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McKinsey Center for US Health System Reform

The productivity imperative for healthcare delivery in the United States

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Preface

This report, “The productivity imperative for healthcare delivery in the United States,” examines how productivity in the healthcare delivery industry evolved between 2001 and 2016. We look at how healthcare delivery compares with other US services industries and wealthy countries, as well as highlight some specific areas in which there are likely opportunities for productivity improvements. The aim of this independent report,[1] produced by the McKinsey Center for US Health System Reform, is to arm public- and private-sector leaders with fact-based insights to guide informed decision making.

This report builds on previous work published by McKinsey. Two reports published about a decade ago investigated why healthcare spending is higher in the United States than in other wealthy countries.[2,3] A more recent report, “The next imperatives for US healthcare,” laid out three steps the country could take to better control that spending: achieve rapid—and dramatic—productivity improvements in the delivery of health services, improve the functioning of healthcare markets, and improve population health.

The research underlying this report was led by four McKinsey consultants: Nikhil Sahni, an associate partner[4]; Pooja Kumar, a partner; Edward Levine, a senior partner; and Shubham Singhal, a senior partner and global leader of McKinsey’s Healthcare Practice. Valuable perspectives and advice were offered by a distinguished panel of academic and industry experts, including David Blumenthal, Yvette Bright, Jeff Canose, Amitabh Chandra, Michael Chernew, David Cutler, Leemore Dafny, Doug Elmendorf, Robert Gordon, Michele Holcomb, Robert Huckman, Ashish Jha, Joe Kimura, Bob Kocher, David McCready, Lenny Mendonca, Brian Newkirk, John Romley, Jonathan Skinner, and Jim Weinstein.

The report also benefited enormously from the contributions of McKinsey’s global network of industry experts. It drew on McKinsey’s in-depth analytical expertise, our work with leading healthcare organizations, and our understanding of healthcare systems around the world.

The authors would like to thank the external and internal advisers for their contributions, as well as Eric Chen, Oliver Falvey, Arjun Krishnan, Kyle Patel, and Rishi Shah, who helped with analyses. In addition, the authors would like to thank Ellen Rosen for her leadership, as well as Julie Lane, Lyris Autran, Ginny Hull, and Susan Schwartz for their help in producing and disseminating this report. ○

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[1] This report was not commissioned or sponsored in any way by a business, government, or other institution.

[2] Farrell D et al. Accounting for the cost of US healthcare: A new look at why mericans spend more. McKinsey white paper. December 2008.

[3] Bradford JW et al. Accounting for the cost of US healthcare: Pre-reform trends and the impact of the recession. McKinsey white paper. December 2011.

[4] Nikhil Sahni is also a fellow in the Economics Department at Harvard University.

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Executive summary

There is little doubt that the trajectory of healthcare spending in the United States is worrisome and perhaps unsustainable. Underlying this spending is the complex system used to deliver healthcare services to patients. Given that the US currently expends 18% of its gross domestic product (GDP) on healthcare, this system might be expected to deliver high-quality, affordable, and convenient patient care—yet it often fails to achieve that goal.

Numerous factors have been blamed for the US's higher healthcare spending, including an excess supply of healthcare services, poorly controlled demand for those services, other market irregularities (e.g., reimbursement mechanisms), regulatory requirements, structural differences between the US and other wealthy countries, and patient characteristics and behaviors (especially those influenced by social determinants of health). One explanation, however, has largely been overlooked: poor productivity in the healthcare delivery industry.* Between 2001 and 2016, healthcare delivery contributed 9% of the $8.1 trillion ($4.2 trillion in real terms) growth in the US economy—but 29% of the 14.4 million net new jobs.† Looking at healthcare delivery in terms of productivity provides three important advantages.

- First, it puts the focus not on short-term spending minimization but on long-term growth and the overall spending trajectory.
- Second, it makes it possible to identify specific opportunities that are likely to better control healthcare spending growth without harming—and in some cases improving—both patient outcomes and the overall economy.
- Third, productivity is the lifeblood of any economy's ability to deliver more for less (or, at least, the same cost). In practical terms, increased productivity in healthcare delivery would make it possible to continue driving medical advances and meet the growing demand for services while improving affordability (and likely maintaining current employment and wages).

This report addresses the supply side of the healthcare delivery equation—what and how services are delivered. Thus, our focus is on the individuals and organizations that provide healthcare services, including ambulatory services, hospitals, and nursing and residential care facilities. Although we describe the implications of our findings for payers and governments, the productivity of these sectors (and others, such as pharmaceuticals and medical devices) is not analyzed in depth. Furthermore, we acknowledge that the demand side of healthcare delivery is also important for controlling the long-term healthcare spending trajectory. Demographic changes in the US make it highly likely that demand will continue to grow, although greater patient engagement in healthcare decisions could slow the rate of healthcare spending growth considerably. While demand-related opportunities can play a significant role, they do not eliminate the need to improve the productivity of healthcare delivery.

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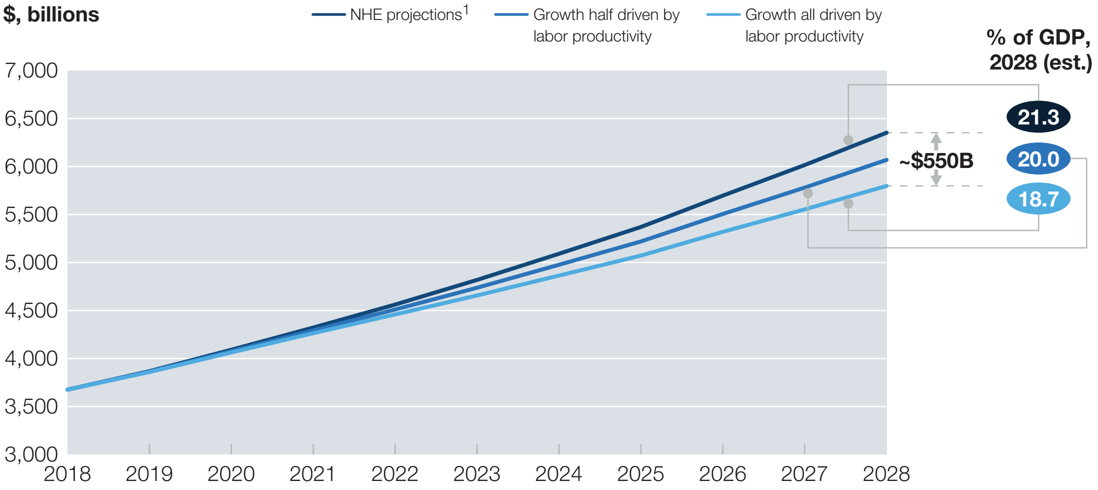
*This report focuses on how healthcare services are delivered to patients, not how those services are paid for. The health insurance sector is also in need of productivity improvements, but that is an issue that needs to be investigated separately. In this report, we discuss payers only in terms of how their policies and activities have a direct impact on the delivery of patient care services.

†Source data does not adjust for the skill or education of the workforce.

EXHIBIT **Projections for healthcare spending growth over next decade**



GDP, gross domestic product.

[1] National health expenditure (NHE) projections from the Centers for Medicare & Medicaid Services.

Sources: Bureau of Economic Analysis; McKinsey analysis

The impact of improving productivity would be profound. Our conservative estimates suggest that if the healthcare delivery industry could rely more heavily on labor productivity gains rather than workforce expansion to meet demand growth, by 2028 healthcare spending could potentially be (on a nominal basis) about $280 billion to $550 billion less than current national health expenditures (NHE) projections suggest (Exhibit).‡ Cumulatively, $1.2 trillion to $2.3 trillion could be saved over the next decade if healthcare delivery were to move to a productivity-driven growth model. Savings of this magnitude would bring the rise in healthcare spending in line with—and possibly below—GDP growth. In addition, the increased labor productivity in healthcare delivery would boost overall US economic growth at a faster rate than current projections—an incremental 20 to 40 basis points (bps) per annum—both through direct economic growth and the spillover impact of greater consumption in other industries. However, meaningful action by, and collaboration among, all stakeholders will be needed to deliver this value.

Inputs to healthcare delivery

In all industries, productivity growth can be assessed by comparing changes in inputs with changes in outputs. In economic terms, the inputs can be categorized as labor, capital, and multifactor productivity (MFP)—the contributions made by innovation, changes in technology, and inputs that cannot be

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‡This calculation assumes that medical inflation would become partially or fully equivalent to economic inflation during that time.

properly measured or are unmeasured. (Parsing out each component's individual contribution to MFP is difficult, however.) Examples of innovations that hold the potential to improve MFP in healthcare include clinical products (e.g., pharmaceuticals and medical devices), new care delivery models, operating model changes,[§] and the democratization of information (e.g., electronic health records, price transparency). The outputs are the services delivered. Productivity rises, for example, when inputs hold steady while outputs increase, or when inputs decrease without a change in outputs.

From 2001 to 2016, the US economy grew (in real terms) by 1.9% per annum, to $19.4 trillion. Just over half of this growth resulted from capital investments. Labor contributed another 25%, and MFP was responsible for 19%. In contrast, the healthcare delivery industry grew (in real terms) by 3.3% per annum during those years, to $1.3 trillion.[#] Labor contributed 99% of this growth, and capital, 14%. MFP had a negative (–13%) contribution.[¶] More than two-thirds of the contribution made by labor resulted from workforce expansion (over 4 million net new jobs were added).

In short, job creation—not labor productivity gains—was responsible for most of the growth in the US healthcare delivery industry from 2001 to 2016. Innovation, changes in business practices, and the other variables that typically constitute MFP harmed the industry's growth. If the goal is to control healthcare spending growth, both trends must change.

Outputs of healthcare delivery

In this report, our primary aim is to identify specific opportunities the healthcare delivery industry could pursue today to improve its productivity, and so we define the industry's outputs as services delivered (e.g., treatments administered to sick patients, preventive health measures given to the well).[**] By focusing on services, we can explore how service delivery could be made more efficient—and pinpoint a number of opportunities that, we believe, will make it possible to effectively bend the spending curve without lowering the quality of care. (For example, better care coordination could deliver the same outputs by using fewer inputs more efficiently.)

[§] Operating model changes could include economies of scale, improved managerial skill, changes in the organization of production, or some combination of these factors.

[#] The technical appendix explains why this number differs from estimates of national health expenditures.

[¶] To understand how MFP can affect the productivity of healthcare delivery, consider the example of a new treatment option for back pain. If the treatment that had routinely been offered patients is surgery, the inputs would include labor (the surgeon, anesthesiologist, nursing staff, etc.) and associated capital (for the operating room, recovery room, etc.). If, instead, the patient could obtain similar relief from back pain through physical therapy, the inputs would decrease markedly. These types of changes in the operating model can affect MFP positively.

[**] We chose to define the system's outputs as the services delivered—not as the outcomes achieved (the metric often used in academic studies, typically measured in terms of quality-adjusted life-years, or QALYs). We acknowledge that better outcomes are the ultimate goal of the healthcare delivery industry. However, outcomes are influenced by a range of factors (e.g., social determinants of health), not all of which are within the control of those who deliver healthcare services; furthermore, QALYs can be difficult to measure objectively. Furthermore, a focus on outcomes rather than services would not have allowed us to identify specific opportunities to improve the efficiency of how healthcare is delivered, which was our goal.

How productivity can be improved

Our investigation revealed a range of issues that have been hampering productivity growth in the healthcare delivery industry; the primary problems are detailed in the sidebar that begins on p. 8. However, we also confirmed that none of these problems are intractable. Industry stakeholders have numerous opportunities to improve the productivity of healthcare delivery—and there are concrete steps they could take *today* to seize these opportunities. A sizable portion of the opportunities do not require major technological advances or massive operating model shifts.

Minor changes, for example, could help provider systems more fully utilize their clinical workforce. Physician utilization, for example, could be increased through a combination of approaches:

- Modifying scheduling systems by periodically “pruning” clinically inappropriate preference rules that limit the types of patients clinicians will see at certain times
- Broadening the application of automatic reminder systems to reduce the number of patients who fail to show up for appointments

Our analysis suggests that given the current unused capacity in physician schedules, these types of improvements could fill much—if not all—of the projected national physician shortage. (Note: this analysis does not fully account for differences in specialty or geography.) To prevent physicians from burning out after these changes are made, provider systems could encourage all clinical staff members to maximize the amount of time they spend on the highest-complexity activities commensurate with their training and experience (what is referred to as working at “top of license”). Our research has shown, for example, that in the inpatient units at many hospitals, 36% of the tasks performed by registered nurses (RNs) could safely be performed by non-RN team members. In addition, technological advances, including artificial intelligence, computer-assisted coding, and natural language processing, could be used. The key to success when integrating these opportunities into a provider system is to leave sufficient flexibility in the team structure to ensure that services can always be provided in the most efficient and effective way possible.

Productivity gains through asset reallocation are likely to be harder to achieve in the near term, but not in the longer term. Demand for inpatient services continues to drop, yet excess—and therefore unproductive—capital continues to remain in the healthcare delivery infrastructure. (For example, US bed capacity is 62%, compared with 75% to 90% in other wealthy countries.) As provider systems contemplate renovations or rebuilding, they have the chance to more aggressively rethink service distribution in light of modern care pathways. Even in the short term, provider systems could increase the productivity of some fixed assets by consolidating certain services (e.g., pathology and radiology reviews) and delivering some services in the community or at home.

Payers have an opportunity to take the lead in simplifying and streamlining administrative processes, and in standardizing reporting requirements and the incentives offered

The causes of low productivity growth: Our findings

Although the US economy experienced approximately 370 bps per annum MFP growth from 2001 to 2016, MFP decreased by about 420 bps per annum within healthcare delivery. To determine why productivity improvements have been so small—and what could be done to change that situation—we looked closely at the two factors that have contributed most to economic growth in healthcare delivery: labor and capital. (We did not investigate MFP closely because its impact on economic growth was small. However, improvements in the productivity of labor and capital would eventually translate to improvements in MFP.)

We looked at clinical labor and administrative labor separately, given the marked difference in their responsibilities. We also considered the effect of historical forces on current capital allocations within the industry. In all cases, we used comparisons with other US services industries and other wealthy countries to identify problems and potential solutions.

Clinical workforce. This group's productivity remains low because the clinical workforce is neither fully nor optimally utilized. Our research suggests that at many provider systems, physicians' schedule density is currently about 80%, but high-performing practices can consistently reach a 90% to 95% density without physician burnout. The lower density results primarily from suboptimal scheduling practices for physicians and other clinicians. An additional problem is that tasks are not consistently assigned to workers at the appropriate skill level (e.g., RNs perform activities that could be delegated to nursing assistants). However, other industries, such as legal services, have found that task reallocation can usher in rapid labor productivity growth. Furthermore, most provider systems have not fully harnessed the ability of technology to safely automate certain tasks, even though doing so would free up clinical staff for more complex patient care services.

To date, approaches to address these issues have been slow to spread (e.g., better scheduling), too blunt in nature (e.g., mandated nursing staff ratios), or inadequate in scope (e.g., automation efforts that address only a small minority of tasks). Also, the clinical workforce is not always sufficiently supported or given appropriate—and aligned—incentives to make changes that would benefit overall industry productivity.

Administrative functions. The degree of administrative complexity in the US healthcare delivery industry is high, especially because of the considerable number of provider systems and payers that must interact to process billing and insurance-related (BIR) information. In 2017, the top

10 US provider systems were responsible for only 18% of all inpatient days; an additional 3,000+ systems accounted for the remaining 152 million inpatient days. That year, Medicare (Part A/B only), Medicaid (fee-for-service only), and the top five private health insurers accounted for only 58% of covered lives; more than 350 other payers covered the remaining 120+ million Americans with health insurance. According to the Institute of Medicine, the absence of standardization among these players has produced "excess" BIR costs of about 50% to 70%.

An additional problem results from the industry's substantial performance reporting requirements. The Centers for Medicare & Medicaid Services alone uses more than 1,700 metrics, most of which focus on processes, not outcomes.

Because of the industry's administrative complexity, healthcare delivery has an unusually high number of non-clinical workers, many of whom focus on routine transactions that could easily be digitized or automated. Other industries with a similar high number of players (e.g., financial services) have found ways to standardize and streamline the interactions among the players. The healthcare delivery industry would also benefit from more aggressive efforts to streamline and improve performance metric reporting.

Capital. Capital's contribution to the healthcare delivery industry's GDP growth from 2001 to 2016 (14%) was the lowest among major US services industries. Often, capital is not optimally allocated in the healthcare delivery industry—much of it is tied up in or allocated to underutilized fixed assets rather than productivity-enhancing investments. (In 2016, for example, several other sectors, including utilities, had capacity utilization of 73% to 86%, whereas hospital bed utilization was 63%.)

Healthcare delivery has historically been hospital-centric, and thus significant sums have been spent on buildings and beds that once were, but no longer are, central to care pathways. Requirements to serve the public good (e.g., through critical access hospitals) have also entailed major investments. Most provider systems have market-driven incentives to keep installed capacity in use even when it is not needed on a total-system level.

In addition, some provider systems may invest in equipment to meet patient expectations, such as short wait times for diagnostic imaging, even if the equipment duplicates what is available nearby. (The US has more imaging devices per person than most other wealthy countries, and utilization of those devices is below average.)

through alternative payment models. As a first step, they could aggregate certain functions (e.g., claims processing and adjudication) and further automate their BIR processes. We estimate that if payers were to collaborate to develop a clearinghouse for BIR data (similar to the approach taken in the financial services industry), overall administrative spending could be reduced by up to 30%.

Government agencies could consider moving forward with the adoption of "smart" regulations—those well aligned with current healthcare delivery needs and flexible enough to accommodate industry evolution. For example, research has shown that US physician practices currently spend more than $15 billion annually to report performance metrics; streamlining reporting requirements holds the potential to reduce this sum considerably. Updating some healthcare regulations might make it easier for provider systems and payers to undertake the innovations needed to improve the productivity of healthcare delivery.

In addition, some government agencies might want to consider taking steps to encourage payers to increase their streamlining and standardizing activities, or even to help develop a clearinghouse for BIR data.

The opportunities described above—and many more—are discussed in greater detail in this report. ○

Chapter 1. Introduction

Without question, healthcare is a key component of the economy in the United States. In 2017, healthcare delivery employed 11% of the country's workforce, and total healthcare spending accounted for 18% of the US economy.[*,1] As McKinsey and others have shown, much of this spending is in excess of what would be expected based on the country's wealth.[†] Although some of the excess spending reflects choices the US has made about the mission of healthcare delivery, there is little doubt not all of it delivers high value.[2-4]

Between 1980 and 2017, the average annual real growth in US healthcare spending was 4.7%, whereas average annual real gross domestic product (GDP) growth was 2.7%.[‡,5] Over that same period, medical inflation grew at 3.8% per annum, while overall economic inflation grew at 2.6% per annum.[6] Among patients with commercial insurance, price increases have been shown to be the primary driver of spending growth[7]; utilization increases play a larger role in Medicare and Medicaid.[8,9] Although healthcare spending growth and medical inflation have moderated slightly in the past few years, both are expected to continue outpacing GDP growth and economic inflation.[10] Finding ways to slow the healthcare spending trend has proved to be quite difficult, however.

What if we looked at the problem differently? Instead of focusing solely on dollars spent, could each American get more for each dollar spent? Answering this question requires us to look at the productivity of the healthcare delivery industry. In simple economic terms, productivity can be defined as output per given unit of input. As we explain below, the outputs in healthcare delivery are largely the services delivered and outcomes achieved; the inputs include the workforce, invested capital, and new technologies. An advantage of looking at healthcare delivery this way is that it puts the focus not on spending minimization, but on long-term growth and the overall spending trajectory.

By many metrics, the US healthcare delivery industry is not efficient and has not kept pace with the productivity improvements other US services industries have achieved in recent years. Between 2001 and 2016, healthcare delivery contributed 9% of the $8.1 trillion ($4.2 trillion in real terms) growth in the US economy—but 29% of the 14.4 million net new jobs (Exhibit 1-1).[§,11] During this period, more than 19% of the growth in the overall economy resulted from improvements in what is termed multifactor productivity (MFP), a category that includes clinical products (e.g., pharmaceuticals and medical devices), new care delivery models, operating model changes,[#] and the democratization of information (e.g., electronic health records, price transparency) (Exhibit 1-2).

It could be argued that, overall, the supply of services in the US healthcare delivery industry is matched well with the current demands of the patient population. However, inefficiencies

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[*] In the report, we use the most recent data available. For that reason, the time periods we reference sometimes differ.

[†] Box 1-1 includes an updated estimate of the US's excess spending on healthcare, based on a comparison with other wealthy countries. An earlier estimate was published in the McKinsey Global Institute report: Accounting for the cost of U.S. health care: A new look at why Americans spend more. December 2008. Other researchers have also shown that US healthcare spending is above what would be expected based on cross-country comparisons. (See, for example, Anderson GF et al. Health spending in OECD countries: A 2004 update. Health Affairs. 2007;26(5):1481-9.)

[‡] Note: "real" values are adjusted for economy-wide inflation.

[§] Source data does not adjust for the skill or education of the workforce.

[#] Operating model changes could include economies of scale, improved managerial skill, changes in the organization of production, or some combination of these factors. Note also that, by definition in the KLEMS framework, MFP includes the effects of inputs that are unmeasured or not properly measured.

The numbered references appear at the end of this chapter.

exist in both how patients present their demands and how the healthcare delivery industry produces the supply, partly because of market irregularities within the healthcare industry. Because of these irregularities, the healthcare delivery industry has lagged other services industries in improving production output.

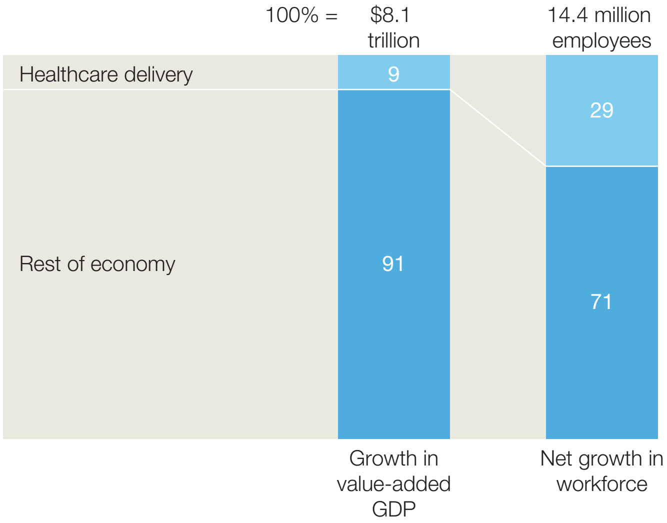
Why higher healthcare delivery productivity is necessary

Any discussion of productivity must acknowledge certain truths about US healthcare. Per capita spending on healthcare is higher in the US than in other wealthy countries (see Box 1-1), but Americans often get more rapid access to new treatments and advanced technologies.[12] Although the US strives to provide all patients with access to high-quality healthcare services, healthcare financing relies heavily on the higher reimbursement rates paid by commercial insurance, which can sometimes create perverse incentives for stakeholders. Structural differences in how healthcare is delivered and paid for make cross-country comparisons difficult, yet these comparisons show that structural factors alone cannot explain the difference in spending.[13-15]

It is crucial that the productivity of the US healthcare delivery industry be improved, given the role it plays in the economy and likelihood that healthcare spending will keep growing. (For an illustration of the impact that poor healthcare delivery productivity can have on the overall US economy, see Box 1-2.) Population aging, lengthening life spans, and the rising prevalence of obesity and other chronic conditions are increasing the demand for healthcare services. Some have argued that this increasing demand will offset the pressure on individual players to improve productivity to maintain profitability; we believe the opposite is

EXHIBIT 1-1 **Healthcare delivery's contribution to GDP and workforce growth**

% of US growth, 2001–16

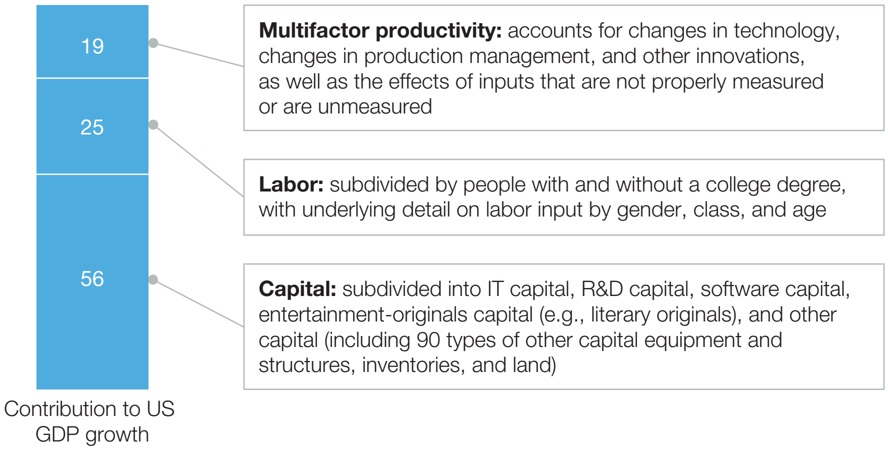


GDP, gross domestic product.

Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; McKinsey analysis

EXHIBIT 1-2 **Contribution to GDP growth by sources of growth**

% of US economic growth (1.9% per annum), 2001–16



Multifactor productivity: accounts for changes in technology, changes in production management, and other innovations, as well as the effects of inputs that are not properly measured or are unmeasured

Labor: subdivided by people with and without a college degree, with underlying detail on labor input by gender, class, and age

Capital: subdivided into IT capital, R&D capital, software capital, entertainment-originals capital (e.g., literary originals), and other capital (including 90 types of other capital equipment and structures, inventories, and land)

GDP, gross domestic product; IT, information technology; R&D, research and development.
Note: GDP is defined here as value-added GDP.

Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; McKinsey analysis

true. Meeting the growing demand for appropriate healthcare services while reining in spending growth should, over time, bend the healthcare spending curve. It should also liberate growth across the economy by freeing up resources for consumers, employers, and governments.

We believe that untapped productivity improvements—particularly in the clinical workforce—could address the demand growth. Although the improvements might slow the rate at which new jobs are added, they would not necessarily entail job cuts or wage reductions for an important segment of the US workforce (assuming there is at least some healthcare labor mobility across geographic regions and skill mix).[16]

Our findings are applicable not only to the private sector but to the public sector as well. A recent McKinsey report that looked at government productivity in 42 countries showed that the US lags many of its peers in terms of the productivity of its public healthcare sector.[17]

Defining productivity more precisely

If productivity is defined simply as output per given unit of input, then productivity would improve if either output increased in the absence of input increases, or input decreased without lowering output. In healthcare delivery, output has been defined in various ways, many of which are hard to measure. (The same problem exists in other services industries.) Some analyses use healthcare spending as an output, but spending cannot be considered the core output of healthcare delivery because it is not the industry's goal. Another, more common definition of output is "quality-adjusted life years" (QALYs), which focuses on patient outcomes and attempts to account for morbidity and mortality.[¶,18,19] Research has shown that QALYs have been improving over time in the US,[20] but whether the improvement results from greater healthcare delivery productivity—or reflects other factors—is unclear. Some studies that used QALYs as the output have suggested that healthcare delivery productivity has declined in recent years, and most studies examining productivity (using other definitions) have also found that productivity growth is lower in healthcare delivery than in the economy as a whole.[21] However, one study found that the productivity of hospital care delivery for three specific diseases (heart attacks, heart failure, and pneumonia) had improved once its analysis was adjusted for severity of illness.[22]

[¶] A body of research also focuses on a similar metric, disability-adjusted life-years (DALYs).

Box 1-1: Expected spending according to wealth

In previous reports by McKinsey's Center for US Health System Reform, we estimated the amount of US healthcare spending that can be defined as "above expectations."[1] To do this, we assessed the wealth of different countries and their healthcare spending to derive what we termed "expected spending according to wealth." Since healthcare can be considered a luxury good (a person consumes increasingly more as wealth increases), we then ran a power regression line to evaluate US healthcare spending (both overall and by category) and plotted actual US spending against expectations (see the technical appendix for more details).

Although this method provides a useful way to better understand US healthcare spending trends, it relies on historical data. Thus, it was necessary to update our previous analyses for this report. Using 2016 data (the most recent available in many cases), we found that the US continues to spend more than the expected in the aggregate and in most categories (Exhibit 1-A). (Note: however interesting this finding may be, it tells us little about differences in the productivity of healthcare delivery among countries because, among other factors, the calculations do not account for differences in health system structure. For example, countries of similar wealth could have a single-payer or multi-payer system.)

Thus, in this report, we took a different approach. Studying productivity rather than spending shifts the focus away from mechanisms that can lower spending but could have unwanted knock-on effects. Instead, we wanted to identify mechanisms that could improve productivity by achieving greater output with the same resources. Improving productivity should still bend the spending curve unless demand dramatically increases. This is not to say that productivity improvements will be sufficient on their own to enable the US to control its healthcare spending, but it gives the country important new options that could minimize the need for more drastic steps.

REFERENCE

[1] Bradford JW et al. Accounting for the cost of U.S. health care: Pre-reform trends and the impact of the recession. McKinsey report. December 2011.

