

Health Policy Opinion



Metamorphosis of Medicine in the United States: Is Information Technology a White Knight or Killer Whale?

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Health care reform movement aspires to provide cost effective, high-quality health care for most Americans (1,2). The Affordable Care Act was designed to be a comprehensive approach affecting the character, function and appearance of health care delivery. Sadly, the toxic environment of contemporary politics and policies continue to hinder the debate on optimized health care delivery and what that should cost. At times it appears that the health care conundrum has become a surrogate for all the problems of the country (3).

The debate has always focused on cost drivers, often inappropriately with the conventional wisdom citing the aging demographic trends and overuse of services in a fee-for-service environment as primary drivers. In contrast, 3 important cost drivers – information technology (IT), consolidation, and the patient consumer movement have often been ignored (3). The Patient Protection and Affordable Care Act (ACA), or ObamaCare, hoped to achieve the laudable triple aim of improving the individual experience of care, improving the health of the population, and reducing the per capita costs of care for various populations (1). The American Recovery and Reinvestment Act (ARRA) of 2009 (2), which preceded the ACA, was heavily focused on IT for implementation and improving quality. However, multiple barriers to IT adoption in health care have been described. Many of these include issues related to technology development and costs. Technology entrepreneurs do not necessarily address the issues at hand by identifying a problem and working to solve that problem.

Practice and hospital administrators are not enthusiastic about paying for technologies that make their limited time more efficient. Too often, physicians believe rather than enabling efficiency, technology takes up too much of their time. More ominously, technology may be creating barriers between physicians and patients. Physicians often see technology as impersonal (4). In fact, so-called technological innovations have resulted in numerous regulations by the Centers for Medicare and Medicaid Services (CMS) and Congress with assessment of various value-based penalties with a cumulative reduction in reimbursement totaling 11% in 2017 and growing to 13% by the end of the decade, with reduced access to services (5).

Information technology entities have created health care hackathons which are growing rapidly as described by Garg (6). Innovation within the health care industry conjures up an image of behemoth institutions with the regimented top-down bureaucracy and slow-moving progress to many in IT. Garg, however, maintains that it doesn't have to be that way; it can be cured by hackathons. In another IT manuscript headlined as disruptive technology, Singh (7) states that health care is an unusually difficult market to sell into – between government regulation, consolidation and

market behemoths constantly highlighting the risks of doing things differently, ways that innovators can make money to disrupt the space with potential clients looking for continuity and reliability.

The present state of affairs in the practice of medicine may be described as innovation within the health care industry means behemoth IT with regimented top-down bureaucracy and slow moving progress, between massive government regulations favoring IT, consolidation of health care market favoring hospitals and highly bureaucratic institutions, with overriding draconian cuts and bureaucracy, health care practitioners may not be able to survive the storm.

With challenges continuing to evolve, it is often argued that IT is a white knight and the future of health care and the human race, whereas, others believe that IT is a ravenous beast such as a killer whale which continues to infringe upon health care in the United States.

HISTORICAL PERSPECTIVE

Health care has changed dramatically from the early 1960s. There have been dramatic strides in treating diseases and in curtailing damaging personal habits like smoking. However, health care has lost some pivotal aspects – the most important being the sense of connection with patients, because of escalating costs, diminishing time per patient, exploding use of IT, intertwined with onerous regulations. While it is plausible that IT should enable efficiency it is at the crux of a variety of regulatory challenges facing medical professionals and one sided focus of benefitting IT industry, without attention to needs of patients and providers. Numerous regulations related to or intertwined with IT include, but are not limited to, electronic health records (EHR), International Classification of Diseases, 10th revision (ICD-10), Physician Quality Reporting Initiative (PQRI) and comparative effectiveness research (CER) (5).

The federal government has been encouraging adoption of health IT by physicians and hospitals for the last decade. The Medicare and Medicaid EHR incentive programs authorized by the 2009 Health Information Technology for Economic and Clinical Health (HITECH) Act, provide incentive payments to health care providers that demonstrate Meaningful Use of certified EHR systems (2). Until the enactment of ARRA in 2009 the use of IT had been an optional commodity.

