

Dot-Gov: Market Failure And The Creation Of A National Health Information Technology System

The market has failed to produce a viable health information technology system; we need government intervention instead.

by **J.D. Kleinke**

ABSTRACT: The U.S. health care marketplace's continuing failure to adopt information technology (IT) is the result of economic problems unique to health care, business strategy problems typical of fragmented industries, and technology standardization problems common to infrastructure development in free-market economies. Given the information intensity of medicine, the quality problems associated with inadequate IT, the magnitude of U.S. health spending, and the large federal share of that spending, this market failure requires aggressive governmental intervention. Federal policies to compel the creation of a national health IT system would reduce aggregate health care costs and improve quality, goals that cannot be attained in the health care marketplace.

JOE WILSON, A THIRTY-EIGHT-YEAR-OLD software engineer from Pittsburgh on his first trip to Las Vegas, is feeling out of sorts as he walks into the casino. The free drinks help his mood, and he discovers after his third that he has a serious gambling problem. At the casino's cage, where cash, credit card capacity, and creditworthiness are turned into chips, Joe liquidates the \$6,324 in his checking and savings accounts and another \$8,121 from his credit cards. Twenty hours and ten drinks later, this money runs out on the craps table, but Joe secures another \$24,983 in cash, which represents 40 percent of his retirement account and 30 percent of the equity in his home. The casino was able to find out this information about him—as well as his marital status, the names of his last three employers, the number of years he has lived at his current address and worked for his current employer, the lapsed status of an earlier life insurance policy and the paid status of another, and the absence of liens against his assets—in less than five min-

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utes, based on his name and Social Security number. In twelve more hours, Joe has burned through the last of his cash. Then the chest pain starts.

■ **Leaving Las Vegas.** Joe is rushed to a community hospital a few blocks from the casino. He is drunk, dizzy, and disoriented and cannot give the emergency room (ER) doctors any information about his medical history. But he is able to produce a tattered insurance card from his wallet, which includes his Social Security number, listed as his “Member ID.” The hospital’s admissions clerk spends twenty minutes on the phone to confirm that Joe is indeed covered by the health insurer in Pittsburgh and that she should collect up to \$500 from Joe for his visit; but the insurer’s “information specialist” cannot say exactly how much, because he cannot tell from “the computer” if Joe has met his deductible yet that year. He can tell the hospital nothing else about Joe—not his medical history, the names of his physicians, or any medications he might be on—because “the computer” has no other information about him. That information is “in the other computers.”

Joe’s condition worsens; the ER physician diagnoses a heart attack and prescribes intravenous metoprolol, a generic beta blocker. What she does not know is that until a month earlier, Joe had been taking 20 milligrams per day of Paxil (paroxetine) for depression. But a month before Joe’s trip to Vegas, his employer’s health plan had switched to a new pharmacy benefit management (PBM) company, which required Joe and his coworkers to fill their medications for chronic conditions via mail order. One of Joe’s doctor’s three medical assistants had faxed the doctor’s usual handwritten prescription for Paxil to the mail-order pharmacy. The mail-order pharmacist misread the prescription as “Plendil,” a calcium channel blocker often used for the same purposes as beta blockers and commonly dosed at 10 milligrams per day but occasionally at 20 milligrams for patients with congestive heart failure.¹ Joe had been dutifully taking the medication for the past few weeks, walking around with dangerously low blood pressure caused by high levels of the unneeded medicine. Joe’s depression had also been slowly, imperceptibly returning—hence his unusual appetite for alcohol, which lowered his low blood pressure even further, resulting in wooziness and cognition problems severe enough to render Joe vulnerable to the casino’s temptations.

In the ER, the metoprolol does the trick within minutes of entering Joe’s bloodstream: His blood pressure plummets, he goes into cardiac arrest, and he dies.

■ **HIT market failure.** The underlying cause of Joe’s death is health information technology (HIT) market failure. If the state of U.S. medical technology is one of our great national treasures, then the state of U.S. HIT is one of our great national disgraces. We spend \$1.6 trillion a year on health care—far more than we do on personal financial services—and yet we have a twenty-first-century financial informa-

tion infrastructure and a nineteenth-century health information infrastructure.² Given what is at stake, health care should be the most IT-enabled of all our industries, not one of the least. Nonetheless, the “technologies” used to collect, manage, and distribute most of our medical information remain the pen, paper, telephone, fax, and Post-It note. Meanwhile, thousands of small organizations chew around the edges of the problem, spending hundreds of millions of dollars per year on proprietary clinical IT products that barely work and do not talk to each other. Health care organizations do not relish the problem, most vilify it, many are spending vast sums on proprietary products that do not coalesce into a systemwide solution, and the investment community has poured nearly a half-trillion dollars into failed HIT ventures that once claimed to be that solution. Nonetheless, no single health care organization or HIT venture has attained anything close to the critical mass necessary to effect such a fix. This is the textbook definition of a market failure.

