Chapter Eight

Reviving the American Healthcare System

"Our physical and mental health is perhaps the nation's greatest asset. It behooves each community, therefore, to consider what plan will most effectively promote the health of its citizens."[1]

- Ray Wilber, Chairman, Committee on the Cost of Medicare Care, 1932

Americans spend far more on health care than anyone else in the world. Yet there is unacceptable variation in the quality of care and millions of Americans face financial catastrophe should illness strike. The number of uninsured is steadily rising. If the healthcare system were a patient, we might say it was in critical condition.

This is not for want of remedies. Ever since the report of the Committee on the Cost of Medical Care, ideas for improving access while lowering cost and raising quality have emanated from the private and public sectors. Every candidate in the ongoing Presidential election has offered their prescriptions. We do not need any more proposals for healing our health care system. There are more than enough to go around. What we need are ways to assure that the proposals already on the table have a better chance of succeeding.

Looking back at a century of health reform, it is easy to identify some common barriers to success:

· *Inadequate information.*

· *Inappropriate incentives.*

· *Too many opportunities to prosper by paying games instead of creating value*

· *Unrealistic expectations about the cost of care*

In this chapter, I offer some ideas about how to lower these barriers.

Laying the Foundation for Reform through Electronic Medical Records

We are a half century into the computer age, though you might never know it if you were to look at the state of health information technology. Many providers still rely on paper records. Those who have shifted to computerized records often have separate files for clinical and billing data. There is no technology standard for clinical systems, so providers cannot easily share information. The result is that too many people are making too many important medical decisions in a virtual information vacuum. It is a sorry state of affairs. It is also business as usual for the U.S. healthcare system.

As far back as 1974, the federal government passed legislation aiming to standardize administrative claims and medical records data. (This was part of the National Health Planning and Resources Development Act .) Improving data has remained a major public policy goal ever since, though the emphasis has shifted from standardized paper forms to standardized, integrated electronic medical records (EMRs). The original impetus for standardizing medical records was to minimize administrative costs by standardizing claims forms. We have largely accomplished this and today's providers face fewer billing headaches than at any time in recent memory. We need to do more. Our data systems must incorporate clinical information and outcomes and they must be fully integrated across all providers. There must be common demographic, financial, and medical data fields. There should be uniform coding of all variables. And computerized systems must be compatible – provider and payer must be able to "talk" to one another.

Standardized, integrated EMRs will breathe new life into older strategies for cost containment and quality improvement, including global capitation, physician hospital organizations, integrated delivery systems, and disease management. EMRs are essential to ongoing initiatives, including consumer directed health plans, report cards, pay for performance, and the use of cost-effectiveness criteria for evaluating new technology. EMRs will facilitate the kind of risk adjustment of insurance premiums that Enthoven envisioned for his CCHP. Risk adjustment would also encourage insurers to participate in risk pools and brokerage arrangements such as the Massachusetts Connector.[2] If we do nothing else to improve our health care system, we must standardize and broadly implement EMRs.

Obstacles to EMRs

To date, fewer than half of all hospitals and 20 percent of physicians have adopted an EMR system. Nursing homes, home care agencies, dentists, and other providers are even further behind. Those who have adopted EMRs are frustrated by the lack of a technology standard. There are many vendors hawking their EMR systems, and each one has different data fields and variable names. Even if a doctor and a hospital both have an EMR, the chances are that they cannot exchange electronic information.

These problems stem from simple economics. Some providers refuse to adopt EMRs because vendors have failed to make a compelling business case for it. For a typical physician, adoption costs can exceed $40,000, with annual maintenance costs of $8000.[3] Proponents claim that doctors can recover this investment through improvements in billing (i.e., increasing coding levels to maximize reimbursements) and

better management of accounts receivable. Their claim must not be very convincing, or doctors would be adopting EMRs at a much higher rate.

EMR proponents also point to tremendous potential cost savings; one study suggests that the savings from reducing unnecessary lab tests alone would exceed $30 billion annually.[4] Health IT expert J.D. Kleinke suggests that such savings represent a *losing* proposition for many providers.[5] He observes that any cost savings to society represents lost revenues to providers and wonders why providers would purchase a system that would drive down their revenues. Kleinke is probably correct in the short run. But if providers do adopt standardized EMRs, it will be easier for payers to implement payment systems that reward efficiency. When this happens, provider and consumer interests in reducing health care spending will be aligned and the overall benefits of EMR will more than offset the cost. But this is a chicken or egg problem – we will not see these long run benefits of EMRs if providers have no short run incentives to adopt them.

Even if vendors could make a business case for EMRs, providers may remain on the fence because of concerns about system compatibility. A few heavy hitting technology companies, including GE and Oracle, are beta-testing interoperability software that will enable partial integration of previously incompatible systems. This may coax some providers off the fence, but many others will undoubtedly wait for a unified standard.

I am not quick to recommend massive government intervention in the healthcare system, but chicken-or-egg problems and an absence of standards are two clues that the market, left to its own devices, may never give us EMRs. A closer look at the economics

of standards suggests that a little push from the government may be all it takes to resolve this problem.

The Economics of Standards

Standards can emerge organically, such as when the VHS videocassette recorder gradually overwhelmed Beta or when Microsoft's MS-DOS format beat Apple for supremacy among personal computer users. Both home video and personal computing were naturals for standardization because they display "network externalities." This means that the benefits to any one user of a given format depend on how many others use that format. Once a particular format reaches a "tipping point" in terms of market share, the entire market moves in that direction and the format becomes the industry standard. Much time and money can be wasted waiting for the tipping point, however, and some technologies display such weak network effects that standardization may never happen. This seems to be the case for EMR. Patients may gain a lot from standardization, but providers get very little. Thus, there is little meaningful network externality effect and the market has no momentum to standardize.

To avoid inefficient and time consuming standards battles, industries often create standard-setting consortia that agree to a common format. The DVD consortium did this in the mid-1990s and the result was the fastest growing consumer electronics innovation in history. Standardization sometimes requires a push from the government. This is what happened with the creation of the high definition television standard. Fortunately, the federal government is now pushing for standardizing EMR.

