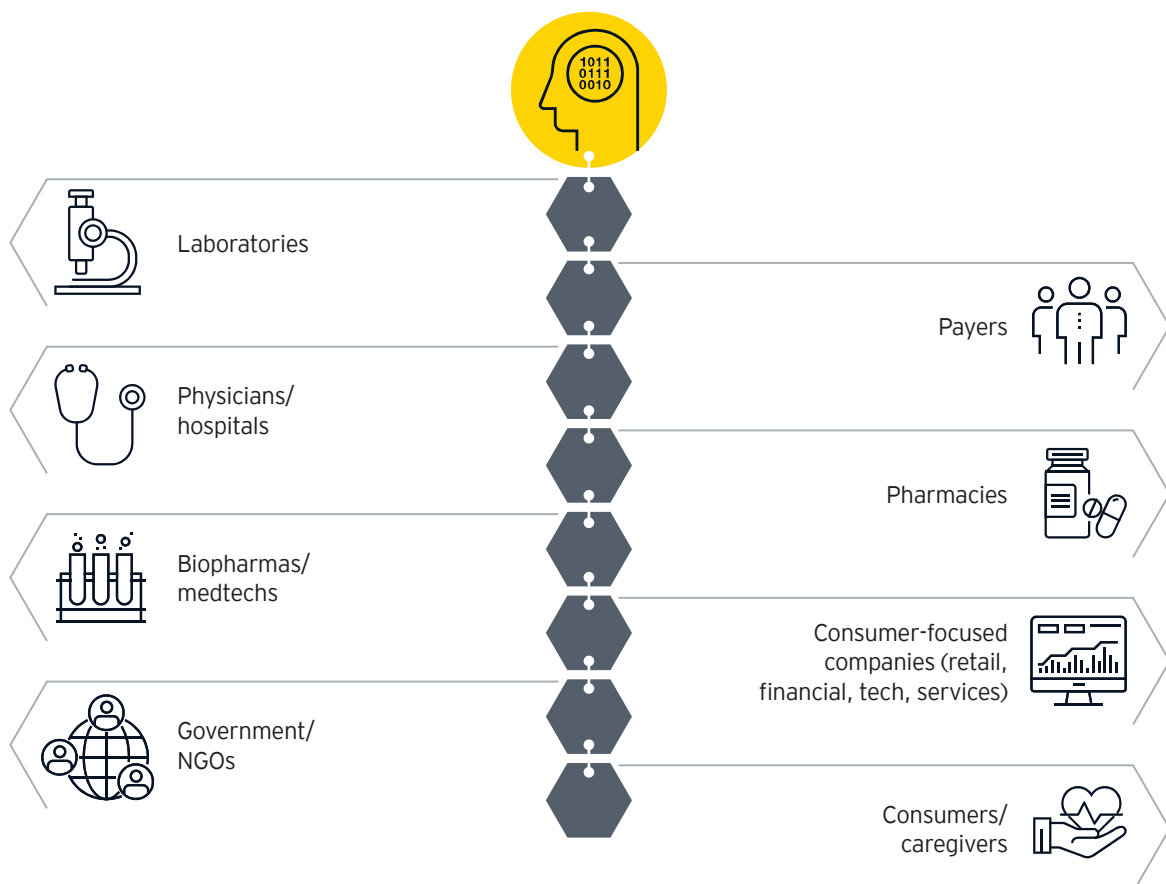
TREND 3

A “digital backbone” will emerge across the industry ... but who will own it?

At present, the health industry has no universal digital standards and the variety and volume of data being generated is huge. In addition, there’s no single infrastructure that fuses all the available health data. (See Figure 6.)

Figure 6. Integrating information at scale requires a digital backbone to connect multiple data sources

One of the greatest challenges is to construct a digital backbone that allows stakeholders to seamlessly and conveniently exchange and use health data at scale.



Source: EY

Without this infrastructure and warehousing of information, individual stakeholders might be able to make modest improvements to care in specific disease areas, but more holistic and consumer-oriented change will be extremely unlikely, if not impossible. And with the current lack of a truly collaborative infrastructure, it is difficult to move large amounts of data quickly between stakeholders - a necessary precursor to enabling the combination and analysis of different data.

That said, digital backbones are emerging - and they will be critical to the data-driven future of health. While a comprehensive infrastructure combining open source platforms, APIs and storage architecture is yet to emerge, multiple models for integrating data are already appearing on the market. Carebox and Apple, for instance, are thinking beyond electronic health records to interoperable personal health records that empower the individual consumer.⁴ Flex Health, in collaboration with Google, has created a platform called BrightInsight that allows companies to integrate and analyze data from multiple sources. Or consider b.well, which integrates wearable, genomic, EHR and other data on a single, accessible customer-facing platform.