All but the most zealous free-market ideologues recognize that some markets simply do not work. Indeed, reasoned free-market champions often deconstruct specific market failures to elucidate normal market functioning.³ The most obvious examples of such failures (such as public transit and the arts) are subsidized by society at large because such subsidies yield benefits to the public that outweigh their costs. Economists refer to these net benefits as “positive externalities,” defined as effects that cannot be captured through the economic equation of direct cost and benefit.⁴ The positive externalities of an HIT system approaching the functionality of our consumer finance IT system include reduction of medical errors like the one that killed Joe Wilson; elimination of tens of thousands of redundant and expensive tests, procedures, and medications, many of which are not only wasteful but harmful; and the coordination and consistency of medical care in ways only promised by the theoretical version of managed care. These public health benefits are well beyond the reach of a health care system characterized by the complexities of medicine and conflicts of multiple parties working at economic cross-purposes.⁵ They are trapped outside the economic equation, positive externalities of a stubbornly fee-for-service health care system that inadvertently rewards inefficiency, redundancy, excessive treatment, and rework.

■ **Bipartisan agreement.** The U.S. health care marketplace’s continuing failure to adopt IT on a scale approaching that of other industries has been egregious enough to elicit the unthinkable: bipartisan political agreement. How else to explain the specter of Sen. Ted Kennedy (D-MA) and Newt Gingrich (former Republican Speaker of the House) sharing a public forum and agreeing not just on the problem but on the solution: federal funding of an interoperable HIT infrastructure. According to one press report, “The political partisans put their party differences aside to tout electronic prescriptions, online patient records and an integrated, paperless health-care system.”⁶

Such a rare convergence of opposing political belief may be less useful for underscoring the seriousness of the problem than for highlighting the utter absur-

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dity of it. In his 2005 State of the Union address, President George W. Bush reiterated his earlier call for the creation of a personalized and universally accessible health record for every American and called for a strong federal role in developing it.⁷ That an avowed champion of free markets and states’ rights would call for an expanded federal role—in a speech otherwise dominated by privatizing Social Security—illustrates how desperate we are for just such a solution to this intractable problem. Small wonder that observers left, right, and center agree that a fully wired health care system would be more efficient, more transparent, less dangerous, less maddening, and—after an enormous initial investment—far less costly in the aggregate than the tangle of antiquated mainframes, miserable PCs, unreadable handwriting, handwork, and guesswork that holds “the system” together today.⁸ In Gingrich’s succinct words, “Paper kills.”⁹

Against this gloomy backdrop, the purposes of this paper are (1) to illustrate how the failure of the health care IT market is rooted in economic problems unique to health care and business strategy problems typical of fragmented industries; (2) to show how this failure is exacerbated by U.S. reliance on the zigzag of market forces to generate technology standards for infrastructure development; and (3) to suggest ways in which the federal government can and should intervene, beyond its current strategy of trying to talk HIT vendors into voluntarily adopting technical standards and providers into voluntarily buying the industry’s products.

Health Care’s Blue Screen Of Death: Reboot Or Reform?

The compulsion today is to find the elusive “business case” for health care IT.¹⁰ Legions of IT vendors and consulting companies have struggled to cobble together “the ROI” (consultantspeak for “return on investment”) to prove that an individual health care organization would benefit by investing in better IT and that the failure to date has been merely a cultural problem on the demand side (“the doctors won’t use computers”) or a sales problem on the supply side (“it’s all vaporware”). These objections are hardly sufficient to stop a force as revolutionary as IT. The practical reality is that the typical ROI is modest at best, ephemeral for most, and attainable only well past its investment horizon—a dressed-up way of saying that it exceeds the political capital of its current CEO and CIO. If there were a strong business case for a health care organization to break from the pack and build out a twenty-first-century IT system, we would have no need for this paper—or, for that matter, this entire issue of *Health Affairs*. If the health care IT market worked, it would have worked by now.

