Healthcare in 2017: Amid the uncertainty, these changes are certain

We are living through a truly transformative period in health — for both consumers and the organizations who serve those consumers.

Unsustainable levels of spending are driving the shift to value-based care and the search for more effective and more affordable solutions. New technologies are empowering patients, shifting control away from health care professionals and innovating the delivery of care. In addition, across the world people are viewing access to health care as a right, and governments are recognizing that societal wellness is an economic asset. Finally, the past year saw organizations learning how to balance adapting to new regulation while simultaneously sustaining quality, positive patient experience and profitability.

The confluence of these changes -- in mindset, technology, spending, and adaptation to regulation -- is dramatically disrupting how healthcare is designed and delivered. And in the U.S., with a new presidential administration in place and the process to repeal the Affordable Care Act underway, the transition is presenting organizations with an uncertain future; one where a shift to a changing and potentially less regulated healthcare policy environment is expected, but the precise nature, process and timetable for change remain uncertain.

With change as a certainty, watch for the following five trends to accelerate in 2017. Our teams at EY are focused on helping our clients navigate the potential effects of these trends, and prepare for continued disruption.

1. Health care shifts to total health.
The very definition of the word “health” is changing. Health is no longer merely something of concern when someone is sick. Now, health is viewed as a holistic pursuit — a daily, lifelong, all-encompassing engagement with wellness. Early intervention is being recognized as essential to preventing disease. New technologies are helping people make smarter, more proactive wellness choices. Insurance companies, worksites and others are using data-driven, evidence-based incentives to encourage healthy behaviors among populations. This trend is turning the health industry on its head, transforming the industry from one that treats illness to one that promotes total health and focuses on improving quality while reducing cost.

2. Participatory health flourishes.
Traditional care delivery models are being upended by technology, consumerism and greater access to information. Patients are taking on greater responsibility for their health, curating and navigating their care in partnership with their health care provider. Mobile and web tools are encouraging active, daily patient participation. At the same time, individuals are shifting their focus from reactive “sick” care to preventative intervention and proactive wellness actions.
preventative care and wellness promotion. As a result, as detailed in Health reimagined: a new participatory health paradigm, the successful health system of tomorrow will embrace participatory health by being on-demand, connected and data-driven.

3. The M&A market stays hot.
Rapid shifts in delivery and payment models will continue to force health care organizations to rethink their business models, structures and operations. In particular, new reimbursement models based on outcomes are forcing providers to broaden their scope of care, while continuing to pursue efficiencies. As a result, the health care industry is engaged in a record level of M&A activity as organizations choose to merge, acquire or partner with other organizations that can help them provide and control patient care along the entire health care continuum — from initial treatment through all the stages of recovery. With mega deals under scrutiny, expect an increase in smaller strategic tuck-ins; as opposed to a slowdown in deal activity.

As data becomes more useful in health care, protecting that data becomes more important. Medical records have always been a high-value target for identity thieves because they contain a large amount of personally identifiable information that is difficult to change. But now, the rise of consumer-friendly digital and mobile health technology is fueling the cybersecurity threat by creating additional access points for sensitive medical information, including medical devices themselves. Health care organizations are scrambling to detect and prevent cyber-attacks, but many lack comprehensive, enterprise-wide plans to identify and secure high-risk data. Look for health care entities to get even more serious about cybersecurity. In traditional environments as well as within the growing biome of connected devices, watch as health care entities adopt the leading practice approaches from other high-risk industries, such as banking and utilities.

5. Big data, paired with human experts, provides better insights.
How do you make big data better? By adding people power. Artificial intelligence (AI) technologies are growing more advanced, and health care organizations are rapidly adopting AI as a way to quickly analyze large swaths of patient data and to glean insights about patient populations. But to really maximize those insights, interaction is needed between data, technology and people. The true power of AI is unleashed when computer-generated analytics is augmented by human decision-making and when algorithms are well-informed by medical experts. Assuring the data is clean, accurate, properly indexed, de-fragmented and interoperable is critical to produce insights that can arm leaders to make better decisions.

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Value-driven care. Are you ready?

Insights drawn from EY Health Advisory Survey 2017
Abstract
EY recently surveyed 700 qualified health care professionals. Respondents included chief medical officers, clinical quality executives and chief financial officers at US-based health care providers, with annual revenue of US$100 million and higher. Surveys started on 22 February 2017 and were completed by 23 March 2017. This research sheds light on the state of the provider industry, including some prominent factors that are challenging organizations’ performance and growth. Based on our industry knowledge and interpretation of the survey findings, health care organizations can address challenges through a total transformation across the continuum of care that will lead to a competitive advantage and better health outcomes.

The graphs notated with *EY Health Advisory Survey 2017* represent proprietary results and findings from the survey.
An ailing industry

Much of the American health care system is straining under an increasingly oppressive burden of rising costs. In 2015, health care spending grew by 5.8%, reaching a total of US$3.2 trillion in the United States, or US$9,990 per person. Health care spending in the US has now risen to 17.8% of GDP, a rate far above that of any other industrialized nation. Yet, by many measures, American consumers are not getting their money's worth. Americans have a lower life expectancy, higher incidences of chronic conditions such as heart disease and diabetes, and higher infant mortality rates than people in other industrialized nations. Even worse, health care disparities still exist among several vulnerable demographics, and equitable access to health care remains problematic.

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Who’s ready for the financial future?

Value-driven care will require new reimbursement models; resources and the level of clinical and financial integration vary along with a rise in risk and reward. Here’s where organizations stand in their reimbursement priorities for 2017:

Provider health care organization by revenue

Bundled payment models
These are designed to pay multiple service beneficiaries to coordinate all services required for an episode of care.

Alternative payment models
This offers incentive payments to provide high-quality and cost-efficient care. APMs can apply to a specific clinical condition, a care episode or a population.*

*Respondents were asked: “What specific value-based reimbursement initiatives, if any, are you planning and undertaking in 2017? Select all that apply for both planning and undertaking.”
The relationship between costs and outcomes is complex. Priorities across the continuum of care often compete with each other, putting unreasonable pressure on all constituents of the health care system. As a result, many organizations are under tremendous pressure to balance delivering the highest value and quality to their patients with managing other expectations. Consider the following industry challenges:

- **Inefficiency**
- **Inconsistent quality of care**
- **Workforce challenges**
- **Lack of trust, transparency and coordination**

### Inefficiency

Fee-for-service (FFS) payment agreements and poor integration across the health care system boost overall costs by increasing the likelihood of repetitive tests and overtreatment. This wasteful spending is amplified by the increasing prevalence of expensive-to-treat chronic illnesses, greater levels of administrative support required to comply with regulations and the need to invest in expensive new technologies. Organizations across the care continuum are feeling pressure on their bottom line. While cost control initiatives are commonplace today, organizations are seeking incremental improvement as opposed to transformative gains.
Top five cost-control initiatives for 2017

Of the professionals surveyed, 78% think the cost of care is “considerably important” or “very important.” In addition, 95% of respondents are taking “cost-control measures.”

Respondents were asked: “What specific cost control initiatives, if any, are you planning and undertaking in 2017? Select all that apply for both planning and undertaking.”

Reduction medical errors and increasing reliability: 58% (planned 18%, undertaking 40%)

Decreasing unnecessary variation and utilization: 41% (planned 24%, undertaking 17%)

Peer benchmarking and competitive benchmarking: 13% (planned 40%, undertaking 34%)

Increasing patient access to primary and specialist care: 34% (planned 17%, undertaking 28%)

Reducing hospital use and emergency departments by high-cost patients: 20% (planned 28%, undertaking 18%)
Inconsistent quality of care

Clinical outcomes and health care quality are often measured inconsistently by health care providers — if they are measured at all. At the same time, a high prevalence of medical errors is stoking the anxieties of the public through alarming headlines and creating concern among health care executives over potential litigation. Despite these concerns, our survey found that only 58% of respondents are currently undertaking initiatives to reduce medical errors in 2017. It should be noted, however, that 18% of respondents have initiatives planned for 2017.

Workforce challenges

Organizations are struggling to identify talent and keep their employees engaged. Our survey found that only 12% of respondents rated their clinical ancillary staff as “highly engaged,” and a mere 8% answered that their administrative staff are “highly engaged.” This is especially concerning because the administrative and frontline staff are often the first point of contact for patients, and may help provide long-term patient support. Our survey also showed that physicians and nurses rank among the most engaged employees. However, they constantly struggle to balance the demands of patient care with administrative burdens, leading to high rates of burnout.
The talent crisis in health care

The US health care industry is facing unprecedented physician burnout and a severe nursing shortage. This is an ignored and understated public health workforce crisis that merits focused attention.

Physician burnout: industry-wide epidemic
Fifty-one percent of physicians reported experiencing frequent or constant feelings of burnout in 2017, up from 40% in 2013.¹

Nursing shortage: nationwide crisis
Inadequate nurse staffing has been a factor in 24% of the 1,609 cases involving patient death, injury or permanent loss of function reported since 1997.²

Strategic solutions addressing declining morale of these health care providers working at the front line of patient care must be prioritized. Otherwise, avoidable medical errors will exponentially place patient lives at risk, and transformation toward value-driven health care will remain nothing but a theoretical conversation.

Lack of trust, transparency and coordination

Historically, the relationship between providers and payers has been ruled by a FFS reimbursement arrangement centered on health care visits and procedures. However, unsustainable costs and a demand for improved clinical outcomes are making it increasingly difficult for payers and providers to develop a contracting structure that works for both entities now and in the future.

Health care players are reacting

Leaders in both the public and private sector have attempted to craft a holistic response to these issues, moving away from the traditional FFS model and toward a system that ties cost to favorable clinical outcomes. Critics point out that the existing health care reimbursement model fails to encourage performance standardization and provider accountability for value delivery. Providers and payers have started to react to market pressures coming from consumers and legislation that encourage outcome-based reimbursement, such as the Affordable Care Act (ACA) and the bipartisan Medicare Access and CHIP Reauthorization Act (MACRA).
Payers on the move

Legislation is disrupting traditional FFS models, but leading private payers are also moving down the pathway to value-centered reimbursement on their own. Here are some ways private payers are embracing value:

APMs

One major national payer is already making 50% of its reimbursements in APMs and is committed to make 90% of reimbursements in a value-based model by 2018.¹

Value-based contracting

The chief executive of a second major payer organization has stated value-based contracting currently represents approximately 45% of the company’s medical spending, and the goal is to achieve 75% by the end of the decade.²

New payment structures

A third major payer organization has partnered with a data analytics and population health vendor to move forward in value-based payment structures.³

Market forces are moving the industry toward a new paradigm; one in which delivering the highest value is an organization’s defining goal. Future market share will be dependent on an organization’s ability to measure and demonstrate properly the impact that providers and payers have on the health of customers. While some providers are taking initial steps to establish quality, they are doing so in a piecemeal fashion that does not recognize the need for a total transformation across the continuum of care.

According to our survey, 49% of interviewees have already initiated quality audits, 31% had instituted physician performance scorecards that include a quality measure and 38% plan to institute facility scorecards in the future.

However, audits and scorecards alone will not move the needle far enough.

Organizations that hope to thrive in the health care industry of tomorrow must start aligning revenue and costs with quality-first thinking and a culture of accountability.
Payers and providers

With health care expenditure accounting for nearly 18% of America’s gross domestic product, both payers and providers recognize the need to bend the cost curve. There’s an opportunity to optimize value, and the payoff is huge.