Some efforts to integrate data focus on managing a specific disease or condition. The increasingly high-touch, digital nature of diabetes management has drawn multiple companies into developing digital infrastructure for this chronic disease, including traditional medical technology companies such as Dexcom and startups such as Welldoc and Virta Health. Other companies are combining AI and behavioral science to provide new mechanisms for treating depression and anxiety.

However, all of these initial efforts to build digital backbones for health data are, for now, only point solutions. To transform health care, data need an infrastructure that is both broader and more flexible. Technological advances, such as the rise of 5G networks, will help. But to achieve scale, the design of the infrastructure is also critical. The optimal digital backbone requires an open architecture that is accessible to multiple collaborators and that can adapt itself to the patient-consumer's needs - rather than today's closed systems that require the patient-consumer to adapt to them.

Incumbent leaders in the health sciences and wellness sector are unlikely to have the know-how to define the digital standards or deliver this digital backbone themselves. Building it will require the expertise of the bigger technology specialists. The challenge health incumbents must consider is how they can connect with, and participate in, this emerging infrastructure. As data capture and analytics become ever more vital to their businesses, the incentive to be part of the leading networks will be increasingly compelling.

There are two big questions that have yet to be answered. First, which organizations will orchestrate the development of this needed infrastructure? Second, how will they persuade multiple partners to engage in cross-sector data collaborations?

Whichever company achieves this will benefit from a first-mover advantage - and be in a position to help define the future rules of engagement. As more and more organizations tap into this existing digital infrastructure, a positive feedback loop will develop that cements its use as the primary mechanism for interaction and access. As a result, its developer becomes a preferred partner of choice and an increasingly indispensable part of the ecosystem.

Call to action

How will your organization access the infrastructure needed to turn data into actions at scale?

- ▶ To avoid ceding value in the future, all stakeholders need to consider how their products and services will align with the emerging data infrastructure.
- ▶ This may mean identifying the right digital backbone developer(s) to work with - or being bold and making the first move to build that infrastructure themselves.

⁴ Shourjya Sanyal, "Your iPhone Can Now Store Your Health Records: Why Should You Care?", *Forbes*, January 31, 2019.

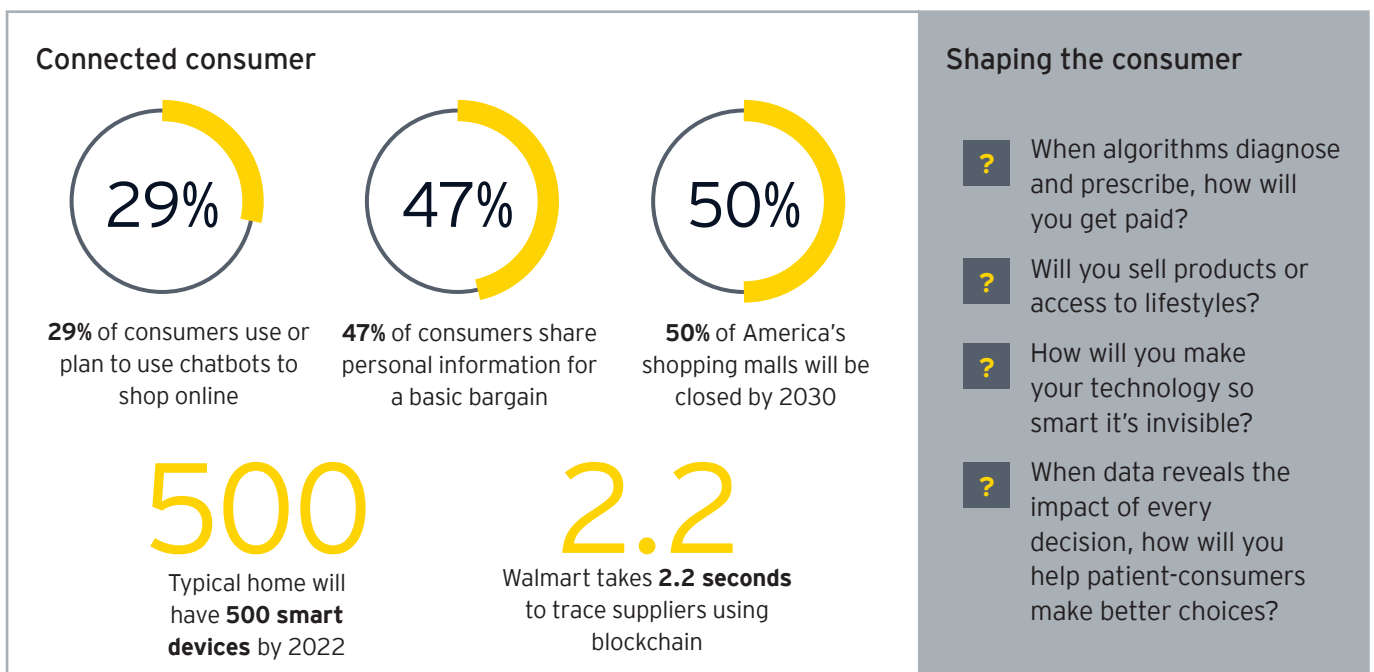
TREND 4

The patient-consumer will demand increasing power and influence over other stakeholders