Part of the explanation for the discordant results may lie in the types of healthcare services studied. Research has shown that services and treatments that may or may not have significant clinical impact are typically linked to increased healthcare spending without any gains in the MFP of healthcare delivery. Some of these interventions can prolong life or improve quality of life for some patients, but unless their use is offset by decreases in other inputs, they appear to be a drag on MFP. Conversely, highly effective treatments can significantly improve MFP, regardless of whether the treatment is inexpensive or costly.[23]

In this report, our definition of output focuses primarily on the services delivered (e.g., treatments administered to sick patients, preventive health

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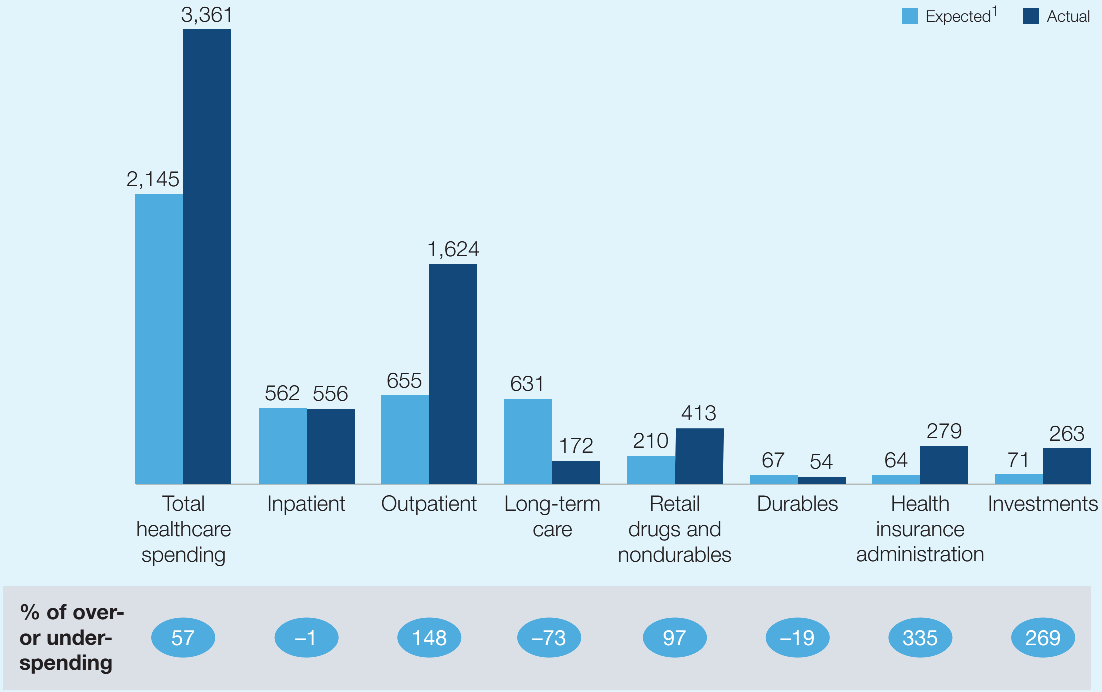
EXHIBIT 1-A

Variations between expected spending according to wealth and actual healthcare spending

US healthcare spending by category, $ billions, 2016



[1] Expected spending according to wealth is estimated using Organisation for Economic Co-operation and Development (OECD) healthcare spending per capita vs gross domestic product (GDP) per capita regression results (see the technical appendix).

Sources: OECD; McKinsey analysis

measures given to the well). We used this definition so we could drill down more deeply into two key contributing factors that determine overall economic growth (labor and capital), which we consider to be the chief inputs into the productivity of healthcare delivery. This definition also allowed us to investigate whether healthcare delivery could be made more efficient. A focus

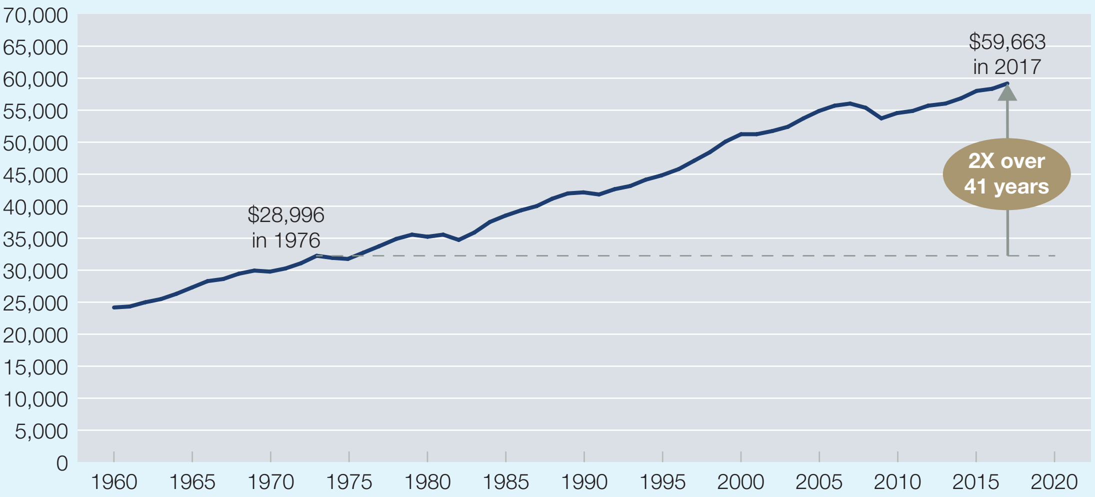
Box 1-2: How healthcare delivery productivity may drag down the US economy

Between 1976 and 2017, the average American's standard of living doubled (Exhibit 1-B). If the US is to double its standard of living again over the next 40 years, per capita GDP would have to grow at 1.8% per annum; this rate, when coupled with overall population growth (0.6% per annum), would result in overall economic growth of 2.4% per annum. Can the country achieve this rate of growth?

A closer look at the productivity of the healthcare delivery workforce illustrates the potential problem its low rate of improvement could have on the economy as a whole. Our analyses show that in the US overall, population growth and the resulting increase in the workforce are likely to produce a 0.5% per annum increase in GDP over the next 40 years, assuming that the unemployment rate holds steady (Exhibit

EXHIBIT 1-B **Growth in real US per capita GDP**

$, indexed to 2017



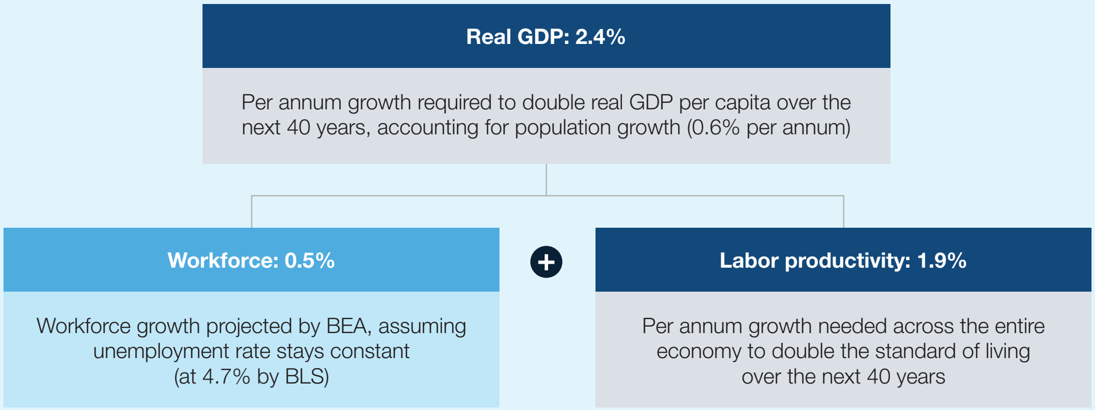
GDP, gross domestic product.

Sources: Bureau of Economic Analysis; US Census Bureau; McKinsey analysis on efficiency, rather than just spending, made it possible to identify specific opportunities to improve productivity (often in ways that are likely to also improve patient outcomes) and to avoid mechanisms that have the potential to lower spending but might have unwanted knock-on effects. While focusing on services, we do not ignore the ongoing debates about whether

1-C). Thus, labor productivity would have to increase by 1.9% per annum in the overall economy to achieve the 2.4% economic growth rate (GDP per capita growth plus population growth) needed to double the country's standard of living—a level far above the 1.2% per annum improvement in labor productivity that occurred between 2001 and 2016. Given that healthcare delivery labor productivity grew by 1.1% per annum during that time, we calculated that productivity improved in the remainder of the US economy by 1.3% per annum—still below the level needed.

For the healthcare delivery industry, a labor productivity growth rate of 1.9% per annum is nearly double its current growth rate. Because of healthcare's current and continued importance to the US economy, this simple analysis demonstrates why healthcare delivery needs to improve labor productivity and not remain a drag on overall economic growth.

EXHIBIT 1-C **GDP growth needed to double the standard of living over the next 40 years**

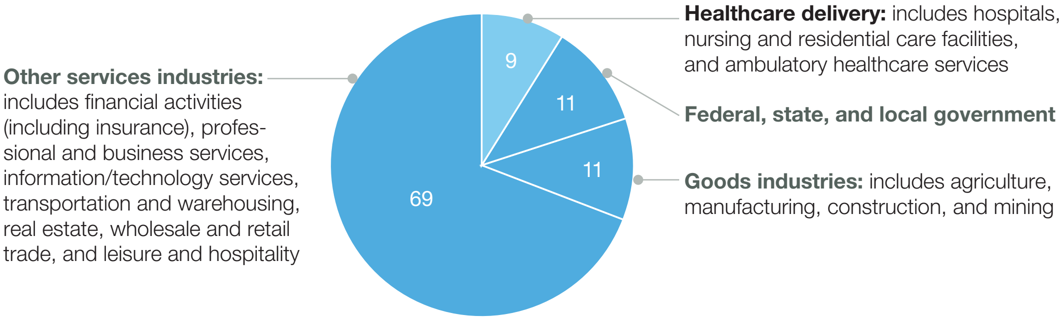


BEA, Bureau of Economic Analysis; BLS, Bureau of Labor Statistics; GDP, gross domestic product.

Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; US Census Bureau; McKinsey analysis

EXHIBIT 1-3 **Contribution to US GDP growth by type of industry**[1]

% of US economic growth (1.9% per annum), 2001–16



GDP, gross domestic product.

[1] Classification of industries into services and goods based on definitions by Bureau of Economic Analysis.

Note: GDP is defined here as value-added GDP.

Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; McKinsey analysis

some healthcare services are being delivered too often or whether reimbursement should be based on value rather than volume. Both of those are legitimate questions. However, focusing on services allowed us to identify what can be done *today* to enable the industry to deliver the same outputs with fewer inputs or more outputs from the same inputs, approaches that could effectively bend the spending curve without lowering the quality of care. (For example, better care coordination can deliver the same outputs by using fewer inputs more efficiently.)

Note: this report does not address the demand for healthcare services or the social determinants of health. We admit that, in the absence of any changes in demand or social determinants, greater service delivery efficiency would not necessarily lower overall healthcare spending. We believe, however, that some of the opportunities we have identified might help lower patient demand. If nothing else, greater efficiency would mitigate the impact of growing demand.

How healthcare delivery compares with the rest of the economy

From 2001 to 2016, the US economy grew (in real terms) by 1.9% per annum.[24] The healthcare delivery industry grew by 3.3% per annum. Healthcare delivery contributed 9% of overall US GDP growth during that time. Other services industries accounted for 69% of the growth (Exhibit 1-3), reflecting the importance of services to the US economy.

Technology also contributed strongly to US GDP growth between 2001 and 2016. Non-healthcare delivery industries that use IT intensively accounted for 50% of that growth; industries that produce IT hardware and software contributed another 17% (Exhibit 1-4).[**,25] In all these cases,

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[**] Industries that use IT intensively are defined as those in which 15% or more of their capital input was associated with IT equipment and software in 2005. IT-producing industries are those that manufacture computers and electronic products or develop software for that equipment. (See Jorgensen DW et al. A prototype industry-level production account for the United States, 1947–2010. Proposal for presentation at the NBER/CRIW Summer Institute. July 16-17, 2013.)

what prompted growth? Answering this question requires breaking down value-added[††] GDP into three sources of growth[‡‡]:

- **Labor:** the contribution made by the workforce
- **Capital:** the contribution made by capital assets
- **Multifactor productivity:** the contribution made by innovation, changes in technology or production management, and/or inputs that cannot be properly measured or are unmeasured[§§]

Of the growth in the overall US economy between 2001 and 2016, 25% can be attributed to labor, 56% to capital, and 19% to MFP. However, within the healthcare delivery industry, labor contributed to 99% of the growth from 2001 to 2016; capital, to 14%; and MFP, to –13% (Exhibit 1-5). MFP increased approximately 370 bps per annum within the economy as a whole but decreased by about 420 bps per annum within healthcare delivery specifically (a result also found in the Medicare Trustees report).[26]

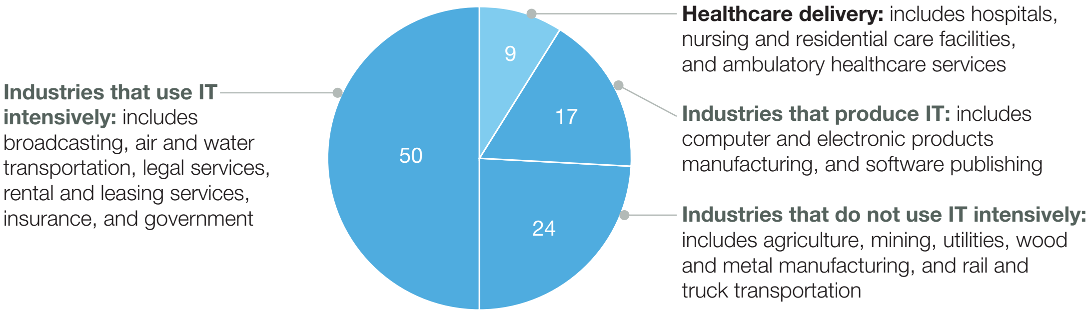
[††] According to the Bureau of Economic Analysis (BEA), "value-added" equals the difference between an industry's gross output (consisting of sales or receipts and other operating income, commodity taxes, and inventory change) and the cost of its intermediate inputs (including energy, raw materials, semi-finished goods, and services that are purchased from all sources).

[‡‡] The BEA and Bureau of Labor Statistics (BLS) work together to break down gross-output and value-added GDP using the KLEMS (K-capital, L-labor, E-energy, M-materials, and S-purchased services) framework on an annual basis. The data allows for time comparisons using current dollars and in chain-type quantity and price indexes. (For more information on the BEA/BLS methodology, see Fleck S et al. A prototype BEA/BLS industry-level production account for the United States. Presented at 2nd World KLEMS Conference, Aug. 9–10, 2012. For more information on the KLEMS framework, see Jorgenson DW et al. Productivity and U.S. Economic Growth. Harvard University Press. 1987.)

[§§] To understand how MFP can affect the productivity of healthcare delivery, consider the example of a new treatment option for back pain. If the treatment that had routinely been offered patients is surgery, the inputs would include labor (the surgeon, anesthesiologist, nursing staff, etc.) and associated capital (for the operating room, recovery room, etc.). If, instead, the patient could obtain similar relief from back pain through physical therapy, the inputs would decrease markedly. These types of changes in the operating model can affect MFP positively. In the KLEMS framework, MFP is not computed directly but is estimated indirectly.

EXHIBIT 1-4 **Contribution to US GDP growth by industry's use of IT**[1]

% of US economic growth (1.9% per annum), 2001–16



GDP, gross domestic product; IT, information technology.

[1] Classification of industries into use of IT based on definitions by Jorgenson DW et al. Information technology and U.S. productivity growth: Evidence from a prototype industry production account. Journal of Productivity Analysis. 2011;36:159–75.

Note: GDP is defined here as value-added GDP.

Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; Journal of Productivity Analysis; McKinsey analysis

Comparisons with other parts of the economy further accentuate healthcare delivery's position as an outlier. For other services industries, capital drove 60% of growth; labor and MFP contributed 26% and 14%, respectively. For goods industries (which include pharmaceutical and medical device manufacturers), MFP accounted for 87% of the growth and capital another 66%; labor's contribution was –53%, in part, because the technology evolution these industries underwent reduced their overall labor costs.

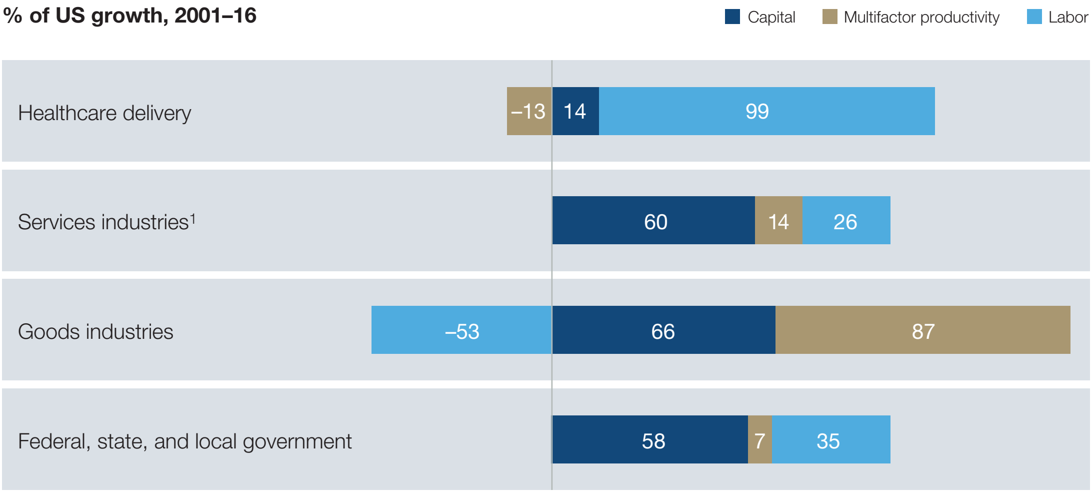
In this report, we focus on both multifactor productivity and labor productivity. MFP provides a view of the entire healthcare delivery industry and offers insights into the impact of innovations; in addition, it makes it possible to distinguish between the impact of labor and capital contributions. Given the importance of labor to growth in the healthcare delivery industry, it is also critical to examine labor productivity; indeed, some experts have argued that workforce growth has been necessary to offset low labor productivity gains in healthcare delivery.[27] We therefore separately analyzed the effects of workforce growth and labor productivity improvements.[##]

Role of regulation in healthcare delivery

The degree and nature of regulation (as well as the absence of regulation) can affect healthcare delivery productivity. For example, the need to collect data about a high number of performance metrics increases the amount of clinical staff time that must be spent on administrative activities.

[##] In this report, we define labor productivity improvements as real industry GDP growth minus workforce growth.

EXHIBIT 1-5 **Sources of GDP growth by type of industry**



GDP, gross domestic product.

[1] Includes social assistance.

Note: GDP is defined here as value-added GDP.

Note: contributions from a factor can be negative. For example, salaries and wages may outweigh the value-added GDP generated by the workforce.

Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; McKinsey analysis

Similarly, the absence of standardized claims data increases billing and insurance-related (BIR) costs. Regulatory changes (modification or replacement) are one of the ways that could be considered to address these problems.

One measure of the impact that regulations can have on healthcare delivery productivity is the amount of time needed to comply with them.[28] Using estimates from the Information Collection Budget released in 2016 by the federal government, we found that regulations issued by the Department of Health and Human Services (HHS) are second only to those imposed by the Treasury Department in terms of time spent by the private sector (Exhibit 1-6).

In the next chapters, we include examples of how regulatory changes have been shown—or have the potential—to help improve the productivity of healthcare delivery; we also offer some examples of regulations that have not delivered on their promise or have had unintended consequences on patient care. In addition, we discuss how some regulations could be made "smarter" (e.g., adaptive as markets evolve or more focused on patient outcomes rather than processes).

Options for improvement

The growth contribution data (both historic and future) cited above make it clear that the healthcare delivery industry should not be exempted from the need to capture productivity gains. The data instead raises certain questions that must be answered. Why are trends occurring in other services industries not occurring in healthcare delivery? How can labor productivity in healthcare delivery be improved? Why is MFP growth so hard to achieve in healthcare delivery? The next four chapters provide answers to some of these questions.

Healthcare delivery workforce. In the second chapter, we begin our discussion of labor productivity by looking at the impact the healthcare delivery workforce has had on the overall US economy. We then delineate the various constituents of that workforce.

Clinical workforce. In the third chapter, we look at the roles played by the more than 9 million individuals involved in direct patient care. Using data and case studies from other services industries, we identify three approaches that could potentially raise productivity in this group:

- Accessing additional existing capacity within the current workforce
- Improving the allocation of tasks based on skill mix
- Increasing the use of technology to automate certain tasks and enhance efficiency

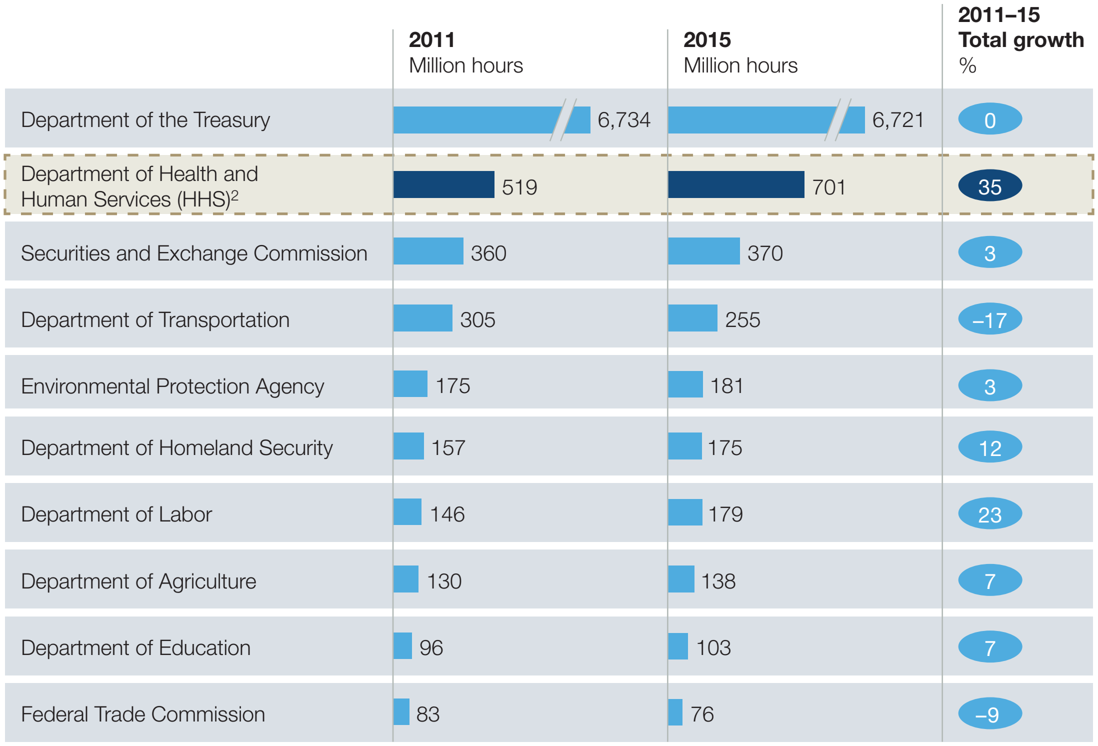
Administrative functions. In the fourth chapter, we turn our attention to the more than 6 million people who provide administrative services in support of healthcare delivery. The productivity of these individuals could be increased by either reducing the time the workforce spends processing information (which would allow them to focus on higher-value tasks) or modifying regulations to encourage data standardization and transform the BIR infrastructure.

Capital. A significant amount of capital is invested in the healthcare delivery industry, and inefficiencies in the deployment of this capital have often resulted in low returns. In the fifth chapter, we consider how the use of capital could be improved through changes in regulation, shifts to alternative sites of care, and new approaches to service distribution.

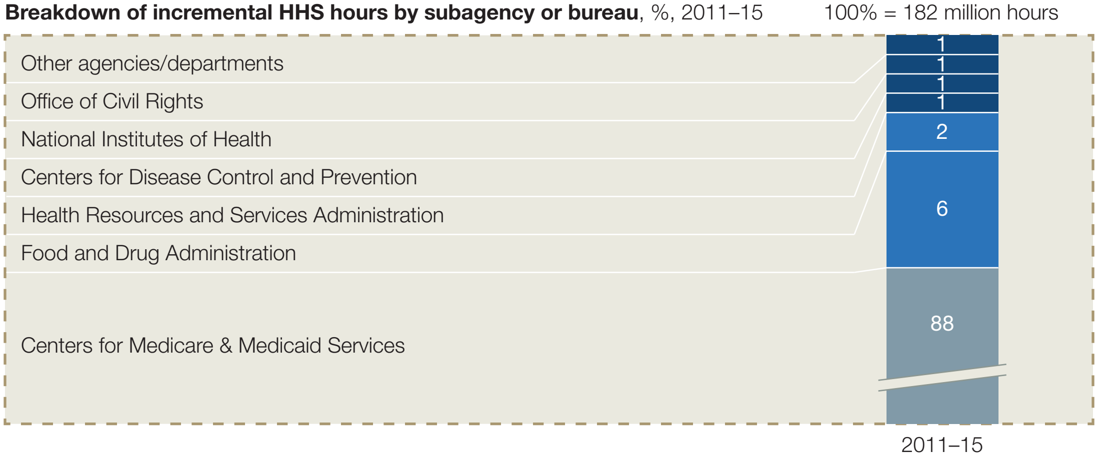
In the final chapter, we recommend actions provider systems, payers, and the government could

EXHIBIT 1-6 **Number of hours the private sector spends on regulatory issues**

Top ten departments in 2011, by total hours[1] created by regulations, 2011–15



Breakdown of incremental HHS hours by subagency or bureau, %, 2011–15



[1] "Hours" are defined by the Paperwork Reduction Act as the "time, effort, or financial resources expended by persons to generate, maintain, or provide information to or for a Federal agency, including the resources expended for: (A) reviewing instructions; (B) acquiring, installing, and utilizing technology and systems; (C) adjusting the existing ways to comply with any previously applicable instructions and requirements; (D) searching data sources; (E) completing and reviewing the collection of information; and (F) transmitting, or otherwise disclosing the information."

[2] The available data (2011–15) covers implementation of the Affordable Care Act but not the 2018 changes to tax law.

Sources: Based on Information Collection Budget of the US Government; Bureau of Labor Statistics—National Compensation Survey; McKinsey analysis take to increase productivity in healthcare delivery. In formulating these recommendations, we have tried to balance the needs of all stakeholders to ensure that the productivity improvements do not jeopardize patient care or inhibit appropriate competition. The findings we present in this report should not be viewed as the *only* ways to improve productivity in the healthcare delivery industry. Rather, they are examples of what could be done to bend the US healthcare spending curve. The findings have significant implications for all stakeholders. Those organizations that take advantage of the opportunities we have identified are the ones that will be most likely to succeed as the market evolves. Those that do not will be forced to play with a competitive disadvantage. ○

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Chapter 2. Healthcare delivery workforce

Between 2001 and 2016, the economy of the United States grew by $8.1 trillion ($4.2 trillion in real terms). The healthcare delivery industry contributed 9% of that growth; labor accounted for 99% of healthcare's contribution. Indeed, healthcare delivery has relied more heavily on labor for growth than almost all other services industries have (Exhibit 2-1). However, the majority of the contribution the healthcare delivery workforce made to economic growth has resulted from an increase in its size, not its productivity—a fact that has had important secondary effects (both positive and negative) on the US economy as a whole.

Increasing the productivity of the US healthcare delivery workforce is a critical part of reining in healthcare spending. At many provider systems, labor accounts for more than half of their operating expenses.[1] Without improvements to labor productivity, these systems may find it impossible to manage the spending trend, which in some cases could jeopardize their financial sustainability. (As we mentioned in chapter 1, productivity improvements in healthcare delivery may not always reduce spending, but the ability to produce more outputs with the same inputs would make it possible to bend the spending trend without necessarily impairing patient care.)

Any changes made to increase the productivity of the healthcare delivery workforce must take into consideration both the impact on the overall US economy and the need to deliver high-quality care to patients. For this reason, we present several analyses in this chapter to investigate the healthcare delivery workforce in detail. In the next two chapters, we discuss ways in which the productivity of the two core components of this workforce—clinical labor and non-clinical (administrative) labor—can be improved.

Understanding the impact on the US economy

In recent years, the US economy has relied disproportionately on healthcare delivery for job growth. Between 2001 and 2016, the healthcare delivery industry expanded at a somewhat faster pace than the US economy did (3.3% and 1.9% per annum, respectively); however, the majority of the 3.3% expansion resulted from an increase in the size of the workforce.* As we discussed in chapter 1, healthcare delivery accounted for 29% of the 14.4 million net new jobs created in the US during those years (2.9 million clinical and 1.3 million non-clinical jobs).†

Improvements in labor productivity (defined as real industry gross domestic product

The numbered references appear at the end of this chapter.

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*The method used for this analysis, which measures labor productivity, is different from the method for understanding labor's contribution to value-added GDP. This analysis approximates labor productivity growth as real industry GDP growth minus workforce growth. The other uses the KLEMS (K-capital, L-labor, E-energy, M-materials, and S-purchased services) framework to break down value-added GDP.

†For our analysis of the healthcare delivery workforce, we relied primarily on the Bureau of Labor Statistics (Occupational Employment Statistics survey). For all years except 2000, we limited ourselves to North American Industry Classification System (NAICS) codes 621, 622, and 623, examined all data at the "detailed" level, and then removed dentists, veterinarians, and associated occupations. In 2000, NAICS codes were not yet in effect, and so we used Standard Industry Classification (SIC) codes 801, 803, 804, 805, 806, 807, 808, 809, and 836. The transition from SIC to NAICS, as well as updates to some of the occupation definitions (e.g., the separation of advanced practice nurses from registered nurses) does introduce some error into our estimates, but we believe these errors are likely to be small.

(GDP) growth minus workforce growth) were responsible for about one-third of the healthcare delivery industry's growth between 2001 and 2016 (Exhibit 2-2).[‡] By contrast, labor productivity improvements were responsible for almost two-thirds of overall US economic growth.