There is bipartisan agreement in Congress for the need to standardize EMR and President Bush has made this a national goal to achieve by 2014. Tremendous progress is already underway. The Healthcare Information Technology Standards Panel (HITSP), a consortium of over 200 IT vendors, healthcare providers and payers, and public sector agencies, was formed in late 2005 under the auspices of the American National Standards Institute and chaired by Dr. John Halamka, the Chief Information Officer of the Harvard Medical School. HITSP is developing a set of standards to "enable and support widespread interoperability among healthcare software applications."[6] In January 2007, U.S. Department of Health and Human Services Secretary Michael Leavitt accepted 30 consensus standards proposed by the HITSP. These standards will ensure compatibility across providers' office systems and among providers' systems, laboratory systems and patient-centered systems such as those fostered by CDHPs. According to Halamka, the standards will "empower consumers to be stewards of their own health information."[7]

By January 2008, all new and upgraded federal health information systems will have to comply with these standards. The federal government should go further and require providers to adopt EMRs that use the same standard; a threat to withhold Medicare payments would be sufficient to make this a reality. I expect that the private sector would soon follow suit, as private payers often take their cue from Medicare.[8] Most hospitals already have or are considering adopting EMR and will only weakly oppose such a requirement. Physicians may require a bit of convincing.

It will cost a solo practitioner somewhere around $12,000-$15,000 annually (including amortized upfront costs) to move to EMR. This is a big expense, even for a physician. If we are to get physicians on board with EMR, then the path of least

resistance would be to subsidize adoption, perhaps by adding an EMR "factor" to the RBRVS. That is to say, all physician fees would increase by some nominal amount (likely less than 1 percent) to cover the cost.

This approach would meet with some opposition, however, because the EMR factor that is profit neutral for the average physician would not be sufficient to cover the costs for solo practitioners and small groups. Even so, I see no economic justification for giving solo practitioners a bigger subsidy. Solo practice is non-economical; EMR is just one more diseconomy of scale. If patients want the personal touch and doctors want the luxury of solo practice, then they should bear the cost. Given the importance of gaining speedy acceptance of EMR, it still might be necessary to grease the skids. An extra $10-$20 billion spread out over 2 to 3 years should be enough to pay for half the cost of putting EMR in every doctor's office, no matter what the size of the practice. This would represent less than 0.5 percent of total healthcare spending. The payback for society, in terms of the ability to implement meaningful healthcare reform, would be palpable.

Improving Data Collection

A big problem with administrative claims data is that it does not include sufficient risk adjusters or outcomes. This will be remedied once we have integrated EMRs. In the meantime, we can use the present claims system to gather additional clinical data. New York State requires hospitals to report a small number of risk adjusters for heart patients, in addition to traditional claims information. The result is the best report card in the nation. Medicare should do the same, requesting diagnosis-specific risk adjusters for

every inpatient and outpatient. Medicare should also request more detailed outcomes data, such as the social and functioning status data that I describe below.

Confidentiality

Electronic health data systems contain confidential patient diagnostic information. Computer hackers could access this information, with dire results. Individuals with chronic conditions might find it difficult to obtain insurance or employment. Many people could be subject to embarrassment, derision or worse. Opponents of implementing standardized EMRs conjure up scenarios like this one. But this describes the *current* state of affairs. Medicare administrative claims data is stored electronically and contains enough diagnostic information to allow anyone to wreak havoc with the lives of beneficiaries. The same is true for private insurance administrative claims. Fortunately, the guardians of this data have been on their toes there appear to have been no widespread instances of abuse. EMR will not make things worse. Centralized safeguards, including coding to mask individual identities, could make this information even more difficult to steal. Concerns about confidentiality are a red herring; if we really are that concerned, we should do away with administrative claims data, Medicare records, you name it. The cat is already out of the bag. Let's get the best cat we can.

Recapitulation

It is little exaggeration to say that every other major ongoing healthcare initiative depends on the success of EMR. EMRs must be our top priority. But there is a lot more we can do to revive our health care system.

Make CDHPs Work

There are only a handful of ways to counter the excesses of Marcus Welby era incentives. The government can put a lid on prices and limit access to technology. Done halfheartedly, as has been the case with rate setting and CON, this has little impact. Done all out, as is the case in Canada and elsewhere, costs can be kept under control, though queuing for care is an inevitable byproduct. In any event, a full-blown government takeover of the U.S. health care system seems no more likely to win Congressional approval today than any time in our past, potential claims of "this time is different" notwithstanding. Private insurers have their own options for cutting costs. They can salary or capitate providers, "reversing" the economics as Kaiser once put it. But this solution has succumbed to the HMO backlash.

If we shift the focus of cost containment away from payers and providers, then we must turn our attention to patients. This is CDHP is supposed to be about. Amidst all the hoopla, the economic reality is that the financial incentives in today's CDHP plans are inadequate. CDHP deductibles are too low and 100 percent last-dollar coverage kicks in too soon. As a result, CDHPs will have little impact on any patient who is hospitalized or anyone with a chronic illness.

The solution is simple: Change the financial incentives. Instead of a 100 percent deductible of $5000, try a 25 percent copayment up to a ceiling of $20,000.[9] Patients would face the same maximum expenditure of $5000, thereby securing the same degree of financial security. But with this redesigned CDHP, almost all enrollees, even those with chronic illnesses or requiring hospitalization, will have an incentive to shop around for providers offering the best value. Shopping around is what makes markets work,

because it forces providers to become more efficient.[10] Even patients who do not shop around will get the benefits from efficient providers.

A bit of experimentation could further strengthen CDHPs. If possible, copayments should be calibrated to make patients sensitive to the marginal expense of additional health care. For example, a diabetic who is sure to spend at least $15,000 annually should get the first $15,000 free and then face cost-sharing provisions up to $40,000. The current rules enabling tax deductibility of HSAs limit the ability of plans to experiment with copayments. It is time to relax the rules.

Simplify the financial instruments

One goal of CDHPs is to make it easier for patients to be good health care consumers. But HSAs add a new layer of complexity to health care financing. Some enrollees are having difficulty getting payments from their HSAs to providers who are unaccustomed to this new financial instrument. I suspect that this problem will quickly sort itself out. But there is a second problem that may only get worse over time, as HSAs grow into valuable retirement investment vehicles. Banks and brokerage houses are eager to get into the business of managing HSAs. As the business of managing HSAs grows alongside the business of managing individual retirement accounts, so too will the requisite administrative burdens and account management fees.

There is a simple solution. Congress should do away with HSAs and instead change the rules regarding IRAs. Employers should be permitted to contribute up to an extra $5000 annually into their employee's tax deferred retirement accounts. Individuals may use their retirement accounts for uncovered medical expenses without penalty, up to

an annual limit of $5000. CDHPs can keep the same copayments and ceilings or experiment as I described above. This approach keeps all of the financial features of CDHPs and HSAs without creating yet another retirement account. The only caveat is that, like CHDPs, wealthier taxpayers would be the biggest winners because they have the highest tax rates. If possible, we should couple this proposal with another change that will balance out the tax impact.