Newly empowered patient-consumers are driving much of the change we see in health care today. People have increased expectations around their health care experience, shaped by the growth of customer-centric, convenient digital platforms that make it easy to shop, travel or bank on an individual's own terms. Health care has yet to make this shift. But with customer demand for better health care experiences rising, this is a huge unmet need that the industry must address. Fulfilling the increased expectations of the patient-consumer can only be achieved with a more data-driven approach to health. (See Figure 7.)

Figure 7. The future health consumer: super connected

Do we sufficiently understand the future consumer pathways for health care? The connected consumer has disrupted business models in the retail market; health sciences and wellness stakeholders must use data to meet the increased expectations of empowered patient-consumers.



Source: Chris Martin, "Consumers Turn To Chatbots For Online Shopping," *AI&IOT Daily*, April 22, 2018; Lee Raine and Maeve Duggan, "Privacy and Information Sharing," *Pew Research Center*, January 14, 2016; Lisa Millar, "Dead malls: Half of America's shopping centres predicted to close by 2030," *ABC News*, 28 January, 2015; "Gartner Says a Typical Family Home Could Contain More Than 500 Smart Devices by 2022," *Press release*, September 8, 2014; Ron Miller, "Walmart is betting on the blockchain to improve food safety," *Techcrunch.com*, September 24, 2018.

“

People have increased expectations around their health care experience, shaped by the growth of customer-centric, convenient digital platforms that make it easy to shop, travel or bank.

In the past, people have played a passive role in their own health care, with decision-making power in the hands of physicians. It was these care providers, rather than patient-consumers, that biopharmas and medtechs viewed as their primary customers. This relationship has already started to change - with health care spending constrained globally, decision-making power has

started to shift from providers to payers and consumers.

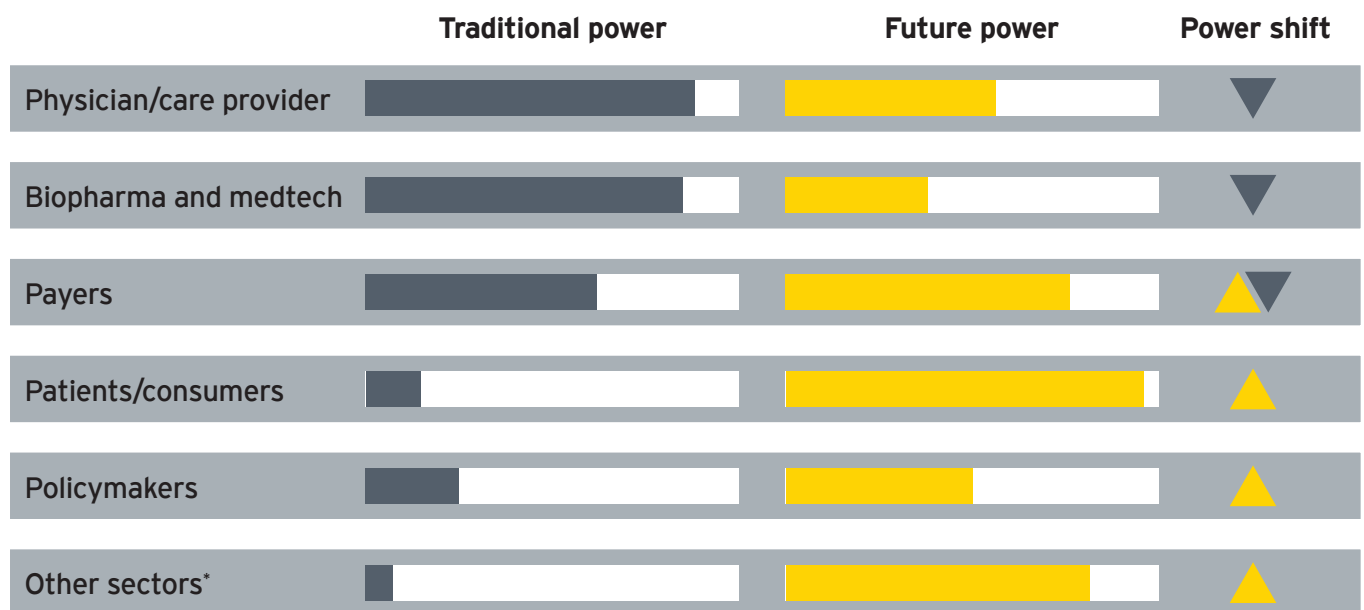
Longer-term, power will shift more radically, especially if individual patient-consumers bear more of the cost for their health. Biopharmas and medtechs will not simply be supplying innovations and attempting to persuade payers to reimburse them for these products; instead, they will have to deliver results - and that

