



**PHILIPS**

Future Health Index

U.S. analysis

**Breaking the cycle  
of reactive healthcare:  
Analysis of the U.S.  
Future Health Index results**

## **About Royal Philips**

Royal Philips (NYSE: PHG, AEX: PHIA) is a leading health technology company focused on improving people's health and enabling better outcomes across the health continuum from healthy living and prevention, to diagnosis, treatment and home care. Philips leverages advanced technology and deep clinical and consumer insights to deliver integrated solutions. The company is a leader in diagnostic imaging, image-guided therapy, patient monitoring and health informatics, as well as in consumer health and home care. Headquartered in the Netherlands, Philips' health technology portfolio generated 2015 sales of EUR 16.8 billion and employs approximately 69,000 employees with sales and services in more than 100 countries.

## **About the Future Health Index**

In partnership with an independent global market research firm, a survey was fielded from February 24, 2016 to April 8, 2016 in 13 countries (Australia, Brazil, China, France, Germany, Japan, The Netherlands, Singapore, South Africa, Sweden, UAE, U.K. and U.S.) in their native language. The survey had an average length of 25-30 minutes. In the U.S., 2,006 patients and 209 healthcare providers were surveyed online. At the 95% confidence level, the margin of error for the patient sample in the U.S. is +/- 2.2% and estimated margin of error for the healthcare provider sample is +/- 6.9%.

## **About the Institute for the Future**

The Institute for the Future (IFTF) is an independent, nonprofit strategic research group with almost fifty years of forecasting experience. The core of our work is identifying emerging discontinuities that will transform global society and the global marketplace. We provide organizations with insights into business strategy, design process, innovation, and social dilemmas. Our research spans a broad territory of deeply transformative trends, from health and healthcare to technology, the workplace, and human identity. IFTF is based in Palo Alto, California.

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# Introduction

By 2030, more than 20 percent of US residents will be sixty-five years of age or older, compared with 13 percent in 2010.<sup>1</sup> An aging population, while often characterized by the set of challenges it creates, is in fact one of the most important achievements of the twentieth century. The current average life expectancy of almost eighty years reflects the success of a powerful combination of public health, education, employment, and biomedical interventions.

So while we should relish the achievement of extending the life span for most residents of the United States, we now face a pressing challenge for the twenty-first century: **How do we ensure we not only live longer but also live well?**

Four out of five Americans age fifty or older suffer from at least one chronic health condition.<sup>2</sup> In fact, the rise of chronic conditions is so dramatic that it threatens to erase the progress made in the last century in increasing life expectancy. Researchers now express concern that we are approaching a tipping point where “the medical advances that have boosted life expectancy for so long can no longer keep pace with the many illnesses people are collecting as they age.”<sup>3</sup>

Equally troubling, the prevalence of chronic conditions can have a significant and adverse impact on quality of life. Biomedical treatments may reduce or even prevent a particular disease from progressing, but without increased focus on improving daily life, regardless of an individual’s health status or illness diagnosis, many will not be able to enjoy fully the years that have been added to their life span.

Of paramount importance to improving the length and quality of life for US residents is to find ways to break today’s healthcare cycle of reactive treatment. Both healthcare providers and patients want to disrupt the current pattern of engaging with one another only once symptoms are present. They are looking to build meaningful and sustaining relationships with one another through modernizing how they connect. Providers and patients alike would also benefit if the links were improved between healthcare services and information on the one hand and all the other services and information sources in people’s lives.

Recently, leaders have begun to explore how harnessing digital health technologies might accelerate the shift from a reactive healthcare cycle toward a proactive, team-based approach to preserving, promoting, and restoring health. Informed by two key drivers—a need to do more with less in healthcare and the growing adoption of digital health devices and services in clinical and personal care—the next decade for healthcare will include a heightened focus on finding meaningful applications for these new technologies to improve the quality of life for all Americans, regardless of their health status.

If we're to use connected technology to help break the cycle of reactive treatment, we need to understand the attitudes and preferences of both healthcare professionals and patients. Responding only to the views of healthcare professionals, we may improve healthcare delivery, but without understanding the needs and preferences of patients, we will not improve the overall care experience and will fall short of improving their quality of life. Only by evaluating how both groups define and understand access, integration, and application of digital technologies can leaders take meaningful action to optimize the patient-provider relationship.

This report, *Breaking the Cycle of Reactive Healthcare*, explores present-day views of patients and providers about healthcare access, health system integration, and adoption of new technologies. In addition, it invites readers to consider external forces that may change what access, integration, and new technologies look like over the next decade and may consequently reshape the opinions and attitudes of patients and providers.

Thinking more purposefully about the future and exploring a wider range of needs and preferences in healthcare will improve the ability of leaders and policy makers to break the cycle of reactive treatment. **The ultimate goal is to design a healthcare system and engage patients in ways that help to ensure our healthspan<sup>4</sup> matches our life span.**

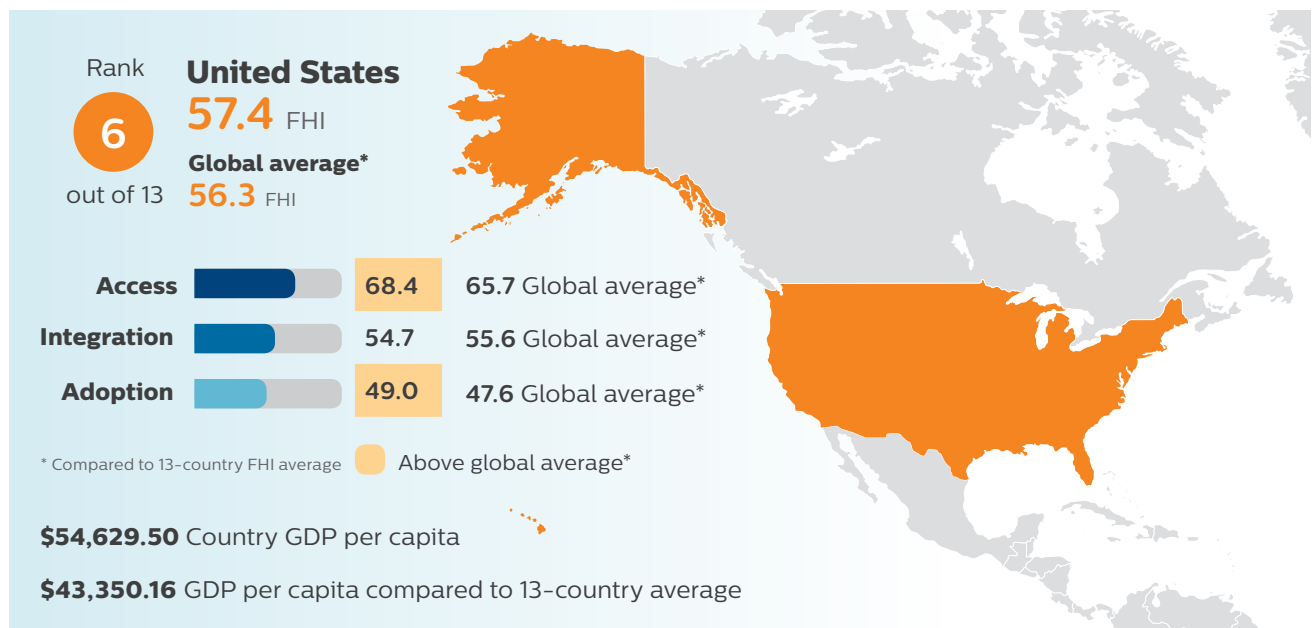
# Views on access, integration, and technology adoption today

Historically, measurements around access, integration, and technology adoption have taken a provider-centered view of healthcare. Access is often defined by the quantity and distribution of healthcare professionals and clinical care establishments; integration is judged by how well different entities in the healthcare system communicate and align; and technology adoption is assessed by examining the technological investments, practices, and know-how of healthcare professionals. Equally important, however, is viewing these three elements through the lens of patients or consumers of healthcare services.