US$1 trillion

Estimated wasted spending each year in the health care industry due to factors such as inefficiencies, redundancies, fraud and abuse¹

A new vision of value

Historical cost management models — including disease management programs, authorizations/pre-authorizations and benefit designs — are no longer sufficient on their own and have done little to address quality and value in a meaningful way. Today, new value-based care models are emerging with the expectation to increase both reliability and industrialization within health care. However, adoption has been slow and inconsistent, and results have been mixed.

Focusing on value is essential to overcoming the current challenges in the health care industry, but executives will need to act quickly and strategically if they want to stay ahead of competitors. The first step toward transformation is to broaden the understanding of the narrow but frequently used term “value-based care” to a new vision of value that describes a complete transformation of care delivery: “value-driven care.”

Our definition of value-driven care is delivering the best clinical outcome relative to the optimal cost of care within an environment that fosters the right patient experience delivered by engaged and satisfied providers.
The four pillars that support EY’s concept of value-driven care are:

- **Clinical outcomes**: Effective care that delivers positive, sustainable, and measurable results.
- **Cost optimization**: Transparency, efficiency, and process improvements that eliminate waste, redundancy, and misuse of resources.
- **Patient experience**: Access to care and high levels of customer satisfaction.
- **Talent engagement**: Engaged, satisfied employees committed to the organization’s mission.

These pillars must be enabled by cultural transformation and robust technology, which increase transparency and accountability across all stakeholder organizations.

Through this new value-driven lens, organizations can start to view their disconnected initiatives as part of a total transformation across the continuum of care that will lead to a competitive advantage and better health outcomes.
Moving to value-driven care will require balancing the following priorities:

EY Health Advisory Survey 2017

**Embrace a holistic approach**

Organizations are taking a piecemeal approach to delivering quality and value. To unlock the full potential of value-driven care, an organization must implement all components of the model in a coordinated manner.

78% of EY Health Advisory Survey respondents “strongly agree” or “slightly agree” that health care organizations need to pivot to thrive in a value-based environment.
Elevate the patient experience

Health care is becoming a consumer-driven industry, so patient satisfaction is an integral part of the move to value-driven care. Provide patients with appropriate access to health care, focus on customer service, measure clinical outcomes and deliver patient-centric tools that increase transparency for the consumer.

93% of respondents are undertaking patient experience initiatives in 2017. However, only 26% of respondents selected patient access/satisfaction as one of their top three initiatives for the year.

Transform the culture

Successful organizations will exhibit the cultural behaviors that indicate “the head and the heart” are operating together to deliver on a collective purpose, collaborate effectively in teams and maintain a steady focus on the patient.

51% of respondents believe that employee satisfaction in health care drives patient satisfaction.

Advance with analytic insights

Value-driven care relies on predictive, proactive and preventative analytics to deliver the best clinical outcomes. Organizations will need to invest in robust technology that can leverage statistics and exploratory data mining techniques to help identify the underlying drivers of cost and quality.

26% of respondents ranked new technologies as one of their top three priorities for 2017.

Increase productivity

Costs are only part of the equation in the move to value-driven care. Monitoring costs must be counterbalanced by monitoring productivity, and both must be measured and reported accurately.

13% of respondents are undertaking cost control initiatives for peer benchmarking/competitive benchmarking. Forty percent of respondents have these initiatives planned for 2017.

Embrace the new way to pay

Payers and providers will devise a new type of partnership and redefine the current reimbursement structure. An essential part of the process is redefining the payment model to focus on overall value rather than transactional services.

25% of respondents have no reimbursement initiatives planned for 2017.
Elevate the patient experience

Health care is becoming a consumer-driven industry. With patients increasingly involved in their own care, patient satisfaction needs to be front and center. This means providing patients with appropriate access to health care, focusing on customer service, measuring clinical outcomes and delivering patient-centric tools that increase transparency for the consumer. More importantly, involving the patient will improve performance results. Engaged patients support quality initiatives, reduce cost and lead to better outcomes.
Engaging the patient

Patient engagement is proven to drive measurable results.

**Better clinical outcomes**

More engaged patients are more likely to have biometrics such as body mass index, blood pressure and cholesterol in normal range than less engaged patients.¹

**Reduced cost**

Less engaged patients had readmission rates up to 1.75x higher than less engaged patients.²

**Medication adherence**

Text messaging can improve medication adherence rates for chronic disease patients by 17.8%.³

¹ [http://content.healthaffairs.org/content/32/2/207.full#ref-27](http://content.healthaffairs.org/content/32/2/207.full#ref-27).
Transform the culture

Transformation requires a vision and culture of shared accountability and ownership regarding the patient experience and health outcomes. Providers must be held responsible for their overall performance through measures such as physician scorecards and facility dashboards that allow for internal and external peer benchmarking, with scores made public for consumers. For physicians, the only way to drive change in behavior and enforce accountability will be to tie their compensation and incentives to the delivery of positive experiential outcomes.

Optimizing patient experiences across the continuum of care while industrializing quality requires more than episodic effort. Quality measures, balanced scorecards, financial incentives and other metrics are important methods to clarify objectives. In addition to that, however, each patient’s care experience along the continuum must be delivered in a coordinated and synergistic way to avoid variation and yield the best possible health outcomes and patient satisfaction. Successful organizations will exhibit the cultural behaviors that indicate “the head and the heart” are operating together to deliver on a collective purpose, collaborate effectively in teams and maintain a steady focus on the patient.
Shifting health care culture toward value-driven care

Culture is the way an organization does business, powered by an underlying set of rules, values and beliefs that everyone, from the top to the bottom, is aligned on and applies consistently.

Current health care environment

According to the EY Health Advisory Survey, the employees that ranked as the most engaged at provider organizations are:

- Physicians: 82%
- Nursing staff: 80%
- Department heads: 75%

However, these employees ranked lower on engagement:

- Administrative staff: 45%
- Maintenance staff: 38%

Leveraging purpose drives engagement

Employees are:

- 1.4 times more engaged\(^1\)
- 1.7 times more satisfied\(^1\)
- 3 times more likely to stay\(^1\)

According to the EY Health Advisory Survey, the employees that ranked as the most engaged at provider organizations are:

- Physicians
- Nursing staff
- Department heads

However, these employees ranked lower on engagement:

- Administrative staff
- Maintenance staff

Highly engaged employees create highly satisfied patients. Engaging around the organization’s purpose not only enhances the patient experience, but also helps organizations attract and retain the best talent.

Percentages aggregate “quite engaged/committed” and “highly engaged/committed” responses.

Respondents were asked: “How engaged are employees at your organization/company? Please use following five-point scale provided for each of the following roles.”

Advance with analytical insights

Determining the effectiveness of value-driven care requires an organization to collect, store and analyze meaningful metrics. Organizations should invest in the IT infrastructure needed to provide near real-time data analysis for measuring performance. They can then use predictive, proactive and preventative analytics to drive the best clinical outcomes. Statistical modeling and exploratory data mining techniques will help identify the underlying drivers of cost and quality, enabling disciplined processes for system-wide cost containment, expense management and quality outcomes. Our survey found that only 26% of respondents ranked new technologies as one of their top three priorities for 2017. In terms of patient experience, only 8% said they are leveraging patient-centric analytics. The competitive field is wide open for an organization that invests in robust technology and talent to exploit big data beyond the current focus on actuarial risk.

Increase productivity

The EY survey shows that CEOs and CFOs are more likely to prioritize costs. However, costs are only part of the equation in the move to value-driven care. In the drive to increase value, keeping the bottom line under control should be a function of performance optimization rather than a separate priority that competes with quality of care. Monitoring costs should be counterbalanced by monitoring productivity, and these metrics need to be understood and managed by all members across organizational leadership.
Embrace the new way to pay

Finally, the existing payment model needs to be redefined to focus on overall experiential value rather than transactional services. Payers and providers will need to devise a new type of partnership and redefine the current reimbursement structure. Despite pressure on the current payment model, many health care executives today appear to be unprepared for a change in payer contracting. Our survey found that 95% of respondents are taking cost control measures, but 25% do not have any “value-based” reimbursement initiatives planned for 2017.

EY Health Advisory Survey 2017

Cultural transformation

Eighty-four percent of survey respondents agree that improving quality, cost management and outcomes can be a shared objective of health care providers and payers.

Respondents were asked: “Please rate your level of agreement or disagreement with the following statements using the five-point scale provided.”
Value-driven care is the destination

With market forces pushing for a new care delivery model, many organizations will undoubtedly be dragged into the realm of value. Relying on a series of disjointed initiatives to get there is not an effective strategy. The leaders in the next iteration of American health care will be organizations who boldly embrace value-driven care now. By going all in with a patient-centered, outcomes-driven approach, organizations will have the opportunity to build market share by attracting more customers based on their core competency of delivering value.

The move to value-driven care will not be easy. Not only does it require the industry to look at patients as consumers, it also demands a holistic approach to operations, the adoption of new technologies, an increase in transparency and a dynamic organizational culture. But the payoff is huge. Organizations that act strategically now will become more resilient in the face of tomorrow's challenges. They will be empowered by an engaged workforce that collaborates to deliver the best outcome possible: healthy happy patients treated in an enabled ecosystem of affordable, accessible, accountable care.
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Cost

Value-driven care. Are you ready?
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A note from W. Gregg Slager, EY Global Health Transaction Advisory Services

Health executives foresee steady sector growth, with tech and health services firms eyed most for new deals.

Health sector results from EY’s 16th Capital Confidence Barometer (CCB16) indicate that executives remain positive in 2017, with improved economic fundamentals driving organic growth.

Executives in the sector expect the M&A pipeline to remain stable, with 36% planning to actively pursue mergers and acquisitions in the next 12 months. Among those looking for new deals, technologies and services top the list of strategic interests.

**Biggest risks include cybersecurity**

Concern around cybersecurity was the top reason cited as to why deals failed over the last 12 months. As the recent WannaCry attack demonstrated, acquisitions that lack up to date security measures can be a liability, as they may be a vulnerable entry point into an otherwise secure environment. Executives are justifiably cautious.

Issues uncovered during due diligence was the next largest concern. The use of analytics to derive high quality insights from structured and unstructured data sets has never been higher, enabling companies to rapidly identify and raise issues prior to deal completion.

From a macroeconomic perspective, volatility in capital markets and uncertainty about US government policy is slowing decision-making around investment. But caution, not pessimism, seems to rule the day: only 10% of health executives worry that the new US administration will implement policies that will reduce M&A activity. Similarly, 70% responded that Brexit is not influencing decision making about making investments in the UK.

**Biggest disruptor: digital and new technologies**

Digital disruption is top of mind for health executives. The impact of new technologies on the current business model is the issue most frequently discussed in the boardroom. Disruptive technology and potential changes in trade policies are compelling companies to be more responsive, and more frequent, in their portfolio and operational reviews.

**M&A Confidence: optimism with ongoing deals and pipelines**

Uncertainty about policy and capital markets is influencing a relative pause in M&A activity compared with 2016’s record levels. Pipelines remain focused and stable with more than 75% of respondents reporting that they expect no change in pipeline size. Optimism remains high with ongoing deals, as 94% of executives expect deals to close at the same rate or higher than last year.

Of those looking to achieve strategic goals through M&A, more than 75% anticipate pursuing small deals (<US$250m). Strategic growth is the focus for this group, which reports a desire to tap into new areas of geographic and market share growth.