means an increased and intensified focus on patient-consumers. Studies show that when patient-consumers are more engaged and participate in their health care decisions they are more likely to have better outcomes.⁵ (See Figure 8.)

To successfully engage individual patient-consumers, companies must get more detailed patient data and use it more effectively.

Figure 8. Power will shift significantly between different stakeholder groups in the future

As health budgets tighten and data are democratized, power shifts increasingly to payers, policymakers and new entrants, and, critically, patient-consumers.



* Other sectors include retail, technology, manufacturing and industrial products, and consumer products.

Source: EY

⁵ Judith H. Hibbard and Jessica Greene, "What the evidence shows about patient activation: better health outcomes and care experiences; fewer data on costs." *Health Aff (Millwood)*. 2013 Feb;32(2):207-14.

Patient data are subject to tight governance because of regulations such as HIPAA and GDPR. But studies show empowered patient-consumers will share their data if they can make a direct linkage to something of value to them - better, more personalized care.

The **EY Future of Health Survey 2018** suggests that patient-consumers themselves are more than ready for a shift toward more informed, participatory care: the survey's central finding was that "consumers expect a modernized physician-patient interaction and are already comfortable utilizing digital technologies in health."⁶ This willingness to embrace digital health is

increasingly apparent, from individuals investigating their symptoms on the internet, to ambitious enterprises such as the Mercy Virtual Care Center, an entire health facility dedicated to providing telehealth and remote care.

As the health care ecosystem reorganizes itself around patient-consumers, their data will become the key to delivering these improved interactions and achieving better outcomes. (See Figure 9.) In the future, patient-consumers will be able to own and manage their own health data as they do their own personal bank accounts, sharing it as needed to help proactively maintain their own health status.

Call to action:

How will your organization adapt to the increasing demands of the patient-consumer and satisfy these unmet needs?

- ▶ Organizations must learn to use data in ways that give patient-consumers seamless, accessible, brand-agnostic platforms to conveniently manage their own care.

⁶ The survey focuses on US patients; for recent survey data on patients in England, the Netherlands and Australia, see the EY 2019 NextWave Health Survey: [ey.com/en_gl/future-health/tech-enabled-change-health-care](https://www.ey.com/en_gl/future-health/tech-enabled-change-health-care).

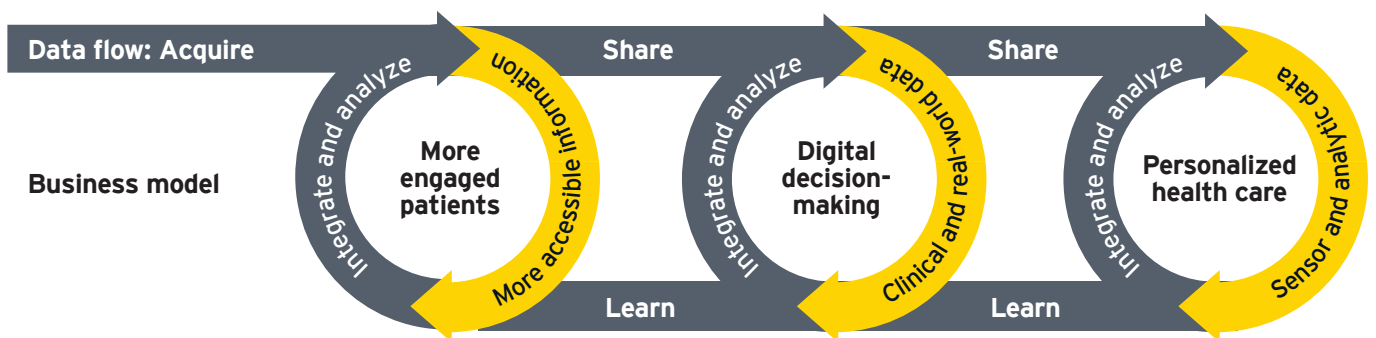


“

Consumers expect a modernized physician-patient interaction and are already comfortable utilizing digital technologies in health.