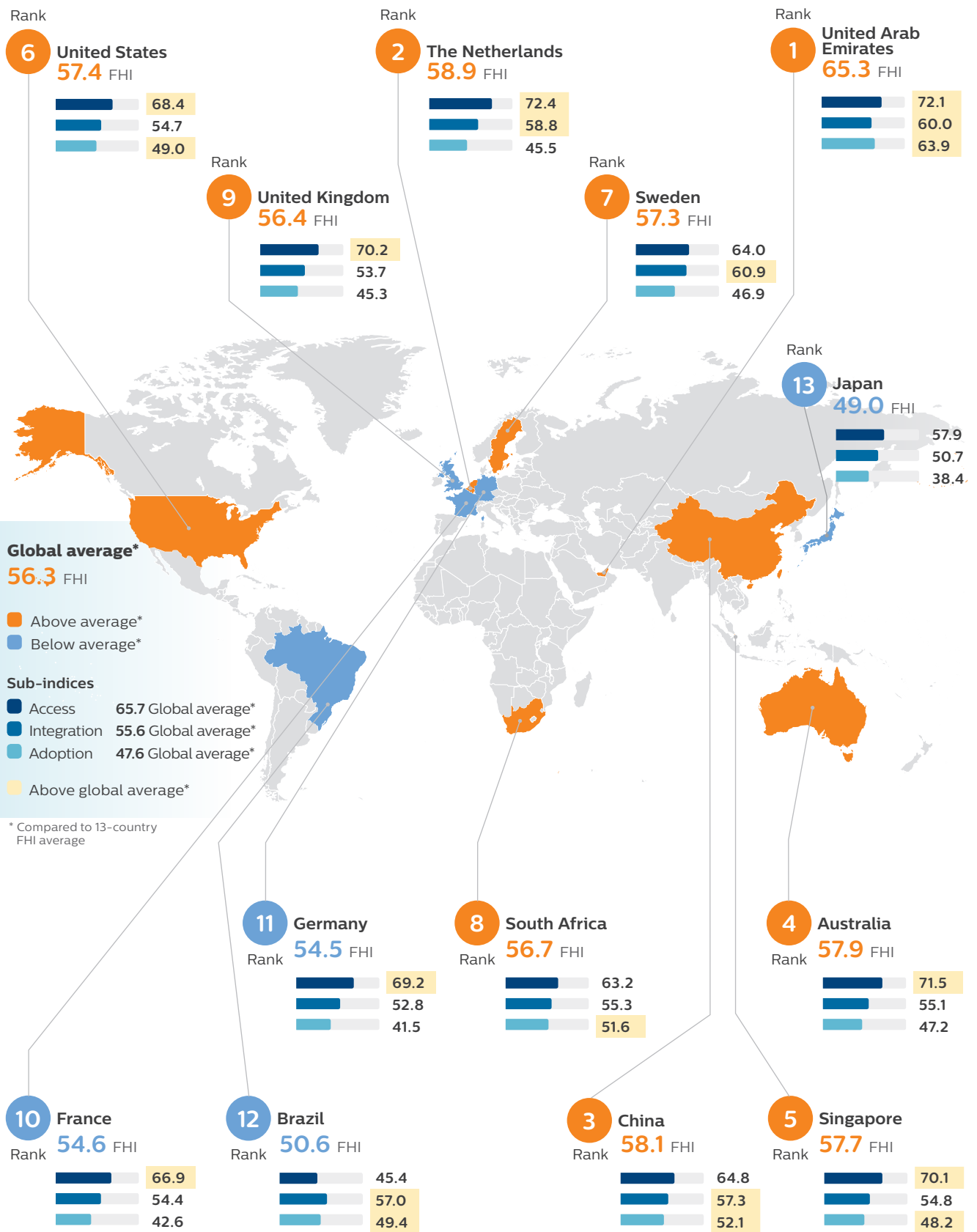
The 2016 Future Health Index (FHI) developed by Royal Philips relies on data from a survey of the perceptions and attitudes of both patients and providers. (Appendix A details survey methods.) Both groups were asked to assess levels of access to the healthcare system, the current state of healthcare system integration, and the adoption of connected care technology.

In terms of the overall index (which averages scores for access, integration, and technology adoption), the United States ranked sixth out of the thirteen countries surveyed. It ranked higher than average on healthcare access and connected care device adoption but lower than average on healthcare integration. (See the [Future Health Index map on the next page](#)).

This section discusses some of the key findings of the survey of patients and providers in the United States as a foundation for thinking about how to shift away from a reactive healthcare cycle.



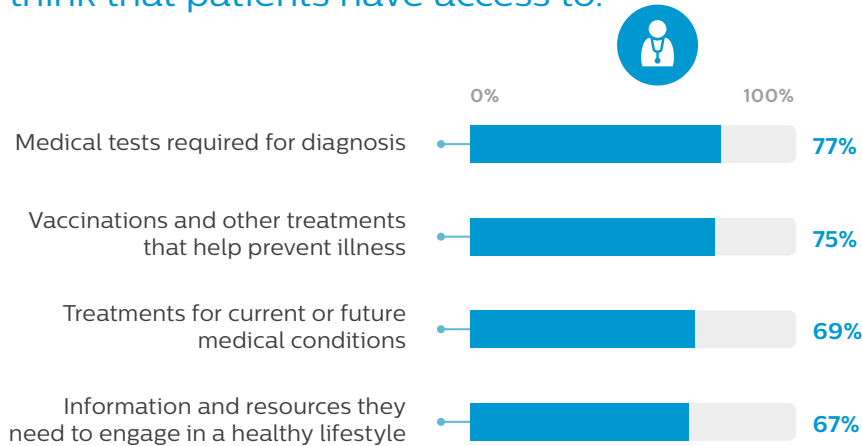
# The Future Health Index map



### Access to the healthcare system

From the perspective of healthcare professionals (HCPs), patients in the United States have good access to diagnostic tests and treatment options. An overwhelming majority of HCPs think that patients have access to medical tests required for diagnosis (77 percent), vaccinations and other treatments that help prevent illness (75 percent), and treatments for current or future medical conditions (69 percent).