Level the Insurance Market Playing Field

HSAs are a "if you can't beat them, join them" approach to leveling the tax playing field. There are three problems with this approach. First, it does nothing to level the playing field for HMOs, for which big deductibles make little sense. Second, it continues to make health insurance artificially less expensive than all other goods and services, distorting purchases towards health care and away from everything else. Third, it has the largest distortionary effect for the wealthiest taxpayers who face the highest marginal income tax rates.

There is a "beat em" solution: eliminate tax deductibility for all health insurance. This would level the playing field while eliminating one of the most regressive elements of the tax code. Of course, eliminating a $200 billion tax break for the middle class and wealthy is a political nonstarter. In addition, research on insurance take up suggests that if we take away the tax benefits, more workers may choose to go without insurance.

Thirty years ago, Alain Enthoven proposed capping the deduction at the premium charged by the typical HMO. This would keep most of the tax subsidy intact and, at the same time, the tax code would no longer subsidize the purchase of excessively generous

health insurance. Various versions of this idea have floated around ever since, most capping deductibility at or around the cost of the "median" plan in the market. If implemented today, this would give HMOs a fairer chance against more costly plans. It would also eliminate the unnecessary intermingling of health insurance with retirement investing that characterizes CDHP.

Although this proposal forces enrollees to bear the full incremental cost of expensive plans, it still gives a tax break to "median" plans relative to "cheap" ones. President Bush has proposed offering a flat tax deduction to all individuals who purchase health insurance, regardless of the premium and regardless of whether they obtain insurance through their employer. This would mean that all consumers would pay the full marginal cost of their health insurance purchases; if someone wants to purchase $100 more of insurance coverage, they will have to give up $100 worth of other stuff. This would completely level the insurance market playing field, putting HMOs on the same footing as CDHPs. However, it sustains the regressive elements of the present tax code and the Enthoven proposal.

We ought to move to a neutral or even a progressive tax system. Many economists have observed that the best way to do this is to move from tax deductions to tax credits. I will discuss this a bit further when I explore options for covering more of the uninsured. First, I will offer other suggestions for improving efficiency and quality.

Fix Pricing

It is staggering to think that the average American spends over $7000 annually on medical care but has little idea of what anything costs. I am not sure if there is a simple

solution to this problem – the unpredictability and complexity of the medical care process make it all but impossible for any individual patient to do a sensible job of comparison shopping. Even so, we should not cut too much slack for an industry whose pricing system seems deliberately designed to confuse patients. We could make great strides in improving efficiency if we fixed pricing, not so much to give more information to consumers, but more to give the right incentives to providers.

In a textbook competitive market, prices are supposed signal to consumers the amount that goods and services cost to produce, so that no one purchases something that costs more than it is worth. Prices are also supposed to signal to producers the amount that goods and services are worth to consumers, so that producers do not produce things that have not value. This is how markets reach efficient outcomes. This is not how health care markets work, and the resulting inefficiencies are massive. CDHPs address moral hazard distortions on the demand side. There are less well-known equally pernicious distortions on the supply side.

Consider "per diem" payment systems in which hospitals receive a fixed price for each day a patient is in the hospital. The price of an extra day in the hospital can vastly exceed the cost of the last day or two in a hospital, when a patient is receiving little more than "hotel" services. As a result, hospitals try to keep patients longer than is necessary. Under the prospective payment system, hospitals receive a fixed price per admission; the price of extra day is zero. Now the hospitals try to discharge patients early. When patients have Medicaid coverage or are uninsured, prices are so low that hospitals try to avoid treating these patients altogether. To make matters worse, some specialty hospitals cherry pick the most profitable privately insured patients.

Payers know about these distortions and are taking a few steps in the right direction. Medicare is refining DRG adjustments to assure that specialty hospitals cannot easily prosper by cherry picking. A few private payers set lower per diems for the last few days of an inpatient stay. These are small but important steps towards eliminating the tactics that providers and payers currently use to arbitrage the system. But many distortions remain, none better exemplified than in the so-called overuse of the emergency room.

The ER Myth

Nowhere is the gap between price and cost bigger than for routine care delivered in the emergency room. Patients who go to the ER for routine care must wait for a lull in the action, when the medical staff is not attending to more urgent cases. When that lull arrives, patients are treated by doctors and nurses who would otherwise be waiting for the next emergency. The incremental cost of their time is next to nothing. But the hospital's price is astronomical. This is why insurers try to prevent their enrollees from visiting ERs even though the cost to the healthcare system is negligible. Hospitals could fix this problem by billing routine care at marginal cost and billing true emergencies to cover the cost of the standby capacity that has been waiting to handle them. The same story is true, more or less, for hospital-based outpatient care. Prices bear no relation to cost, and the result is that outpatients are driven away from hospitals.

Ironically, in our zeal to push everything outside the hospital, we have failed to reduce the costs of hospital infrastructure while adding billions of dollars for outpatient infrastructure. There is nothing wrong with community-based clinics or with patients

who value convenience. But the system should not provide financial incentives to deliver care in inefficient ways. It is no wonder that health care costs have continued to skyrocket even as we push more and more care to outpatient settings.

Other Pricing Fixes

There are other examples of pricing distortions with pernicious effects. For example, prospective payment punishes hospitals that treat patients with above average medical needs. Economists who have studied inpatient pricing unanimously agree that payers should move to a two-part payment system that includes (1) a fixed fee per admission (adjusted for the DRG) that is less than the current fee, and (2) some percentage of the total cost of treatment. This would simultaneously reduce gaming and increase the quality of care given to the sickest patients.

In the same vein, the DRG classification system needs refining. There are currently about 550 DRGs, with considerable variation in medical needs within each one. This means that within any diagnosis, some patients are more profitable than others. Some hospitals cherry pick the most profitable patients and dump the rest on their competitors. Payers are not too concerned about this because they feel that with fixed payments, their overall costs will be unaffected. This is short-sighted. These games drive up total system costs and often place patients in hospitals that do not ideally meet their needs. Health services researchers have field-tested a variety of methods for refining risk adjusters. Payers should embrace them.

Finally, the practice of setting different prices for each element of the medical care process can lead to numerous inefficiencies, because providers try to maximize their

own reimbursements, rather than reduce total costs. This problem can be fixed by moving to a single episode of illness payment.

