Special Communication

The Anatomy of Health Care in the United States

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Health care in the United States includes a vast array of complex interrelationships among those who receive, provide, and finance care. In this article, publicly available data were used to identify trends in health care, principally from 1980 to 2011, in the source and use of funds ("economic anatomy"), the people receiving and organizations providing care, and the resulting value created and health outcomes. In 2011, US health care employed 15.7% of the workforce, with expenditures of $2.7 trillion, doubling since 1980 as a percentage of US gross domestic product (GDP) to 17.9%. Yearly growth has decreased since 1970, especially since 2002, but, at 3% per year, exceeds any other industry and GDP overall. Government funding increased from 31.1% in 1980 to 42.3% in 2011. Despite the increases in resources devoted to health care, multiple health metrics, including life expectancy at birth and survival with many diseases, shows the United States trailing peer nations. The findings from this analysis contradict several common assumptions. Since 2000, (1) price (especially of hospital charges [+4.2%/y], professional services [3.6%/y], drugs and devices [+4.0%/y], and administrative costs [+5.6%/y]), not demand for services or aging of the population, produced 91% of cost increases; (2) personal out-of-pocket spending on insurance premiums and co-payments have declined from 23% to 11%; and (3) chronic illnesses account for 84% of costs overall among the entire population, not only of the elderly. Three factors have produced the most change: (1) consolidation, with fewer general hospitals and more single-specialty hospitals and physician groups, producing financial concentration in health systems, insurers, pharmacies, and benefit managers; (2) information technology, in which investment has occurred but value is elusive; and (3) the patient as consumer, whereby influence is sought outside traditional channels, using social media, informal networks, new public sources of information, and self-management software. These forces create tension among patient aims for choice, personal care, and attention; physician aims for professionalism and autonomy; and public and private payer aims for aggregate economic value across large populations. Measurements of cost and outcome (applied to groups) are supplanting individuals' preferences. Clinicians increasingly are expected to substitute social and economic goals for the needs of a single patient. These contradictory forces are difficult to reconcile, creating risk of growing instability and political tensions. A national conversation, guided by the best data and information, aimed at explicit understanding of choices, tradeoffs, and expectations, using broader definitions of health and value, is needed.

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Health care in the United States comprises a vastly complex array of interrelationships among those who receive, provide, and finance it. Health care affects everyone, including the well, the occasionally ill, and those with serious illness. Medicine encompasses activities as diverse as childbirth, cosmetic surgery, assistance in managing a chronic disease, and hospice care at life's end.

Current taxonomy is frequently misleading and fails to describe the complexity of the entirety of the US health care system. *Health* is a misnomer, because most activity involves illness. *Health care* and *medical care* are not synonymous. *Prevention* requires tools that are often unfamiliar because educational, behavioral, and social interventions, not usually considered to be part of medicine, may be most effective for many diseases. *Provider* does not accurately describe the dozens of different professions and organizations required for a patient's care. *Payers* are paid not to pay too easily; *insurers* do only modest amounts of insuring because government and employers accept most risk. Economic concepts of *cost* and *value* are ambiguous, as measurement is elusive and because one segment's cost is another's value. *Market* is a misnomer because few prices are transparent and many are controlled. Above all, US health care is not a *system,* as it is neither coordinated by a central entity nor governed by individuals and institutions that interact in predictable ways.

Since 1900, US life span (at birth) has lengthened by 30 years, or 62%, and today it is estimated at 81 years for women and 76 years for men.[1] From the 1950s through the 1980s, gains in longevity were attributable to a combination of increasingly sophisticated, scientifically based medical care as well as by effective public health and health

education measures. Another strong but underappreciated contributor was a 4-decade-long increase in real personal incomes.[2] However, chronic illnesses, now the major source of mortality and morbidity in all developed countries, are proving less tractable to the technology-driven medical model that had previously been so successful. This trend, when added to the increasing cost of health care, creates tensions with which 21st-century medicine is now grappling. Those tensions will, in the coming decade, highlight the often conflicting priorities of those in medicine, public health, and social policy with those of individual patients.

ACO *accountable care organization*
GDP *gross domestic product*
IT *information technology*
PBM *pharmacy benefit manager*
POS *point of service*
PPACA *Patient Protection and Affordable Care Act*
PPO *preferred provider organization*

Methods

To describe and document the current anatomy and historical trends of health care in the United States, we assembled an array of information from various data sources. We relied on publicly available data, recalculated those data for display when necessary, reconciled inconsistent sources, and included years for which data are complete (in general, from 1980 to 2011). The **Box** contains a list of the included and supplementary figures and tables.

For these data and analyses, we provided international comparisons when they are especially relevant and when data of adequate quality could be found.

In addition, we chose not to make projections about the US data, although we discuss the significance of the information and made observations about its implications. These perspectives are diverse and reflect the backgrounds of the authors in various aspects of health care: as clinicians (H.M. and E.R.D.), medical student (B.P.G.), biomedical scientist (S.Y.), health system executive (H.M.), and management consultants to industry, insurers, and systems (H.M., D.H.M.M., and D.S.). Any analysis of this scope is incomplete and selective, but the information presented is intended to provide a guide to those who must rely on a detailed compilation for their discussions in the years to come.

Key Questions

We address 6 areas (**Figure 1**). Three involve the current and historical landscape, including the economic anatomy of health care; the profile of people who receive care and organizations that pro-

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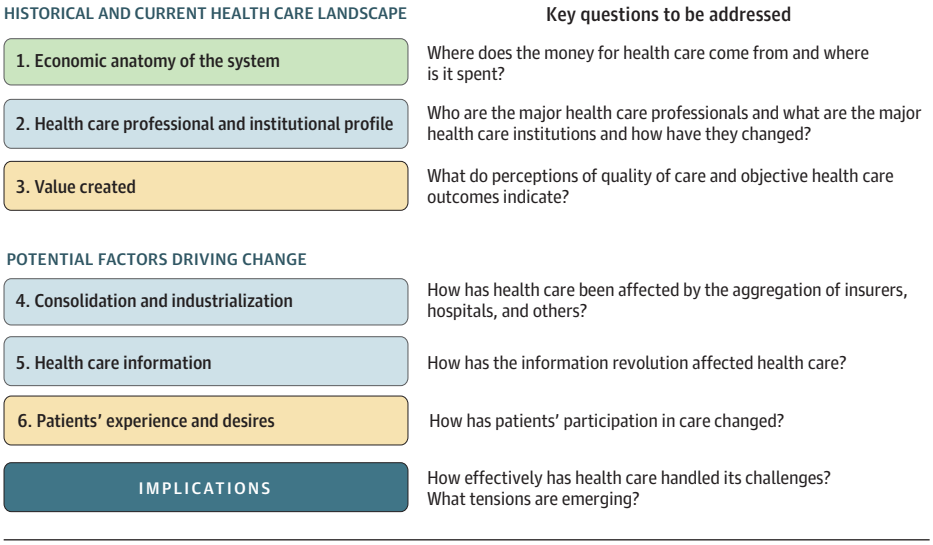
Figure 1. Anatomy of US Health Care: Overview, Topic Outline, and Key Questions



vide care; and the value created in terms of objective health outcomes and perceptions of quality of care. Three other areas involve the key drivers of change, including consolidation of insurers and health systems; health information; and the patient as consumer. A subsequent report will discuss the state of biomedical science and technology, with international comparisons.

We also discuss the implications of these analyses and present a central tension among 3 mutually conflicting forces (an "iron triangle" of different expectations): patient expectations for individual care and personal attention; physician autonomy; and value as defined by policy makers using health status of large groups and aggregate measures of cost.

Economic Anatomy

In 2011, spending on health was $2.7 trillion (**Figure 2**) or 17.9% of gross domestic product (GDP). The health care sectors employed more than 21 million people, accounting for 15.7% of the US workforce (**Figure 3**). In 2011, there were approximately 800 000 physicians and 2.7 million nurses in the United States.

Since 1980, the rate of increase of different categories of health care spending has varied from year to year. Administrative costs have more than doubled (from 3% [1980] to 7% [2010] of total spending with growth at 5.6%/y); but since 2000, most (84%) of the increase is attributable to growth of drugs and devices (+4.0%/y), professional services (3.6%/y), and hospital care (4.2%/y) (Figure 2). However, since 1970, the *rate* of average yearly increase of total expenditures has declined (with some fluctuations), a trend especially marked since 2002 (**Figure 4**).

Total cost of care is affected by 3 factors: price, population, and demand, as reflected in eFigure 1 in the Supplement. Since 2000, increase in price has continued but has moderated from historical norms, intensity of services has moderated sharply, and demographic factors have contributed only modestly to growth (**Figure 5**). The continued increase of health care as a portion of the economy can largely be accounted to the failure of the rest of the economy to increase much at all.

These data contradict a commonly held belief that aging of the population and increased demand for services have driven spending historically. Between 2000 and 2011, increase in price (particularly of drugs, medical devices, and hospital care), not intensity of service or demographic change, produced most of the increase in health's share of GDP.

We have attempted no analysis of the individual effects of introduction of the Medicare Part D drug benefit, behavior in anticipation of the 2010 Patient Protection and Affordable Care Act (PPACA), the 2007 recession, actions to reduce utilization by insurers, or efficiency efforts by clinicians and health care organizations. Some of those factors ameliorated while others exacerbated the rate of growth.