**The outlook: growth expectations stay high**

Fluctuations in currency and capital markets are moderating last year’s record breaking deal levels. Expectations for growth remain high, and interest in new geographies and cross-border activity has moved to the forefront of the boardroom agenda.
About EY's Transaction Advisory Services

How you manage your capital agenda today will define your competitive position tomorrow. We work with clients to create social and economic value by helping them make better, more-informed decisions about strategically managing capital and transactions in fast-changing markets. Whether you’re preserving, optimizing, raising or investing capital, EY’s Transaction Advisory Services combine a set of skills, insight and experience to deliver focused advice. We can help you drive competitive advantage and increased returns through improved decisions across all aspects of your capital agenda.

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Disrupt or be disrupted

The future of health is digital
Digital is transforming the world of health so dramatically that even organizations not rooted in technology know they must respond – and embrace – technology’s wide-reaching disruptions. Today’s health care consumers are more networked, engaged and empowered than ever before. They’re accustomed to technology making their lives easier, speedier and more connected. They’re demanding harmonized health experiences with simple, coordinated interactions as they receive service across the health care spectrum.

Brave new (health care) world

Inspired by consumer interactions in other industries, it is easy to imagine a brave new health care world where:

• A diabetic patient shares her personal glucose levels directly with her insurance company via a remote-care app. Her insurer uses the data to adjust her premiums favorably to reinforce her positive behavior.

• Your primary care physician gets an email alert when you fail to pick up your prescription from the pharmacy, and a care manager calls you to find out why you aren’t taking the prescribed medication.

• Artificial intelligence analyzes the medical history of an entire patient population and, making decisions based on historical results from millions of patients, recommends customized disease prevention coaching for each patient, based on their medical history.

Technology is forcing health care organizations to shift how they approach their business, who they collaborate with and how they interact with their patients. And many traditional players are scrambling to keep up. A badly designed patient portal or long wait times for an appointment won’t stand with a population accustomed to rides-on-demand and real-time blood pressure data available on their wrists. The successful health care organizations of the future will be those that best adapt to the new digital reality.
The changing landscape

The digital health era is here

The digitalization of health care has been a multifaceted discussion over the last decade, but it has now arrived. One key stumbling block is the isolated and fragmented way in which many health organizations approach customer engagement. To win in digital health, organizations need to rethink their business models to align cost, quality, patient engagement and customer experience. This requires partnerships with IT companies, payers, start-ups and even other industries. These new partnerships and the products they create are paving the way to a digital health future.

Furthermore, health care’s high barrier of entry is falling as entrants from other industries bring their competencies to bear:

- Technology companies are using social and consumer engagement platforms, coupled with data analytics and mobile health solutions, to develop personalized, actionable insights on a population health-level.
- Retailers are driving insights into patients' lifestyles and behaviors and becoming the future of health care service.
- Consumer product companies are introducing user-friendly technologies from other industries and making big bets on nutraceuticals and superfoods.
- Start-ups are accelerating the industry’s speed to market, spurring fresh thinking and forcing traditional players to move fast.

Consider this: since 2000, digital disruption has demolished 52% of the Fortune 500*

To prepare for disruption, take note of other industries where digital convergence is a way of life. In many cases, established players failed by ignoring similar customer demands and reacting too slowly. Remember Blockbuster? It was overrun by Netflix, and today, major television networks look to Netflix with envy as the streaming service continues to transform how people view and pay for television and movies. Other examples include:

- In four years, Airbnb has completely disrupted the hotel industry and today has more than 100 million users with close to a million listings around the world.
- Robotics process automation helped an international insurer cut down reporting times from 90 to 12 minutes, with 100% accuracy.

- Electric carmaker Tesla, which produces a fraction of vehicles compared with major US automakers, has achieved a higher market capitalization than any – based on its prospects, not profits. It uses personalized digital marketing, as opposed to a dealer network, to drive sales.

So the pressure is on the health sector to catch up and keep up. As other industries have learned, disruption is full of threats – and opportunities.

What can I do differently to avoid being disrupted?

As Apple’s early marketing so famously posited, “Think different.” The digitization of health care requires a new business model, a new organizational structure, new talent and new questions. Leaders are asking:

- How can digital simultaneously improve patient safety and quality of care, while bringing down costs?
- How can digital transform care management across multiple care settings, such as hospital, ambulatory, retail and home?
- How do I use digital to improve patient outcomes by better managing handoffs within my facility and across care settings?
- How do I leverage data and analytics to direct patients to lower-cost care settings or providers?
- How can blockchain help me manage provider data?
- How will digital solutions impact my operating model? What processes, technologies and organizational changes are required?

That last question is key. If your destiny is to disrupt rather than be disrupted, you must shift how your organization operates. Digital will impact every facet of your organization, so the silos must give way to interoperability. In the new digital environment, disconnected departments, such as supply chain, risk, technology, finance, recruiting, accounting, scheduling and care management, will all be linked and collaborating.

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* Source: https://www.constellationr.com/disrupting-digital-business
The patient-centric health ecosystem

Digital Enablement
Analytics, Cybersecurity and Artificial Intelligence

Automation
Robotic Process Automation
Conversational Intelligence
Blockchain

Provider
- Care delivery
- Collections
- Compliance
- Customer service
- Denials or referrals
- Patient access
- Patient engagement
- Telemedicine

Payer
- Billing and premium
- Care management
- Claims
- Compliance
- Customer service
- Membership management
- Plan or product management
- Provider networks

Patient portals
- Mobile
- Wearables
- Care coordination

Self-service
- Social media
- Pricing transparency

Implantables
- Sensors and monitors

Other ecosystem partners
Telecom, retail, pharma and regulatory

Health sector update 37
**Realign the model**

Is your business strategy and operating model aligned to reap the benefits of the digital age? Silos are a barrier to progress. Think of digital as an enterprise investment, not a simple solution to one problem. A holistic view is best. Workflow and architecture need to be aligned to capitalize on the full capabilities of the technology. Future digital investments need to expand the return of prior initiatives.

**Convergence of industries will unlock value**

The convergence of industries is moving health care forward in ways never imagined. Twitter is tracking disease outbreaks, telehealth is now a standard model of care delivery, insurers and employers are now investing in preventative care, 3D pills allowing "downloadable medicine," home-based genetic testing kits, fitness trackers and wearable devices. These innovations are all part of an industry that will reap great rewards in improving safety, decreasing costs and meeting customer expectations.

**Know your customer**

Do you know when consumer demands change? How are you monitoring shifts in consumer sentiment? Today’s super consumers want super experiences. Embrace the world of the constituent, from consumers to providers to brokers and employers in the health care value chain – then design and recommend new experiences for them. Obsess over helping your customers solve their biggest problems.

**Say goodbye to the digital divide**

Is your operating model designed to support and enhance your digital decisions while advancing the member and patient experiences? Digital is most powerful when your entire organization embraces its possibilities and understands its internal and external impacts. Sharing technology through common platforms will enable artificial intelligence, advanced decision-making and more consumer-friendly capabilities. Align your operations to deliver on the promise of digital.

**Manage your risks**

Are you scanning the horizon and protecting your business from risks inherent in the digital future? Patient chat rooms, electronic medical records and social media all require the most advanced cybersecurity measures. But – a word of caution – don’t let cybersecurity paralyze your digital transformation.
Disrupt or be disrupted; the future of health is digital
Be a winner in the consumer-driven, health marketplace of the future

Health care's future winners will be those that can best recognize the impact of the digital future and adapt accordingly. They will focus on core competencies and outsource tasks others can do better. They will team up quicker, collaborate in a more meaningful way and invest in dynamic capabilities. But most of all, they will overcome the inertia to change, as well as the perceived risks of adapting and diversifying their business model.

EY is equipped to help as you apply digital solutions and innovation to your business, reinforce your cybersecurity programs, make sense of massive daily data collection or look to tax savings to fund an acquisition. No matter where you are on this journey, we have proven experience that can help you apply a holistic view of your organization to take care your business, systems, talent and communities reap the full value of today’s digital enterprise.

We can provide end-to-end services, as well as the confidence to help you navigate the complex world of digital ecosystems. Ask us about new ways to map the latest breakthrough, manage risk, lower costs and find new markets.

At EY, we have the knowledge, experience and talent to provide options as the universe of digital health evolves. From back-office operations to the most innovative strategies, we are leaders in helping businesses like yours reimagine, comply, measure and monitor in a changing landscape.
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Across the world, health care systems and entities are under unprecedented pressure. Spiraling costs, exacerbated by aging populations and emerging market growth, are bringing newfound focus on value and outcomes. Mobile health and data analytics promise to revamp care delivery but are also bringing in competitors from other sectors. For governments, payers and providers, these trends create a host of challenges: extracting insights from “big data,” partnering in new ways, boosting operating efficiencies and more.

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Health care: the cross-currents of convergence deliver participatory health

A second paper in the Health Reimagined series
The EY Health Reimagined Compendium

Health reimagined: a new participatory health paradigm

This paper explores a vision of the future of an expanding and participatory health ecosystem based around the individual as an engaged and active consumer. Health systems will reshape into a digital health ecosystem – one that is globally connected and locally relevant. Solutions to sustainability, growth and delivering health care to the rapidly growing population will be driven by three key shifts around digital technologies, social media 2.0 and a maturing health care consumerism.


The future of health insurance

A participatory health solution

This paper discusses six trends disrupting health insurance. These trends are driven by two shifts: the need to tame runaway cost inflation, which is spawning new incentives and payment structures, and digital health, which is democratizing data and empowering consumers.


The new innovation imperative

Reshaping biopharma business models

New technologies, customers and competition are forcing – and enabling – biopharmaceutical companies to find novel ways to create and capture value.


How will we disrupt aging before aging disrupts economic growth?

Building an engaged aging strategy

Aging is a megatrend as big as digital disruption. EY Engaged Aging Summit, and associated thought leadership, explores how we – industries, governments, health consumers and non-governmental organization (NGO) – can seize the upside of aging.

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Foreword

This paper further extends our thinking on participatory health. We examine shifts in emphasis, direction and focus necessary to realize a new and disruptive paradigm. Based upon conversations with a broad group of health and wellness industry executives in the United States, Europe, Southeast Asia and Australia, desk research and a pulse survey of professional young adults globally, this paper outlines shifts that will move health care into an entirely new space – that of participatory health becoming embedded as business as usual in the health industry. How this might be financed will be addressed in the third paper in this series.

The innovation challenge to shift health care toward a participatory system is quite clear. Breakthrough technologies, new sciences and integrated design-based solutions will drive fundamental change in the delivery of health, wellness and care. The leading edge of the health industry is already moving at breathtaking speed toward anywhere, anytime care fashioning health care as continual and participatory in the home and community. But delivering participatory health care and well-being at scale is immensely complex, especially in an industry notoriously slow to change. In this paper, we propose a model of industry transformation where key elements of curation, navigation, data fusion and an eventual global platform-based ecosystem drive innovative solutions to some of the intractable problems in health care.

What realm of possibilities exist as health runs headlong into the space where industry, technology, science and social constructs converge? This convergence brings opportunity for those seeking to enter the health arena as well as to incumbents willing to reinvent core business, create non-traditional alliances or step into adjacent areas. Platforms that build networks that organize transactions and interactions, as well as draw upon the power of the crowd, will create new pathways by which to organize and deliver health care. Global alliances that blend the technical capabilities of one partner with the health care expertise of another could offer interesting opportunities if they were to get off the ground.

So who will lead and who will follow? Emerging and developing economies may well take the lead in this journey to participatory health. Advanced technologies enable these economies to leapfrog the more industrialized as they seek to build, rather than retrofit, health care markets. This will not be simple – or easy to put into practice – but may well deliver a decidedly disruptive change.

Participatory health is not the future of health care; it is, without doubt, the present.