The ability of the gambling industry to liquidate Joe Wilson’s assets within

minutes is an example of IT market success; the inability of the health care industry to catch a simple medical error during his half-day in the ER is an example of IT market failure. All parties involved in consumer financial transactions have an economic interest in seeing that those transactions work as smoothly as possible. Not so all parties involved in health care's myriad transactions.

■ **The business case for no HIT.** The first step in understanding the real intractability of the problem is ignoring the rhetoric. There is a veritable cottage industry involving the articulation of moral outrage over the health care quality "crisis," much of it public relations spadework for someone's political or commercial ambition and most of it culminating in a the naïve insistence that the system is on the verge of collapse and cannot go on like this. Actually, it can and will go on like this forever, absent any major intervention by the nation's largest health care purchaser—the U.S. government. Why? Because in the crude fee-for-service (FFS) reimbursement system inherited by that purchaser in the 1960s and fundamentally unchanged since then, the Las Vegas hospital has little real interest in knowing Joe's medical history. In most cases, access to such information would represent a reduction in billable services. In an industry rife with dirty little secrets, this is health care's dirtiest: Bad quality is good for business. And the surest road to bad quality is bad or no information. The various IT systems out there are expensive to buy, implement, and train staff to use, but this expense pales in comparison to all of the pricey and billable complications those systems would prevent.¹¹

Health insurers' interest. By contrast, Joe's health insurer back in Pittsburgh has a strong interest in conveying Joe's treatment information to whatever hospital he may end up in, to reduce its bill for Joe's admission. But is this rational business objective powerful enough to invest in an open, accessible information system that would, at the same time, allow Joe, his coworkers, their dependents, and every doctor, hospital, pharmacy, outpatient clinic, and lab in Pittsburgh to track every penny the insurer owes them? Of course not. The only information the insurer wants to transmit readily is what it does not owe and what Joe himself has to pony up as a copayment.

The principal goal of the consumer finance industry is to increase the number of transactions. By contrast, the principal goal of the health insurance industry is to slow down transactions or lose them altogether.¹² Anyone who believes otherwise is ignorant of the central metric by which a health insurer is judged by Wall Street: its "medical loss ratio." This accounting term describes the percentage of the insurer's premiums paid out in medical claims. The lower the medical loss ratio, the higher the insurer's profits and, in turn, its stock price. The conflict between this metric and the other business objectives of an insurer is the active fault line running beneath the entire health insurance industry. Insurers must simultaneously please their members and providers with better service (which implies more and faster claims payments) and their employer-customers with lower medical costs (which implies fewer and slower claims payments). Given which constituency

pays the bulk of the industry's premiums, is it any wonder which one wins? If this were not the case, then the industry would not have lobbied so uniformly and furiously against all of the thirty-day claims payment rules proposed by numerous states.¹³ And, if this were not the case, the large insurers would have gotten together in the 1980s, when the large banks did, and created a uniform and open transaction system that everyone could use, at every point of care in the United States. After the installation of such a system, every provider then—and everyone with an Internet connection today—would have simple and secure access to the health insurance equivalent of an ATM, through which we could track the status of all of our transactions in real time.

Providers' interest. Providers are no less conflicted. Nearly every U.S. hospital has an ATM in its lobby, enabling secure access to patients' financial information. Why doesn't the ER have the equivalent for at least some of their medical information? Because not knowing is good for business. FFS reimbursement still dominates our health care system, Rasputin-like, after more than two decades of attempts to kill it.¹⁴ Those excited about the promise of "pay-for-performance," the latest attempt to fix this problem, may wish to consult the dozen books and five hundred journal articles published in the mid-1990s about capitation. Under the past, current, and future FFS reimbursement system, Joe Wilson's tattered insurance card is a blank check for a hospital; the less the hospital knows about him, the more services it can render, the more it can bill his health insurer, and the more it will collect.

Lab-testing firms' interest. The diagnostic imaging and lab-testing businesses across the street from the hospital are equally motivated not only to do nothing bold or innovative with HIT, but to impede others' attempts to do something. Nearly half of the \$77.8 billion we would save per year by digitizing the entire U.S. health care system, according to a financial analysis by Jan Walker and colleagues, would be derived from a major reduction in lab costs, most of it by eliminating redundant tests.¹⁵ Is it any wonder that the three dominant U.S. lab companies have not rushed to embrace such a system? Many would like to blame it on technology, arguing that we do not have uniform standards for lab tests. This would be news to Clement McDonald and his colleagues at the Regenstrief Institute who created Logical Observations, Identifiers, Names, and Codes (LOINC), a uniform system for classifying lab tests and reporting on their values, back in 1994.¹⁶ Why have the three lab companies not installed this system to improve the transactions of those who order their tests and receive their results? It surely would have reduced their administrative costs the same way automated claims payment systems would reduce health insurers' administrative costs. The labs have not installed these systems because, like the insurers, these administrative savings are a pittance compared with the economic benefits of inefficiency; in the case of lab testing, that inefficiency rings up \$31.8 billion in annual sales.¹⁷ As Walker and colleagues point out with agonizing understatement, "those who depend in subtle ways on redun-

