

The 2006 Leon and Josephine Winkelman
Lecture

**A SOCIALLY RESPONSIBLE
HEALTH CARE SYSTEM IN THE
ERA OF LONGEVITY GENES**



**University of Michigan
School of Social Work**

The Leon and Josephine Winkelman Memorial Lecture was established at the U-M School of Social Work by the Winkelman brothers (Stanley J., John H., Frederick R., and Henry R.) as a memorial to their parents.

The lecture provides a forum for presenting new and emerging knowledge from the social sciences and helping professions, and discussion of the application of that knowledge to the development of social policy, the organization and management of social welfare services and the delivery of social work services.

The selection of topics and scholars reflects the interdisciplinary character of the lecture. This is in keeping with the representation of several disciplines in the Social Work faculty, the School's links with social sciences through its interdisciplinary Joint Doctoral Program in Social Work and Social Science, and the School's collaborations with the School of Public Health, the Medical Center, and the Institute of Gerontology.

A Socially Responsible Health Care System in the Era of Longevity Genes

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I selected my title, “A Socially Responsible Health Care System in the Era of Longevity Genes,” in an attempt to emphasize the tremendous challenges we face today—challenges posed by the power and potential of scientific and technological advances and their associated costs, especially when projected into our current dysfunctional health care system. There is increasing tension between what we can and will be able to do for an individual and what we should or must do for everyone.

I. Research: What We Could See

What the Science Tells Us

Throughout history, many have searched for the Fountain of Youth—a magical elixir that would prevent and reverse aging. According to legend, Ponce De Leon heard Indians tell of Bimini, a fabulous island in the North that promised eternal life, so on March 3, 1513, he set sail from Puerto Rico. The Ponce de Leon expedition sighted land in the present locality of St. Augustine and named it “La Florida.” The “true” Fountain of Youth remains elusive—but there is some exciting science to discuss that is nearly as remarkable as a Fountain of Youth. We have seen the average life expectancy rise rather dramatically, and we have the potential to live **a lot** longer. What is the maximum life expectancy? We do not know, but it could be 120 years. In 1900, for instance, life expectancy was 47 years. By the 1930s it was just under 60 years. By 2000 it was 77 years and by 2020 it will be 100+ years.

The single proven method for extending life is extreme calorie restriction, something we have known since 1935. It causes longevity genes to “kick in.” According to authors David Sinclair and Lenny Guarente, in “Unlocking the Secrets of Longevity Genes” in the March 2006 *Scientific American*, “A handful of genes that control the body’s defenses during hard times can also dramatically improve health and prolong life in diverse organisms. Understanding how they work may reveal the keys to extending human life span while banishing diseases of old age.”

The SIR2 gene is a “longevity gene” that is being discussed right now, including in the compelling article by Sinclair and Guarente. SIR 2 codes for an enzyme that removes acetyl groups from histone proteins and, in so doing, makes the DNA more tightly coiled and resistant to change. Researchers have found that having extra copies of SIR2 increases longevity in yeast, roundworms, fruit flies, and maybe mice. It could be **the** regulator of survival mechanisms. The key is to activate the gene—but how?

A compound called resveratrol causes SIR2 activity. Where is resveratrol found? Red wine! Another hurrah for science! When fruit flies were fed resveratrol, they saw a 30-percent increase in longevity. Now, researchers are studying mice to see whether SIRT1 (the mammalian version of SIR2) lengthens life. (SIRT1 also removes acetyl groups from proteins, but it also interacts with the insulin/IGF I system.)

So while we will not see the discovery of a Fountain of Youth in our lifetime, we will see tremendous progress, including . . .

- Medicines that activate longevity genes to treat Alzheimer’s disease, cancer, diabetes, and heart disease. Clinical trials are now under way.
- Greater understanding about factors in youth that protect against the aging process. Researchers from U-M and across the country convened in March for a National Institutes of Health workshop on this topic.

Let me give you some examples of aging research work a little closer to home. We have an exceptional group of researchers at the U-M. Richard Miller is looking at correlation between size and longevity (smaller is often better). His research involves Snell dwarf mice. His hypothesis is that dwarf mice live longer because many of their cells are resistant to injury or stresses that cause aging. Snell dwarf mice have a mutation in a single gene that reduces production of growth hormone and thyroid hormones, leading to slower aging of the eyes, tendons, kidneys, and immune system, as well as lower rates of cancer.