David Roberts
EY Asia-Pacific Health Leader
Digital clones of real-life medical experts that give personalized advice and support on a vast range of medical issues around the globe – far-fetched? Not at all.

Medical avatars that look and sound like your own doctor are under development at the University of Southern California.¹ Virtual reality technology and artificial intelligence come together as an interactive and responsive virtual physician – one that maximizes quality time spent with you, in partnership with your regular physician or health professional.
Now is not the time to be thinking about how health care might benefit from digital technologies – that time has long passed. In fact, the important conversation around the future of health care is not about shifting to digital at all. It is about people.

The real force for change in health care is patient-mediated – the power of the patient or consumer to engage and participate. A new health care ecosystem is arising from convergence between traditional and non-traditional players that blends health care expertise with network and platform capabilities. New pathways of health and wellness arise at the interface between the consumer and the system that transform the industry into one that is online, networked and participatory.

Participatory health – a radically different future

A significant catalyst for change is an engaged and participating patient or consumer who acts as an equal partner in their care. Market dynamics are shifting rapidly to the consumer as integrative platforms form ecosystems that disrupt both supply and demand with new ways of creating and consuming health care goods and services. Central to this is the deep and profound shift in the model of care toward participatory health.

Integrating participatory health as a pillar of the system, as part of the core business of health care, takes the industry into a radically different future. The digital revolution has changed what is possible in health care. Low-cost, fast mobile connectivity and smart devices redefine how consumers manage their health and engage with care systems. Sensor technologies and mobile solutions are reinventing how the health industry can connect and communicate with patients. In participatory health, it is the fusion of all these tools that builds an ecosystem and capabilities to deliver at scale.

The first paper in this Health reimagined series A new participatory health paradigm discusses how demand for health care can be reshaped by participation, strengthening an individual’s capabilities to manage their health status and lifestyle choices, foster prevention and wellness, and support chronic conditions in vastly different ways. In this second paper, we suggest that convergence or points of intersection between traditional players (providers, payers, life sciences and devices) and non-traditional new entrants (retailers, telecommunications and technology companies, entrepreneurs and venture capital investors) create the tools and platforms by which participatory health can be delivered. Exponentially developing technologies through integrative platforms delivers a suite of new offerings around well-being, remote care, medical imaging at home and the internet of things (IoT). Participation is the underlying premise as the notion of health transitions from reactive to proactive care systems focused on wellness, chronic care and population health management.

This paper discusses a model of industry transformation and three conditions necessary to achieve scale:

- Consumer participation through curation and navigation technologies that are the interface between the consumer and the health care system
- Data-fusion platforms, which are the glue that hold the system together
- Global aggregators or “orchestrators” that pull together a scalable ecosystem

We conclude with some thoughts around opportunities that emerge at the intersection of consumerism, technology and markets for those willing to explore beyond their traditional boundaries.
The challenge

The awkward truth is that, for the most part, the current reach of digital health technologies is restricted to pockets of activity globally, directed toward a specific condition, operational or administrative problem. In a fast-moving and early stage environment, adopting an incremental approach makes sense, picking the “battles to be won” by targeting outcomes that are amenable to action. Getting across the “last mile” to the hardest-to-reach consumers – whether they are in remote underserved areas or disinclined to engage in managing their health and wellness is a clear focus for disruptive innovators, health professionals, technologists and payers.

Emerging and developing economies may well take the lead, being less constrained by existing infrastructure and vested interests seeking to preserve the status quo. Delivering participatory health care and well-being at scale is immensely complex. What is not yet clear is how health care systems – either national, regional or local – will transition to incorporate or replace existing ways of doing business with participatory health. The case for change is being written today but, in an industry notoriously slow to change, this will be a deep-seated journey of transformation – for the system, for the professionals and for the consumer or patient.
Background
“More of the same” can’t resolve 21st-century health care problems

Future adoption of advanced technologies built upon networks or platforms that organize transactions and interactions is important for all economies – whether they be emerging and developing or developed. Economic, epidemiologic and demographic shifts mean that legacy systems of providing health care or “more of the same” are failing to deal with the many difficult problems facing 21st-century health care. Rising costs, consumer expectations, new technologies and increasing globalization place intense pressure on the health sector to align better with economic constraints. Long-established systems of primary, secondary and tertiary care are increasingly unsuited to deliver responses to challenges arising from aging populations and as the burden of disease shifts to chronic conditions such as diabetes, musculoskeletal disease and cardiovascular disease. Chronic conditions and increasing longevity extend the end-of-life cost burden. Growing middle classes in emerging/developing economies will bring increased demand through rising health consumption expectations and health-related outcomes of lifestyle changes. Moreover, how care is organized and delivered is being reshaped by changes in the broader environment, including self-determination, social and crowd source networks, and a cultural shift toward sharing and participation.

Population aging and a rising middle class push health systems toward participatory health

By 2050, 1 in 5 people globally will be aged 60+ years. Rapid population aging places increasing demands on health care systems and expenditure.

Disparities in investment in health

Global health expenditure per capita (2014)
- High-income countries
  - US$5,251
- Middle-income countries
  - US$292
- Low-income countries
  - US$37

In some regions, around 25% of the population will be aged more than 60 years old by 2030. Improved longevity and larger numbers of the aging put pressure on health systems.

Overall, the middle class will grow from 1.8 billion (2009) to 4.9 billion (2030), bringing rising consumption expectations. Growth will be in Asia-Pacific, with two in three of the growing middle class located in this region by 2030.

Mobility and rapid telecommunications underpin the shift to integrated, digital health care systems.

Source: UN World Population Aging 2015.
The long run to transformation
A digital ecosystem is inevitable – emerging and developing economies may leapfrog ahead
The internet of everything (IoE)7 is emerging as cyber and physical systems combine the physical, digital and biological worlds in novel and powerful ways. This so-called Fourth Industrial Revolution is profoundly altering our way of life as the speed and scope of breakthroughs propel a transition to a new set of social and economic systems.10 Self-driving cars, for example, have moved from concept to real-time tests and are expected to be on the road by 2021.11 Advancements such as gene-editing technologies, additive manufacturing (3D printing), robotics and artificial intelligence (AI) are rapidly changing health care.12, 13 At the societal level, in anticipation of “technological unemployment”14 as jobs disappear due to automation and AI, some countries such as Finland and the Netherlands are experimenting with paying citizens a guaranteed and unconditional universal basic income.15

For many in the health care industry, the journey to and adoption of digital is inevitable. Industry executives interviewed were confident that the future of health care includes a participatory and digital ecosystem. Many saw the need to move from running a supply-side agenda of imperfect resource allocation to tackling a demand-side agenda. Shaping the move from running a supply-side agenda of imperfect resource participatory and digital ecosystem moving toward scale. Shortages and maldistribution of health professionals, a rapidly aging population and hospital overcrowding are some of the many issues driving growth in China’s digital health space. Digital giants from insurance, online search engines, social media and e-commerce are moving into the health care space and developing nationwide diagnostic, treatment and administrative platforms. And the numbers are vast (see below). Ping An Good Doctor, for example, claims to have 77 million registered users16 — larger than the entire United Kingdom population, three times the population of Australia and one-fourth that of the United States. With industrialized countries facing similar drivers of demand and changing demographics as China, there is potential for a powerful impact from lessons learned across the health value chain, from service delivery through to structural reform and rising investment opportunities.

“...It’s just a matter of time before the whole market shifts to ‘got to know the patient, got to know the consumer, got to know the data, got to connect the stuff.’”
Deborah Kilpatrick, CEO Evidation Health

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Ping An Good Doctor
This is a Chinese online to offline (O2O) health care platform backed by the Ping An Insurance and Financial Services Group. It provides raffles 24/7 virtual health care consultations by phone, text or video online appointment booking, diagnostic services, health education, and online retail of pharmaceuticals and medical devices. In 2016, there were 77 million registered users and up to 250,000 consultations per day.

Guahao.com
Meaning “take a number”, Guahao.com initially targeted resolving long wait times for hospital services in China, introducing an online appointment registration system. Recent intentions include expansion into a national digital health platform covering diagnostic and treatment services.

Source: PRNewswire The Largest Unicorn to Date Emerges in the Online Health care Industry, 2016.

Shifting the mindset – easier with a clean slate

In the long run, many of the interviewees expect improvements in quality, cost and consumer experience through participatory health. Technologies open the doors to radically different approaches to care and will transform how we deal with ill health and disease; capture, manage and share health data; and how consumers engage with care systems. Opinions as to how this might likely happen varied greatly. Uptake was thought to be perhaps more likely in single payer, large integrated or centrally organized health care systems. Many executives thought that emerging and developing economies could bypass setting up traditional primary care structures in favor of a participatory health model that can support low-cost models of care across larger populations. System transformation is highly dependent upon “crossing the chasm” of adoption, or the propensity to act early or wait and see. Of course, there may be little choice but to act if, as Christensen’s disruptive innovation theory suggests, fast-moving challengers disrupt the market using technologies to offer cheaper and better products, forcing incumbents to rethink legacy systems. Some interviewees also weighed the possibility of a “big-bang” large-scale and fast-paced disruption completely upending health care.

Facing the “double burden of disease” (the overlap between communicable diseases and a growing prevalence of chronic health conditions), many emerging and developing economies are looking to deliver services via low-cost mobile solutions and analytic insights from digital devices data. AI has the potential to lower the cost of care, mobile device ownership fosters communications and application program interfaces (APIs) bridges the gaps between solutions.

“... if you’re building a health care system from scratch, you would not mimic or replicate what we have and so I think you might see people who have more of a, you know, clean slate. They’re actually able to be much more progressive and get to that end state in a far quicker time.”

Venture Investor Executive
Emerging economies – leading the way?

Innovations designed around mobile devices, telecommunications networks and AI will enable emerging economies to bypass establishing traditional health systems and move directly toward a virtual system. Initial steps may focus on discrete components of the health system, such as supply chains, frontline services, workforce and public health measures, rather than whole of system development:

- For developing health systems, health navigation will provide an alternative to the costly establishment of the current model of primary care and avoid the substantial overcapitalization of Western health systems in favor of virtual. Navigation supports a participatory health model that is better equipped to provide low-cost models of care for larger populations and underpinned by emerging supply chain advances.
- Solutions will be shaped to achieve best fit by factors such as demand for basic health care and preventive services, workarounds of the limitations of existing infrastructure, national budget constraints, the degree to which solutions can be integrated rather than act in a stand-alone capacity, affordability and opportunities for partnerships to develop a sustainable ecosystem. Barriers include rising anti-globalization sentiment, evidence gaps regarding the effectiveness of some solutions and impact on health system objectives, and protection of intellectual property.
- An interesting question arises of who leads and who follows. Will established economies take on lessons learned from the experiences of virtual health systems implemented in the emerging economies or not? Will governments force the changes due to fiscal constraint or will a consumer revolution be driven by a commercial explosion of alternatives?

Mobile phone-based systems are used in emerging and developing economies in many ways for system enhancement (such as registries that replace paper-based systems), quality improvement, delivering frontline care, health worker supervision, training and further education and establishing communications and networks between health workers.