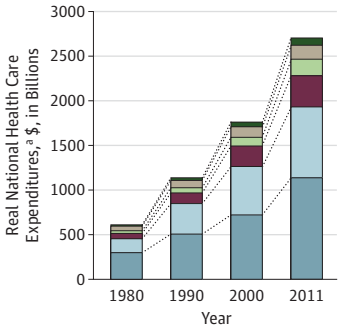
Between 2000 and 2010, health care increased faster than any other industry (2.9%/y), with only total government spending exceeding its growth (3.3%/y).[11] Health's proportion of GDP doubled between 1980 and 2011, accounting for its importance as a political factor and in debates about US international competitiveness, because the United States outspends the mean of other developed countries (the 34 members of the Organisation for Economic Cooperation and Development [OECD]) by 4.2% of GDP.[12]

The sources of spending have changed substantially since 1980, with the major government programs (Medicare, Medicaid, and federal employee/retiree) increasing disproportionately compared with private insurance, and with personal out-of-pocket spending declining by half (from 23% to 11%) (**Figure 6**). An even more substantial change has been the 83% decline in personal spending for physician services and drugs, with government and commercial payers now responsible for more than 90% of hospital and physician costs and 80% of drugs and nursing home care (eFigure 2 in the Supplement). A similar pattern is seen with personal share of insurance premiums (eFigure 3 in the Supplement), which have increased more slowly than employers' share of premiums for private insurance and Medicare. Likewise, total personal out-of-pocket share of payments for care (co-payments) plus payments for insurance premiums increased 2.1% per year since 1990, with the largest increase in personal Medicare contributions (5.7% per year) (eFigure 4 in the Supplement). These data contradict another common perception that personal out-of-pocket spending for premiums and co-payments have increased faster than those of government and employers.

Perhaps more than any other factor, these changes in who purchases care have changed the relationship between patient and physician and spurred consolidation of the industry and will pose challenges to medicine that are fundamental and unfamiliar. The relative decline in personal spending on health care accompanies (and abets) the shift from medicine's historical commitment to a single individual and substitutes responsibility for groups of people, representing ascendancy of the public health and social policy perspectives over that of traditional, individually focused medicine.[13] This change produces many ethical, cultural, and economic questions.

Coverage of uninsured Americans has long been a goal of policy advocates, insurers, and hospitals and was a primary rationale for the

Figure 2. Historical National Health Expenditures by Category, 1980-2011



Categories of Health Care Spending	Real National Health Care Expenditures,[a] $ (%), in Billions				Compound Annual Growth Rate,[b] %		
	1980	1990	2000	2011	1980-1990	1990-2000	2000-2011
Public health activity[c]	15(2)	31 (3)	55 (3)	79 (3)	7.5	5.8	3.3
Investment[d]	48 (8)	76 (7)	112 (6)	154 (6)	4.8	3.9	2.9
Administration costs[e]	29 (5)	61 (5)	104 (6)	189 (7)	7.9	5.5	5.6
Prescription drugs and equipment[f]	61 (10)	120 (11)	227 (13)	349 (13)	6.9	6.6	4.0
Professional services[g]	159 (26)	346 (30)	540 (31)	797 (30)	8.1	4.5	3.6
Hospital and other care facilities[h]	295 (49)	501 (44)	772 (41)	1133 (42)	5.5	3.7	4.2
Overall	607	1136	1760	2701	6.5	4.5	4.0

The national health care expenditures were calculated based on data obtained from the Centers for Medicare & Medicaid Services[3] and then adjusted for inflation using gross domestic product (GDP) deflator obtained from the Federal Reserve Bank of St Louis.[4]

[a] Adjusted to 2011 dollar value using GDP deflator.

[b] Compound annual growth rate (CAGR) supposing that year A is x and year B is y, CAGR = $(y/x)^{\{1/(B-A)\}-1}$.

[c] Includes government activities such as epidemiological surveillance, inoculations, immunization/vaccination services, disease prevention programs, the operation of public health laboratories, and other such functions.

[d] Investment is the sum of medical sector purchases of structures and equipment and expenditures for noncommercial medical research by nonprofit or government entities.

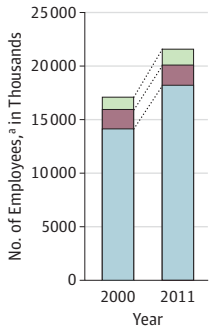
[e] Includes all administrative expenditures, including the net cost of private health insurance.

[f] Equipment includes durable and nondurable medical products.

[g] Includes physician, clinical, dental, home health care, and other professional services.

[h] Includes hospital care, nursing and continuing care retirement facilities, and other health/residential/personal care.

Figure 3. Number of US Employees in Health Care Sectors, 2000-2011



	No. of Employees,[a] in Thousands, (%)		Compound Annual Growth Rate[b]
	2000	2011	2000-2011, %
Payer	1139.0 (7)	1509.0 (7)	
Health and medical insurance carriers	377.5	632.8	4.8
Insurance agents and brokers	761.6	876.3	1.3
Subtotal	1139.0	1509.1	2.6
Manufacturer or distributor	1849.0 (11)	1874.0 (9)	
Pharma or Biotech (drug manufacturing)	312.7	266.0	-1.5
Medtech	597.2	712.0	1.6
Wholesaler (drugs and other supplies)[c]	267.4	189.0	-3.1
Pharmacy and drug stores	671.4	706.9	0.5
Subtotal	1848.6	1873.9	0.1
Personnel	14109.0 (83)	18205.0 (84)	
Physician (generalist)	274.7	320.3	1.4
Physician (specialist)	417.7	510.4	1.8
Registered nurses	2189.7	2724.6	2.0
Physician assistants	55.5	83.5	3.8
Medical assistants	330.8	539.2	4.5
Dentists	90.1	95.8	0.6
Pharmacists	212.7	272.3	2.3
Home health aides	561.1	924.7	4.6
Administration	174.4	196.1	1.1
All other health practitioners[d]	5169.4	6063.1	1.5
All other employees[e]	4632.6	6474.9	3.1
Subtotal	14108.7	18204.9	2.3
Overall	17096.3	21587.8	2.1

The numbers of US employees in health care sectors were obtained from the US Department of Labor[5] and examined from 2000 to 2011.

[a] These data include employees in the government sectors.

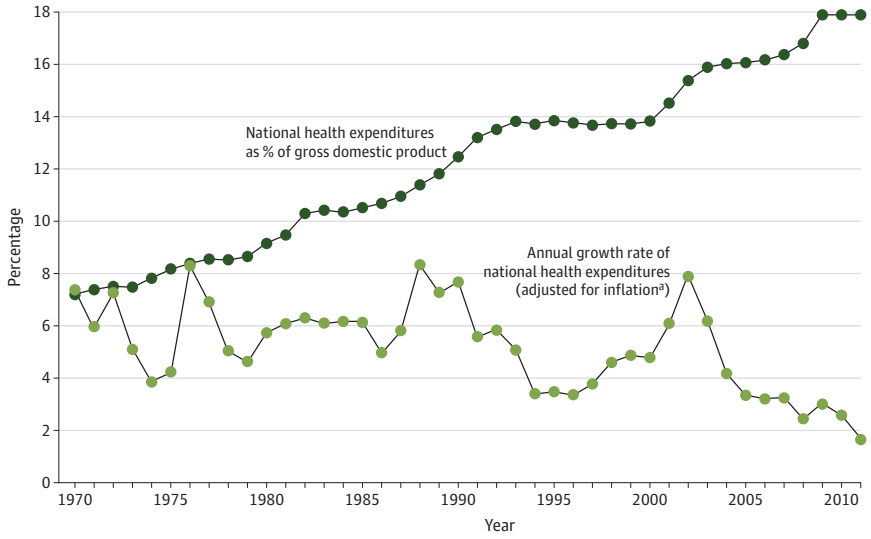
[b] Compound annual growth rate (CAGR) supposing that year A is x and year B is y, CAGR = $(y/x)^{\{1/(B-A)\}-1}$.

[c] Includes drugs and druggists' sundries.

[d] Includes all other personnel categorized under occupation codes 29-000 (health care practitioners and technical occupations) and 31-000 (health care support occupations) defined by the US Department of Labor.

[e] Includes all employees under North American Industry Classification System code 62 (health care and social assistance) except medical or health practitioners.

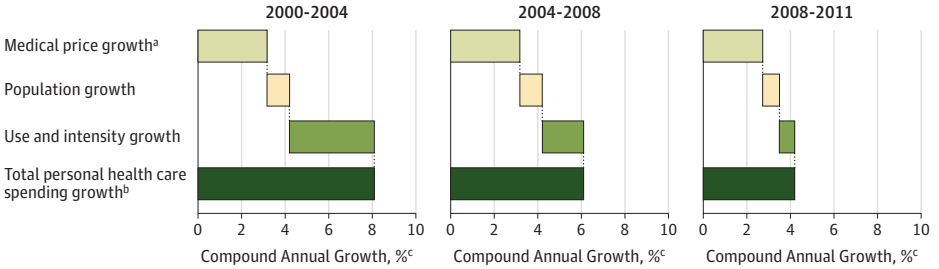
Figure 4. Historical Growth Trajectory of National Health Expenditures, 1970-2011



The annual growth rate of national health expenditures (NHEs) was calculated based on data from the Centers for Medicare & Medicaid Services,[3] then adjusted for inflation using gross domestic product (GDP) deflator obtained from the Federal Reserve Bank of St Louis.[4] The NHE as a percentage of GDP was calculated based on data from the US Department of Commerce.[6]

[a] Inflation was adjusted using GDP deflator.