The US government shows total spending on IT ranges approximately \$80 billion (8). IT spending grew 7.1% per year from 2001 to 2009, and slowed to 0.27% per year for 2009 to 2015 for health care (8). Health

IT is undoubtedly complex and even supporters questioned whether we are able to get health IT right (9). The stimulus package allocated \$19 billion for health IT which was expected to increase to \$29 billion through 2016 (2). However, with Meaningful Use covering only a fraction of providers by August 1, 2014, the cost approached \$25 billion, which could in fact escalate to over \$100 to \$200 billion if the majority of providers participate (10).

Thus, IT has contributed to escalating costs to maintain various types of equipment and personnel while simultaneously there has been an overall reduction in reimbursements. IT has not only failed to reduce the expenses of practices and hospitals, but has increased them and also created new issues with increased risks given the leverage of even basic functions to IT.

There is no sign of slowing down the rate of development and proliferation of information and communication technologies. It is postulated that in the next 10 years we can expect more sophisticated human-computer interfaces with efficient voice and handwriting recognition, the penetration of techniques such as telesurgery into mainstream clinical practice, sophisticated undergraduate and postgraduate computer-based training, and better structuring and portability of integrated EHRs. It is thought that health professionals will harness the new power at their disposal for the benefit of their patients (11). But, past performance does not indicate that the benefits will be appreciated by many providers.

Further, with extensive use of IT, CER, and the Patient-Centered Outcomes Research Institute (PCORI) (12,13), the public is skeptical about research-based treatment guidelines. Specifically, the public found arguments against establishing research-based treatment guidelines more convincing than arguments in favor of it.

ECONOMIC IMPACT OF INFORMATION TECHNOLOGY

Basically, IT is the application of computers and telecommunication equipment to store, retrieve, transmit, and manipulate data, often in the context of a business or other enterprise. Even though the term IT is commonly used as a synonym for computers and computer networks, it also encompasses myriad other information technology distribution such as television and telephones. IT is becoming a major force in human lives with several industries associated with IT including computer hardware, software, electronics, semiconduc-

tors, internet, e-commerce, and computer services. The business value of IT lies in the automation of business processes, provision of information for decision-making, connecting businesses with their customers, and the provision of productivity tools to increase efficiency. Worldwide IT spending forecast for various categories of IT services in 2013 exceeded \$3.7 trillion (14). Employment, occupational growth, and wages continue to increase in the IT industry, whereas they continue to decline elsewhere. With rapidly changing technology and the opportunities available in IT, commentators have suggested that graduates may be loathe to choose medical education given its cost and time requirement (15). In fact, the incomes of programmers with a graduate degree may exceed those of a family physician with 10 years of intense education and enormous debt.

Physician income had tracked cost of living increases very closely with initiation of Medicare in the mid 1960s (16-18). Employer-provided insurance plans produced a significantly higher rate of growth, and Medicare costs escalated. The spiraling costs prompted controls on physician reimbursement, and doctors have experienced income reductions in real, inflation-adjusted dollars. IPM has been no exception. In 1989, a lumbar epidural injection was reimbursed by Medicare for the physician fee 150% more than the 2014 reimbursement without taking inflation into consideration. Private insurers also paid in the same manner, around 300% to 400% of Medicare. Now, with the changing dynamics in health care reform, some private insurers are paying less than Medicare and Medicaid. Consequently, physicians' incomes, often saddled with loans coming out of medical school, have been lagging behind those who chose finance, business, and other pursuits, specifically IT. Today, a programmer with 4 years of education and minimum loans to repay could make the same as a family practitioner with 8 to 10 years of education and loans to repay (15).

