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Insight Report

Value in Healthcare Laying the Foundation for Health System Transformation

In collaboration with The Boston Consulting Group (BCG)

April 2017



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Foreword



Cheryl Martin
Head of
Industries,
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Managing Board,
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At the World Economic Forum, it is our belief that fostering co-operation between the public, private, academic and other sectors can produce a force for positive change that creates lasting impact.

The Value in Healthcare project brings together cross-sector healthcare stakeholders with the objective of stimulating healthcare reform to deliver health outcomes that matter to patients. This signifies a paradigm shift from the current volume-focused approach in most healthcare systems to one of value. I am proud of what we have achieved in Year 1 of this project: among them, defining value, identifying key factors that enable a value-based system and putting forward policy recommendations.

In the early stages of the endeavour, this report provides a solid foundation for continued progress. I would like to express my gratitude to the project Executive Board and Steering Committee for their steadfast partnership and thought leadership in this work. I am also grateful to the Partners and engaged stakeholders for joining us on this journey of putting patients at the heart of healthcare delivery.

The focus of this WEF report is primarily the hospital, and the costs of delivering care through that institution. But realize that that's just part of the overall healthcare cost that also includes insurance premiums, co-pays, out-of-pocket costs, government subsidies, and more.

In his 38-page TIME magazine special report, "Bitter Pill: Why Medical Bills are Killing Us," Steven Brill dives into our health care system to understand why things cost so much. Why does a single drug cost thousands of dollars? Why do lab tests done over a few days while in the hospital cost as much as a new car? Why are tax-exempt "nonprofit" hospitals among a town's most profitable businesses, employing the most workers and run by the most richly compensated executives? And why is technology driving up health care costs instead of lowering them as it has done on other industries? (<http://www.mhealthtalk.com/why-high-medical-bills-are-killing-us/>)

Brill describes the medical industrial complex as hospitals, insurers, drug companies, testing companies, and equipment providers. This perversely profitable industry "spends more than three times what the military-industrial complex spends in Washington." That special-interest lobbying is the #1 obstacle our nation faces in adopting the healthcare reforms described here.

Preface

**Co-Chairs,
World Economic
Forum
Value in
Healthcare
Project**



Joseph Jimenez
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Many of us in the healthcare industry recognize that we stand at an inflection point. Old ways of doing business are becoming obsolete. Industry stakeholders are increasingly being held accountable for the value their actions and products provide to patients, payers, and society at large. And some leading organizations are actively driving the change.

“Why?” you might ask. The answer is simple but perhaps may not be obvious to everyone. Healthcare ought to be driven by a relentless focus on delivering outcomes that truly matter to patients and to society in a financially sustainable manner. But this is hard to do and hard to manage when the patient outcomes we should deliver are not clearly defined. To add to the problem, costs are increasing unsustainably with a significant fraction of healthcare spending wasted on low-value diagnostic procedures or treatments and on the consequences of clinical errors. By eliminating inefficiencies, we could save approximately \$1 trillion globally each year. Imagine the possibilities if we were to invest that capital in meaningful innovation or disease prevention.

The U.S. alone could save \$1.5 trillion/year, as I often say on mHealthTalk.com.

It therefore makes sense that the public is beginning to lose faith—or has already lost it—in many healthcare institutions. We need to bring disengaged stakeholders back into the system with a single focus on value-based healthcare, and with determination to cooperate with each other to improve healthcare value over time. Value-based healthcare is the revolution at our doorstep. As leaders of large healthcare organizations filled with brilliant and passionate individuals who come to work every day to develop better ways to improve the health of our fellow citizens, we are eager to embrace a new reality that focuses on outcomes that matter to patients and to society. The fundamental questions are not only “What will this change mean?” or “When will it happen?” but also “How do we get there?” Addressing this last question is the focus of the Value in Healthcare project, conducted by the World Economic Forum in collaboration with The Boston Consulting Group.

Obstacles barely mentioned include political influence from special interest lobbyists.

While the work is in its early stages, we are delighted by the emerging recommendations that provide specific steps to create value-based health systems in which stakeholders are rewarded for their contributions to an improvement in patient value and to the sustainability of the health system. We see already that the role of policymakers will be paramount in stimulating system-level change and in establishing a level playing field for everyone. However, actions will not be limited to the public sector alone. As leaders in the healthcare sector, we will all need to work together in new ways in order to deliver the best possible value for patients and health systems. The journey will not be without obstacles, but it is the journey that we need to take together and learn as we go.

We urge the global healthcare community to recognize not only the challenge facing us today but also the enormous opportunity created by value-based healthcare. There are promising signs that the pace of change is accelerating. For example, a major theme of this report is the importance of creating global standards for health outcome metrics for each major disease or condition. Just recently, the Organization for Economic Cooperation and Development (OECD) and the International Consortium for Health Outcomes Measurement (ICHOM) have agreed to collaborate on creating such standards and using them to compare the quality of care across OECD member nations. This is a landmark milestone on the path towards value-based healthcare because standardized measurement around the world creates an unparalleled opportunity to learn from high-performing clinical teams and innovators, no matter where they operate.

The opportunity is not just saving money from reducing the cost of providing care. It also comes from reducing suffering, increasing longevity, improving wellness and worker productivity, and thus driving profits & GDP.

In 2017, the Value in Healthcare project will continue to make recommendations to spur the transition from volume-based to value-based healthcare. We are eager to contribute to these learnings, and even more eager to share them with the world. As co-chairs of the Value in Healthcare project, we hope you share in our excitement.

In conclusion, we would like to thank our full Executive Board who has accompanied us on the start of this journey:

- Omar Ishrak, Chairman and CEO of Medtronic
- Michael Porter, the Bishop William Lawrence University Professor at Harvard Business School
- Edith Schippers, Minister of Health, Welfare, and Sport of the Netherlands
- Simon Stevens, CEO of the National Health Service in the UK
- Bernard J. Tyson, Chairman and CEO of Kaiser Permanente, and
- Christophe Weber, President and CEO of Takeda.

We would also like to acknowledge the contributions of our steering committee which includes approximately 50 representatives from leading stakeholders across the healthcare sector. Last but not far from least, we are grateful for the hard work of the Value in Healthcare project team, led by Olivier Oullier from the World Economic Forum and Stefan Larsson from The Boston Consulting Group.



Executive Summary

The World Economic Forum, in collaboration with The Boston Consulting Group (BCG), launched the Value in Healthcare project in July 2016. This two-to-three-year multistakeholder project has four **basic goals**:

- To develop a comprehensive **understanding** of the key components of value-based health systems
- To draw general lessons about the effective implementation of value-based healthcare by codifying **best practice** at leading healthcare institutions around the world
- To identify the **potential obstacles** preventing health systems from delivering better outcomes that matter to patients, and at lower cost
- To define **priorities** for industry stakeholders to accelerate the adoption of value-based models for delivering care

During the first six months, the project developed a detailed taxonomy of the components of a value-based health system, prepared in-depth case studies of leading stakeholders that illustrate best practices in the field, identified some of the main barriers that hinder further adoption of value-based healthcare, and devised a preliminary roadmap for health systems to adopt to make them truly patient-centric. The project is one of the first attempts to take a genuinely systemic approach to value-based healthcare in which all industry stakeholders have a seat at the table.

Value in Healthcare: Laying the Foundation for Health System Transformation was initially prepared as input for the Value in Healthcare project session held at the World Economic Forum Annual Meeting 2017. The report synthesizes the project's preliminary findings, with a focus on defining the problem, developing a comprehensive framework for a value-based health system and proposing a high-level roadmap for system transformation. It also gives special emphasis to the priorities for public policy. The paper's **key findings include the following**:

- Despite the sector's remarkable achievements over the past century, global healthcare is marked by **growing concern over its sustainability**. In particular, **costs are growing at roughly double the rate of growth in gross domestic product**, putting severe pressure on healthcare budgets and constraining further development.
Incredibly, this is even with significant tech innovation. Aging is just part of the problem.
- Value-based healthcare is a genuinely patient-centric way to design and manage health systems. Compared to what health systems currently provide, it has the **potential to deliver substantially improved health outcomes at significantly lower cost**.
- The fundamental principle of value in healthcare is, first, to **align industry stakeholders around the shared objective of improving health outcomes** delivered to patients at a given cost, and then to give stakeholders the autonomy, the right tools and the accountability to pursue the most rational ways of delivering value to patients.
Start with: <http://www.mhealthtalk.com/ask-the-right-questions/>.
- The value-based approach to care rests on **three foundational principles**: measuring systematically the health outcomes that matter to patients and the costs required to deliver those outcomes across the full cycle of care, tracking those outcomes and costs for **defined population segments** on an ongoing basis, and developing customized interventions to improve value for each population segment.
Young/old, poor/rich, rural/urban, liberal/conservative, race/religion/culture
- Despite considerable progress, however, **no country has fully embraced value-based healthcare** at the level of a national health system. Moreover, even the institutions that have taken the lead are encountering obstacles to change that are built in to how traditional health systems are organized, financed and regulated, and how financial and non-financial incentives are structured.

- **Four enablers** are key to accelerating the adoption of value-based healthcare: health informatics, to facilitate the easy collection, analysis and sharing of outcomes and cost data; benchmarking, research and tools, to leverage data on outcomes and the costs for clinical practice improvement and innovation; value-based payments, to create incentives for all stakeholders to focus on value; and innovations in organizing care delivery, to improve coordination across the health system. **Politics and public policy can be either an enabler or inhibitor.**
- Because healthcare is a highly regulated industry, **public policy has a critical role to play** in enabling the value-based transformation. Policy-makers should mandate the tracking of health outcomes and set standards for data collection, analysis and transparency. They also need to balance the trade-off between patient privacy and data sharing; enable cooperation, coordination and partnerships along care pathways while protecting against conflict of interest; establish new payment models that support improvement in patient value; and make it easier for pharmaceutical and medical technology companies to be more accountable for and contribute more actively to healthcare value. **Steven Brill describes lobbying from the medical industrial complex as 3* the military industrial complex.**

The Value in Healthcare project's subsequent work will focus in more detail on a number of themes introduced in this initial report, including informatics, data and applications, new opportunities for clinical research, new approaches to the regulation and approval of new drugs and medical devices, and priorities for public policy. (A more detailed description of the 2017 plan can be found in the appendix, "Next Steps for the Value in Healthcare Project".)

Influencing public policy is critical in the U.S. as Congress considers options that could significantly help, or prevent, our healthcare system from meeting identified objectives.



Value in Healthcare

A Call to Action

U.S. alone is a \$3.3 trillion/yr market.

In many respects, the \$7.6 trillion global healthcare sector is a remarkable achievement. Access to healthcare is nearly universal in most developed countries and is growing rapidly in developing ones. Breakthroughs in biomedical science and major advances in public health have led to a near doubling of average life expectancy in developed countries since about 1900 (and since 1950 in developing nations). In addition, the quality of life has significantly improved for many suffering from chronic disease or severe disabilities.

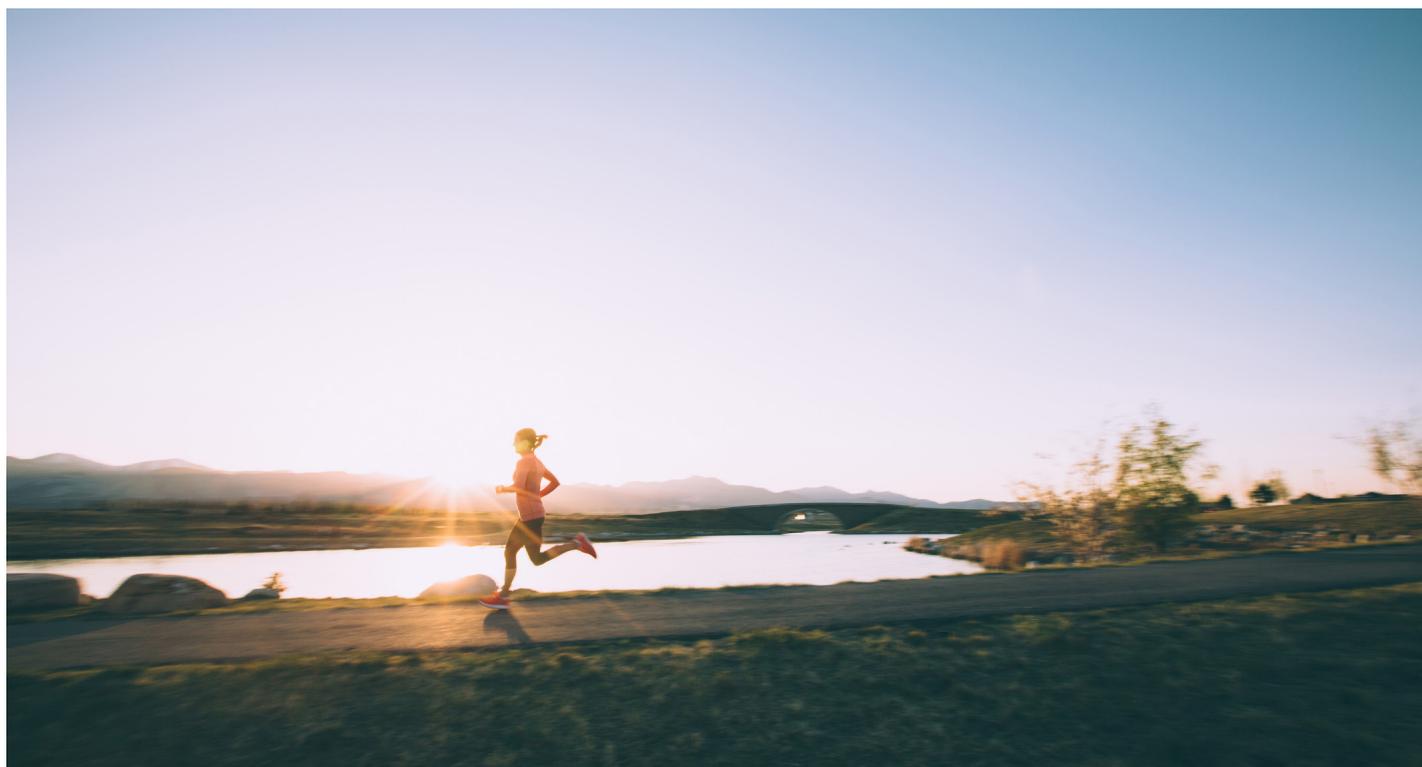
And yet, many of the sector's stakeholders worry that this progress is unsustainable. Costs are growing at roughly double the rate of growth in gross domestic product (GDP),¹ putting severe pressure on healthcare budgets, limiting the potential for meaningful innovation and, in some countries, even leading to rationing in the form of longer waiting times or restricted access. Most providers continue to be paid for the volume of procedures delivered, with almost no systematic assessment of the quality of services provided or even whether they are medically necessary. Growing evidence indicates that a significant portion of healthcare spending – as much as 30%, according to some estimates² – is wasted on unproven or unnecessary treatments, and that the quality of care delivered varies widely across different provider institutions.

How much of this problem is global versus U.S.?

Tens of millions in U.S. have no access.