Analyzing the healthcare delivery industries in wealthy countries reveals that the US is not unique in relying on workforce increases rather than labor productivity improvements for growth (Exhibit 2-3).[§] (For more details about this topic, see Box 2-1, "Defining the healthcare delivery industry for cross-country comparisons.")

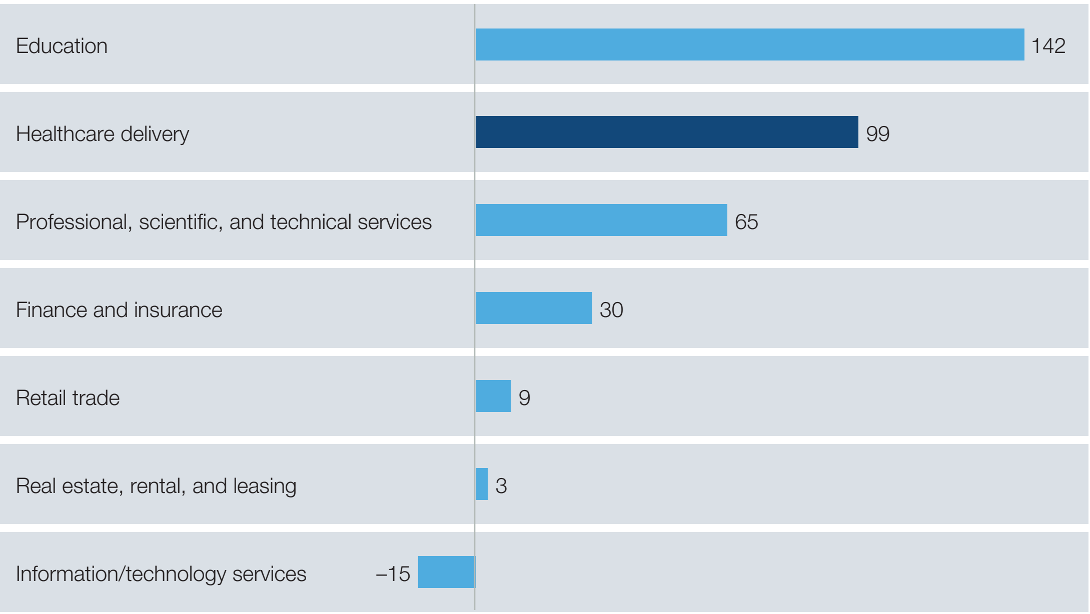
Comparing the US healthcare delivery industry with other US services industries shows that it is not the only industry to rely disproportionately

[‡] For our analysis of labor productivity, we used employment as the denominator. Alternatively, total hours worked could be used. The difference in denominators produces small changes in results. For the US economy as a whole, for example, our estimate of labor productivity growth would have been 1.5% if we had used total hours worked, rather than the 1.2% we calculated using employment.

[§] Admittedly, all cross-country comparisons of the healthcare delivery industry are inexact, not only because of the technical reasons discussed in Box 2-1, but also because different countries often have fundamentally different views of what healthcare delivery should accomplish. Nevertheless, our analysis shows that many countries share a similar problem: low labor productivity.

EXHIBIT 2-1 **Labor's contribution to annual GDP growth in US services industries**

% of total growth, 2001–16



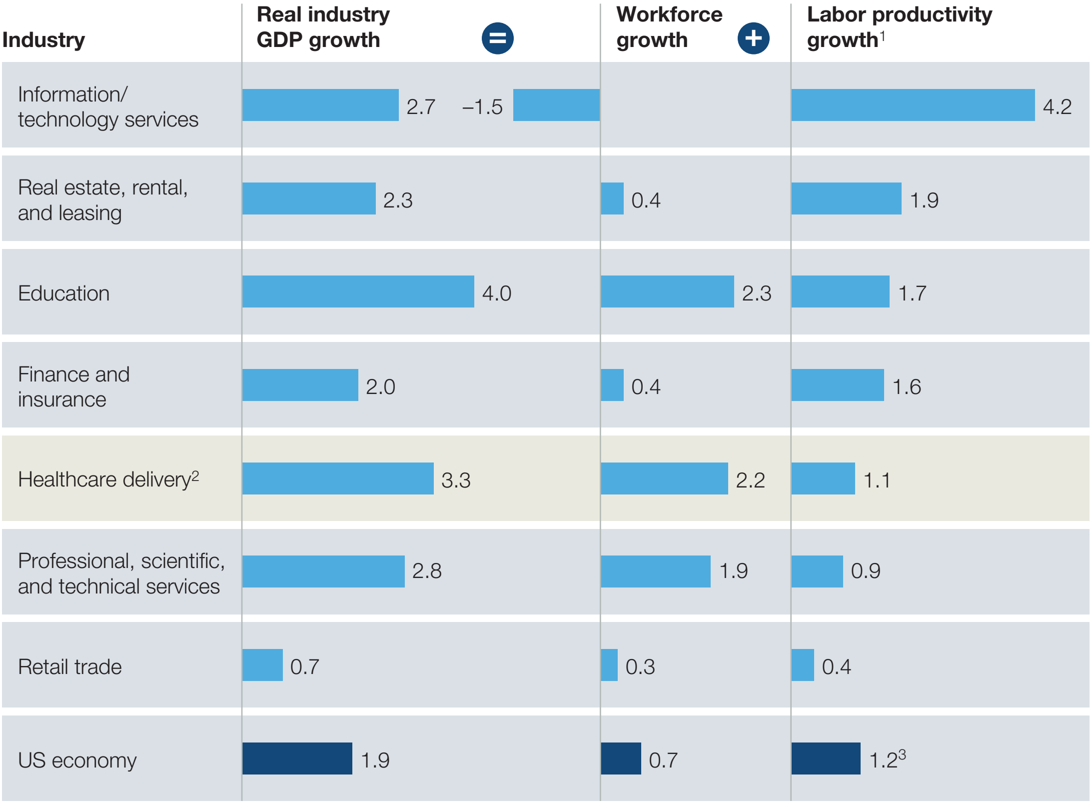
GDP, gross domestic product.
Note: GDP is defined here as value-added GDP.
Note: contributions from a factor can be negative. For example, salaries and wages may outweigh the value-added GDP generated by the workforce.

Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; McKinsey analysis

on net new jobs for growth—the same is true of education and professional, scientific, and technical services. Part of the reason services industries appear to have disproportionately high job growth is the fundamental nature of the work ("hands on" with consumers at the point of service). These acknowledgments should not, however, be taken to mean that the "per job" productivity of the US healthcare delivery workforce is improving as quickly as is possible—far from it. Considerable evidence suggests that its output could be significantly raised without increasing the net number of jobs, as we will discuss in chapters 3 and 4.[2]

EXHIBIT 2-2 **Labor productivity growth in US services industries**

CAGR, %, 2001–16



CAGR, compound annual growth rate; GDP, gross domestic product; NAICS, North American Industry Classification System.

[1] The method used for this analysis, which measures labor productivity, is different from the method used to understand labor's contribution to value-added GDP. This analysis approximates labor productivity growth as real industry GDP growth minus workforce growth. The other method uses the KLEMS (K-capital, L-labor, E-energy, M-materials, and S-purchased services) framework to break down value-added GDP. Labor productivity can be negative when the size of the workforce grows faster than the industry's GDP growth, which implies that each additional worker is reducing the average output per worker.

[2] Defined as NAICS 621 (ambulatory healthcare services), 622 (hospitals), and 623 (nursing and residential care facilities). This does not include 624 (social assistance), which must be used in international comparisons and yields slightly different results (0.9% vs 1.1% without including 624).

[3] For our analysis of labor productivity, we used the number of people employed. Alternatively, total hours worked could be used. For the overall economy, the latter approach would result in labor productivity growth of 1.5%, compared with 1.2% using our method.

Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; McKinsey analysis

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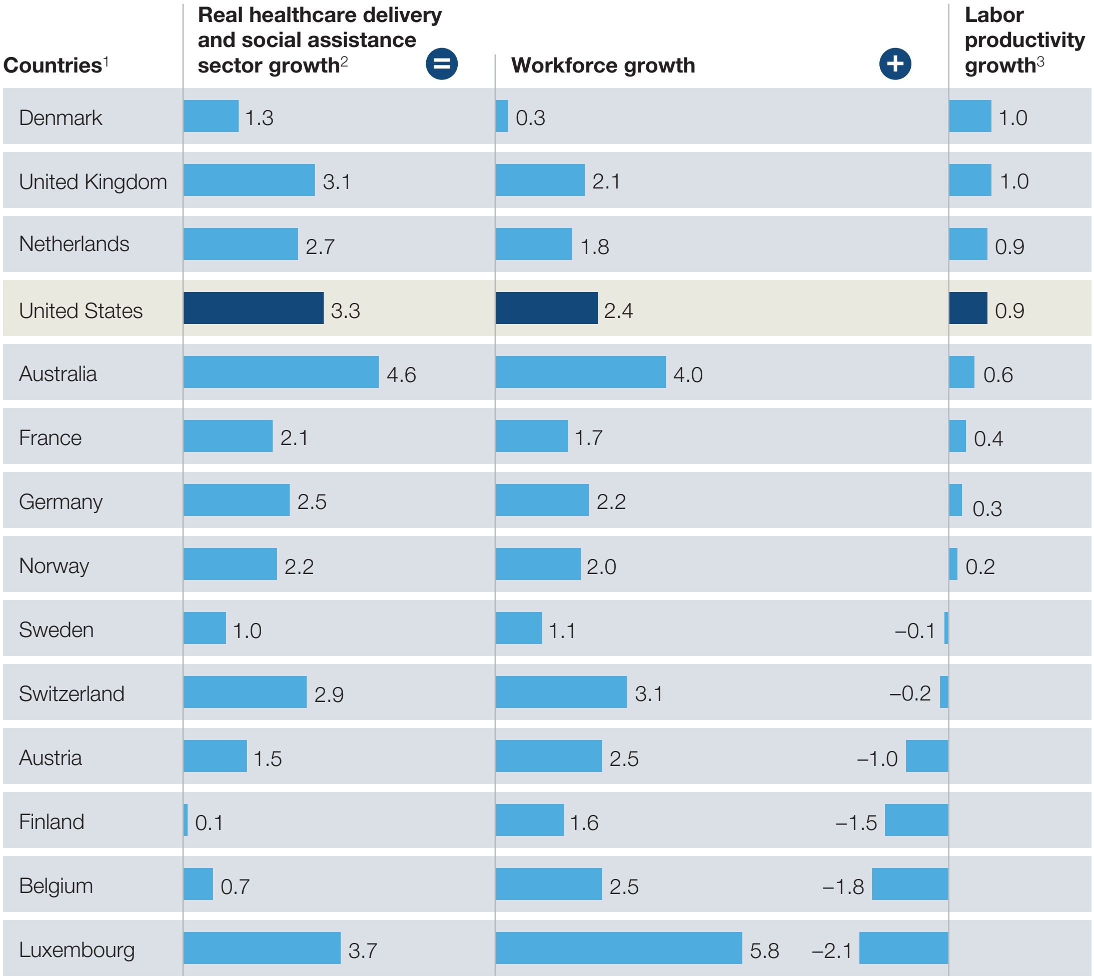
EXHIBIT 2-3 Healthcare delivery and social assistance labor productivity growth across countries

CAGR, %, 2001–16



The US estimates in this exhibit differ slightly from those in Exhibit 2-2 because most other countries group healthcare delivery and social assistance together. See footnote 2 for more details.

CAGR, compound annual growth rate; GDP, gross domestic product; NAICS, North American Industry Classification System.

[1] Only countries with GDP per capita above $40,000 in 2016 were included.

[2] To conduct a country-to-country comparison, the US industry GDP and workforce examined were for NAICS code 62 (healthcare and social assistance). Since other analyses were specific to the US, the NAICS codes for healthcare delivery only were used: 621 (ambulatory healthcare services), 622 (hospitals), and 623 (nursing and residential care facilities).

[3] The method used for this analysis, which measures labor productivity, is different from the method used to understand labor's contribution to value-added GDP. This analysis approximates labor productivity growth as real industry GDP growth minus workforce growth. The other method uses the KLEMS (K-capital, L-labor, E-energy, M-materials, and S-purchased services) framework to break down value-added GDP. Labor productivity can be negative when the size of the workforce grows faster than the industry's GDP growth, which implies that each additional worker is reducing the average output per worker.

Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; Organisation for Economic Co-operation and Development; McKinsey analysis

Admittedly, increasing the productivity of the healthcare delivery workforce could make it harder for the industry to continue to be a major engine of overall job growth. But the US cannot have both job growth and productivity growth in healthcare delivery without changing the fundamental structure of the industry. Furthermore, productivity improvements could offer relief to provider systems under increasing margin pressure, and existing healthcare delivery workers might experience real wage growth as a result.

Understanding the healthcare delivery workforce

The 15.8 million people in the 2017 US healthcare delivery workforce can be divided into four groups, as shown in Exhibit 2-4:[#,3]

- Physicians. This group includes all those with Doctor of Medicine or Doctor of Osteopathic Medicine degrees.
- Non-physician clinicians. This group includes advanced practice nurses,[¶] physician assistants, and registered nurses. In some states,

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[#] Note: all labor figures reflect head counts, not full-time equivalents.

[¶] The category “advanced practice nurses” includes nurse practitioners, certified nurse midwives, and nurse anesthetists.

Box 2-1: Defining the healthcare delivery industry for cross-country comparisons

There are some inconsistencies between the US North American Industry Classification System (NAICS) definition of healthcare and the International Standard Industrial Classification of All Economic Activities, which groups healthcare and social assistance together. For this chapter, the inclusion of the social assistance category in the definition of healthcare delivery results in differences between the estimates of labor productivity shown in some of our exhibits (Exhibits 2-2 and 2-3) and introduces the possibility of error in some of our analyses. To investigate this possibility, we first examined the contribution of the combined healthcare delivery and social assistance categories (as defined by NAICS) to value-added GDP in the US. We found that social assistance represented 8.6% of the combined industry’s value-added GDP in both 2001 and 2016. This stable percentage suggests that the addition of the social assistance category did not skew our estimates of labor productivity to a significant degree. However, social assistance represented 16.1% of the combined workforce in 2001 and 19.3% in 2016, which indicates that social assistance had more rapid workforce growth than healthcare delivery. As a result, our estimate of labor productivity at the NAICS 62 level in Exhibit 2-3 is somewhat lower than our estimate for healthcare delivery alone in Exhibit 2-2.

While inclusion of the social assistance category does affect our estimates of labor productivity growth, it does not affect our conclusion: labor productivity is lower in the US healthcare delivery industry than in other countries’ healthcare delivery industries and other US services industries.

EXHIBIT 2-4 **Breakdown of US healthcare delivery workforce**

Number, millions			**Workforce**		
			2001[1]	**2017**	**Examples**
Core	**Industry-specific**	**Physicians**	0.3	0.6	Physicians, surgeons, obstetricians/gynecologists, pediatricians
		Non-physician clinicians	1.9	2.8	Advanced practice nurses, physician assistants, registered nurses
Non-core		**Clinical support staff**	4.0	5.9	Licensed practical/vocational nurses; pharmacists; physical, occupational, and respiratory therapists; clinical laboratory technologists and technicians; surgical technologists; phlebotomists; nursing assistants; medical assistants
	Industry-agnostic	**Non-clinical support staff**	5.4	6.4	Do not perform clinical activities; most are in administrative functions

[1] In 2001, Standard Industrial Classification (SIC) codes were used. The values represent the best available comparison to 2017 North American Industry Classification System (NAICS) codes.
Note: dentists, veterinarians, and associated occupations were removed from all workforce analyses.

Sources: Bureau of Labor Statistics; McKinsey analysis

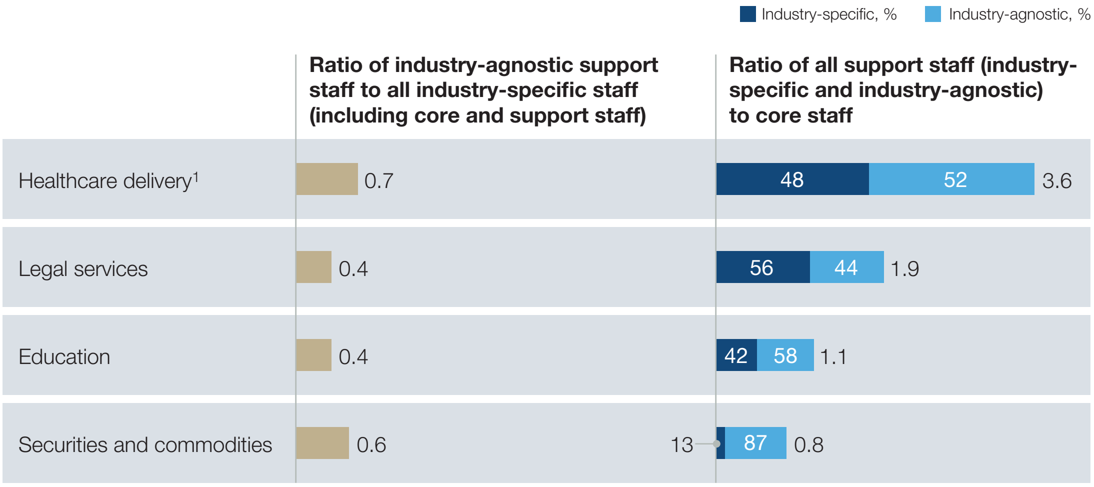
advanced practice nurses and physician assistants are permitted to practice independently.

- Clinical support staff. This group includes a wide range of workers, from pharmacists and respiratory therapists to nursing and medical assistants.
- Non-clinical support staff. The individuals in this group do not perform clinical activities; most of them are in administrative functions.

These numbers show that for each physician in the US, there are almost 5 non-physician clinicians and 10 other clinical support staff. On average, a physician's salary is more than double that of non-physician clinicians.[4] This salary difference makes it clear that a key step for improving the labor productivity of the healthcare delivery workforce is to reallocate certain tasks so that all non-physician clinicians and clinical support staff members work at "top of license," as we discuss in chapter 3.

We were not able to compare the healthcare delivery workforces in the US and other wealthy countries with any degree of precision, because most countries report healthcare delivery and social assistance personnel as a single category. However, a few cross-country comparisons could be made. We found, for example, that in 2017 the US had fewer physicians per 1,000 people than most other wealthy countries.[5] Given the differences in how various health systems are structured, this finding cannot be cited as proof that US physicians are more productive than their peers elsewhere (although that may be the

EXHIBIT 2-5 **Workforce ratios in US services industries, 2017**



[1] Definitions of healthcare industry workers are included in Exhibit 2-4. Definitions of the workers in other industries are included in the technical appendix.

Sources: Bureau of Labor Statistics; McKinsey analysis

case). As we will show, ample opportunity exists to improve the productivity of US physicians.

However, we were able to compare the non-clinical support staff with similar workers in other US services industries (legal, education, and securities and commodities). We began by investigating the job descriptions used in these industries and the educational requirements for those jobs, so that we could match them with jobs in the healthcare delivery industry. (In the legal services industry, for example, lawyers and judges are considered the equivalent of clinicians.) We then grouped the workers into three sets:

- Core staff (physicians, non-physician clinicians, and their equivalents in the other industries)
- Industry-specific support staff (the clinical support staff and their equivalents in the other industries)
- Industry-agnostic support staff (the non-clinical support staff and their equivalents in the other industries)

First, we compared the ratio of all industry-specific staff (including core staff and industry-specific support staff) to industry-agnostic support staff (Exhibit 2-5). The results were roughly equivalent in all four industries. However, when we compared the ratio of core staff to all support staff (industry-specific and industry-agnostic), we found that value considerably higher in healthcare delivery than in any of the other industries. Given the complexity of care delivery and related administrative tasks, it is not surprising that this ratio was higher in healthcare delivery. ○

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[2] Cutler D. JAMA forum: The good and bad news of health care employment. news@JAMA. January 24, 2018.

[3] Data analyzed is from the Bureau of Labor Statistics (Occupational Employment Statistics survey).

[4] Data analyzed is from the Bureau of Labor Statistics.

[5] Data analyzed is from the Organisation for Economic Co-operation and Development's Health Statistics 2018.

Chapter 3. Clinical workforce

Of the 15.8 million people in the 2017 healthcare delivery workforce in the United States, roughly 60% are involved in direct patient care.[*,1] In addition to about 600,000 physicians, the clinical workforce includes almost 200,000 advanced practice nurses,[†] roughly 100,000 physician assistants, and approximately 2,500,000 registered nurses (RNs). Another 5.9 million people work in other clinical positions (see chapter 2 for details). The productivity of healthcare delivery depends significantly on the efficiency with which this clinical workforce delivers high-quality and safe patient care.

While certain aspects of healthcare delivery will likely always require human-to-human touch between a caregiver and a patient—and therefore may be subject to some element of Baumol's cost disease[‡]—a number of tasks and responsibilities could be rethought (e.g., automated, shifted to others). In many parts of the US, provider systems are facing margin pressure, because revenue compression is increasing without compensatory flexing in operating costs.[2] At these institutions, clinical workforce costs account for more than one-third of operating expenses. Thus, improving the productivity of that workforce (e.g., by making it possible for the same staff to see more patients or for patients to receive high-quality care from fewer or less expensive staff members) is important for overall expense management—and, in some cases, a provider system's existence. From 2001 to 2016, labor productivity increased by only 1.1% per annum in healthcare delivery, but by more than 1.6% per annum in other services industries. Unless the nation is willing to continue seeing significant increases in healthcare spending, improving the productivity of the clinical workforce is mandatory.

To illustrate how clinical labor productivity can be improved, we focus in this chapter on three approaches:

- Accessing additional existing capacity within the current workforce
- Improving the allocation of tasks based on skill mix
- Increasing the use of technology to automate certain tasks and enhance efficiency

These three approaches are not the only ways to improve the clinical workforce's productivity, nor do they address all the factors that could influence their productivity. (Other factors include the fragmented provider system and physician landscape, the complexity of healthcare delivery, and the regulations governing healthcare delivery activities.) Nevertheless, they illustrate the impact that greater clinical workforce productivity could have.

Note: opportunities to improve the productivity of non-clinical support staff are discussed in chapter 4.

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[*] For our analysis of the healthcare delivery workforce, we used the Bureau of Labor Statistics (Occupational Employment Statistics survey). We limited ourselves to North American Industry Classification System (NAICS) 621, 622, and 623, examined all data at the "detailed" level, and then removed dentists, veterinarians, and associated occupations. Note: all labor figures reflect head counts, not full-time equivalents (FTEs).

[†] The category "advanced practice nurses" includes nurse practitioners, nurse midwives, and nurse anesthetists.

[‡] The basic theory of Baumol's cost disease is that for some jobs that depend primarily on human activity (e.g., musical quartets), the need for a certain amount of labor does not necessarily change over time—but wages must nonetheless increase. This combination could then result in a drag on labor productivity.

The numbered references appear at the end of this chapter.

Accessing additional existing capacity

A core issue we wanted to address is whether the work hours of physicians and other highly trained clinicians are being used as effectively as they could be. To answer this question, we began by analyzing data about physicians' time from provider systems across the country. Because considerably less information is available about how other clinicians' time is allocated, we discuss those clinicians only briefly at the end of this section.

Excess capacity among physicians

High-performing provider systems use 90% to 95% as a retrospective target schedule density in ambulatory settings to ensure that the time of their physicians—their most valuable workers—is adequately focused on patient care provision while allowing some "flex" time to account for the unaccountable (e.g., unexpected illnesses) and prevent burnout.[§] In our experience, however, primary care physicians' clinical schedules are, on average, about 78% filled with patients who show up for appointments; specialists' schedules are, on average, roughly 82% filled. These results are in line with national analyses.[3]

These low schedule densities may seem surprising, given how often and long patients report having to wait for appointments. Since 2004, the national average wait time for an appointment with a physician has been more than a week, but actual wait times vary markedly by geography and specialty (Exhibit 3-1).[4] The wait to see a family practice physician in 2017, for example, was eight days in Minneapolis but 109 days in Boston. For some specialties (e.g.,

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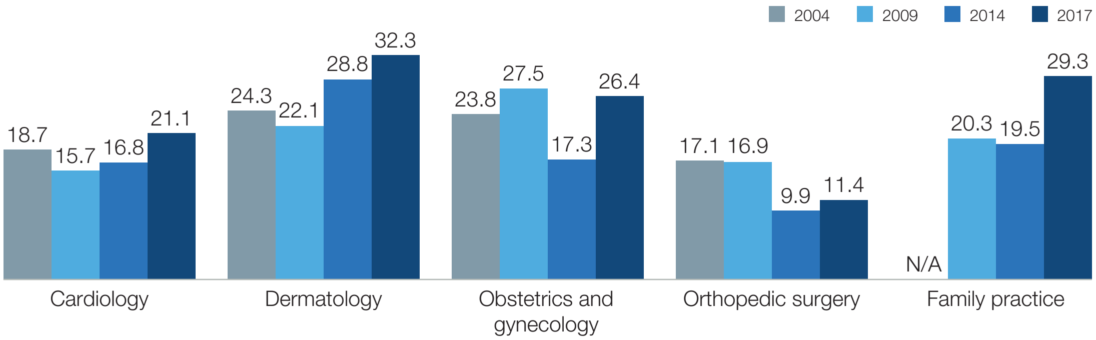
[§] Generally, two scheduling metrics are examined in provider systems. The first is the fill rate, which is defined as the hours booked in a physician's schedule divided by the hours spent in clinical session. This metric looks at the scheduled amount of time. The second is the arrival rate, defined as the hours booked minus no-shows, divided by the hours in clinical session. This metric is a more accurate measure of actual hours spent seeing patients. We used the arrival rate to define schedule density for our analyses.

EXHIBIT 3-1 **Wait times in US by physician specialty**

Average days until first available time for a new patient appointment with a physician



Source: 2017 Survey of physician appointment wait times and Medicare and Medicaid acceptance rates. Merritt Hawkins. March 2017 dermatology), the average wait time nationwide was more than four weeks in 2017.

Wait times are sometimes, but not always, shorter in the US than in other countries. In 2016, for example, only about 6% of patients who needed to consult a specialist had to wait two months or longer in the US; in Canada and the United Kingdom, the percentage of such patients was much higher—but it was lower in France and Germany.[5]

If lack of demand is not the cause of the low schedule densities, what is? There are several challenges to schedule density, including:

- Physician preferences
- Patient preferences
- Informational gaps
- A practice's ownership structure

We examine these factors below. In many cases, the challenges can be overcome through focused attention on highly tactical "nuts and bolts" changes to scheduling practices.

It is also worth noting that improving a physician's schedule density is likely to provide advantages other than just increasing the productivity of the clinical workforce. For example, it has been shown to shorten the time patients must wait for appointments, which could improve both patient satisfaction levels and clinical outcomes.[6] And, in our experience, increased schedule density does not reduce the amount of time a physician spends with each patient.

Physicians' schedules can often be complex because of the need to match patient requirements with specific subspecialties, ensure a mix of availability for new and existing patients, and, in some cases, take into account other services that should be provided at the time of appointment (e.g., radiologic imaging for orthopedic visits). Physician preferences that go above and beyond clinical needs, however, often create a surprising level of added complexity.[#] When they are not actively managed, significant mismatches between the preferences and needs often arise—and some slots are unused.

In our experience, the failure to periodically "prune" clinically inappropriate rules has left some provider systems with thousands of different appointment types and "calendar holds" in their scheduling systems. Admittedly, managers at provider systems often find it difficult to get all departments to minimize restrictions on non-clinically warranted preferences; however, doing so is crucial if they are to prevent the suboptimal scheduling that results in underutilized capacity.[¶]

Patient preferences—about a physician's gender, location, language spoken, insurance accepted, etc.—add another level of complexity. Schedulers must attempt to match these requests using IT systems that may not have all the required information in a single location.

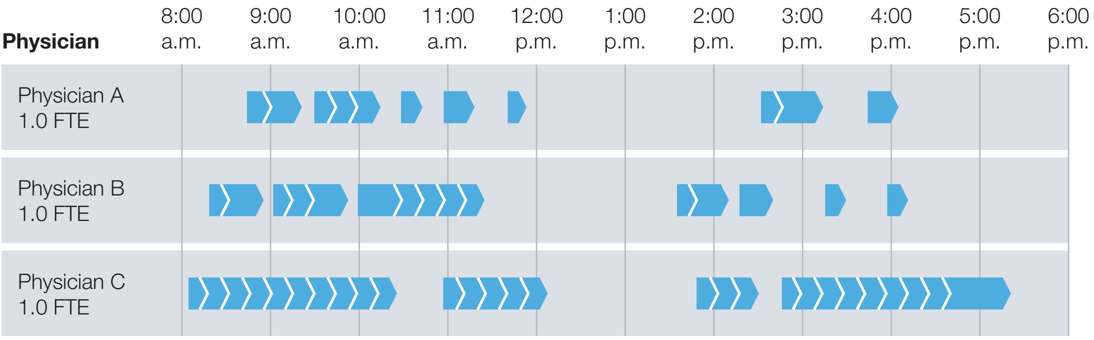
[#] Some physicians specify, for example, when during the day they would prefer to see certain classes of patients (e.g., follow-ups vs new patients). Other physicians may want to differentiate patient slots based on referral type (e.g., from another physician vs self-referral), length of appointment, or treatment type—and then determine how many slots in their schedule should be aligned with each patient type.

[¶] Scheduling procedures can be more difficult than scheduling routine office visits. Nevertheless, reducing the number of allowable non-clinically relevant physician preferences can free up capacity here as well.

EXHIBIT 3-2 **Map of physician schedules**

Typical workday schedule of scheduled patient visits

ILLUSTRATIVE



FTE, full-time equivalent.