Figure 9. The flow of data will increasingly empower patient-consumers, creating new care models

Patient-consumers have shown readiness to move to a more digital, engaged, personalized model of health care. The increasing availability of data can make this a reality.



>50% indicate they are comfortable contacting their physician digitally

56% would use some form of tech to interact with care providers

27% have used personal activity trackers to track health- or exercise-related data in the past 12 months

Source: EY Future of Health Survey 2018

TREND 5

Therapeutic focus and the adoption of specialized business models will position companies to outperform

No company or organization can own all the data. Entities must therefore focus on the data that are most valuable to them and the capabilities required to use those data most effectively. Moreover, as the cost of capital grows, it is becoming increasingly unsustainable to make the investments required to transform highly diversified businesses. As a result, organizations must focus on a particular business niche, and develop the skills and capabilities to excel in this area.

Evidence from the **2019 EY M&A Firepower report** suggests that such focus is linked to greater value creation: when EY researchers analyzed the operational and market performance of 25 biopharma companies, they found that companies with greater therapeutic focus surpassed those with less focus on a number of measures, including historical revenue growth and return on invested capital. Although the data are specific to life sciences organizations, the reality is that as the health ecosystem continues to change, all organizations must identify what differentiates them, and optimize their operations around this core expertise.

As they optimize their growth strategies, health sciences and wellness organizations will increasingly adopt one of four business models, becoming

Breakthrough innovators, Disease managers, Lifestyle managers or Efficient producers. (See Figures 10 and 11.) Succeeding in each of these business models require specific data expertise.

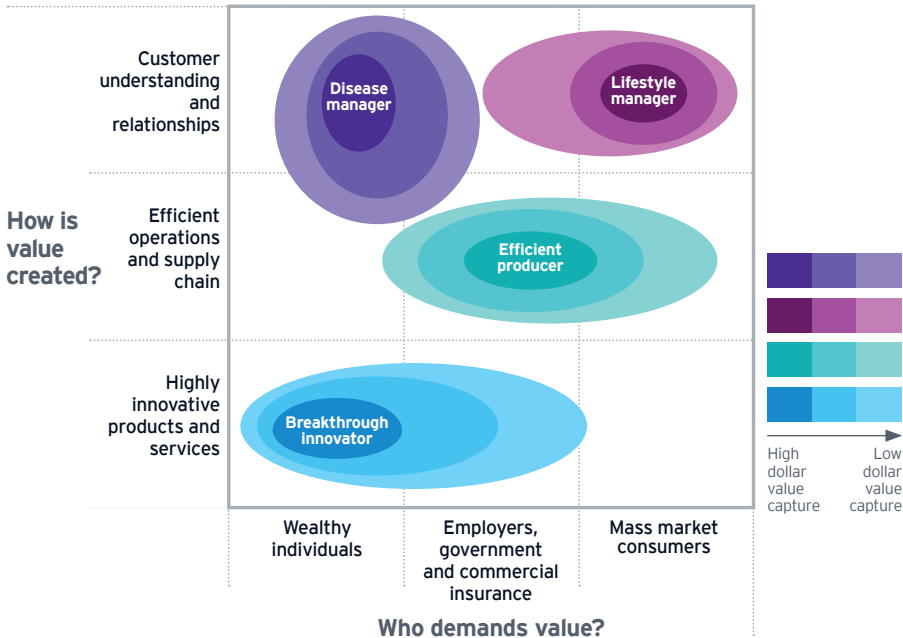
Breakthrough innovators, whether biopharmas, medtechs or specialist academic centers, need to use data to deliver the best results for rigorously identified patient sub-groups. That requires a better understanding of genomic, biomarker and other determinants of patient response, as well as augmented use of analytics to develop new, personalized treatments. Furthermore, the integration of AI with remote data capture can streamline clinical trials, reducing the cost of validating new interventions.

Disease managers, meanwhile, need to build up the data expertise required to understand every facet of a person's complex chronic disease and offer tools for seamless, personalized management. This means using data to improve compliance, adherence and other influencing factors, and to offer best-in-class personalized services including real-time logistics, coaching and communications with relevant stakeholders. Companies focused on chronic disease may adapt their business model to specialize in disease management, but they may have to compete for this role with care providers. CVS/Aetna for example, aims to become a "coordinator of care for patients"⁷ through its new health hubs.

⁷ Nathaniel Meyersohn, "This is the CVS of the future," *CNN Business*, February 16, 2019.

Figure 10. Organizations will create value differently based on the business model

As stakeholders respond to evolving customer demands their total market value will shift in ways that depend on their chosen business models.