Recently, however, a new development has emerged in response to these problems. Some of the industry's leading stakeholders have begun to redefine their mission and their operating model to focus on *improving healthcare value*, or the health outcomes that matter to patients relative to the resources or costs required. Consider the following illustrative examples:

- In India, the Aravind Eye Care System, a network of hospitals dedicated to providing low-cost, high-quality cataract surgery, combines systematic tracking of health outcomes with an integrated approach to care delivery. The resulting health outcomes are equivalent to those of the world's best providers, and at approximately 10% of the cost per surgery in the United States.³ **Factory-like operation with high efficiency.**
- In Germany, Martini-Klinik, a prostate cancer centre at the University Hospital Hamburg-Eppendorf, collects comprehensive data on its patients' health outcomes, including documentation of all post-surgical complications down to the level of individual surgeons, and uses the data to continuously improve its performance in prostate cancer care. As a result, the clinic's rates of severe erectile dysfunction one year after surgery are less than half the national average, and instances of urinary incontinence are about one-seventh of the national average.



This is more common with employer self-insured programs.

- In the United States, Kaiser Permanente (KP), an integrated payer-provider with more than 10.6 million members, has created an integrated care delivery model that emphasizes preventive care and the active management of chronic disease, and includes incentives that simultaneously promote excellent clinical outcomes and resource efficiency. KP has been able to provide employers with health benefits that are, on average, 10-20% more cost-effective than traditional managed-care plans, while delivering outstanding quality. In 2012-2014, its health plans took the top three spots in the US National Center for Quality Assurance (NCQA) Medicare plan rankings, and the company's commercial plans were in the top 10% of the NCQA's ranking of national commercial plans. In addition, KP consistently has the highest member satisfaction in its markets.
- In Sweden, more than 100 quality registries covering the majority of national health expenditure systematically track health outcomes for patients suffering from a specific condition or disease. The accumulating body of data has allowed Swedish clinicians to identify which providers deliver the best outcomes, codify their clinical best practices and share them with other providers, thus improving average health outcomes over time. A recent study demonstrated that 30-day mortality after acute myocardial infarction is 37% higher in the United Kingdom than in Sweden.⁴ Researchers are leveraging the provider networks affiliated with Sweden's quality registries to conduct clinical trials evaluating the effectiveness of treatments and procedures, at roughly 10% of the cost of traditional clinical trials.

These examples begin to suggest the potential of a relentless focus on value to transform the global healthcare sector. National health systems face an extraordinary opportunity: to deliver substantially improved health outcomes to patients and at significantly lower cost than today's health systems. Given the size of healthcare budgets in most countries, such improvements promise to significantly raise national productivity through more rational use of resources and by allowing more people to stay at work longer and contribute to society. The value-based approach to care will also improve access to appropriate care, spur innovations in treatment and care delivery, and provide major new business opportunities for the public and private sectors.

Currently, however, value-based initiatives in healthcare, like the ones described above, represent only isolated patches of innovation, often the result of visionary leaders being in the right place at the right time. Despite considerable progress and remarkable results, no nation has fully embraced value-based healthcare at the level of a national health system. And even leading institutions are encountering obstacles to change that are built in to how traditional health systems are organized, financed and regulated, and how financial and non-financial incentives are structured.

These obstacles need to be addressed in a systematic and comprehensive fashion for value-based healthcare to progress further. Until they are, progress in improving healthcare value is likely to be sporadic, unevenly distributed and far slower than it could be. The key challenge, therefore, is to accelerate the transition to value-based healthcare in health systems throughout the world. How to do so is the focus of the World Economic Forum Value in Healthcare project.

Defining the problem

The best way to begin to understand the current state of value-based healthcare is by examining the interlocking problems it responds to within the global health industry. The first such problem is the unsustainable rise in healthcare costs, particularly in developed countries (which make up about 75% of global healthcare spending). Although the rate of growth in costs has slowed slightly in recent years in some countries, the long-term trend remains the same, despite decades of efforts at cost containment.

Costs are increasing at even greater rates in developing nations. Since 2000, China's spending on healthcare as a percentage of GDP grew at almost five times the rate of the European Union, and three times that of the United States. Although this reflects the lower base of healthcare spending in developing countries and the necessary expansion of access to care, it is not sustainable over the long term. Most developing countries do not have – and may never have – the resources required to replicate the high-cost model of care delivery found in developed nations.⁵

In addition to rapidly rising costs, there is also widespread variation in medical practices, healthcare costs, and health outcomes across providers, regions within countries, and between countries.⁶ In the United States, patients in the poorest-performing hospitals are three times more likely to die and 13 times more likely to experience complications than those in the best-performing hospitals.⁷ Moreover, no clear correlation exists between money invested and health delivered in the global healthcare industry. Stakeholders continue to invest in research and development (R&D), but the portion of that investment devoted to relevant innovation is unclear, and the most meaningful advances are not always rewarded accordingly. The systems that spend the most money do not necessarily deliver the best health outcomes. So while Japan, for instance, spends slightly more than half of the US spending on healthcare per capita, its citizens' average life expectancy is about four and a half years longer than that of the United States.

Disruptive innovation is seen as a threat to incumbents sitting at the top of the healthcare mountain, because they know they must adapt to the megatrend of health reform (and Obamacare, the Patient Protection and Affordable Care Act) or die. After all, 429 of the original Fortune 500 companies [1955] are no longer in business today.

The industry is also coming to realize that the incentives driving different stakeholders are fundamentally misaligned. As a result, a series of behaviours are becoming increasingly dysfunctional, as seen from the patient's perspective and that of the system as a whole. This leads to growing inefficiency, mistrust and frustration. Consider the following examples:

- Payers try to control costs by imposing constraints on medical decision-making and patient choice, using controls such as utilization reviews, drug formularies, prior authorization and restricted provider networks. Highly qualified and experienced clinicians end up feeling micromanaged, caught between the demands of payers to contain costs, the demands of hospital administrators to maximize capacity utilization of expensive medical technologies, and their professional desire to provide the best treatments to their patients. **AI systems like IBM Watson should help.**
- The exponential growth in biomedical knowledge creates an ever deeper understanding of health and disease, as well as new tools to diagnose and treat patients. However, it makes clinical decision-making more complex. In most healthcare systems, the vast majority of clinicians and nearly all pharmaceutical and medical technology (medtech) companies are paid by the volume of procedures and products they deliver. Without outcomes measurements to assess whether treatments are appropriate, proliferating new therapies become powerful drivers of unnecessary variation in practice and, in some cases, overtreatment. The scientific literature suggests that the scientific basis for up to 50% of clinical interventions, per one estimate, remains frustratingly unclear.⁹ In addition, growing evidence indicates that a substantial portion of healthcare spending is for treatments deemed medically unnecessary by widely accepted treatment guidelines. According to one estimate, such overtreatment is responsible for approximately \$750 billion in avoidable costs each year in the United States.⁹
- Many health systems do not invest in certain health interventions, even when their costs and benefits are well aligned. As medical science learns more about the risk factors that lead to disease, prevention, for example, is becoming highly effective at improving health outcomes (by preventing disease in the first place) and controlling costs (by avoiding expensive care because fewer people become ill). Yet, because most health systems are still organized around the objective of “treating illness” – that is, providing care to those already ill – many countries systematically underinvest in prevention and public health.¹⁰

This is especially true in the U.S.

- In the midst of these misaligned and contradictory incentives, it is easy to lose sight of patients and their experience in the health system. The rapid increase in medical specialties has led to a step-function increase in health system complexity and, therefore, to a fragmented patient experience. Increasingly, patients are being asked to take more responsibility for their health and to pay out of pocket for a growing share of treatment costs. And yet, they must do so faced with extreme asymmetries of information making it impossible to make informed choices among different providers or treatment options.

These misaligned behaviours are not necessarily the result of bad intentions. The people who work in healthcare are among the most caring and committed of any industry, devoted to their patients, clients and customers, and dedicated to relieving suffering and finding cures. They try to do the right thing. The problem, however, is that such behaviours are often rational responses to the complex regulatory frameworks, local rules, incentives, resources and constraints that have evolved in healthcare over decades and even centuries, typically for good reasons at any one time. But they have now combined to produce negative, unintended consequences. In other words, dysfunctional behaviours are the product of an increasingly dysfunctional system. To change behaviors, we must change the system.

See <http://www.mhealthtalk.com/get-the-health-incentives-right/>

What value means in healthcare

The new focus on value in healthcare seeks to address these interlocking problems holistically. It does so by taking a principle that has guided healthcare professionals throughout history – namely, doing their best for patients given the resources available – and making it the centrepiece of health system design and organization. The fundamental principle of value in healthcare is, first, to align industry stakeholders around the shared objective of improving health outcomes delivered to patients for a given cost, and then to give stakeholders the autonomy, the right tools and the accountability to pursue the most rational ways of delivering value to patients. This represents a different way of approaching the management and organization of the healthcare sector.

The many initiatives in value-based healthcare underway around the world have furthered understanding of how to create a comprehensive value-based health system. The system's main parts (Figure 1) can be clustered into three broad areas:

- I. **Three foundational principles** of value-based care delivery: A) the systematic measurement of the *health outcomes* that matter to patients and the costs required to deliver those outcomes across the full cycle of care, B) the identification of *clearly defined population segments* and the specific health outcomes and costs associated with those segments, and C) the development of customized *segment-specific interventions* to improve value for each population segment.

II. **Four key enablers of value in healthcare** support and facilitate the reorientation of health systems around these three foundational principles. The misalignment of these enablers has hindered progress to date and their proper alignment can greatly accelerate it:

- *Informatics* – including shared standards and new capabilities that enable the routine collection, sharing and analysis of outcomes data and other relevant information for each population segment
- *Benchmarking, research and tools* – including systematic benchmarking for continuous improvement by identification of variations in responses to treatment and the emergence of clinical best practices; new data sources for research, innovation and new approaches to clinical trials; and finally the development of sophisticated decision-support tools for clinicians and patients

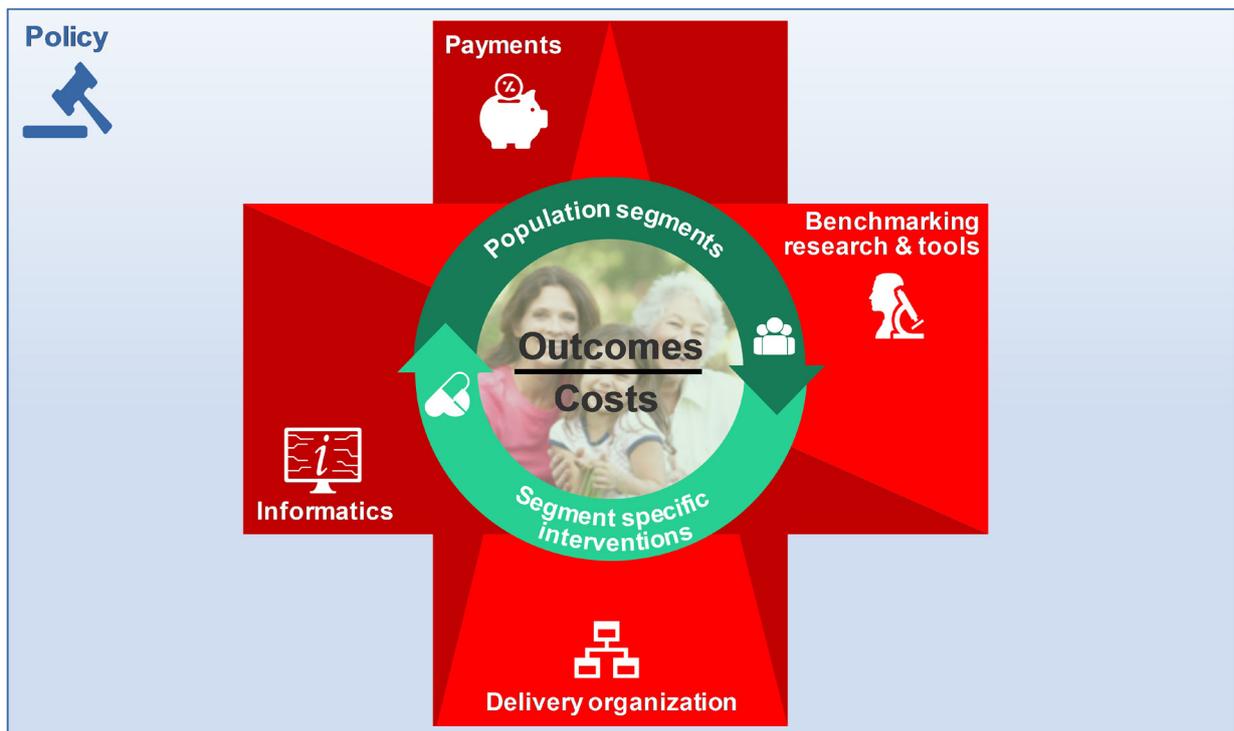
Stark differences in public policy is the primary reason for such contrast in U.S. costs and outcomes as compared with other advanced nations. The others see basic healthcare as a human right and have single-payer systems rather than employer-provided private insurance.

- *Payments* – including new forms of compensation and reimbursement that help to improve patient value
- *Delivery organization* – including new roles and organizational models that allow providers and suppliers to adapt to new opportunities and innovations, provide better access to appropriate care and engage clinicians in continuous improvement

III. **Public policy** stands out because it can influence all the other enablers of value in health. The policies shaping the healthcare sector’s legal and regulatory environment can either hinder value-based healthcare or greatly accelerate the transition to it.

Despite the many isolated patches of innovation, no national health system has systematically addressed all elements of this model. Each of the elements, however, shows signs of progress which, in some cases, are considerable. The rest of this report describes the logic, state of play, future challenges and key next steps in each of these three areas. In addition, a preliminary roadmap provides an outline for accelerating the global healthcare industry’s value-based transformation.

Figure 1: A Comprehensive Framework for a Value-Based Health System



Source: BCG analysis

Three Foundational Principles of Value-Based Care Delivery

All efforts to improve value in healthcare should start with the systematic tracking of health outcomes over time and the costs required to deliver those outcomes. Defining healthcare value in this way has multiple advantages:

- The focus is on value delivered to the patient, and not just to the health system as a whole or to any individual institution within it. **Without other incentives, the profit motive is an obstacle.**
- Providers can address cost issues in the context of their core mission and their daily work to prevent disease and treat ill patients. Therefore, clinicians and other medical personnel are far more likely to be motivated and engaged than through traditional productivity-improvement programmes.
- A common frame of reference is created for the crucial dialogue between payers and providers about payment; and, more broadly, for the critical alignment of other stakeholders (e.g. pharmaceutical and medtech companies) around the shared goal of improving value delivered to a defined patient group or other population segments.
- Through ongoing tracking of standardized outcome metrics, health systems can analyse variations in outcomes – in a local network, a regional health system, an entire nation and even around the globe – to identify and spread best practices, and continually improve the quality and cost-effectiveness of care. This approach dramatically broadens the base to identify and recognize relevant innovations and successful initiatives that improve patient value.
- Perhaps most importantly, this definition of value in healthcare empowers patients. It focuses on measuring the outcomes that matter to them – not only traditional clinical indicators, but also broader factors such as a patient's quality of life and ability to work. In this way, providers can assess a care team's repertoire of interventions brought to the patient. This includes not only the right drugs or a technically accomplished surgeon, but also the right information or levels of trust and comfort, all of which are critical for the patient and the end result. Moreover, when patients have access to detailed information about provider health outcomes, they can make informed decisions based on the outcomes that matter the most to them.