### An overwhelming majority of HCPs think that patients have access to:



Slightly more than two-thirds (67 percent) of HCPs also think that patients have good access to the information and resources they need to engage in a healthy lifestyle. More specifically, a majority think their patients are knowledgeable about the effects of tobacco consumption (72 percent), weight (66 percent), and exercise/physical activity (63 percent) on their health.

But having good access and actually taking advantage of it are two different things, and the cost of healthcare seems to be a significant barrier for patients in the United States. A large majority (89 percent) of HCPs report that at least a few of their patients have not visited them or another HCP when they needed medical care, and 65 percent of those HCPs assume that their patients' inability to pay is the reason. In general, three-quarters (76 percent) of HCPs think that healthcare is too expensive for their patients.

The high cost of care is an overwhelming concern for patients, too. More than 70 percent believe that reducing the cost of healthcare should be the top priority for the US government in improving public health and healthcare. This exceeds the 66 percent who give top priority to improving prevention services and access to treatments when sick, and the 24 percent who view improving legal and regulatory policies as paramount.



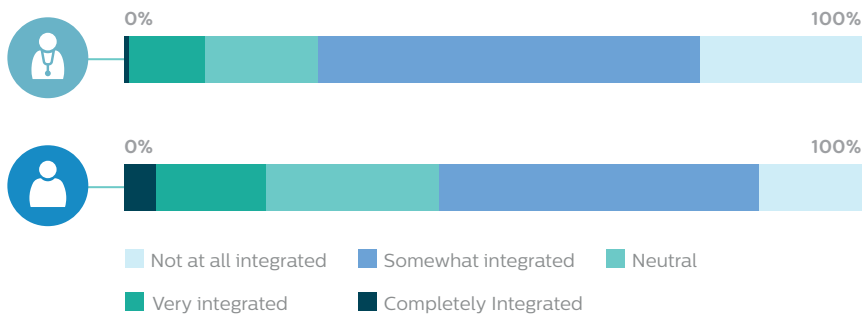
Although the high cost of healthcare is the most common explanation of why people don't visit their healthcare professionals regularly, it's not the only factor. One-third (33 percent) of HCPs report that their patients don't come see them because it's too difficult to get an appointment.

### Healthcare integration

Although HCPs and patients alike see healthcare integration as important (potentially leading to reduced costs as well as improved quality of care and patient health), care from various medical providers is not always well coordinated for individual patients in the United States. One indicator is that nearly three-quarters (73 percent) of patients have had to repeatedly tell the same information to multiple doctors or healthcare professionals when seeking help for a single medical condition.

Three-quarters of HCPs believe that an integrated healthcare system is important (and of these, 42 percent view it as extremely important), and only about half of them (52 percent) see US healthcare as somewhat integrated today. Patients feel just as strongly about the importance of integrated healthcare in the United States: 75 percent rate it as important, and only 41 percent view healthcare as even somewhat integrated today.

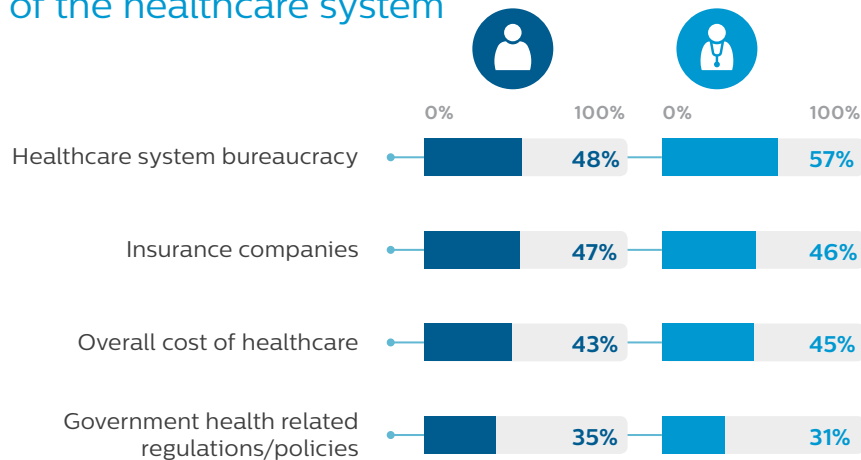
### Perceived level of current integration



Although both HCPs and patients in the United States recognize that integrated healthcare can address cost concerns, the two groups differ in the benefits and challenges they foresee. HCPs think an integrated healthcare system would reduce costs of diagnosis (68 percent) and treatment (71 percent). Patients are more concerned than HCPs about the personal and overall costs of healthcare system integration; 41 percent of patients (versus 35 percent of HCPs) think integration would make healthcare more expensive to patients in the long term.

Both groups (57 percent of HCPs and 48 percent of patients) identified the healthcare system bureaucracy as the top barrier to coordinating healthcare in the United States. They ranked this barrier ahead of insurance companies (46 percent of HCPs and 47 percent of patients), the overall cost of healthcare (45 percent of HCPs and 43 percent of patients), and government regulation (31 percent of HCPs and 35 percent of patients).

## Top perceived barriers to coordination of the healthcare system

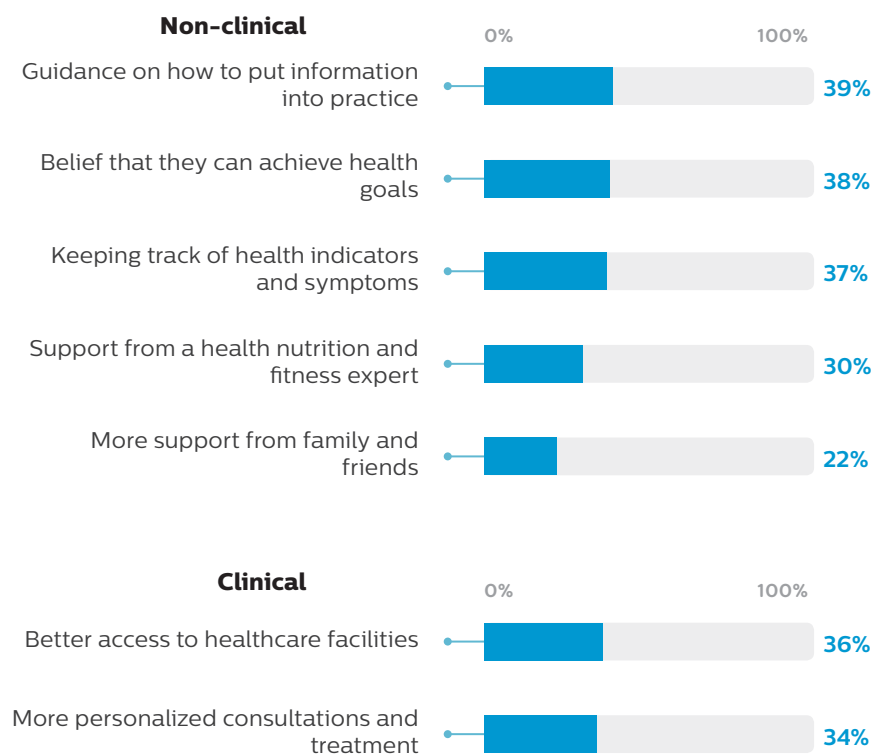


Another weak point of integration in the healthcare system is the boundary between the care delivered in a clinical setting and in the home. Almost 40 percent (37 percent) of HCPs do not think people have the medical resources they need to take care of sick family members or themselves in their homes. In addition, 29 percent of HCPs think that more information about health, nutrition, and fitness would make their patients more effective in managing their own health, and another 39 percent believe that their patients need guidance on how to put such information into practice. Most of the tools and resources that HCPs believe would improve their patients' ability to manage their own health require minimal involvement from the clinical healthcare system.