Sources: Disguised provider system data; McKinsey analysis

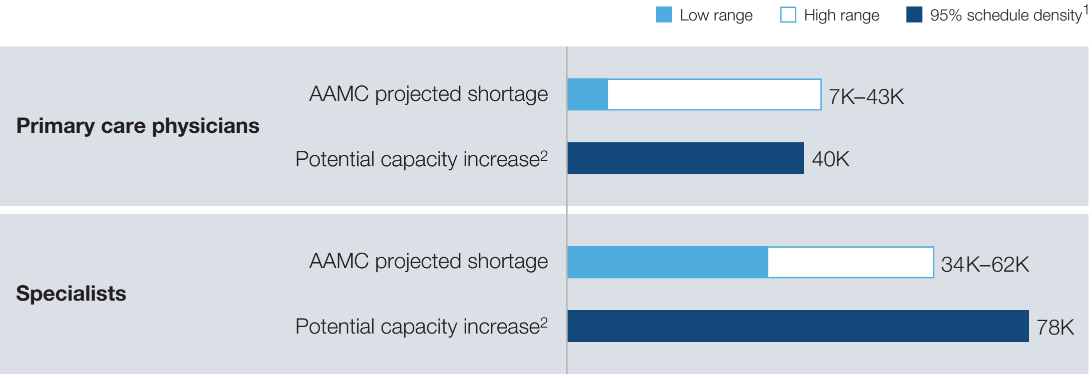
Other issues can also make the process of matching a patient and physician arduous. Hand-offs between schedulers (e.g., between call center agents and front-office staff in clinical practices) may result in informational gaps or misinformation about preferences. Patients may not be able to accurately describe their clinical needs with enough specificity to match to the correct specialist. Scheduling rules that have been collected over time may inadvertently become so convoluted that some patients may be prevented from making an appointment to see an appropriate specialist. (At one provider system, we discovered that the orthopedics department had a 40+-page telephone call tree for schedulers to take patients through before scheduling an appointment.) Late cancelations and no-shows create additional inefficiencies. Furthermore, allocated appointment times may be suboptimal if they are not continually managed—clinical advances in testing, for example, may change required appointment lengths for certain diagnoses. Better matching and curating of appointment lengths to patient needs could improve both productivity and physician satisfaction.

The ownership structure of physician practices can also affect productivity; for example, physician-owned practices have been shown to be more productive than hospital-owned practices.[7] A likely explanation is that in physician-owned practices, income is usually linked directly to practice performance, providing an incentive to see more patients. In hospital-owned practices, physicians are often paid salaries, and the bonuses offered for productivity may not offer as strong an incentive. In some cases, however, conscious or unconscious patient selection bias (e.g., accepting comparatively few patients with lower-reimbursed complex care needs) may contribute to the higher productivity among physician-owned practices.

The net result is that different physicians can have markedly different schedule densities (Exhibit 3-2). What would happen if all physicians were supported and able to reach a schedule density of 90% or 95%? The Association of American Medical Colleges has estimated that by 2030 the US will have a shortage of up to 43,100 primary care physicians and 61,800 specialists, a result of both increased demand and the retirement of baby boomer physicians.[8] We calculated that if those two factors (i.e., increased demand and retirements) remained as projected but all physicians were to have a 95% schedule density by 2030, there would be almost no physician shortage (Exhibit 3-3). (A small shortage of primary care physicians would remain, however.) Other researchers have also posited that the US does not face a physician shortage.[9] Our analysis may be optimistic, given that achieving a 95% schedule density may not be possible for all physicians; in rural areas, for example, the demand for physician services can be too inconsistent to make that rate achievable. However, the analysis did not assume that physicians worked more hours per day or more days per week, just that their schedules would be better filled. Thus, our larger point remains: many physicians could be supported to more fully utilize their existing capacity, thereby improving the productivity of the clinical workforce.

As the healthcare delivery system adjusts itself to capture this opportunity, it must do so with care. In many specialties, physician burnout is a real and growing problem.[10,11] Furthermore, email and other forms of electronic communications with patients are taking up an increasing proportion of physicians' workdays. Asking physicians to do more without providing greater support could exacerbate burnout and adversely affect patient care. However, support is available. For example, allowing non-physician clinicians and the clinical support staff to work at "top of license"

EXHIBIT 3-3 **Projected 2030 physician shortage vs potential physician capacity**



AAMC, Association of American Medical Colleges.

[1] Schedule density was defined as "arrival rate" (the hours booked minus no shows) divided by the hours in clinical session.

[2] The potential capacity increase was calculated by determining the amount of work physicians could do at 95% schedule density, minus the work they currently do. (Our research suggests that current schedule density is 78% for primary care physicians and 82% for specialists.)

Sources: AAMC; disguised client data; McKinsey analysis could allow physicians to offload some of their more mundane tasks. Also, some appointments between patients and physicians, especially those that do not require a physical exam, could be handled through scheduled video chats, telephone visits, or other virtual modalities—which could reduce the number of in-person physician visits needed or make it possible for the visits to be handled by non-physician clinicians.[12] (These modalities could also be used to help patients avoid missing appointments.) These modalities therefore offer the possibility of improving efficiency as well as patient access and satisfaction—but achieving productivity gains will require thoughtful implementation to ensure that the modalities are not too complex for clinicians to use efficiently.

Overall use of remote consultations is increasing but remains low. In one large study, the number of telehealth visits increased by an average annual compound rate of 52% from 2005 to 2017; most of the visits were for primary care or mental health services.[13] However, less than 1% of the patients in this study had taken part in a telehealth visit.

Some provider systems are already delivering a substantial part of their services through virtual visits and other forms of remote consultations. Kaiser Permanente, for example, has reported that in 2015 about half of the interactions its 4.5 million patients had with clinicians occurred virtually.[14,15] At a recent conference, Dr. Elizabeth Nabel, the CEO of Brigham Health, said that her organization is trying to move 50% of its primary care visits to telehealth.[16]

At present, however, two factors—regulations and reimbursement—are hindering the adoption of virtual modalities. Although regulations in support of these modalities have been introduced in most states, they do not always agree—with each other or with federal guidelines—on who can provide the services and other issues.[17] (For example, state regulations vary on whether clinicians can prescribe most medications to the patients they interact with via virtual modalities.) In addition, many payers do not yet reimburse for virtual modalities. In November 2018, the Centers for Medicare & Medicaid Services broadened the range of telehealth services that are eligible for Medicare payments under the physician fee schedule; other payers may follow its example.[18] However, concerns about over-utilization may influence those decisions.

Excess capacity among non-physician clinicians

Schedule densities among other clinicians for whom appointments must often be booked (e.g., advanced practice nurses, physician assistants) have not been studied extensively. It is likely, however, that these clinicians face some of the same barriers to scheduling optimization—and opportunities for improvement—that physicians face. In our experience across a range of provider systems, the way advanced practice nurses and physician assistants are used to deliver care varies dramatically. In some cases, they see patients independently; in other cases, they are used as ancillary staff during patient appointments with physicians. We have also seen significant differences in both their target and actual scheduling densities, and in how much of their time is spent on administrative rather than clinical tasks during patient appointments. At one medical group, for example, advanced practice nurses who were capable of seeing patients independently were being used essentially as medical scribes for physicians. Taking greater advantage of the capabilities of these clinicians could have a significant impact on the productivity of individual provider systems, as well as the healthcare delivery system at large.

For clinicians who do not have booked appointments, even less information about their schedules is available. Nevertheless, some evidence of excess—or, at least, poorly allocated—capacity exists. For example, a few states have enacted or proposed regulations that established minimum RN-to-patient ratios based on acute-care unit type (e.g., intensive care units). The regulations were based on evidence showing that higher RN staffing improves patient safety.[19] However, mandated ratios have been criticized (by the American Nurses Association, among others) as being too inflexible, preventing staffing optimization for individual patients.[20]

As more and more clinical data becomes available for analysis, it is becoming easier to identify specific factors that have the strongest impact on patient outcomes. A focus on these factors, rather than on blunter requirements such as mandated RN-to-patient ratios, could improve healthcare delivery and make it easier to introduce and evaluate innovations.

Note: other changes that would improve the productivity of the general nursing staff are discussed in the next section.

Improving task allocation based on skill mix

The productivity of the healthcare workforce depends not just on how much time the staff spends on clinical tasks but also on what tasks they are doing. Simply put, physicians should not perform tasks that an RN is trained and legally entitled to do. RNs should not perform tasks that an licensed practical/vocational nurse or nursing assistant could do. (For example, helping most patients walk does not require an RN. That task can be performed by unlicensed staff members with the right training.) Each group should maximize the amount of time it spends on the highest-complexity activities commensurate with its training and experience (what is typically referred to as working at top of license). This approach would improve productivity and could potentially deliver other benefits. For example, surgeons who specialize in, or at least perform a high volume of, a given procedure have been shown to deliver better care quality and outcomes.[21,22] Research has also demonstrated that outcomes improve when surgeons work repeatedly with the same team, which suggests that a surgeon’s ability to delegate less specialized tasks to others contributes to the outcome improvements.[23]

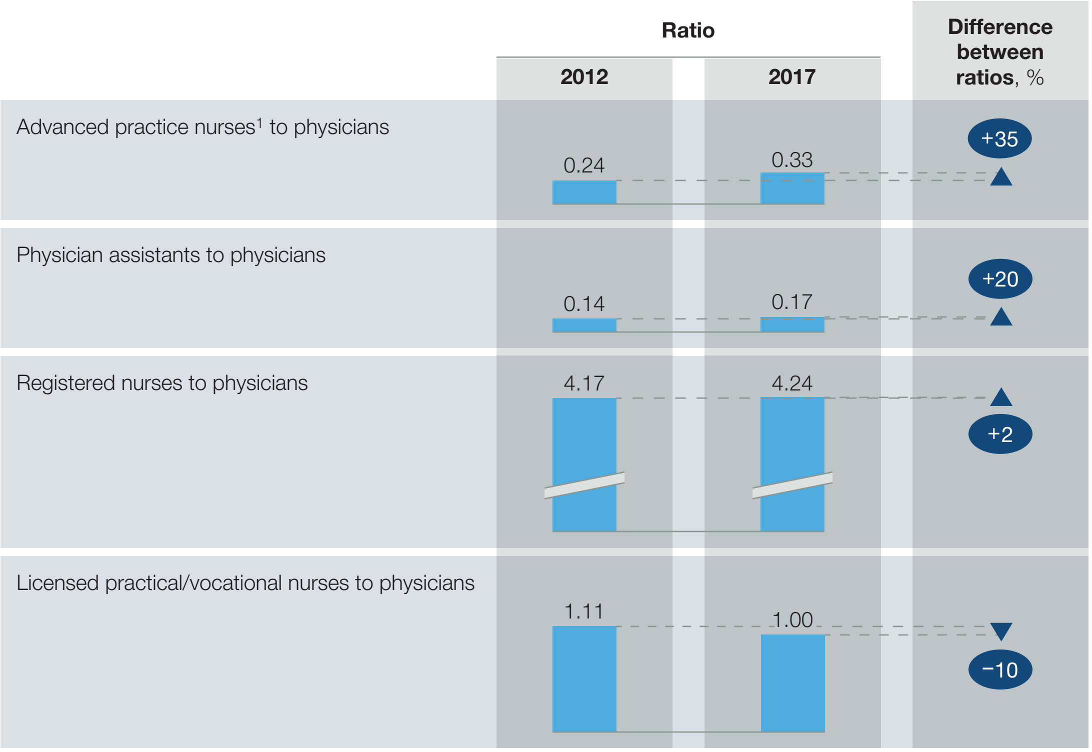
Many provider systems appear to have already begun reallocating tasks across their workforce to take better advantage of skill mix. As a result, physicians have been able to focus more on higher-acuity patients as well as the higher-acuity services and critical clinical decisions needed for other patients. For example, the use of certified registered nurse anesthetists

(CRNAs) has grown in recent years.[24] (The majority of these nurses work under the supervision of a physician.) A recent study found that physician anesthesiologists now spend a greater amount of time on general anesthesia; the CRNAs spend more time on monitored anesthesia care.[25]

In the US healthcare delivery system, the ratio of advanced practice nurses to physicians increased by 35% between 2012 and 2017, and the ratio of physician assistants to physicians rose 20%, which has increased the opportunity for provider systems to use lower-cost clinicians to increase overall capacity (Exhibit 3-4).

However, the full potential of task reallocation has not been realized because it requires active redesign of workflows and responsibilities, and in some cases additional training, not just the addition of new classes of workers (e.g., hiring advanced practice nurses or physician assistants for a large primary care medical group). Although many tasks will be reassigned to team members with less clinical training, the team structure should retain sufficient flexibility to ensure that services can be provided in the most efficient and effective way possible. In several situations, we have found that simply adding new types of clinicians to provider systems can fail to

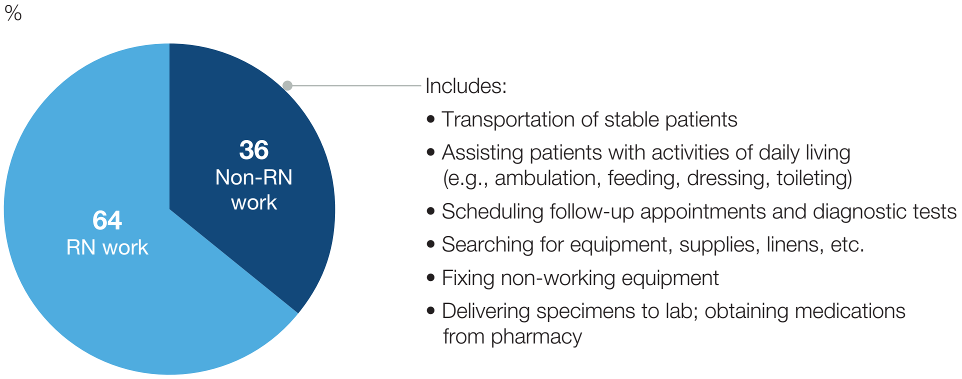
EXHIBIT 3-4 **Changes in the ratios between clinical workforce types**



[1] Advanced practice nurses defined as nurse practitioners, nurse anesthetists, and nurse midwives.

Sources: Bureau of Labor Statistics; McKinsey analysis

EXHIBIT 3-5 **How registered nurses typically spend their time**



RN, registered nurse.

Source: Berlin G et al. Optimizing the nursing skill mix: A win for nurses, patients, and hospitals. McKinsey on Healthcare. May 2014.

improve—and may harm—productivity unless there is explicit agreement about what the new staff members will do and how the roles of existing staff members will change. For example, an East Coast medical group recently hired a significant number of advanced practice nurses and physician assistants to work in its outpatient practice but did not specify what responsibilities these new staff members would have. Each clinic or physician paired with a new clinician could decide how best to use that person's time, which led to considerable inefficiency. (Some of the new clinicians spent most of their time on low-importance administrative tasks; others "shadowed" physicians and did not see patients directly; some could not describe the consistent requirements of their jobs.)

RN responsibilities encompass another major area in which the full potential of task reallocation has not been realized. Our research has shown that in the inpatient units at many hospitals, 36% of the tasks performed by RNs could safely be performed by non-RN team members (Exhibit 3-5).**,[26] Here too, ensuring that task shifting actually occurs requires more than just hiring other team members; there must be specific guidance on the roles and responsibilities of, and allocation of time for, each team member. All too often, task reallocation is done on an ad hoc basis, with suboptimal results.

The time spent by RNs on tasks that could have been done by less-skilled workers is particularly problematic because an RN shortage already exists in many parts of

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**Similar findings have been reported in the academic literature. For example, a study of three intensive care units found that the RNs in those units spent a fair amount of time on tasks, such as helping patients bathe or eat, that could easily have been delegated to a nursing assistant. (See Koch SH et al. Intensive care unit nurses' information needs and recommendations for integrated displays to improve nurses' situation awareness. Journal of the American Medical Informatics Association. 2012;19:583e590.)

the country. Among the reasons for the shortage is job dissatisfaction, a problem that working at top of license could help correct. Allowing RNs to work at top of license would increase productivity directly and improve patient care. In addition, hospitals would find it easier to recruit and retain RNs, which would reduce the institutions' turnover rates and reliance on temporary nurses, both of which impair productivity.

Some experts have argued that task reallocation could be further extended—and productivity and patient care improved—if the scope of RN practice was expanded. Outpatient nurses in the United Kingdom, for example, have long been able to prescribe certain routine medications (e.g., inhalers, refills), and Ontario, Canada, is moving in that direction.[27] Many US states already allow advanced practice nurses and physician assistants to prescribe some medications, but expanding the scope of general RN practice more broadly would require careful consideration of patient safety concerns, as well as regulatory changes in each state. This is just one example of the broader regulatory, educational, and technical issues that would need to be addressed in order to reallocate tasks.

The extent to which task reallocation could improve overall productivity will depend on the number of segments within the workforce that are affected by it. We believe that the role of every segment should be rethought. A large primary care practice in New England recently reported that it had retrained its medical assistants so that, in addition to setting up exam rooms and taking vital signs, they could take patient histories and serve as patient coaches.[28] The result has been a marked decrease in patient wait times and lower turnover among the medical assistants.

For an example of how the reallocation of tasks improved productivity in another services industry, see Box 3-1, "The impact of paralegals."

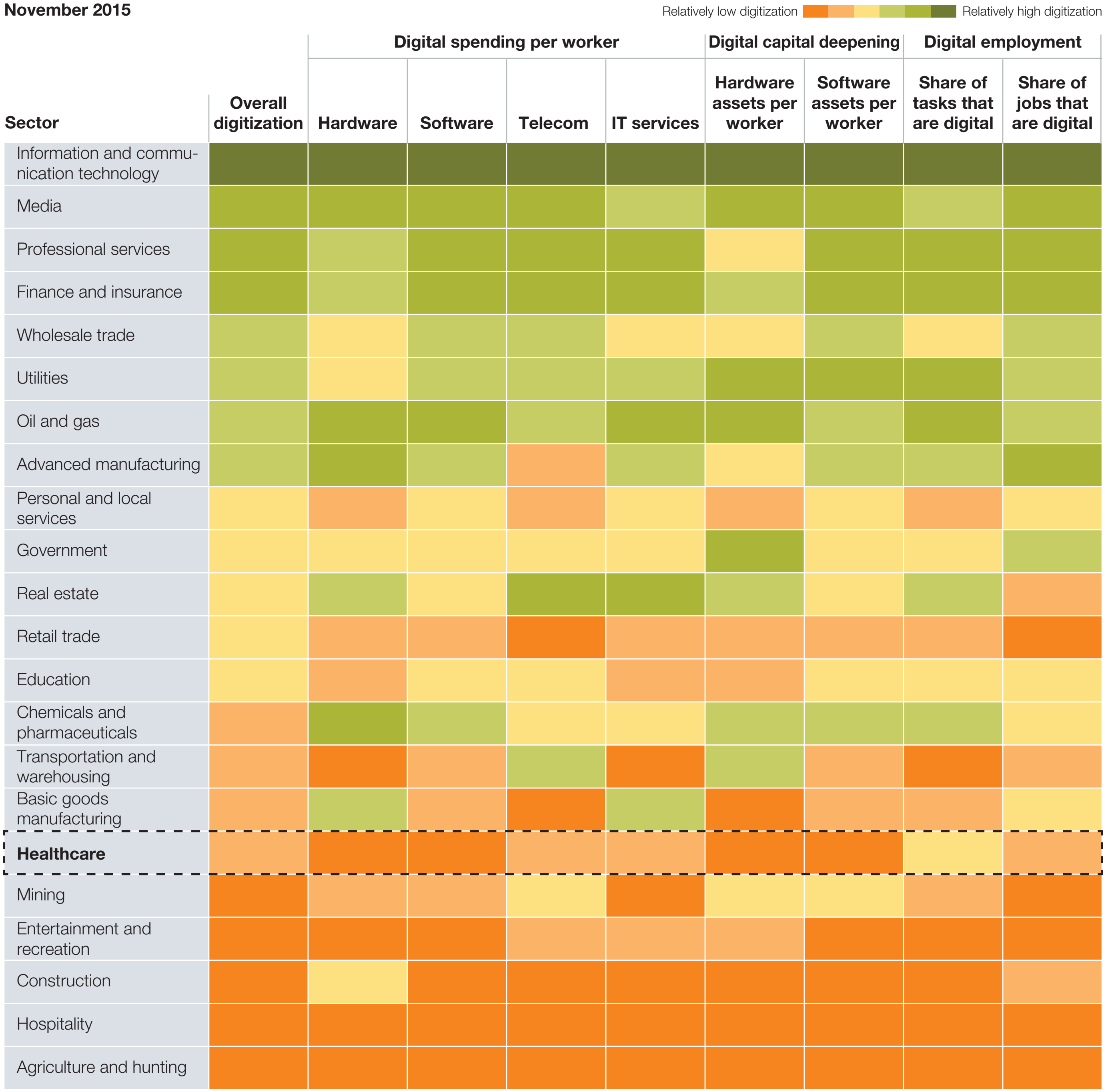
Increasing the use of technology

A logical extension of reallocating tasks by skill mix is to automate any task that can safely be performed by machines. A recent report from the McKinsey Global Institute estimated that nearly half of the activities people in the US are paid to perform today could be automated using existing technologies.[29] The report acknowledged that the extent to which tasks can be automated varies by industry; given the nature of patient care, healthcare delivery has a lower potential for automation than, say, banking or retail sales. Nevertheless, the current use of automation in healthcare delivery is far below what is possible with existing technologies. (Note: technological innovations can also improve multifactor productivity.)

A key explanation for the low use of automation in healthcare is that the delivery system invests less per worker on productivity-enhancing digital tools and services than most other industries do (Exhibit 3-6). Healthcare delivery also has lower "capital deepening" (fewer hardware and software assets in use per worker). However, as new technologies emerge, this picture

EXHIBIT 3-6 **McKinsey Global Institute labor industry digitization index**

November 2015



Relatively low digitization 🟧🟠🟨🟢🟩🟫 Relatively high digitization

Sector	Overall digitization	Digital spending per worker				Digital capital deepening		Digital employment	
		Hardware	Software	Telecom	IT services	Hardware assets per worker	Software assets per worker	Share of tasks that are digital	Share of jobs that are digital
Information and communication technology	🟫	🟫	🟫	🟫	🟫	🟫	🟫	🟫	🟫
Media	🟩	🟩	🟩	🟩	🟢	🟩	🟩	🟢	🟩
Professional services	🟩	🟢	🟩	🟩	🟩	🟨	🟩	🟩	🟩
Finance and insurance	🟩	🟢	🟩	🟩	🟩	🟢	🟩	🟩	🟩
Wholesale trade	🟢	🟨	🟢	🟢	🟨	🟨	🟢	🟨	🟢
Utilities	🟢	🟨	🟢	🟢	🟢	🟩	🟩	🟩	🟢
Oil and gas	🟢	🟩	🟩	🟢	🟩	🟩	🟢	🟩	🟢
Advanced manufacturing	🟢	🟩	🟢	🟠	🟢	🟨	🟢	🟢	🟩
Personal and local services	🟨	🟠	🟨	🟠	🟨	🟠	🟨	🟠	🟨
Government	🟨	🟨	🟨	🟨	🟨	🟩	🟨	🟨	🟢
Real estate	🟨	🟢	🟨	🟩	🟩	🟢	🟨	🟢	🟠
Retail trade	🟨	🟠	🟠	🟧	🟠	🟠	🟠	🟠	🟧
Education	🟨	🟠	🟨	🟨	🟠	🟠	🟨	🟨	🟨
Chemicals and pharmaceuticals	🟠	🟩	🟢	🟨	🟨	🟢	🟢	🟢	🟨
Transportation and warehousing	🟠	🟧	🟠	🟢	🟧	🟢	🟠	🟧	🟠
Basic goods manufacturing	🟠	🟢	🟠	🟧	🟢	🟧	🟠	🟠	🟨
Healthcare	🟠	🟧	🟧	🟠	🟠	🟧	🟧	🟨	🟠
Mining	🟧	🟠	🟠	🟨	🟧	🟨	🟨	🟠	🟧
Entertainment and recreation	🟧	🟧	🟧	🟠	🟠	🟠	🟧	🟧	🟧
Construction	🟧	🟨	🟧	🟧	🟧	🟧	🟧	🟧	🟠
Hospitality	🟧	🟧	🟧	🟧	🟧	🟧	🟧	🟧	🟧
Agriculture and hunting	🟧	🟧	🟧	🟧	🟧	🟧	🟧	🟧	🟧

Sources: Appbrain; Bluewolf; Bureau of Economic Analysis; Bureau of Labor Statistics; Computer Economics; eMarketer; Gartner; industry expert interviews; International Data Corporation; LiveChat customer satisfaction report; US Census Bureau; US Contact Center Decision-makers Guide; McKinsey Global Institute analysis; McKinsey payments map; McKinsey social technology survey may change. In our experience, provider systems today often spend between 15% and 25% of their capital expenditures on IT, up significantly from the past few decades. However, a sizable portion of those investments is spent in areas that would not enhance workforce productivity (e.g., routine maintenance).

Some provider systems are using technology effectively to automate tasks and enhance staff efficiency, thereby increasing labor productivity. For example, digital tools can be used to automate manual staff scheduling processes and communicate staffing needs to supervisors, freeing up more of their time for

Box 3-1: The impact of paralegals

The introduction of paralegals in the legal services industry provides an example of the potential impact of skill reallocation on labor productivity.

Until 1970, most specialized legal tasks had to be completed by lawyers, supported by legal secretaries. That year, however, the American Bar Association (ABA) professionalized the paralegal position and provided guidelines about how paralegals should be educated and trained. Among the activities this new subgroup was entitled to perform—contingent on the lawyer's level of comfort—were the coordination, management, and monitoring of specific tasks (e.g., discovery, diligence in mergers and acquisitions, patent/trademark activity).

The impact on productivity in the legal services industry was not felt immediately, since paralegals needed to be trained and lawyers had to get comfortable using them. By the 1980s, however, labor productivity in the legal services industry began to rise dramatically—and not just because of workforce growth (Exhibit 3-A). In that decade, labor productivity growth in the legal services industry far exceeded that in the US economy overall.

The task reallocation made possible by the introduction of paralegals generated significant value for individual law firms. The ABA estimated that a five-lawyer firm that made minimal use of paralegals would need to devote 40 hours per week of one lawyer's time, plus 16 hours per week of a paralegal's time, to deal with a typical client problem.[1] In contrast, a firm that relied more heavily on paralegals would need to devote only 16 hours per week of a lawyer's time to the problem. Although 48 hours per week of a paralegal's time would also be needed, the salary differential between lawyers and paralegals would result in significant savings for the firm and enable it to serve more clients.

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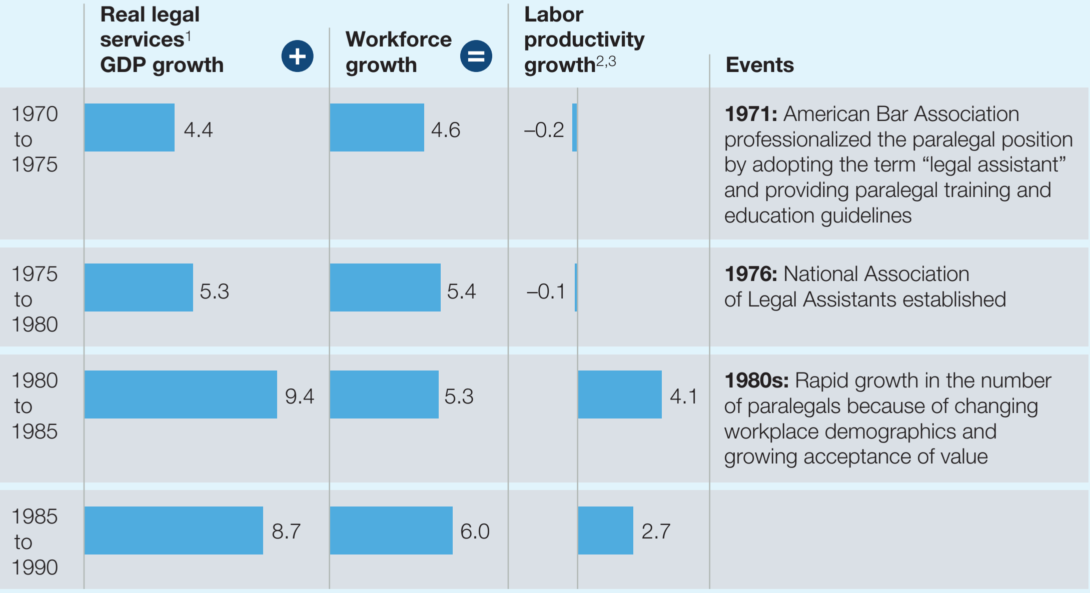
clinical tasks. Labor productivity management tools can help match staffing levels and skill mix to patient needs with real-time, acuity-based clinician dispatching. Software that sits on top of existing patient monitoring systems can reduce the amount of “predictable noise” that nurses and other clinicians must sort through. The software proactively flags (through text messages or phone calls) the alarms or patient needs that truly warrant attention.

Effective use of automated templates and natural language processing can also help clinicians accurately—and,

EXHIBIT 3-A **Case study: Introduction of paralegals in the legal services industry**

%, CAGR



	Real legal services[1] GDP growth	+	Workforce growth	=	Labor productivity growth[2,3]	Events
1970 to 1975	4.4		4.6		–0.2	**1971:** American Bar Association professionalized the paralegal position by adopting the term “legal assistant” and providing paralegal training and education guidelines
1975 to 1980	5.3		5.4		–0.1	**1976:** National Association of Legal Assistants established
1980 to 1985	9.4		5.3		4.1	**1980s:** Rapid growth in the number of paralegals because of changing workplace demographics and growing acceptance of value
1985 to 1990	8.7		6.0		2.7	

CAGR, compound annual growth rate; GDP, gross domestic product; NAICS, North American Industry Classification System.