For all these reasons, the most useful way to think about value in healthcare is in the ratio of health outcomes (those delivered to defined patient groups) to their respective costs. Improving those outcomes over time must be the critical guiding principle of any healthcare system.

Measuring outcomes and costs

Where does the global healthcare industry stand on delivering against this objective? The journey has only just begun. Most health systems do not routinely track health outcomes, and even fewer are able to link outcomes to the cost or even the key cost drivers of the full cycle of care delivered to patients.

To be sure, healthcare providers have been tracking an increasing number of metrics, often in response to requirements from payers or regulatory agencies. Most of these metrics, however, do not address actual health outcomes. Most providers track financial metrics by department, usually in terms of whether a given unit is on budget, and process metrics, with an emphasis on waiting times and the productivity of individual units. While some measure quality, "quality" is often defined as compliance with treatment guidelines – in effect, process efficiency – or in terms of patient satisfaction. Such metrics have their uses and may be relevant and important in some situations. But they typically emphasize efficient throughput for the institution or department or the subjective experience of the patient, not the actual health outcomes delivered to patients suffering from a disease or undergoing a procedure. In the United States, of the 1,958 quality indicators in the National Quality Measures Clearinghouse of the Agency for Healthcare Research and Quality, only 139 (7%) are actual health outcomes, and only 32 (less than 2%) are patient-reported outcomes.¹¹

As more of the sector's stakeholders have embraced healthcare value, remarkable progress has been made in developing methodologies and approaches for tracking health outcomes. One prominent example is the development and growth of quality registries. Usually established by medical professional societies or patient advocacy groups, registries create databases and methodologies for systematically tracking the most relevant outcomes for all patients suffering from a specific condition or disease.¹² In addition, considerable progress has been made in developing international standards for outcome metrics across key disease categories. (See the sidebar: "The International Consortium for Health Outcomes Measurement".)

As Steven Brill wrote in his TIME report, "The health-care-industrial complex spends more than three times what the military-industrial complex spends in Washington." That's because they don't really want value-based reforms that could result in over \$1 trillion/year in lost revenue.

The International Consortium for Health Outcomes Measurement

Since 2012, the International Consortium for Health Outcomes Measurement (ICHOM), an independent non-profit organization, has convened global working groups of clinicians, patient representatives and other leading experts to define and publish globally harmonized sets of outcome metrics for specific conditions, diseases and population segments.

By the end of 2016, ICHOM had published standardized metrics and risk-adjustment variables for 21 major conditions, with an additional eight under active development and 13 in the initial planning stages. ICHOM's standard sets will cover more than 50% of the global disease burden in developed countries by the end of 2017.¹³

ICHOM has helped address many of the challenges that have made conducting systematic outcomes measurement difficult. These challenges include aligning stakeholders on outcomes that matter to patients, selecting the appropriate metrics, standardizing nomenclature and measurement techniques, and devising both short- and long-term measurements that capture caregiver contributions along the full cycle of care.

The organization's standard sets aim to define a comprehensive but minimally sufficient set of metrics that all providers should track for a given condition. The sets track outcomes not only in traditional clinical categories, such as improving health, increasing life expectancy, and slowing, eliminating or preventing disease, but also in broader areas that matter to patients, such as minimizing time to recovery, dying a good death when recovery is no longer an option, and ensuring that treatment does not create undue burdens on a patient's family. **EXCELLENT!!!**

A growing network of healthcare providers around the world actively implements ICHOM standards. Some 185 organizations in 32 countries are implementing at least one ICHOM standard set, and 33 are implementing more than one. The consortium directly supports 40 hospitals and health systems in 13 countries, including the MD Anderson Cancer Center, Boston Children's Hospital, Stanford Healthcare (all USA), Great Ormond Street Hospital for Children (UK) and Karolinska University Hospital (Sweden) (Figure 2). In January 2017, ICHOM signed a letter of intent with the Organisation for Economic Co-operation and Development (OECD) to initiate a collaboration with the goal of including ICHOM metrics in the OECD Patient Reported Indicators Survey for comparing quality of care across member nations.¹⁴

Figure 2. A Growing Ecosystem of Stakeholders Are Implementing and Tracking ICHOM Standards



Source: International Consortium for Health Outcomes Measurement

Driven by profit motive...

In recent years, providers have gained considerable experience in tracking costs, as budget pressures have forced them to focus on cost-cutting and process efficiency. The problem, however, is that **most approaches to tracking costs do not really link them to the delivered outcomes.** Conventional methodologies for analysing healthcare costs typically use claims data as a proxy for actual costs. Costs are aggregated and analysed at the level of the individual department or procedure, but they do not reflect the actual costs of the care delivered to an individual over an extended period of time, nor are they linked to the outcomes generated. Costs for a given condition that are distributed across many different departments and provider organizations make it extremely difficult to get a clear picture along the full cycle of care. As a consequence, nobody “owns” or can manage the trade-offs between cost and quality along the clinical pathway.

However, analysts have developed a variety of alternative methodologies in recent years for measuring healthcare costs. Probably the most comprehensive is a technique known as time-driven activity-based costing (TDABC).¹⁵ Using this methodology, providers develop detailed process maps to identify typical patient treatment pathways and allocate costs on the basis of the amount of time patients spend with each resource in the care pathway.

Leading provider organizations are beginning to use TDABC to identify waste and improve efficiency. TDABC has also been used to analyse cost variation among multiple providers. A recent study compared primary total knee arthroplasties across 29 US hospitals and their affiliated orthopaedic surgeons. The study found that the average cost of care varied by a factor of approximately 2 to 1, despite similar patient demographics and readmission and complication rates.¹⁶

But providers do not necessarily have to adopt TDABC to link costs to outcomes. Some organizations start by embracing a less comprehensive approach that identifies the most significant and easiest-to-measure cost drivers for a given patient group or disease area, including average length of stay, operating theatre time and the cost of expensive purchased items, such as specialty drugs or implants. Organizations are then able to manage those costs aggressively, with the goal of continuously improving over time. Such focus provides opportunities for significant short-term reductions in cost, leaving the more detailed analysis of personnel and equipment costs to subsequent efforts.

According to HBO’s 4-part documentary, “The Weight of a Nation” (<http://www.mhealthtalk.com/americas-obesity-epidemic-a-big-problem-updated/>), there is a direct relationship between poverty, obesity and health. Public health officials can accurately predict obesity and longevity rates by zip codes. And they’ve seen differences in average longevity of 20 years between poor and affluent neighborhoods on opposite sides of the same town.

Focusing on distinct population segments

Value-based healthcare puts the patient at the centre of the care system. In order to improve healthcare value, **the key unit of analysis is the population of individuals suffering from the same disease or condition, or sharing similar risk profiles.** By focusing on distinct population segments, providers can meaningfully compare health outcomes, identify the causes of unnecessary variations in those outcomes and improve the overall level of outcomes over time.

The simplest way to define the population segments of a value-based system is to group all individuals suffering from the same condition or disease – for example, all those with type 2 diabetes or who have experienced an episode of acute myocardial infarction. Most quality registries track outcomes by disease or condition, and a few track outcomes among patients who have undergone a procedure (e.g. hip or knee replacement). However, while procedure-based segmentation can have significant value for certain well-defined procedures, it is not ideal because researchers cannot compare the efficacy of the procedure in question with alternative modes of treatment (e.g. surgery vs physical therapy).

To be effective, segmentation must also consider the risk factors influencing outcomes. The patient population suffering from a condition or disease will typically have subgroups with different risk profiles. For example, within the broader population of all patients suffering from diabetes, some patients suffer from other medical conditions, such as congestive heart failure or asthma, and others do not. These groups will have different risk profiles, as patients with multiple diagnoses will have a greater risk of worse health outcomes than those suffering from diabetes alone. Robust techniques for risk-adjustment to the patient mix are needed to meaningfully compare the outcomes of two different providers in a given disease area. Over time, as the appropriate health outcome metrics for these patient subgroups become better understood, those subgroups may become clearly defined population segments in their own right (for example, all type 2 diabetes patients with heart failure), with their own clearly defined clinical interventions and priority health outcomes.

Another key dimension of risk concerns individuals who may currently be asymptomatic, but who are at risk of developing a disease in the future. They also represent distinct population segments that any population-based approach to healthcare must take into account. **In some cases, social or demographic factors will be the most relevant segment category (e.g. the population segment of all newborns or the frail elderly), as such groups are likely to face similar health issues, pose unique challenges or place special demands on the health system. In other situations, the key risks will be behavioural, as for the population of heavy smokers.** Whether or not members of this segment are symptomatic today, their current behaviour represents a key health risk and requires certain types of interventions,

such as smoking cessation programmes, to minimize the risk of future illness. Finally, an individual's genetic profile may represent a key risk factor for certain population segments. As biomedical researchers accumulate knowledge of important genetic risk factors, certain risk groups are becoming well known, as with the role of inherited mutations in the BRCA1 and BRCA2 genes in creating an increased risk of female breast and ovarian cancers.

Leading healthcare providers have considerable experience with this population-based approach for care delivery. At Kaiser Permanente, geriatricians have developed a senior segmentation algorithm that uses administrative and clinical data from the system's electronic health record. It categorizes each member aged 65 years and older into one of four care groups with similar needs: those without chronic conditions, those with one or more chronic conditions, those with advanced illness or end-organ failure, and those extremely frail or nearing the end of life.¹⁷ The algorithm and categorization are inputs to the care plan for each senior in the KP system, with a focus on slowing progression into the higher-need segments over time.

Customizing segment-specific interventions

As the Kaiser Permanente example suggests, providers that track outcomes and costs for carefully defined population segments can learn more about the clinical interventions that improve health outcomes for a given segment. As a result, they can drive the systematic improvement of care by designing customized and increasingly precise interventions for each group and subset within the group.

Martini-Klinik's care for prostate cancer patients shows that its focus on improving health outcomes has driven volume. The clinic nearly tripled its number of prostate cancer patients by 2011 since its founding in 2005, making it the largest prostate cancer centre in the world, and widely recognized as one of the best for research on prostate cancer and its treatment. The more data the clinic accumulates, the more it has been able to identify multiple subsegments within the broader population of prostate cancer patients, to do increasingly sophisticated risk assessment and to define multiple care pathways for different patient categories. The result has been more precise and more personalized care, depending on each patient's risk profile.

Leading pharmaceutical and medtech companies are repositioning themselves to partner with providers in developing more effective treatments that improve health outcomes. Pharmaceutical companies are expanding their offerings "beyond the pill," combining their drugs with a variety of value-added services, including more precise diagnostics, data and health information services, and sometimes even care-management expertise and care delivery. Novartis is pursuing this approach with Entresto, its new heart failure drug. The company is bundling

it with add-on services to improve patient outcomes, including remote monitoring devices for early detection of deteriorating heart performance. In addition, Novartis is evaluating the use of internet-connected devices at home, such as scales and blood-oxygen meters to detect changes in fluid balances, with the goal of improving health outcomes among patients taking the drug.

Meanwhile, medtech companies are beginning to integrate downstream and build fully integrated supplier and care-provision franchises. Device-maker Medtronic is taking this approach to improve outcomes and lower the cost of treating heart failure and diabetes. Germany's Fresenius Medical Care is doing the same in end-stage renal disease. Fresenius is the only medtech company active across the entire value chain, from selling equipment and dialysis supplies to operating more than 800 centres providing peritoneal dialysis and haemodialysis to manufacturing and marketing renal drugs. The company is also engaged in pilots in which it takes full responsibility for the myriad health issues that frequently afflict patients with end-stage renal disease, such as diabetes, cardiovascular disease and chronic ulcers.

As healthcare organizations set more holistic goals for improving a population's health, customization is required along two critical dimensions. First, whereas traditional care delivery focused on diagnosis, treatment, recovery and rehabilitation, a genuinely integrated value-based approach to care will reach upstream to include interventions that encourage prevention, and downstream to include the long-term monitoring and management of patients with chronic disease. Second, moving beyond the traditional clinical setting will allow for inclusion of both behavioural and social interventions. The former include helping patients modify unhealthy behaviours (e.g. smoking, poor diet, the lack of exercise), comply with treatment guidelines or increase their individual motivation and willingness to participate in care. Social interventions address issues that have traditionally been treated in the separate public health or social services system (e.g. access to housing, immigration status, food security). Kaiser Permanente has recently appointed its first chief community health officer to oversee the roughly \$2.2 billion the system spends annually on community benefits, including prevention-based community health programmes. In this respect, value-based healthcare represents a higher degree of alignment and integration of what were largely separate sectors: healthcare, public health and social welfare. Integration will require partnerships with new stakeholders who are best equipped to deliver social and behavioural interventions, including family members, churches, community organizations and schools.

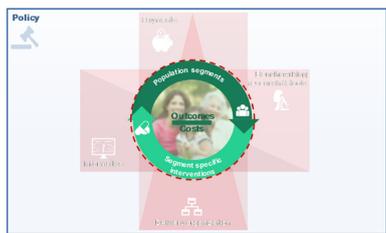
This is a good example of where emphasizing patient value improves reputation and profit. Let's hope it helps CEOs with fiduciary responsibility to shareholders (profit motive) to focus more on patient value.

An integrated approach to care delivery along the entire treatment pathway is not only a more effective way to monitor and treat patients. It also allows for better coordination across multiple stakeholders, as well as more integrated treatment pathways for sufferers of a given condition or disease. Moreover, it gives health systems full visibility of the system costs to make informed trade-offs – for example, investing in preventive care to

avoid high treatment costs at later points in the value chain. Through standardized measurement of outcomes, thoughtful segmentation and rigorous risk adjustment, new innovations – whether a new surgical technique, a predictive-response diagnostic or a statute to limit local pollution emissions – will continue to improve healthcare value for each population segment.

Figure 3 provides a summary of the patient-centric care delivery model for value-based healthcare.

Figure 3: Patient-Centric Care Delivery Is the Centrepiece of the Value-Based Model



Patient-centric care delivery model designed to optimize value for patients

- Standardized tracking of health outcomes and costs of care
- Carefully defined population segments (by diagnosis and risk profiles)
- Segment-specific interventions along the full cycle of care

	<p>Measuring Patient Value</p>	<ul style="list-style-type: none"> • Outcome measures standardized globally, aligned to patient population and clinician goals, and risk-adjusted • Costs attributed to each patient are measured across the full cycle of care, encompassing all steps of the care chain
	<p>Population segments</p>	<ul style="list-style-type: none"> • Patient groups prospectively segmented and stratified, according to health condition and risk-level (on the basis of physical, behavioral, and social factors) • Population segments are the cornerstone of care – i.e., the basis for intervention type and outcomes measurement; supported by innovative diagnostic capabilities and data collection
	<p>Segment specific interventions</p>	<ul style="list-style-type: none"> • Holistic interventions, health care provided along the full care chain, customized to achieve outcomes specific to each population segment. Includes preventive, social, and behavioral interventions. • Innovative medtech and pharma products and services integrated in care provision, supported by new business models

Source: BCG analysis

A preliminary roadmap for system transformation

As some examples in this section suggest, leading providers in countries around the world are already implementing value-based care delivery. But while it is one thing for an individual provider to institutionalize the value-based model, it is quite another for an entire national health system to do so. The real potential will be realized only when the approach is applied system-wide, at the regional, national or international level. The bigger the population of patients with extensive standardized outcomes data, the more powerful the insights clinicians can draw on what interventions work best for which patient segments and subsegments.