### Technology adoption

More than a third (37 percent) of HCPs think that individuals would manage their health better if they kept track of health indicators and symptoms such as blood pressure, blood sugar, sleep patterns, and heart rate in a journal, on a website, with an app / mobile device, or with some other computer. In fact, HCPs thought an automated tracking program would empower patients, improve social support, and harness the expertise of food, nutrition, and fitness experts—and further, that it would be as effective a tool for patients as better access to health facilities, and more effective than more personalized consultations with and treatments from their healthcare providers.

## Tools and resources that HCPs believe would improve their patients' ability to manage their own health



Individuals also see the benefit of tracking health information. More than half (56 percent) of respondents report tracking their weight, and half (50 percent) track their diet frequently—yet at present few are relying on a connected device to do so. Of those surveyed, 54 percent keep track of the information in their head, and another 29 percent store the information on paper.

Considering email is the primary mode of work communication for most professionals, it's notable that only slightly more than half (55 percent) of the HCPs reported discussing care with their patients via email, online chat, or a secure portal. Tight regulatory control of personal health information is often the explanation for the lag in tech-enabled communication practices in healthcare, but it continues to frustrate patients. Beyond the use of a computer program to track health information, HCPs also believe that the overwhelming majority of their patients would be interested in online receipt of test results (75 percent), appointment scheduling (70 percent), and prescription requests (70 percent).

What's more, despite the fact that providers perceive that the paucity of digital communication between providers and patients is due to the protection of personal health data, patients don't think that the data is theirs. Only about a quarter (24 percent) of patients surveyed believe they have complete ownership of their medical records. As if to prove this theory, nearly a third (31 percent) find it difficult to obtain their health records when needed.

In summary, healthcare providers and patients in the United States view access to care resources, integration of health services, and technology adoption as works in progress. The majority of providers rate the level of access for certain care resources (medical tests, select treatments) as high, but both providers and patients view the high cost of care as a major barrier to access. **More than 60 percent of HCPs perceive that healthcare is integrated among providers and across clinical settings, but more work is needed to include patients in the communication and decision-making flows.** And finally, while usage rates of digital and mobile technologies are lower in healthcare than in other industries, interest in using new technologies to improve health is very high among both patients and providers.

Studying the views of providers and patients on healthcare is important in identifying present-day challenges and finding opportunities to break the cycle of reactive healthcare. To understand how the healthcare system might evolve in the future toward greater engagement between providers and patients, however, we must also pay attention to external forces. The following section takes a deeper look at how these forces might change how access and integration are defined while also advancing the technological capabilities of connected devices and influencing consumer preferences in the coming decade.

# Forces shaping access, integration, and technology adoption tomorrow

A heightened emphasis on person-centered, value-based care models in the United States is chipping away at the existing clinician-centered, volume-based care models that largely defined the US healthcare system in the past. And while the transition to person-centered care is slow, early indications of this fundamental redesign of healthcare models challenge the existing definitions of access to care resources and integration of health services.

This section highlights three external future forces—flipped care, integrative health systems, and encoded intuition—that will inform and influence how patient and provider views on access, integration, and technology adoption evolve over the next decade. Flipped care will redefine access to healthcare; integrative health systems will redefine healthcare integration; and encoded intuition will redefine technology adoption. It's critical that leaders and policy makers understand that the definitions of these key components of our healthcare system are in flux, and as the definitions change, so may the expectations of patients and providers.

## **Flipped care**

### **From provider-centered to person-centered access**

Innovative care delivery models that leverage an explosion of consumer devices related to health and wellness are making it possible for individuals to access clinical health information outside of traditional settings. The quickly dropping price of biosensing technology means that sensors are becoming ubiquitous—and tracking fitness data is only the beginning. Workplace and retail clinics, and even ridesharing companies, are homing in on which services to offer and how to deliver them, taking advantage of technology and the full spread of allied workers to manage costs. Digital health companies are eager to break into the care delivery space, working diligently to pressure change in regulations to allow for individuals to have more direct access to diagnostic tools and their biological information.

Over the next decade, the flipped classroom model—where instruction is delivered online outside of class and classroom time is spent learning through activity with the teacher as guide—will come to healthcare. *Flipped care* (a term derived from a 2014 Robert Wood Johnson Foundation initiative called Flip the Clinic) will reset the medical encounter between patients and care providers. The activities that have historically taken place in clinical settings—collecting samples and running tests—will be distributed across new technologies and new locations. Data flows that were formerly episodic will become more continuous.

The time a provider spends with a patient (whether face to face or remotely) will be used to explore health concerns in greater depth. The precious fifteen-minute visits will be focused on sense making, problem solving, and collaborating on direction and next steps.

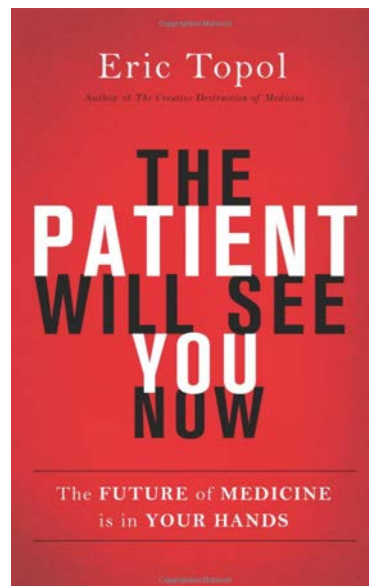
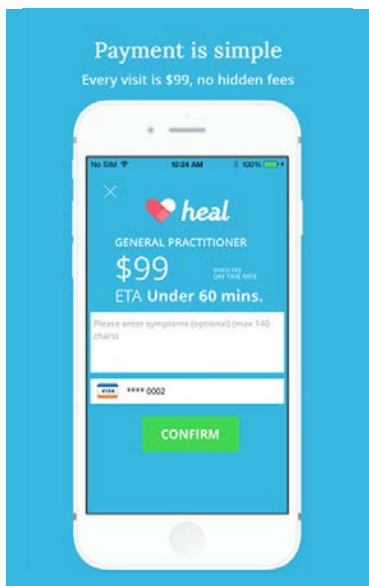
### Implications

Over the next decade, access will be defined on patients' terms and refer not only to access to providers and treatments but also to data and decision support where and when needed. Consumer-defined access will require healthcare systems to build capacity in IT and nonphysician providers to analyze and respond to patient-generated data and provide just-in-time interactions where and when patients want to engage with the healthcare system. As patient-provider encounters occur virtually and in new consumer-directed settings, as diagnostics and simple treatments take up less provider time, providers may be required to focus attention on more nuanced decision support and guidance rather than quick transactions. Patients will learn which modes of interaction to use for what and will accustom themselves to collecting and sharing data and tapping consultative expertise in new ways.