[1] Legal services defined as NAICS 5411.

[2] The method used for this analysis, which measures labor productivity, is different from the method used to understand labor’s contribution to value-added GDP. This analysis approximates labor productivity growth as real industry GDP growth minus workforce growth. The other method uses the KLEMS (capital, labor, energy, materials, and purchased services) framework to break down value-added GDP. Labor productivity can be negative when the size of the workforce grows faster than the industry’s GDP growth, which implies that each additional worker is reducing the average output per worker.

[3] For comparison, the labor productivity growth of the overall economy was 1.2% per annum from 1970 to 1975, 0.3% from 1975 to 1980, 1.7% from 1980 to 1985, and 0.9% from 1985 to 1990.

Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; Career Igniter; CS Monitor; National Association of Legal Assistants; National Paralegal Association; McKinsey analysis eventually, more rapidly—record patient progress. In the past, multipage handwritten notes were the only method of patient charting, but electronic health records (EHRs) now make possible the use of standard note templates that can often be updated by medical assistants or other clinical support staff. EHRs can also automatically pull information from different areas to speed tasks such as medication reconciliation. Using EHRs effectively does entail a learning curve, which many clinicians find harms productivity initially. It also requires platforms that are nimble and shapeable to clinician and patient needs; in the absence of this type of optimization, EHRs may fail to deliver on their promise.[30]

EHRs have not yet matured sufficiently to reduce the time spent on metric collection (see chapter 4 for more details). In one study, internists reported spending 48 minutes per day inputting data[31]; another study found that physicians spent 38% of their clinical time documenting and reviewing records in their EHR systems.[32] Furthermore, fragmentation in both the provider system landscape and types of EHR systems being used makes transferring information between EHRs difficult. However, as data extraction from EHRs becomes easier, it will become more feasible to track outcomes achieved, reducing the need to track process metrics (e.g., the percentage of patients with chest pain given aspirin). And, as mentioned earlier, tracking outcomes would also make it easier to determine causal interventions and introduce innovations in healthcare delivery.

Greater use of technology holds the potential to improve not only direct patient care but also productivity. As we discussed, some provider systems are already using virtual visits as a substitute for in-person encounters, making it possible to use clinicians' time more efficiently (when effectively deployed). In addition, automated reminder systems reduce the number of patients who fail to show up for appointments, which can aid in improving productivity. Decision support tools hold the promise of delivering real-time guidance to clinicians at the point of care (for instance, by identifying the proper prescription for a condition given a patient's allergies). Artificial intelligence is being used to help interpret diagnostic images, which improves labor productivity. In the near future, artificial intelligence may also help diagnose illnesses and predict the probability of disease progression.[††]

Given the relative newness of many technologies and many clinicians' lack of familiarity with their use, their ultimate impact on labor productivity remains uncertain. Furthermore, patient privacy and other regulations may need to be adjusted, and some payer reimbursement policies may need to be updated, to maximize the potential of these technologies.[‡‡] Nevertheless, as technology advances, we expect to see a shift to greater automation in healthcare delivery and a subsequent rise in productivity. ○

[††] Between October 1, 2017, and September 30, 2018, alone, more than 4,000 academic articles on the use of artificial intelligence in healthcare were published.

[‡‡] Patient privacy standards are mandated by the Health Insurance Portability and Accountability Act (HIPAA) of 1996.

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Chapter 4. Administrative functions

Administrative processes are a necessary component of healthcare delivery in the United States. Without them, consumers would not be able to purchase health insurance, provider systems would not be paid, and patients would not be reimbursed. However, many current administrative processes are inefficient, which is lowering the productivity of healthcare delivery.

In this chapter, we first describe the complexity of current administrative processes, especially those related to healthcare billing/insurance and performance metric reporting, much of which results from industry fragmentation. (For a deeper look at industry fragmentation, see Box 4-1.) We then focus on two opportunities that hold the potential to simplify administrative processes and increase the productivity of both the clinical and non-clinical workforce:

- Refocus the workforce and streamline tasks to reduce the administrative burden
- Encourage greater standardization of billing and insurance-related (BIR) processes and electronic health record (EHR) data

These are not the only ways through which the industry's performance on administrative tasks can be improved, but they illustrate the scope of the opportunity to increase the productivity of healthcare delivery.

Excess BIR administrative costs

Each patient touch point with healthcare delivery—such as an inpatient admission, outpatient visit, or lab test—typically generates a claim for reimbursement. (To understand just how many claims can be generated from a single patient encounter, see Box 4-2.) Given the number of payers, provider systems must devote considerable staff resources (both clinical and non-clinical) to ensure that all necessary information is appropriately documented for entry into their BIR systems so they can manage their revenue cycles.

Claims submissions involve a natural tension between provider systems and payers. Provider systems have a strong interest in ensuring they are paid as agreed (or as legislated) for all the care they deliver; they submit claims with what they consider to be the appropriate definitions of diagnoses and care delivery.* Payers, of course, have an interest in reimbursing only for what they consider to be appropriate care, and often have a different interpretation than provider systems do. Given these dynamics, both sides must devote considerable administrative labor to capture what they believe is the full value at stake, but the result is inefficiency for the healthcare delivery industry as a whole. Value-based payments may reduce—but will not eliminate—this inefficiency, given that they are subject to risk adjustment.

Prior authorization requirements present a similar dilemma. These requirements, like value-based payments, can help control healthcare spending. However, prior authorization creates additional administrative work for both provider systems and payers.

In short, many of the administrative processes required to document and appropriately

The numbered references appear at the end of this chapter.

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*This statement should not be taken as a suggestion that most provider systems are submitting inaccurate claims. Fraud and abuse do sometimes occur, but in most cases, disagreements about claims codes reflect judgment calls.

pay claims are inevitable. Nevertheless, it is worth considering how much of the effort is in excess of what is necessary. International comparisons—even those that account for differences in healthcare system structure—have demonstrated the need for administrative simplification in the US.[1]

In 2010, the Institute of Medicine (IOM) estimated that 14% of national healthcare spending resulted from BIR administrative costs.[2] The costs had been incurred by five different groups: private payers, public programs, physicians, hospitals, and other providers (e.g., pharmacies; laboratories; skilled nursing,

Box 4-1: Industry fragmentation

In 2017, fee-for-service Medicare and Medicaid and the top five private health insurers accounted for only 58% of covered lives; more than 350 other payers covered the remaining 120+ million Americans with health insurance.[1] That year, the top 10 US provider systems were responsible for only 18% of all inpatient days; more than 3,000 additional provider systems accounted for the remaining 152 million inpatient days.[2]

Given that much of healthcare (both delivery and insurance coverage) is governed by the states, a certain amount of fragmentation is inevitable. Because the regulations for health insurance and care delivery can differ from state to state, payers must have appropriate administrative procedures for each state in which they operate; provider systems must be able to deliver care under different sets of regulations.

Insurance product proliferation exacerbates the lack of standardization. For example, the systems used to process claims for patients with commercial insurance may not be appropriate for patients with Medicare coverage. The trend toward consolidation in the payer and provider sectors addresses these issues only partially.

Of course, some level of fragmentation in the payer and provider sectors is not necessarily a bad thing. It creates competition, which can lower prices (and perhaps improve patient outcomes through innovation). It also gives consumers a greater selection of products to choose from.

However, fragmentation increases administrative complexity.[3,4] Payers must accept claims from hundreds of provider systems or more; provider systems often must submit claims in a dozen or more different ways, depending on the requirements of each payer. The resulting permutations complicate the healthcare BIR system.

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Box 4-2: BIR system complexity

To illustrate the complexity in current BIR systems, let's consider a woman undergoing a cesarean section (C-section), a procedure that currently accounts for nearly one-third of all US births.* Exhibit 4-A shows the various touch points the woman could encounter. At a minimum, she will likely pass through the labor and delivery area, operating room, and recovery room before being moved to a postpartum floor and then discharged. In addition to her obstetrician, she will receive care from an anesthesiologist, nurses, and possibly a lactation expert, and she will probably be given antibiotics, anesthesia, and analgesics. If the birth is complicated, additional clinicians and medications may be needed.

Furthermore, the child, once born, will generate his or her own hospital bills, which may be quite high. Infants born via C-section are more likely to need radiology services (e.g., chest x-rays), admission to a neonatal intensive care unit, and care by neonatal subspecialists.

Although all these touch points between the provider system and payer are predictable, the sheer number of them creates opportunities for confusion, error, and claims denials. Denial rates are especially likely if preauthorization was required but not obtained for the C-section, or if the procedure was performed on an emergency rather than elective basis. (In an emergency, a patient may not have time to confirm whether the provider system is in-network.) Furthermore, the claims for the infant's care may be denied if they are submitted before the payer receives proof of birth (e.g., a birth certificate) and formally enrolls the infant in a health plan.

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*Some experts have argued that the C-section rate in the US is too high, and that lowering it would both improve quality of care and reduce healthcare spending. However, this report focuses on the productivity of healthcare delivery, not on clinical decision making. Our use of C-sections in this example should not be construed as either an endorsement or criticism of the current C-section rate.

Abbreviations used in Exhibit 4-A: Anes., anesthesiologist; NICU, neonatal intensive care unit; OR, operating room.

EXHIBIT 4-A **Procedures such as cesarean sections require complicated billing and additional administrative support**

Patient experience

☐ Potential for claim to be denied or to require preauthorization or additional administrative support

	Patient arrives in labor, 40 weeks gestation	Labor progresses with signs of fetal distress	Emergency cesarean section	Infant delivered	Maternal recovery	Neonatal care	Mother and infant discharged with follow-up	
Medical intervention	• Patient admitted to labor and delivery unit • Labs, monitoring, antibiotics, oxytocin initiated	• Epidural placed by anesthesiologist • Labor monitored by obstetrician	• Cesarean section • Anesthesiologist monitors and administers medication	• Infant delivered, then assessed by neonatologist • Uterus and abdomen closed	• Mother admitted to postpartum floor	• Newborn admitted to NICU • Neonatal labs, newborn screening	• Postpartum follow-up appointments • Physical exam, patient counseling	• Neonatal follow-up appointments • Physical exams • Vaccine administration
Healthcare professionals involved	• Obstetrician • Nurse	• Obstetrician • Anes. 1 • Nurse	• Obstetrician • Scrub nurse • Anes. 2	• Obstetrician • Anes. 2 • Neonatologist • Nurse	• Obstetrician • Nurse	• Neonatologist • Radiologist • Nurse	• Obstetrician • Lactation consultant • Nurse	• Pediatrician • Nurse
Additional procedures						• Neonatal chest x-ray		
Pharmaceuticals	• Oxytocin • Non-penicillin antibiotics	• Epidural anesthesia • Intravenous hydration	• Local lidocaine • Anesthesia • Intravenous hydration		• Analgesics	• Vaccines	• Analgesics	• Vaccines

Newborn infant has not been added to insurance plan covering mother; cost of infant's hospital stay and care is billed separately from mother's stay and care

OR anesthesiologist is out of network, bills separately from floor anesthesiologist

Neonatologist out of network

Services billed by radiologist for newborn infant are not covered for additional patient (infant)

Lactation consultants are not covered under insurance plan, unbeknownst to the patient at time of consultation

Additional services, such as chest x-ray for tachypnea, not covered in birthing coverage

Patient receives nonformulary antibiotics because of penicillin allergy

Vaccine coverage is denied until newborn can be added to insurance plan long-term care, and rehabilitation facilities). For each of these groups, the IOM also estimated the percentage of BIR costs that it considered "excess,"[†] which ranged from 51% among hospitals to 71% among private payers (Exhibit 4-1). (In this breakdown analysis, the IOM did not include public payers.) When the IOM aggregated the results of all studies, including those that did include public payers, it estimated that 47% to 51% of total BIR costs were excess.[‡]

In our experience, the IOM calculations overstate the potential savings for healthcare spending if excess administrative costs were markedly reduced. Having worked with payers and provider systems alike, we estimate that if all members of both groups achieved current best-in-class efficiencies in administrative processing (given the industry's market structure), total BIR administrative costs could be lowered by about 17% (from 14% to less than 12% of total healthcare spending); the savings by industry would range from 10% for hospitals to 25% for physicians and private payers. Examples of how these savings could be obtained include aggregating functions (e.g., claims processing and adjudication for private payers), and automating billing/claims processes between payers and provider systems.

Additional savings could likely be derived if the industry were to move beyond current best practices by migrating to new systems, similar to the ones used by the financial services industry. More than a century ago, banks developed systems to process business-to-business non-cash payments transactions. The first system standardized the movement of checks between banks by using a "batch" method, in which all checks for one bank were aggregated and cleared at once, then disaggregated by the receiving bank for its customers. This system eventually became the "automated clearinghouse" (ACH) system, which was standardized by the Federal Reserve in the early 1980s, creating a national infrastructure that was interoperable for all banks. A drawback of this system is the time required before a transaction can be completed (overnight at a minimum, and sometimes up to three days).

For high-value payments that need to be completed immediately, a new system was created: the Clearing House Interbank Payments System can execute a single transaction in near real time, although at a higher cost. This year, with the evolution of the digital economy, a "real-time payment" (RTP) system that can process low-value transactions immediately—24 hours a day, 365 days a year—has been constructed. This system, the development of which is estimated to have cost more than $80 million, has the added benefit of being able to share additional information during each transaction using standardized fields. Over the years, transaction costs using ACH have been driven down to less than a penny; the per-transaction cost of the new RTP for a comparable transaction is about 4 or 5 cents.[3]

If similar clearinghouses were created for healthcare claims, the average transaction costs would likely drop.[4] Such a move would require part of the healthcare system to be reorganized, and payers would have to be willing to alter their billing and insurance systems. However, the concept is not foreign to healthcare;

[†] The IOM defined "excess" as spending above the indicated benchmark comparison. The IOM developed its aggregate estimates by triangulating among the available papers for each category.

[‡] Since the IOM report was released in 2010, several trends (e.g., the increased use of prior authorization) have likely increased the percentage of "excess" administrative costs.

EXHIBIT 4-1 Estimated excess spending within billing and insurance-related administrative costs

🟫 Estimates from academic literature 🟦 McKinsey analysis (low-end estimate) ■ McKinsey analysis (high-end estimate)

Setting	BIR admin costs, 2009	Estimated excess spending, %	Actions that could reduce BIR administrative costs
Private payers	$105B	71 25 40	**Performance management** • Integrate systems across business units • Optimize prior authorization processes • Standardize claims formats across lines of businesses and providers **System overhaul** • Aggregate functions (claims processing, utilities, adjudication) • Create clearinghouses • Automate payment interaction with providers
Physicians	$70B	50 25 35	**Performance management** • Improve utilization of EHR systems • Improve skilled-labor usage for billing-related tasks **System overhaul** • Automate payment interactions • Consolidate IT systems • Reduce overhead associated with physician groups
Hospitals	$67B	51 10 25	**Performance management** • Consolidate assets to reduce fixed costs • Increase utilization in specialized points of care to reduce administrative variation in billing **System overhaul** • Utilize center-of-excellence model • Reduce fixed assets per system
Other providers[1]	$77B	51 15 20	**Performance management** • Adopt tracking technologies to reduce manual load of pharmaceutical tasks **System overhaul** • Automate pharmaceutical tasks (e.g., make effective use of robots in distribution)
Public programs	$42B		**Performance management** N/A **System overhaul** N/A

BIR, billing and insurance-related; EHR, electronic health record; IT, information technology.

[1] Other providers include pharmacies, labs, and skilled nursing, long-term care, and rehabilitation facilities.

Note: the low-end (light blue) estimate represents what we calculate could be done given today's market structure. The high-end (dark blue) estimate represents what we calculate could be achieved if market infrastructure evolved. In neither case do we believe the healthcare industry can reach the academic (taupe) estimate with known opportunities.

Sources: Institute of Medicine. The healthcare imperative: Lowering costs and improving outcomes: Workshop series summary. 2010; McKinsey analysis the processing of pharmacy claims, which involves a very high number of claims submitted by extremely fragmented consumer touch points, has gone through a radical shift over the past few decades.

Our experience suggests that shifting healthcare claims into clearinghouses might enable the industry to save an additional 10 percentage points of BIR administrative costs, which would bring the industry's total administrative savings to 27%. (In other words, the current 14% would drop to about 10% of total healthcare spending.) Given certain characteristics of healthcare delivery (e.g., the likelihood that claims are contested or rejected is much higher in healthcare than in banking), it is doubtful that healthcare claims processing costs could ever be reduced to the cost of ACH transactions—nevertheless, significant savings are possible.

Our experience with both provider systems and payers suggests that further opportunities for savings also exist. At most provider systems, this opportunity would typically range between 10% and 20% in non-IT administrative functions, but in some cases could be as high as 30%. Relevant administrative functions include general functions such as human resources (HR), as well as healthcare-specific groups. Admittedly, healthcare has some important differences from other services industries (e.g., its important role as a primary employer in many communities, higher prevalence of decentralized "holding company" governance structures). Nevertheless, we have found that there are no critical barriers that would prevent provider systems from capturing savings in traditional corporate functions similar to those achieved elsewhere.

Although payers do not deliver healthcare services, their policies and practices strongly influence healthcare delivery. Reductions in payers' administrative costs could free up additional capacity and make transformational shifts such as clearinghouses easier to implement. In our experience, reductions of up to 20% are possible. These savings typically arise across the entire payer value chain, from general administrative functions (e.g., finance, HR) to healthcare-specific functions (e.g., claims processing). Furthermore, not all these savings are contingent on scale, as normally thought of, but can be captured using additional levers, such as outsourcing and digitization/automation. In our experience, the digitization of key processes such as enrollment does require up-front investment but can produce a long-term decrease in administrative costs.

Time requirements for metric reporting

The past few decades have seen the development of numerous performance metrics to better assess the effectiveness of the US healthcare industry; reportedly, about 1,700 metrics are being used by the Centers for Medicare & Medicaid Services alone.[5] Gathering the data required to report performance on these metrics has increased the administrative burden on provider systems (and, in some cases, on payers to verify and process the information they requested). Studies have estimated that US physician practices spend $15.4 billion annually to report performance metrics, yet few, if any, provider systems have insight into the cost of measuring each metric.[6,7]

Several issues make reporting performance metrics difficult for provider systems. First, the sets of metrics required by payers are not standardized, which accounts for a lot of the time the workforce must spend. In 2016, the US Government Accountability Office identified three key factors driving the misalignment of performance reporting requirements in healthcare: dispersed decision making by payers when choosing performance metrics, variations in data collection and reporting systems, and few meaningful measures that are universally agreed upon.[8]

Second, many of the reporting requirements were put in place before the era of automated data collection and big data analytics, and therefore obliged physicians and other staff members (including advanced practice and registered nurses, physician assistants, and others) to collect and analyze information manually. The introduction of EHR systems offered the promise of automating highly manual tasks like metric reporting and thus ease the administrative burden, and the use of EHRs has risen markedly in recent years. (In 2015, the most recent year for which data is available, 54% of office-based physicians and 84% of hospitals had basic EHR systems that met the criteria for "meaningful use."[§,9,10]) Evidence suggests that as EHR systems mature, productivity gains often follow.[11] However, the systems require long learning curves for clinical and administrative users, and thus many provider systems have yet to realize meaningful data collection improvements from their EHR systems.[12] Some provider systems have even experienced increased administrative inefficiency in the near term because of the time physicians must spend ensuring that required data is recorded in the EHRs. Yet another challenge is that the reports that can be generated from many current EHR systems often align poorly with performance reporting requirements.[13]

Third, interoperability (the free flow of data among EHR systems) is still suboptimal. In 2015, the most recent year for which data is available, only one-quarter of all hospitals were able to electronically find, send, and receive data from both inside and outside their system and then integrate that data into patient summary-of-care records.[14] To understand the implications of this issue, consider: if a patient from provider system 1 is referred to a specialist at provider system 2, it is often nearly impossible to electronically transfer a seamlessly accessible medical record into system 2's EHR. Because of problems like this, many physicians still have incomplete information for patient appointments, which wastes time and may result in appointment cancellations. (To understand why interoperability remains elusive, see Box 4-3.)

Fourth, even if an EHR system can produce the required data, some metrics can be reported only by entering data manually into different portals. For example, the National Healthcare Safety Network registry requires separate entry of data, as do several disease-specific registries. For most Joint Commission measures, provider systems must often print out the required metrics and then have nurses do the data abstraction. For example,

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[§] Estimates are based on organizations having a "basic EHR," as originally defined by DesRoches et al (see DesRoches CR et al. Electronic health records in ambulatory care—a national survey of physicians. New England Journal of Medicine. 2008;359:50-60). For office-based physicians, a basic EHR is defined as a system that enables physicians to view the following: patient demographics, problem lists, current medications, clinical notes, prescription orders, lab results, and imaging results. For hospitals, a basic EHR is defined as including the following: patient demographics, physician notes, nursing assessments, problem lists, medication lists, discharge summaries, advance directives, lab reports, and radiology reports.

provider systems that do transplant surgery often have fully dedicated organ-specific staff members focused entirely on reporting and data.

Fifth, many of the metrics that must be reported still focus on clinical processes rather than patient outcomes. In 2016, for example, more than 60% of the indicators tracked by the National Quality Measures Clearinghouse focused on processes and another 22% focused on patient experience—only 7% were true outcome measures.[15]

Process measures were introduced as a proxy for outcome measures, given the initial difficulty in measuring outcomes. The use of process metrics has not disappeared, even though, for many, their use as proxies for outcomes has never been fully validated. The need to collect multiple process metrics has significantly increased the amount of time the workforce at many provider systems must spend on metric reporting.

Reducing the requirement to report process metrics could increase the productivity of healthcare delivery—but how best to report outcome metrics remains a problem to be solved. For example, provider systems may now be able to track how many patients develop postsurgical infections, not just how many surgical patients were given antibiotics. But most systems still have difficulty determining how many patients with postsurgical infections suffered long-term adverse outcomes as a consequence.

Box 4-3: Why interoperability remains elusive

Several challenges must be overcome before information can flow freely across IT systems, including EHR systems. For example, most provider systems have multiple legacy systems that cannot communicate with each other. (They may have specific systems for certain clinical areas such as lab tests and radiology, as well as a range of administrative systems for such areas as materials management.) Since replacing these systems is an enormous undertaking, the provider systems must often install open application program interfaces (APIs) to enable the legacy systems to exchange data. In addition, data continues to be stored and sent in different formats, which further inhibits the free flow of data between (and in some cases within) provider systems.

Solving the problem of interoperability is becoming increasingly important, given the rise of digital health devices/applications and the need to give patients access to their EHRs. As interoperability is enhanced, productivity in healthcare delivery should rise by some degree—and the effect on how patients engage with their health and the overall healthcare system could be transformative.

Potential solutions

To reduce the administrative burden and inefficiency—and decrease the drag on the productivity of healthcare delivery—we considered two methods of improvement:

- Refocusing the workforce and streamlining tasks
- Encouraging greater standardization of BIR processes and EHR data

Refocusing the workforce

As discussed, inefficiencies in the current approaches to BIR administration and metric reporting lower the overall productivity of the healthcare delivery workforce. If ways can be found to increase the efficiency of the support staff (clinical and non-clinical), it would be easier for physicians and other highly trained clinicians to delegate tasks to the appropriate people.

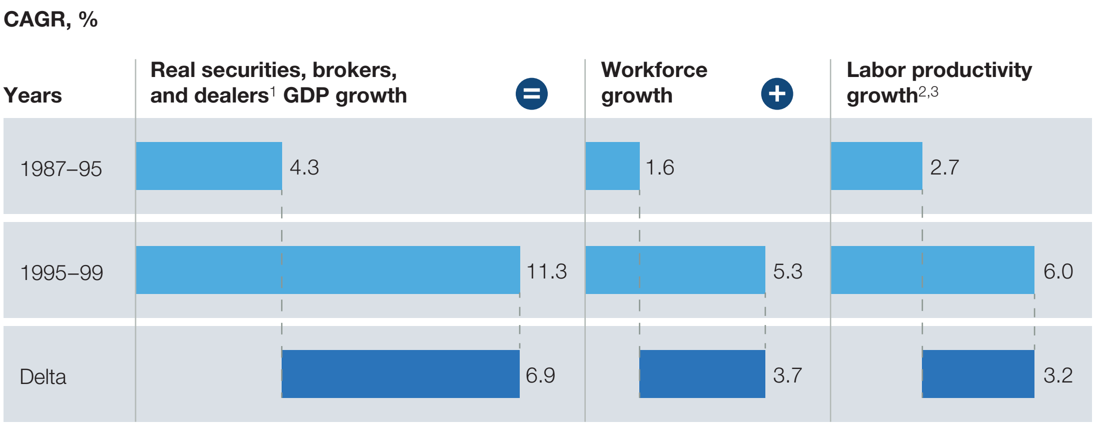
Our comparisons of the US healthcare delivery workforce with the equivalents in other services industries suggest that the opportunity to improve administrative efficiency in healthcare delivery is a large one (see Exhibit 2-5). Although the healthcare delivery workforces in the US and other wealthy countries cannot be compared with precision, the available evidence suggests that the US has a higher percentage of the workforce focused on administrative tasks.[16] Given this, even small improvements in administrative efficiency could permit clinicians to reassign tasks that do not require a high level of training to support staff (clinical and non-clinical), and thereby enable the clinicians to spend more time on patient care.

A second reason that improving administrative efficiency is important is the sheer cost involved. A recent study found that the cost of BIR-related activities ranged from $20 for a primary care visit to $215 for an inpatient surgical procedure. Physicians' time accounted for between 11% and 31% of these charges, depending on the activity. Administrative staff time and overhead accounted for the remainder.[17]

Finding ways to minimize the amount of administrative work performed by physicians and other highly trained clinicians could be accomplished in a variety of ways. As we discussed in chapter 3, licensed practical/vocational nurses, nursing assistants, and medical assistants could take on some of these activities. In addition, computer-assisted coding utilizing natural language processing could reduce the amount of time spent on data entry and markedly decrease the need for professional coders. Claims submissions could be standardized (or at least simplified), and many back-office tasks could be automated. Recent research suggests that wages are growing more rapidly for non-clinical workers than for clinical workers, making the automation and digitization shift more critical.[18]

The securities industry provides an example of the potential impact of automation on labor productivity. (Admittedly, the securities industry may have less transactional complexity than healthcare delivery.) In the late 1980s, financial companies began making significant investments in IT to automate the trading process. Automation affected labor productivity growth primarily through substitution: computers

EXHIBIT 4-2 **Effect of automation on labor productivity in securities industry**



CAGR, compound annual growth rate; GDP, gross domestic product; NAICS, North American Industry Classification System.

[1] Defined by NAICS code 523 (securities, commodity contracts, and other financial investments and related activities).

[2] The method used for this analysis, which measures labor productivity, is different from the method used to understand labor's contribution to value-added GDP. This analysis approximates labor productivity growth as real industry GDP growth minus workforce growth. The other method uses the KLEMS (K-capital, L-labor, E-energy, M-materials, and S-purchased services) framework to break down value-added GDP. Labor productivity can be negative when the size of the workforce grows faster than the industry's GDP growth, which implies that each additional worker is reducing the average output per worker.

[3] For comparison, labor productivity for the overall economy was 1.0% from 1987 to 1995 and 1.9% from 1995 to 1999.

Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; McKinsey analysis

were able to take on certain tasks formerly performed by people, especially in back-office operations (e.g., processing of a trade) and front-office processes (e.g., ATMs). These changes fundamentally altered how the securities industry operated. As a result, labor productivity growth, which had been 2.7% per annum from 1987 to 1995, rose to 6.0% per annum from 1995 to 1999 (Exhibit 4-2).[19]

Encouraging standardization

An important consideration in the discussion of administrative inefficiency is the role of regulation in creating—or reducing—the burden.[20] In some cases, eliminating, streamlining, or rationalizing regulations could encourage greater efficiency. At other times, new regulations—or updates to existing regulations—could enable greater innovation and productivity.

For example, there is still little standardization of BIR data, both within and across payers, as well as among provider systems. Industry fragmentation exacerbates this challenge (see Box 4-1). The lack of standardization could be addressed in different ways. Some states have imposed new or revised regulations to encourage the standardization of both EHR and BIR data; regulations could also be used to promote the development of central clearinghouses. Alternatively, industry stakeholders could agree to collaborate to address these challenges. A combination of these approaches could also be considered.

Although some attempts have been made in the past to standardize the adjudication of claims data, results have been suboptimal, primarily for two reasons. First, many of the efforts were undertaken by individual payers, none of which were probably large enough to have the economies of scale needed to improve the process for the entire healthcare system. Second, individual payers often use different claims submission rules. (Each one has rules that it believes are optimal for its purposes and give it a better value proposition for its customers.) However, some regulatory attempts to standardize data have also achieved suboptimal results. Take, for example, the Health Information Technology for Economic and Clinical Health (HiTECH) Act, which has succeeded in encouraging provider systems to adopt EHRs, but has been less successful in solving the interoperability challenge.[21] One of the factors that has contributed to this problem is that HiTECH failed to take into account variations in state policies and private/local market forces across the country.

Regardless of how the standardization of BIR and other data comes about, establishing central clearinghouses that all payers and provider systems could utilize would drive down administrative costs for both groups and free resources they could invest elsewhere. As the financial services industry learned long ago, the use of standardized data managed in central clearinghouses makes it possible to significantly improve productivity and lower transaction costs.

Standardization of other data in central repositories could also create new opportunities for healthcare stakeholders. For example, if de-identified EHR data could be stored in a central repository, the information could be commoditized to improve healthcare delivery and patient care. This approach would make it easier to conduct research and develop technology innovations—another way to deliver better outcomes for patients.