Source: EY.
 Concept developed from an initial idea first profiled by Prof. Brian D. Smith in his book, *The Future of Pharma*, published by Gower Publishing in 2011. Three different parameters define value creation (y-axis): innovative products, efficient operations and customer understanding. The x-axis corresponds to which health stakeholders are defining the value: wealthy individuals, health care systems and mass market consumers. The area of the ellipse corresponds to dollar value of the total addressable health services market captured by companies employing a particular business model. The color gradient correlates with the increased opportunity for value capture (US\$). The darker the color, the greater the opportunity for value capture.

Figure 11. Each of the four business models requires different data capabilities to optimize value

Specializing in a particular business model obliges stakeholders to build expertise in specific skills and tools for capturing and using data to deliver value.

Breakthrough innovator	Disease manager	Lifestyle manager	Efficient producer
First-in-class premium-priced products Use data to: <ul style="list-style-type: none"> Develop higher precision products Capture evidence of real-world effectiveness 	Products plus services to manage conditions Use data to: <ul style="list-style-type: none"> Manage chronic diseases end to end Create seamless customer experience 	Products sold directly to the consumer Use data to: <ul style="list-style-type: none"> Maintain health and wellness status Engage proactively with consumer 	Good-enough products - cost leadership Use data to: <ul style="list-style-type: none"> Focus on volume and economies of scale Optimize manufacturing and supply processes
Deliver best-in-class efficacy e.g., accelerate precision R&D, validate real-world outcomes	Deliver end-to-end continuum of care e.g., improve adherence and outcomes, customize guidance/services	Deliver consumer-centric services e.g., predict/influence consumer behavior, tailor offerings	Deliver commodity products better e.g., optimize processes, cut marginal costs of distribution

Source: EY

Defining the business models

We believe there are four business models that will be key to delivering future value. At present health care incumbents pursue a mix of these approaches; increasingly they will need to identify their core expertise and focus their growth strategies in this area. The four models are:

1. Breakthrough innovator:

Developer/provider of best-in-class products and services that command high prices and are primarily paid for by traditional health insurance.

2. Disease manager:

Developer/provider of products and solutions that manage chronic conditions in a more personalized way, with a focus on customer experience, convenience and maximum adherence.

3. Lifestyle manager:

Developer/provider of products and services aimed at overall health and wellness maintenance and disease prevention, marketed directly to the consumer.

4. Efficient producer:

Developer/provider of lower cost commodity products and services that offer the same outcomes as more expensive alternatives, with an emphasis on a high-volume, low-margin revenue model.

“

No company or organization can own all the data. Entities must therefore focus on the data that are most valuable to them and the capabilities required to use those data most effectively.

Lifestyle managers, like Disease managers, need to focus on capturing and analyzing data outside the medical system. But they must do so through the more holistic consumer lens, proactively engaging individuals about their health and identifying marketing opportunities. Predictive analytics tools that interpret consumer behaviors and choices will be critical for capturing customer preferences and customizing interactions for a better user experience. Digital health companies that incorporate behavioral science into their offerings - for instance, Arivale, Human Longevity and Evidation - could become leaders in developing this business model. Consumer giants such as Nestlé could also adopt this business model in the future, working at the intersection of medical, nutritional and behavioral health factors. In China, Alibaba's health platform already integrates consumer, nutrition and pharmacy services.

For **Efficient producers**, the emphasis is less on patient data and product efficacy, and more on the back-end processes linked to product manufacturing and the supply chain. To maximize efficiency, companies will need to apply analytics across their own internal value chain to cut marginal costs at every stage and optimize supply, inventory and delivery processes to deliver the maximum returns on their product portfolios.

Each of these business model niches depends on data expertise. The choice confronting all stakeholders will not be whether to build a data strategy, but rather, which of these data strategies aligns best to the business model, and thus, provides a clear path to future growth.

Call to action

How will your organization identify which of these diverging business models to focus on in the future?