### Signals of flipped care

**Heal** is one of the many start-ups offering on-demand house or office calls to make care more convenient for patients and for providers, who can work during blocks of time when they are available.

Cardiologist Eric Topol argues in his 2015 book *The Patient Will See You Now: The Future of Medicine Is in Your Hands* that smartphones enable a range of medical applications to move from the hospital to the home, potentially shifting control of access from doctor to patient.



“Almost of half (43 percent) of Americans do not feel cared for by their doctor in between visits.”

### **Integrative health systems**

#### **From clinical to comprehensive health**

As more reimbursement schemes are linked to health outcomes and not volume of service, healthcare organizations are focusing on identifying factors that influence and even produce good health. They are learning that social determinants—societal factors that lie outside of clinical care—have profound effects on the health and well-being of individuals and communities. And they are learning that if they don't work in conjunction with other sectors to solve social issues that contribute to patients' poor health, they will continue to experience poor treatment adherence and unnecessary readmissions—which will in turn have a negative impact on their bottom line.

To respond to this new financial reality, clinical medicine is integrating more systematically with social services to provide integrative care that encompasses the biological, environmental, and social determinants of health. As part of the discharge routine, providers are actively checking to see that their patients possess not only the biomedical resources to treat their health condition but also the social and environmental support needed to ensure a full recovery. And prevention efforts are less siloed, with more communities recognizing the value of designing policies and programs that see the interdependencies between good economic and educational opportunities and good health.

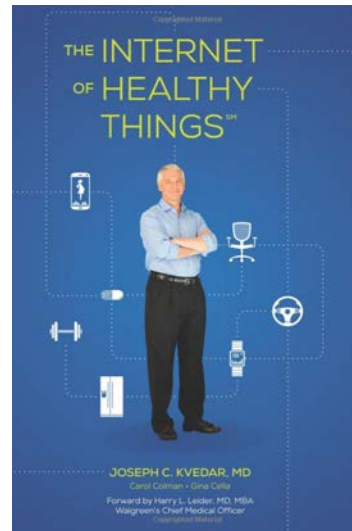
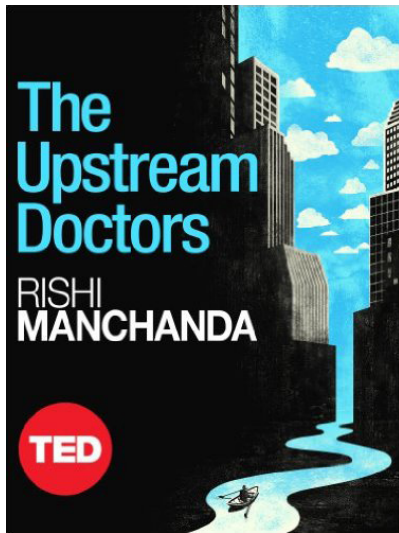
#### **Implications**

A system of health includes so much more than just healthcare, and healthcare outcomes rely on factors well beyond the walls of the clinic or hospital: housing, family support, food, income, and education. When care integration no longer means coordination among parts of the healthcare system but is defined as collaboration among those sectors affecting the full spectrum of the determinants of health, healthcare systems and providers will have to forge tighter relationships with their social services counterparts. They will have to beef up data exchange and hand-off capabilities to optimize health outcomes. True integration will also require that connected care technologies designed for clinical care can seamlessly participate in the larger ecosystem of connected health devices, the emerging Internet of Healthy Things (a term coined by Dr. Joseph Kvedar, founder and director of Connected Health at Partners HealthCare).

## Signals of integrative health systems

At **Health Begins**, Dr. Rishi Manchanda and his team train healthcare providers to become “upstreamists” equipped with the information and skills to address patients’ unmet social needs along with their clinical health needs.

The 2015 book *The Internet of Healthy Things* by Dr. Joseph Kvedar explores how more of the data flowing from all the soon-to-be-connected everyday objects in our lives—phones, cars, kitchen appliances, bathroom items—will provide useful insight to both providers and patients on how to optimally manage individual and population health.



## Encoded intuition

### From assistive to empowering mobile devices

The first wave of health apps and fitness wearables was heralded as if these new health tools would become permanent fixtures on or near our bodies. We’d rely on these smart devices to assist us in making the best decisions or to motivate us through data tracking and accountability nudges. Inquiry into actual usage, however, has shown that interest in digital health tools is temporary, and many people grow tired of or indifferent toward apps and wearables, especially when they seem to be more of a nuisance than a help.

Assumptions about the role of health apps and fitness wearables and people’s relationship with them are changing, and the next wave will be designed as temporary tools to help reprogram our lifestyles and our behaviors to improve our overall health and well-being. Through providing encouragement, information, and even scolding, an effective device will help encode intuition in us so that eventually we won’t need the device to make healthy decisions.



Wearables and apps will also emerge as powerful tools to build habits of daily medication adherence or routine monitoring for people who are managing a chronic condition. Ultimately, the goal of a health app or fitness wearable will be to make itself redundant, not to build dependency.

### Implications

Technology adoption, formerly driven by healthcare systems, will increasingly be driven by users of healthcare systems. It will be left to healthcare systems to adapt by building the capacity to leverage, reward, and reinforce the new encoded health intuition supported by consumer-driven technology adoption. Healthcare systems will need to choose whether to keep health records separate from consumer-generated data or to distinguish themselves among the most empowered users of healthcare systems by partnering with them. Those that choose to partner with patients and their connected and wearable devices can help these patients understand the data generated, and they can also help their patients choose and use such technologies to manage the most burdensome chronic conditions.

### Signals of encoded intuition

**Liv** is a bracelet that aims to bring awareness to subconscious behaviors that the wearer wants to stop, such as hair pulling or nail biting. The bracelet can learn up to eight different subconscious behaviors, and users can delete modification nudges when they are no longer needed.



**Validic** is a cloud-based technology platform that connects patient-recorded data from digital health apps, devices, and wearables to key healthcare services and providers like hospitals, doctors, pharmaceutical companies, payers, and wellness companies.



“When asked how long they regularly used a device to track physical activity, slightly more than half of respondents (54 percent) replied ‘less than three months,’ and fewer than a quarter (23 percent) said ‘three to six months.’ In total, 77 percent of respondents used their wearable to track physical activity for only six or fewer months.”

“When asked why they stopped using the device, more than half (54 percent) said they just ‘lost interest in using the device.’”