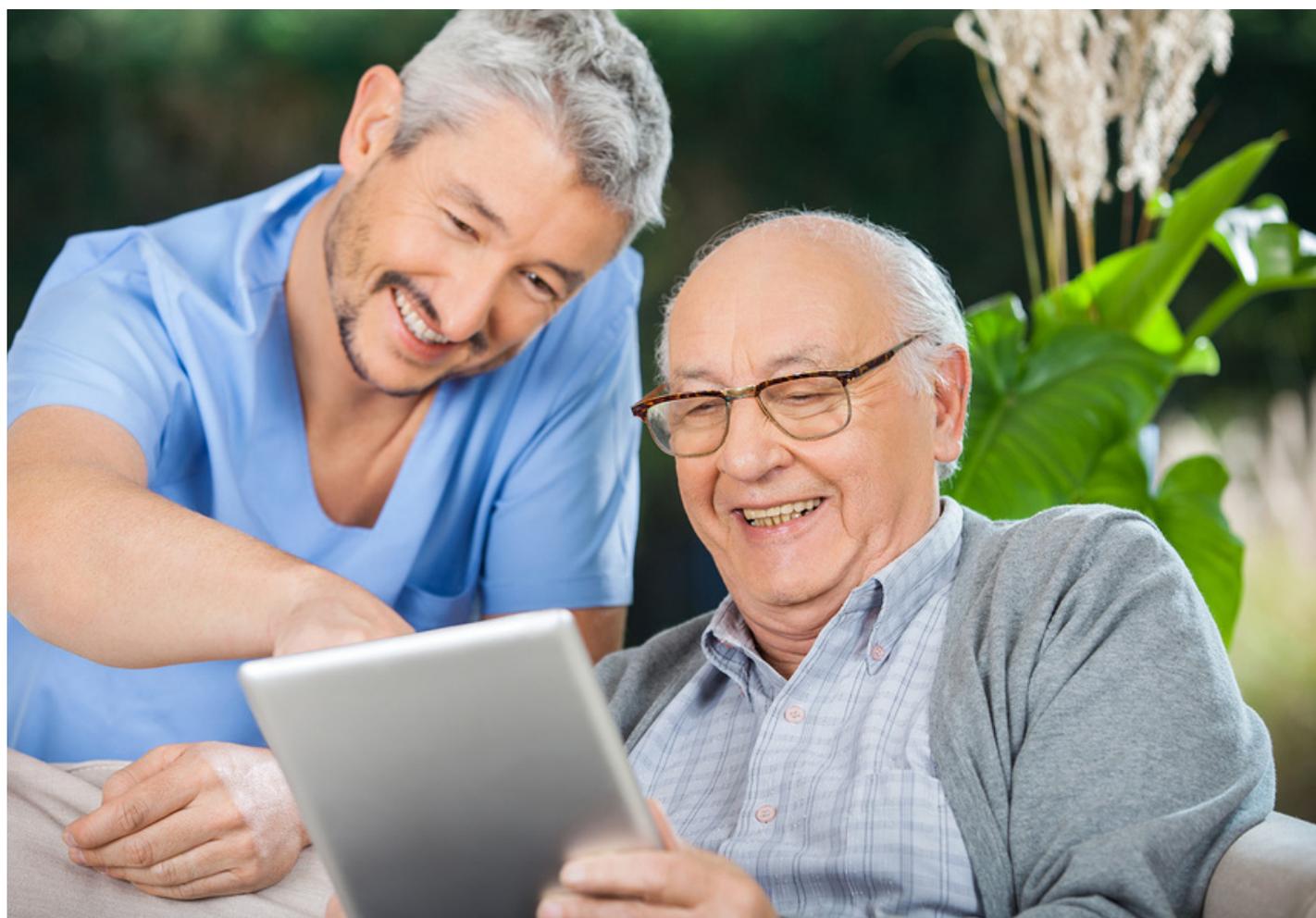
Four phases in the evolution of value-based healthcare can serve as a preliminary roadmap for system transformation:

- **Phase One – Internal performance improvement:** Individual provider organizations, pharmaceutical companies and medical device makers begin measuring their contribution to healthcare value and reducing variation in health outcomes across all treatment and product categories, much as Kaiser Permanente and Martini-Klinik do routinely today.

- **Phase Two – System learning and performance improvement:** Once a critical mass of providers in a national health system is actively tracking health outcomes and working to improve them over time, the next step centres on improving performance across the entire health system. The priority should be on developing shared standards and benchmarking the performance anonymously across and within health systems, with a focus on learning and continuous improvement. This currently occurs at many quality registries around the world.
- **Phase Three – Transparency and value competition:** Once system-wide standards are in place and methodologies for outcomes tracking and risk-adjustment have been validated – results can be made public. The public sharing of health outcomes data empowers patients to make informed choices from treatment options and providers, based on the outcomes mattering most to each patient. In addition, stakeholders have financial and non-financial incentives to cooperate and compete on improving healthcare value. This occurs to an extent in some countries, such as Sweden, and in some disease areas at the international level (e.g. in cataract treatment centres across Europe). But genuine competition over value is still relatively limited.

- **Phase Four – A continuously improving value-based healthcare system:** The final phase in the transition is the creation of national health systems that are fully optimized for continuous improvement in the value delivered to defined population segments. In such a system, outcomes data is measured for all major patient and population segments. Data is made available to the public for making informed decisions, to care providers for benchmarking their own results and making continuous improvements, and to academic and industrial innovators for developing new knowledge and products. This phase will include development of more global disease-focused centres of excellence (e.g. Martini-Klinik for prostate cancer), a higher degree of provider integration similar to that of Kaiser Permanente, and new business models enabling closer collaboration among payers, providers and suppliers.

To progress across these phases, national health systems must develop four key enablers of the value-based delivery model, as discussed in the next section.



Four Key Enablers of Value in Healthcare

Health systems can greatly accelerate the transition to value-based healthcare by aligning four key enablers: informatics; benchmarking, research and tools; payments; and delivery organization.

Informatics

Value-based healthcare is an evidence-based approach to health maintenance and improvement. As such, one of the most critical enablers of any value-based health system is **a comprehensive informatics infrastructure for the routine collection, sharing and analysis of outcomes data and other relevant information for each population segment along the full cycle of care**. Informatics is defined as the combination of data standards, information technology (IT) architecture, and analytic capabilities to support the systematic tracking and analysis of health outcomes, relevant risk-adjustment factors, segment-specific interventions and the corresponding costs of care. The more that health informatics systems share common data standards and a common architecture, the easier it will be to share data across databases and organizations.

A minimally sufficient architecture has six key components:

1. Standardized outcome metrics and accurate measurement of resource costs by population segment
2. A universal data taxonomy across diseases and population groups (e.g. a consistent methodology and scale for measuring pain or patient quality of life)
3. Interoperability that allows databases to efficiently communicate with each other
4. Integration of outcomes data into the systems clinicians use in their daily work (e.g. electronic medical records [EMRs]) with a user-friendly interface that minimizes the effort required for entering data
5. Mechanisms to link individual patient data across multiple databases (e.g. a unique personal identifier)
6. Robust governance processes, with comprehensive rules for data access, agreements about data sharing and guidelines for managing privacy

Although considerable progress has been made in developing health informatics in recent years, the goal of creating such an integrated informatics infrastructure is still relatively far off. The current marketplace for health-related IT systems and databases is highly fragmented. Many countries continue to record and maintain patient health records on paper. And, even in health systems where **EMRs** have become the standard for capturing diagnostic and treatment information for individual patients,

the currently available off-the-shelf systems do not include structured and standardized data on patient health outcomes. Moreover, the procedures for entering and validating the data in EMRs are often less rigorous than those found in the outcomes databases of, for example, a typical quality registry. Indeed, in some cases, a large proportion of EMR data is erroneous, limiting the potential for trust and buy-in from physicians once outcomes data extracted from EMRs is used for comparisons or compensation. As a result, the data often has to be entered twice: first in the EMR as part of everyday clinical routine, and then in a quality registry, according to the well-defined data categories used by registries.

The general lack of interoperability across the many health-related databases created by stakeholders is another problem; such databases include EMRs, registry databases, financial reporting systems, lab data and biobanks. In the absence of both system interoperability (technical specifications allowing different systems to communicate with each other) and semantic interoperability (shared data taxonomies that allow systems to exchange data with unambiguous, shared meaning), it is difficult to combine data sets with high accuracy, draw meaningful inferences from the data or use multiple databases to uncover useful knowledge.

In most healthcare organizations, a further obstacle is the relative lack of people with the appropriate data-science skill sets for using the growing quantities of health-related data. Increasingly, stakeholders need personnel who can develop the appropriate analytic approaches for making sense of the data, or need to partner with outside organizations that can do it for them. This capability is an important though often neglected part of a comprehensive informatics infrastructure.

Finally, legal and regulatory restrictions, or the absence of certain legal requirements, also hinder the development of informatics infrastructure in many countries. Stringent data privacy laws can prevent the sharing of data; in many cases, it is impossible to comprehensively track the data of individual patients across multiple systems and databases. In addition, traditional regulatory frameworks make it difficult to use new types of data, such as genetic data, social media and mobile technology information, for population segmentation, risk stratification and treatment choices.

AND... Incentives don't promote sharing.

Nevertheless, some leading providers have made extensive progress on building integrated informatics platforms. As part of its comprehensive population-based approach

Providers often view patient data as proprietary. Hospital A has no incentive to share EMR data with Hospital B if that means losing a customer. And Hospital B can charge for re-doing tests themselves if they don't receive it.

to care delivery, Kaiser Permanente has invested heavily in system-wide IT platforms with common standards across all providers and standard methodologies for risk stratification. KP has implemented the largest advanced electronic health record in the United States that integrates each patient's clinical record with appointments, ancillary services, and registration and billing, creating a complete healthcare business and management system that enhances the quality of patient care. Finally, the system integrates data from KP's extensive databases that track outcomes across its patient population. This integrated informatics infrastructure allows the organization to analyse outcomes at the level of specific population segments, identify variations in outcomes or costs, and codify and share best practices for specific segments. These best practices then become the foundation for new treatment protocols. This infrastructure is a critical enabler, allowing KP to continuously improve the healthcare value it delivers to its members.

Some countries are also making progress at the national level. In the Netherlands, the Dutch Institute for Clinical Auditing (DICA), a non-profit organization funded by the country's Association of Health Insurance Companies and managed by its professional medical societies, functions as a provider-neutral aggregator of outcomes data on the national level for 23 quality registries. DICA provides: technical support, including methodologies for risk adjustment and statistical analysis; a standardized process for determining the relevant outcome metrics for a given condition; standardized data formats, so that data is comparable across providers; and rules for data access and anonymization to ensure patient privacy.¹⁸

There has also been considerable innovation in the rapidly evolving health informatics space which is generating a variety of new sources of data and new solutions to the data-integration challenge. Digital health applications are leveraging wearable devices and social media to collect new data and translate it into information that provides insights to doctors and personalized recommendations to patients. Such applications also connect with patients to mobilize engagement and help them adhere to care protocols. Cloud-based applications are allowing start-ups to collect real-world evidence from cancer patients on the precise impact of cancer drugs, helping pharmaceutical companies to better understand patients' medical needs and accelerate delivery of effective therapies. New approaches to data architecture are creating more effective ways to aggregate data from disparate databases with different architectures and data standards. Examples include "data lakes", in which raw data is stored in its native format, and data structure and requirements are not defined until the moment of use; and blockchain, a new type of data structure that allows for sharing data among distributed networks of computers without the need for a central authority.¹⁹

All these innovations are rapidly expanding the "art of the possible" when it comes to integrating health data around the patient. In the near term, these developments will contribute to fragmenting the health-informatics landscape. Through the adoption of critical standards over time, however, they will become integral components of the comprehensive informatics infrastructure for value-based healthcare.

Benchmarking, research and tools

Can't start until then?

Once health systems begin to routinely track and share health outcomes data and other relevant information by condition and population segment, the resulting accumulation of data will become a powerful asset for driving research and innovation in healthcare. This will occur through more systematic benchmarking, new types of research and the development of sophisticated decision support tools. In this model, highly granular data about health outcomes will increasingly help clinicians identify the most effective interventions and therapies for a population segment. Thus, value-based healthcare could create a dynamic learning system on an international scale, identifying and adopting superior clinical practice more quickly.

Benchmarking. Leading quality registries are already moving in this direction, resulting in what could be termed the "industrialization" of traditional clinical observation. The systematic collection of detailed information on health outcomes makes it possible to identify variations in outcomes across clinical sites, analyse the root causes of those variations and codify best practices (those that produce the best outcomes). Through systematic benchmarking, quality registries around the world are identifying effective treatments and important clinical innovations, and are then spreading them rapidly through the health system, reducing variation in outcomes and improving average health outcomes.

Importantly, this benchmarking is intended to compare outcomes, not processes. While benchmarking will make identifying best practices easier and push towards greater efficiency by eliminating inefficient interventions, it also will provide a measuring stick to demonstrate the impact of breakthrough innovation on improving outcomes.

Sweden's cataract registry, for example, used its growing database of cataract surgeries to identify patients at risk of postoperative endophthalmitis, a rare but debilitating surgical complication with a nearly 50% risk of blindness, and to determine the best clinical practices for preventing it (e.g. administering an antibiotic prophylactically). As a result, the average Swedish ophthalmology clinic delivers results on par with those of the best ophthalmic hospital in the United States.²⁰

Research. Ever larger databases for health outcomes can be used for more than merely identifying and sharing clinical best practice. By accessing these databases, clinical scientists will be able to identify previously overlooked variations in outcomes within a population, which will guide the development of more precise diagnostics and, ultimately, improve the appropriateness and accuracy of treatments.

The gold standard in clinical research is the double-blind randomized controlled trial (RCT). RCTs assess a new clinical procedure or drug therapy based on a rigorously designed comparison between two populations of patients; in the process, researchers, doctors and patients all do not know who receives the therapy being tested and who gets the control treatment. With the growing availability of high-coverage registry databases, researchers can conduct RCTs as part of normal clinical practice, using existing registry-based data capture (known as registry-based RCTs, or rRCTs). Clinical centres participating in the registry can randomize patients in normal clinical practice into one treatment group or another. These high-volume rRCTs are dramatically less expensive – as low as 10% of the cost of traditional clinical trials – because the assembling of the patient sample is completely integrated into routine care. They also test a representative population of patients, as narrow inclusion or exclusion criteria are typically not applied.

rRCTs are highly effective for testing the medical efficacy not only of potential new practices and treatments, but also of existing treatments. A team of Swedish, Danish and Icelandic researchers recently used this approach to evaluate the effectiveness of coronary artery thrombus aspiration, a technique increasingly used along with percutaneous coronary intervention (PCI) for patients suffering from ST-segment elevation myocardial infarction (STEMI), a type of heart attack. The study found that routine thrombus aspiration before a PCI did not significantly reduce mortality and, therefore, did not contribute to healthcare value.²¹ *The New England Journal of Medicine* recognized the study's design as a "new paradigm" for conducting clinical trials and a potential "disruptive technology in clinical research".²²

Registry-based trials may also significantly improve the efficiency of drug development. RCTs are essential to assessing drug candidates for safety and efficacy. But that process is extremely expensive; Phase III trials in the biopharmaceutical industry make up about 30% of total R&D costs. If regulatory authorities would allow some of these studies to be done through rRCTs, savings would be substantial and could be passed on to patients and payers. Of course, providers might see a reduction in revenue derived from clinical trials, but less cumbersome clinical trial protocols and the resulting reduction in physician workload would increase clinical productivity, freeing resources to improve outcomes or treat additional patients.