GROWTH OF AMERICAN ENTERPRISE

Americans have witnessed many policies, presidents, congresses and both parties controlling the country. With numerous changes over the years, the middle income jobs of the nation's postwar boom years disproportionately vanished while low wage jobs have burgeoned. Further, employment has become less secure, often coming with reduced or no benefits (19). While some claim that poverty in the United States has declined since 1964, which was 19% to around 15%, it appears that middle class has shrunk. In fact, in 1960, of

the top 20 employers, only 3 were service industries or news industries (AT & T technologies, CBS, and Kraft), while all others were manufacturing industries. In contrast, in 2014, only 2 of the top 20 employers are manufacturing firms and the rest are in the service industry, topped by Walmart.

The IT boom has had some notable failures; Y2K costing billions or even trillions of dollars followed by dot-com busts with costs exceeding hundreds of billions or trillions of dollars. Now, Apple and IBM together, joining forces, are focusing on health care (20). The implications of this ever greater forced, rather than organic reliance on IT in health care raise concerns.

FAILURE OF HEALTH INFORMATION TECHNOLOGY

Health care has become a surrogate for many of the problems of the country with patients being disenfranchised in the process and policy makers revising their policies on a regular basis (3). The conventional wisdom has been that aging demographics, overuse of services, and fee-for-service have been responsible for these issues. However, a Johns Hopkins study (3) identified 3 important factors different from traditional concepts for the health care cost explosion including IT with considerable investment, but elusive results, consolidation of health care entities and a lack of competition, increasing bureaucracy and regulations and empowerment of non-physicians, and the patient consumer movement. The patient consumer movement is based on IT with social media, informal networks, public sources of information, self-management, software, and finally, so-called shared decision-making. Unfortunately, shared decision-making is often based on policy regulations, payer demands, or patient demands, which may not include evidence-based guidelines.

The ACA has escalated all these factors. In fact, the historical ranking of health care quality in the United States, which ranked number 5 in overall rating in the Commonwealth Fund's 2004 edition, slipped to number 6 in 2006 and 2007. However, in 2010, it slipped further to 7 and in the 2014 edition, it slipped to 11 as shown in Table 1 (21), with continued escalation of costs as shown in Fig. 1 (21). It has been estimated that 31% of US health care spending goes to administration for providers and payers; however, now the administrative costs are escalating further due to huge investments in IT.

A recent comparison of how 4 countries use health IT to support care for people with chronic conditions

Table 1. *Historical ranking of health care quality.*

	AUS	CAN	FRA	GER	NETH	NZ	NOR	SWE	SWIZ	UK	US
OVERALL RANKING (2014 EDITION)	4	10	9	5	5	7	7	3	2	1	11
Overall Ranking (2010 edition)	3	6	n/a	4	1	5	n/a	n/a	n/a	2	7
Overall Ranking (2007 edition)	3	5	n/a	2	n/a	3	n/a	n/a	n/a	1	6
Overall Ranking (2006 edition)	4	5	n/a	1	n/a	2	n/a	n/a	n/a	3	6
Overall Ranking (2004 edition)	2	4	n/a	n/a	n/a	1	n/a	n/a	n/a	3	5
Health Expenditures per Capita, 2011*	\$3,800	\$4,522	\$4,118	\$4,495	\$5,099	\$3,182	\$5,669	\$3,925	\$5,643	\$3,405	\$8,508

* Expenditures shown in \$US PPP (purchasing power parity); data for Australia from 2010.

Data: OECD, *OECD Health Data, 2013* (Nov. 2013).

Source: The Commonwealth Fund; Davis K, Stremikis K, Squires D, Schoen C. *Mirror, mirror on the wall, 2014 update: How the U.S. health care system fares internationally.* June 16, 2014. www.commonwealthfund.org/publications/fund-reports/2014/jun/mirror-mirror (21).