Figure 5. Growth Drivers of Spending on Personal Health Care, 2001-2011



Compound Annual Growth Rate, %[c]		
2000-2004	2004-2008	2008-2011
3.2	3.2	2.7
1.0	1.0	0.8
3.9	1.9	0.7
8.1	6.1	4.2

Factors accounting for growth in personal health care spending were calculated as previously described.[7] The annual growth rate of personal health care spending was calculated based on data from the Centers for Medicare & Medicaid Services.[3] Medical price growth was estimated using the producer and consumer price indexes obtained from the US Department of Labor.[8,9] The US population data from the US Census Bureau[10] was used to calculate the population growth rate. As a residual, the category of use and intensity includes any errors in measuring prices or total spending.

[a] Medical price growth includes economywide and excess medical-specific price growth. Based on the gross domestic product deflator, the annual economywide price growth during each of the 3 periods was as follows: 2000 to 2004, 2.2%; 2004 to 2008, 2.9%; and 2008 to 2011, 1.4%. The remainder is that of excess medical-specific price growth.

[b] Includes spending on hospital care, physician and clinical services, dental and other professional services, nursing and continuing care retirement facilities, other health/residential/personal care, home health care, nondurable medical products, durable medical equipment, and prescription drugs.

[c] Compound annual growth rate (CAGR) supposing that year A is x and year B is y, CAGR = $(y/x)^{\{1/(B-A)\}-1}$.

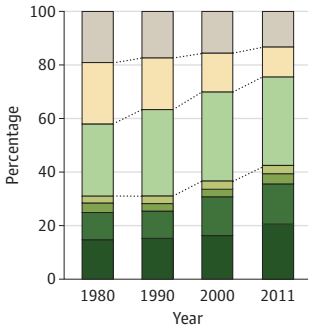
PPACA, both to extend the safety net and to reduce hidden subsidies by payers and practitioners. The proportion of uninsured among the US population was 15% in 2012 (**Figure 7**), although the number of uninsured appears to have peaked in 2010 (estimated at 50 million people) and declined through 2012 (estimated at 48 million people).[16]

Over the past 2 decades, the private insurance market has substituted managed products (such as preferred provider organizations [PPOs], point-of-service [POS] plans, and others) for traditional indemnity programs, which is in response to employers' desire to reduce costs by directing patients to lower-cost physicians and hospitals. This has the effect of reducing patient choice, resulting in the paradox that choice, especially of hospitals, is greatest within Medicare and Medicaid, which control payment rates while maintaining patients' choice of where to seek care. In response, the PPACA created accountable care organizations (ACOs) that seek to lower Medicare costs via incentives and penalties for patients and clinicians. By implication, as ACOs increase in number and size, if they are to reduce costs effectively, patient choice (to move between ACOs, choose hospitals, or change physicians) will need to be restricted by the imposition of disincentives (known as switching costs).

Who Receives Care and What Are the Costs?

Medical costs are driven overwhelmingly by chronic illness at every age (**Figure 8**). Moreover, chronic illness among those younger than 65 years, not among the elderly, accounts for 67% of spending. If trauma is added (including assault, attempted suicide, and motor vehicle crashes), about 80% of total US expenditure is for those younger than 65 years (**Figure 9**), although per capita spending does increase by age (eFigure 5 in the Supplement). The 30 most rapidly increasing chronic and acute conditions (heart disease, trauma-related disorders, and can-

Figure 6. Percent Distribution of National Health Expenditures by Source of Funds, 1980-2011



	Distribution of National Health Care Expenditures, (%)			
	1980	1990	2000	2011
Other third-party payers and programs/investments[a]	19.1	17.4	15.4	13.1
Out of pocket[b]	22.8	19.1	14.6	11.4
Private health insurance	27.0	32.3	33.3	33.2
Public health activity	2.5	2.8	3.1	2.9
Other government health insurance[c]	3.8	3.0	2.6	3.8
Medicaid	10.2	10.2	14.6	15.1
Medicare	14.6	15.2	16.3	20.5

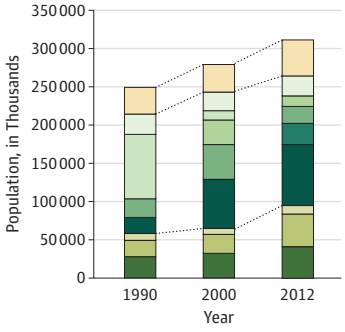
The percent distribution of national health expenditures by source of funds was calculated based on data obtained from the Centers for Medicare & Medicaid Services.[3]

[a] Other third-party payers and programs include work-site health care, school health, other private revenues, Indian Health Services, workers' compensation, general assistance, maternal/child health, vocational rehabilitation, and Substance Abuse and Mental Health Services Administration.

[b] Other government health insurance programs include Child Health Insurance Program, Department of Defense, and Department of Veterans Affairs.

[c] Out-of-pocket spending for health care consists of direct spending by consumers for health care goods and services. Included in this estimate is the amount paid out of pocket for services not covered by insurance and the amount of coinsurance or deductibles required by private health insurance and public programs such as Medicare and Medicaid (not paid by some other third party), as well as payments covered by health savings accounts.

Figure 7. Health Insurance Coverage Status of the US Population, 1990-2012



	Population, %			Compound Annual Growth Rate,[a] %
	1990	2000	2012	1990-2012
Uninsured	14	13	15	1.5
Private				
Direct purchase	11	9	8	-0.2
Conventional	34	4	0	-19.5
POS	0	12	4	31.1
HMO	10	16	7	-0.3
HDHP/SO	0	0	9	NA
PPO	9	23	26	6.2
Government				
Military health care	3	3	4	1.3
Medicaid	11	12	13	3.3
Medicare	8	9	11	1.8
Overall, in thousands	248 886	279 517	311 116	

POS indicates point of service; HMO, health maintenance organization; HDHP/SO, high-deductible health plan/savings option; PPO, preferred provider organization. The health insurance coverage status of the US population was estimated based on data obtained from the US Census Bureau[14] and from Jones & Bartlett Learning.[15]

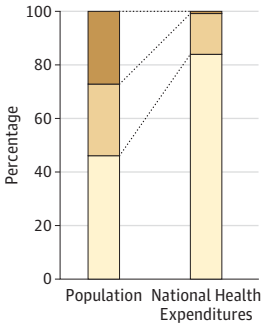
[a] Compound annual growth rate (CAGR) supposing that year A is x and year B is y, CAGR = $(y/x)^{\{1/(B-A)\}-1}$.

cer are the 3 leading categories) (**Table 1** and eTable 1 in the Supplement) account for 44% of total spending, for which costs are increasing by 6% per year (chronic conditions) and 4% per year (acute conditions). This pattern of cost among those younger than 65 years and the burden of chronic disease at all ages underscore the need for more sophisticated and better coordinated approaches to common conditions.

Who Provides Care? Who Employs Them?

Observers since the 1980s have argued that health care in the United States is on the cusp of a transition to "Big Med"[22]; ie, more systematic provision of services by much larger integrated entities that control most aspects of a patient's care. Current data demonstrate that this is now occurring, and at an accelerating pace. In several sectors of health care, with respect to both the consolidation of entities within the sector and the sheer size of institutions, the data support this view. In health insurance, pharmacies, and physician practices, the last decade saw substantial consolidation (**Figure 10**). Of even greater importance was integration across sectors, with physicians shifting en masse from solo or small group private practice (from 53% in 2000 to 23% in 2012 having independence from their hospitals) either to employment by or significantly increased affiliation (41% in 2000 to 72% in 2010) with hospitals (eFigure 6 in the Supplement). With the passage of the PPACA, the ACO movement was launched, with 8% of Medicare patients eligible to be served through ACOs and more than 300 ACOs established in most regions of the United States, with a goal to have one-third of the Medicare recipients enrolled by 2018.[28] Regardless of whether the ACO structure is effective at improving quality and reducing cost, the formation of these entities is requiring health systems to devise more effective and less costly ways to serve the Medicare population locally; ie, to integrate care. The effect on patients is to shift the relationship to an institutional health care provider entity rather than a single physician or group practice.

Figure 8. National Health Expenditures (NHEs) by Patient Group, 2011



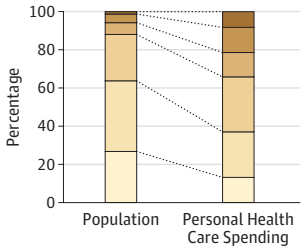
Patient Group	Population, in Millions (%)	National Health Expenditures, $, in Billions (%)
Well[a]	85 (27)	20 (1)
Acute self-limited conditions[b]	82 (26)	412 (15)
Chronic conditions	144 (46)	2269 (84)
Total	311	2701

The population of each patient group was estimated combining multiple data sources. The population of patients with chronic conditions was calculated based on data obtained from the Robert Wood Johnson Foundation.[17] People who did not visit medical care providers in 2010 were defined as "well" and the data for this population were obtained from the US Census Bureau.[18] The residual population was defined as having "acute self-limited conditions." These population data were all adjusted to the 2011 gross US population, which was obtained from the U.S. Census Bureau.[10] Health care spending on patients with chronic conditions was calculated based on the data obtained from the Robert Wood Johnson Foundation.[17] Spending on people in the "well" category was estimated by assuming that their mean expenditure per person is in the lowest 50% bracket, and this spending data was obtained from the National Institute for Health Care Management Foundation.[19] The residual was assumed to be spending on population with acute self-limited conditions.

[a] Defined as those who made no visit to medical care providers in 2010.

[b] Calculated as difference between the total and the sum of "well" and "chronic conditions."