As scientists learn more about the genetics of disease and population heterogeneity, drugs are being targeted at ever smaller populations of individuals who share the same risk profile. While this development is a central part of precision medicine, it poses an additional challenge: while trial sizes can be smaller, finding the appropriate patients for the trial sample can be much more difficult. Registry data on health outcomes in a given population segment can help to identify such patients and to research drug effectiveness in real-world patient populations. (See the sidebar: "US Cystic Fibrosis Registry".)

By integrating outcomes measurement in normal clinical practice, clinicians will look for means of improving outcomes and be more inclined to engage in translational research projects that test promising innovations. This should, in itself, strengthen the position of clinical research in many provider organizations. High-quality healthcare is a prerequisite for high-quality clinical research.

Decision support tools. In the future, researchers will analyse large databases of all patients treated for a given disease to develop algorithms that help clinicians identify the clinical interventions likely to be most effective in any individual case. Defining the right interventions for the appropriate population segment leads to improved health outcomes. The more structured, high-quality data that clinicians have on both, the more benefit they can reap from decision support tools that help with choosing the most appropriate intervention. Measuring outcomes systematically will enable the assessment of how well current treatments match population segments and contribute to developing ever more precise treatments. Such algorithms will be particularly valuable in managing complex patients with multiple comorbidities. In addition, new tools will facilitate shared decision-making, in which patients can actively contribute to choices regarding providers and interventions and thus optimize the outcomes most important to them.

< Incentive for drug companies

< Disincentive for providers

US Cystic Fibrosis Registry

Cystic fibrosis (CF) is a rare disease, occurring in less than one of every 3,000 newborns. That rarity poses a challenge in researching the disease and developing improved treatment guidelines. Since the mid-1960s, the US Cystic Fibrosis Foundation, a patient advocacy group, has managed a quality registry that collects systematic outcomes data on all US patients suffering from the disease. **More than 28,000 living patients are enrolled in the CF Patient Registry, which collects data from more than 120 certified CF centres in the US. The registry's work has been instrumental in improving the average life expectancy of a newborn diagnosed with CF, from three years in 1964 to 40 years today.**

The registry publishes comparative data on the performance of all CF centres, and has a comprehensive quality engagement programme to reduce variation in outcomes. A “learning and leadership collaborative”, with 90% participation across centres, provides coaching to physicians. Patients and their families are included in these improvement initiatives as part of multidisciplinary teams.

In addition to helping CF centres improve their outcomes, the registry also collaborates with patients to encourage their adherence to treatment plans and to assess the overall value of care. Physicians have found that sharing registry data with individual patients can enable frank dialogue about the implications of patient behaviour for future survival. It also helps patients understand how they can influence the life cycle of their disease. In the future, the registry hopes to further understand the obstacles patients face, and to provide the knowledge, skills and resources they need to overcome them.

The registry has also invested in research partnerships with biotech companies to discover new therapies for curing CF. By using national registry data for clinical trials, the CF Patient Registry has found that drug approvals can be accelerated by up to three or four years because its extensive genetic profiles of CF patients makes it far easier to identify and track a relevant study population. The registry has participated in clinical trials of new antibiotics, and helped conduct drug effectiveness research to determine which medications and treatments yield the best outcomes. These projects have even become an income stream for the registry; it has earned revenue from licensing its data for post-marketing and Phase IV clinical-trial information, and from royalties and rights collected on new drugs approved on the basis of research using registry data.

Sources: Cystic Fibrosis Foundation 2015 Annual Report; Interviews with the Cystic Fibrosis team

Payments

How healthcare providers and suppliers are compensated – through direct payments, reimbursement or supplier contracts – **can be either a major obstacle to or an enabler of value-based healthcare.** Three problems with current approaches to payment constitute serious barriers to the value-based model of care delivery.

First, current payment mechanisms in many cases create **disincentives for improving healthcare value.** Consider the perverse economic impact of reimbursing complications at US hospitals. An analysis of net revenues, fixed costs and variable costs associated with more than 34,000 inpatient surgical procedures at a major US hospital system found that **privately insured surgical patients with one or more complications provided hospitals with a 330% higher profit margin, or an additional \$39,000 per patient, on average, than those who had no complications.** Patients with one or more complications who are covered by Medicare, the US federal health insurance programme for people 65 years of age or older, produced a 190% higher margin, or an additional \$18,000 per patient.²³ In other words, the reimbursement system made it economically irrational to improve the value of healthcare by minimizing complications.

Unfortunately, there's higher profit in making errors.

Second, a fundamental disconnect remains between how providers are paid and the health outcomes they deliver, even when payment mechanisms are not actively discouraging improvement in healthcare value. This concerns not only the **traditional fee-for-service compensation model that has been widely criticized for leading to overtreatment and to the fragmentation of care chains;** it also pertains to alternative models of provider compensation. Capitation is one example. In theory, capitated payments should encourage more investment in preventive medicine because the more a provider network can limit costly secondary and tertiary care, the better it will be compensated for a given patient population. But unless clinicians are focused on improving health outcomes and have the data available to inform their decisions, capitation can easily become an incentive for undertreatment. This is especially so if the likely savings from increased prevention will only be realized over a long time period.

Third, in current approaches to compensation and reimbursement, **national health systems rarely take a holistic approach to payment across the full cycle of care. Because the costs and benefits are separated, incentives are not aligned.** One reason health systems have difficulty focusing on prevention is that many of the costs come out of the national healthcare budget, whereas many of the benefits accrue to the national social insurance budget as savings on, for example, unemployment benefits and

disability payments that result from a healthier workforce. Because public agencies or government bodies in most nations are not taking a holistic view of the full cycle of care, systems fail to make the trade-offs necessary to improve value in health. The problem is exacerbated by patient churn in health systems that feature multiple payers, given patients' tendency to move from one insurer to another over time. If an individual payer is unlikely to reap the benefit of prevention because patients move on to other insurers, why invest in it in the first place?

Factoring value into payment. As more health systems focus on value, however, payers have begun to address some of these issues and to introduce a value-based component into compensation and reimbursement. In Sweden, for example, the Stockholm County Council has leveraged the country's extensive network of disease registries to become a leader in developing value-based payment models. (See the sidebar: "Value-Based Payments at the Stockholm County Council".) The US federal government's Centers for Medicare and Medicaid Services, the agency overseeing the Medicare and Medicaid health insurance programmes and the world's largest public payer, has a stated goal of shifting 50% of the agency's payments from fee-for-service to value-based models by 2018. (See the sidebar: "Moving Beyond Fee-For-Service at the Centers for Medicare and Medicaid Services".)

Value-Based Payments at the Stockholm County Council

Stockholm County Council, commonly known as SLL, is the public entity responsible for funding healthcare for the roughly 2 million residents of the greater Stockholm metropolitan area. SLL has piloted bundled payments for cataract surgery, hip and knee replacement, and spine surgery, in which the level of payment depends, in part, on the actual outcomes achieved. In the hip and knee replacement model, providers are financially responsible for the full cycle of care for up to 2 years after the operation, including all diagnostics and any non-acute complications related to the primary surgery. In the programme's first two years, complications decreased by 18%, reoperations by 23% and revisions by 19%. Furthermore, costs per patient declined by 20%, and patient sick leave by 17%.

SLL has also begun to use quality and cost data to steer patient volumes to the most cost-effective providers and hospitals. The prices at Capio S:t Görans, a private hospital in central Stockholm and one of Sweden's largest emergency hospitals, are 9% lower than those of nearby public hospitals, even though salaries and other employment terms are the same and quality is high. Capio S:t Görans has achieved this cost advantage through rigorous measurements of performance, full public transparency of its score on key quality indicators and strong clinical leadership in championing outcomes-focused healthcare.

Source: Stockholm County Council

Moving Beyond Fee-For-Service at the Centers for Medicare and Medicaid Services

The Centers for Medicare and Medicaid Services (CMS), a US government agency, oversees the Medicare and Medicaid health insurance programmes which together cover about 130 million people or roughly 40% of the US population. The CMS annual budget of about \$1.2 trillion represents roughly 36% of total annual US national health expenditure. CMS has traditionally paid the vast majority of doctors who see Medicare and Medicaid patients on a fee-for-service basis. However, it seeks to shift 50% of the agency's payments from fee-for-service to value-based models by 2018. **How will Obamacare repeal affect this?**

Before the agency introduced any new reimbursement schemes, it focused on putting the appropriate quality metrics in place. In 2013, CMS completely redesigned its metrics for tracking physician performance, eliminating the vast majority of traditional process metrics and gradually replacing them with more relevant metrics intended to better reflect the quality of care. Although providers do not have to use the recommended metrics, the financial incentives to do so are strong. The agency also launched programmes to increase transparency and compare quality at more than 80% of hospitals. In 2015, CMS began streamlining its existing physician quality incentive programmes to help bridge the shift to value-based payments. These changes alone have had a major impact on healthcare value; CMS estimates that 80% of hospitals have improved their outcomes since 2007.

Once this tracking system was in place, CMS announced its plan in early 2015 to start shifting progressively to more value-based reimbursement. The approach, akin to rapid prototyping used in product development, sets broad goals and funds pilots, and then adapts those pilots as new and unanticipated problems emerge. The approach helps manage the risk providers face when shifting to the new system. In 2015, CMS also established the Healthcare Payment Learning and Action Network to support stakeholders in adopting value-based payments and analysing the results.

CMS is testing various models, including:

- Simple quality bonuses within a traditional fee-for-service model
- Value-based bundles for discrete episodes of care
- Full-fledged value-based capitation in the form of medical homes (a team-based care-delivery model that provides comprehensive and continuous care to patients, with an emphasis on prevention and wellness)
- Integrated accountable care organizations (ACOs) that take full responsibility for providing care to a specific population of patients and that receive a capitated population-based fee, with significant bonuses possible if health outcomes are improved

Today, approximately 30% of Medicare payments are made through these alternative models, covering about 16% of providers and 44% of the Medicare population.

Sources: US national health expenditure data 2014; Centers for Medicare and Medicaid Services

How will Obamacare repeal affect these changes enacted by the ACA?

Developing mechanisms that factor value into drug compensation is a more challenging task. Drug prices are typically negotiated with payers; however, patients, in dialogue with their providers, are the best judges of whether pharmaceutical companies are improving value through new diagnostic or care-management services. The absence of mechanisms for assessing the impact of drug therapies on value has held back many companies from developing novel approaches and broader offerings.

Price is no object if the choice is living, suffering or dying. Despite this obstacle, much experimentation is occurring. Pharmaceutical companies are partnering with payers to develop outcomes-based payment schemes for innovative new drugs. Novartis has signed value-based payment deals with US payers Cigna, Aetna and Harvard Pilgrim for its new heart failure drug, Entresto. The payers will receive rebates on the price of the drug if it does not deliver health outcomes agreed in advance (e.g. a reduction in hospitalizations for heart failure). Harvard Pilgrim has similar deals with Eli Lilly for Trulicity, its type 2 diabetes drug, and with Amgen for its new cholesterol drug, Repatha.

Whatever form value-based payment ultimately takes, it is highly unlikely that there will be a one-size-fits-all solution. Rather, the type of payment must fit a population segment's needs. In some contexts, capitation, adjusted for population risk and with some kind of outcomes-based component, will be the most appropriate model – for example, in most primary care settings or for chronic diseases, such as diabetes. When it is easier to define discrete episodes of care (e.g. surgeries, such as knee or hip replacements), value-based bundling will be the model of choice. In still other situations, for example trauma care, it may make sense to retain the traditional fee-for-service model or, alternatively, to combine a fixed budget with volume-based compensation. In short, value-based payment will likely also need to be patient-centric, with different approaches depending on the condition, the population segment and the type of care delivered.

Industry stakeholders should keep a critical caveat in mind as they pursue these and other approaches. How healthcare providers are reimbursed and compensated isn't the only – or even necessarily the most important – incentive shaping their behaviour. In the value-based model, the biggest driver in improving health outcomes is transparency, because it harnesses clinicians' natural desire to do the best for their patients. National health systems must not corrupt the focus on the core value of improving outcomes by tying it too closely to strong financial incentives.

Delivery organization

The organization of most provider networks can make it difficult to create multidisciplinary teams and achieve sufficient coordination across the full cycle of care, both of which are necessary to improve health outcomes and manage costs optimally. Health systems need to reconsider the structure of providers and care delivery networks as value-based healthcare progresses beyond individual pilots or initiatives. To improve value for a given population segment, care pathway designs and system goals need to be aligned both within individual providers and across the entire care chain.

Most care delivery networks are organized around functions. Provider organizations are typically divided between primary, secondary, tertiary or quaternary care. In theory, this structure allows patients to find the most appropriate treatment setting based on their condition. Primary care focuses on basic population health and disease prevention, as well as caring for the chronically ill. Then, depending on the uniqueness or severity of a patient's condition or the need for specialized care, patients are referred to secondary, tertiary or even more specialized quaternary care centres. Too often in practice, however, each unit of the care chain is managed separately, and incentives for clinicians at the various levels often conflict.

So, too, inside the typical hospital: departments are usually organized by medical specialty, for example cardiology, thoracic surgery, rheumatology and radiology. In many hospitals, resources shared by all departments, such as emergency and intensive care, or surgery, are likewise organized into their own specialty units. Despite the high degree of formal interaction among departments through referrals for diagnostics or treatment, each unit is measured on its own budget and its own, organizationally distinct key performance indicators. Moreover, departments and care units typically do not share incentives.

This highly functional organizational structure made sense in the past; increasing specialization and the unique expertise of a hospital's clinicians was the primary means of improving healthcare delivery, and choices among diagnostic and therapeutic alternatives were far simpler. Currently, however, the situation is increasingly dysfunctional. The independence of separate, specialized units makes it extremely difficult to optimize the full care pathway and to manage costs in an integrated way. Although individual unit performance and costs can be tracked, no one unit is typically responsible for the health outcomes of a given group of patients across the entire care chain. In fact, negative financial incentives for the clinicians in one unit may dissuade them from collaborating with those in another.

In order to shift to the patient-centred, population-based model of care delivery, some care delivery organizations are putting new roles and new organizational structures in place that encourage coordination across the full cycle of care. Such roles and structures also encourage the rational choice of treatment location based on the trade-off between costs and the expertise needed for the best possible health outcomes. Indeed, the traditional definition of a provider or care delivery organization will need to evolve into a multistakeholder ecosystem, including but not limited to redesigned hospital systems.

New “integrator” roles. The first step is the introduction of new roles within the existing care delivery organizational structure. The recent trend of using care managers to monitor and coordinate the health needs of chronically ill patients is one example. In the United States, CareMore, a small integrated care provider, has pioneered this approach through a network of small decentralized clinics staffed by nurse practitioners (referred to also as care managers). These case managers closely monitor and manage the care of chronically ill patients, often the frail elderly. In effect, they serve as *integrators* who, by collaborating with primary care physicians and specialists, provide wraparound services supported by proprietary assessment tools, predictive models, longitudinal data and an integrated IT system.