Standardization of other data could also create additional ways to increase labor productivity in healthcare delivery. For example, current approaches to performance metric reporting are inefficient—and not just because of the number and type of metrics that must be reported. Manual processes are often used to gather the data. However, regulatory changes may be necessary before the number of required metrics can be reduced and standardized.

Some states (e.g., Massachusetts) have attempted to take on the burden of standardizing the performance reporting requirements of public and private payers. Approaches used include legislation and convening stakeholders. While these approaches are beginning to yield positive results, national attempts continue to be plagued by the challenge of finding policy (and sometimes even clinical or operational) consensus.

Admittedly, data standardization could come at a cost. For example, payer innovation around product design could be stifled.

Nevertheless, greater standardization of performance reporting requirements, coupled with greater standardization of EHR data, could eventually make automated reporting possible. That, along with digitized information collection could further improve labor productivity in healthcare delivery. ○

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[14] Patel V et al. Interoperability among US non-federal acute care hospitals in 2015. ONC Data Brief 36 (Office of the National Coordinator for Health Information Technology). May 2016.

[15] Porter ME et al. Standardizing patient outcome measurements. New England Journal of Medicine. 2016;374:504-6.

[16] Data analyzed is from the Organisation for Economic Co-operation and Development. As we noted in chapter 2, most countries report healthcare delivery and social assistance personnel as a single category.

[17] Tseng P et al. Administrative costs associated with physician billing and insurance-related activities at an academic medical center. JAMA. 2018;319(7):691-7.

[18] Du JY et al. The growing executive-physician wage gap in major US nonprofit hospitals and burden of non-clinical workers on the US healthcare system. Clinical Orthopedics and Related Research. 2018;46:1910-9.

[19] Data analyzed is from the Bureau of Labor Statistics (Current Employment Statistics survey). For comparison, labor productivity growth in the overall economy was 1.0% per annum between 1987 and 1995, and 1.9% between 1995 and 1999.

[20] Singhal S, Coe E. The next imperatives for US healthcare. McKinsey white paper. November 2016.

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Chapter 5. Capital

Capital investments have made possible a host of healthcare advances, including the creation of provider systems that allow consumers to walk into a range of care locations at any time. They have also given consumers access to many new high-end technologies (e.g., advanced imaging, nuclear therapeutics).* However, capital investments have made a smaller contribution to productivity improvements in healthcare delivery than in other industries. Between 2001 and 2016, capital contributed only 14% to the economic growth of healthcare delivery[1]—the lowest percentage among major US services industries (Exhibit 5-1).

Why has capital productivity been so low in healthcare delivery?† Can the productivity of future investments be increased? In this chapter, we address these questions. We begin with a discussion of inpatient bed capacity, capital equipment, and clinical service-specific infrastructure to illustrate the forces that have made it difficult for the healthcare delivery industry to rationalize capacity. We then describe trends that are making new investment approaches increasingly important and provide several examples of how capital could be invested more productively.

We freely admit that for many provider systems, redeploying the capital currently tied up in unproductive fixed assets will not be easy—but it is not impossible, especially if considered over a 10- or 20-year period. Opportunities exist to redeploy existing capital assets and to invest in less capital-intensive sites and types of care, as well. The result would be greater capital productivity and a healthcare delivery infrastructure better aligned with patients' needs.

Why capital productivity is so low

A variety of historical forces have contributed to the low capital productivity in healthcare delivery. For example:

- Choices the United States made in years past about healthcare delivery—especially the need to serve the "public good"—have sometimes restricted the return on capital investments (see Box 5-1).
- Most provider systems are not-for-profit entities, and the philanthropic donations they receive often have a strong influence on how and where capital is invested.
- Many specialized procedures and diagnostics can be delivered only through in-person interactions at hospitals, which has required provider systems to invest in and maintain real estate, major equipment, and large IT systems.
- The US has long put strong emphasis on the need for medical progress, as National Institutes of Health funding has demonstrated. These investments in research have benefited not only the US but also the rest of the world—but often in ways that cannot be easily measured in strictly economic terms.

The original investment decisions made in response to these forces may often have made sense from the perspective of individual provider systems or, in some cases, society as a whole. However, newer forces—including medical and technological advances, as well as changing consumer needs and expectations—have made many of the decisions obsolete. As a result, US provider systems have a considerable amount of capital tied up in what are now unproductive fixed assets, specialized pro-

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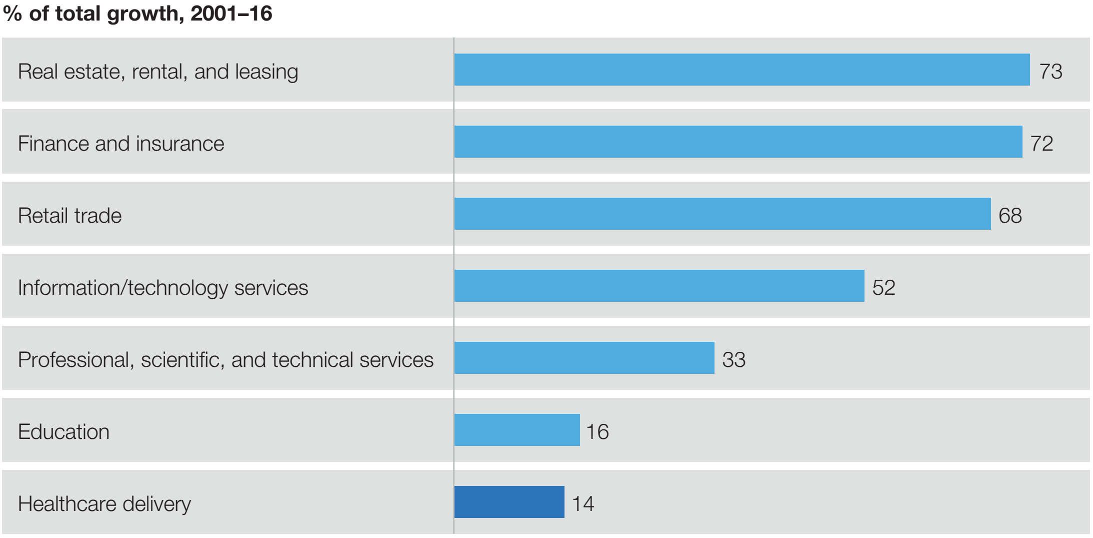
*Access depends in part on a consumer's ability to pay for healthcare services.

†As discussed in chapter 1, our definition of capital productivity in healthcare delivery focuses on output (the number of services delivered) per unit of input (investment or labor), not the number of quality-adjusted life-years (QALYs) gained. However, given the core mission of the healthcare delivery industry, increasing output should never be made in ways that would adversely affect quality of care or patient outcomes. The recommendations in this report are therefore based on evidence that output can be increased without harming—and, in many cases, improving—quality of care.

The numbered references appear at the end of this chapter.

EXHIBIT 5-1 **Capital's contribution to annual GDP growth in US services industries**



GDP, gross domestic product.
Note: GDP is defined here as value-added GDP.
Note: contributions from a factor can be negative. For example, salaries and wages may outweigh the value-added GDP generated by the workforce.

Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; McKinsey analysis

grams and, in some markets, duplicate services, as the following three examples demonstrate.

Inpatient bed capacity

Hospital beds account for one of the largest capital investments in healthcare delivery, yet many of the beds are underutilized. A comparison between hospitals and several other sectors that also make significant capital investments suggests that healthcare delivery lags in capacity utilization (Exhibit 5-2).

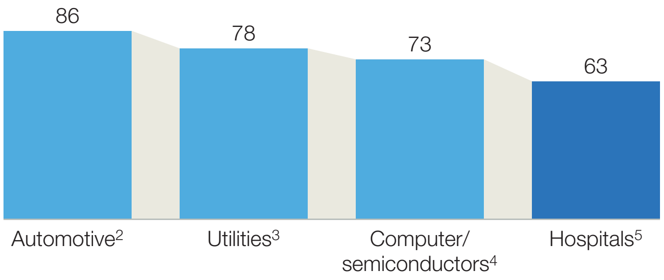
To better understand why capital productivity is low in US healthcare delivery, we then conducted several international comparisons of inpatient bed capacity. These comparisons are inexact, because practice patterns differ considerably from country to country. (For example, hospitalized patients tend to have higher-acuity care needs in the US than in most other countries.) Nevertheless, these comparisons are useful.

Although the inpatient bed occupancy rate in the US has increased since 2001, it is still far below the average for wealthy countries (Exhibit 5-3). However, the US also has a smaller average number of inpatient beds per 1,000 persons (Exhibit 5-4). Taken together, these numbers suggest that the demand for beds is lower here than other wealthy countries, but the lower demand has not translated to lower spending. As we showed in Box 1-1, the US's "expected spending adjusted for wealth" on inpatient care is close to its actual spending. This finding can partially be explained by the

(continued on p. 64)

EXHIBIT 5-2 **Capacity utilization for selected industries**

%, seasonally adjusted, 2016[1]



Note: per the Federal Reserve Bank of St. Louis: "For a given industry, the capacity utilization rate is equal to an output index divided by a capacity index. The Federal Reserve Board's capacity indexes attempt to capture the concept of sustainable maximum output—the greatest level of output a plant can maintain within the framework of a realistic work schedule, after factoring in normal downtime and assuming sufficient availability of inputs to operate the capital in place."

[1] Data is for Q4 2016.

[2] Data analyzed is from the Federal Reserve Bank of St. Louis capacity utilization report on "Durable Manufacturing: Automobile and light duty motor vehicle."

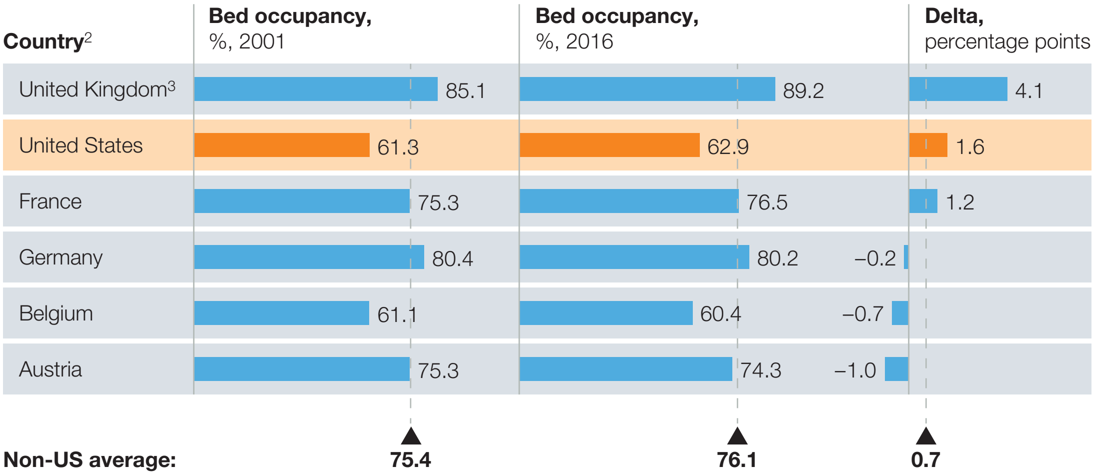
[3] Data analyzed is from the Federal Reserve Bank of St. Louis capacity utilization report on "Electric and gas utilities."

[4] Data analyzed is from the Federal Reserve Bank of St. Louis capacity utilization report on "Computers, communications equipment, and semiconductors."

[5] Data analyzed is from the American Hospital Association for bed occupancy; no equivalent metric is available from the Federal Reserve Bank of St. Louis.

Sources: American Hospital Association; Federal Reserve Bank of St. Louis; McKinsey analysis

EXHIBIT 5-3 **International comparison of bed occupancy rates**[1]



GDP, gross domestic product.

[1] All bed occupancy rates are based on staffed beds.

[2] Only countries with GDP per capita above US $40,000 in 2016 were included.

[3] UK data comes from the National Health Service (NHS) England website—bed availability and occupancy (overnight) data.

Sources: NHS England; Organisation for Economic Co-operation and Development; McKinsey analysis

Box 5-1: Serving the public good

Perhaps the strongest of the forces that has affected today's healthcare delivery infrastructure is the consensus the US reached decades ago—often codified in regulations—that the overall healthcare system should serve the public good. The Hill-Burton Act of 1946, for example, stipulated that all Americans should have access to a nearby hospital. The Emergency Medical Treatment and Active Labor Act of 1986 requires hospitals to provide certain services to all those who present in their emergency departments.

The desire and need to serve the public good in an economically sustainable fashion has often heavily influenced the types of capital investments provider systems have made. The public good achieved has often been considerable, but capital productivity in its traditional sense has frequently been low or nonexistent. Two examples illustrate this point.

Critical access hospitals. The Balanced Budget Act of 1997 included provisions to help ensure that all Americans have access to a nearby hospital. Since that act became law, Medicare has paid certain rural hospitals—which it designates *critical access hospitals*—at a cost-plus rate to help ensure they stay open and offer nearby patients a basic level of services.* However, only a small percentage of the US population lives far from a hospital; our analysis shows that although more than 60% of zip codes are over 10 miles from a hospital, they include only about a quarter of the population (Exhibit 5-A).

Thus, the funds expended on critical access programs may have enabled many rural hospitals to stay open but, in general, they have not encouraged the hospitals to deliver more services per unit of investment. It therefore seems reasonable to wonder whether some of the funds used to support critical access hospitals could be employed instead to provide healthcare services to rural residents in other ways—ways that might improve both patient outcomes and capital productivity.

Building standards. California changed its building standards for hospitals after the 1994 Northridge earthquake. Reconstructing the hospitals damaged during that earthquake had cost nearly $3 billion, and an assessment afterward suggested that another 37% of the state's hospitals were at risk of collapsing during a future major earthquake.[1]

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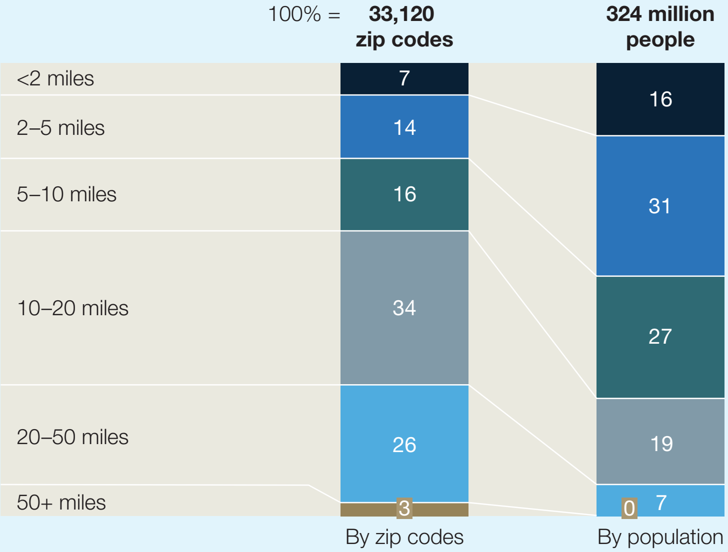
*Key requirements for eligibility as a critical access hospital include having 25 or fewer acute care inpatient beds, an annual average length of stay of 96 hours or less, and 24/7 emergency care services. The location requirements for designation are based on distance from the nearest hospital (35 miles or more in most areas; 15 miles or more in mountainous terrain). (See Balanced Budget Act of 1997. Pub.L. 105–33, 111 Stat. 251, enacted August 5, 1997.)

EXHIBIT 5-A **Distance to nearest hospital in the US, by zip code and population size**

% of hospitals, 2017



Sources: American Hospital Association; US Census Bureau; McKinsey analysis

Since that time, billions have been spent across California to make hospitals earthquake resistant and upgrade aging infrastructure. While these investments will likely save costs—and lives—if another earthquake of equal magnitude occurs, many of them linger at present as unproductive investments. If some hospitals used the invested capital not only to protect against a low-probability event, but also to update archaic infrastructure and create higher-quality delivery mechanisms, then capital productivity should eventually rise. However, if the funds are deployed merely to strengthen the existing infrastructure against low-probability events, the capital will remain unproductive.

As these examples show, there may be ways through which the capital productivity of healthcare delivery investments to serve the public good could be improved. In at least some cases, however, the changes would require the US to reach a new consensus about how to achieve that good.

REFERENCE

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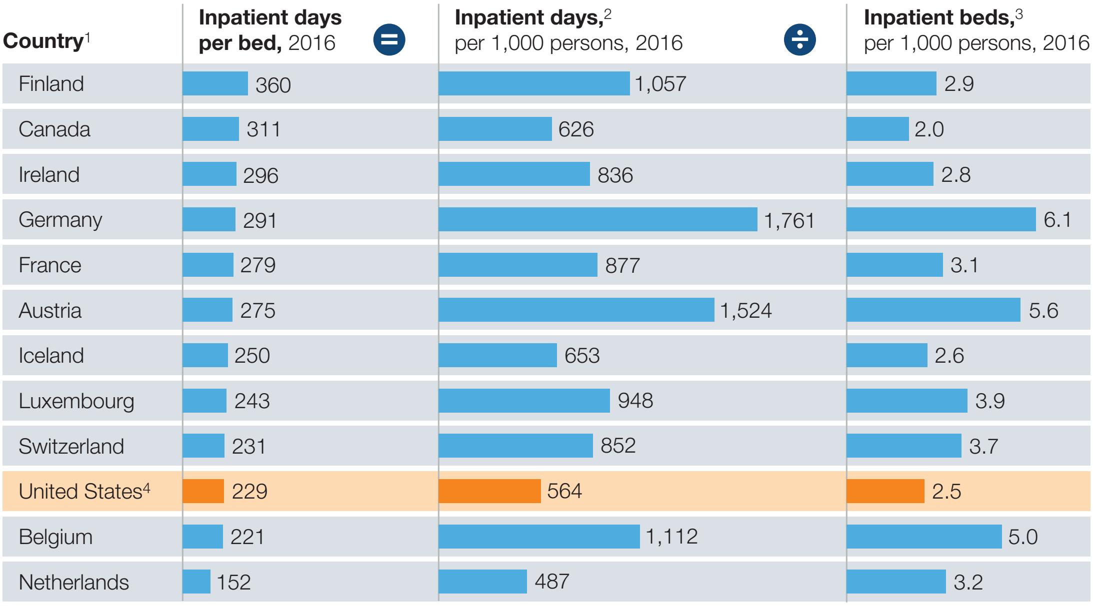
EXHIBIT 5-4 **International comparison of patient days and inpatient beds**



GDP, gross domestic product.

[1] Only countries with GDP per capita above US $40,000 in 2016 were included.

[2] Defined as curative-care bed days.

[3] Defined as staffed curative (acute) care beds.

[4] Full data for the US is not available through the Organisation for Economic Co-operation and Development (OECD), and so American Hospital Association (AHA) data was used instead (for total inpatient days and total inpatient beds).

Sources: AHA; OECD; McKinsey analysis

higher acuity of US inpatient admissions, but it also suggests that average prices for comparable inpatient care are higher here than in other wealthy countries.

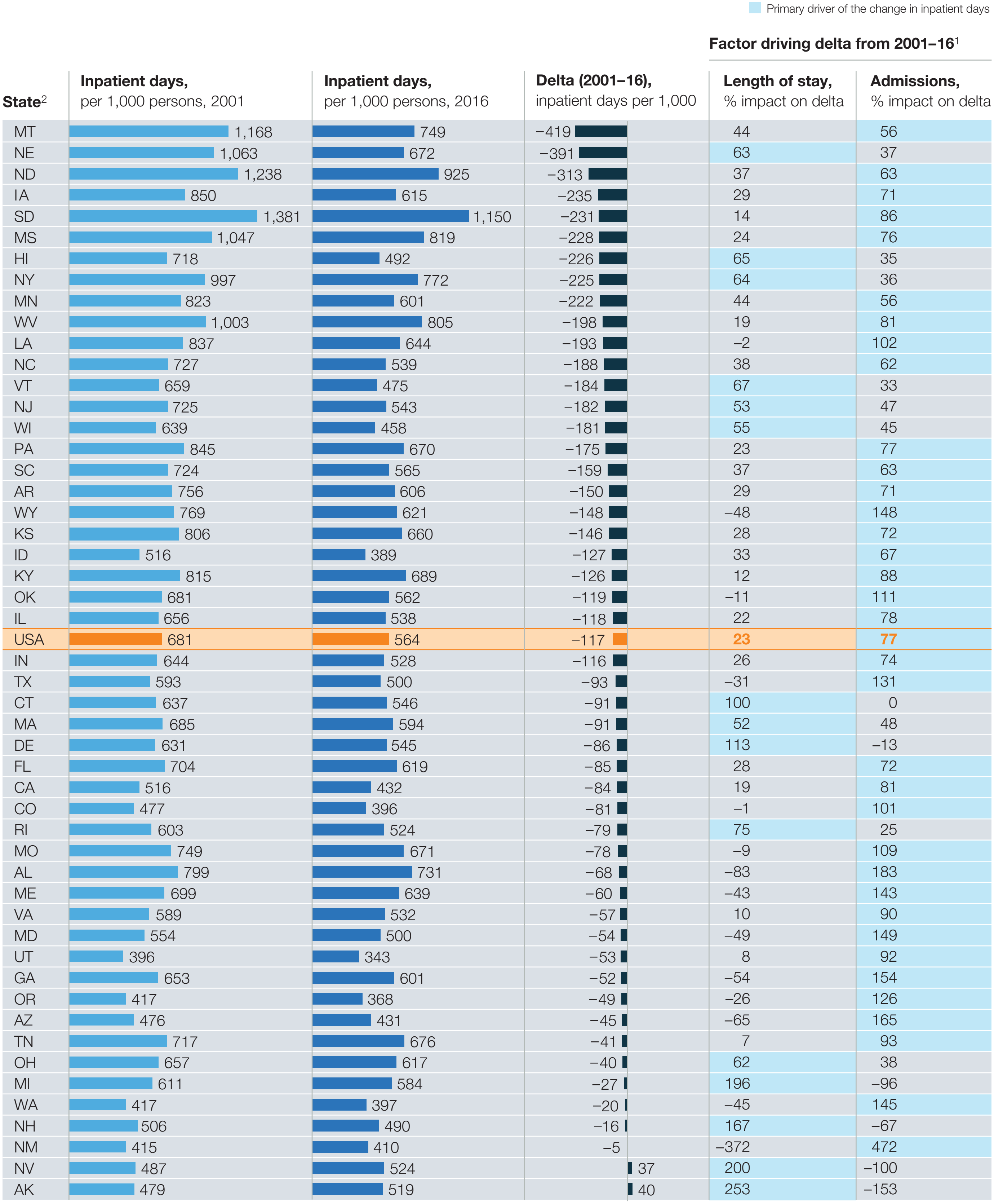
Inpatient bed demand primarily reflects both the number of admissions and length of stay.[‡] Our analysis showed that in the US between 2001 and 2016, inpatient days per 1,000 persons decreased by 117, primarily because of a drop in inpatient admissions, which accounted for 77% of the decrease in inpatient days (Exhibit 5-5). There was some variability among the states, however.[§]

In short, the decreases in US inpatient bed capacity have not kept pace with reductions in bed demand, in part due to the long life cycle of an inpatient bed.[2] Because of this mismatch, US consumers rarely face long wait times for inpatient services—but capital productivity is low.

[‡] Other factors were also likely involved in recent years. For example, many short-stay inpatient admissions are increasingly being given “observation status,” which is considered an outpatient visit. As a result, the inpatient bed occupancy rate is decreasing even though, in some cases, beds are still occupied. A growing number of patients want private hospital rooms (or need them for infection control). Because there is often no easy way to convert a two-person room to two private rooms, the hospitals simply leave the second bed in a room empty.

[§] In 35 states, the decrease in the average number of inpatient days resulted primarily from a reduction in the average number of admissions.

EXHIBIT 5-5 **State-by-state comparison of factors affecting inpatient days**



🟦 Primary driver of the change in inpatient days

				Factor driving delta from 2001–16[1]	
State[2]	**Inpatient days,** per 1,000 persons, 2001	**Inpatient days,** per 1,000 persons, 2016	**Delta (2001–16),** inpatient days per 1,000	**Length of stay,** % impact on delta	**Admissions,** % impact on delta
MT	1,168	749	–419	44	56
NE	1,063	672	–391	63	37
ND	1,238	925	–313	37	63
IA	850	615	–235	29	71
SD	1,381	1,150	–231	14	86
MS	1,047	819	–228	24	76
HI	718	492	–226	65	35
NY	997	772	–225	64	36
MN	823	601	–222	44	56
WV	1,003	805	–198	19	81
LA	837	644	–193	–2	102
NC	727	539	–188	38	62
VT	659	475	–184	67	33
NJ	725	543	–182	53	47
WI	639	458	–181	55	45
PA	845	670	–175	23	77
SC	724	565	–159	37	63
AR	756	606	–150	29	71
WY	769	621	–148	–48	148
KS	806	660	–146	28	72
ID	516	389	–127	33	67
KY	815	689	–126	12	88
OK	681	562	–119	–11	111
IL	656	538	–118	22	78
USA	681	564	–117	23	77
IN	644	528	–116	26	74
TX	593	500	–93	–31	131
CT	637	546	–91	100	0
MA	685	594	–91	52	48
DE	631	545	–86	113	–13
FL	704	619	–85	28	72
CA	516	432	–84	19	81
CO	477	396	–81	–1	101
RI	603	524	–79	75	25
MO	749	671	–78	–9	109
AL	799	731	–68	–83	183
ME	699	639	–60	–43	143
VA	589	532	–57	10	90
MD	554	500	–54	–49	149
UT	396	343	–53	8	92
GA	653	601	–52	–54	154
OR	417	368	–49	–26	126
AZ	476	431	–45	–65	165
TN	717	676	–41	7	93
OH	657	617	–40	62	38
MI	611	584	–27	196	–96
WA	417	397	–20	–45	145
NH	506	490	–16	167	–67
NM	415	410	–5	–372	472
NV	487	524	37	200	–100
AK	479	519	40	253	–153

[1] Driving factors were calculated as follows: the cumulative average growth rate (CAGR) for length of stay was divided by the CAGR for inpatient days per 1,000 persons; the CAGR in inpatient admission rates was divided by the CAGR for inpatient days per 1,000 persons. In each state, the driving factor that scored above 50% was assumed to be the major factor causing the change in inpatient days.

[2] The American Hospital Association categorizes Washington, DC, as a separate state. However, given its small size, it is not include in this analysis.

Sources: American Hospital Association; McKinsey analysis

A number of factors help explain the mismatch. Closing part or all of a hospital can be quite difficult. In some parts of the US, inpatient beds remain available even though demand is low because no other hospital is nearby, and thus the facility is deemed a "critical access hospital" (see Box 5-1). In addition, pressure from patients and staff can make it difficult to close beds (or entire hospitals), even if closure would result in quality improvements and spending reductions. (Patients often want to retain easy access to services and may not understand that subscale service delivery can harm outcomes. Staff members are usually concerned about job security, especially if the hospital is the largest employer in the region.) The level of competition in the heavily regulated US hospital market is yet another factor. In some markets, provider systems may offer duplicate facilities in close proximity to one another. When this occurs, consumers benefit, because they can choose among the facilities. However, the supply of inpatient beds in those markets may exceed the demand for them.

Clinical capital equipment

In many markets, provider systems maintain a wide range of diagnostic equipment (e.g., CT, MRI, PET scanners) to provide patients with a full range of services and access, including shorter waiting times. However, this approach can introduce more capital equipment than is needed on a population basis, thereby resulting in lower capital productivity overall.[#] Compared with other countries, the US has more imaging devices per person.[¶] Furthermore, due to a number of limitations (including hours of operation), the machines are not always used to their full capacity in the US. For example, many other wealthy countries perform more scans per machine per day (Exhibit 5-6). Even though the scanners in the US are relatively less utilized, the availability of these machines may help explain why the US performs more scans per person than the international average.

Clinical service-specific infrastructure

The proliferation of certain clinical services (and related infrastructure) is similar to the proliferation of imaging devices in terms of its impact on capital productivity and total healthcare spending. Some of these services (e.g., neonatal intensive care units [NICUs], trauma units) have especially high fixed costs because they require a considerable amount of dedicated infrastructure, but they can be lucrative for some provider systems. The result is often an over-supply of these services, especially if lag time exists between the need for such services and their availability. The US has more than twice as many NICU beds per 10,000 births than Canada does, a difference that is only partially explained by differences in the pre-term birth rate (12% in the US vs 8% in Canada).[3]

California's experience helps illustrate how an over-supply can arise. In that state, an increase in the number of live births in the early part of this century led many hospitals to invest in building NICUs (Exhibit 5-7). About a decade ago, the number of live births spiked and then declined,

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[#] The capital productivity on these devices is typically higher at ambulatory care facilities than at hospitals because of differences in patient mix: many ambulatory care facilities focus on attracting commercially insured patients, whereas hospitals treat a higher volume of patients with government insurance.

[¶] In addition, the imaging protocols may be more complex at many US provider systems, such as academic medical centers, than in other countries.