- RapidSMS (www.rapidsms.org), an open-source framework for building customized mobile services with web-based dashboards, is the basis of a range of registry, performance improvement and outreach programs:
  - The EGPAF performance-based financing program is in Mozambique. Health workers are incentivized to complete mobile-based quality surveys, resulting in improved quality of health services:
    > www.rapidsms.org/projects/episurveyor-for-pbf-verification
  - The Liga Inan (Mobile Moms) Project uses mobile phones to connect expectant mothers and health providers in Timor-Leste. Maternal health and post-delivery care are delivered via SMS, and midwives create local support networks that communicate by SMS:
    > www.rapidsms.org/projects/liga-inan-mobile-moms
  - mSakhi is an open-source Android application developed specifically for frontline health workers in India. Health workers access up-to-date information, training and supervision through their smartphone, and it also functions as an electronic medical record system, replacing multiple paper-based tools. Workers can track and report outbreaks or rising health issues in their communities:
    > www.intrahealth.org/msakhi-award-winning-mobile-phone-app-frontline-health-care

- Switchboard builds software to register health workers’ mobile numbers and connects them to colleagues and the larger health system through messaging platforms and free calling networks. These services, along with nationwide phone directories of health workers, allow practitioners to receive information, guidance and advice, while also supporting government efforts to track diseases and manage potential epidemics, and are in action in Ghana, Liberia and Tanzania:
  > www.switchboard.org
Revisit, redesign and reset health care: a new default setting
Shifting health care from reactive to proactive
A vision of the future emerged over the course of our conversations with industry leaders. As Andrew Thompson, CEO and co-founder of Proteus Digital Health observed, the health care system will be built: “Using the best technologies that we now have in the 21st century, not to replace sick care but to extend it, magnify it and make it better ... you have to shift from sick care into health care, and the current and future generations of mobile devices in every consumer’s pocket will become the most significant platform for health care service delivery the world has ever seen.” Technologies vital to sustained engagement are embedded in everyday items, pervasive, always connected and discreetly in action behind the scenes. These draw upon economic, behavioral and cognitive insights to shape an individual’s behavior and decisions. Payers may well be influential in pushing general adoption of monitoring devices through incentive-based health and wellness improvement programs.

“I would go one step further than patient centric and say it is patient mediated. Patient centric means just designing around the patient or consumer – 30% of the way there. Patient mediated means patients are actively controlling and influencing the process ... patients have access to a data set they’ve never had access to before – access to their data.”

Deborah Kilpatrick, CEO Evidation Health

Digital is a defining trend

Digital is considered by our interviewees to be a central pillar that shapes an intelligent health care system. Technology, in all its various forms, will ultimately embed as a common platform in all aspects of health care. This will be as an interconnected environment around an individual, across the continuum of care and the lifespan. Most of those interviewed considered that uptake would vary. Some early adopters are in this space already, to be closely followed by the “early majority” in the next three to five years. Most in the industry will wait and see and, as the network effect kicks in, move when comfortable with technology. This is thought likely to occur in the short to medium term in advanced economies. The executives’ views on the adoption cycle of digital health technologies were based upon three qualifications:

- The early stage maturity levels of emerging technologies
- The profound cultural shift within health care (of consumers, health professionals, administrators, policy-makers and governments) necessary to achieve this vision
- A recognition that it is early days and many iterations are required to learn the lessons to deliver the evidence and attractiveness to persuade others (including fundamental shifts around payments, transparency of costs, and system incentives away from the prevailing transactional and institutional focus)

Several interviewees stressed that digital solutions coming to market need to be very clear about the problem to be solved, be of demonstrable efficacy and clinically relevant, and avoid creating inequities.

Wearables and monitoring devices: a clear consumer appetite

The global market for connected wearable medical devices and remote patient monitoring systems is expected grow from US$123 billion in 2015 to US$612 billion by 2024, driven by the adoption of mHealth devices, wearable technologies and the IoT. In 2016, around 259,000 mHealth apps were available through major app stores, and worldwide shipments of wearable devices such as watches, wristbands and clothing are expected to grow by a compound annual growth rate (CAGR) of around 20% by 2020. The industry is beginning to consolidate, and emerging players are focusing upon improved accuracy and lower costs for consumer-focused medical devices. Some devices are targeting achieving clinical-grade quality. Universal adoption becomes possible as sensors and monitoring systems become embedded in everyday objects and industries (telcos, life sciences, manufacturers and health care players) converge.


As digital uptake within the health care system moves from where it is today to digitization of transactions, tasks and processes (translational) and then to more fully integrated and personalized solutions (transformative), expectations are also changing around what can be delivered by technology.

We seek to know more from the digital space and to do a lot more with the information. Strong capabilities exist to capture, analyze and predict from data arising from the “digital crumbs”21 of an individual’s life. Intelligent machines and devices that sense, recognize and learn from signals in the environment enable disparate data about drugs, biophysical attributes, mood and behaviors to be combined. We want to understand, at a deep level, who does what, who responds and, importantly, how can we learn from the data to deliver better care and to engage individuals.

Health is running headlong into the industry, technology, science and social convergence space. The resulting new technologies demystify health care and simplify wellness by solving translational and transformative problems, and open the door to a raft of commercial opportunities previously considered the exclusive preserve of the health care industry.

In the early stages of disruption, the system is chaotic. There is a lot of noise, and a vast range of innovations are emerging and under trial. Not all will add value, remove pain points or give better utility to health professionals and consumers. These will be ultimately abandoned or rethought as learnings emerge. What is new, innovative and demonstrably impactful will eventually become incorporated into the core business of health care.

The digital uptake equation

<table>
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<tr>
<th>Capture, analyze and understand</th>
<th>Tools of connection</th>
<th>Connectivity</th>
<th>Digital uptake</th>
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<tr>
<td>▪ Sensory</td>
<td>▪ Mobile</td>
<td>▪ Enhanced 4G</td>
<td>▪ Mobile devices</td>
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<tr>
<td>▪ Perceptual</td>
<td>▪ Devices</td>
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<td>▪ Locational</td>
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<td>▪ Sensors</td>
<td>▪ E-home</td>
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**Mobile devices**

Increasingly sophisticated capabilities to capture and understand sensory, perceptual and locational information. Even entry-level phones and tablets will soon have biometric technologies, such as ultrasonic fingerprint authentication capabilities,22 that strengthen personal data security and facilitate a vast range of actions from service delivery through to payment.

**Medical-grade wearables**

Wearables such as Bioflux ECG monitor23 and the Phillips biosensor24 that require approval as medical devices25, 26 are emerging. Once approved they will be able to provide clinically relevant and reliable data.

**Cognitive technologies**

Cognitive technologies such as machine learning on mobile devices, even when offline,27 suggest untold possibilities for cognitive behavioral therapies that target psychosocial issues.28-30

**Connectivity**

Enhanced 4G and forthcoming 5G networks31 will enable universality and responsiveness of applications with faster mobility, lower latency and better connectivity. These will support IoT/IoE and health programs that draw upon complex functions such as virtual reality, gamification, robotics, video coaching and the e-Home.
Could health care be “Uberized”? 

The question on everyone's lips is, “could health care be ‘Uberized’ or ‘AirBNB’d’?” Some say yes, and are pursuing their ambitions seeking to develop platforms around transaction and interaction-based networks. Others believe not, that diverse parts of the world, health systems and industry segments, payers and providers will advance quite differently. The disconnected and highly fragmented nature of the health industry points to opportunities to incorporate the power of platform-based transactional and interactive networks and drive industry transformation. Lack of price transparency in health care is an issue that distinguishes it from other industries in which a massive shift has occurred. Tackling this may well open the doors to change, setting up conditions for an information-driven disruptor to emerge unexpectedly and upend health care.
Discontinuity with the past: a curation-navigation-fusion model
Capacity to scale will be the turning point

Enabling technologies form a data-driven foundation for the health industry. The capacity to scale up new care models and settings through integrated pathways will deliver the quantum leap necessary to break with the past. In this section, we discuss a model comprised of several building blocks that structure the ecosystem and may deliver a clear route to achieve scale (Figure 1). We then address three key elements that we consider important in the transition toward an ecosystem.

We envisage an integrated system of interconnected attributes, all needed to operate and exist within an environment as a complex sum of its parts. Participatory health becomes possible through:

Unstructured and structured data feeds

- From personal devices as well as industry-generated information (such as clinical records and payer data) interfacing with curation and navigation technologies

Overall systematization behind the scenes

- Order is imposed on chaotic data through:
  - Cloud-based services, natural language processing, APIs, deep learning intelligence and data aggregation platforms
  - Integration of social determinants of health and behavioral, environmental and social network data
  - Insights based upon meaningful patterns for individuals and populations
Figure 1: Building blocks of a participatory health care ecosystem

**Global aggregators**
- Are formed where there are strong bonds between global players.
- Create a demand-driven marketplace based upon digital platforms delivering network effects, value and benefit.

**Data fusion platforms – the glue that holds the system together**
- Data fusion platforms are the glue that hold the system together. The point at which the curation and navigation data and insights interface in a structured way with the system as AI and analytics turn complex information into usable insights and new solutions.

**Personal health cloud (PHC)**
- Captures and curates a digital bio-portrait of deep personal data, including biometrics, and a lifelong narrative of health and wellness, and behavioral traits, including moods, emotions and propensity to act.

**Curation and navigation technologies**
- Technologies that steer through system complexity, connecting a patient through to diagnosis or treatment via a vast array of channels.

---

Yet to emerge digital underpinnings of ecosystem and engagement

Emerging behind the scenes integration, synthesis, knowledge and predictive

Available now and rapidly evolving

Convergence zone

Curation and navigation technologies

Patient participation zone

Data fusion zone
Building blocks

For individuals, the base is a **personal health and wellness cloud**. Highly sophisticated, this:

- Captures and curates a digital bio-portrait of deep personal data, including biometrics, a lifelong narrative of health and wellness, and behavioral traits, including moods, emotions and the propensity to act.
- Inputs flow from environmental and social sources, including unstructured data feeds from wearables, IoT/loE, remote monitoring, environmental sensors and structured data from clinical information systems and payer portals.
- Utilises multiple channels including mobile devices (phones and tablets), social media and wearables that link the individual to their PHC and to the broader health system.

Curation and navigation: the interface between the consumer and the health care system

Functions as a care navigator or broker with tools that connect and capture, direct and deliver to assist consumers to make choices regarding the services they need and the experiences they prefer. A vital part of the participatory care team, curation and navigation technologies follow clear pathways and coordinated resources to help people make the right decisions regarding their care and to answer the burning questions of “where do I go for help?” and “what do I do next?”

These interfaces can automate many routine tasks and enhance the work of health professionals, freeing them to focus on more complex tasks and interpersonal relationships. Navigation is critical to improved communication and coordination of high-risk patients who typically have multiple chronic conditions and multiple health care providers in a number of settings.

Examples of curation and navigation models include:

- **Solera Health** ([www.soleranetwork.com](http://www.soleranetwork.com)), which connects fragmented disease management programs into an integrated network to better coordinate care for chronic conditions and manage costs.
- **CommunityRx**, a population health improvement program that combines ePrescribing and community engagement, and links patients with local resources and community-based services in a high-poverty urban area in Chicago for health and wellness management.
- **Next IT Health care** ([www.nextithealthcare.com](http://www.nextithealthcare.com)), which uses cognitive-based digital health coaching technologies to support behavior change.

At the health system-level, building blocks are those of:

- **Curation and navigation** connecting and steering a patient through the delivery system (real and virtual) from diagnosis through to treatment and lifelong learning.
- **Data fusion platforms** are the glue that hold the system together. This is where the curation and navigation of data and insights interface in a structured way with the system as AI and analytics turn complex information into usable insights and new solutions.
- **Supra-system** or ecosystem that is made up of strong bonds emerging between global players, with potential for alliances and benefits that trickle down through the system.
Data fusion platforms: the glue that holds the system together

The integration of vast flows of data fused with AI form the backbone of the system where curation/navigation materials meet the health delivery system. Data fusion aggregates volumes of patient data from multiple sources (clinical, financial, social, environmental and operational) delivering insights into care management, risk stratification, performance and care gaps with respect to populations.