Episode of Illness Payments

There has been considerable effort over at least two decades to design "episode of illness" payments that assign a lump sum payment to a provider organization for each episode of illness treated. For example, a provider organization might receive $40,000 for a hip replacement, which would cover the cost of diagnosis, surgery, and rehabilitation. This would give the organization responsibility for finding the lowest cost way to delivery the full gamut of services. The physician-hospital organizations of the 1980s and 1990s were developed along these lines, but payments were calibrated only for age and sex and PHOs had inadequate internal monitoring and compensation systems. As a result, it was difficult for the PHO to hold each member physician accountable for cost containment. I think that EMRs will greatly improve the ability of organizations to implement episode of illness payment systems. Episode-of-illness payments may yet be resurrected.[11]

Keep Pushing on Quality

As we continue to pay more attention to health care costs, we had better not neglect quality. The good news is that payers and employers are not just talking about quality; they are taking bold steps to measure and reward the best providers. The bad news is that they have a long way to go in terms of measurement and compensation systems. The worse news is that they need patients to help, but most patients seem blissfully unaware of the quality movement.

Towards Better Report Cards

All too often, we measure what we can, not what we should. Perhaps the best known example of this is the push to measure school performance on the basis of test scores. The result is predictable – teaching to the test with little apparent improvement in anything that is not captured by standardized testing. The health care report card movement often succumbs to the same trap. Everyone understands that the ideal report card should measure the outcomes that matter most (e.g., mortality, quality of life) and use comprehensive risk adjusters (i.e., those available on medical records). But most report cards measure one or two secondary outcomes (i.e., post-surgical complications) and use minimal risk adjusters (i.e., those available in administrative claims.) We might be better off if we measured nothing at all!

New York State's surgery mortality report cards represent the current state of the art, in large part because the state obtains crucial risk adjustment data from the hospital medical records. Other states should follow suit. This may invite upcoding, but the virtues of rich risk adjustment should outweigh such criticism. The proof is in the pudding. There may be some gaming going on in New York, but hospitals there are less likely to invoke the "holy writ" that their patients are sicker and instead have engaged in the difficult task of actually improving quality.

New York can do even better, and the rest of the nation can follow their lead.[12] New York should use all statistically valid risk adjusters, including race and prior health spending, not just those that have a direct medical link to outcomes. This will have the twin virtues of increasing the precision of the rankings and eliminating some of the gaming. States should also explore constructing report cards based on diagnosis (e.g.,

heart failure), not the chosen procedure (e.g., heart surgery). This will further limit gamesmanship. Perhaps the most important step is to measure a broader set of outcomes. Mortality is important. For many conditions, other outcomes matter even more. Can an asthma patient return to work? Can a hip replacement patient climb stairs? Is the cancer patient in pain? Once we get the answers to these questions, we can produce meaningful outcome report cards for wide range of procedures and conditions, not just high risk surgery.

Once again, health services researchers have field-tested the necessary metrics. John Ware and Cathy Sherbourne have pioneered and validated a comprehensive outcomes measurement tool, the SF-36 patient questionnaire. The 36 questions generate eight different outcomes scores, including physical functioning (such as ability to climb stairs), social functioning (such as ability to work), mental health, and bodily pain.[13] Researchers have also developed disease specific surveys, such as the asthma impact survey. Unfortunately, providers rarely administer the SF-36 (or the two-minute SF-12 or the new, even shorter, SF-8) to their patients. Let's find a way to collect this information every year.

Harvard's David Cutler has even loftier ambitions. He proposes creating National Health Accounts (NHAs). Similar to the Gross Domestic Product, which measures the sum total of our economic output, NHAs would measure the sum total of our nation's health, relying on metrics such as Quality Adjusted Life Years (QALYs) and the closely related Healthy Years Equivalents (HYEs). Cutler's plan to track the QALY score of the nation is ambitious and audacious. But think of the benefits. By tracking each individual's health status, as measured by their QALY scores, we can assess the overall

quality of care that patients are receiving and say goodbye to report cards that miss the forest for the trees. By tracking the entire population's QALY scores we can determine how well the overall health system is functioning. These are worthy goals.

Go Slow with P4P

Americans enthusiastically embraced the efforts of their physicians to assure quality. Payers are now assuming responsibility for quality assurance through their P4P programs. I am not sure if this is what patients want.

Patients already have their own P4P mechanism – it is called repeat purchase. If we do not like our doctors, we look for new ones. If we want our doctors to provide smoking cessation advice or book an appointment within 24 hours – two popular P4P metrics – we can take our business elsewhere when they do not. We do not need our payers intervening in such decisions.

Some P4P metrics are more sophisticated and it might be asking too much for patients to pay attention to things like CPOE adoption. But I am leery of P4P micromanagement. As we learned from the failures of utilization review, it is a big step from informing providers about what works to paying them to do what works. Providers want to do the right thing most of the time. If they choose not to abide by the latest P4P metrics, then more often than not it is because they are putting their money and time where they think it will do more good.

Theory and emerging evidence also suggest that payers should take multitasking seriously. I pose the following challenge to any payer who is currently engaged in P4P. Find two measurable tasks, call them A and B, that compete for a provider's time or

finances. Implement a P4P scheme that rewards A and measure whether providers cut back on B. If so, then there is a problem. The solution is not to reward B. There is always a task C, and D and E, and so forth. And if payers reward the entire alphabet, why give doctors any discretion? This is the wrong way to go.

It is far more prudent to reward outcomes. Do not worry that the link between provider actions and patient outcomes is sometimes indirect. Weak outcomes-based incentives will have powerful effects. Providers will still gain by improving quality. Besides, outcomes-based rewards promote overall improvements in quality, because they differentiate among providers who are superior in intangible ways, such as diagnostic skill. Task-based P4P will never do this.

We could do without P4P altogether if patients would respond more strongly to report cards. Despite some encouraging evidence from New York State, it seems that most report cards go unheeded. It is hard to blame patients who still rely on their doctors to guide them through the health care system. It is our doctors who must do a better job of reacting to report cards. If Dr. Welby ever found out that Lang Memorial Hospital had unacceptably high surgical mortality rates, I am sure that he would have told his patients and complained bitterly to the surgical staff. It is the doctors more than the patients who need to leave Lake Woebegone. They could start by spending a few minutes a day taking a look at report cards. Even better, medical schools could provide more training in the statistics of report cards, so that doctors can do a better job of evaluating them. If doctors are to be our agents in this information age, they need more than just medical training.

Keep Some Regulations; Jettison the Rest

The list of healthcare regulations is longer than the list of healthcare acronyms in the Appendix. I will examine a few that are salient to the success of our overall system.