# Discussion

Today's provider-centered healthcare system in the United States was shaped by a focus on making efficient use of fixed health assets and personnel. To break the cycle of reactive treatment over the next decade, the focal point of healthcare will need to shift in three ways:

- From provider/system-centered efficiency and access to **patient-centered access**
- From health system integration designed to optimize health services production and clinical health to **cross-sector integration** to optimize health outcomes and promote well-being
- From exclusively provider/system-centered technology adoption to **user-driven technology adoption** that empowers people to achieve health and well-being

These shifts will chip away at the existing cycle of reactive care by moving care from the clinical exam room to serve patients wherever they are; by coordinating healthcare with other social services that promote health (housing, food, legal and financial services) to create integrated systems; and by leveraging connected technologies to encode intuitive behaviors that promote health in individuals.

As the patient becomes the protagonist, providers and healthcare services will take on a new role as supporting actors. Providers will give up the starring role and become part of a team promoting health. This new role will require new provider skills and modes of work as well as new system capacities, some that challenge the protective regulatory frameworks that govern healthcare in the United States.

Patients will have to step up to their new role, too. They will have an abundance of tools and more choices of where, when, how, and from whom to receive care. As the diagnose-and-treat model of clinical services is interrupted, patients will not only have greater support for preventing disease and managing chronic conditions, but they will also benefit from true consultation and coaching. Yet patients may also have more decisions to make and, quite possibly, many services to manage. The administrative burden will be high until all systems and services adapt and align to make it easier for patients to pursue health.

Finally, new measures of the performance of the healthcare system will be required. The system will be judged by both providers and patients on how responsive it is to new understandings around what access means, what integrated care really looks like, and where the true value of connected devices in health lies.

The challenge for leaders will be to measure not only the distribution of clinics, specialists, and hospitals, not only the wait times for appointments and the availability of treatments, but also the degree to which patients are able to access and understand health information, to use their own health data, and to receive timely decision support. Forward-thinking leaders will consider the robustness of the healthcare system's network in terms of how well it provides the services patients need in order to be healthy, from assistance at home to nutrition services. And savvy leaders will evaluate the rate at which the healthcare system is building the capacity to interact with and use data from consumer health technologies that patients adopt, and to support patients in using such technologies in concert with clinical medicine to anticipate needs, prevent illness, and pursue health.

In short, new capabilities will be required of providers, services, and patients to succeed in a world in which provider-patient and cross-sector collaborations are harnessed to interrupt reactive healthcare and produce health across the life span.

# Conclusion

To maximize the potential of connected care to break the cycle of reactive healthcare, leaders and policy makers will be well advised to consider two distinct aspects of the healthcare system in the United States.

First, they need to grasp how patients as well as providers view key elements of today's healthcare system, such as access to care resources, integration of care services, and technology adoption. Measuring the performance of today's healthcare system through the lens of this broader group of healthcare stakeholders reveals urgent needs and immediate opportunities for connected care to transform our reactive care system into a proactive partner in people's pursuit of health.

Second, leaders and policy makers must recognize that the attitudes and opinions of stakeholders will evolve as expectations around those key elements change. Over the next decade, person-centered access will dominate how both patients and providers measure how accessible the healthcare system is. The recognition that health is a multisector enterprise will frame how integration is assessed. And the ability of the system to adapt to the technology tools and preferences of its users (both providers and patients) will drive how technology adoption is measured.

This report has summarized some of today's opinions and attitudes about the healthcare system and explored how those needs and preferences may change over the next decade. **The key takeaway for healthcare leaders is that to thrive in the future, they must redefine access, integration, and technology adoption, taking a person-led or family-led view of each.**

We hope this report has also made clear that **patients must prepare for their role as engaged partners in their own health and healthcare.** If healthcare services and providers adopt a more user-led approach to technology, the onus will be on patients to make sure their providers have access to all relevant information for a clinical encounter. And if a mentality of "the patient will see you now" takes hold, patients will need to understand which modes of clinical interaction are most appropriate for which types of illnesses, and under what circumstances they should prioritize clinical healthcare above all else.

One of the critical health challenges of the twenty-first century is to ensure that our healthspans track with our life spans, and to meet this challenge the formation of a true partnership between providers and patients is key. Expanding how we measure our healthcare system to include patient-centered access and cross-sector integration will improve the impact that digital technologies can have on cultivating meaningful and sustaining relationships between people and their doctors. It will help chip away at the diagnose-and-treat model that exists today and will allow for clinical care to play as pivotal a role in improving quality of life as it has in increasing life expectancy.

# Appendix

In early 2016, Royal Philips undertook original research to understand global nuances with access, integration and adoption of connected care across healthcare systems. The results are being used to inform the Future Health Index (FHI). The index itself is a measure of the extent to which people, technology and health systems are working together to leverage an increasingly connected world of health.

The study included both quantitative surveys and qualitative in-depth interviews conducted from February–April, 2016 among the following key stakeholders in 13 countries around the world:

- Healthcare providers (HCPs) (qualitative and quantitative)
- Patients (defined as consumers who have visited a HCP within the last three months) (quantitative)
- Insurance professionals (qualitative)
- Public policy makers (qualitative)

Secondary research was also conducted, gathering information from third party data and case studies to further validate the primary research results.

## Detailed methodology

### Qualitative interviews

#### (HCPs, insurance professionals, public policy makers)

To provide color and context around the quantitative data, the survey was supplemented with 30–45 minute in-depth interviews conducted in partnership with a third party from March 7–April 11, 2016. The following audiences were interviewed in-person or over the phone:

- Healthcare providers
- Insurance professionals
- Public policy makers:

Audience	Markets	# of interviews conducted
<b>Healthcare providers</b>	<b>13 countries:</b> Australia, Brazil, China, France, Germany, Japan, Singapore, Sweden, The Netherlands, UAE, UK, US, South Africa	20 per country
<b>Insurance professionals</b>	<b>Six countries:</b> China, France, Japan, The Netherlands, UK, US	8-10 per country
<b>Public policy makers</b>	<b>Six countries:</b> China, France, Japan, The Netherlands, UK, US	8-10 per country

### **Quantitative survey (HCPs and patients)**

In partnership with an independent global market research firm, a survey was fielded from February 24, 2016 to April 8, 2016 in 13 countries (Australia, Brazil, China, France, Germany, Japan, The Netherlands, Singapore, South Africa, Sweden, UAE, U.K. and U.S.) in their native language. The survey had an average length of 25–30 minutes. A combination of online, face-to-face (computer-assisted) and phone (computer-assisted) interviewing was used to reach a total sample of:

- 2,659 healthcare providers (defined as those who work in healthcare as a doctor, surgeon, nurse practitioner, registered nurse, licensed practical nurse or nurse across a variety of specializations)
- 25,355 adult patients (defined as those 18-years-old or older who have visited with a healthcare providers in the last three months)

About 200 healthcare providers and 2,000 patients (except UAE where n=1,012) were surveyed in each country. At the 95% confidence level, the 13-country total for the patient population has a margin of error is +/- 0.6 percentage points and the 13-country total for the HCP population has an estimated margin of error\* of +/- 1.9 percentage points.