Figure 9. Personal Health Care Spending by Age, 2004



Age, y	Population, in Millions (%)	Personal Health Care Spending, $, in Billions (%)
≥85	4 (1)	147 (8)
75-84	13 (4)	245 (13)
65-74	18 (6)	231 (13)
45-64	69 (24)	521 (29)
19-44	107 (37)	432 (24)
0-18	77 (27)	241 (13)
Total	288	1817

The data for population by age were obtained from the US Census Bureau.[10] For personal health spending by age, we used National Health Expenditure data[20] on total personal health care expenditures by age in 2004 and adjusted to 2011 dollars using the gross domestic product deflator from the Federal Reserve Bank of St Louis.[4]

Despite these historically unprecedented changes in the direction of Big Med and consolidation, the sheer number of health care facilities has continued to increase, from 765 729 (in 2000) to 935 872 (in 2011), producing a countervailing trend toward greater fragmentation. Indeed, some of most rapid yearly growth rates since 2000 have occurred in profitable niches, providing patients or physicians greater convenience and personal service, such as retail clinics (82%) or urgent care (8%), surgical centers (7%), home care services (5%), and imaging facilities (3%). In contrast, the number of general acute care hospitals has decreased from 6588 in 2000 to 5836 in 2011, while the number of specialty hospitals (predominantly orthopedic and cardiovascular) has nearly doubled (from 499 to 956). Evidence is insufficient as yet to judge the effects of these new facilities on cost or quality, although countering the risk of additional fragmentation is a primary rationale for investment in information technology (IT).

These institutional changes have driven trends in employment and supply of professionals. The traditional roles of the physician and nurse professions have blurred, with continued increase in the numbers of advanced practice nurses and other independent practitioners (Figure 3). Moreover, the undersupply of primary care physicians both as a percentage of the total US number and when compared with other developed countries in the OECD (eFigure 7 in the Supplement), implies that the undersupply will become more apparent as the population ages and the health care system organizes for chronic disease care. Contrary to popular perception, the United States ranks 19th of 25 countries analyzed in number of primary care physicians per 100 000 population and ranks sixth of 25 in medical specialty physicians and 12th of 25 in surgical specialty physicians (eFigure 7 in the Supplement).

Investment in new care models using an array of practitioners operating as coordinated teams has been a goal of large health systems since the 1960s. Given that the vast preponderance of human talent deployed within health care is nonphysician (only 1 in 25 employees is a physician), and given the shift in orientation to measurement of success with populations rather than individuals, there is a struggle between efforts to manage professionals systematically and efficiently and traditional structures that reflect preference for autonomy, hierarchy, and historically based professional values. These factors, along with increasing patient assertiveness, create the primary management challenge of this era.

Table 1. Direct Health Care Expenses of the Civilian Noninstitutionalized Population by Selected Conditions, 2000-2010[21a]

Disease Category	Total Expenses, $, in Billions[b] 2000	2010	Annual Growth Rate, 2000-2010, %[c]
Top 10 largest spending conditions			
Heart conditions	72.4	109.5	4.2
Trauma-related disorders	53.7	84.1	4.6
Cancer	49.7	83.5	5.3
Mental disorders	44.0	74.6	5.4
Osteoarthritis and other nontraumatic joint disorders	22.6	63.7	10.9
Diabetes mellitus	23.4	52.4	8.4
Hypertension	29.9	43.9	3.9
Back pain	22.3	40.1	6.0
Hyperlipidemia	9.9	38.0	14.4
Systemic lupus and connective tissues disorders	14.3	31.5	8.2
Total	342.2	621.1	6.1
Top 5 fastest-growing conditions			
Congenital anomalies	2.8	12.9	16.4
Hyperlipidemia	9.9	38.0	14.4
Hereditary, degenerative, and other nervous system disorders	5.4[d]	16.2	11.6
Osteoarthritis and other nontraumatic joint disorders	22.6	63.7	10.9
Gallbladder, pancreatic, and liver disease	8.3	23.1	10.8
Total	49.0	153.8	12.1

[a] The health care expenses of the civilian noninstitutionalized population by selected conditions were obtained from the Agency for Healthcare Research and Quality and examined from 2000 to 2010. Data for nervous system disorders and complications of pregnancy and birth were not available for 2000 and were therefore estimated using the compound annual growth rate (CAGR) for 2001 and 2010. Data were adjusted for inflation using the gross domestic product deflator from the Federal Reserve Bank of St Louis.[4]

[b] Adjusted to 2011 dollar value using gross domestic product deflator.

[c] CAGR supposing that year A is x and year B is y: CAGR = $(y/x)^{\{1/(B-A)\}-1}$.

[d] Data for this condition were not available for 2000 and were therefore estimated using the CAGR.

What Value Is Created?

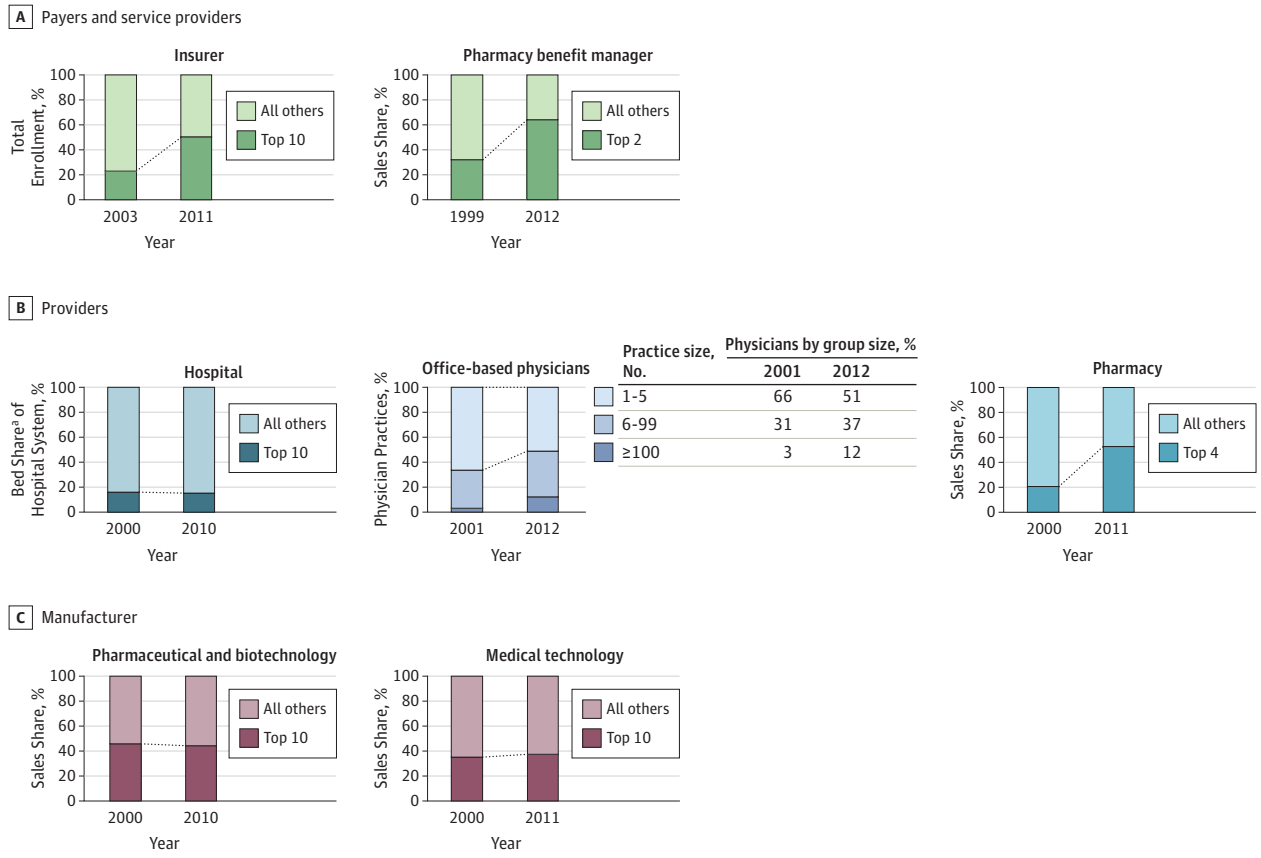
Public opinion polls reflect perceived value. Since the 1990s, US polls have consistently shown high levels of patient satisfaction with experiences with individual physicians and nurses, whereas insurers, hospitals, and Medicare fare less well on satisfaction ratings.[29] Similar high satisfaction levels are also found within the OECD despite very different health system philosophies, organization, and insurance programs.[30] High levels of US satisfaction with personal aspects of care confound health economists and policy advocates who are most mindful of costs and see shortfalls in quality, and also influence political debate over Medicare and Medicaid. While government programs are more popular than those of private insurers, the trend is negative for all insurers, with most polls since 2010 showing a majority (70%-80%) favoring major restructuring of the current system. The trend has accelerated since passage of the 2010 PPACA.[31]

Mortality in the United States (all causes) from common conditions compares unfavorably with mortality in other OECD countries, and the relative trend in changes in mortality rate is also unfavorable (eFigure 8 in the Supplement). While longevity (at birth) is increasing in all countries, the US rate of improvement began to diverge beginning in the 1980s for men and 1990s for women. Significant differences in morbidity are also found between the United States and the OECD in total burden of disease (as adjusted for age, income, and other demographic factors), with only cancer (all types) reaching equivalence for all 6 decades between 1960 and 2008 (eFigure 9 and eTable 2 in the Supplement). Areas of particular concern include cardiovascular disease, infectious diseases (including human immunodeficiency virus infection and AIDS), perinatal disorders, and respiratory diseases, which account for 75% of the deviation.