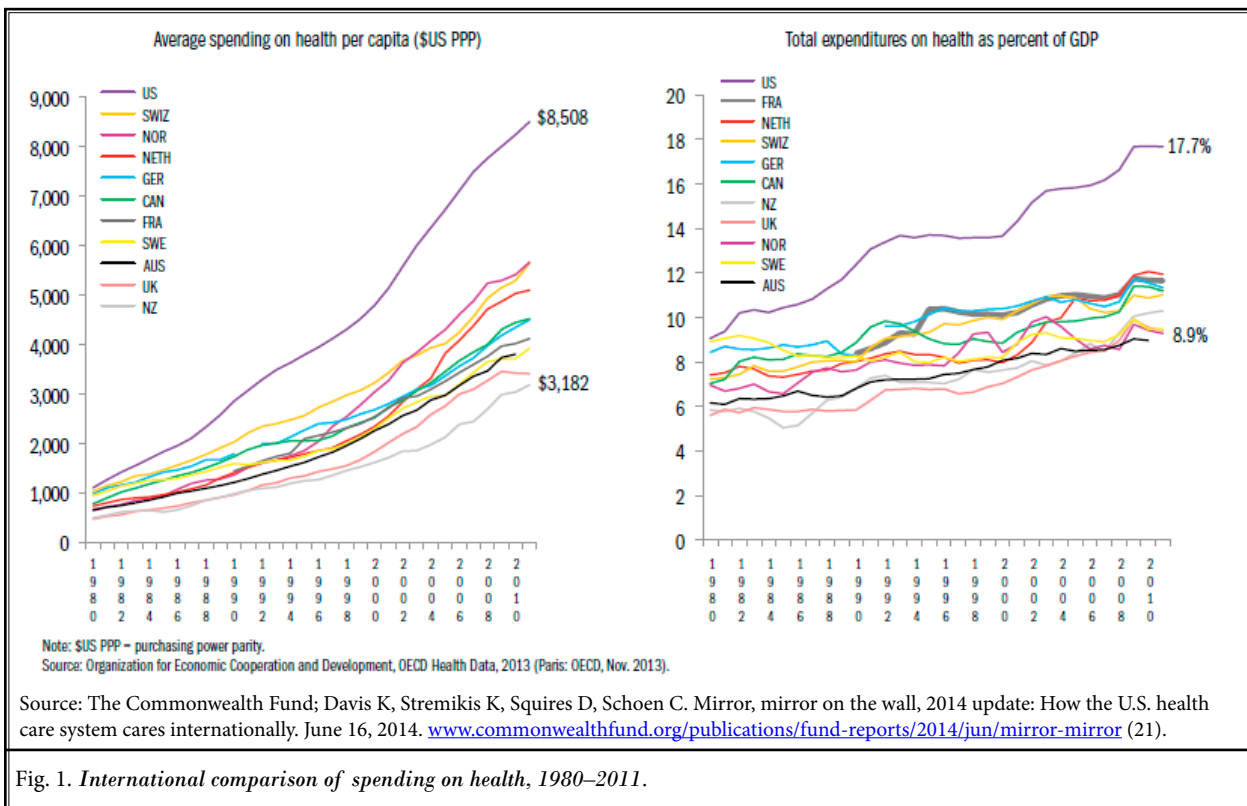


Fig. 1. *International comparison of spending on health, 1980–2011.*

showed that although the 4 nations have different health care systems and health information and communication technologies in which they have heavily invested, all of them faced a similar set of challenges with no demonstrable change in outcomes (22). Not surprisingly, they suggested improvements in order to achieve the potential benefits. Conventional wisdom holds that the redesign of health care or any other system, specifically if it is affecting the sector heavily, requires stepping back from the issues of individual benefits. In

contrast, IT in health care continues to grow despite no proven advantages and seemingly contrary results.

CMS on October 28, 2014, announced additional expenditures of an \$840 million initiative to improve patient care and lower costs, once again stressing the importance of IT. They have also attributed almost 10% savings for Medicare from a 10% reduction in hospital readmissions with saving 15,000 lives and \$4 billion in health spending during 2011 and 2012 which are attributed to IT (23).