Many hospitals are also investing to create similar integrator roles. Typically, this involves a matrix organization in which clinical experts within the traditional functional organization are formally assigned the integrator role, and are responsible for taking a horizontal view of the entire experience for a given patient group. Such patient-group “owners” report simultaneously to line management and to a senior executive for value-based healthcare who has a cross-departmental perspective. But some institutions are going further, embracing fundamentally new organizational structures designed to encourage multidisciplinary coordination and integration across the entire clinical pathway for a given population segment or disease category.

Integrated providers. As an organizational model, the integrated provider institution is responsible for whole patient health in a given geographic population across primary, secondary and tertiary care. These providers manage the population for maximum health-care value and, to a large extent, manage their own integrated care chains. They will also act as brokers, however, helping their patients to navigate to the best independent providers, which align their approaches with the integrated providers’ systems and provide distinctive capabilities.

Institutions that fully integrate the roles of both payer and provider (e.g. Kaiser Permanente) represent one form of this new model. In the United States, a number of private payers are forming closer partnerships with provider networks or, in some cases, acquiring them outright to move directly into care delivery. At the same time, many providers have launched their own health plans; the United States currently has 150 provider-owned health plans, with about 10 to 20 new entrants each year. This type of industry-driven consolidation may be one way that the value-based model will begin to spread.

From medical functions to disease-based organizations. A parallel trend is the shift from a functional organizational structure based on medical specialty to one based on conditions and population segments. The Cleveland Clinic in the United States underwent a major reorganization in 2008, jettisoning a structure organized around traditional medical disciplines in favour of one based on multidisciplinary institutes organized by disease areas. These institutes combine medical and surgical departments for specific diseases or somatic systems. All are required to publish outcomes and measure costs. Cleveland Clinic has integrated care through shared protocols and use of electronic medical records. The change has allowed the Cleveland Clinic to take a more patient-centric approach to care and to achieve the cooperation and alignment necessary to improve outcomes and treatment efficiency by taking a holistic view of costs along each treatment pathway.

In this context, clinics shifting from being organized by medical specialty to being structured by patient group with multispecialty teams is a major change for most large provider organizations. Specialty training, research and much of the financial accountability are located in traditional specialty clinics (that are also the professional home for specialists). Recruitment and development of medical expertise, which will be no less important in the future, will need adequate accountability, funding and focus. In the new value-based model, however, those responsible for the patient groups will also be responsible for outcomes and financial accountability. Experience indicates that once this shift is made, it often leads to a dramatic increase in professional influence over the institution’s performance and change agenda, and to a higher degree of autonomy and work satisfaction. Moving the focus of top management away from forcing compliance with the clinical budget and towards delivering high-value care to defined patient populations builds teams and cooperation, enhances innovativeness and allows clinical experts to contribute in a meaningful way to improving organizational efficiency.

Focused players. Other more specialized providers are pursuing the integrated practice unit (IPU).²⁴ Under this organizational model, they develop focused offerings that take advantage of economies of scale to provide the full range of care for patients suffering from a single condition or disease. Martini-Klinik (in prostate cancer) and Aravind Eye Care System (in cataract surgery) are the classic examples.

Value-added partnerships. Increasingly, suppliers are also providing a broad array of value-added services in order to take increased accountability for improving outcomes and reducing costs for sufferers of a given condition or disease. Medtronic has improved outcomes and lowered costs over the annual cycle of diabetes care through its acquisition of Diabeter, a Netherlands-based diabetes clinic and research centre dedicated to providing comprehensive and individualized care for children and young adults with diabetes. In addition, Medtronic’s

Most of the U.S. innovation examples described came about because of Obamacare, so I wonder about the effect of repealing it.

digital tools link patients with physicians to encourage self-management, and care managers are assigned to each patient. Similarly, it has acquired Nederlandse Obesitas Kliniek (Dutch Obesity Clinic) to implement a multidisciplinary network with expertise to help patients with morbid obesity maintain long-term weight loss and reduce comorbidities. The company continues to establish new capabilities to support additional value-based healthcare programmes, including its new Hospital Solutions unit to operate cardiology catheterization labs within hospitals, as well as integrated telehealth and patient services to monitor and prevent escalation of chronic disease.

It has also become increasingly clear that providers and their pharmaceutical and medtech suppliers alone cannot provide all the interventions needed to improve patient value. Behavioural and social factors are key drivers of poor outcomes and high costs, and often result from limited access to care, lack of education about healthy lifestyles, difficulty navigating healthcare systems, neighbourhood violence and other challenges created by below-average socio-economic conditions. In such environments, it often makes sense for providers to shift certain interventions away from traditional clinical settings to other stakeholders, such as churches, community centres, schools or universities, local governments and family members, all of whom may be better able to reach and influence affected population segments.

While sharing these tasks requires considerable investment and a commitment to training and monitoring, the results can be dramatic. In fact, partnerships can be tailored to address the needs of distinct population segments to deliver a holistic set of interventions. A model for this is the Congregational Health Network in the United States, a partnership between 512 local congregations and Methodist Le Bonheur Healthcare, a network of seven hospitals caring for a predominantly low-income, African-American population in Memphis, Tennessee. The partnership supports transitioning patients from hospital to home by working with church-based volunteers and

clergy to provide post-discharge services, assistance with daily living activities, and education on healthy living and disease prevention. The programme has resulted in a 50% decrease in mortality, a 40% reduction in readmissions for enrolled participants and \$4 million in savings (approximately \$9,000 per patient).²⁵

‘Confirms my view that \$1.5T/yr savings is possible.

In the future, all of these types of players will interact with each other much more closely than they do now, in extended health networks and ecosystems. Kaiser Permanente, for example, has partnered with Fresenius Medical Care to provide its renal failure patients with comprehensive, high quality care. KP also has similar partnerships with regional providers, such as Exempla and Banner Health in Colorado, as well as with safety-net providers across the United States that treat more than 100,000 patients with KP’s evidence-based clinical protocols. Risk management will be a crucial capability for providers pursuing this strategy, and access to high-quality data and analytics will be critical.

Nevertheless, the physician’s core role must not be lost, even as extended health ecosystems combine the capabilities of various medical specialties, provider organizations, pharmaceutical companies, medical device suppliers and community organizations. The provider’s role will not shrink, but grow in a value-based world, as providers will be increasingly empowered to convene and integrate stakeholders who can contribute to improved patient value. Just as new integrator roles are being established to coordinate care across care chains, so, too, will physicians and their clinical teams be asked to coordinate care across suppliers and community organizations that provide value-adding interventions. While physicians maintain legal liability for patient health, they, as well as nurses and other members of the multidisciplinary teams, are also in the best position to support patients with choosing the therapies they should or should not pursue.

Figure 4 summarizes the four enablers supporting value-based care delivery.



Figure 4: Four Key Enablers Support Value-Based Care Delivery



Effective collection and utilization of data to support provider benchmarking, clinical research and development of decision support tools for better patient value

- Health informatics allowing interoperable systems for the collection and sharing of data
- Benchmarking, research, and tools leveraging data analysis to enable identification of best practices, population variation and enhanced development of better decision support tools

New payment models and delivery system reorganization to improve patient value

- Payments that create incentives for appropriate and coordinated high-value care
- Organizational structure, roles, and incentives that support the behaviors required for provider teams to deliver high-value care

 <p>Informatics</p>	<ul style="list-style-type: none"> • Tools for high quality data collection along the full cycle of care enabling adequate population segmentation, measurement of value, and optimization of patient interventions and treatment • Adequate technical interoperability and links between systems, enabling efficient and consistent data capture, analysis, and sharing • Agreement on common standards to secure semantic interoperability across data sets
 <p>Benchmarking, research, & tools</p>	<ul style="list-style-type: none"> • Well-managed access to high quality data and global benchmarking to drive system-wide learning, meaningful research and innovation, and continuous improvement in value • Communication and transparency enabling comparison of common outcome and cost metrics, identification of variations, and selection of best practices • Availability of core applications and tools for patient engagement and data-driven decision support allowing care providers to most effectively utilize medical knowledge
 <p>Payments</p>	<ul style="list-style-type: none"> • Reimbursement schemes that incentivize improvement in outcomes and appropriate care • Payments and risks are shared among providers and suppliers along the care chain for better cooperation and optimal use of resources
 <p>Delivery organization</p>	<ul style="list-style-type: none"> • Case for change to motivate systems toward focusing on value; led by clinician engagement • Organizational context (roles and incentives) designed to support delivery of value-based interventions • Change management and roadmaps with priorities and sequencing of key steps, including training and adoption and the spread of best practices to enable continuous improvement

Source: BCG analysis

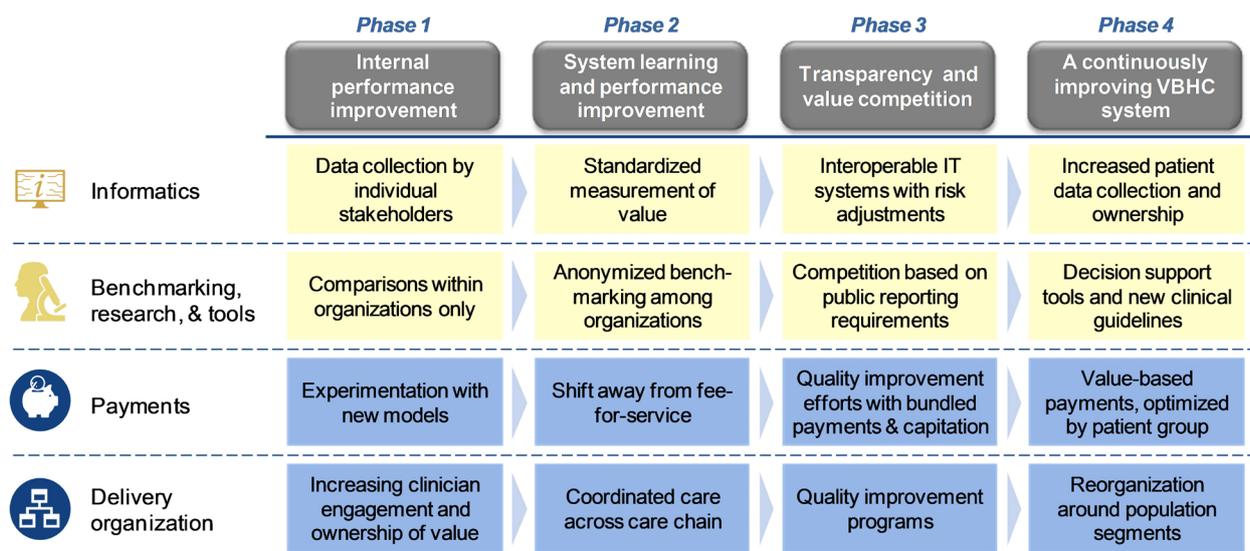
A preliminary roadmap for enabler transformation

The following **four phases** address how industry stakeholders can accelerate the development of the **four key enablers** for value-based healthcare (the phases also correspond to the transformation roadmap described in the previous section).

- **Phase One: Internal performance improvement** – Individual providers and other stakeholders put the basic building blocks in place for the organization to improve healthcare value. Enormous progress can be made simply by getting started. For instance, **organizations should not wait until common outcomes standards are developed for every single disease or medical condition, or until technical standards for a national IT infrastructure are entirely in place.** They can already begin to track outcomes, create quality registries, benchmark their internal performance and even experiment with new alternative payment models. Even the most rudimentary approach can represent a big step forward. When delivery organizations start to systematically track health outcomes, they often unleash clinicians’ engagement and commitment to improving healthcare value. The new focus on outcomes stimulates clinicians’ desire to do the best for their patients, and clinicians themselves can decide which outcomes to track. Thus, these initial efforts also begin to reorient the organization to the long-term change process.

- **Phase Two: System learning and performance improvement** – As value-based healthcare moves to the system-wide level, however, the issues of shared standards and new mechanisms for continuous improvement and clinical coordination will need to be addressed. During this phase, health systems must rethink the organization of care delivery to improve coordination around patient groups. **Governments will also have a leadership role to play.** Key tasks in this phase include adopting regional or national informatics strategies; encouraging, and perhaps even mandating, anonymized benchmarking across provider organizations; providing incentives to encourage a shift away from fee-for-service as the dominant mode of payment; and new regulations to encourage the creation of genuinely coordinated networks of care with shared goals and incentives.
- **Phase Three: Transparency and value competition** – As health systems gain more experience with tracking outcomes and using them to improve healthcare value, the focus is now on making outcomes data transparent to the public at large and creating an environment where stakeholders can both cooperate and compete on their ability to deliver value. IT systems must be sufficiently interoperable and include robust methodologies for risk adjustment to make data meaningfully comparable across providers. An appropriate model may be countries such as Sweden or the Netherlands – namely, those nations

Figure 5: Enabler Transformation Roadmap



Note: VBHC = value-based healthcare
Source: BCG analysis

that currently have extensive networks of quality registries and shared IT platforms for collecting and sharing data. Once the use of outcomes data for benchmarking is broadly established, national health systems can begin to leverage the data for clinical research. In addition, as national systems spread the use of value-based bundles and capitation, they will be better able to understand the precise impact these new payment mechanisms will have on healthcare value, to develop mechanisms that prevent selectively choosing the healthiest patients, and to use value-based payment to create financial incentives for continuous improvement in the health system. Finally, as coordinated care networks increasingly compete with each other on their ability to improve healthcare value, national or international interest groups must put quality programmes in place to help laggards improve their performance. Thereby, they also raise the quality of care across the entire system.

- **Phase Four: A continuously improving value-based healthcare system** – The transformation’s endpoint is a robust set of enablers supporting a comprehensive value-based healthcare system. An integrated informatics infrastructure will simultaneously guarantee the integrity of patient data and data privacy, and allow for accessing data for R&D. As younger generations are more comfortable with sharing personal data and information, the ultimate solution may be to let patients both collect and own their personal outcomes data and set the terms for its use. Innovative technical solutions, such as blockchain, may provide both the right level of security and a high degree of interoperability for those with rights to access.

Such solutions will give researchers routine access to large data sets. Registry-like databases will be used to conduct fast and cheap clinical trials to prove product or service effectiveness for regulatory approval. In addition, data accumulating in outcomes databases will serve as the foundation for regular development of new decision support tools and clinical guidelines.

The final phase in the transformation of payments will arrive when national health systems have a detailed understanding of which value-based payment mechanisms are most appropriate for improving value in a given disease area or for a specific population segment. A comprehensive legal and policy framework for value-based payment will govern payment options. It will define a discrete set of payment models appropriate for different patient profiles and treatment situations, including models for payment of suppliers that encourage cooperation between providers and suppliers.

Health systems will be reorganized around population segments, with clearly defined and differentiated integrated treatment pathways available to all those suffering from a given condition or disease, or who share the same risk profile. Finally, the number of national and international centres of excellence in key disease areas will increase.

Figure 5 summarizes the enabler transformation roadmap.

Getting to that endpoint is a long journey, and the precise path will depend on a particular stakeholder or country’s starting point. In some cases, these four phases will overlap and even occur in parallel. But whatever the starting point, national health systems need to begin setting the vision and creating a framework so stakeholders can move as quickly as possible through this evolution. Creating enabling public policies will be especially important because healthcare is such a highly regulated industry. Moreover, in many countries the government is the most important healthcare payer. This challenge is examined in the next section.