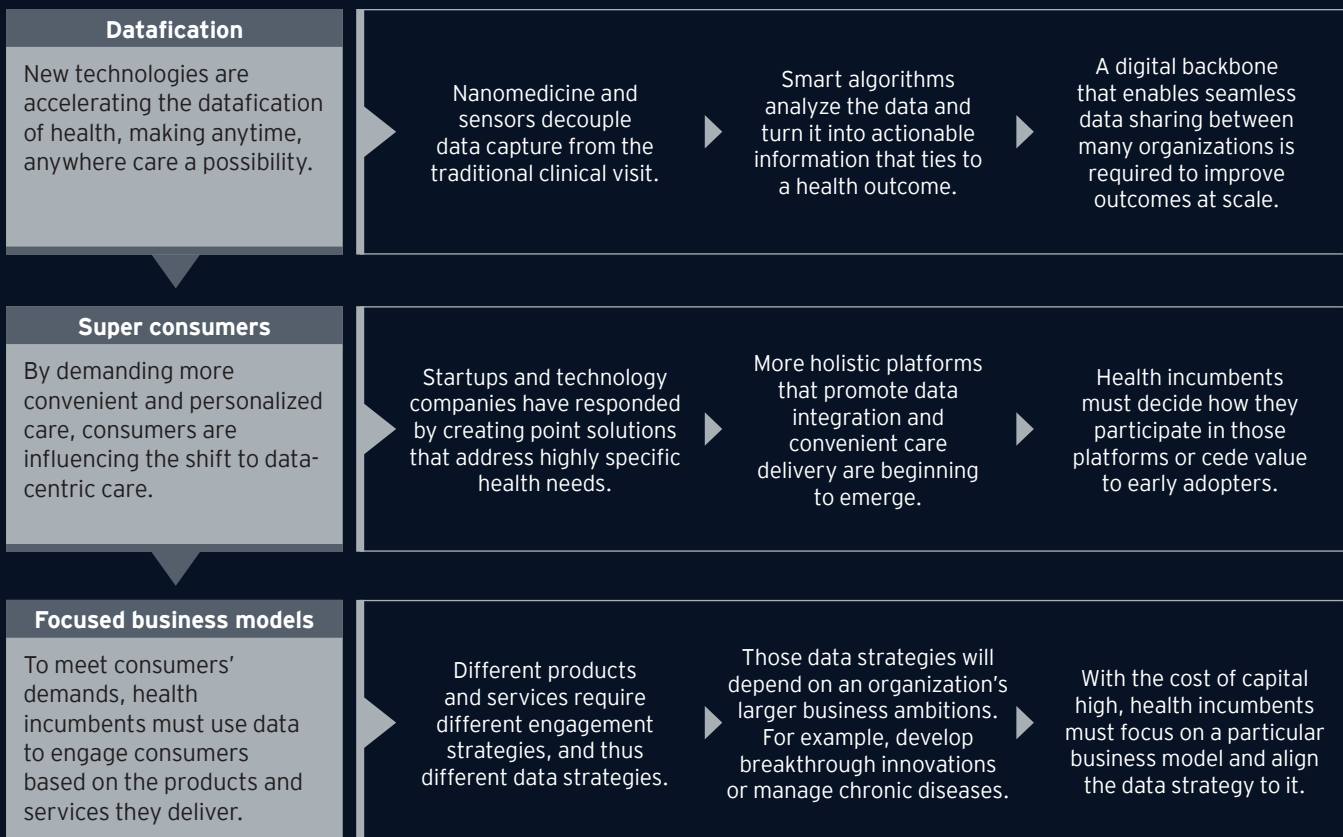
- ▶ Business model focus is the starting point for knowing which products, services and capabilities to prioritize - and which data are needed to deliver future value for your organization.

Conclusion

- ▶ These five trends are all visibly taking shape across the health sciences and wellness space, and hold transformative potential for the ecosystem.
- ▶ While not all data will easily generate better outcomes or greater revenues, the rapid improvement in tools for data capture and analysis creates significant new opportunities for the stakeholders that prioritize this capability.
- ▶ To succeed, companies must address technological, regulatory and cultural challenges associated with data sharing and usage. Only then will it be possible to deliver improved outcomes at scale.
- ▶ As they pursue the goal of delivering better health outcomes, all stakeholders need to focus on patient-consumers, who are demanding not only more personalized services but also greater share of voice in their health decisions.
- ▶ Organizations that can deliver the best personalized outcomes and the most engaging user experience will be best placed to win in the data-centric, consumer-centric future.

The datafication of health care requires all stakeholders to connect, combine and share data to deliver better outcomes to consumers. But what is the right data strategy to create value?

As health evolves from a clinical science to a data science, success requires investing in the right data strategy based on the business model.



Acknowledgments

Our sincere thanks to the following individuals who assisted in the creation of this report.

Pamela Spence, EY Global Health Sciences and Wellness Industry Leader, **Peter Behner**, EY Global Life Sciences Transaction Leader, and **Louise Wilkie**, EY Health Sciences and Wellness Strategic Operations Leader, provided strategic guidance and feedback on the narrative throughout its development.

Ambar Boodhoo, EY Americas Life Sciences and Health Care Transactions Leader, **Patrick Flochel**, EY Japan Life Sciences Representative, **James Welch**, EY Central US Life Sciences Leader, and **Jerome Pagani**, EY Global Health Sciences and Wellness Senior Analyst, also provided key input on concepts or draft versions of the publication.

Richa Arun conducted industry research and analysis to underpin the narrative. **Cécile Guiot**, **Kimberly Medland**, and **Ankur Sadhwani** reviewed the publication for quality and consistency. **Scott Chapski** edited and proofread the report.