“Almost everything that’s connected to aging is slowed down” in these mutant mice, Miller says. “The mice still get old and die, of course, but they do so about 40 percent later.” Miller’s research team is studying cells from the mutant mice to explore the underpinnings of a long, healthy life. They have found that cells from dwarf mice are somehow able to resist many kinds of damage, including injury caused by heat, UV light, toxic metals, and cancer-causing drugs.

“Presumably, the cell has different mechanisms to deal with each of these toxins or stressful agents,” Miller says. “We think there may be some kind of developmental switch that raises the whole range of defense mechanisms—just like when someone in Washington raises the terror threat to Yellow, and safety precautions are taken in train stations and bus stations and so on. We’d like to find out what that developmental switch is. We’d also like to know which of the hormonal changes seen in the mutant mice lead to this stress resistance and how that eventually ties to the disease resistance of the mouse as a whole.”

We had the pleasure recently of having in town Linda Partridge, Weldon Professor of Biometry at University College in London. One of the world’s most prominent scientists studying longevity genes, she was here last month to give one of the Evolution Theme Semester main public lectures. Her topic was “Evolution, Aging, and Medicine.” In a recent article she discussed:

- The rate at which organisms age can evolve:
 - As a side effect of mutation accumulation
 - As a side effect of earlier success
- How aging evolves in response to extrinsic hazard—the greater the hazards, the more rapid the aging
- How genes of insulin-like, growth factor-signaling pathways have been shown to affect the life span of worms, fruit flies, and mice

Another interesting bit of research involves Telomerase, an enzyme that was discovered to replenish DNA at the ends of chromosomes during replication. When cells have it, they keep dividing (as with cancer). When they do not, it is predicted that senescence sets in.

“Shorter telomeres are associated with a 3.2-fold higher mortality rate from heart disease, [with a] 8.5-fold higher mortality rate from infectious disease, and with poorer survival overall,” according to the National Institute on Aging’s “Summary of the Symposium: Stress, Telomeres and Aging” in February 2005.

These are just a few examples of the exciting work that is going on. The study of aging is hot—with tremendous potential ahead given the right funding.

II. Treatments: What We Will Experience

Personalized Medicine—Already Here; More Coming Soon

One day in the not-so-distant future, a DNA test will be as much a part of an ordinary doctor’s visit as a blood pressure check. By scanning each patient’s unique genetic code, doctors will be able to predict which patients are most likely to develop a specific disease and select the most effective therapy for each patient.

Research advances in genetics have the potential to transform the practice of medicine. But to achieve that potential, laboratory scientists and clinical researchers must work together to make the difficult transition from scientific discovery to clinical practice.

This is the idea behind personalized medicine. The definition is that it creates “new methods of molecular analysis to better manage a patient’s disease or predisposition toward a disease.” (This definition is from the Personalized Medicine Coalition, an independent, nonprofit group that works to advance the understanding and adoption of personalized medicine. Members of the coalition include pharmaceutical companies and other industry, research, and educational institutions, patient advocacy groups, venture capitalists, and governmental agencies, including the Centers for Medicare and Medicaid Services, Centers for Disease Control and Prevention, the National Cancer Institute, and more.)

The promise of personalized medicine is genetic testing, tailored drugs based on genetics, and optimal prevention techniques.

An example: A large British Heart Foundation study has identified which mutations in blood clot genes increase the risk of heart disease. Health care leaders from across the country see the tremendous potential in personalized medicine. Bernadine Healy is the former NIH director who launched the Women's Health Initiative (WHI) in the 1980s. Now, she is urging others to tap the databases of information collected during the WHI—161,000 women, “everything from family history to aspirin use.” There is a wealth of information available to study and eventually use to customize care. The future of medicine, she says, is “more powerfully predictive, preventive, and personalized.”

This is the precise idea behind our new Center for Genetics in Health and Medicine. The center's overall mission is to enhance scientific interaction among U-M scientists and clinicians conducting genetics-related research in many different fields.

III. Health Care Landscape: What We Must Face

Get Ready, the Seniors Are Coming

In 1970, half of all people in developed countries were *under* 28; by 2020, half will be *over* 50! There will be an explosion of Americans over age 65 in next 20 years; by 2030, 72 million people. The 85+ group is the fastest-growing segment of the U.S. population, and we know that older Americans spend four times more on health care than others, on average. The good news: Disability among older Americans fell dramatically, from 26.2 percent in 1982 to 19.7 percent in 1999. The bad news: 80 percent of seniors have at least one chronic health condition—which often leads to later disability.