Some people believe that implementing ICD-10 will be more expensive than the costs incurred with Y2K compliance. ICD-10 costs have been estimated to be \$300 billion and perhaps as much as \$1 trillion. For medical practices, implementing ICD-10 is estimated to cost as low as \$56,000 to more than \$8 million. Cash flow disruptions will cause an additional burden, ranging from \$20,000 to as much as \$15 million (24-29). Added to that are the ongoing costs of HIPAA, which range from \$200 billion to an astronomical \$2 trillion. With this much money at stake, IT professionals and consultants are poised to make windfall profits at the expense of medical practices.

The IT and health care industry are not prepared for the transition to ICD-10 which is set to occur on October 15, 2015. The number of ICD-10 codes is mind-boggling. Substantial changes, perhaps even a complete overhaul, of many EHRs will be required. A survey of physicians reported that 67% were dissatisfied with their EHR's functionality, 45% believe patient care suffers, and 69% believe there has been no improvement in care coordination (30-32).

The PQRI is interlinked with EMRs in the world of IT, contributing to substantial cuts in physician reimbursement and dissatisfaction among physicians (5,33,34) and has been shown to be arcane and duplicative with an overwhelming number of practices and 76% of physicians saying they dislike the quality reporting programs and expect them to have a negative or significant negative effect on practice resources. In addition, those surveyed also stated that these programs negatively affect efficiency, morale, and staff time. The survey was conducted by Medical Group Management Association (MGMA) (35) representing more than 33,000 executives and administrators of medical practices. They surveyed more than 1,000 medical groups in October to assess how 3 quality reporting programs under Medicare Part B are affecting patient care and process. The physical quality reporting system was included in the survey along with value-based payment modifier and Meaningful Use EHR incentives which are supposed to in tandem improve the quality and cost of patient care.

The Office of the National Coordinator for Health Information Technology (ONC), the Federal Communications Commission (FCC), and the Food and Drug Administration (FDA) released a proposed strategy and framework for the regulation of health IT products (36-38). The proposed recommendations under the

provision of the FDA Safety and Innovation Act (FDASIA), signed into law in 2012, developed a regulatory strategy that promotes innovation while protecting patient safety. The proposed strategy is a risk-based approach, taking into consideration both the function of the health IT product and the risk to patient safety if the product fails to perform as intended. It would divide health IT products into 3 categories: those used for more administrative functions, such as billing software; those used for health management, such as clinical decision support software; and those used as medical devices, such as computer-aided detection software.

RISKS OF INFORMATION TECHNOLOGY

The risks of IT are real with security breaches that result in a lack of patient and provider confidence with reduced quality. Moreover, many providers believe that rather than decreasing, the current health care IT framework increases their workload (36-43). In fact, more than 30.6 million individuals have been affected by major health care data breaches since September 2009 according to information from federal regulators; however, security experts believe that the number of breaches may be significantly higher than reported and the breaches will shift, with business associates being implicated more often. Thus, to add to existing regulations, the Department of Health and Human Services (HHS) has released security assessment rules to help providers with HIPAA compliance (42,43).

The ACA accelerated the legislatively mandated growth of health care IT and its regulatory superstructure. The national health care law supports the formation of accountable care organizations which benefit from scale and hence mergers of physicians and hospitals. The law may also have introduced many new rules and restrictions that will reduce the degree of competition in the IT industry.

DISCUSSION/CONCLUSION

In the metamorphosis of medicine in the United States, IT that doesn't grow organically satisfying actual needs of providers and patients could be a killer whale for physicians. Prior and present experience indicates that IT has created a regulatory framework that has disadvantaged small practices given the associated cost.

Adding fuel to the fire, some have called for a follow-up round of reforms – subjecting hospitals to regulatory caps on prices, regulating spending limits and cost-effectiveness requirements, and heightening anti-

trust prosecution (44-46). The government regulations with IT and increasing costs of personnel which have become a major component of practices, will be leading to similar results as their failure of consolidation often leading to increased costs without clear benefit.

Thus, we believe it is time to put the brakes on the enforced growth of IT and hence IT spending in health care.

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