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dancy and excess could find such change costly.”¹⁸ This is health care’s second-dirtiest little secret: One organization’s unnecessary medical product or service is another’s revenue stream.

Physicians’ adoption of HIT. The list of economic impediments to HIT adoption is as long (and grim) as the list of impediments to health care system reform. A steady stream of researchers marvels at the low penetration of electronic medical record (EMR) systems in physicians’ offices, when the greater marvel is that any physician, at his or her own personal expense, would install a system that (1) costs upward of \$24,000 per physician in the short run, (2) promises to reduce billable services in the long run, and (3) saves money for every health care stakeholder except the adopting physician.¹⁹ Add interoperability to the list of features of the EMR, and each of these three economic effects is magnified. Even the most mundane and interoperable HIT stumbles on the simplest economic obstacle: Physicians have a dozen reasons for not exchanging at least some e-mail with established patients, but the reduction in billable office visits—the most obvious—rarely makes the list. Given these many economic obstacles, it is noteworthy not that so few practices voluntarily computerize their clinical activities but that so many actually do.

The insurer WellPoint experimented with this problem by controlling the direct cost, offering 25,000 of its high-volume physicians an e-prescribing device free of charge. The popular press did its usual glass-half-empty health care reporting: An Associated Press reporter noted that one-quarter of physicians did not accept the systems, rather than the more quantitatively relevant fact that three-quarters did.²⁰ The bold, unprecedented WellPoint program is an object lesson for the federal government, showing how removal of the direct cost hurdle can have a major impact on physicians’ adoption rates and how a critical mass payer can, when motivated, break up the HIT market failure with a directed subsidy.

PBMs’ and pharmacies’ interests. Beyond the physician’s office, examples of the power of economics to obviate HIT adoption pervade the system. The large chain pharmacies could just as easily redirect maintenance prescriptions to their own mail-order operations, but how then would they sell patients birthday cards, candy bars, and shampoo? The PBM companies cutting into the market shares of those chain pharmacies make their money by switching patients not to the lowest-price drugs available but to the drugs for which those PBMs get the best deals from drug companies.²¹ Why would a PBM want to publish any of its actual prices on its Web site? This is health care’s third-dirtiest little secret: Paper may kill, but obfuscation pays—and not just for PBMs, but for hospitals, nursing homes, and health insurers, all of which publicly claim to want to disclose data on

their outcomes and yet fight every third-party effort to do so.²² Similarly, it was only under the threat of reimportation that the drug companies became willing, reluctantly, to publish drug prices, which they began to do in 2004. Their stock prices have yet to recover for this and numerous other reasons, most of which relate directly to pricing transparency, delivered via the Internet.

■ **Exceptions to the rule.** All of these health system actors are allowed to indulge in this economically self-serving behavior because, aside from two exceptions noted momentarily, there is no unifying economic stakeholder in the health status of any individual American. The persistence of job-based insurance—combined with the constant movement of the insured person across jobs, insurance plans, and care settings—galvanizes the fragmentation, economic conflict, and persistence of FFS reimbursement. Lack of information, gross inefficiency, and shoddy quality generate more money for providers, and health insurers who should be motivated to do something about this are captive to conflicting business agendas that compel them to block access to information, slow down transactions, and hold onto money in the short run, even at the expense of persistently gross inefficiency and shoddy quality over the long run. Viewed through this lens of “realeconomik,” it is easy to see that health care’s IT problems are not IT problems at all; they are health care system problems.

There are two glaring exceptions to this rule. Kaiser Permanente Health Plan and the Veterans Health Administration (VHA) have enterprisewide EMRs that are the envy of the rest of the health care system, and for reasons that are not coincidental.²³ Although one organization is a commercial health plan and the other a government health plan, both are vertically integrated systems—that is, each is responsible for both the financing and delivery of medical care to its members. Even more unlike the rest of the FFS health care system, Kaiser and the VHA have business models that control three key variables: (1) They own their own hospitals; (2) they employ and thus control the workflow of their physicians; and (3) their members do not jump in and out of the plans at will. All three features are central to the “business case” for their expensive, useful, and robust clinical HIT systems.