The first Baby Boomers turn 60 this year, and they are a different breed of health care consumer than their predecessors. They are:

- better-educated (including about health care)
- living longer and more active
- demanding more care—they have a “fix it” mentality

As Ian Morrison, president emeritus of the Institute for the Future (a nonprofit group focused on trends and “discontinuities that will transform the global marketplace”) says about this generation of health care consumers:

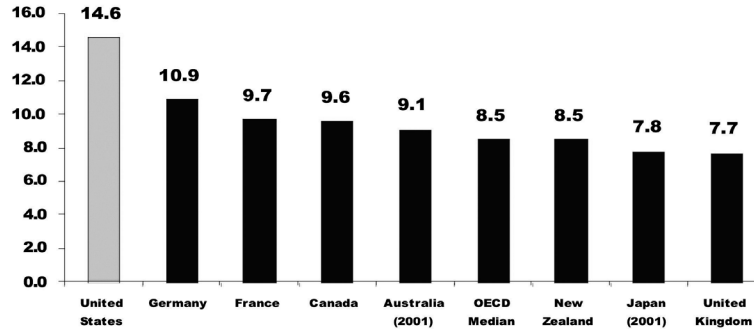
“ . . . they will not be the passive stoics of Tom Brokaw's Greatest Generation; they will be cranky, selfish, self-indulgent Baby Boomers like me. They will want everything and sacrifice nothing.”



What We Spend— and What It's Worth

- The U.S. will spend nearly \$2 trillion on health care in 2006—15.6% of GDP, more than any other major expenditure and more per capita than anywhere else in the world. Medicare spending is skyrocketing—to an estimated \$395 billion in 2007.

Percent of GDP spent on health care, 2002

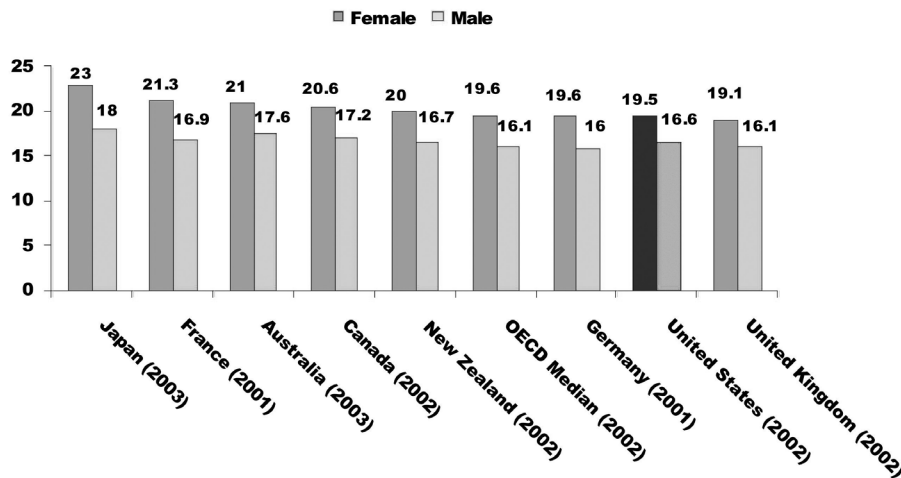


Source: A Need to Transform the U.S. Health Care System: Improving Access, Quality and Efficiency, The Commonwealth Fund.

The United States will spend nearly \$2 trillion on health care in 2006—15.6 percent of Gross Domestic Product, more than any other major expenditure and more per capita than anywhere else in the world. Medicare spending is skyrocketing—to an estimated \$395 billion in 2007. Despite this spending, the United States performs poorly on life expectancy at age 65, as you will see in the following chart.