What Works

Like it or not, the U.S. approach to healthcare depends on competition, and there can be no competition without competitors. The antitrust laws are therefore essential to the system's success. If anything, the courts have been too eager to accept discredited ideas that competition in health care "doesn't work". Fortunately, the U.S. Department of Justice and the Federal Trade Commission have been diligent in assembling the evidence demonstrating the benefits of provider competition and seem poised to convince skeptical judges and juries. The antitrust agencies should be just as diligent in assuring that payers remain competitive.

Insurance markets require additional oversight lest they fall victim to cream skimming and adverse selection. Employer-sponsored coverage still works for most Americans, and COBRA, HIPAA, guaranteed renewability and other rules sustain risk pools and increase portability. Until we find a more comprehensive approach (which may retain an important role for employers), this hodgepodge of regulations is far better than nothing.

Medicare funding continues to be based on an intergenerational social contract that will soon confront unpleasant demographic realities, with not enough workers supporting too many beneficiaries. Congress already knows about both the problems and the limited set of viable solutions for Medicare's looming budget crisis. There is no time

to act like the present, but I am scarcely the first to offer such advice and, like those before me, I expect it will go unheeded.

As long as traditional Medicare endures, the Center for Medicare and Medicaid Services will necessarily have its hands in the marketplace. Just as private insurers must set rules governing payments to providers and access to services, so too must Medicare. The list of innovative rules originating with Medicare is impressive, and the willingness of the private sector to mirror Medicare's practices is telling. Medicare introduced the DRG system for paying hospitals and the RBRVS system for doctors. Most MCOs followed suit. Medicare created the Professional Review Organizations that spun off private utilization review agencies. Medicare is pushing for information technology standards and exploring how to incorporate cost effectiveness analysis into drug pricing. Perhaps I am hopelessly biased, but I think that one reason for Medicare's successful track record as a regulator is that the program has a long history of relying on the best and brightest minds from academia to advise, develop, and implement program changes.[14] This approach to regulation seems to have worked.

What Doesn't Work

Even as the FTC and DOJ try to maintain competition, many states have tried to undermine it. Starting in the 1990s, some states have required MCOs to contract with "any willing provider," effectively eviscerating selective contracting. In most states, the rules apply only to retail pharmacy, but in a few states they also apply to hospitals and doctors. The broadening of networks in response to the managed care backlash took the pressure off of other states to enact similar rules, but provider lobbying groups are

resurrecting the idea. Legislators should ignore them. A few states have considered doing away with competition altogether by giving doctors permission to openly collude. Fortunately, these proposals have generally not gone far and even if they are enacted, they will not preempt federal antitrust laws.

Certificate of Need laws are the most egregious anticompetitive regulations, artifacts of bygone days when most patients had indemnity insurance and most hospitals received cost-based reimbursement. CON now serves as a wasteful barrier to much needed competition. Hospitals that obtained precious bed licenses decades ago are protected from competition for the indefinite future, regardless of how well they meet the needs of their communities. Many states have dropped their CON laws. The rest of the nation should follow suit.

I have recently heard two new justifications for CON from legislators in states that do not adequately fund Medicaid or cover the uninsured. One argument is that CON protects safety net hospitals from competition. The legislators can sustain the hidden cross-subsidies of the pre-selective contracting era, rather than raise the taxes necessary to properly fund Medicaid and cover the uninsured. This is political subterfuge. The irony is that legislators will have to raise taxes anyway, because Medicaid and Medicare HMOs have to raise their premiums to pay the rates commanded by monopoly hospitals.

Legislators would also like to prevent entry by specialty hospitals that might cherry pick the most profitable patients, leaving community hospitals with the burden of caring for Medicaid patients and the uninsured. There is some merit to this.[15] But once again, CON is being used to overcome other shortcoming in the system and we all pay

higher prices as a result. Our legislators should stop applying band-aids on top of band-aids.

States have also been eager to regulate insurance markets. Insurance benefits mandates drive up premiums for exactly those buyers who can least afford it – small businesses and individuals who do not enjoy ERISA exemptions. About 10 states allow small firms to purchase "Mandate-lite" plans. Forty others need to join them. At the same time, the federal government should exempt Association Health Plans from state mandates (much as ERISA exempts self-insured firms.) This would do far more to help small firms buy low cost health insurance than all the purchasing pools put together.

In the tradition of all "two handed economists," I do have a few misgivings about eliminating all mandates. Insurers who offer stripped down policies stand to enjoy favorable risk selection. I would require a minimum set of coverage requirements, such as those included in Medicare Parts B and D (i.e., including prescription drugs). This would exclude a myriad of politically motivated mandates that plague state coverage rules.

If we mandate nothing else, it should be a broad set of preventive health care services. It is a dirty little secret of the industry that employers and insurers lack adequate incentives to cover prevention. The logic is air tight: why should employers and insurers pay for services today that will prevent spending by some other employer or insurer years from now? The problem is even worse for children's preventive services; the odds of the insurer enjoying the payoff from encouraging healthy childhood behaviors are nil. This is a classic problem in economics and has a classic solution. If individually selfish behavior leaves everyone worse off, then we should try to we mandate

“selflessness.” This is how we limit pollution, keep the highways safe, and raise money for the public defense. We ought to mandate that all insurers cover preventive measures. We should go one further, overwriting ERISA to force self-insured plans to do the same. An expert panel could routinely review the evidence to determine preventive measures merit coverage; not every preventive service is cost-effective.

Covering the Uninsured

At some point in the late 1960s, health policy makers must have thought that they had solved the access problem. The vast majority of Americans had coverage through their employers. Medicare and Medicaid covered the elderly, the disabled and many of the indigent. Nonprofit hospitals, community health centers, and government providers of last resort provided a safety net for the millions who remained uninsured. To a large extent, this uniquely American approach to healthcare reflected America’s values, accepting modest inequities in access in exchange for maintaining a largely free market system. Only it turns out that the inequities in access were not modest. We did not have a safety net so much as a torn and tattered patchwork quilt. In the remainder of this book, I will describe how we can cover the uninsured while still upholding America’s belief in competition.