The Role of Public Policy

In contrast to President Obama's Patient Protection and Affordable Care Act, which was meticulously crafted with hundreds of days of public hearings to understand perspectives of various stakeholders, the Republican repeal & replace efforts have so far been rushed through in secret, behind closed doors and shielded from public scrutiny. This is troubling to healthcare professionals and consumers alike.

The healthcare sector is not only large and complex, but also heavily regulated. For these reasons, perhaps the most important enabler in the transition to a value-based health system is aligned public policy. **AGREED.**

As the previous sections make clear, stakeholders across the healthcare industry are engaged in myriad initiatives to improve healthcare value. However, they are running up against barriers that hinder further progress. In this respect, the shift to value-based healthcare is what economists call a collective action problem. Although all industry stakeholders aspire to the goal of improving healthcare value, disincentives and risks built in to the current system make it difficult for individual stakeholders to achieve that goal single-handedly.

Government thus has a central role to play in enabling and providing the incentives for a value-based health system. If the goal is to create a healthcare industry where players can both cooperate and compete on value, then government must set the rules and define an appropriate legal and regulatory framework to allow such cooperation and competition to emerge. During its second year, the Value in Healthcare project will further define the policy barriers and opportunities that must be addressed. A preliminary assessment suggests that governments must focus on five priorities:

1. Mandate the tracking of health outcomes and set standards for data collection and transparency

Systematic tracking of health outcomes is the foundation of any value-based health system. Such tracking depends on defining standardized outcome metrics and clear guidelines for creating fully interoperable outcomes databases so patients can be followed across providers and disease categories. The most important action policy-makers can take to accelerate value in healthcare is to facilitate and eventually mandate the tracking of health outcomes.

Currently, all nations mandate at least some reporting of health outcomes (e.g. basic mortality statistics). A few, such as the United Kingdom and Germany, have more expansive mandatory requirements. Most quality registries, however, collect and report data on a voluntary basis. This approach works in nations such as Sweden, where a strong consensus prevails among providers to collect and share data on a national level. In fact, the federal and regional governments in Sweden invested approximately SEK 1.5 billion (Swedish kronor), or about €160 million, in 2011-2015 to extend the country's registry network, develop new tools for using outcomes data to inform clinical decision-

making, and make data easily available to patients. But in countries without such a consensus, government can play a facilitating role by either creating incentives to encourage providers to track outcomes or legally obliging them to do so.

Obamacare initiated EMR meaningful use incentives.

All healthcare providers should be obligated to report the health outcomes data of the population segments they are responsible for. This can be viewed as the healthcare equivalent of financial disclosures required of all public companies in their filings to regulatory authorities. Among other things, that means adopting standardized outcome metrics; building standardized, interoperable information systems for tracking those metrics across providers; and sharing the results so that outcomes can be meaningfully compared with those of other providers.

Some providers may resist what they perceive to be a new burden of reporting, especially if it adds to their current reporting requirements. The solution is to follow the example of the Centers for Medicare and Medicaid Services in the United States – namely, to streamline the number of metrics providers are required to track so they focus squarely on outcomes that matter to patients. Once those metrics are in place, others, such as many process metrics, can be eliminated. In the end, the total reporting burden should be reduced, not increased.

2. Balance the trade-off between patient privacy and data sharing

As governments move towards the mandated tracking of outcomes, policy-makers will need to determine the appropriate balance between patient privacy and the sharing of outcomes data for benchmarking, continuous improvement and R&D. In some cases, approaches taken by two groups of key players can make it difficult or even impossible for industry stakeholders to share data for benchmarking, research, continuous improvement and innovation: one group is regulators who take a too-stringent tack on data privacy, and the other is providers, pharmaceutical companies or other institutions that hoard data for reasons of self-interest or perceived competitive advantage.

Governments will need to establish guidelines for data integrity and security, processes for shared governance, rules for access, and methodologies for anonymization so that aggregate data can be shared without violating an individual patient's privacy. The European Union (EU) General Data Protection Regulation establishes a legal

framework for securely processing health data. The regulation sets out a shared framework for defining key personal, health and genetic data; mandates standards for collecting and processing different types of data; and includes safeguards and protections for patient privacy. It also defines the individual's right to be informed of data breaches, to have access to personal data and to opt out of data collection. In addition, the regulation creates a unified framework to simplify data interactions across EU member countries. Beyond this, policy-makers can also learn from existing practices of quality registries that have safely shared aggregate and anonymized patient data for years.

Once sufficient privacy protections are in place, policy-makers can discourage data hoarding by providing meaningful incentives for data sharing. For example, in addition to promoting standards for interoperability, the Office of the National Coordinator for Health Information Technology in the United States is considering options to use Medicare and Medicaid payment policies for motivating the adoption and use of certified health-IT products that make it easier to exchange information.

3. Enable cooperation, coordination and partnerships along care pathways, while protecting against conflict of interest and focusing competition on value

Healthcare value requires creating customized interventions across the full cycle of care. As such, extensive coordination and partnerships are needed among multiple stakeholders and clinical experts. However, existing conflict-of-interest rules, designed to prevent fraud and abuse, can sometimes hinder cooperation from taking place. Laws in the United States prevent physicians from referring patients to diagnostic centres or other healthcare facilities in which those physicians have a financial interest. While such laws are a necessary constraint on self-dealing, they can also prevent the kind of coordination required in a value-based health system – for example, by prohibiting hospitals from rewarding providers that order less expensive treatments. More effective ways may exist to protect against financial abuse (e.g. value-based bundled payments) while also allowing for increased coordination across the full cycle of care.

Policy-makers need to craft new rules and regulations that encourage the necessary coordination, while also safeguarding against inappropriate collusion. An EU directive (of February 2014) encourages value-based purchasing in the procurement of medical supplies. The directive allows public authorities to consider full life-cycle costs rather than just the up-front purchase price of such supplies. In addition, it provides more freedom and flexibility to contracting authorities by shifting the tender process away from arms-length negotiation and towards closer collaboration with suppliers. This will encourage suppliers to develop proposals that show how their devices or supplies will lower the total costs of care.

Such cooperation will not necessarily hinder competition in healthcare. This false dilemma assumes that national health systems must choose between cooperation and competition. Rather, the challenge is to use public transparency around outcomes to create the right context – one in which providers and their partners compete on delivering value to the patient as opposed to simply maximizing market share or offering the lowest price per procedure. In some situations, stakeholders will cooperate with each other in value-adding partnerships; in others, they will compete to provide the best value to patients at the lowest cost. A value-based health system will combine aspects of both cooperation and competition.

4. Encourage and establish new longitudinal payment models that support improvement in patient value

As discussed earlier, traditional payment and reimbursement schemes can be significant obstacles to value-based healthcare. Not only are they not linked to outcomes, but in some cases they create actual disincentives to improving healthcare value. In countries that have multiple insurance systems (e.g. United States, Netherlands, Germany), frequent patient “churn”, or the movement of patients from one insurance company to another, can strongly dissuade payers from investing in prevention.

As both payer and regulator, the government can do a great deal. A simple step is to remove legal and regulatory barriers to value-based compensation models. Germany recently eliminated legal provisions favouring fee-for-service payment that prevented payers and providers in the country from initiating value-based compensation schemes. Public payers can also actively support new models for value-based compensation, as the Stockholm County Council is doing in Sweden, and CMS in the United States. In all these models, putting mechanisms in place that prevent manipulation of the patient mix (cherry-picking) to improve outcomes results will be critical. Auditing will also be needed to ensure accurate reporting.

Over the long term, policy-makers need to define new funding models, potentially including cost-sharing that supports meaningful screening and preventive care. The Singaporean government has used creative mechanisms for financing a healthcare system that emphasizes prevention in improving the population's health and minimizing expensive care. In 2015, 20% of total government health spending in Singapore was invested in social and economic development and in preventive measures. According to one government policy, each generation must be able to finance its own healthcare expenses, thus freeing younger generations from the burden of financing care for the elderly. The government allocates resources up front to each generation and uses mechanisms such as Medisave, a compulsory health savings plan, to increase individual accountability. Under the plan, employees contribute a percentage of their wages to the accounts, while the government incentivizes the right behaviour by continually adjusting how the funds can be used. Medisave has become a highly effective way

for the government to get Singaporean citizens to take responsibility for their own health and invest in behaviours that support prevention.

Another creative approach is the use of social impact bonds; namely, a government issues a contract in which it agrees to pay a specified return for the achievement of a specific social or health outcome. In the US state of South Carolina, a consortium of philanthropic funders has committed \$17 million (with an additional \$13 million provided by Medicaid) to fund the Nurse-Family Partnership. The programme pairs first-time, low-income mothers with specially trained nurses who support the mothers to have healthy pregnancies and become knowledgeable and responsible parents. The state will make up to \$7.5 million in success payments if the programme meets its goals, which include reducing pre-term births, child hospitalization and use of emergency departments.

5. Enable all actors, including pharmaceutical and medtech companies to become more accountable for and contribute more actively to improving healthcare value

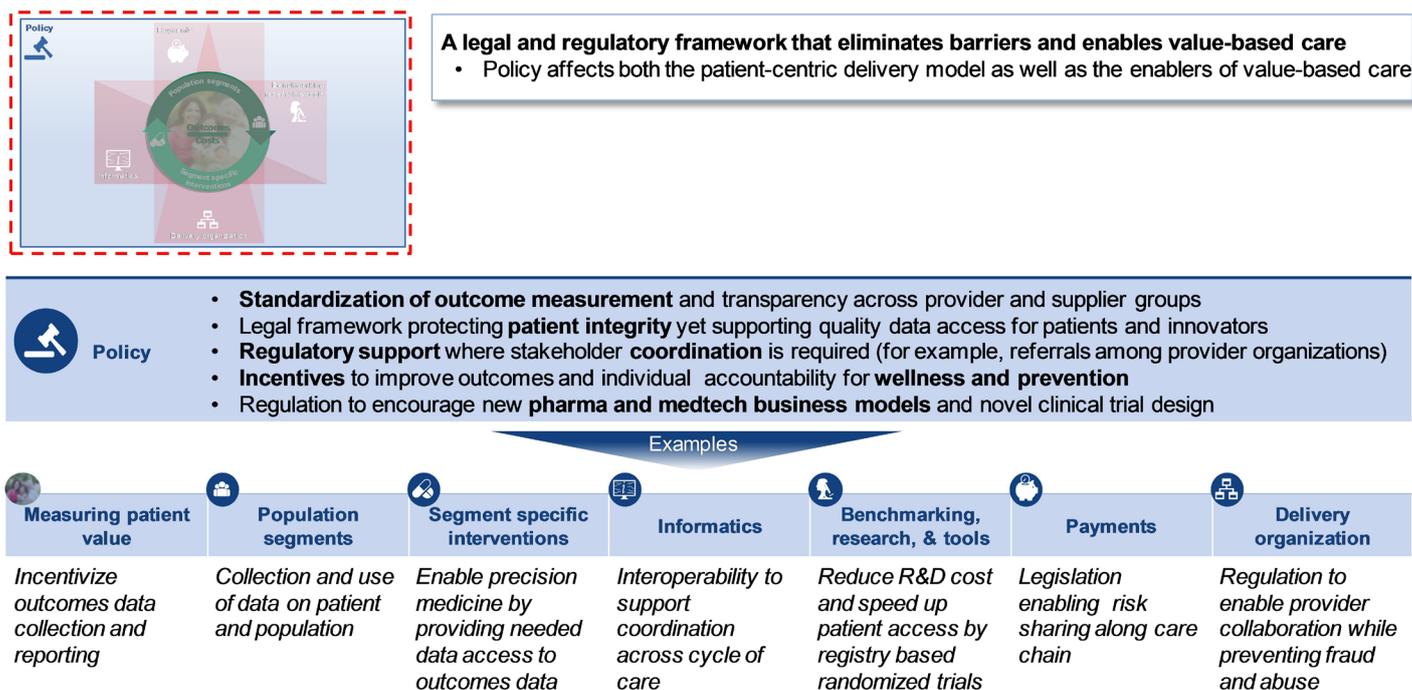
A fifth and final focus for public policy should be regulations that make it easier for pharmaceutical and medtech companies, as well as other innovative suppliers, to contribute to improving healthcare value. One focus could be changes in the regulatory approval process. As nations make progress in tracking health outcomes, “real-world” evidence provides an opportunity to test the efficacy of new drugs, devices and other products and services, with potentially large cost savings for Phase III

clinical trials. Regulatory bodies should consider giving conditional approval to products that have already proven their safety in order to allow for registry-based trials, as long as all patients using the new products are monitored with standardized outcome metrics, such as the ICHOM standard sets. Such an approach could lead to replacing some expensive Phase III trials by more cost-effective, registry-based RCTs.

Other changes could facilitate competition “beyond the pill” and “beyond the device” among pharmaceutical and medtech companies. Currently, payers typically negotiate prices by product. Ideally, health systems should make it easier for providers to collaborate with suppliers on jointly developing (and being reimbursed for) solutions that improve value. However, the legal and regulatory environment can hinder such collaboration. In the United States, anti-kickback statutes require pharmaceutical companies to document and charge back the fair-market value of any added services or solutions delivered to customers of its pharmaceutical products.²⁶ This requirement puts those companies at a disadvantage compared to entrepreneurial competitors outside the pharmaceutical industry that do not have this constraint. The requirement is an obstacle to their engaging in risk-sharing contracts with providers regarding their drugs’ impact on healthcare value.

Figure 6 summarizes public policy’s role in value-based healthcare and its impact on all other dimensions of a value-based health system.

Figure 6: Public Policy Needs to Create an Appropriate Legal and Regulatory Framework for Value-Based Healthcare



Source: BCG analysis

What Value in Healthcare Means for the Patient

This report has focused on the implications of value-based healthcare for the global healthcare industry's traditional stakeholders: providers, payers, pharmaceutical and medtech suppliers, and healthcare policy-makers. And yet, because the overarching objective is to improve a population's health, the central stakeholder in a value-based health system is the patient. Once all the building blocks of such a system are in place, patients will enjoy a variety of benefits. But for value-based healthcare to reach its full potential, patients will also have to engage differently with the health system, adopt new roles and take more active responsibility for their health.

New benefits

The primary benefits of a value-based health system will be the continuous improvement of health outcomes for the entire population, a lower disease burden for society and a potentially lower cost of care. Moreover, major improvements are foreseen in the quality of the patient experience.

One way to think about this improvement is in the context of the growing focus on “consumerism” in healthcare. With widespread access to outcomes data, increased accountability for health outcomes, and growing understanding about the specific treatments appropriate for particular population segments, healthcare consumers will be able to develop a far more informed understanding of who the best providers are and what kind of treatments are most appropriate for their specific needs. Put simply, healthcare will have a much more informed consumer.

Patients will also benefit as their information moves more easily through the health system, giving their caregivers a more shared understanding of their situation. Gone will be the days when patients had to repeatedly answer the same questions as they moved from provider to provider. Patients also stand to benefit from better coordination between different caregivers. The more seamless the health system along the entire care pathway for a given disease or condition, the less fragmented the patient experience is likely to be.

As technology enables continuous monitoring and data collection, patients will have increased access to (and ownership of) previously unavailable information about their physical health. As the balance between their privacy and data sharing is perfected, patients will have more freedom to decide who has access to their personal data and for what purposes.