Possible causes of this departure from international norms were highlighted in a 2013 Institute of Medicine report[32] and have been ascribed to many factors, only some of which are attributed to medical care financing or delivery. These include differences in cultural norms that affect healthy behaviors (gun ownership, unprotected sex, drug use, seat belts), obesity, and risk of trauma. Others are directly or indirectly attributable to differences in care, such as delays in treatment due to lack of insurance and fragmentation of care between different physicians and hospitals.[32,33] Some have also suggested that unfavorable US performance is explained by higher risk of iatrogenic disease, drug toxicity, hospital-acquired infection, and a cultural preference to "do more," with a bias toward new technology, for which risks are understated and benefits are unknown.[34] However, the breadth and consistency of the US underperformance across disease categories suggests that the United States pays a penalty for its extreme fragmentation, financial incentives that favor procedures over comprehensive longitudinal care, and absence of organizational strategy at the individual system level.

County-by-county variation in life expectancy is considerable, as measured by US departure from OECD median mortality (**Figure 11**A) and cost (eFigure 10 in the Supplement). Even when comparing variation from the US counties' median, life expectancy differs by 8 years (Figure 11B). Of note is the similarity among the distribution of rates of poverty, obesity, life expectancy, and Medicare reimbursement in the United States. Recently, controversy has

Figure 10. Consolidation/Industrialization Status of Different Health Care Sectors



Payer/service provider–insurer: The numbers of total health plan enrollment for the top 10 insurers were obtained from Atlantic Information Services and examined for 2003 and 2011. Payer/service provider–pharmacy benefit manager: The sales share for pharmacy benefit managers was obtained from industry reports published by Liberum Capital[23] and examined for 1999 and 2012. Providers–hospitals: The numbers of total staffed beds for each hospital system were obtained from the American Hospital Directory and examined for 2000 and 2010. Providers–office-based physicians: The data for physician practices by group size were obtained from the American Medical Association[24] and the Physicians Foundation.[25] Providers–pharmacy: The sales share for pharmacy industry was obtained from industry reports published by Citigroup[26] and Liberum Capital[23] and examined for 2000 and 2011. Manufacturer–pharmaceutical/biotechnology: The sales share for pharmaceutical and biotechnology companies was calculated based on data obtained from IMS Health. Manufacturer–medical technology: The sales share for medical technology companies was obtained from EvaluatePharma.[27] Market data were not available for 2000 and were therefore estimated using both top-down and bottom-up approaches. The overall market size for 2000 was estimated using the compound annual growth rate (CAGR); supposing that data for year A is x and year b (A<B) is y, $CAGR = (y/x)^{\{1/(B-A)\}-1}$, and sales data in the medical technology segment for major medical technology companies were obtained from their annual reports to identify the top 10 players. The top 10 entities identified for 2000 were Johnson & Johnson, General Electric, Covidien, Medtronic, Abbott Laboratories, Siemens, Fresenius, Roche, Philips, and Boston Scientific.

[a]By number of staffed beds.

focused on the veracity of such international comparisons and whether they should be used to guide US policy.[37] However, the consistency of the data, that they are derived from different original sources and from other developed countries, and that they have been stable for several decades make them compelling.

Forces Producing Change

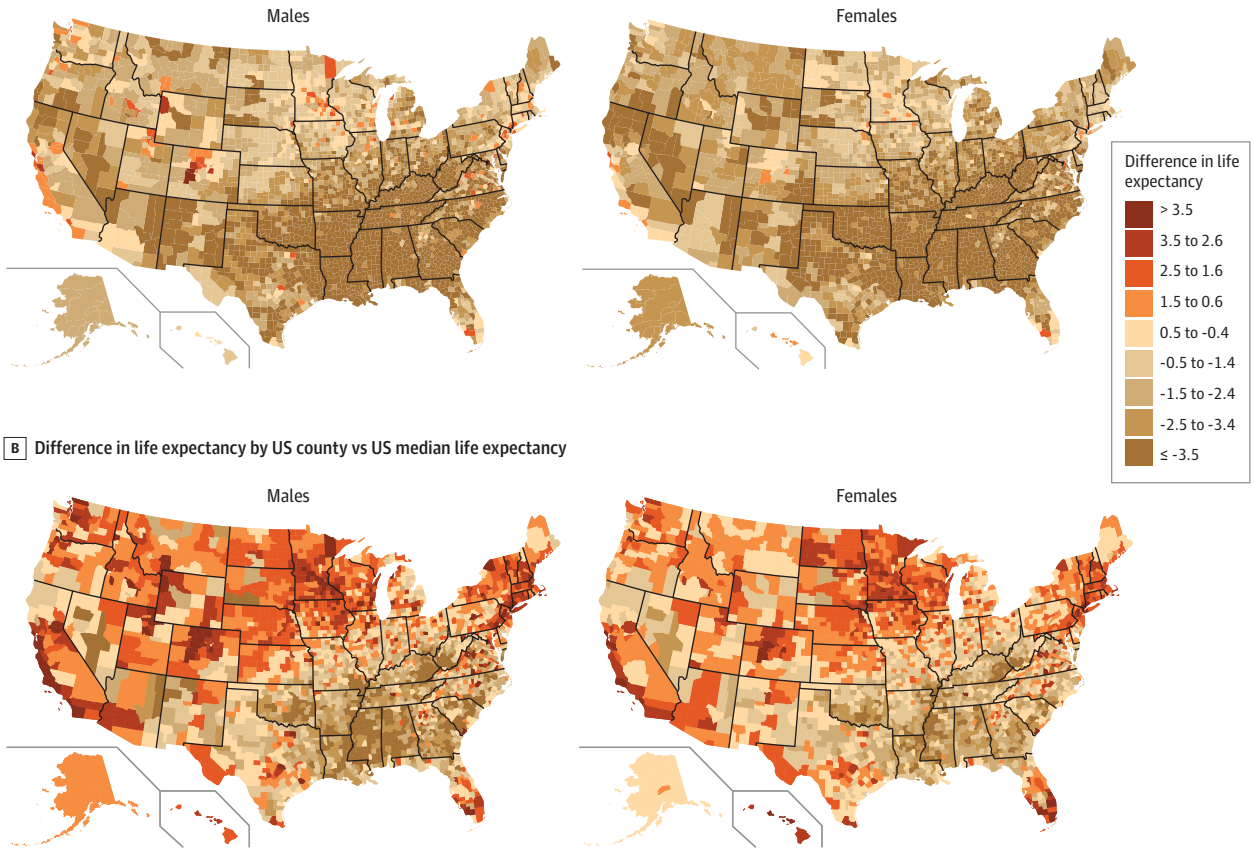
Three forces are likely to produce change in health care in the next decade. All are consequences of the historical trends we have described.

Consolidation and Industrialization

Consolidation is the rule in most industries once they reach a certain size and maturity. Consolidation can be triggered by changes in regulatory policy, a new entrant that spurs defensive action by incumbents, a search for competitive advantage through lower cost (known as scale advantage), or to achieve greater market share. Since the 1980s, the industries of banking, energy, airlines, railroads, automobiles, and media have been altered by cycles of mergers. These provide lessons for health care, and they highlight potential pitfalls, especially in anticompetitive behavior, increasing prices, and exploitation of and less choice for consumers. A recurring lesson is that once begun, consolidation can proceed astonishingly quickly.

The United States has seen rapid consolidation over the past decade among insurers, physician practices, and pharmacies (Figure 10 and eFigure 6 in the Supplement). Entire multibillion-dollar subsectors of health care have been quickly created (eg, pharmacy benefit managers [PBMs]), then consolidated. Since 2003, the largest insurance companies, pharmacy chains, and PBMs have com-

Figure 11. Difference in Life Expectancy by US County vs OECD Median Life Expectancy and US Median Life Expectancy, 2010[a]



Data on life expectancy at birth by US county in 2010 are from the Institute for Health Metrics and Evaluation.[35] Data on life expectancy at birth in Organisation for Economic Cooperation and Development (OECD) high-income countries in 2010 are from the OECD Health Statistics Library.[36] The difference in US county life expectancy from the US median county life expectancy and OECD median country life expectancy was calculated by sex for each county.

[a] OECD median life expectancy is the median life expectancy of OECD high-income countries.[36] US median life expectancy is the median value for all counties in the United States as reported by the Institute for Health Metrics and Evaluation.[35]

manded more than half of their markets as firms reached for the economic advantages that scale creates in those segments.

Two main factors have been behind the push for size: to achieve economies of scale (lowering costs) and the desire to have the upper hand in the negotiation for revenue with the adjacent sectors (eg, large insurers can apply pressure to clinicians and health care organizations, as can PBMs to pharmacies).

To date, consolidation has been primarily horizontal; eg, when firms merge with other firms in the same sector. These typically create efficiencies in industries with high fixed costs, in which advantage accrues because of accumulated experience or where transaction costs can be reduced. For example, high, fixed IT costs for processing of transactions can be spread over more subscribers by a large insurer.

Horizontal consolidation also allows negotiating leverage. For example, PBMs steer volume to pharmacies in return for preferred pricing. The recent contested negotiations between a large PBM (ExpressScripts) and a pharmacy chain (Walgreens) exemplifies this issue, wherein each party believed their scale gave them an upper hand in extracting value from the other. During this episode, both companies exploited patients' concerns about losing access to drugs.[38]

Horizontal consolidation has special relevance for insurers and hospitals, in which each has attempted to gain advantage (or defensively retain it) by acquiring competitors. The goal is often to create asymmetry to shift value. The most striking example: in all but 5 states, the top 1 or 2 insurers have market shares of more than 50%, and in 18 states they have shares higher than 75% (eFigure 11 in the Supplement). Insurers' consolidation may therefore be called "Big Pay." Such concentration among insurers is permitted only by their exemption from antitrust law (under the McCarran-Ferguson Act)[39] and by incentives of federal health legislation (first under Medicare in 1965 and as most recently extended by the 2010 PPACA). The logic has been that only insurers have the ability to constrain hospital and physician fees. Because hospitals have been limited by the Federal Trade Commission to about 30% market share, an asymmetry is now established in many locales.[40] These differences in concentration do not necessarily lower cost, improve quality, or increase consumer choice. This is because such rate negotiations only transfer

revenue from providers to insurers, thereby shifting how profits are divided; ie, they are a zero-sum game.