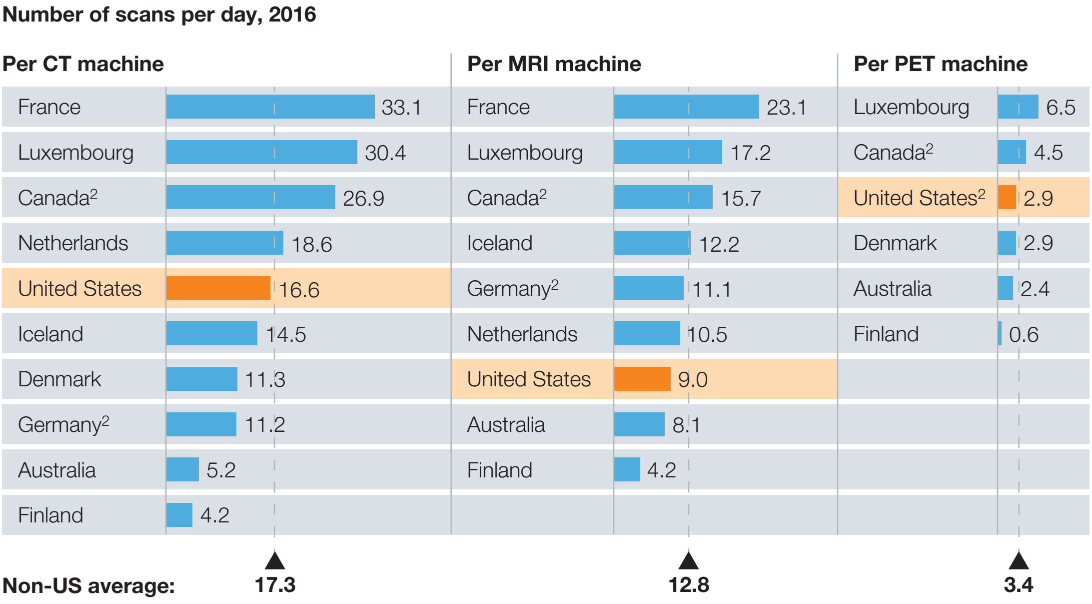
but the state's NICU capacity continued to grow as investments came to fruition.[4] Average asset utilization rates decreased from 67% in 2002 to 50% in 2016 as a result, reducing capital productivity. There is no low-cost way for the capital invested in the NICUs to be redeployed because this infrastructure cannot easily be repurposed for other types of care.

Improving capital productivity

Several recent trends have altered, and are continuing to alter, the types of healthcare services patients need, as well as where and how many services are delivered. Medical advances have made it possible to shorten—and, in some cases, eliminate the need for—hospital stays. The move to value-based payment is putting pressure on provider systems to more carefully manage spending. Some healthcare services can now be delivered virtually, and the number of such services is likely to grow substantially in coming years. Consumers who have the option of choosing where to receive care are increasingly demanding that it be delivered in a convenient location—if not in their homes, then in nearby clinics. They also expect greater comfort when care is delivered.

As the three examples discussed above show, the US healthcare delivery industry has found it difficult to adjust capital investments in light of these trends, which has limited the productivity of many assets. To understand how capital productivity could be improved, we used historical data about patients and other variables to build a regression model that would allow us to estimate the excess capacity in the overall

EXHIBIT 5-6 **International[1] comparison of diagnostic imaging machine utilization**



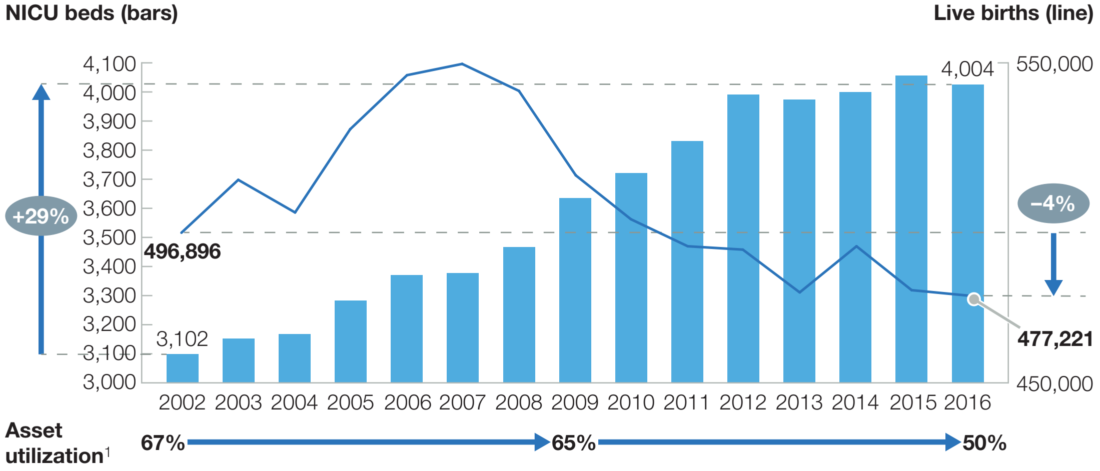
CT, computed tomography; GDP, gross domestic product; MRI, magnetic resonance imaging; PET, positron emission tomography.

[1] Only countries with GDP per capita above US $40,000 in 2016 were included.

[2] Data from 2015.

Sources: Organisation for Economic Co-operation and Development; McKinsey analysis

EXHIBIT 5-7 **NICU capacity vs demand in California**



NICU, neonatal intensive care unit.

[1] Asset utilization is based on a benchmark of 240 births per bed per year.

Sources: Office of Statewide Health Planning and Development, California; McKinsey analysis

US healthcare delivery industry (see the technical appendix for more information). The results confirm that the US has a significant opportunity to reduce the number of both inpatient beds and hospitals. (Recently, there has been an increase in rural hospital closures.[5]) Given the data, we discuss below three mechanisms with strong potential to improve capital productivity:

- Shifting some services to alternative sites of care
- Changes in regulation
- New approaches to service distribution

Shifting to alternative sites of care

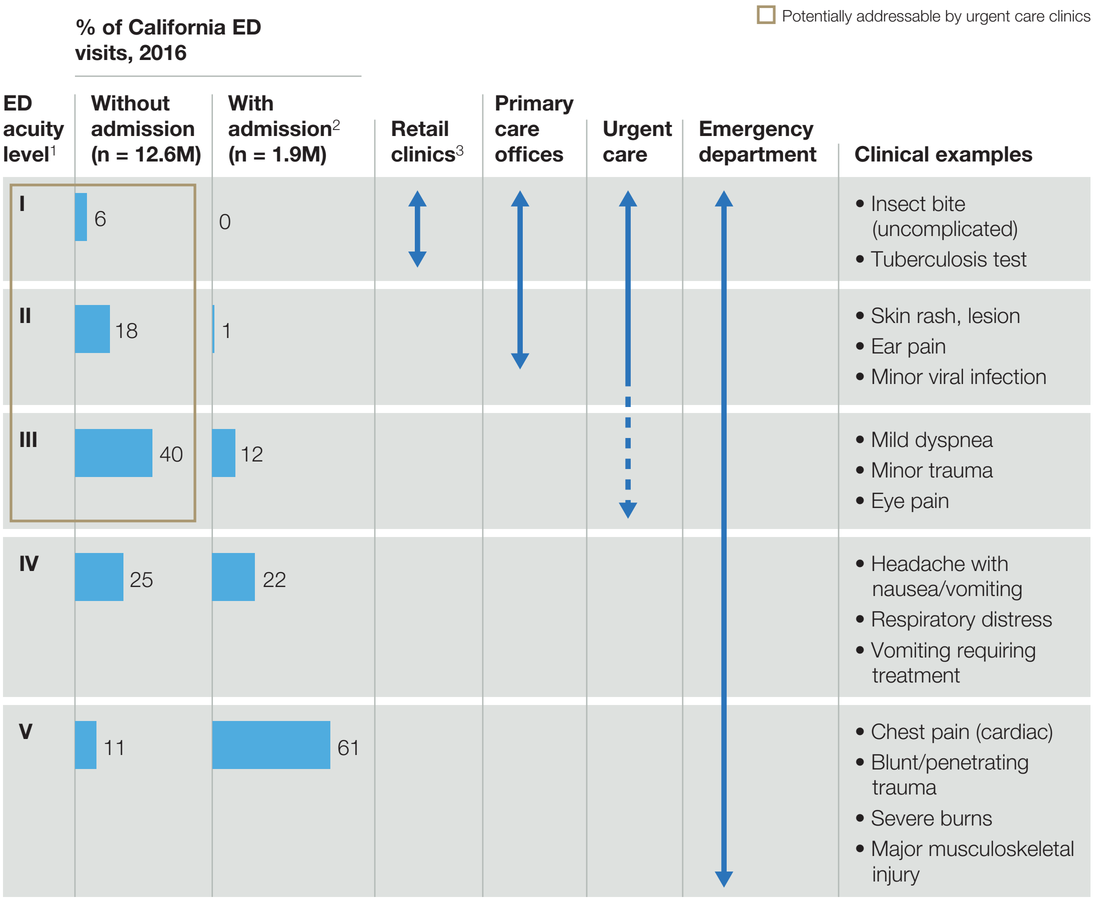
Over the past few years, healthcare delivery has seen a rise in less capital-intensive sites of care (e.g., retail and urgent care clinics, ambulatory surgery centers, freestanding emergency departments [EDs]). Many provider systems are finding these sites a better way to deploy capital than traditional facility expansion, particularly given declining demand for inpatient beds. Capital productivity for the alternative sites is higher because they require less up-front investment and provide treatment less expensively than traditional hospital-based facilities typically do. For example, our analysis suggests that up to 64% of the low-acuity conditions often treated in EDs** could be shifted to the lower-cost sites of care without any negative impact on patient outcomes (Exhibit 5-8).

**For this analysis, we defined "low-acuity conditions" to be those that do not require a hospital admission and are not covered under the Emergency Medical Treatment and Active Labor Act. That act requires hospitals to screen all patients who present to their EDs to determine if they have an emergency medical condition (which includes active labor in pregnant women). If a patient does have an emergency medical condition, the hospital is required to provide appropriate treatment to resolve or stabilize it, regardless of the patient's ability to pay. Transfer to another hospital before a patient is stabilized can be done only if it is medically necessary. (See Centers for Medicare & Medicaid Services. Emergency Medical Treatment and Active Labor Act. CMS-1063F.)

A more dramatic shift to alternative sites of care is occurring as a growing number of provider systems begin to offer certain services directly to patients at home (e.g., infusions,[6] postoperative recovery after some types of surgery,[7] virtual visits). Although the initial investments for these new types of care delivery are not trivial, the ability to more efficiently deliver healthcare services than is possible with traditional assets should improve capital productivity over the long term.

It is important to note, however, that all these less capital-intensive sites of care introduce certain risks. For example, supply-induced demand could result in overutilization, which

EXHIBIT 5-8 **Typical level of care (billing level) by acuity level**



ED, emergency department.

[1] Acuity level severity is based on Current Procedural Terminology (CPT) codes. Classified as 99281 (I), 99282 (II), 99283 (III), 99284 (IV), 99285 (V).

[2] 4% of ED visits with admission (73,895 visits) have an unknown acuity level because the CPT code is unknown (this occurs when hospitals report only aggregate numbers rather than by individual CPTs).

[3] Generally, retail clinics may bill only for level I, which is the only evaluation and management code allowable for visits without the presence of a physician.

Sources: Office of Statewide Health Planning and Development, California; McKinsey analysis would offset the productivity gains.[††] Thus, if these sites of care are to improve capital productivity in healthcare delivery, several questions must be addressed. For example, how can hospitals continue to provide higher-acuity services in a way that allows sustainable economics if the lower-acuity services are transferred elsewhere? Can the US maintain a "level playing field," given that many provider systems are using certain high-margin services to cross-subsidize services they are obligated to provide? To what extent will greater convenience of care translate to higher utilization? Will the movement of consumers to these alternative sites of care continue—or accelerate? And, how can provider systems make sure that care continuity for patients with high-acuity chronic condi-

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[††] Supply-induced demand has been observed in a range of settings—for example, when provider systems open retail clinics to reduce ED utilization for low-acuity conditions, but the decreased utilization fails to materialize. (See Ashwood JS et al. Retail clinic visits for low-acuity conditions increase utilization and spending. Health Affairs. 2016;35(3):449-55.)

Box 5-2: Using alternative sites or types of care wisely

To understand the potential impact that alternative sites of care (e.g., retail clinics, urgent care clinics) and types of care (e.g., telehealth encounters) could have on the capital productivity of healthcare delivery, three questions must be answered:

- How many expensive types of care delivery can they replace with a lower-cost alternative?
- Do they replace those services, or merely increase overall service utilization?
- Do they make it more difficult to ensure good care coordination?

None of these questions can be answered definitively at this time. Studies have shown, for example, that two-thirds of the patients who visit the ED with truly emergent (rather than merely urgent) conditions cannot be appropriately treated at an alternative site of care.[1-3] However, many lower-acuity conditions can be treated at lower-cost sites of care without impairing patient outcomes.[4]

A recent study, based on an analysis of data from one large national payer, found that between 2008 and 2015, members' use of urgent care clinics rose by 119%, and retail care clinics, by 214%.[5] Although ED use for low-acuity conditions decreased by 36% during that time, overall utilization rose by 31% and average per-member spending rose 14% (largely because of a steep increase in the cost of ED visits for low-acuity conditions). In this study, telehealth use rose from zero per 1,000 members in 2008 to six per 1,000 members in 2015.

Another study has shown that convenience—especially driving distance—appears to be a key factor influencing whether retail and urgent care clinics decrease ED volume.[6] From 2010 to 2014, the percentage of Massachusetts residents with nearby access to these clinics rose sharply. ED usage rates dropped much more steeply among the residents who gained nearby access than among those who did not.

Other studies have also found that telehealth utilization still remains low, although this may change in coming years. To date, only a minority of telehealth encounters appear to replace ED tions is not lost? (See Box 5-2 for more information about the potential impact of alternative sites of care on the productivity of healthcare delivery.)

Changes in regulations

Many healthcare regulations serve an important role in protecting patient safety, ensuring access to healthcare services, and achieving other public-good aims; the benefits they achieve may more than compensate for their impact on capital productivity. However, some healthcare regulations that impair capital productivity have been shown to have little effect on desired outcomes or may have unintended negative consequences. Others may simply be out of date. In these cases, changing or updating the regulations could contribute to improving capital productivity.

Consider, for example, certificate of need (CON) requirements, which seek to moderate the establishment of new services unless a demonstrated community need exists. Some states have implemented these requirements to manage investment in inpatient beds and imaging devices (or, put

visits or in-person consultations; the remainder reflect increased utilization.[7] Given the comparatively low cost of telehealth encounters, the increased utilization could help improve patient outcomes (e.g., it might make it easier to spot early warning signs of disease progression). If this proves to be the case and adoption is rapid, the capital productivity on telehealth modalities is likely to be high even if some increased utilization remains.

Payers, provider systems, and other stakeholders are finding ways to encourage patients to make the switch to alternative sites of care. In some cases, billboards are being used to advertise not only the available services, but also live wait times. Many patients can now use mobile apps to check in prior to arrival. Some payers are also offering financial incentives to encourage the use of more appropriate care settings. As patients become more comfortable using alternative sites of care, average spending may decrease even if a small net increase in utilization persists, which would increase capital productivity.

Continuity of care remains problematic, however, in part because of the legacy electronic health record (EHR) systems many provider systems still use. However, care coordination should become much easier as EHR systems mature, a growing number of retail and urgent care clinics align with other healthcare stakeholders, and more and more provider systems offer virtual visits and other forms of telehealth to their patients.

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[3] Data analyzed is from 2015 Truven claims; the NYU algorithm was applied.

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another way, to improve the equipment's return on investment). However, studies on the effects of CON laws suggest they have little or no impact on healthcare spending and quality.[8-11]

Similarly, the Medicare three-night rule requires a patient to spend a minimum of three nights in a hospital before admission to a skilled nursing facility (SNF) will be covered for payment. When this rule was originally enacted in the 1960s, its intent was to ensure that only the highest-need patients would be admitted to SNFs, since beds in those facilities are often in short supply.[12] Since then, some experts have called for the rule to be updated because it may be encouraging some provider systems to keep lower-acuity patients in the hospital for three nights—often when not warranted medically—to help them gain access to an SNF.[‡‡]

The Stark law—formally known as the Ethics in Patient Referrals Act of 1989—may also need to be updated in light of changes in care delivery. The law was enacted three decades ago to prevent physicians from making referrals based on financial motives rather than clinically appropriate practice.[13] Although the law has addressed that type of behavior, it sometimes now creates difficulties for provider systems wanting to enter into risk-based contracts in partnership with others—even though such partnerships hold potential to reduce capital requirements and thereby improve capital productivity.[§§] (Note: at the time this report was written, statutory and regulatory changes to the Stark law were under consideration, but no changes had been made.[##])

Conversely, new regulations may be needed to level the playing field. For example, if hospital EDs must, by law, provide certain services, should urgent care centers and other freestanding facilities also be subject to similar provisions (i.e., provide certain services to uninsured patients)? In short, periodic review and updating of the regulations governing healthcare delivery could lead to improvements in capital productivity.

New approaches to service distribution

A more radical change would be to reinvent how services are distributed, either by closing hospitals or converting some hospitals into specialized facilities. Despite the myriad ways in which healthcare delivery has changed over the past century, the infrastructure of US hospitals has remained relatively constant. Most hospitals are still expected to provide a wide range of services, which may result in less-than-efficient physical layouts and increase the demands placed on the workforce.[¶¶] As

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[‡‡] In December 2018, the Centers for Medicare & Medicaid Services expanded eligibility for a waiver to the three-night rule for accountable care organizations participating in the Medicare Shared Savings Program. (See Centers for Medicare & Medicaid Services. Medicare Shared Savings Program; ACOs-Pathways to Success and Extreme and Uncontrollable Circumstances Policies for Performance Year 2017. 83 Fed. Reg. 67816. December 31, 2018.)

[§§] Partnerships could allow provider systems to collaborate on the investments needed to succeed under risk-based contracts, which would reduce the total capital required and improve capital productivity. (See Roeder KM, Wheeler SK. The Medicare Shared Savings Program and the Stark law. The Compliance and Ethics Blog. August 23, 2016.)

[##] In June 2018, CMS published a request for information seeking comments on how to reduce the regulatory burdens of the Stark law. (Centers for Medicare & Medicaid Services. Request for information regarding the physician self-referral law. 83 Fed. Reg. 29524. June 25, 2018.) In July 2018, the House Ways and Means Subcommittee on Health held a hearing on "Modernizing the Stark law to ensure the successful transition from volume to value in the Medicare program."

[¶¶] At most hospitals, for example, general medical-surgical nurses often come from large pools and must be able to take care of patients with very different conditions. In contrast, the nurses at stand-alone, specialized facilities may need to focus on only a small subset of patient types and conditions.

EXHIBIT 5-9 **What could be consolidated—or distributed—in healthcare delivery?**

ILLUSTRATIVE

		Out of the hospital		
	Remains at quaternary/ tertiary hospital	**Consolidated locations**	**Distributed to other sites of care**	**Considerations**
Elective	• Advanced surgery, especially those with low volumes (e.g., neurosurgery) • Complex patients needing inpatient care (e.g., ICU patients) • Residency training	• Radiology reviews of imaging • Pathology reviews • Majority of pharmacy (need to keep a portion in hospital)	• Primary care visits • Specialists office visits • Non-complex surgery • Rehabilitation/therapy through low-cost mobile units delivered at home	• Ensure appropriate access to care (distance and availability) • Avoid adverse effects to quality of care • Reduce overall spending • Improve productivity
Emergent	• Treatment of acute episodes (e.g., heart attacks) • Leverage use of ambulatory air transportation to move high-acuity patients • Residency training	• Monitoring of high-risk patients at home • Remote session with physician to decide whether ED visit required	• Urgent care and retail clinics for lower acuity • Skilled nursing facilities for longer-term rehabilitation, reducing ICU days	

ED, emergency department; ICU, intensive care unit.

Source: McKinsey analysis

we discussed earlier, closing inpatient beds is far from easy. (Note: our analyses in this chapter use staffed inpatient beds as reported by provider systems rather than the total number of inpatient beds, and so may understate the capital implications.) Taking inpatient beds offline as demand or utilization decreases may not be the optimal way to improve productivity in the short term (in comparison with increasing output), but it may allow some provider systems to repurpose space to alternative, more productive uses or to prevent unnecessary utilization in markets experiencing supply-induced demand. However, a forward-looking focus that reimagines a provider system's footprint could improve capital productivity, especially as hospitals go through re-sizing or renovations.

It may be possible to eliminate the over-supply of specialized services through the use of "narrow networks" tied to quality of care. This approach would help guide patients to a smaller number of hospitals, which would improve productivity (as well as outcomes***); it would likely also reduce the number of provider systems planning facilities that are unlikely to be profitable.

Closing an entire hospital is even harder than removing inpatient beds, but ongoing financial losses could make some closures inevitable.

*** An excess supply of clinical services can impair care quality if it results in subscale programs or provider systems.

When this occurs, it may be possible to dampen community opposition to closures by stressing how new arrangements could increase both quality and consumer convenience. For example, highly complex elective activities (e.g., low-volume, advanced types of surgery) could be consolidated at a small number of tertiary or quaternary hospitals (Exhibit 5-9); patient outcomes would improve because of the higher volumes seen at these centers of excellence.[14] Many non-surgical clinical activities could be distributed to non-acute sites of care (including home); others could be consolidated (physically or virtually[†††]). Some routine types of surgery could be transferred to ambulatory surgery centers.

Consumers have already shown their willingness to use alternative sites of care and narrow networks and are becoming more comfortable using smartphones and other electronics for a wide range of services. And, as their out-of-pocket spending continues to mount, consumers may become more willing to accept the need to travel farther for certain services (especially if routine care can still be obtained close to home). Some employers (e.g., Walmart) have contracted directly with certain institutions for specific services such as joint replacement; when an employee needs one of these services, the employers cover travel as well as medical costs. Furthermore, technological advances are making it easier to implement the necessary changes (e.g., advanced analytics can be used to improve scheduling among the various sites of care).

When altering their asset profiles, provider systems would have to be careful not to sacrifice quality and keep spending under control. Disruptive technological innovations (e.g., digital applications embedded onto free-flowing clinical data, the use of genetic information to develop personalized care plans) are likely to be crucial to enabling these types of changes. Provider systems that do change their asset profiles may have the opportunity to more closely align with consumer preferences. ○

[†††] Consolidation does not necessarily involve co-location. A team of radiologists, for example, could be responsible for interpreting all images obtained in a provider system. Where the radiologists work is much less important than whether they can all see the same high-quality images and communicate with each other when necessary.

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Chapter 6. Conclusions

Productivity improvements have been central to raising the standard of living by making it possible to improve goods and services while, simultaneously, increasing their affordability. From 2001 to 2016, multifactor productivity (MFP) in the overall US economy increased by 370 basis points (bps) per annum—but it decreased by 420 bps per annum in the healthcare delivery industry.

If the United States is to reduce healthcare spending growth so that it is equal to or lower than gross domestic product (GDP) growth, productivity improvements are critical. Past attempts to control the growth in healthcare spending have had, at best, only marginal success. However, switching the paradigm to productivity increases would enable the healthcare delivery industry to provide more (and often better) services without a steep rise in spending.

As this report makes clear, stakeholders in the healthcare value chain have numerous opportunities to improve the productivity of healthcare delivery. Even more important, there are concrete steps they can take today to seize these opportunities—many of which do not require future technological advances or massive operating model changes. The impact could be profound. Our conservative estimates suggest that if the industry relied predominantly or solely on labor productivity growth, not workforce expansion, to deliver more services, by 2028 nominal healthcare spending could be between $280 billion and $550 billion less than current national health expenditure (NHE) projections—and a cumulative $1.2 trillion to $2.3 trillion would be saved over the next decade. (This calculation assumes that the difference between medical inflation and economic inflation would slowly disappear. For more details, see Box 6-1.) Savings of this magnitude would bring the rise in healthcare spending in line with—and possibly below—GDP growth.

Admittedly, it may not be possible for the healthcare delivery industry to eliminate workforce growth altogether. Nevertheless, the impact of increasing productivity would be profound. However, capturing opportunities to improve productivity will require all stakeholders to innovate and, in some cases, collaborate; the extent to which they do so will determine how well healthcare spending can be tamed. Taking action *now* is critical. Given the importance of healthcare to the US economy, productivity growth in the healthcare delivery industry is vital for the vibrancy of the nation.

Potential actions to improve productivity

Capturing the full value from improving the productivity of healthcare delivery will require action by all stakeholders, but especially from provider systems, payers, and government. Based on our initial exploration of productivity, we outline below key actions each of those three stakeholder groups should consider taking to begin capturing this potential. Those players that take action quickly—some have already begun to do so—will likely create a competitive advantage in an evolving industry.

Provider system actions

For provider systems, efforts to improve the productivity of healthcare delivery

The numbered references appear at the end of this chapter.

should focus on the drivers of growth: labor, capital, and MFP. Because labor often accounts for more than half of a provider system's operating expenses, new approaches to labor deployment are critical. It is equally important that provider systems rethink what their asset base should be and move toward a footprint that aligns with how care delivery is changing. In both cases, provider systems should carefully consider how they are deploying technology: they must develop a concrete understanding of how different technologies can improve productivity, and then take advantage of those technologies to achieve those aims.

Box 6-1: The savings potential of productivity

Improving the productivity of healthcare delivery is one of the few levers that holds the potential to reduce healthcare spending growth and improve patient outcomes while increasing the standard of living in the US. To investigate this issue, we examined the two factors that have contributed most to economic growth in healthcare delivery (labor and capital), since they are the primary *inputs* into the productivity of healthcare delivery. We defined outputs as the services delivered (e.g., treatments administered to sick patients, preventive health measures given to the well).

Our analysis started with the NHE projections published by the Centers for Medicare & Medicaid Services, which estimates historical and projects future healthcare spending (at the category and payer level), as well as estimates of medical inflation.* These projections do account for current trends but do not assume that there will be major changes to the healthcare delivery industry, which has historically used workforce expansion as its chief method to meet demand growth.

Given that workforce expansion accounted for nearly two-thirds of the healthcare delivery industry's growth between 2001 and 2016, we estimated the impact of two scenarios: What would happen if increases in labor productivity rather than workforce growth were able to address all utilization growth by 2028?† Alternatively, what would happen if labor productivity increases could address half of the utilization growth by then?

- In our first scenario, we assumed that productivity improvements would bring medical inflation down to the level of overall economic inflation (historically, medical inflation has grown 1.2 percentage points faster per annum). In

*External dynamics, such as population aging and Medicaid expansion, are also factored in.

†Because capital productivity and MFP gains have had a much smaller impact on the healthcare delivery industry's growth, we assumed labor productivity increases were inclusive of these.

Labor

Historically, to meet the increased demand for healthcare services, provider systems have relied heavily on growth in the size, not the productivity of their workforce. Changing this paradigm is critical. Four sets of steps can be taken.

Use technology to lighten the clinical workload. Healthcare is behind most other industries in its use of technology to increase productivity. More widespread use of automated reminder systems, for example, can decrease the number of patients who fail to show up for appointments, which would improve physician productivity. Artificial intelligence can be used to help interpret diagnostic images. Software that sits on top of existing patient

our second scenario, we assumed that productivity improvements would cut the difference in half, so that medical inflation would increase only 0.6 percentage points faster per annum. In both scenarios, we assumed that historical utilization trends would remain constant.

- We also assumed that it would not be possible for the industry to switch from workforce growth to labor productivity improvements to drive industry growth immediately. Thus, in both scenarios, some amount of workforce growth would continue from 2018 to 2023, but the difference between medical inflation and economic inflation (the 0.6 or 1.2 percentage points cited above) would slowly disappear.
- Finally, in the first scenario, we assumed that from 2023 to 2028, labor productivity (and therefore overall healthcare spending) would increase by 2.3% per annum (in real terms), and no net new jobs would be created. All growth in the volume of services delivered would be handled from these labor productivity increases. In the second scenario, we assumed 0.6% per annum of workforce growth. This growth, in combination with labor productivity increases, would meet the demand for services.

The result: In the first scenario, healthcare spending in 2028 would be about $550 billion less than current NHE projections suggest on a nominal basis (approximately 265 bps less as a percentage of GDP). In the second scenario, healthcare spending would be about $280 billion less than current projections (about 130 bps less as a percentage of GDP).

Cumulatively, these scenarios project that the US could save $1.2 trillion to $2.3 trillion over the next decade. In addition, the labor productivity increases in healthcare delivery would boost overall US economic growth at a faster rate than current projections (an incremental 20 to 40 bps per annum).

monitoring systems can reduce the amount of "predictable noise" that nurses and other caregivers must sort through. Decision support tools are improving and will soon be able to deliver real-time guidance to clinicians at the point of care. Automated templates can help clinicians accurately—and, soon, more rapidly—record patient progress.

Modify and simplify scheduling systems so that clinicians' time is used more effectively. In our experience, the failure to periodically "prune" clinically inappropriate preference rules leaves provider systems with thousands of different appointment types and "calendar holds" in their scheduling systems—and subpar clinician productivity. By reducing the number of inappropriate rules, we have found that provider systems can reach a schedule density of 90% to 95%, enough of an increase to drastically enlarge the volume of patients who can be seen each day and substantially offset the projected physician shortage.

Distribute work more intelligently across the clinical team. Making changes to schedule density in the absence of other operating model changes could have unintended consequences, such as physician burnout. For each physician in the US, there are almost five non-physician clinicians (e.g., registered nurses) and 10 other clinical support staff, many of whom could take over some of the more mundane tasks physicians or other clinicians with greater training currently perform. Productivity will rise if all clinical staff members can maximize the amount of time spent on the highest-complexity activities commensurate with their training and experience, and enough flexibility is left in the team structure to ensure that services can be provided in the most efficient and effective way possible. However, the full potential of task reallocation requires active redesign of workflows and responsibilities, and in some cases additional training. Also, regulations governing scope of practice may need to be updated in some states.

Reduce the administrative burden. Transferring many administrative tasks from physicians and other highly trained clinicians to colleagues with less training—or to machines—is another step provider systems can take. For example, computer-assisted coding utilizing natural language processing can reduce the amount of time spent on data entry and significantly decrease the need for professional coders. Many back-office tasks can already be automated, and even more could be if claims submissions were standardized.