Dennis Ryan created the memorable accompanying visuals. This publication benefited greatly from his creativity and artistic judgment.

Alan Duerden, **Cécile Guiot**, **Katie Costello** and **Angela Kyn** led the public relations and marketing efforts.

Authors

Pamela Spence (global sponsor)
EY Global Health Sciences and Wellness Industry Leader
pspence2@uk.ey.com
+44 207 951 3523
Twitter: @pamelaspence_EY

James Evans (first author)
EY Global Health Sciences and Wellness Senior Analyst
james.evans@uk.ey.com
+44 207 951 3751

Ellen Licking (managing editor)
EY Global Health Sciences and Wellness Lead Analyst
ellen.licking@ey.com
+1 650 521 7238
Twitter: @EllenLicking

Contacts

EY GLOBAL HEALTH SCIENCES AND WELLNESS INDUSTRY LEADER

Pamela Spence
pspence2@uk.ey.com
+44 207 951 3523

EY GLOBAL HEALTH LEADER

David Roberts
david.roberts@uk.ey.com
+44 207 951 7819

CHINA ADVISORY SERVICES

Steve Au Yeung
steve.auyeung@cn.ey.com
+86 21 2228 6415

ASIA-PACIFIC TRANSACTIONS ADVISORY SERVICES

Abhay Bangi
abhay.bangi@sg.ey.com
+65 6309 6151

GLOBAL TRANSACTIONS ADVISORY SERVICES

Peter Behner
peter.behner@de.ey.com
+49 30 25471 12467

GLOBAL ADVISORY SERVICES

Nick Cernese
nick.cernese@ey.com
+1 917 783 8448

US WEST REGION

Carole Faig
carole.faig@ey.com
+1 713 582 5819

EMEIA

Daniel Mathews
dmathews1@uk.ey.com
+44 207 197 9375

GLOBAL ADVISORY SERVICES

Aloha McBride
aloha.mcbride@ey.com
+1 703 517 0454

UNITED KINGDOM AND IRELAND

Andrew Monro
amonro@uk.ey.com
+44 774 776 7798

GERMANY, SWITZERLAND AND AUSTRIA

Gerd Stuerz
gerd.w.stuerz@de.ey.com
+49 211 9352 18622

CHINA TRANSACTIONS ADVISORY SERVICES

Hua Su
hua.su@cn.ey.com
+86 186 1676 9380

ASIA-PACIFIC ADVISORY SERVICES

Hugo Walkinshaw
hugo.walkinshaw@sg.ey.com
+65 9836 8991

US CENTRAL REGION

James Welch
james.welch@ey.com
+1 312 879 3827

US NORTHEAST REGION

David Womelsdorf
david.womelsdorf@ey.com
+1 908 578 3743

JAPAN

Hironao Yazaki
hironao.yazaki@jp.ey.com
+81 3 3503 1110

About EY

EY is a global leader in assurance, tax, transaction and advisory services. The insights and quality services we deliver help build trust and confidence in the capital markets and in economies the world over. We develop outstanding leaders who team to deliver on our promises to all of our stakeholders. In so doing, we play a critical role in building a better working world for our people, for our clients and for our communities.

EY refers to the global organization, and may refer to one or more, of the member firms of Ernst & Young Global Limited, each of which is a separate legal entity. Ernst & Young Global Limited, a UK company limited by guarantee, does not provide services to clients. For more information about our organization, please visit ey.com.

About EY Health Sciences and Wellness

The rise of the empowered consumer, coupled with technology advancements and the emergence of digitally focused entrants, is changing every aspect of health and care delivery. To retain relevancy in today's digitally focused, data-infused ecosystem, all participants in health care today must rethink their business practices, including capital strategy, partnering and the creation of patient-centric operating models.

The EY Health Sciences and Wellness architecture brings together a worldwide network of more than 20,000 professionals to build data-centric approaches to customer engagement and improved outcomes. We help our clients deliver on their strategic goals; design optimized operating models; and form the right partnerships so they may thrive today and succeed in the health systems of tomorrow. We work across the ecosystem to understand the implications of today's trends, proactively finding solutions to business issues and to seize the upside of disruption in this transformative age.

© 2019 EYGM Limited.
All Rights Reserved.

EYG no. 001341-19Gbl
1902-3068211 US CSG
ED none

This material has been prepared for general informational purposes only and is not intended to be relied upon as accounting, tax or other professional advice. Please refer to your advisors for specific advice.

The views of third parties set out in this publication are not necessarily the views of the global EY organization or its member firms. Moreover, they should be seen in the context of the time they were made.

ey.com/lifesciences