Through data mining, learning and predictions from captured data, simple AI delivers an ability to organize, monitor and support a user, generate risk alerts from the data and deliver services. For example:

- Sentrian (www.sentrian.com) is a remote patient intelligence big data predictive analytics platform. It captures and analyzes a patient’s physiological data from a raft of sensors to build personalized disease deterioration models that detect subtle changes or warning signs in an individual’s condition and support clinical decision-making, especially for those at risk for hospital admission.

- HealthReveal (www.healthreveal.com) analyzes incoming data from medical records, claims, wearables/implantables, and directly from patients, to monitor continually high-risk clinical signals and sends diagnostic/treatment information directly to the patient and care team via mobile alerts.

Supra-system: strong bonds between global players

Digital technologies are borderless. As the inflection point is reached and the reduction of fragmentation becomes possible, an overarching supra-system or ecosystem will likely appear. The catalyst to shift to scale will be rising interest from players who see opportunity in a global ecosystem of peer value creation, such as large retailers, venture investors, large integrated networks and global technology companies. Network orchestrators, or “digital platform organizations that leverage a growing and virtual network of suppliers and customers,” will seek to build and manage global networked platforms. A supra-system will draw together dynamic groups of players (traditional and non-traditional) into communities that evolve and change over time, and new models of collaboration and competition will ultimately create value. For example, consider the potential for the “Fab Five” trusted brands of consumer, tech and electronics companies with a global audience to build upon existing platform know-how and forge partnerships with leading health industry players. Partnerships are likely to emerge that blend the technical capabilities of one partner with the service and health care expertise of another. In so doing, global alliances could offer interesting opportunities if they were to get off the ground. New business models will prompt a rethink of talent, culture and organizational forms. To illustrate:

- Finnish multinational communications and information technology company Nokia (www.nokia.com) acquired Withings digital health start-up in 2016. From this base, it intends to build out beyond consumer wearables and devices to advanced sensors, AI and insights arising from large-scale data. A supra-system will draw together dynamic groups of players (traditional and non-traditional) into communities that evolve and change over time, and new models of collaboration and competition will ultimately create value. For example, consider the potential for the “Fab Five” trusted brands of consumer, tech and electronics companies with a global audience to build upon existing platform know-how and forge partnerships with leading health industry players. Partnerships are likely to emerge that blend the technical capabilities of one partner with the service and health care expertise of another. In so doing, global alliances could offer interesting opportunities if they were to get off the ground. New business models will prompt a rethink of talent, culture and organizational forms. To illustrate:

- Babylon Health (www.babylonhealth.com), a subscription remote care provider, is tackling the issue of misdiagnosis in the face of accelerating volumes of health information, testing an app that employs AI speech recognition to check symptoms against a database of diseases and provide advice to physicians. Currently at a very early stage of development, “complex AI” is taking steps toward building intelligent systems that transform massive data sets into action. Personal data, real-world evidence and growing capabilities in perception, sensing, object recognition and language learning through iterative, dynamic modeling are hoped to deliver personalized solutions for individuals and populations eventually. Accuracy will improve over time as systems self-learn, validate and fine-tune. For example:

- Saffron (www.saffrontech.com) is a hybrid of machine learning, AI and advanced analytics. Associative memory technology mimics the way a human brain makes connections and associations. Through organizing structured and unstructured data, Saffron learns, recalls and finds meaningful patterns in the connections between people, places and things.

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It is early days

The curation/navigation marketplace is beginning to emerge through start-ups and new organizations that are driving change. Governments, particularly in the United States through the Office of the National Coordinator for Health Information Technology (ONC), the United Kingdom through the National Health Service (NHS) and Australia through the Digital Health Agency, are setting ambitious digital Health Information Technology (HIT) and consumer-empowerment agendas. Improving access to quality health care is a priority in emerging health care markets and in economies facing extreme pressures through population aging and rising chronic health problems. Some countries are moving to digital platforms as a model for affordable, universal and patient-centric care. For example, when Estonia transitioned to a digital economy after leaving the Soviet bloc, a national e-health system was launched in 2008 that covers electronic health systems, patient portals and e-prescriptions. Telemedicine is under trial in remote areas of South Korea and nationally in Indonesia. Finland is positioning as a leader in digital and personalized health, actively promoting a start-up and venture investment culture with the Vertical Accelerator and exporting health technology through the Digital Hospital program. Japan is pursuing a portable personal health information system via cloud computing, and Portugal is implementing a nationwide telemedicine and telemonitoring program across the national health system.

"Creating a connected health ecosystem will establish structure, priorities and collaboration to truly advance the market, leading to a more cohesive and successful endeavor, eliminating the 'noise' and focusing on winning ideas and services."

Joseph Kvedar, MD Vice President, Connected Health, Partners Health Care

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The courage to lead: Mercy Virtual, a virtual care center first

The US$54 million Mercy Virtual Care Center, the world’s first virtual care center, opened in October 2015 in Chesterfield, MO. With no beds and no on-site patients, it’s a virtual facility connecting patients to the care they need 24/7, 365 days a year. A team of medical and health professionals, along with leading-edge telemedicine technologies, is housed in the four-story, 125,000m² building. Dr. Randy Moore, president of Mercy Virtual, spoke with EY about the innovative and forward-leaning medical care.

The facility is bed-free and technology-rich, with clinicians treating patients remotely, monitoring vital signs and health status and providing expert advice to patients and health professionals alike. Currently keeping an eye on care to patients at 34 hospitals in six states, Mercy Virtual supports and cares for people in their local communities. While virtual care reduces travel costs and inconveniences for patients, Mercy Virtual is focused on identifying a person’s medical needs earlier, reducing hospitalizations and keeping people healthier.

Mercy Virtual is improving quality of life and delivering a better care experience for the patient, which is paramount. As Moore notes, “We’re treating the sickest patients with the highest needs. They’re engaged, they’re getting care and their quality of life is much better.”

And the concept is working. For Mercy Virtual’s Engagement @Home patients, it has meant a 50% reduction in hospital admissions and emergency room use. Besides a 98% satisfaction by patients, staff too have experienced lower stress levels. Clinical teams have accurate data and the right decision-support tools at their fingertips. “We are reaching more patients in more places, providing care where and when they need it most,” said Dr. Moore. “In the past year alone, Mercy Virtual has served more than half a million people.”

The result of 10 years of hard work and a US$300 million investment is paying off with reduced costs and healthier patients. Insights gained inform future care and financial models to develop and extend the reach of the virtual care platform. Mercy Virtual is keen to partner with others, sharing what they know with a firm belief that transforming the entire health care process lies at the core of their strategy to optimize health seamlessly.

“Creating a connected health ecosystem will establish structure, priorities and collaboration to truly advance the market, leading to a more cohesive and successful endeavor, eliminating the ‘noise’ and focusing on winning ideas and services.”

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We have shown the transformative power of virtual care.”

Randy Moore, MD, MBA

Mercy Virtual Care Centre can be found at https://www.mercyvirtual.net/.
Getting to business as usual – system transformation

Breaking out of old models requires a new way of thinking
To change course, many things need to be in place, and where the stimulus for health system transformation will arise – whether through consumers, government, private sector or public-private partnerships – is not yet evident. Moore (2014), discussing new technology adoption in mainstream markets, suggests that the key to system transformation is leadership commitment and intention as a matter of political and economic will. As Andrew Thompson from Proteus Digital Health explained, “Someone has to decide it’s a priority and it’s what they’re going to get done. At some point, they decide we’re going to enable consumers to access health care using mobile devices and … to create legal and regulatory and other policy structures to make that happen. The Japanese Government (for example), has said they’re going to build a secure foundation and they want the entire industry to run off it. It appears that there is going to be an emerging set of policy, regulatory and economic factors in that country that mean they coalesce around digital services and health care reasonably quickly.”

The health industry is often noted as slow to adopt technological change. Consumers are more agile, and many already take advantage of changes in information flows as the internet and social networks become trusted sources of information and personal support. Conditions exist to benefit from the best of what technology can offer – a mass market enabled by mobility, enhanced 4G/forthcoming 5G telecommunications and cloud storage underpinned by integrative platforms.

Emerging technologies will not necessarily arise from within health care: blockchain

Initially developed as a way of validating and relaying financial transactions, blockchain offers considerable potential for use in health care.

Blockchain is a distributed framework that could support the integration of health care information at scale, across organizations and across time. Pseudonymous accounts would allow individuals to control their own data and privacy settings while providing de-identified rich standardized data sets for research and population health. Analytical tools and AI capabilities could deliver solutions for personal health management, patient engagement programs and virtual health systems beyond organizational boundaries.

While not a perfect solution and not a substitute for an enterprise system, blockchain may offer promising solutions to address medical records interoperability, identity verification, data standardization, protection and scalability.

Vian, Voto and Haynes-Sanstead, A Blockchain Profile for Medicaid Applicants and Recipients, 2016.

Three key elements that we consider important to system transition are:

1. Capitalizing on the advantages of technologies
2. Empowering platforms that combine technologies, people and processes
3. Cultural shifts that enable the system to transition toward an ecosystem
Shift 1: Putting technology to work

The right infrastructure

Core infrastructure needs include:

- Access (broadband, cloud service technologies and security)
- Affordability, mobility and connectivity (device ownership and subscriptions; 4G/5G connectivity)
- Consumer skills and readiness
- Enabling regulatory and innovation environments

Global locations will have some various combinations of these, and several indices track the overlay between infrastructure and health system readiness (Figure 2). For example, the United Kingdom intends to be paperless by 2020 and to develop local area digital health road maps that improve digital technology strategy. In the United States, the Connect2Health project maps broadband connectivity, deployment and subscribership to metrics of health status, physician access and prevalence of chronic conditions in urban and rural areas.

Figure 2. State of readiness: 12 countries' capabilities to benefit from information technology

Information technology state of readiness: selected countries
The right environment

Participatory health of the future may well occur across national boundaries and clinical interest areas. Safeguards arise from regulatory, financial and policy environments that define and set the future course of creating a technologically rich environment. Regulations can and do change, particularly when driven by public benefit and consumer demand – Uber, for example, has rewritten the transport industry regulatory handbook.

Scaling and sustaining participatory health models that deliver optimal health and health care for individuals and communities will require attention to:

- User-centered design
- Supporting mission-critical activities, including safe/secure capture and sense-making of unstructured patient-generated data and structured system data (providers, payers) for shared decision-making, clinician use and patient information

The right information

Mobile devices are key tools with capabilities to capture data, interface and connect via platforms, are cloud based and require no specialized knowledge or skills. They represent a key first step in personal sensors that sit alongside everyday life. They become the invisible hand guiding an individual, removing complexity from participation and self-management, and bring functions to capture and understand sensory, perceptual and locational information. Health literacy, or the ability to understand health and medical information sufficiently well enough to make informed decisions, is foundational to engaging individuals. Evidence suggests that better understanding health and medical information leads to improved outcomes as individuals gain skills and confidence in managing their health and care.\(^5\)\(^2\) Solutions include health-literate organizations that support people to navigate, understand and use information and services,\(^5\)\(^3\) improved accessibility and platform design,\(^5\)\(^4\), \(^5\)\(^5\) and early intervention. Vivo (www.vivoclass.com.au), for example, has embraced this through creating a learning platform, targeting children at school. It has built the fundamentals of health knowledge and learning into the digital future for wellness in youth. Incentives are used to influence and reward behavior shifts.