Since 2010, vertical consolidation has begun, in which insurers orchestrate care and hospital systems provide insurance. These vertical operating and financial models can be aimed at enabling care of better quality at lower cost but may also serve as a means to gain competitive advantage as firms eliminate entire layers or segments of an industry (called disintermediation). Vertical consolidation was explicitly sanctioned by the PPACA, which reinforces integration by transferring some risk and management functions from insurers to hospitals and physicians. Vertical consolidation, like horizontal, also produces economic advantages, but the challenge of operating effectively is greater and chance of failure to reduce cost or provide more value is also higher. Therefore, the success of insurers as they attempt to control physicians and other clinicians or hospitals acting as insurers remains an open question.

Thus far, no truly national hospital companies have emerged, either among for-profit or nonprofit entities, although many have established a strong presence in regions. However, several hospital systems are experimenting with national branding of services (typically in cardiac, cancer, and pediatrics), which lay a foundation with insurers for preferential contract terms. With the exception of emergency medicine, intensive care, pediatrics, radiology, and locum tenens companies, few national physician companies are currently operating.

Consolidation into larger hospitals and physician groups (Figure 10) has created demand for professional managers.[41] This increase is fueled by regulation, the need to coordinate different types of clinicians and other personnel, and because clinicians work within larger, more complex entities and at many locations. Likewise, managers have assumed responsibility for application of clinical algorithms, practice guidelines, standardization of procedures, cost-control measures that affect care directly (such as choice of orthopedic prostheses and implantable cardiac devices), quality improvement programs, and supply of clinical information required by insurers. As a consequence, administrative costs have increased from 3% (1980) to 7% (2011) of total expenditures on care and at a higher rate than other categories (Figure 2).

Administrative coordination may permit greater productivity and lower costs,[42] as a managerial hierarchy is needed to manage multiunit business enterprises. However, once created, the managerial hierarchy can become a "source of permanence, power, and continued growth,"[42] eventually inhibiting those very goals.

Consolidation and industrialization may reduce physician autonomy, breed professional dissatisfaction,[43] spawn dependency, and have the potential to frustrate goals to integrate care by increasing fragmentation.[44] Cost reduction has led to demand for an increasing number (Figure 3) and greater variety of clinicians, such as physician assistants and nurse practitioners, and newer classes of practitioners, such as primary care assistants.

The vertical integration of health care has also led to the increasing employment of physicians (eFigure 6 in the Supplement). An industrial care model requires an ample labor pool, which has been echoed by numerous calls for increasing the supply of physicians, though with little thought to incentives, specialty choice, and demand produced by disease prevalence.[45] For instance, the data suggest that the total number of physicians per capita in the United States is comparable with that of peer nations (eFigure 7 in the Supplement). Because the distribution of physicians in the United States is skewed toward specialists (especially those performing procedures), increasing the aggregate number of trainees without modifying the current training structure and financial disincentives for primary care or other underserved specialties is unlikely to add value and may only further inhibit care integration.

The last generation has witnessed a doubling of medical students' debt-to-physician income ratio (eFigure 12 in the Supplement). This increase in debt influences who can financially afford to be a physician, frequently excluding those from underrepresented minorities[46] and rural backgrounds. It also breeds dependence among physicians on institutions for their continued employment, especially primary care physicians, who confront the highest level of debt relative to future income. In this regard, medicine is following the same path to employment, which is the norm in other technology-driven fields, such as airline pilots and nuclear engineers, where proficiency, reproducibility, and safety take precedence over case-by-case judgment and communications. In medicine, the long-term consequences for patients of this institutional dependence are uncertain, but it will surely change the patient-physician relationship.

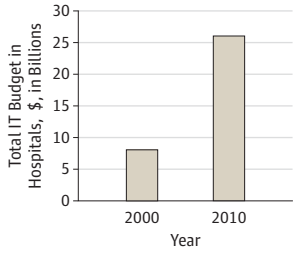
Information and Information Technology

To foster communication across increasingly large and complex industrial enterprises, health care firms have made substantial investments in IT. Since information plays a central role in every aspect of health care, it has been expected to be pivotal in improving the effectiveness of the system.[47] Moreover, investment in IT can generally be made without alienating either political progressives or conservatives, and its payoff is sufficiently long-term that there is little immediate accountability. Accordingly, federal appropriations and private investment in IT have been increasing steadily over the last 10 years (**Figure 12**), with spending on IT reaching $33 billion in 2011, or 3% of total hospital and facility expenditures. Has this increased spending been valuable?

There have been 2 main goals: (1) increasing the efficiency of the administration and management of the system and (2) improving the quality of clinical care (largely by integrating the flow of information required to support coordination across multiple providers and over time). From the high (and increasing) level of accounting, insurance, and management cost alone, it appears that IT has had little effect on the first goal. **Figure 13** captures one credible estimate of the current cost of billing, insurance, and related costs. Administrative costs related to the provision of services is 13% for physicians and 8.5% for hospitals, whereas that for insurers is 12.3% for private payers and 3.5% for public programs such as Medicare and Medicaid. These costs compare unfavorably with what virtually every other care system in the world spends on accounting, insurance, and management costs. Health care also compares poorly with other service industries in its transactions efficiency and cost, as illustrated by the workforce and personnel required to process $1 billion in revenue (Figure 13B). For instance, US billing and insurance costs are 13.0% of revenue vs 6.6% in Canada.[50,51] Other countries that also have combinations of public and private insurers (eg, Germany, France, Japan) have lower rates than the United States. Information technology investments may have reduced costs from what they would otherwise have been, and likely only partially account for their enormity, but have not made US system administration efficient by any measure.

More promising but unproven has been the investment in IT to support better-coordinated clinical care. The complexity of what

Figure 12. US Health Care IT Market Overview

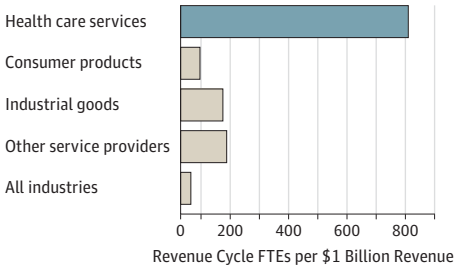


Category	Health Care IT Market by Segment, 2011, in Thousands		
	Physician Office	Hospital	Total
Hardware	414	1775	2189
Software	1517	5360	6877
Internal services	489	9253	9743
IT services	2296	8384	10680
Telecommunication	756	2712	3468
Total	5473	27484	32957

The size of the US health care information technology (IT) market by different segments was obtained from Gartner[48] and examined for 2011. The net operating expense of hospitals was obtained from the American Hospital Directory. The total IT budget was then calculated by multiplying percentage of net operating expense spent on health care IT, which was estimated based on data obtained from Gartner.[48,49]

Figure 13. Estimate of Billing- and Insurance-Related Costs in the Health Care Enterprise and Comparison With Other Industries

A Median of revenue cycle FTEs in different industries



B Estimate of BIR costs, United States

Spending Category	Annual Spending, $, in Billions	Percentage for BIR Costs Estimated in 2005-2009	Annual BIR Costs, $, in Billions
Physician care[a]	541.42	13.0	70.38
Hospital care	850.55	8.5	72.30
Other providers[b]	887.36	10.0	88.74
Private insurance	896.35	12.3	110.25
Public programs[c]	1063.75	3.5	37.23
Total	4239.43	47.3	378.90

Annual health care spending data for 2011 were obtained from the Centers for Medicare & Medicaid Services.[3] The percentages for billing- and insurance-related (BIR) costs were taken from prior estimates.[50] We used these percentages to calculate annual BIR costs from total annual spending in 2011. Data on median of revenue cycle full-time equivalents in different industries in 2006 are from the Institute of Medicine.[50]

[a] Includes office-based physician and clinical services.

[b] Includes spending on dental services, home health care, nursing and continuing care retirement facilities, durable and nondurable medical equipment, and prescription drugs.

[c] Includes Medicare, Medicaid, Child Health Insurance Program, and other programs in the Department of Defense and Department of Veterans Affairs.

needed to be coordinated produced multiple preconditions for success, each difficult to achieve. First, all relevant information had to be captured digitally. Second, information formats had to be sufficiently standardized so that the captured information could be deployed in the multiple IT systems that might use it. Third, the individuals and institutions involved needed to agree to share the information (with appropriate protection for privacy and security interests). Fourth, application programs needed to be developed to convert the data into useful information for clinicians. The complexity of accomplishing these tasks in the million-facility US system is truly extraordinary, and for many years it largely frustrated the efforts of IT missionaries to create value through care coordination.

The last decade has nevertheless seen some substantial gains. This is true of both individual care systems (the VA and Kaiser Permanente are among the more commented-on success stories), and regional systems, which typically invest 4% to 5% of revenue in IT, twice the rate of smaller systems.[52] In contrast to the situation in 2000, 95% of hospitals have now adopted electronic medical records, although there is great variety in their sophistication (eFigure 13 in the Supplement). Even more significant, based on the substantial federal appropriation of the American Relief and Recovery Act of 2008, most physician offices are now on their way to having their information captured digitally.[53] Format standardization also progressed in the 2000s, largely because of collaborative efforts by standards groups, strongly reinforced by federal legislation.