Because the exception proves the rule, it is important to point out that Kaiser and the VHA are anathema to what is most sacrosanct within the U.S. health care system: consumer choice. By contrast to the choice-based system, they are de facto single-payer systems. Members go to hospitals owned by the payer and are treated by physicians employed by the payer. Friction is minimized, data are captured and shared across the system, the business case for HIT emerges, and HIT development flourishes. Numerous single-payer systems overseas are digitizing in ways that we can only fantasize about in the United States, for exactly the same reasons.²⁴ If Joe Wilson were a veteran instead of a commercially insured American, he would have been rushed to the VA hospital in Las Vegas; as a result, his ER physician would have had access to all of his prescriptions, avoided compounding one medication error with another, and not accidentally killed him.

Health Care's 'Prisoners' Dilemma'

Joe Wilson's health insurer back in Pittsburgh might have a clear financial interest in a system that would allow it to feed various streams of Joe's clinical information to the Las Vegas hospital, to improve the quality and reduce the cost of his medical care. But doing so would be massively expensive for the insurer, not just in direct and indirect costs, but in incalculable strategic costs. If the company invested millions to create the open infrastructure required to connect its hospital, physician, pharmacy, and lab claims information systems to every hospital in Pittsburgh—let alone to every hospital in the United States—all of the other health insurers in Pittsburgh could connect to the same network for a fraction of the cost. While Joe's insurer did the heavy lifting, its competitors would bear none of the massive up-front costs and could price their health plans well below the cost of Joe's, for all of the years that his insurer was investing in that system.

If health care's IT problems are a reflection of its broader economic problems, then the strategic conflicts within the health insurance and hospital industries themselves—the two most obvious beachheads for HIT development—are sufficient explanation for why we have no interoperable health care infrastructure. Notwithstanding the happy talk of their advertising, health insurers aim to attract and lock in healthy people and drive away sick ones. The less masqueraded goal of the hospital is to attract and lock in sick people and market to those who are not sick yet. Having an interoperable HIT system that allows patients to shop around, with their fully portable EMRs, for a higher-quality or lower-cost health insurer or hospital works directly against these goals.

For insurers in particular, this strategic conundrum over HIT is a redux of the broader managed care conundrum about prevention, which is essentially the prisoners' dilemma at the heart of game theory. The prisoners' dilemma always results in an unfortunate ending: All actors in the game would be rewarded if they cooperated and did the right thing by each other. But none will do the right thing without assurance that the other players will all follow, and so they each do exactly the wrong thing, limiting their own downside and thus creating a suboptimal outcome for all.²⁵ The best way for a health insurer to use HIT to cope with the prisoners' dilemma is to design a proprietary system that makes it easy for healthy members to sign up; difficult for sick members who need good information to find it and thus remain satisfied with their plan; and even more difficult for everyone outside the insurer's own organization (that is, everyone looking to get paid) to navigate it. The worst way to cope with the prisoners' dilemma is to provide an open, interoperable system that works equally well for all members and can exchange data with all other health insurers.

■ **First-mover disadvantage.** Given the strategic pressures on Joe Wilson's insurer, it would be easy to blame his death and every other casualty of health care's stunted IT infrastructure on health care itself. But it would not be entirely accurate or fair. A broader version of game theory bearing on the health care industry—when

applied to something as formidable as the development of IT standards and interoperable data exchange systems—confronts all industries that are unable to achieve technical standardization. This impediment is steeped in problems of competitive strategy for all industries and can be summed up in what Michael Porter first identified as “first-mover disadvantage.”²⁶ This concept explains why Joe’s insurer would not want to build an information system connecting its numerous data systems with the nation’s hospitals. Why would one insurer go to all of the financial and strategic cost of creating a ubiquitous information system that would benefit its competitors? For exactly the same reason that IBM created the Internet. Indeed, IBM did not create the Internet—the federal government did—but IBM and all of its competitors have made a fortune creating things that run on, over, off, and because of the Internet. But suppose for a moment that Joe’s insurer were foolish enough to violate this strategic principle and initiate at its own expense an HIT system that allowed it to exchange data with all of its contracting hospitals, physicians, labs, and pharmacies. First, would it be able to get those providers to go to the expense of connecting with the system? (Or would it have to subsidize them, the way WellPoint had to subsidize physicians to get them to use its e-prescribing system?) Second, would it be able to get those same providers to retool their workflows around the new system? Finally, would it build that system based on open standards that would allow its competitors to exchange the same kind of data with those same providers? The health insurer might be able to answer “yes” to the first two questions, but only if it were willing to answer “yes” to the third, thus burning its own capital and internal resources on behalf of its competitors. And so no one, save the occasional e-pioneering physician like Charles Kilo, writing in this volume of *Health Affairs*, is the first to install.²⁷