The five Cs of information are:

- **Capacity**
  To improve outcomes, reduce costs and variations, and enhance user experience and convenience

- **Capabilities**
  Underlying technological and connectivity infrastructure and clinically acceptable capabilities that form the backbone of the system

- **Coherence**
  Fit with health care system - alignment, complementarity and coexistence with existing system

- **Clinical**
  Achieve clinical, operational, consumer, investor and policy outcomes

- **Commercial**
  Meet macro-environment demand for customizable, scalable disruptive business systems and new models, and predictive and prospective analytics and AI that deliver value for money
Shift 2: Platforms: the architecture of transformation

Platforms create new pathways by which to organize and deliver health care. The idea of a platform is a familiar one — something that can capture, organize, scale and automate. A platform is a layer of infrastructure upon which other applications and technologies can be built. As a vehicle that brings parties together for exchange through sharing, collaboration and competition, platforms can fulfil functions where exchange becomes the basis of value to the participants: whether that be trade of goods and services (such as online marketplaces), exchange of information and interactions (such as crowdsourcing solutions to complex diagnostic problems) or resources brokerage (such as accommodation rentals).

Network effects

One of the strengths of platforms lies in generating a network effect or demand-side economies of scale – the more people who join and use them, the greater the benefit. This is a shift from a linear arrangement of inputs and outputs to an ecosystem that creates value exchange between members. This is evident in peer-to-peer systems such as social networking sites and in shared resources networks for patients such as PatientsLikeMe (www.patientslikeme.com) and SmartPatients (www.smartpatients.com) and Patientory (www.patientory.com), an app that store and manage personal medical information and, through a platform, connects individuals who have shared interests and enables care teams to manage a patient's care across multiple locations. Consumers can actively source comparative information, support and navigation. Aggregation platforms or comparison sites such as Why Not The Best (www.whynotthebest.com) and Castlight Health (www.castlighthealth.com) enable consumers to compare prices, products and performance of insurers and hospitals. Health& (www.healthand.com.au) consolidates an individual's health records in the one place, providing evidence-based clinical information and a personalized risk-driven dashboard.

Platforms
Systematize and organize

Other strengths of platforms lie in the capacity to systematize and organize around (or to create) an ecosystem. In addition to platform technologies, success to reach scale depends upon key attributes of:

- Good governance
- Valued partnerships
- Codes of conduct
- A facilitatory regulatory landscape

Disruptions become possible due to reduced barriers to entry for new entrants and low investment costs as those entering build upon what has gone before. New business opportunities arise through the capture and monetization of vast amounts of data. Health care organizations and entrepreneurs recognize value in consolidating and controlling ensuing data sets and in deep analytics that optimize information sharing and system-wide coordination, and help deliver cost benefits.

Validic (www.validic.com), for example, provides a “one-to-many” connection between patient-recorded data from health applications, clinical and remote-monitoring devices, fitness equipment, sensors and wearables to key health care companies. The consolidated data supports better patient engagement, population health management and efficient care coordination. And Fitbit (www.fitbit.com), the consumer fitness device maker, has signaled its ambition to become a digital health platform across the health system.56

For many, competitive advantage will arise in developing innovative solutions and services, as well as growing consumer relationships, preferences and brand loyalty. As health care platforms continue to evolve and mature, they deliver the foundations to re-envision entirely how health care is delivered. Issues around privacy, enterprise risk, cybersecurity, regulatory challenges, resolving resistance to data sharing and achieving coordination across platforms will all impact the evolution of platforms.
Shift 3: The transformation journey

Pressure from patients or consumers who want a “voice” and “choice” will likely drive industry change toward a participatory health system. This comes about as people expect in health care what they have in other areas of their lives—autonomy, connectivity, immediacy and tools for self-direction. Consumerism trumps culture. It will be a critical lever of change in an industry resistant to technological transformation.

New entrants emerge as the industry transitions to an environment that is online, networked, participatory and integrative. But this shift also breathes life into incumbents willing to redevelop their core business or move into adjacent areas. Critical to the move toward care in the home and community (such as health care homes) will be the degree to which stakeholders (professionals, consumers, policy-makers, payers and the public) and organizations embrace a participatory health system. This will require a deep understanding of the benefits that participatory health brings along with shifts in the economic, behavioral and motivational factors that determine and shape how performance is recognized and rewarded. Highly fragmented and with many vested interests, the industry needs to quicken its pace to keep abreast with the changes occurring outside of traditional legacy structures as what was once disruptive becomes the norm.

Reaching an adoption threshold capable of achieving and sustaining a growing segment is vital. Sensors such as accelerometers are a good case in point. The technology is increasingly sophisticated and cheaper. Consumer adoption of wearables is rising (although recent studies suggest abandonment rates of around 30%) and some health professionals incorporate them into treatment plans. But the shift to scale to effect positive behavior change, and health and wellness management options at the population level, remains elusive. Broad adoption is only likely when these products transition into cheap and readily available tools that are integrated into daily life. As Associate Professor Alain Labrique, founding Director of the Johns Hopkins University Global mHealth Initiative, told us, the need for improvements in functionality and accuracy, along with a lower price point, will be necessary to shift the market to mass adoption.

This shift challenges long-held assumptions and routines requiring changes across organizational and professional boundaries. To achieve scale means:

- Meeting consumer expectations for technologically enabled care that is mobile and connected and as new generations of clinicians turn to mobile devices, decision support, cognitive assistants and diagnostic support (see below and see young professional pulse survey results)
- Dealing with service design, payment and performance management issues that encourage and support the delivery of participatory health care
- Attending to clinical, regulatory, safety, risk and privacy concerns, and organizational and cultural transformation
- Understanding and addressing the dynamics of complex change and innovation adoption (for example, persuading health professionals to change the long-held ways of interacting with consumers, and the ownership and sharing of information and expert knowledge)57, 59, 60
- User-centered design should form the basis for creation of integrated service models based on consumer engagement to drive an individual’s health

Health care open to change

62% of health professionals surveyed believe that health apps will encourage patients to take more responsibility for their health.
59% of health professionals surveyed use smartphone technology to access medical research.
46% of health care professionals surveyed say that they will introduce mobile apps to their practice in the next five years.
72% of United States consumers interested in virtual care as alternative to in office doctor visit for non-urgent care.
>74% greater convenience

Source: Research Now. 2015.

46% of consumers who search online for health information act directly upon the information they find.


20% of consumers would switch to a Primary Care Provider (PCP) who offered video visits.

Source: American Well Telehealth Index 2017 Consumer Survey.
Participatory health: taking the pulse of young professionals’ survey

Engaged, empowered and digitally active

Young professionals clearly see for themselves an active role in managing their own health and wellness in partnership with their health professional. Engagement, self-management and accepting personal responsibility for their own health is important to them.

Inevitably online

Use of virtual resources is high. In the past year:

- 73% turned online for general research and information on health issues.
- 49% sought information for diagnostic purposes for themselves or another.
- 24% used internet research to develop questions to ask during their most recent appointment with a health professional.

Digital tools and technologies would help an individual better manage and coordinate their health care. The most helpful tools are (all data reflects ratings of extremely helpful or helpful)

- 81% Access to test results in understandable formats
- 77% Digital tools (e.g., reminders and self-management programs)
- 73% Secure phone apps to store personal records and data

Changing models of health care

Open to non-traditional care models, young professionals are highly receptive to non-urgent care in alternative locations, such as pharmacies or department stores, and by health professionals other than physicians. However, for urgent and emergency care, preferences are evenly divided between new emerging care models and preference for physician-provided care.

<table>
<thead>
<tr>
<th>Strongly agree/agree</th>
<th>To what extent do the following statements accurately reflect your views?</th>
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<tbody>
<tr>
<td></td>
<td>I am willing to ...</td>
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<td></td>
<td>(Five-point rating scale)</td>
</tr>
<tr>
<td></td>
<td>Strongly agree/disagree</td>
</tr>
<tr>
<td></td>
<td>Be treated by a health professional (e.g., registered nurse, physician assistant or pharmacist) instead of a doctor for minor/non-urgent health problems, vaccinations and basic health screenings (e.g., blood pressure, blood sugar or weight)</td>
</tr>
<tr>
<td></td>
<td>Have non-urgent treatment, vaccinations and health screenings (blood pressure, blood sugar or weight) by a health professional (e.g., registered nurse or pharmacist) at a retail pharmacy or in a facility located in a department store</td>
</tr>
<tr>
<td></td>
<td>Be treated by a health professional (e.g., registered nurse, physician assistant or ambulance officer) instead of a doctor at an emergency department in a hospital</td>
</tr>
<tr>
<td></td>
<td>Be treated by a health professional (e.g., registered nurse, physician assistant or pharmacist) instead of a doctor for urgent or complex health problems or screening procedures</td>
</tr>
</tbody>
</table>

In early 2017, EY took a snapshot of young professionals’ views of participatory health and the future of health care. A convenience sample of 267 respondents in nine countries, respondents were male (47%) and female (53%) and aged between 21 and 35 years. More information about the survey can be found in the “Methodology” section later in this report.

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The next five years will bring big changes. The future of the health industry lies in digital and mobile solutions, consumer influence and engagement, and non-traditional players and locations. Health broadens to wellness, as well as dealing with chronic conditions and population health.

<table>
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<tr>
<th></th>
<th>Very likely/likely</th>
<th>Unlikely/very unlikely</th>
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<tbody>
<tr>
<td>Digital, mobile and social solutions give patients the knowledge, skills and confidence to engage persistently with the health system.</td>
<td>71%</td>
<td>5%</td>
</tr>
<tr>
<td>Individuals will use apps and social media for health-related information and support in preference to the formal health care system.</td>
<td>68%</td>
<td>10%</td>
</tr>
<tr>
<td>The location of care will shift beyond the four walls of the clinic to care anywhere and anytime in the home and community.</td>
<td>64%</td>
<td>9%</td>
</tr>
<tr>
<td>Non-traditional players – entrepreneurs, retailers, telecommunications and technology companies – will develop consumer-orientated services that compete with existing systems.</td>
<td>64%</td>
<td>6%</td>
</tr>
<tr>
<td>The concept of health will transition from sick care systems to wellness, chronic care and population health management.</td>
<td>62%</td>
<td>13%</td>
</tr>
<tr>
<td>Consumer opinion through crowd-sharing of experiences, ratings and reviews will become an important influence on improving system performance.</td>
<td>62%</td>
<td>11%</td>
</tr>
<tr>
<td>Connected health will become the norm as clinical telemedicine and consumer-oriented personal health technologies combine and create new ways to deliver care.</td>
<td>59%</td>
<td>14%</td>
</tr>
<tr>
<td>Individuals will manage their own PHC of personal data feeds, e.g., from wearables, IoT or remote monitoring.</td>
<td>58%</td>
<td>17%</td>
</tr>
<tr>
<td>Primary care as we know it will change fundamentally as integrated care teams form around a patient-centered medical home supporting chronic and complex health conditions.</td>
<td>57%</td>
<td>14%</td>
</tr>
<tr>
<td>Consumer demands for a “voice” and “choice” will ultimately force the health system to refocus around consumers.</td>
<td>51%</td>
<td>12%</td>
</tr>
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**Could health care be “Uberized”?**

More than half consider health care in their country likely to shift to on-demand services.

- **Very likely/likely**: 56%
- **Neutral**: 27%
- **Unlikely/very unlikely**: 16%
Primary care transitions to chronic care and population health

The primary care model is transitioning toward chronic disease and population health management, drawing upon curation, navigation and integration technologies and team-based care. Personal data fusion in the individual’s cloud will supplant electronic health records that have failed to deliver utility.