Shown on the next page is the specific sample size, margin of error at the 95% confidence level, and interviewing methodology used for each market.

### **Local market patient population weighting**

For the patient sample, all countries were weighted to be representative of the national population based on census statistics for key demographics (including age, gender, and region), except Brazil, China and South Africa, which were weighted to be representative of the country's online population due to low Internet penetration in that market. The weighting was applied to ensure the sample is representative of individuals age 18+ in each country who have visited a healthcare practitioner within the past 3 months.

### **Total country weighting (HCPs and patients)**

The 13-country total is an average calculation with each country's sample size weighted to have the same value to ensure each country has an equal weight in this total. The same was done for all regional totals.

\* Estimated margin of error is the margin of error that would be associated with a sample of this size for the full HCP population in each market.



	Patient			Healthcare provider		
	Unweighted sample size (N=)	Margin of error	Interview methodology	Unweighted sample size (N=)	Estimated margin of error*	Interview methodology
13-country total	25,355	+/- 0.6	Online	2,659	+/- 1.9	Online, face-to face, phone
Australia	2,063	+/- 2.2%	Online	201	+/- 6.9%	Online
Brazil	2,045	+/- 2.2%	Online	203	+/- 6.9%	Online
China	2,029	+/- 2.2%	Online	203	+/- 6.9%	Online
France	2,005	+/- 2.2%	Online	205	+/- 6.9%	Online
Germany	2,027	+/- 2.2%	Online	203	+/- 6.9%	Online
Japan	2,010	+/- 2.2%	Online	205	+/- 6.9%	Online
The Netherlands	2,010	+/- 2.2%	Online	210	+/- 6.9%	Online
Singapore	2,008	+/- 2.2%	Online	203	+/- 6.9%	Online, face-to face, phone
South Africa	2,067		Online	201	+/- 6.9%	Online, face-to face, phone
Sweden	2,013		Online	202	+/- 6.9%	Online, phone
UAE	1,012		Online	202	+/- 6.9%	Online, face-to face, phone
UK	2,060		Online	212	+/- 6.7%	Online
US	2,006		Online	209	+/- 6.8%	Online

\* Estimated margin of error is the margin of error that would be associated with a sample of this size for the full HCP population in each market.

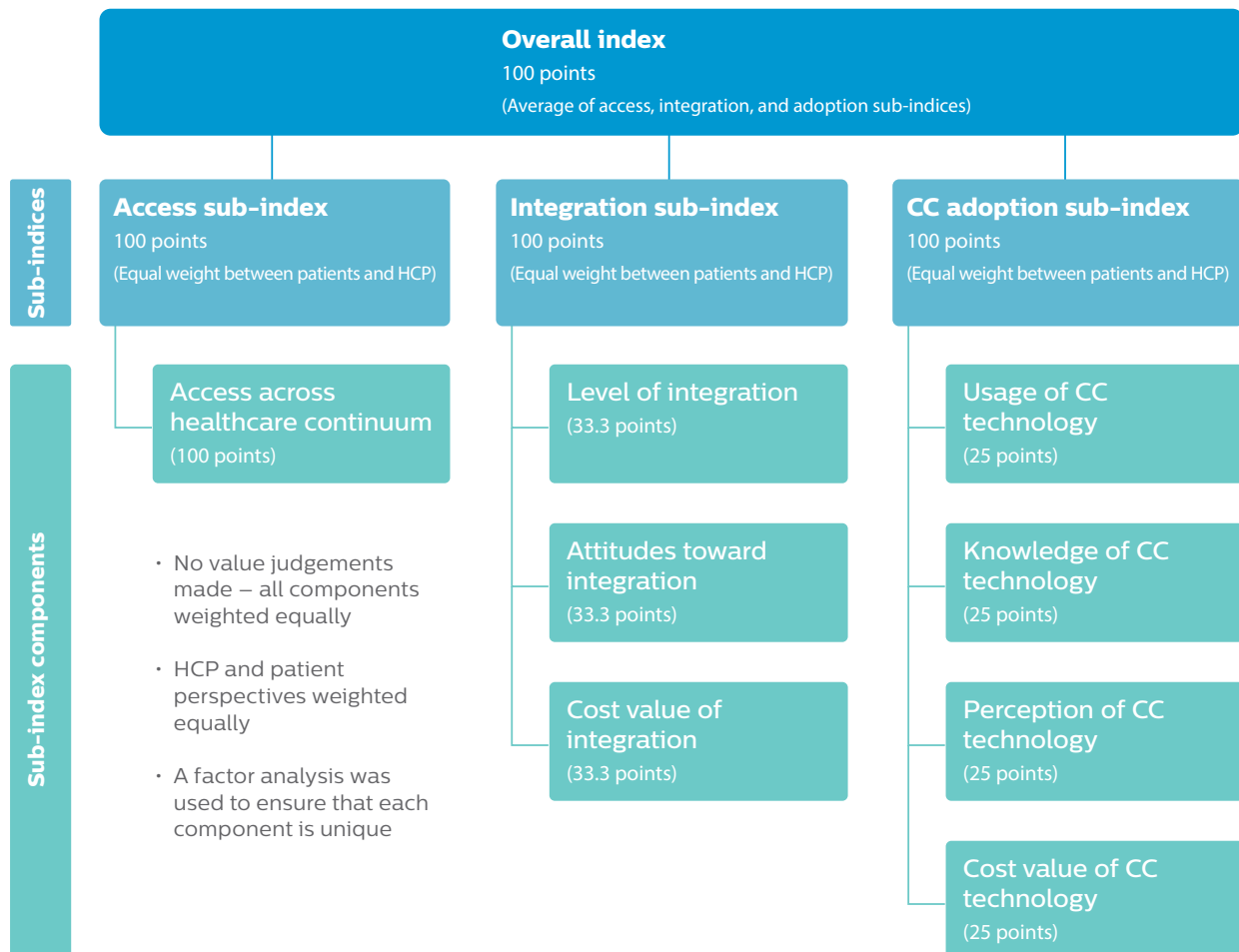
## Index score

In order to benchmark and measure changes in perceptions an Index has been created and will be run on an annual basis. The Future Health Index (FHI) is calculated by combining the quantitative survey responses from patients and healthcare professionals equally on questions about their country's current state of health integration, adoption of connected care technologies and access to the healthcare system. The index ranges from 0 to 100 points, and is the average of three sub-indices: Access (to health continuum); Integration (of health system); and, Adoption (of connected care technologies). Each of the three sub-indices range from 0 to 100 points, and each are weighted equally in the final FHI score

The three sub-indices scores are based on a series question groupings (or components) that draw from a distinct theme in the questionnaire. These components were statistically tested using an exploratory factor analysis to ensure that each component is actually measuring a unique dimension.

The figure below outlines the scoring structure of the FHI.

## The index **structure** – how is the index calculated?



\* Refer to the appendix for the full questions that go into each sub-index component.