Substantial investment in applications development has also occurred, both by the major systems vendors and by entrepreneurial companies, and within many health systems. The success of these efforts can be partially demonstrated by viewing the penetration of applications types. The integration and consolidation of health care and the formation of ACO-type entities, together with the creation of the health information exchanges nurtured by incentives and penalties enacted by the Obama Administration, have all chipped away at the challenge of fostering collaboration among individuals and institutions. Nevertheless, this remains the most daunting of the 4 challenges.

The hope and belief of IT reformers is that enough progress can be made along these dimensions that a virtuous cycle of effective investment in IT can be sustained. To date, value delivered for the national system lags well behind investment. Individual systems can be identified that are performing well, where IT plays a central role. Overall, however, value has yet to accrue at the expected rates from the nation's large investment of time and money, despite remarkable progress in building the IT infrastructure. The best that can be said is that the management agenda gained momentum despite the complexity of deploying IT. A

Table 2. Number of US Facilities in Health Care Sectors, 2000-2010

Subsector	No. of Facilities in Health Care Sectors		
	2000	2010	Annual Growth Rate, 2000-2010, %[a]
Offices of physicians	195 655	223 797	1.4
Social assistance	129 053	158 764	2.1
Offices of dentists	116 494	129 830	1.1
Nursing and residential care	63 005	79 047	2.3
Pharmacies and drug stores	40 614	41 672	0.3
Home health care services	16 092	27 314	5.4
Outpatient care centers	19 700	27 202	3.3
Medical and diagnostic laboratories	9750	13 220	3.1
General hospitals[b]	6588	5836	−1.2
Urgent care centers	2503	5419	8.0
Retail clinics[c]	3	1200	82.1
Specialty hospitals	499	956	6.7
All others	165 773	221 615	2.9
Total	**765 729**	**935 872**	2.0

The numbers of US health care–related facilities, except for retail clinics, were calculated based on data obtained from the US Census Bureau.[61] The data for retail clinics were obtained from the American Medical Association.[62]

[a] Compound annual growth rate (CAGR) supposing that year A is x and year B is y, CAGR = $(y/x)^{\{1/(B-A)\}-1}$.

[b] Includes general medical/surgical hospitals and psychiatric/substance abuse hospitals.

[c] Health care clinics located in retail stores, supermarkets, and pharmacies.

notable exception is the success of automated drug interaction monitoring, where clinical value became evident almost from the outset.

Information technology is also a disruptor of the traditional, fragmented model of care.[54] Clinical quality and value initiatives are critically dependent on it because it brings together the information required to measure virtually anything. Another example is telemedicine, which enables care provision over long distances. Telemedicine permits highly specialized advice or judgment to be introduced into settings where it was previously logistically impossible and also expands access to patients at home, which is likely to be of increasing importance in managing chronic, severe illnesses. In the future, telemedicine could also expand the reach of clinician and health care networks, which could introduce new and potentially disruptive competition to local markets.

The next challenge (which some health systems and insurers are pursuing) is to exploit the new infrastructure to make care not just better coordinated, but truly better and safer. This frontier depends on "Big Data," the use of massive databases and data-mining capabilities to find the key opportunities for care improvement and refine solutions to them. All sectors in the care system see this frontier as having great promise, although there are concerns that the gains will come in the 2020s rather than in this decade, and believe privacy concerns have received insufficient protection.

The Patient as Consumer

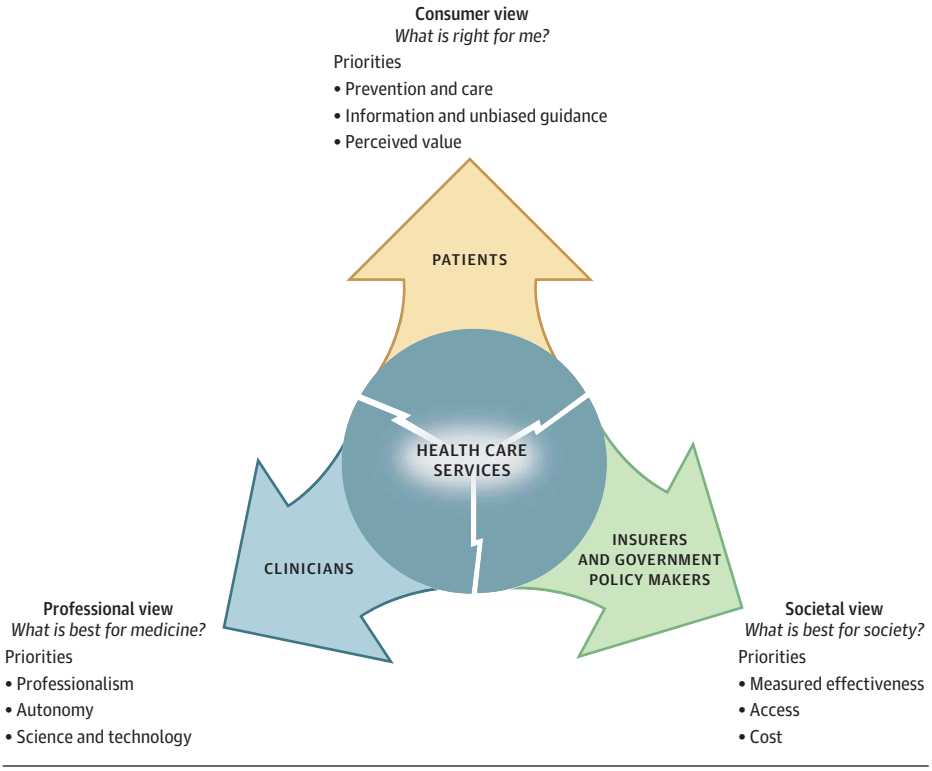
As medicine consolidates, the entities providing care become larger, and the PPACA takes effect, individuals have little influence in the direction of change. However, with new information and networks of relationships, consumers are increasingly demanding a greater voice in the setting of clinical and research priorities. Patient influence is expressed principally outside the traditional health care establishment, particularly using social media and other new channels. Because of this, patient preferences are potential obstacles to the intentions of all incumbents in health care, leading to unanticipated consequences.

Taxes, employment benefits, and personal expenditures pay for health care (Figure 6 and eFigure 2 in the Supplement). However, consumers currently have little, if any, role in oversight. For example, neither the 17-member Medicare Payment Advisory Commission nor the 31-member committee that helps set Medicare's reimbursement for physician services has a single consumer representative. Moreover, consumers lack information about health care practitioners' financial incentives, which greatly influence the care that they receive. Even if diligent in seeking prices for services, consumers frequently cannot obtain them.[55] Similarly, the delivery of health care often falls short of patients' expectations (especially among severely or chronically ill patients), as the needs of regulators currently take priority. Moreover, as the PPACA and insurers measure health outcomes in populations rather than by individual, patient dissatisfaction has the potential to increase.[56] At the extreme, some policy makers have even questioned the utility of asking consumers about their experiences, despite compelling evidence that patient perception is an accurate reflection of technical quality, risk of surgical complication, and likelihood of hospital readmission.[57]

Patients are also supported by an increasing number of caregivers (family members, friends, or hired aides) who now include 20% of all Americans (eFigure 14 in the Supplement).[58] The Internet and new simple, tablet computer–based self-monitoring technologies are making these patients and caregivers more knowledgeable and exacting in their expectations of clinicians and hospitals. For example, from 2000 to 2012 the proportion of US adults who were online "health seekers" more than doubled from 25% to 59%.[59] Seventy percent of American adults now track at least 1 health indicator,[59] many of which are novel (eg, sleep patterns, risk of falling) and measured by personal sensors. While still in their infancy, social networks are developing for many conditions and are enabling patients to learn and gain support from peers.[60]

Patients expect convenience. Consequently, care delivery will become more fragmented, with greater demand for a wider breadth of health care practitioners (Figure 3) at more locations. For example, the number of ambulatory care centers, urgent care centers, and retail clinics has almost doubled over the last decade, displacing care that would traditionally occurred in hospitals, emergency departments, and physician offices (**Table 2**) or care (such as routine adult vaccination) that would not have occurred at all. The next horizon, if not hindered by reimbursement policies, is receipt of care directly in the home either in person, via telemedicine, or through mobile devices.

Figure 14. Medicine's Triangle of Conflicting Expectations



Patients' expectation for easy access to clinicians has spawned "concierge" and alternative practice arrangements in which individuals, rather than being part of large patient "panels," are members of a small practice. The popularity of these concierge practices reflects the preferences of both physicians and consumers. Consumers, who increasingly extend beyond the wealthy and include those with chronic or less common diseases,[63] purchase assured access and additional time in their search for expert advice, not solely procedures or interventions. As more physicians opt out of Medicare[64] and private insurance, patients who choose to purchase preferred access become a visible reminder of the shortcomings of large hospitals or group practices and their reimbursement contracts. In response, some states (eg, Massachusetts, Oregon) have considered discouraging growth of concierge medicine via regulation and physician licensing laws. In this regard, the United States is recapitulating the lessons learned in the United Kingdom, Canada, and Europe, where (unsuccessful) attempts to limit patient choice and their ability to pay directly for care occurred in the early years of country-wide reorganization of health care financing. Today, the futility of such restrictions is reflected by the inability of state-controlled health systems to restrict access to procedures that enhance quality of life (eg, major joint replacement, cataract surgery) but that do not affect mortality or for which benefit is subjective.