New responsibilities

The role of patients in the health system also needs to evolve, however, so they can realize the full benefits of value-based healthcare. With widespread access to outcomes data, increased accountability for health outcomes, and growing understanding about the specific treatments appropriate for particular population segments, healthcare consumers will be able to develop a far more informed understanding of who the best providers are and what kind of treatments are most appropriate for their specific needs. Patients must be willing to help generate new data – for example, by answering surveys after treatment in order to log patient-reported health outcomes, or by using wearables that register data about their routines and physiological functions.

As for medical decision-making, patients will also need to play a more active role; and, given healthcare's complexity and the uncertainty of illness, physicians will continue to be central to that process. But patients should be encouraged to discuss the factors most important to them with their caregivers. While easily available outcomes data will greatly facilitate this dialogue, it will not happen on its own. Patients will need help navigating the data, understanding its significance and making their preferences known.

While these new responsibilities will challenge many patients, cultivating the motivation to change their habits or lifestyle and adopt healthier behaviours will be even more challenging for them. Patients will need to follow treatment protocols carefully, with many needing to pursue a healthier lifestyle through diet or exercise. All this will increase the focus on ongoing patient education. Some of the most important interventions in a value-based health system won't be medical interventions but, rather, the educational and motivational interventions that help patients shift their habits, behaviors, and lifestyle choices to lower their health risks over time.

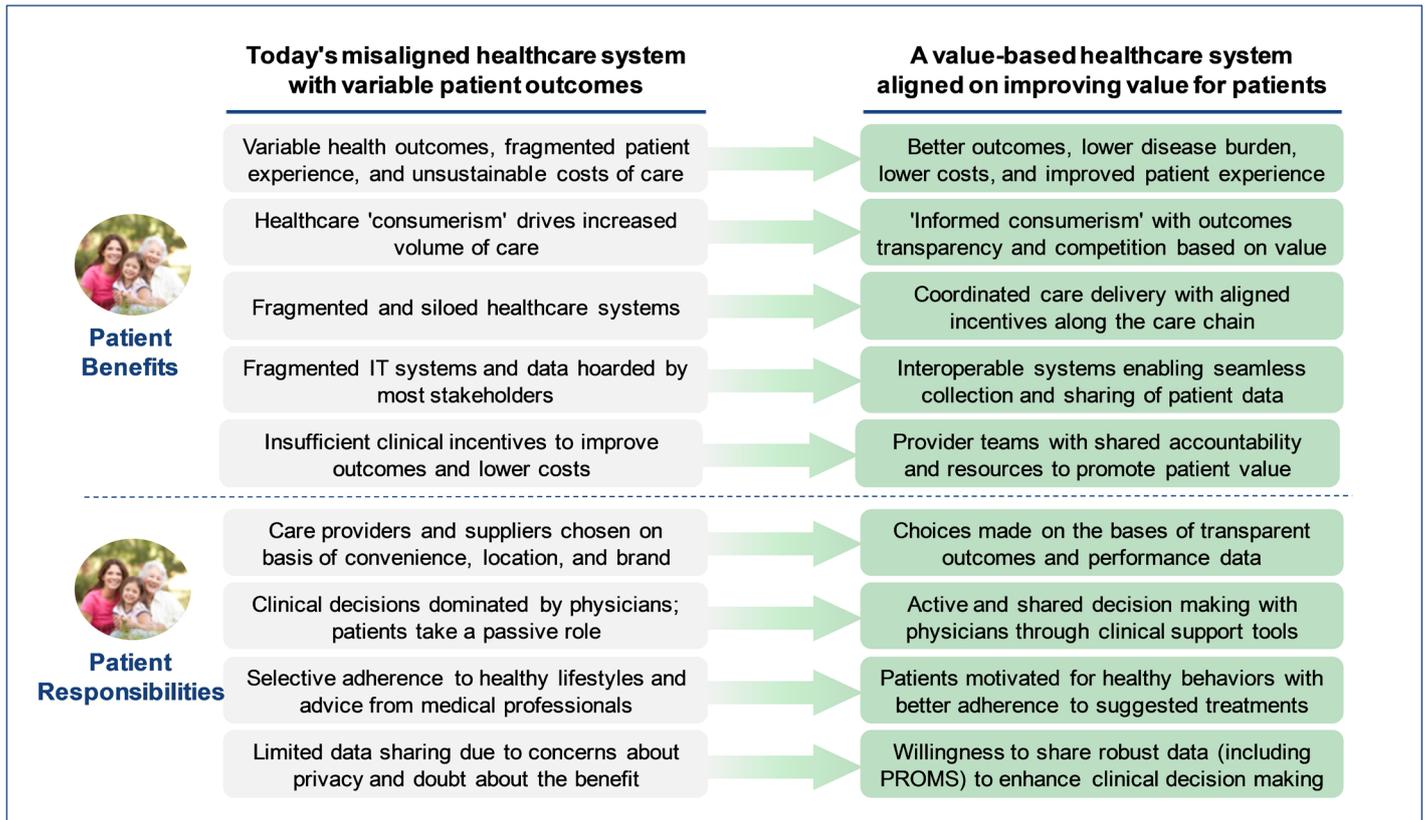
The degree of patient responsibility and involvement will vary depending on the situation and the severity of illness. Some patients – the young, the information-savvy, the better educated, the less severely ill – may find it relatively easy to assume more active roles, while others – the less well-educated, the poor, the elderly and the severely ill – may find it far more difficult or even impossible. When patients are seriously ill or weak, their healthcare team will need to adapt to their needs and take on a more active role. When patients are well informed and able to participate more easily in decision-making, caregivers will share the data and explain the choices at hand.

Considering patients as active stakeholders in the health system may also lead to new and broader ways of thinking about incentives in healthcare. In addition to new provider incentives, new patient incentives may be necessary to promote behaviours that help patients optimize healthcare value; these may include co-pays, reduced insurance premiums, tax subsidies or health savings accounts. Concurrently, a value-based health system will provide the training, resources and community partnerships needed to assist patients in adopting and maintaining value-oriented behaviours, especially in those segments of the population that find these new roles especially challenging.

Value-based healthcare is a recipe for empowering patients. But like all the other changes discussed, empowerment can develop either slowly and fitfully, or systematically and more quickly. The world's health systems must actively embrace the goal of empowering patients to make informed decisions about their care on the basis of outcomes that matter most to them.

Figure 7 summarizes the new benefits available to patients and the new roles they will be encouraged to take on in a value-based health system.

Figure 7: Value-Based Healthcare Will Deliver New Benefits – and New Responsibilities



Note: PROMS = patient reported outcome measures
 Source: BCG analysis

Appendix: Next Steps for the Value in Healthcare Project

In the first year of the Value in Healthcare project, the goal was to demonstrate why value-based healthcare is a necessary vision for future health systems. The project defined a case for change, provided a synthesis of best practices from case studies, identified issues and barriers that hinder reform, and outlined a preliminary roadmap for progression towards a mature value-based health system.

The work in 2017 will build on this foundation to sharpen the reform agenda, detail the roadmaps and address the challenges facing policy-makers and other leaders driving the change. The key themes will be practicality, real-world implications and multistakeholder implementation. Work in 2017 will also feature:

1. An in-depth analysis of **informatics and digital tools** to support value-based healthcare
2. An in-depth analysis of **clinical research and regulatory frameworks** to support relevant innovation
3. Further description of the **policy recommendations** needed to address key barriers
4. Analysis and documentation of 5-10 additional **case studies**
5. The planning and execution of system-level **pilots** in prioritized regions
6. The completion of system-level **implementation roadmaps**

Informatics and digital tools. In its first year, the project only scratched the surface of the deep and complex landscape of health data and analytics. The project will draw on the expertise of key stakeholders in the industry in its second year to achieve the following:

- Map key technical and legal barriers to effective management of patient outcomes and cost data, and identify required changes in standards, incentives and regulation
- Map and compare existing data capture, data analysis, and data sharing applications and standards
- Review opportunities to create major international data repositories to support large-scale R&D programmes (e.g. how to manage the trade-off between patient integrity and data access)
- Review integrated information systems that efficiently support clinical teams in driving improvement of patient value as part of normal clinical practice: what are currently the best solutions, and what can be expected in the future?

Clinical research and regulatory frameworks. Value-based healthcare will fundamentally transform how new products and innovations are evaluated and approved. This report has noted the potential for randomized registry trials to supplement Phase III product approvals. In 2017, the project will explore which therapeutic areas are most suitable for such a transformational shift, as well as the potential impact on R&D costs, timelines (for approval, as well as reimbursement and access) and trial design. Regulatory frameworks will need to evolve substantially for the transition to occur. To that end, the project's work in 2017 will feature dialogue with the US Food and Drug Administration and the European Medicines Agency to understand areas where potential risks could emerge, and the practical challenges the industry could face as outcomes measurement becomes embedded in clinical research.

Policy recommendations. Governments must use policy levers to address several barriers facing value-based healthcare. The precise nature of such policy interventions, however, needs to be clarified to be useful for national, state and local governments. The Value in Healthcare pilots (described below) will be instrumental for the project team's understanding of policy barriers in key geographies. In 2017, the focus will be on creating policy frameworks to support value-based healthcare in the United States, Europe, Asia and emerging markets. The first step will be a more detailed assessment of existing policy barriers and regulations. Questions to be addressed include:

- What are current quality reporting requirements in each geography?
- What are the limitations of the Health Insurance Portability and Accountability Act (HIPAA) in the United States, and the General Data Protection Regulation (GDPR) in the EU?
- Which elements of coordination along the care chain are currently prohibited or could lead to fraud?
- In which countries is it difficult or impossible to link payments to outcomes?
- How are suppliers prohibited from partnering directly with providers? What workarounds are in place (e.g. rebates to payers) and how effective are they?

By understanding such barriers, the aim is to craft concrete, country-specific policy recommendations, begin the process of lobbying with target governments and help influence new or existing statutes.

Case studies. The first Value in Healthcare case studies included nine health systems and organizations demonstrating best practices relevant to multiple elements of the patient-centric delivery model and the enablers. In 2017, case studies will include more focused examples of organizations that have achieved proficiency in a single element of the value-based healthcare framework. The likely focus areas include, but are not limited to, the use of rRCTs for regulatory purposes and innovative data/IT systems. An additional category will present how new technologies could be leveraged in the future to accelerate the pace of value-based reform (e.g. the role of machine learning, predictive analytics). Once completed, the Value in Healthcare case study library will have best practices covering the past, present and future of value-based healthcare. All cases will be accessible via the World Economic Forum and BCG websites.

Pilots. System-level pilots focused on implementing the transformation roadmaps will be the capstone of the Value in Healthcare project. Pilots will build on the Forum's ability to convene public and private organizations within a region to focus on a defined goal. Pilot proposals must include local government participation, and pilots should include nontraditional or community-based organizations that can often influence patient behaviours. The pilot process will begin by identifying an appropriate population segment within a prioritized region (emerging or developed economies). Subsequently, transformation roadmaps will be customized (through workshops) to address barriers that affect the population, while utilizing the region's capabilities. Current plans suggest a portfolio-based approach including one pilot in a region just beginning its value-based healthcare journey, one pilot in a region where significant progress has been achieved but where a final push is required, and one pilot in a very mature health system to serve as a proof-of-concept and best-in-class example of value-based healthcare.

Implementation roadmaps. The four phases of the transformation roadmap will support system-level change and, hence, require action from multiple players within health systems. Moreover, given the diversity of systems, no single roadmap will serve as a one-size-fits-all solution. Rather, a series of health system archetypes will be identified to respond to the key differences across systems. In 2017, the project will provide further description of the nature and sequence of events that will address the key barriers described in this report, including areas where public policy will play a pivotal role. In many circumstances, solutions will require unilateral action by a single stakeholder (e.g. governments, payers); however, in others, no clear owner or owners of particular actions will be apparent. An attempt will be made in 2017 to define where and how to drive multistakeholder alignment for securing implementation on a local, national or international level.

A final goal for 2017, and beyond, will be to lay the foundation of a self-sustaining network for healthcare leaders to share best practice and learn from each other while driving system reform towards value-based healthcare. Long-term collaboration will be accelerated by disseminating learnings from case studies, creating a digital platform for knowledge sharing, driving multistakeholder alignment on key actions in transformation roadmaps, and encouraging joint learning across pilot initiatives. The convening bodies and forums required for such sustained learning will be outlined at the end of the 2017 work. The Value in Healthcare project thus aspires to make a significant contribution to achieving the long-term health system reform goals of the World Economic Forum and The Boston Consulting Group.



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Endnotes

1. According to the World Bank, the compound annual growth rate in health expenditures for the OECD countries was 2.9% between 2009 and 2015. The equivalent growth rate in GDP per capita was 1.2%.
2. Health Affairs (2012).
3. Although Aravind's lower cost is partially the result of relatively low salaries of cataract surgeons in India, it is primarily due to how Aravind organizes care. See Govindarajan and Manikutty (2010).
4. Chung et al. (2014).
5. World Economic Forum (2014).
6. Kuenen et al. (2015).
7. Rosenberg et al. (2016).
8. A review of 3,000 interventions used to prevent and treat common clinical conditions found that approximately 50% were not supported by evidence of effectiveness. See *BJM Clinical Evidence* (n.d.).
9. Smith et al. (eds) (2012).
10. According to one estimate, combined global spending on public health and preventive and personalized medicine in 2015 was \$534.3 billion, or only about 7% of total global spending on healthcare. See Global Wellness Institute (2016).
11. Porter et al. (2016). Patient-reported outcomes are any report of the status of a patient's health condition that comes directly from the patient, without interpretation by a clinician or other party.
12. Larsson et al. (2012).
13. For more information, see <http://www.ichom.org/medical-conditions/>.
14. Gurría and Porter (2017).
15. Kaplan and Porter (2011).
16. Haas and Kaplan (2017).
17. Zhou et al. (2014).
18. Arora et al. (2016).
19. For a detailed description of blockchain data structures and their potential role in health informatics, see Ekblaw et al. (2016), Evans et al. (2016), and Iansiti and Lakhani (2017).
20. Larsson et al. (2012).
21. Fröbert et al. (2013).
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"A Single-Payer Healthcare System for All Americans" (<http://www.mhealthtalk.com/single-payer/>) is an article critical of both Democrats and Republicans that I posted in June 2017. While I favor single-payer as a more efficient way of paying for care than the added overhead of private insurance, I emphasize that something like Medicare-for-All is not enough to achieve anything close to the potential \$1.5 trillion/year savings I often cite. It alone does little to improve care delivery, and there's almost no focus on health, wellness and prevention to avoid the need for care in the first place. The article includes links to some of my most important related articles, such as those listed at right.

"Escape Fire: The Fight to Rescue America's Healthcare" (<http://www.mhealthtalk.com/escape-fire-rescuing-healthcare/>) features an EXCELLENT documentary film that won several awards at the Sundance Film Festival, and was described as "An Inconvenient Truth for the healthcare debate."

"Bitter Pill: Why High Medical Bills Are Killing Us" (<http://www.mhealthtalk.com/why-high-medical-bills-are-killing-us/>) is a summary of Steven Brill's 38-page TIME magazine special report. Brill dives into our health care system to understand why things cost so much.

"Ask the Right Questions about Healthcare" (<http://www.mhealthtalk.com/ask-the-right-questions/>) argues that there's still time for Congress to replace Obamacare with real health reform that saves over \$1 trillion/year and satisfies President Trump's campaign promise to make sure every American has access to health care that's better and more affordable than what is available today, but they'll need to ask the right questions.



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