Despite Spending, U.S. Performs Poorly on Life Expectancy at Age 65



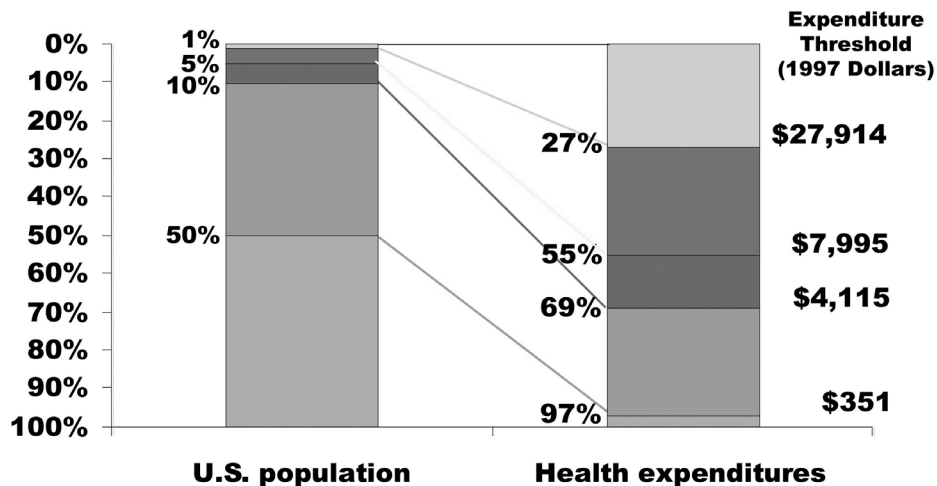
Source: OECD Health Data, 2005.

We also use more expensive specialty services—by far—than elsewhere, but studies show more care does not necessarily mean better health—in fact, it can mean worse. When it comes to length of stay and some other measures, we are actually more efficient than others around the world. However, we use many more and much more expensive specialty services and our pharmaceutical costs are much higher. Where we fall down significantly is in our administrative costs, which are high, and growing at an alarming rate. The annual growth of administrative costs is outpacing total health expenditures in this country. More overhead—ugh! In addition, the money we are devoting to health care is not spread evenly, but is concentrated on a small percentage of the overall population. It also is not devoted to prevention, but rather highly complex, often end-of-life, care.



Health Care Costs Concentrated in Sick Few

Distribution of health expenditures for the U.S. population, by magnitude of expenditure, 1997



Source: A. C. Monheit, "Persistence in Health Expenditures in the Short Run: Prevalence and Consequences," *Medical Care* 41, supplement 7 (2003): III53–III64.

After all that spending:

- We are delivering lots of care—but not always the *right* care at the *right* time. There are wide variations across the country, even across regions.
- We still had 61 million uninsured or underinsured in 2003. Being uninsured is a leading cause of death.
- Amidst all of this, we still have serious workforce shortages among nurses, technicians, and others.
- It is no surprise, then, that we saw a 6.6 percent decline in customer satisfaction between 2004 and 2005.
- The overall satisfaction with health care in this country ranks us worse than the post office, but not as bad as TV news.

Put another way:

“I don’t believe there’s any problem in this country, no matter how tough it is, that Americans, when they roll up their sleeves, can’t completely ignore.” —George Carlin

My diagnosis: We need significant changes in our health care system—**stat**.

- Our system is contentious, litigious, and overregulated.
- Resources and money are not wisely spent.
- We have the capability to deliver exceptional care, but our dysfunctional system leads to worse care. Our system will not withstand the pressures of tomorrow.
- In TV parlance, our health care system needs an “extreme makeover.”

With all of these issues, we have a storm brewing. We need to get to work on transforming our dysfunctional system so that it is ready when the science and the aging population hit.

What do Americans really want in their health care? Experts agree it is:

- Choice—but we must moderate this to keep health care cost-effective
- Control
- Convenience
- Low cost

Here are some solutions I believe we can agree on to give people what they want.

IV. Ideas for the Future

Universal Health Care Coverage

We could require all individuals—by law—to have basic health care coverage. Many health care leaders believe this is doable within the next decade or even much sooner. (Since this presentation, Massachusetts has implemented this very law.) The EMTALA law requires hospitals to care for any patients who come to their doors for medical care. It stands to reason that anyone who comes should have basic health care coverage. Many people used to believe that people had the right not to have health care insurance—that is not the case today. Finally, a consensus on the need for basic coverage for all is developing. Now, the hard work begins on how to get there. A social discourse is required to decide what the basic plan will include. In my opinion, it should focus on prevention and health maintenance. A good definition of reasonable benefits is needed. Other points:

- Evidence-based medicine criteria are essential.
- Personal health savings plans are fine—but only as an addition to a basic plan. If you do not have that, the free market will cause unacceptable stratification. An example of this is the disparity we see in dental care.
- Most people appear willing to consider the collective good and allocate a portion of their own premium to provide basic coverage to uninsured children and adults, according to research conducted by U-M’s Susan Dorr Goold, M.D.