■ **The size factor.** If size mattered and an organization could fix this problem through brute force, no one organization in health care has size enough. WellPoint comes close, especially after it finishes combining with Anthem, but it still does not command a dominant share of any major health insurance market, hence the limitation of its e-prescribing experiment to only 25,000 physicians nationwide. Even if Joe’s health insurer were the largest in Pittsburgh—large enough to force providers to adopt HIT in ways that offset the costs of first-mover disadvantage—it would not be large enough to dictate IT standards to the rest of the market. (And if it were, it would be too busy dealing with folks from the Justice Department to do anything else.) This problem has haunted all new technology industries in their infancy, as multiple players emerge and seek to coalesce around a technical standard. And the health insurance industry—because it is licensed and regulated at the state level—consists of hundreds of different players. Even the largest commercial plans like Anthem/WellPoint and Aetna do not control a sufficient share of the business of a large enough base of physicians across the country to demand that they adopt and use one IT system or another. Once again, only Kaiser has this advantage, one symbolized by and embodied in its development of an EMR system unmatched in the industry.²⁸

■ **Global comparisons.** This problem is hardly unique to health care. It explains why numerous other U.S. IT-related industries limp along behind their counterparts in more highly regulated economies. While U.S. wireless telephone carriers fought for more than a decade over which of two protocols to adopt, leaving all of us to “roam” (when we could) across carriers, countries throughout the rest of the world had the luxury of saying: Use this one, and get on with it. The same goes for broadband access, which is why the United States ranks sixteenth in the world for percentage of citizens with broadband access and why that access moves data at only 60 percent of the rate of the broadband installed in the rest of the industrialized world.²⁹ Most Americans would probably never admit this, especially because most probably are not aware of what they do not have, but U.S. technology markets are years behind those in Asia and several European countries, thanks to our reliance on messy markets to grind their way toward standardized technology platform design rather than rational, orderly design.

Rational, orderly design of a new HIT infrastructure is precisely what Walker and colleagues described and scored financially.³⁰ Not coincidentally, it is the same strategy that David Brailer and Mark McClellan are attempting to inspire within the fractious health care IT vendor community, with more words than dollars, from their bully pulpits in Washington.³¹ Our recurrent struggles with these problems illustrate why they and dozens of others have converged on a single idea: The market has failed to coalesce around health care IT standards on its own. The time has come for rational, orderly design, one that will allow us to get on with the real work of improving the health care system with an IT infrastructure that other industries take for granted. This is hardly an argument for the virtues of command-and-control economies or industrial planning. Rather, it is an elucidation of the hidden costs—or “negative externalities”—of relying on markets for IT standardization.

Railroads, Water, And Moonrocks

As Americans, we have been here before—three times to be exact. By the end of the Civil War, we recognized that railroads were the nervous system of the emerging industrial economy, the same way we recognize today that IT is the nervous system of the postindustrial economy. Railroads ran up and down both coasts and out to the frontier, but none crossed the great empty middle. We fixed that problem through a publicly funded and privately built construction project unprecedented in the history of the world. Fifty years later we recognized that the great empty middle of the country crossed by the new railroad was for the most part uninhabitable without gathering and redirecting its limited supply of water. We also recognized that despite the next industrial revolution that was rationalizing agriculture and freeing up the majority of Americans from subsistence farming where water was readily available, the western United States could make no such progress without first controlling its water supply. Finally, in 1957 we watched the So-

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viet Union, our military and ideological rival, launch the first satellite into orbit. We saw in this a threat not just to our national security but to our national pride, to our belief (then and now) that democracy, capitalism, and political freedom were the hallmarks of civilization and led, inevitably, to greater technical ingenuity. When Sputnik pierced Earth’s atmosphere, it also pierced the national smugness of 1950s America.