## Appendix: Index questions

### Access: Sub-index questions

#### Patient survey

How much do you agree or disagree that you have access to each of the following?

- Information/resources needed to live healthy
- Medicine or treatment that helps prevent illness or disease (e.g. vaccinations)
- Medical tests required for diagnosis
- Treatments required for any current or future medical conditions
- Medical resources needed for me to take care of sick family member(s) or myself in my home
  - Strongly Disagree
  - Disagree
  - Neither Agree nor Disagree
  - Agree
  - Strongly Agree

#### HCP survey

How much do you agree or disagree that your patients have access to each of the following?

- Information/resources needed to live healthy
- Medicine or treatment that helps prevent illness or disease (e.g. vaccinations)
- Medical tests required for diagnosis
- Treatments required for any current or future medical conditions
- Medical resources needed for people to take care of sick family member(s) or themselves in their homes
  - Strongly Disagree
  - Disagree
  - Neither Agree nor Disagree
  - Agree
  - Strongly Agree

### Integration: Sub-index questions

#### Patient survey

- How integrated do you think the health system in your country is today?
  - Not at all integrated
  - Somewhat integrated
  - Neither integrated nor not integrated
  - Very integrated
  - Completely integrated
  - Do not know
- How much ownership do you feel you have over your medical record?
  - No ownership at all
  - Some ownership
  - Complete ownership
- How important is it that the healthcare system in your country is integrated?
  - Completely unimportant
  - Somewhat unimportant
  - Neither important nor unimportant
  - Somewhat important
  - Extremely important
- What type of impact, if any, do you think the integration of the health system would have on the quality of healthcare you receive? Would it make it:
  - Much worse
  - Somewhat worse
  - Have no impact on quality
  - Somewhat better
  - Much better
- What type of financial impact, if any, do you think integration of the health system would have on the cost of healthcare long-term to the following: To You/Overall
  - Much less expensive
  - Somewhat less expensive
  - Have no impact on cost
  - Somewhat more expensive
  - Much more expensive

## HCP survey

- How integrated do you think the health system in your country is today?
  - Not at all integrated
  - Somewhat integrated
  - Neither integrated nor not integrated
  - Very integrated
  - Completely integrated
- How much ownership do you think patients feel they have over their medical record?
  - No ownership at all
  - Some ownership
  - Complete ownership
- How important is it to you that the health system in your country is integrated?
  - Extremely unimportant
  - Somewhat unimportant
  - Neither important nor unimportant
  - Somewhat important
  - Extremely important
- What type of impact, if any, do you think the integration of the health system would have on the quality of healthcare? Would it make it:
  - Much worse
  - Somewhat worse
  - Have no impact on quality
  - Somewhat better
  - Much better
- What type of financial impact, if any, do you think integration of the health system would have on the cost of healthcare long-term to each of the following:  
To Patients/Overall
  - Much less expensive
  - Somewhat less expensive
  - Have no impact on cost
  - Somewhat more expensive
  - Much more expensive

## Adoption: Sub-index questions

### Patient survey

- How knowledgeable would you say you are about connected care technologies?
  - Extremely unknowledgeable
  - Somewhat unknowledgeable
  - Neither knowledgeable nor unknowledgeable
  - Somewhat knowledgeable
  - Extremely knowledgeable
- How much do you understand about the following for connected care devices?
  - How to properly use the device
  - How to interpret results from the device
  - When you should share the data with a healthcare professional
    - Do not understand at all
    - Somewhat understand
    - Completely understand
- How frequently do you think connected care devices are currently being used within the following stages of healthcare?
  - When patients are healthy and have no medical conditions
  - When patients use the health system for treatments that will prevent medical conditions from forming (e.g. vaccines, regular check-ups)
  - When patients are being diagnosed for a medical condition (e.g. screenings)
  - When patients are being treated for a medical condition
  - When patients are living with a serious or long-term medical condition in their own homes
    - Never
    - Rarely
    - Sometimes
    - Often
    - Always

- How important would you say connected care devices are for improving each of the following?
  - Daily healthy living
  - Preventing medical issues
  - Diagnosis of medical conditions
  - Treatment of medical issues
  - Home care services
  - Overall health of the population
    - Completely unimportant
    - Somewhat unimportant
    - Neither important nor unimportant
    - Somewhat important
    - Extremely important
- What type of financial impact, if any, do you think the connected care devices would have on the cost of healthcare long-term to each of the following? To You/Overall
  - Much less expensive
  - Somewhat less expensive
  - Have no impact on cost
  - Somewhat more expensive
  - Much more expensive

### HCP survey

- How knowledgeable would you say you are about connected care technologies?
  - Extremely unknowledgeable
  - Somewhat unknowledgeable
  - Neither knowledgeable nor unknowledgeable
  - Somewhat knowledgeable
  - Extremely knowledgeable
- How much do you think your patients understand about the following for connected care devices they might use themselves?
  - How to properly use the device
  - How to interpret results from the device
  - When they should share the data with a healthcare professional
    - Do not understand at all
    - Somewhat understand
    - Completely understand
- How frequently do you think connected care devices are currently being used within the following situations?
  - When patients are healthy and have no medical conditions
  - When patients use the health system for treatments that will prevent medical conditions from forming (e.g. vaccines, regular check-ups)
  - When patients are being diagnosed for a medical condition (e.g. screenings)
  - When patients are being treated for a medical condition
  - When patients are living with a serious or long-term medical condition in their own homes
    - Never
    - Rarely
    - Sometimes
    - Often
    - Always
- How important would you say connected care devices are for improving each of the following?
  - Daily healthy living
  - Preventing medical issues
  - Diagnosis of medical conditions
  - Treatment of medical issues
  - Home care services
  - Overall health of the population
    - Completely unimportant
    - Somewhat unimportant
    - Neither important nor unimportant
    - Somewhat important
    - Extremely important
- What type of financial impact, if any, do you think connected care devices would have on the cost of healthcare long-term to each of the following: To Patients/Overall
  - Much less expensive
  - Somewhat less expensive
  - Have no impact on cost
  - Somewhat more expensive
  - Much more expensive



#### Reference

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3. Eva H. DuGoff, MPP; Vladimir Canudas-Romo, PhD; Christine Buttorff, BA, BS; Bruce Leff, MD; and Gerard F. Anderson, PhD, "Multiple Chronic Conditions and Life Expectancy: A Life Table Analysis," Medical Care 52 (August 2014): 688–94. [http://journals.lww.com/lww-medicalcare/Abstract/2014/08000/Multiple\\_Chronic\\_Conditions\\_and\\_Life\\_Expectancy\\_\\_A.3.aspx](http://journals.lww.com/lww-medicalcare/Abstract/2014/08000/Multiple_Chronic_Conditions_and_Life_Expectancy__A.3.aspx).
4. To learn more about the concept of a healthspan, see The Future of Science, Technology, and Well-being 2020 at <http://www.iftf.org/our-work/health-self/health-horizons/hh2010-the-future-of-science-tech-and-well-being/>.