We also need to address the long-term care issue at the national level. It is now nestled in Medicaid and it is breaking state systems. Medicaid was meant for women and children; now only 20 percent of that money is going toward its original purpose.

Consumer-driven health care is gaining popularity, and this will affect our system. This approach is of interest to many conservatives. Advocates, such as Regina Herzlinger of the Harvard Business School, point to other consumer-driven industries such as the automobile industry. She notes how consumerism caused quality to go up and costs to go down in that industry. She sees great cost savings—of up to 50 percent—over traditional plans. Consumer-driven plans provide major medical coverage with high deductibles and health savings accounts. I worry that consumer-driven health care will take money from the insurance pool and put it in personal accounts. This could lead to greater stratification of health care. In any case, it probably will result in more administrative costs for a time—and it could get even more chaotic before it gets better. At this point, there is a significant lack of accurate, readily available information about cost and quality of health care providers; consumers do not have much to go on.

Another approach that is gaining steam is value-based benefits design. University of Michigan researchers show that cost-shifting to individuals leads to decreases in essential and non-essential care—and increases serious health concerns. They propose that we base cost-sharing on the likelihood of a service’s benefit as determined from scientific evidence, not on price. Such a system would provide a financial incentive to patients most likely to benefit from the use of a specific intervention. Pitney Bowes did just this for its employees after looking at the research and deciding they could reduce their health claims by keeping employees with chronic conditions on their medications. They targeted employees with the most costly conditions—asthma, diabetes, and hypertension—and made all drugs to control those (whether generic, preferred brand names, or non-preferred brand names) in the most affordable prescription drug “tier” established by the company. What they found was the company’s annual increase in employee health benefit costs was 8.1 percent—much lower than the 17.2 percent increase of other benchmarked companies. Among asthma and diabetes patients, they saw huge decreases in ER visits and hospital admissions. Their medical director, Jack Mahoney, attributes the success of the program to be “outcomes-based versus line-item based.”

The University of Michigan is doing its part with regard to universal health care coverage in several ways. One is through the Washtenaw Community Health Organization, an innovative program jointly operated by University of Michigan Health Service and Washtenaw County that provides for the medical and mental health needs of the mentally ill and underinsured in Ann Arbor and surrounding towns. Another effort is the Washtenaw Health Plan, a program that serves the county’s uninsured residents. Both efforts are considered models for the nation. And just recently, a University of Michigan Community Health Initiative pilot program—providing free or reduced-cost medications to U-M employees and dependents who have diabetes—was announced. In addition, U-M’s Dr. Jack Billi is chairing a work group on essential benefit design resulting from the Michigan State Medical Society’s Future of Medicine Report released in March. Representatives in the group are from major employers, labor, state government, providers, payers, and others. The goal is to produce a consensus on what a basic health benefit package should include.

What We Can Achieve

Transformation of the political and social milieu from a “pioneer” attitude to an egalitarian one. We are a young society founded on the strengths and rights of the individual—a pioneer attitude. But as you increase choice, you increase cost.

“When it comes to health care, choice, a core American value, is a luxury that ultimately must be bought,” notes Uwe Reinhardt, Ph.D., James Madison Professor of Political Economy, Princeton University. He adds, “. . . Ever-wider choice adds fewer and fewer extra benefits at the margin. Sooner or later, the benefits from added choice will be swamped by its added costs. The facile maxim that ‘more choice can’t hurt’ surely belongs on the trash heap of thoughtless mantras.”

Reduce or eliminate variation in care; ensure that effective care is pervasive. Some important points to note:

- Fifty percent of Medicare enrollees are admitted to intensive care units during their final months in some regions; less than 15 percent in others.
- Areas affected by “supply-sensitive” services have a three-fold increase in Medicare spending.

Greater spending does not equal better care with regard to “improvements in survival, functional status, or satisfaction with care,” says John Wennberg, M.D., M.P.H., director, Center for the Evaluative Clinical Sciences, Dartmouth Medical School. “Evidence at the regional level suggests that greater spending, more resource inputs, and more frequent use of hospitals and physician services are not associated with better performance on technical measures of the processes of care. Neither are they associated with improvements in survival, functional status, or satisfaction with care.”