Two possible scenarios emerge:

- “Cradle to grave” care within an integrated system with the generalist physician as navigator, guiding patients through understanding complex information and deciding upon a course of action
- Availability of multiple service options as determined by the market, with integration occurring behind the scenes through personal data fusion in the cloud

Advanced communications and virtual care models support care at a distance and reduce the need for in-person visits. Population health and value-based care models are supported with AI and data analytics that predict risk and support highly personalized care. Analytics platforms that can continually examine and analyze multimillions of items of sensor data and clinical and medical history information will underpin remote patient monitoring and, ultimately, population health.

- **Forward** is a primary care service membership model (US$149 per month) based in San Francisco that provides members with access to physicians, data-driven technology, AI, wearable sensors and 24/7 mobile access via an app. Initial in-person baseline is captured through a body scanner, blood tests and genetic testing, which are used to develop a blueprint for future health and wellness. AI analytics of baseline data and real-time data from phone and devices sensors is used by the medical care team to reach out to the individual via the mobile app with alerts or monitoring progress.
  > www.goforward.com

- **Medalogix** assists home health clinicians by analyzing home health and clinical data with predictive analytics to identify patient risk, predict and resolve issues that may lead to unnecessary hospitalizations, and provide value-based care. Three main types of predictive services target patients at high risk of readmission; provide prospective identification of patients who will likely benefit from hospice care and assists clinicians with managing home health care; and finally, predict which patients will need post-discharge care and assistance and customized care management plans, including monitoring tools, calling prompts and schedule.
  > www.medalogix.com

- The IoHT is changing the face of primary care through such things as home monitoring (for example, the Withings wireless blood pressure monitor), medication management (for example, the AdhereTech wireless pill bottle) and early intervention (for example, Omada Health chronic diseases programs).
  > www.withings.com
  > www.adheretech.com
  > www.omadahealth.com
Creating a cadence for change

“What is the burning platform event where people will say, ‘OMG, we have to change health care?’”

Joseph Kvedar, MD Vice President, Connected Health, Partners Health care

The digital revolution in health care described by Eric Topol offers untold opportunities to deliver care and connect with consumers in unique ways. In this paper, we have sought to understand the changes necessary to embed a participatory ecosystem within the core business of health care – something that we believe is inevitable as technologies mature, disruptive solutions succeed and health systems become participatory.

This paper has canvassed an early stage transformation. The pathway to a participatory health system is under construction as we move past the digitization of everyday practices and tasks toward a future of health care that is personalized, predictive and better value for money. Solutions are emerging that address the many governance, regulatory, social and ethical questions that arise. Gaining public and clinician trust, particularly around the safety, validity and integrity of devices, AI and continual and unobtrusive monitoring is of the utmost importance. Also critical is gaining and sustaining consumer engagement. As one executive noted, “Most people don't actually want to think about their health care on a routine basis, and that's one of the fundamental barriers to truly engaging the consumers”. With information comes power and responsibility – for consumers, a transition to a participatory health system will bring both.

Listening to the leading industry executives speak about the future of the health care industry has been illuminating. Industry transformation will be built upon innovations that truly make health care simpler and seamless – especially innovations developed around the devices of daily life and mobile phones. Disruptive technology-based responses that drive patient engagement through participation and curation of their health and wellness experience, deliver population health outcomes and deal with the burning issue of costs are paramount.

Concerns around purpose and payment were voiced, especially how to benefit from the opportunities afforded by participatory care and, at the same time, avoid increasing health inequities. Data fusion ecosystems that capture and make sense of massive data flows and platforms that glue the multipiece jigsaw that is a health care system together are vital. As are shifts in industry culture and in how we conceive and think about health and wellness in a globalizing and interconnected environment.

Geopolitical differences and the absence of expensive infrastructure may well see emerging and developing economies take advantage of advanced technologies and promising platforms to leapfrog into a participatory health care model.

In our first paper, we concluded that opportunities emerge at the intersection of consumerism, technology and markets for those willing to explore beyond their traditional boundaries. Our views have not changed – the convergence dynamic continues apace. Health care will need to reconfigure to reach its digital potential. (Figure 3) There will be growing pains, and the big issue will be that of the “last mile” – persuading consumers, health professionals and those charged with governance and stewardship to adjust business, clinical, and regulatory processes around the new technologies and participatory care models. How a shift to participatory health might be financed will be addressed in the third paper in this series.

To avoid being on the wrong side of an emerging and disruptive trend, health industry players need to recognize that preserving the status quo is no longer an option. It is timely to be bold. Even highly conservative estimates suggest that considerable health expenditures may be wasted and potentially available for redirection. We ask: what if even a small proportion of this money was directed toward creating a participatory health care system?
Figure 3. The patient journey in different health care ecosystems: opportunities exist to address the wellness gap and resources deployment.
Our view

Some will lead and others follow but, in a forward-leaning world, three things to consider are:

1. Consumerism and technological change are the twin dynamics of disruption in health care

Maturing health care consumerism and changing technologies are a powerful combination. Leveraging the power of the crowd through technology (such as crowdsourcing and social networks) will likely be an effective force for change. Changes in consumer expectations and new patterns in consumer behavior will arise from and be shaped by such networks and platforms, and will ultimately be a key lever pushing the health system to adapt. This will require a clear appreciation of the market and where disruption is most likely — whether this is upcoming generations caring for aging family members, baby boomers vigorously redefining their future or a newly formed health care system in an emerging/developing economy.

2. Convergence between science, social, technology and industry demands a rethink of business models

Convergence opens the doors to new opportunities. A shift in mindset requires core capabilities in partnering to operate and thrive in the new environment of partnerships, alliances, new locations and consumerist orientation, and identifying innovative ways to capture value. A new ecosystem brings a new set of players with opportunity to leverage expertise in adjacent spaces such as financial services, manufacturing and insurance.

3. When system-ready, health care will deliver affordable, accessible total health

Future success depends on the system-readiness of the health industry. In the future state, individuals will access care regardless of geography through teleconnected services, and the core business of health care will be anchored around virtual delivery, consumer engagement, and an integrative and long-term orientation. Platforms are key to new pathways by which organizing and delivering health care and a broad ecosystem of many players becomes possible, including virtual care centers, smart homes, smart hospitals, smart technologies on and in-person the person and smart insurers. Payment models, performance incentives, industry structure and staffing systems require redesign to account for new models of care and changing roles and responsibilities. New approaches in future services demand different talents, including data scientists, creative designers and behavioral economists.
Methodology

This paper draws upon conversations held with health industry leaders in the United States, Europe, Southeast Asia and Australia.

Executives from government and regulatory bodies, academic institutions, providers, payers, entrepreneurs and consumer groups were interviewed between September 2016 and January 2017. Views around participatory health and the shift to a digital health care system were discussed, including likely time horizons and anticipated impact upon the health care industry. We also spoke with our global health care industry professionals, and reviewed relevant academic and industry literature, and conducted an exploratory survey that took the pulse of professional young adults views on virtual health.

Participatory health: taking the pulse of young professionals’ survey

An online pulse survey was conducted in February 2017 of a convenience sample of young professionals located in nine countries. The 267 respondents were aged between 21 to 25 (27%), 26 to 30 (41%) and 31 to 35 (31%) years. Respondents were male (47%) and female (53%). Countries of residence included Australia (10%), Canada (16%), Indonesia (10%), Japan (12%), Malaysia (12%), New Zealand (7%), Singapore (14%), the United Kingdom (11%) and the United States (9%). The majority of respondents report that they are in excellent or good health. Around half use the health care system on an occasional basis for minor illnesses such as colds/flu, 17% are regular users of the health care system for a chronic condition or long-term injury and illness and 24% say they have no real need to use the health care system at this stage in their life.

Ten questions were asked exploring respondents’ views on participatory health, use of online digital tools for health care purposes for themselves or another, views on privacy and security of personal information, interest in new service delivery models and views about the future of health care in their country.
Thank you
to the industry executives who shared their thoughts and insights with EY in the interviews for this study.

**Disclaimer**
The examples included in this report are not endorsements of any organization, service or product, but are illustrations that suggest that the shift toward a digital health ecosystem is already well underway.
Endnotes


Endnotes


Endnotes


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Guest commentary: Why healthcare needs to hire more robots

Jon Powell, left, is the Health People Advisory Leader at Ernst & Young and Chris Massouras is the Robotic Process Automation Health Advisory Leader at Ernst & Young, both based in Chicago.

By Jon Powell and Chris Massouras

In the transition to value-based care, talent management is critical. It is equally as important as cost, quality and patient experience. But one of the biggest challenges facing health organizations is employee disengagement or burnout while trying to satisfy all the demands that come with population health, value-based reimbursement, patient centricity and changing compensation models.

However, technology gives us a solution. Many of the most glaring pain points in healthcare talent management can be solved by taking robotic tasks out of human job responsibilities. This is done through the support and automation of activities that capture and move data.

Robotics process automation (RPA) is about to transform the way people work in healthcare. RPA is a software solution that mimics work done by humans, but operates in the background, completely invisible to patients. For example, RPA can replicate the work that a claims agent performs by moving from one application to the next, gathering and making decisions based on the data accumulated. It can also perform clinical-related tasks, such as using outputs from health monitoring devices to update electronic health records. Essentially, RPA allows any type of routine, rule-based work to be performed by a robot and allows that robot to mimic the interaction with systems, applications and data (and sometimes even people) in the same manner as a human employee.

Think of the possibilities across the revenue cycle—connecting with insurance companies, addressing updates to provider information, and clearing a patient
financially for a procedure. In this last example, the robot would look up a procedure code, compare it to the procedure code for the patient's insurance policy, and make a rules-based “judgment” about whether there is a match. This is a routine and time-consuming task that is currently performed by people but could easily be performed by a robot.

A robot could read though thousands of medical records, look for missing information, then obtain the missing data from another system without getting bored, tired or making any mistakes. Furthermore, a robot can work 24/7, perform the work faster, and complete this mind-numbing work for less than the human cost of payroll.

But the movement to automation isn't solely about managing costs, as some critics argue. Most importantly, it is about redeploying human resources to higher-value activities. Robots allow clinical staff to avoid mindless data entry tasks, spend more time with patients, and work at the top of their licensing. Consider the effect on morale and talent retention. Employees across your organization will be more effective and more engaged when frustrating, mundane tasks are no longer part of their job descriptions. They can then focus on high-value-added tasks that require thinking, creativity, human touch and sophisticated judgment.

Another benefit is a reduction in basic medical errors, and the potential for avoiding patient harm. Pretend, for example, a patient is transferring from one health system to another. The systems' computers don't talk to each other, so information such as medical records, chart information and medication history must be manually entered into the receiving facility's computer system. Each time this is done, it creates an opportunity for errors. It's easy to see where a drug interaction could be missed, or the wrong dosage could be applied to an order. But when a computer robot handles data entry between disparate systems, errors are avoided, the information is entered faster, and a human worker is freed up to perform other duties. Machines certainly aren't infallible, but when designed right and programmed correctly, they're highly reliable.

Of course, cost savings are part of the equation. In addition to the staffing efficiencies that are created, savings are achieved by avoiding errors, corrections and rework. Recruiting, onboarding and attrition costs are saved as well. Quality increases when mistakes are avoided, and the patient experience improves when the "routine" parts of the health system operate efficiently, smoothly and mistake-free.

In the new era of value driven care, the most successful organizations will be those that can attract and retain the best employees by helping them work at the top of their capabilities. This will be best achieved when the robotic tasks in healthcare are left to the robots.

**Article links**