From Tax Deductions to Tax Credits

When the federal government made health insurance tax deductible after World War Two, it catalyzed an already growing private health insurance market. But it also distorted the economics of the insurance market, placing lower cost insurance plans at a competitive disadvantage. With HIPAA of 1997, Congress finally acted to restore some

balance in the tax treatment of insurance by allowing individuals to create tax-exempt HSAs for their CDHPs. This does nothing to restore competitive balance for other low cost plans, however. President Bush's proposal to grant a uniform tax deduction for any health insurance policy would level the playing field but maintains regressivity and will do little to expand coverage to the uninsured. Many low income individuals decline to take up insurance even if their employers are paying 75 percent or more of the premium. A tax deduction that amounts to no more than 25 percent of the premium for most wage earners is not going to improve take up. This will require a different approach.

Leading economists including Mark Pauly and Jon Gruber favor moving away from tax deductions and towards tax credits. With tax credits, individuals who purchase insurance would be eligible for a federal income tax refund based on the price of the insurance and their income. Tax credits have many advantages over other options. Tax credits sever the link between employment and the funding of coverage, thereby limiting labor market spillovers. The parameters of the credit can be chosen to assure a level playing field and balance the desires for a neutral or progressive tax structure, higher take up, and limited budget impact. In fact, economists estimate that tax credits are far more cost effective than tax deductions.

Although tax credits are the best way to encourage take-up, there is no way to assure 100 percent take-up short of having the government pay 100 percent of the premium. Consider that in some states, insurance for a family of four can cost $12,000 or more. If the tax credit was set at $9000 per household, then families would still need to come up with $3000 to pay for coverage. A family of four earning $60,000 annually (about three times the federal poverty level) would have to devote 5 percent of its income

to purchase coverage. Some families would rationally choose not to do so. We would have to increase the "carrot" of the tax credit.

It will be prohibitively costly to rely solely on the carrot of the tax credit to assure universal coverage. We need some sticks. The biggest stick is purchase mandates. All individuals earning at least twice the poverty level should be required to make at least some contribution towards a relatively low cost health insurance plan. If they refuse to purchase insurance, they should pay a penalty enforced through the tax code. The amount of the mandate should vary by income, of course. I see no other way to prevent those with means from free riding on the system.

Play or Pay

If everyone has a mandate to buy coverage, where will they turn to buy it? Most working Americans will probably turn to their employer. Workers could delegate their employers to spend their tax credits, effectively recreating the current employer-sponsored system. But replacing employer-subsidized insurance with government-subsidized insurance is susceptible to risk selection, because healthy employees may opt out of their employer's group and buy cut-rate individual policies.

The solution is to combine tax credits with an employer "play or pay" rule. Employers either provide group insurance or pay a tax. The tax credits would be granted only to individuals whose employers elect not to play. Massachusetts is trying this combination and California's Governor Schwarzenegger has proposed a similar approach. No one yet knows whether a tax credit sufficient to assure individual take-up

will also cause a wholesale withdrawal of employer sponsored coverage. Massachusetts will provide us with a natural experiment.

I like the pay-or-play approach for several reasons. First, it maintains the group market that works reasonably well for most working Americans. Second, it can be calibrated to be roughly revenue neutral for most firms. Third, it keeps employers (and through them, their employees) actively interested in the health economy. I would rather decentralize insurance purchasing among employers, each of whom is competing for employees, than vest it with local governments.

The Fork in the Road

If we sweep aside the details, there are essentially two divergent paths that we can take to cover the uninsured. We can expand coverage in the private sector, through an Enthoven-style voucher scheme, or a combination of an employer mandate, individual mandate, and tax credits. The alternative it to adopt a publicly-financed single payer system, effectively expanding Medicaid or Medicare to the entire population. Congress has wrestled with these two choices for decades with only one breakthrough, the creation of Medicare and Medicaid. The real action in health care reform today is taking place in the states, where the prospects are encouraging. No one can predict the fate of the ongoing experiments in Maine and Massachusetts. But at least we will have experiments to study, and hopefully we can learn from their mistakes.

This is just the beginning. Half of the states are considering health reform initiatives. If anything is standing in the way, it is the justifiable fear among state lawmakers that the new taxes required to fund expansion of coverage will drive

businesses to neighboring states. There is a simple way to prevent this. Congress should mandate that all states reach targets for the number of uninsured, say, below 5 percent within 5 years. Congress could tie compliance to a set of financial carrots and sticks, as it does with Medicaid. To prevent a race to the bottom, Congress should also specify a minimum benefit package. It would then be up to each state to devise the most effective way of meeting these coverage goals.

Experimentation – allowing states to respond flexibly to critical policy problems – is the essence of American federalism.[16] Some states will follow Massachusetts' lead and adopt a market-based system. Others may opt for government control. President Bush endorses this federalist approach and is even open to the possibility that government-controlled systems outperform market-based systems.[17] So am I.

Unless we institute a hard spending cap, no expansion in coverage will come for free. Congress will have to grease the skids to get states to go along. Congress should therefore cap the tax deductibility of health insurance, or move from tax deductibility to tax credits. There should be enough money to go around, and I expect that most states will be eager to run with it.

Democrats are likely to oppose this approach for two reasons. First, it will not guarantee universal coverage. The fact is that anything short of a single payer system will fall short of universal coverage. Some businesses will fail to either pay or play, and some individuals will refuse to purchase anything less than fully subsidized insurance. Second, most states are likely to try market-based reforms, as these have the smallest tax burden. Perhaps a compromise is possible. Hillary Clinton recommends raising the SCHIP income threshold to 400 percent of the federal poverty level. Republicans object

that under this proposal, 70 percent of America's children would have government coverage. Even so, the actual cost of expanding SCHIP coverage would be relatively small; with the exception of neonates (most of whom are already covered under Medicaid or SCHIP), medical costs for children tend to be modest. SCHIP expansion thus might prove to be a relatively low cost yet critical piece of a more comprehensive plan to cover the uninsured, one that might allow all of the stakeholders in the longstanding debate about healthcare reform to finally find common ground.

I would go further, and include children in the Medicare program. We would then rely on states to find ways to assure that all adults have coverage, with partial funding coming from Congress. A similar compromise was struck when Congress created the federal Medicare program but gave control of Medicaid to the states. After 40 years of gridlock, it could not hurt to try the same approach.

If I Had to Choose

In the last week of my health economics class, we turn our attention to healthcare reform. After discussing the pros and cons of various options, my students invariably ask whether I prefer a government or market-based solution. The federalist approach gets me off the hook. As a researcher, I can wait a few years and see which solution is most effective. But if federalism is not possible, I know what choice I would make.

As much as I believe in the power of markets as a force for quality improvement and efficiency, the performance of healthcare markets remains mixed. At the same time, there is much to be said for a single payer system. It is our best chance to get close to 100 percent coverage. It will be equitable. We can probably cut at least 10 percent out of

the overall health care budget simply by limiting administrative costs. And legislators can place a hard cap on health care spending, limiting future growth.