Capital

For many provider systems, redeploying the capital currently tied up in unproductive fixed assets will not be easy—but it is not impossible, especially if considered over the remaining useful life of the existing footprint (i.e., 10 to 20 years). To redeploy capital effectively, provider systems must ask themselves hard questions. First, what role should hospitals play today—and tomorrow—given modern care pathways? The answer is likely to be considerably different from the role hospitals have traditionally played—and it will emphasize the need to reallocate capital toward high-return assets.

Second, where should capital be redeployed? Many provider systems are finding alternative sites of care a better way to deploy capital than traditional facility expansion. Among the options that can be considered are ambulatory surgery centers, urgent and retail care clinics, and care delivered in patients' homes. Which combination of these options is best for a given provider system will depend on its starting point and local market conditions.

Third, are more radical changes possible? Decisions to close or consolidate hospitals must balance clinical considerations, financial concerns, and patients' access to care, but options for radical changes do exist. One option for a provider system is to convert a few of its hospitals into "centers of excellence" by consolidating all highly complex elective activities (e.g., low-volume, advanced types of surgery) into a small number of facilities. This move would improve patient outcomes as well as productivity because of the higher volumes treated at these facilities. Inclusion of these centers of excellence in narrow networks tied to care quality could help encourage patients to use them.

Provider systems also have options for improving the productivity of some of their fixed assets. For example, they can take steps to increase appropriate utilization of imaging devices (e.g., CT, MRI, and PET scanners) by expanding their hours of operation.

Careful attention to non-fixed assets is also important, since it can improve MFP. Provider systems could, for example, use evidence-based guidelines to place stricter limits on physician preference items, which would simplify procurement and help ensure better outcomes. In addition, provider systems could invest in better methods to inform clinicians about the cost and efficacy of healthcare services and products. Research has shown that when clinicians have access to cost information, behavior change often ensues.[1]

Payer actions

The current administrative infrastructure required for healthcare delivery is far too inefficient and requires too many administrative workers.* Other industries have benefited from administrative simplification; there is no reason that healthcare delivery cannot do the same. Much of the work required to simplify administrative processes may need to be led by payers, although provider systems and government have important roles to play as well.

As a first step, payers could enact operational efficiencies using known technologies. For example, they could aggregate functions (e.g., claims processing and adjudication) and further automate billing and insurance-related (BIR) processes.

Efforts to increase standardization have been tried in the past, with limited success. Nevertheless, greater standardiza-

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*Our discussion here is not a recommendation that provider systems (or payers) lay off large numbers of people. Retirements and other forms of natural attrition can be used to decrease the number of administrative workers, and in some cases, workers can be retrained or moved to other jobs that create more value.

tion is crucial for improving the productivity of healthcare delivery, and thus efforts to achieve it must continue to be pursued. Payers can encourage greater standardization by requiring provider systems to submit BIR data using similar formats, rules, and claims submission processes. We estimate that streamlining BIR processes alone could achieve savings in total BIR administrative costs ranging from 10% for hospitals to 25% for physicians and private insurers.

Even greater savings could likely be derived if payers were to move beyond current best practices by migrating to a clearinghouse system, similar to the ones used by the financial services industry to process transactions. Admittedly, no one payer is likely to be large enough to develop a clearinghouse system on its own (nor was one bank). Furthermore, the development of clearinghouses would require that parts of the healthcare delivery system be reorganized and that changes be made to payers' BIR systems. Nevertheless, collaboration among payers (as well as provider systems and government) could produce an infrastructure that would reduce the cost of claims processing by several orders of magnitude (up to 30% of total BIR spending).

Payers should also consider how their policies affect the productivity of healthcare delivery. For example, greater standardization of reporting requirements for performance metrics would reduce the amount of time the clinical staff has to devote to data collection and would likely improve clinician engagement and compliance. Greater standardization of those requirements might also make it easier for payers to use application program interfaces (APIs) to pull data directly, which would improve data timeliness. Greater alignment of the incentives offered in alternative payment models (APMs) would increase the likelihood that the models achieve significant savings. Again, collaboration with other payers, as well as provider systems and government, may be needed to improve this type of standardization.

In addition, payers could consider undertaking joint capital planning with provider systems. This approach could make it easier for both sides to manage the transition from a hospital-centric ecosystem (with its expensive and underutilized assets) to one in which more care is delivered in communities.

Furthermore, payers should pursue productivity improvements within their own businesses, although their efforts will not necessarily increase the productivity of healthcare delivery directly. However, the improvements would free up resources that could be used to implement many of the changes discussed above.

Government actions

Healthcare regulations serve an important role in protecting patient safety, ensuring access to healthcare services, and achieving other public-good aims. However, a combination of actions could be considered to improve the productivity of healthcare delivery: strategic "sunsetting" of some older regulations, updating of other regulations, and in a few cases enactment of new regulations. In particular, greater adoption of “smart” regulations—those well aligned with current healthcare delivery needs and flexible enough to accommodate industry evolution—might make it easier for provider systems and payers to undertake many of the innovations described above.

For example, the amount of data available today, coupled with the sophisticated analytic approaches that can be used to parse it, has made it easier to measure outcomes in terms of efficacy, safety, and quality. Both data capture and analytic capabilities are likely to further improve in the future. Rules governing reporting requirements could be designed to be adaptable so those improvements can be integrated naturally. Similarly, reimbursement regulations could be designed to evolve as data capture and analysis improve.

A combination of new regulations and financial incentives could be considered to encourage payers to increase the standardization of BIR data and submission processes, performance metrics, and APM incentives. A similar combination could also be considered to encourage the development of clearinghouses for BIR data.

Regulatory evolution is already occurring. The Centers for Medicare & Medicaid Services, for example, recently changed its stance on telemedicine, and has expanded eligibility for waivers to the three-night rule for some accountable care organizations.[2,3] Changes to the Stark law are also under consideration.[4] However, more is likely to be needed.

As the ability to measure outcomes improves, the objective, we believe, should be to separate the “what” from the “how.” Government agencies could establish what healthcare delivery is expected to achieve: better patient outcomes, for example, or greater access to high-quality care. Provider systems could be given greater freedom to innovate in how they deliver healthcare services to achieve those goals. Similarly, payers could be given greater freedom to innovate in how they work with provider systems to ensure those goals are met. ○

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Technical appendix

1. Estimating healthcare spending and healthcare delivery productivity

Our work in this report focuses on productivity. To properly estimate factors of growth and measures of productivity, we relied on a set of data—the annual calculations of value-added gross domestic product (GDP) in the United States—produced by the Bureau of Economic Analysis (BEA) and Bureau of Labor Statistics (BLS).* These values are different from the more commonly cited healthcare spending estimates released each year by the Centers for Medicare & Medicaid Services (CMS), the national health expenditures (NHE). While each set of numbers has its pros and cons, value-added GDP was more suitable for the analyses in this report, as explained in Exhibit A.

Normally, when US healthcare spending is discussed, the amount cited is an NHE estimate—$3.4 trillion in 2016 (the year used in many of our analyses, since it was usually the most recent year for which relevant data was available).[1] NHE represents both the total annual dollar amount of healthcare consumption in the US and the dollar amount invested in medical sector structures, equipment, and some types of research. A primary benefit of NHE estimates is that they are comprehensive; they contain all of the main components of healthcare spending and apply a common set of definitions that permit comparisons between categories, across countries, and over time. In previous work by the McKinsey Center for US Health System Reform, NHE data was the basis for analysis.[2,3]

By comparison, value-added GDP represents the contribution a given industry makes to the economy as a whole. BEA and BLS define industries using the standard North American Industry Classification System (NAICS) codes. To investigate healthcare delivery, we examined the three codes that cover core healthcare service components: 621 (ambulatory healthcare services), 622 (hospitals), and 623 (nursing and residential care facilities). The technical definitions of these codes are as follows:

The numbered references appear at the end of this appendix.

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*According to the BEA, “value-added” equals the difference between an industry’s gross output (consisting of sales or receipts and other operating income, commodity taxes, and inventory change) and the cost of its intermediate inputs (including energy, raw materials, semi-finished goods, and services that are purchased from all sources).

621: This sector comprises establishments primarily engaged in providing healthcare services, directly or indirectly, to ambulatory patients. Health practitioners in this sector provide outpatient services, in which the facilities and equipment are not usually the most significant part of the production process.

622: This sector comprises establishments licensed as hospitals, primarily engaged in providing diagnostic and medical treatment services and also specialized accommodation services to inpatients. These establishments have an organized medical staff of physicians, nurses, other health professionals,

EXHIBIT A **Comparison of national health expenditures and value-added industry GDP**

	Definition and value	Pros	Cons
National health expenditures	**2016: $3.4 trillion**		
	• Measures total annual dollar amount of healthcare consumption in the US, as well as the dollar amount invested in medical sector structures and equipment and noncommercial research to procure health services in the future	• Comprehensive because the data set contains all of the main components of the healthcare system within a unified, mutually exclusive, and exhaustive structure • Multidimensional, encompassing not only expenditures for medical goods and services but also the payers that finance these expenditures • Consistent because the data set applies a common set of definitions that permit comparisons among categories and over time	• Not the economic output of healthcare and therefore cannot be used for productivity calculations • Categorization of healthcare spending may differ across countries (e.g., in how inpatient care and outpatient care are defined)
Value-added industry GDP	**2016: $1.3 trillion**		
	• Based on the standard North American Industry Classification System (NAICS) codes, specifically three three-digit codes: 621 (ambulatory healthcare services), 622 (hospitals), and 623 (nursing and residential care facilities) • Represents output of healthcare providers only • Methodology is available to estimate total health spending using National Income and Product Accounts Tables (NIPA) produced by the Bureau of Economic Analysis	• Defined as the output of industries, and therefore can be used for productivity estimates • NAICS codes can link with other data sets from the Bureau of Labor Statistics and the US Census Bureau • Standard metric of output permits comparisons across industries • Standard industry codes allow for comparisons across countries	• Does not include household's direct purchases of pharmaceuticals and medical devices • Does not include healthcare purchased directly by the government

GDP, gross domestic product.

Sources: Bureau of Economic Analysis; Centers for Medicare & Medicaid Services; McKinsey analysis technologists, and technicians. Hospitals use specialized facilities and equipment that form a significant and integral part of the production process. Hospitals may also provide a wide variety of outpatient services as a secondary activity.

623: This sector comprises establishments primarily engaged in providing residential care combined with either nursing, supervisory, or other types of care as required by the residents. In this sector, the facilities are a significant part of the production process, and the care provided is a mix of health and social services, with the health component being largely nursing services.

Together, the three NAICS codes cover the output of the healthcare delivery industry (the services provided); however, they do not include households' direct purchases of drugs or medical devices (the goods provided in healthcare) or healthcare purchased directly by the government. The value-added GDP associated with these codes totaled $1.3 trillion in 2016.

A method has been developed that enables researchers to combine these BEA and BLS data with the National Income and Product Accounts Tables (NIPA) produced by the BEA so they can calculate a total healthcare expenditure value nearly equivalent to NHE estimates.[4] In addition, the NAICS codes can be linked with other data sets from the BLS and US Census Bureau, enabling accurate comparisons across industries and countries. Thus, value-added GDP is the better metric for assessing the productivity of healthcare delivery.

2. Calculation of estimated spending according to wealth

In this report, we evaluated US healthcare spending in the context of spending levels in other developed countries and their relative wealth, as measured by GDP per capita. The methods and data used were consistent with the approach taken in previous McKinsey reports.[5,6]

Data published by the Organisation for Economic Co-operation and Development (OECD) were again compiled and analyzed for quality to ensure consistency across countries. The analysis included every OECD country for which complete healthcare spending data in all categories (total healthcare spending, inpatient, outpatient, long-term care, retail drugs and nondurables, durables, health insurance administration, and investments) was available for 2016, with the exception of Ireland, Greece, Norway, and Luxembourg (statistical outliers due to rapidly growing/shrinking economies or their relatively small population size). The resulting list consisted of 24 countries: Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, South Korea, Sweden, Switzerland, and the United Kingdom (Exhibit B).

To assess potential discrepancies between the US and other OECD countries in per capita spending in each of the cost categories analyzed, we ran regression analyses correlating each nation's spending against its per capita GDP and ad-

EXHIBIT B **GDP and total healthcare spending by country**

All values per capita, current prices, current purchasing power parity, in 2017 US dollars

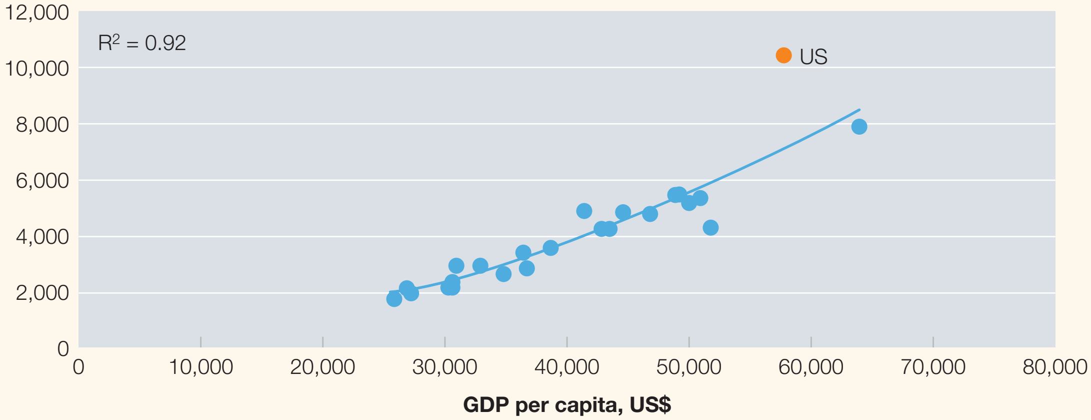
Country	GDP	Total healthcare spending	In-patient	Out-patient	Long-term care	Retail drugs and non-durables	Durables	Health insurance adminis-tration	Invest-ments
Austria	50,924	5,273	1,788	1,486	773	631	261	221	114
Belgium	46,785	4,660	1,424	1,166	1,000	684	98	177	111
Canada	44,562	4,722	1,013	1,588	664	833	125	129	369
Czech Republic	34,714	2,482	636	805	328	433	73	62	144
Denmark	49,833	5,075	1,337	1,721	1,255	335	175	121	130
Estonia	30,565	1,988	519	830	118	378	51	28	64
Finland	43,446	4,118	1,037	1,483	793	516	92	33	163
France	41,358	4,773	1,521	1,275	708	663	249	272	86
Germany	49,187	5,452	1,544	1,512	898	777	297	262	162
Hungary	26,741	1,966	568	606	75	566	54	38	60
Iceland	51,781	4,208	1,301	1,294	864	488	108	50	103
Italy	38,581	3,429	1,096	1,073	347	607	102	68	137
Latvia	25,704	1,597	435	508	76	452	58	31	38
Lithuania	30,002	1,992	616	538	165	541	54	38	41
Netherlands	50,961	5,235	1,254	1,593	1,339	406	218	205	220
Poland	27,094	1,784	633	537	104	369	45	36	61
Portugal	30,822	2,783	719	1,351	73	419	115	54	52
Slovak Republic	30,487	2,170	599	716	15	566	177	73	25
Slovenia	32,730	2,771	844	875	266	507	115	80	83
South Korea	36,630	2,688	567	842	459	573	59	90	99
Spain	36,339	3,257	849	1,197	304	621	126	94	66
Sweden	48,690	5,348	1,176	1,819	1,405	524	135	83	205
Switzerland	64,026	7,824	1,924	2,614	1,517	1,080	203	301	184
United Kingdom	42,757	4,164	1,186	1,271	772	476	100	83	277
United States	57,797	10,410	1,722	5,031	533	1,279	167	863	815

GDP, gross domestic product (Note: GDP is defined here as value-added GDP).

Sources: Bureau of Economic Analysis; Centers for Medicare & Medicaid Services; Organisation for Economic Co-operation and Development; McKinsey analysis

EXHIBIT C **Power regression: Healthcare spending vs GDP**

Healthcare spending per capita, US$



GDP, gross domestic product.

Note: countries with complete data for analysis include: Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, South Korea, Sweden, Switzerland, and the United Kingdom. Greece, Ireland, Luxembourg, and Norway were excluded as outliers.

Sources: Bureau of Economic Analysis; Centers for Medicare & Medicaid Services; Organisation for Economic Co-operation and Development; McKinsey analysis

justed both metrics by dollars at purchasing power parity (PPP). Given healthcare is a superior good, we performed power regressions in all cases (Exhibit C).

We found, consistent with previous reports, that per capita GDP is a strong predictor of per capita healthcare spending and that healthcare is consumed in greater proportions as GDP rises. This information was used to estimate expected spending in the US—both in aggregate and by different categories—according to per capita GDP. This calculation provides a baseline—estimated spending according to wealth (ESAW)—against which actual spending levels can be compared.

3. Definitions of the healthcare delivery workforce

For analyses of the US healthcare delivery workforce, we started with the Occupational Employment Statistics survey from the BLS. We limited ourselves to the three NAICS codes: 621 (ambulatory healthcare services), 622 (hospitals), and 623 (nursing and residential care facilities). Given the focus of our analyses, we removed dentists, veterinarians, and associated occupations; we then categorized all remaining jobs at the "detailed" level into one of four groups: physicians, non-physician clinicians, clinical support staff, and non-clinical support staff (Exhibit D). All occupations covered under the three NAICS codes but not listed in the exhibit (a total of 353) were categorized as non-clinical support staff.

EXHIBIT D **Healthcare delivery workforce definitions**

Physicians	Anesthesiologists
	Family and general practitioners
	Internists, general
	Obstetricians and gynecologists
	Oral and maxillofacial surgeons
	Pediatricians, general
	Physicians and surgeons, all other
	Psychiatrists
	Surgeons
Non-physician clinicians	Nurse anesthetists
	Nurse midwives
	Nurse practitioners
	Physician assistants
	Registered nurses
Clinical support staff	Athletic trainers
	Audiologists
	Cardiovascular technologists and technicians
	Chiropractors
	Clinical laboratory technologists and technicians
	Diagnostic medical sonographers
	Dietetic technicians
	Dietitians and nutritionists
	Emergency medical technicians and paramedics
	Exercise physiologists
	Genetic counselors
	Health diagnosing and treating practitioners, all other
	Health technologists and technicians, all other
	Healthcare practitioners and technical workers, all other
	Healthcare support workers, all other
	Hearing aid specialists
	Home health aides
	Licensed practical and licensed vocational nurses
Clinical support staff *(continued)*	Magnetic resonance imaging technologists
	Massage therapists
	Medical assistants
	Medical equipment preparers
	Medical records and health information technicians
	Medical transcriptionists
	Nuclear medicine technologists
	Nursing assistants
	Occupational health and safety specialists
	Occupational health and safety technicians
	Occupational therapists
	Occupational therapy aides
	Occupational therapy assistants
	Ophthalmic medical technicians
	Opticians, dispensing
	Optometrists
	Orderlies
	Orthotists and prosthetists
	Pharmacists
	Pharmacy aides
	Pharmacy technicians
	Phlebotomists
	Physical therapist aides
	Physical therapist assistants
	Physical therapists
	Podiatrists
	Psychiatric aides
	Psychiatric technicians
	Radiation therapists
	Radiologic technologists
	Recreational therapists
	Respiratory therapists
	Respiratory therapy technicians
	Speech-language pathologists
	Surgical technologists
	Therapists, all other

Sources: Bureau of Labor Statistics; McKinsey analysis

Note: over time, some of these jobs titles have changed or been further defined, which we have adjusted for. Furthermore, for the 2001 data, Standard Industry Classification (SIC) codes 801, 803, 804, 805, 806, 807, 808, 809, and 836 were used, but the same process of defining each occupation (as described above) was employed. These two factors do introduce the possibility of error into our estimates, but we believe any such errors are likely to be small.

Note also: we defined "advanced practice nurses" as nurse anesthetists, nurse midwives, and nurse practitioners.

4. Workforce comparisons across services industries

To conduct workforce comparisons across services industries, we grouped occupations using the method outlined above for healthcare delivery. We then selected three other services industries: education (defined as NAICS 61), securities and commodities (defined as NAICS 523), and legal services (defined as NAICS 5411). In the four industries, all occupations were grouped into one of three categories (Exhibit E):

- Core staff (physicians, non-physician clinicians, and their equivalents in the other industries)
- Industry-specific support staff (the clinical support staff and their equivalents in the other industries)
- Industry-agnostic support staff (the non-clinical support staff and their equivalents in the other industries)

5. Competing-risk model for hospital closures or mergers

To investigate whether there are excess hospitals and hospital beds in the US, we categorized all general medical and surgical hospitals in the 50 states and District of Columbia by a number of variables. We then developed a competing-risk equation for whether a hospital closes, is acquired by a larger hospital, or remains independent. By entering the hospital characteristics into a competing-risk equation, we were able to predict the probability of whether a hospital would close or be acquired, which allowed us to assess if there were excess hospitals and hospitals beds in the US.

Hospital characteristics. Hospital data was obtained from the American Hospital Association (AHA) data files for 1999 through 2014. For each hospital and year, we recorded whether the hospital closed, was acquired, or remained unchanged. We defined closed to include demerger (when a hospital splits into at least two independent entities), dissolution, and change from an inpatient facility. A hospital was deemed to be acquired if it was listed as "merge[d] into" or "merge[d] with" another hospital and had fewer beds than the other merging hospital. Given data constraints, we did not include acquisitions in which a hospital joined a system but maintained its unique identification number.

For all of our analyses, we divided hospitals into urban and rural facilities based on the Rural Health Research Center

EXHIBIT E **Workforce definitions across four US services industries**

	Core staff	Industry-specific support staff
Healthcare delivery[1]	• Physicians • Non-physician clinicians	• Clinical support staff
Legal services[2]	• Lawyers • Arbitrators, mediators, and conciliators	• Paralegals and legal assistants • Legal secretaries • Title examiners, abstractors, and searchers • Legal support workers, all other
Securities and commodities[3]	• Securities, commodities, and financial services sales agents • Personal financial advisers • Financial analysts • Brokerage clerks • Financial managers • Market research analysts and marketing specialists • Financial specialists, all other • Sales managers • Financial examiners • Credit analysts • Loan officers • Financial clerks, all other • Insurance sales agents • Insurance underwriters • Credit counselors • Budget analysts	• Accountants and auditors • Business operations specialists, all other • Sales representatives, services, all other • Tellers • Real estate sales agents • Sales and related workers, all other • Telemarketers • Sales representatives, wholesale and manufacturing, except technical and scientific products • Sales representatives, wholesale and manufacturing, technical and scientific products • Appraisers and assessors of real estate
Education[4]	• Elementary school teachers, except special education • Secondary school teachers, except special and career/technical education • Middle school teachers, except special and career/technical education • Substitute teachers • Teachers and instructors, all other, except substitute teachers • Postsecondary teachers, all other • Special education teachers, kindergarten and elementary school • Health specialties teachers, postsecondary • Kindergarten teachers, except special education • Self-enrichment education teachers • Special education teachers, secondary school • Vocational education teachers, postsecondary • Art, drama, and music teachers, postsecondary • Special education teachers, middle school • Business teachers, postsecondary • Preschool teachers, except special education • Career/technical education teachers, secondary school • English language and literature teachers, postsecondary • Education teachers, postsecondary • Nursing instructors and teachers, postsecondary • Mathematical science teachers, postsecondary • Biological science teachers, postsecondary • Adult basic and secondary education and literacy teachers and instructors • Engineering teachers, postsecondary • Psychology teachers, postsecondary • Special education teachers, all other • Computer science teachers, postsecondary • Foreign language and literature teachers, postsecondary • Communications teachers, postsecondary • Philosophy and religion teachers, postsecondary • History teachers, postsecondary • Chemistry teachers, postsecondary • Special education teachers, preschool • Recreation and fitness studies teachers, postsecondary • Political science teachers, postsecondary • Law teachers, postsecondary • Sociology teachers, postsecondary • Criminal justice and law enforcement teachers, postsecondary • Physics teachers, postsecondary • Social sciences teachers, postsecondary, all other • Economics teachers, postsecondary • Career/technical education teachers, middle school • Social work teachers, postsecondary • Atmospheric, earth, marine, and space sciences teachers, postsecondary • Agricultural sciences teachers, postsecondary • Area, ethnic, and cultural studies teachers, postsecondary • Architecture teachers, postsecondary • Education administrators, preschool and childcare center/program • Anthropology and archeology teachers, postsecondary • Environmental science teachers, postsecondary • Library science teachers, postsecondary • Geography teachers, postsecondary • Health educators • Home economics teachers, postsecondary • Forestry and conservation science teachers, postsecondary	• Teacher assistants • Education administrators, elementary and secondary school • Educational, guidance, school, and vocational counselors • Coaches and scouts • Education administrators, postsecondary • Graduate teaching assistants • Childcare workers • Instructional coordinators • Education, training, and library workers, all other • Registered nurses • Speech-language pathologists • Librarians • Protective service workers, all other • Clinical, counseling, and school psychologists • Child, family, and school social workers • Library technicians • Administrative services managers • Library assistants, clerical • Training and development specialists • Life, physical, and social science technicians, all other • Biological technicians • Occupational therapists • Audio-visual and multimedia collections specialists • Farm and home management advisers • Curators • Archivists • Museum technicians and conservators

[1] Defined as NAICS 621, 622, and 623; [2] Defined as NAICS 5411; [3] Defined as NAICS 523; [4] Defined as NAICS 61.

Sources: Bureau of Labor Statistics; McKinsey analysis

EXHIBIT F **Competing-risk model results**

	Urban		Rural	
Variables	**Close**	**Merger**	**Close**	**Merger**
Number of beds	–0.00542*** (0.00104)	–0.00223*** (0.000680)	–0.0164*** (0.00399)	0.000566 (0.00174)
Bed utilization	–1.183*** (0.436)	–0.221 (0.340)	–0.800 (0.719)	1.187 (0.834)
% inpatient days for Medicaid	2.768*** (0.442)	1.325*** (0.514)	0.527** (0.207)	0.0168 (1.208)
% inpatient days for Medicare	1.132*** (0.378)	0.837** (0.401)	0.00394 (0.498)	0.283 (0.923)
Length of stay	–0.900* (0.462)	–0.931 (0.712)	–0.232 (1.061)	–14.94*** (3.892)
Admissions per bed	–0.00554 (0.00794)	0.0110** (0.00491)	0.0167 (0.0134)	0.0294** (0.0119)
Adjusted admissions per bed	–0.00843** (0.00410)	–0.000495 (0.000894)	–0.00937* (0.00547)	–0.00817* (0.00453)
Surgical operations per bed	–0.00397* (0.00205)	–0.00370** (0.00173)	–0.000599 (0.00200)	0.00111 (0.00305)
Full-time equivalents per bed	–0.0214 (0.0610)	–0.155*** (0.0450)	–0.182*** (0.0656)	–0.213** (0.102)
Hospital referral region Herfindahl-Hirschman Index	–0.000111 (7.11e-05)	3.76e-05 (6.76e-05)	–6.12e-06 (8.49e-05)	–8.23e-05 (0.000198)
Distance to nearest hospital	–0.0498** (0.0233)	–0.102*** (0.0220)	–0.0635** (0.0277)	–0.0989*** (0.0315)
Number of hospitals within 15 miles	0.0255*** (0.00422)	–0.00715 (0.00644)	–0.00816 (0.128)	–0.0148 (0.0504)
Any hospital within 15 miles	0.295 (0.546)	1.299 (1.049)	0.337 (0.422)	1.547** (0.714)
Residency training	–0.419 (0.278)	–0.101 (0.215)		
Observations	39,235	39,235	37,368	37,368
Failures	204	200	91	34
Competing-risk failures	200	204	34	91
Log-likelihood	–1,482.6	–1,541.4	–662.1	–229.7

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Sources: American Hospital Association; Dartmouth Atlas; Rural Health Research Center; US Census Bureau; McKinsey analysis definitions. We also grouped hospitals by hospital referral region (HRR) per the Dartmouth Atlas of Health Care.

We matched our hospital ownership and size data with several characteristics drawn from AHA data and other sources. Fixed hospital characteristics included teaching status, whether the hospital has a residency program, and whether the facility is a critical access hospital. Bed utilization was defined as the total number of inpatient days divided by the number of potential days based on reported staffed beds. The Herfindahl-Hirschman Index (HHI) was used to measure competitiveness at the state and HRR level. Using zip code data, we calculated the distance between each hospital and its nearest neighbor, along with a count of the number of hospitals within a 15-mile radius.

Competing-risk equation. To predict the probability of closure or acquisition, we developed a competing-risk equation. In this model, the independent variable we examined was whether a hospital had closed, was acquired, or remained independent. Each of these events censored the others. We modeled the events separately for urban and rural hospitals.

The dependent variables we used in the model included whether the hospital trains residents, the number of beds, bed utilization, the percentage of Medicaid inpatient days, the percentage of Medicare inpatient days, length of stay, admissions per bed, adjusted admissions per bed (the adjustment being for outpatient use), surgical operations per bed, full-time equivalents per bed, HHI in the HRR, distance to nearest hospital, the number of hospitals within 15 miles, and if there is any hospital within 15 miles (Exhibit F). This analysis yielded four key insights, which together suggest that there is excess hospital and hospital bed capacity in the US healthcare delivery system:

- First, there is minimal difference between rural and urban areas in terms of where closures or acquisitions occurred.
- Second, in all regions, hospitals with a greater number of beds are significantly less likely to close or be acquired.
- Third, the further away the nearest hospital is, the less likely a given hospital is to close or be acquired.
- Fourth, hospitals are more vulnerable to closure or acquisition if they have a higher-than-average mix of public payers (specifically, Medicaid and Medicare in urban areas and Medicaid in rural areas). ○

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The productivity imperative for healthcare delivery in the United States