Consumers are also changing the conduct of clinical research by organizing their own studies, enhancing trial recruitment, and ensuring flow of patients to specialized investigators and centers.[65] Among the first examples of this trend were patients with human immunodeficiency virus infection and those affected by poorly understood or rare diseases, such as autism, inherited myopathies, and amyotrophic lateral sclerosis; however, this is now extending to many common conditions, including dementia and cancer. These expressions of patients' desires are occurring largely outside of established institutions, and they have the potential to challenge all of them.

Implications

Based on this review of the anatomy of health care in 2013, the US "system" has performed relatively poorly, by some measures, despite the extraordinary economic success of many of its participants. Outcomes have improved, but more slowly than in the past and more slowly than in comparable countries. Costs have tripled in real terms over the past 2 decades. In the last 8 years, the trend in cost has moderated, and each of the 3 factors discussed herein (consolidation of insurers and health systems, health information, and the patient as consumer) most likely played a role, especially the development of more systematic management of what remains a highly fragmented system. A general drive to measure and manage for value and accountability, for outcomes, and for spending has emerged, and it appears to have sustained momentum. In contrast to that good news, it is also clear that disruptive tensions are surfacing. Their importance is just now being recognized.

Health care is caught in an iron triangle of conflicting expectations among patients, clinicians, and public health and government policy makers (**Figure 14**). Not all of the forces can be satisfied and some are mutually exclusive. Patients' preference for choice of clinicians, hospitals, or pharmacies with low out-of-pocket costs are incompatible with insurers' cost-reduction goals, which rely on

steering patients to suppliers that the insurer, not the patient, selects. The criteria insurers use are not transparent to the patient, be they based on clinical outcomes, discounts to the insurer, or strictly commercial factors (such as exclusivity or other favorable contract provisions).

Physicians' historical autonomy and professionalism are at odds with the corporatization of "Big Med," "Big Pay," "Big Data," and consolidation of the industry. Above all, the patient's desire for the clinician's best advice and expert attention may be in tension with financial incentives to restrict diagnostic tests and procedures. Today, incentives for quality and tools for its measurement are rudimentary. Unless value to the patient is judged by much more sophisticated nonfinancial measures (objectively by outcomes and subjectively by perception of the care process, adaptation to disability, and emotional accommodation to illness), physicians and patients will be driven apart when they should be allies.[66]

Moreover, public health and social policy goals are applied to groups of people, not individuals. Groups balance cost, morbidity, and mortality as measured by averages and trends, many of which we have herein reviewed. This reflects a shift in attention from the individual to the group, raising risks that norms for panels of patients will supplant those that affect the individual patient. It is not clear that patients will be willing, or even that they should be asked, to shift their allegiance and trust to a health system or insurer rather than a clinician. Part of what has characterized the United States for decades—in some ways one of its strengths—is the focus on the individual. However, as the US health care system is realigned, the larger focus on population health may be inevitable. This change in optimizing care and cost for a population rather than an individual will be disruptive, but its effects will not be known for decades.

The path the nation seem to be embarking on, toward further integration of clinical services and consolidation of payers and health systems, has been pursued without an overall strategy. No single entity, not even the Centers for Medicare & Medicaid Services, can command the pieces of a system so complex or having so many disparate groups, each with different expectations. The biggest driver of change is organizational consolidation and integration, which has generally been pursued under logics of individual-institution competitive success in geographies or business sectors rather than as a part of a national strategy. Although some elements may be favorably aligned to improving US health outcomes and reducing costs (such as IT and rewards for high-value scientific innovations), others are not. An important concern is that patient engagement may be compromised under the evolution.

While a national shared strategy for the system is not a realistic option, a national conversation based on the data can provide helpful structure that can support continued evolution toward financing and delivery of care that provides better value. In particular, a stronger collective grasp on the economic structure of care delivery is needed. For example, Christensen et al[60] have articulated 3 quite different functions (each with distinct business models) that are required to provide health care: one that solves complicated diagnostic problems, a second that adds value through an intervention or procedure, and a third that manages relationships and information. These differences are exemplified by neurology (solves complicated diagnostic problems), hip replacement or cardiac surgery (reproducible intervention), and effective care of chronic diseases (manages relationships and information flow). Each requires different payment schemes and each has distinctly different organizational needs for them to be effective; yet most payers and health care provider entities ignore the challenge to optimally manage each component. The characterization of the current state of US health care reported in this article leads to the conclusion that institutional structure reflects neither the underlying economics nor the operating requirements of providing maximum value at minimum cost.

Other inferences are warranted from the information we have presented. The health care system has not adequately incorporated the evolving understanding of social, personal, and cultural dynamics into the design of health services and information flow. For instance, evidence has accumulated since the 1970s that successful, sustained weight loss, medication adherence, and suicide prevention occur only when the approach is tailored to those with particular educational and social backgrounds, plus peer support, yet these lessons are rarely reflected in existing programs. As another example, the OECD countries have done much better than the United States in serving populations and conserving resources, but lessons that are known appear to be largely ignored, and which factors account for the difference are not fully understood. Similarly, there is limited understanding of the reasons behind variation in cost and outcome between US regions and counties, even those that persist after correction for different demographics, education, disease burden, and income levels.

At the highest level, the US health system is struggling to adapt to the triad, the iron triangle, of goals, desires, and expectations. The conflict among patient desires, physician interests, and social policy is certain to increase. Those tensions will likely become a palpable force that may hinder care integration and inhibit other changes that favor improved outcome and savings. The usual approach is to address each constituency in isolation rather than optimizing efforts across them. The triangle will need to be reconciled. This is the chief challenge of the next decade.

Given the changes described in this article, what developments might stop forward momentum? The first and most salient is resistance to change by patients and the citizenry at large. Such resistance would almost certainly be expressed politically, and with great stridency. This risk could be triggered by a new kind of medical paternalism, one that substitutes "Big Med," Washington, or "my insurer knows best" for "the doctor knows best." The medical profession has spent decades discouraging medical paternalism in all its manifestations. To have it reemerge in another form would be unfortunate and counterproductive. Patients would receive medical paternalism very poorly, as may be reflected by growing public opposition to President Obama's health care agenda and the PPACA.[31]

Another destabilizing risk is failure to invest adequately in care improvement. Service innovation is a poor stepchild, with declining current levels of investment and very low historical investment. It will be important to understand what and where service innovations work and to invest in devising new approaches to refractory clinical process problems, especially those for chronic disease and those for which behavioral and social interventions are required. To that end, insurers should be required to disclose anonymized information on patterns of care that only they posses in claims databases, rather than treat them as proprietary.

A corollary risk is to curtail investment in new technology and its supporting science. However, those in companies and in Congress who must make investment decisions are discouraged by the long gestation period of advances that could fundamentally change diseases for

which neither effective preventive measures nor treatments exist. We have suggested previously[67] that new financial vehicles need to be created that can complement existing sources of public and private funds, especially those to support high-risk/high-reward directions. However, in the current climate of austerity, in which the cost of new medical technology often seems more obvious than its clinical value, the risk of limiting or curtailing funding for research is very real, although shortsighted. It is equally clear that the productivity of the research enterprise needs to be radically improved.

In addition, risk is appreciable that the current patchwork "system," even with the changes of recent legislation and progress in the private sector, will simply collapse under its own weight, especially as the population ages. Some have even advocated this outcome as a necessary step toward a national single-payer system or a way to lower Medicare costs.[68] Given the tensions implicit in health care, such a failure would be chaotic and its outcome uncontrollable.

Could current tensions presage favorable outcomes? Physicians and advance practice nurses, spurred by a new, younger generation, might prove highly receptive to altered incentives, bring new objectivity, and embrace broader measures of success, such as those that reflect the value of their clinical judgment and their ability to engage patients in decisions having major gravity. Physicians and nurses, not "Big Med," "Big Pay," or the government, could become the main sources of service innovation. Similarly, altogether new entrants may enter the arena and would fully mobilize people, information, and technology in ways not currently envisioned.

Disruptive change could also come from patients, as information asymmetries are lessened and as patients show increasing awareness of the emotional costs of high-intensity interventions that have little realistic likelihood of prolonging life or improving its quality. These are exemplified by examination of routine screening practices in primary care medicine, as well as new evidence from palliative care and oncology that permit early identification of diseases at a stage when intensive treatment would likely be futile. In such examples, patient desires and objective outcomes are aligned to a greater degree than many have suspected.[69]

Are these realistic outcomes or just pipe dreams? Each proposal implies a choice. Who is to guide such choices? A new discussion—ideally out of the political arena and with self-interest held at bay—among all of the involved constituencies can do so. What can guide better choices than have been made in the past? Perhaps a conversation, fully informed by the facts and acknowledging perspectives among those who receive, provide, and finance health care, can do better than the political acrimony of the past few years.

ARTICLE INFORMATION

Author Contributions: Dr Moses had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. Dorsey, George, Matheson, Sadoff, and Yoshimura contributed equally.
Study concept and design: Moses, Matheson, Dorsey, Sadoff.
Acquisition of data: Moses, Matheson, Dorsey, George, Sadoff, Yoshimura.
Analysis and interpretation of data: Moses, Matheson, Dorsey, George, Sadoff, Yoshimura.
Drafting of the manuscript: Moses, Matheson, Dorsey, Sadoff.
Critical revision of the manuscript for important intellectual content: Moses, Matheson, Dorsey, George, Sadoff, Yoshimura.
Statistical analysis: Moses, George, Sadoff, Yoshimura.
Administrative, technical, or material support: Moses, Matheson.
Study supervision: Moses, Matheson, Sadoff.

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