In all three cases Americans solved the problem, and in all three cases we did so not by waiting for the invisible hand of a market that would never appear but by working centrally through a federal government with the resources to get the job done. The details of how this worked—how the government planned, financed, and contracted with private firms to achieve these three goals—provide a template for how we could find our way around the intractable HIT infrastructure problems laid bare in this paper. In the three historical cases, no one commercial actor or any consortium of commercial actors was large or well-financed enough to achieve society’s goals through sheer capitalist effort. In all three cases, society rather than shareholders enjoyed enormous benefits (positive externalities) of what private enterprise simply could not finance and build.

So too with the building of a national, ubiquitous, interoperable HIT system. The federal government can and should write the huge check and be done with it. Even with the inevitable graft and corruption that would ensue, this massive public investment would pay for itself many times over. Walker and colleagues have shown that the direct cost of building a national HIT system is \$276 billion (in today’s dollars) over ten years but that the investment would generate direct savings of \$613 billion during those same years and \$94 billion per year thereafter.³² These savings do not include any of the ancillary benefits, such as massive reductions in endless administrative rework or the vast savings gained through better management of chronic disease.³³ As Walker and colleagues point out, “The clinical payoff in improved patient safety and quality of care could dwarf the financial benefits projected from our model.”³⁴

What they do not point out is that we are already burning that money today, a few dollars at a time, with every unnecessary medical test, procedure, and drug that an interoperable system would preclude. These costs are bundled into all of our provider payments and then again into all of our health insurance premiums. This is why government, as the largest health care payer and insurer of last resort, should fund the solution itself, the same way it funded the many great public works projects that came to define the United States at its finest moments.

From Realpolitik To Real Solutions

Back in the real world, the suggestion that the federal government fix this intractable problem by writing a check for a quarter of a trillion dollars is pure political fantasy. It makes economic and technical sense, and it is not without political precedent; however, no one in today's Washington with the political power to say so would keep that power after saying so. The very idea of a public works project (at least within our own borders) sounds like an artifact from an era eclipsed by nearly three decades of hostility toward government-based solutions to domestic problems, combined with a seemingly religious belief in marketplace solutions for all of them.

As this paper makes unambiguously clear, the marketplace will not solve the HIT problem. If so, it would have solved it under the watchful eye of "managed care" or as part of the Y2K conversion or during the most recent Health Insurance Portability and Accountability Act (HIPAA) compliance scramble. There is indeed a collective business case for a national HIT system, but it is one well beyond the reach of the health care marketplace. The federal government may be unable to finance and build that system for political reasons, but it can do far more than trying to jawbone the private sector into building it on its own.

If health care's chronic IT failure is steeped in economic reality, then the solution should be as well. The obvious entry point is reimbursement. The federal government, directly or indirectly, purchases half of U.S. health care.³⁵ Within weeks of the advent of the Medicare drug benefit, that proportion will pass the 50 percent mark. The government has the ability to catalyze the creation and deployment of an HIT infrastructure by wedding that infrastructure to all of its reimbursement policies, as follows.

■ **Mandatory conversion of all government-payer transactions to systems based on new clinical data standards.** The federal government should continue to prod the private sector to come up with standards for interoperable clinical data sets; once those standards are set, it should require payers to process all transactions for Medicare, Medicaid, the Department of Defense, and the Federal Employees Health Benefits Program (FEHBP), using an IT system built from those same standards. This will require converting all of today's administrative processes into processes driven by standard, interoperable clinical data sets. Everything from beneficiary look-up, to authorizations for treatment, to claims submitted for payment should be generated from data formats and classification systems consistent with the new standards. Much of the health care informatics industry is built upon the imputation of clinical information from administrative claims data.³⁶ The proposed idea would simply involve a reverse engineering of the same process. Because this conversion would be required of all government payers, the game theory problem described earlier would go away. The conversion process would be expensive, but that expense would be the same for all payers—all of which could also apply the new systems to their nongovernment business, the way those same payers leverage

and amortize their administrative systems costs today. If the investment community knew that all government payers—and all providers exchanging revenue-critical data with those payers—would soon be required to install a new IT system based on the new standard, capital would flood the vendor community; the vendors' research and development (R&D), fixed, and selling costs would plummet; and the HIT market would finally attain critical mass.

■ **Parallel mandatory conversion of providers' transactions with government payers to systems based on new clinical data standards.** On the other side of the reimbursement table, the federal government should require that all providers adopt the same IT system to receive payment for all claims submitted for governmental reimbursement. Although initially expensive, this conversion would result in a massive reduction in the type and volume of paperwork required of providers in their interactions with government payers. For providers uninterested in these other benefits, unwilling to computerize their clinical activities, and wishing only to comply with the new reimbursement processes integrated into the new standardized IT system, the vendor community would no doubt create a "reimbursement-only" version of the system, which the provider's traditional office staff could use. For the remainder of the patient's medical record, the provider would still be free to scrawl information into a chart or mumble it into a tape recorder, inadvertently helping to kill as many patients as they do today—although it is unlikely that that provider would be as popular with his or her patients going forward.