Many will criticize such a government takeover of the financing of the system, and not without cause. Good things rarely happen when U.S. politicians meddle excessively in any sector of the economy and the specter of socialized medicine would loom large. But this criticism must be weighed against the success of Medicare. Moreover, this proposal falls far short of socializing medicine, because providers will remain in the private sector. If we set the initial budget at the current level of health spending, we can even avoid Canadian-style rationing (at least for now).

If we instead expand the private sector, there is no guarantee that we can cover all the uninsured. Nor could we guarantee cost containment. If anything, expanding insurance through the private sector is likely to drive up total spending, as millions of currently uninsured Americans gain full access to the system. Without the hard spending cap of a single payer system, health care costs could continue to climb.

The arguments in favor a single payer system are very seductive. I sometimes feel the tug, until I consider the nuances. For one thing, there is nothing inherently wrong with spending more money on health care, provided that we spend our money wisely. Competition, when it works, is the best way to allocate our healthcare dollars. In addition, a single payer system must be financed through taxes that will inevitably place a drag on the economy. These are reasonably compelling arguments for redoubling our efforts to support competitive healthcare markets. But it is when I look at the evolution of our health care system over the past century that I fully appreciate the dangers of a single payer system and I am finally able to resist the temptation of a single payer system.

Technological Change

My colleague Burton Weisbrod argues that the most important long run engine of our health care system is technological change.[18] It is hard to look at the history of the health care system and disagree. The X-rays and antiseptics introduced at the end of the 19th century made it possible for surgeons to ply their trade, but also drove up costs and led the Committee on the Costs of Medical Care to recognize the need for health insurance. The remarkable list of innovations from the mid to late 20th century have saved countless lives and added immensely to the quality of life, but once again these have come at a considerable financial cost. The next generation of medical innovation produces may produce even greater health benefits, even as we worry about having the wherewithal to afford them. No debate about national health reform is complete without first considering the consequences for innovation.

A good starting point is to ask whether new medical technology has been worth the cost. I recall a fascinating discussion of this question at a conference hosted by Northwestern University about a decade ago. One of the featured speakers was Jim Mortimer, the President of the Midwest Business Group on Health. An audience member asked if society was better off with 1990s technology at 1990s costs, or 1980s technology at 1980s costs. Without hesitation, Mortimer said that he would rather have 1980s technology at 1980s costs. I suspect he would give the same answer if the comparison were brought up to date.

Mortimer must have done some kind of cost-benefit analysis in his head and concluded that the benefits of a decades worth of new technology, in terms of longevity and quality of life, were not worth the extra cost. We do not have to rely on Mortimer's

snap judgment. It is possible to quantify the benefits of new technology, in dollars, and directly perform the required cost-benefit analysis.

David Cutler and several of his colleagues have performed exactly this calculation.[19] They have estimated the benefits, both in terms of life-years saved and QALYs, from technological improvements in the treatment of a wide range of diseases, including heart disease and cancer. They have drawn on survey research and economic studies to put a dollar value on the health improvements. These studies suggest that an additional year of healthy life is worth as much as $100,000.[20] Finally, they have compared the dollar value of benefits against the increase in medical costs.

Cutler et al. confirm that new technologies are very costly, but the benefits outweigh the costs by as much as 5 to 1. That is a remarkable return on investment and it is hard to find another sector of the economy that offers anything close to it. There is no doubt that much of what we spend on technology is wasted in unnecessary tests and procedures. Even accounting for this waste, the benefits are huge. We should all want today's technology at today's costs. It is worth every penny.

We are on the cusp of yet another wave of medical innovation. Advances in biotechnology and pharmacogenomics will revolutionize the diagnosis and treatment of disease by allowing doctors to decode the genetic causes of illness and customize treatments to increase drug efficacy and minimize adverse drug reactions. Nanomedicine will enable doctors to use microrobots to monitor and repair organ systems at the molecular level. Device manufacturers are miniaturizing pacemakers, defibrillators and brain stimulators to permit non-invasive procedures for a broader population. The FDA recently approved the first temporary implantable artificial heart for patients awaiting

heart transplants. It will not be long before patients receive permanent implantable artificial hearts. And thanks to the lessons learned in the development of artificial skin for burn patients, it is only a matter of time before it is possible to grow entire organs. We do not yet know which of these breakthroughs will prove to have widespread practical value, but it is certain that the practice of medicine in the not too distant future will look a lot different than it does today. This is unless the Luddites have their way and halt technological change in its tracks.

Much of the impetus for ongoing innovation comes from basic research funded by the National Institutes of Health and other public sector agencies. NIH funding is declining for the first time in recent memory. This is a terrible mistake that Congress must quickly rectify. The far more costly and time consuming process of developing innovations and bringing them to market will remain in the private sector. Needless to say, private sector companies will not invest in innovation unless they can expect a reasonable profit, and here is where our choices for covering the uninsured become critical.[21]

In today's environment, when medical R&D companies look to see where the opportunities for profits lie, they look to the United States. Although market forces here offer some restraints on the prices and availability of medical technology, the regulatory controls of other nations are far stricter. As a result, companies rely on U.S. profits to recover their R&D costs. Any major reforms of the U.S. health care system would therefore have a massively disproportionate effect on the pace of technological change worldwide.[22]

Expansion of coverage through the private sector is likely to have minimal impact on incentives for R&D or the pipeline of innovations. There is no guarantee that the benefits of new technologies will continue to outweigh the costs, of course, though a century of experience suggests they will. If instead we nationalize the financing of health care, then sooner or later (probably sooner), legislators will face an imperative to hold the line on spending growth. We can expect them to follow the lead of other nations and set strict limits on spending for medical technology. We can only expect a cutback in R&D spending. No one can be sure how this will affect the pipeline of innovation, but it cannot be good.[23]

Perhaps Congress will understand the importance of innovation and, as Weisbrod has suggested, offer massive prizes for truly great discoveries. There is precedent for innovation prizes; in 1704 the British government offered the equivalent of $5 million (in today's dollars) for a method to determine the precise longitude of ships at sea. John Harrison, a clockmaker who toiled outside of the scientific establishment, won the prize with his invention of the chronometer.[24] But the government's scientific advisors refused to acknowledge Harrison's accomplishment, insisting that he prove the chronometer's accuracy again and again. It took 12 years of additional demonstrations before the 77 year old Harrison finally received his prize money. I doubt whether today's innovators would accept such uncertainty.