Wennberg insists we must resolve to correct the following:

- Under-use of effective care
- Unwarranted variations in care by eliminating “supply-sensitive” variation in service
- Misuse of discretionary treatment

The University of Michigan is eliminating variation in care through its Guidelines Applied in Practice Initiative (GAP). The GAP program, led by U-M, with 10 Michigan hospitals participating, offers evidence-based heart care. Through GAP efforts, 26 percent fewer patients died in the first year after their heart attack when hospitals used quality-improvement tactics. The collaborative project aims to improve use of aspirin, ACE inhibitor, beta-blocker, and cholesterol-lowering drugs, which all help prevent further heart problems.

Simplification of the health care system. We must reduce regulation, reduce overhead, and standardize our processes to eliminate waste. The U-M is doing this through several efforts, including our progressive integration with the Health System. We also are employing lean management techniques. The Michigan Quality System adapts “lean thinking” concepts as a consistent approach to quality and process improvement. MQS builds on the Toyota Production and GM’s Global Manufacturing System to enhance value for the customer. To learn more about our efforts, go to our Web site at www.med.umich.edu/mqs/

Align incentives with behaviors: quality goes up, costs go down, value goes up. We must manage the 10 percent who use 70 percent of the resources. We must develop incentives that encourage prevention, wellness, and low-cost, evidence-based treatment rather than paying “by the widget.”

The University of Michigan has been working on this through a number of initiatives, including our five disease management programs that give patients with chronic illnesses intense education and strong clinical support by proven disease experts so they can learn to self-manage their condition. There is an emphasis on finding those individuals who are in need of extra help and getting them the help they need. The five disease management programs received Disease-Care Certification from the Joint Commission on Accreditation of Healthcare Organizations. The programs—in diabetes, asthma, depression, heart failure, and coronary artery disease—involve collaborative efforts with doctors, nurses, and other clinical specialists.

We also have a Medicare demonstration project. Our Faculty Group Practice was named by the Centers for Medicare and Medicaid Services as one of 10 physician groups—and the only one in Michigan—to demonstrate that improving care in a proactive and coordinated manner also reduces costs. The project seeks to align incentives for physician groups to manage the overall care of their patients, especially beneficiaries with chronic illness who account for a significant portion of Medicare expenditures.

Yet another endeavor is our pay-for-performance research. For example, more than 600,000 Americans have angioplasty procedures to open clogged arteries near their hearts, and treat or prevent a heart attack. A U-M study shows that the quality and risk of their treatment can vary widely depending on where they go—and demonstrates how it could be improved. Before the project’s start, the 3,731 patients treated at the five hospitals in one year received widely-varying levels of care. Many never received drugs that could help prevent complications during or after their angioplasty, while others received far more than necessary of the blood-thinning drug heparin. There was also wide variation in how patients did afterward, including their need for emergency heart surgery and blood transfusions. Five years later, after the intensive quality-improvement project was under way, the 5,901 patients treated at the same five hospitals in that year received much better and more uniform care, including much higher rates of preventive medication use, less use of heparin, and more appropriate amounts of dye. They also did better overall, with lower rates of complications related to their hearts and kidneys.

Finally, there is the National Surgery Quality Improvement Project. In 1999, U-M’s Darrell A. Campbell Jr., M.D., FACS, led the participation in a pilot program to collect and analyze surgery data in a way that would give surgeons the information they need to improve care and reduce complications. Seen as daring at the time, that initial project has since grown to a national effort called the National Surgery Quality Improvement Project (NSQIP). Campbell chairs the NSQIP advisory committee. Results of the project (1991–2001) are impressive:

- Twenty-seven percent decline in post-operative mortality
- Forty-five percent drop in post-operative morbidity
- Decrease of median post-operative length of stay from nine to four days
- Improvement of patient satisfaction

The time is right to make important changes in our system. As Winston Churchill noted, “Americans can be relied upon to do the right thing—after they’ve exhausted all the other possibilities.”

In all seriousness, I believe these are the next changes—for better or worse—that will occur in our country’s health care system:

- There will be a mandate for universal coverage.
- There will be a proliferation of consumer-driven health care insurance products.
- An even more complicated system will develop as Baby Boomers become Medicare-eligible.
- There will be a social consensus and simplification associated with a striking consolidation of the health care insurance industry.

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