■ **Safe harbor for hospitals' purchases of the new system for physicians.** Legislation compelling the adoption of the new systems should include clear, categorical relief from the anti-kickback and anti-self-referral laws that have historically blocked the widespread adoption of IT systems designed to allow physicians and hospitals to exchange clinical data. Laws passed years ago to prevent the unnecessary admission of patients into conspiring facilities by a small minority of unscrupulous physicians have since kept all hospitals from building electronic bridges to any physicians who might admit patients into their facilities. Numerous observers, including the federal government itself, have remarked that these laws inadvertently shut down what could be one of the most efficient avenues for computerizing health care.³⁷ As the WellPoint experiment indicates, most physicians want to computerize; they simply do not have the capital to pay for the systems and the one-time workflow disruptions. Hospitals have the capital, IT know-how, and administrative cost rationale to connect their referring physicians. Because the system would be based on open clinical standards, the fear that this provision would drive steerage to the hospital would be neutralized.

Such legislative relief would be helpful but would hardly quell the hysteria of the provider and payer lobbies, which, when confronted by this proposal, would scream on cue, "Unfunded mandate!" The short answer to this objection is "yes." The long answer, and one that will require considerable political courage, is this: A mandate is a mandate for all, and payers and providers will pass the initial cost of

the new system along in the form of higher charges and utilization rates for all of us, the same way they pass along the unfunded mandate of caring for the uninsured in the ER. This unfunded mandate, however, represents health system progress, a collective investment in a better health care system, rather than a grinding away at the safety net of the current one. New equilibrium prices would be established, the installation costs would eventually be recouped as the efficiencies accrue to the providers, and the new systems would take root. We can, quite often, count on the marketplace to work just fine.

These ideas will no doubt meet with fierce resistance not only from the obvious lobbies, but from health care's outsized Greek chorus of professional naysayers and nitpickers. The absurdity of the industry debate that will accompany this (or any) federal IT proposal has already been presaged in the editorial pages of *Modern Healthcare* in its criticism of the nascent, benign, and as yet barely funded activities of Brailer's Office of National Coordinator of Health Information Technology (ONCHIT). The trade journal's managing editor, Todd Sloane, muses that the federal call for an interoperable health care system is a way of enabling, electronically, President Bush's agenda to decouple health insurance from employment status, enabling portable insurance and health savings accounts.³⁸ In the same pages, Regina Herzlinger excoriates the movement as a left-wing conspiracy that will inevitably usher in a single-payer system.³⁹ The symmetry of these paranoid political observations is probably the best indication that it is a good idea.

Knee-jerk criticism from health care's usual tear-down artists notwithstanding, the time to fix this problem is now. The market has failed, and the only other option is policy-based and one supported by real political muscle. President Bush has included an HIT system on his national agenda and maintained both Brailer and McClellan in their pre-election positions, with the obvious goal of getting this job done. Both have bipartisan support because they are committed to the primacy of public health over political philosophy, to a belief in the power of better information and better IT to fix what ails health care. And there is a third important actor on the political stage. William Frist (R-TN), the current Senate majority leader and a physician from what can safely be called a health care family dynasty, is often mentioned as a Republican front-runner for the White House. For the kind of health care system that Frist envisions, we need look no further than his essay, "Health Care in the Twenty-first Century." While he marvels predictably at the impact of genomics and breakthrough medical technologies, Frist also describes similar miracles of HIT, including a hospital that "transmits the computerized information about [the patient's] treatment, seamlessly and paperlessly, to [his] insurer for billing and payment."⁴⁰ A good first step toward getting there is serious consideration of the proposals introduced in this paper.

BEYOND THEIR SHARED BELIEF in the power of IT to transform health care, what unites Brailer, McClellan, and Frist is the fact that all three started out not as policy wonks or politicians, but as doctors. All three can tell their own stories about patients like Joe Wilson, who die unnecessarily every year not because of human error, but because of system error. Indeed, Joe Wilson's preventable death is not the fault of any individual actor or institution, but of an entire system in which those individuals are merely seeking to survive and thrive. This glib abdication should give us no comfort. Rather, it can just as easily be said that these deaths are the fault of all of us.

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NOTES

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