I suspect that legislators who want to nationalize healthcare financing will simply ignore the impact of today's regulations on tomorrow innovations, adopting a "what we don't know won't hurt us" approach to healthcare reform. It might even turn out that the most important innovations will still reach the market, even with tight-fisted federal

budget controls. But no one can be certain of this, and no federalist experiment can provide the answer.

Coda

There are times when I think about the creeping incrementalism that has characterized our efforts to fill in the health care safety net and despair ever making a serious dent in the problem. At these moments, I understand that a private health insurance system will never achieve 100 percent coverage and I feel ready to endorse a single payer system. But then I think about my children (and their children yet unborn) and ask whether I want to deny them medical technologies as yet undreamed of. It is a risk I am not willing to take.

I am not ready to give up on market-based health care. We must do a much better job of covering the uninsured, and we can do that without ripping everything up. Let us not be so single-minded in the pursuit of access today that we ignore how our choices will affect the entirety of the health system in the future. There is too much at stake.

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[1] Committee on the Cost of Medical Care, 1972, *Medical Care for the American People* New York: Arno Press (reprint of 1932 report.) Preface, p. X.

[2] See Pope, G. et al., 2004, "Risk Adjustment of Medicare Capitation Payments Using the CMS-HCC Model", *Health Care Financing Review*, 25(4): 119-41 and Ash, A., Ellis, R., and M. Kramer, 2001, "Finding Future High-cost Cases: Comparing Prior Cost Versus Diagnosis-based Methods." *Health Services Research*, 36(6): 194-206 for examples of ongoing research and applications of risk adjustment.

[3] There is a wide range of estimates of the cost of EMR. These figures are drawn from Miller, R. et al., 2005, "The Value of Electronic Health Records in Solo or Small Group Practices" *Health Affairs*, 24(5): 1127-37.

[4] Walker, J. et al., 2005, "The Value of Health Care Information Exchange and Interoperability," *Health Affairs Web Exclusive*, January 2005, W5-10.

[5]Kleinke, J. D., 2005, "Dot-Gov: Market Failure and the Creation of a National Health Information Technology System" *Health Affairs*, 24(5): 1246-62

[6] Source: ANSI web site searched 1/31/2007: http://www.ansi.org/standards_activities/standards_boards_panels/hisb/hitsp.aspx?menuid=3#News

[7] Quoted in "Standards Panel Delivers Interoperability Specifications to Support Nationwide health Information Network" PR Newswire, November 1, 2006.

[8] Most private insurers use some variant of Medicare's billing system. Both DRGs and the Resource-based Relative Value Scale started with Medicare before moving to the private sector. Utilization review service agencies got their start as Medicare Professional Review Organizations.

[9] I am not wedded to these exact figures and I am confident that plans will experiment to find the range that works best.

[10] The RAND study was never designed to capture this effect, but it is likely to be huge.

[11]Renowned policy expert Jeff Goldsmith offers similar hope and concern about episode of illness payments, but does not acknowledge the role of information technology. Goldsmith, J. "Physicians and Hospitals: Can They Cooperate to Control Costs?" *Health Affairs Blog* Posted 1/19/2007.

[12] The state also needs to do a better job of generating statistics showing how it is doing. Their current methods suffer from inherent statistical biases due to the failure to account for potential gaming. The state has been hostile to such criticism, bordering on defensiveness. The state should not confuse a discussion about valid statistical measures with a rejection of their program.

[13] Ware J. and C. Sherbourne 1992, "The MOS 36-Item Short-Form Health Survey (SF-36): I. conceptual framework and item selection". *Medical Care* 1992; 30(6):473-83.

[14] The list of CMS/HCFA administrators reads like a Who's Who in health services research, including Carolyn Davis, Gail Wilensky, Bruce Vladeck, and Mark McClellan. The list of advisors is equally impressive.

[15] United States Government Accountability Office, 2003, *Specialty Hospitals: Information on National Market Share, Physician Ownership, and Patients Served,* GAO-03-683R

[16] Nivola, P. 2005, "Why Federalism Matters" Brookings Institution Policy Brief # 146.

[17] Speech given by Secretary of Health and Human Services Michael Leavitt at American Enterprise Institute, Washington, DC, 4/24/2007 and personal communication with Secretary Leavitt.

[18] Weisbrod, B., 1991, "The Health Care Quadrilemma: An Essay on Technological Change, Insurance, Quality of Care, and Cost Containment," *Journal of Economic Literature*¸29(2): 523-52.

[19] Cutler, D. 2005, Your Money or Your Life: Strong Medicine for America's Health Care System, Oxford University Press.

[20] This is not out of line with valuations used in Canada, Australia, and England when health agencies consider whether to pay for new technology.

[21] There is considerable research to back this up. For example, see Finkelstein, A.(2004), "Static and Dynamic Effects of Health Policy: Evidence from the Vaccine Industry," *Quarterly Journal of Economics* 119(2): 527-564 and Acemoglu, D. and J. Linn (2004), "Market Size in Innovation: Theory and Evidence from the Pharmaceutical Industry," *Quarterly Journal of Economics*, August 2004, volume 119, pp. 1049-1090. Unfortunately, the research is not refined enough to tell us the kinds of research projects that would be most affected by a cutback in industry profits.

[22] Other nations "free ride" on technology developed for the potential profits of the U.S. market. The same might occur under the federalist approach, where a state with tight budget controls gains access to drugs developed for the potential profits in other states.

[23] Industry critics such as Marcia Angell, former Editor-in-Chief of the *New England Journal of Medicine*, correctly point out that drug companies earn rates of return well above the norms for other industries and spend as much money marketing their innovations as they spend on R&D. (Angell, M., 2004, "Excess in the Pharmaceutical Industry" *Canadian Medical Association Journal*, 171(12).) Moreover, a lot of R&D leads to "me-too" drugs that only marginally expand treatment opportunities. But it is difficult to envision a way to restrain industry profits without restraining incentives to innovate. Other nations have rules that pay companies higher prices for truly innovative products (as judged by the regulators). Even so, these innovative products command lower prices elsewhere than they do in the United States.

[24] The chronometer is a clock with a spring-based mechanism that allowed the ship's captain to determine the time in Greenwich when the sun was directly overhead at sea (and therefore it was noon at sea). This allowed the captain to compute the difference in time between the ship and the prime meridian, which directly translated into the ship's longitude. Harrison's main challenge was to assure the accuracy of such a device after months of use under far from ideal conditions.