High-Tech Health Care: A Lifesaver, But How Much Can We Afford?

by Craig Havighurst

Its trade name is Magnes, after the shepherd who allegedly discovered magnetism. It looks like a small observatory telescope, a sleek white drum with tubes and wires coiling out of one end. It hangs above a bed, on a pivot, from the ceiling of a vault-like containment room. In the space where the eyepiece should be is a concave space designed to fit a human head. Inside the drum, bathed in liquid helium at -269 degrees centigrade, 37 little barrels nestle around the concave indentation, each containing a fiercely sensitive amplifier called a Superconducting Quantum Interference Device.

Never mind how it works. Suffice it to say that instead of sending signals into a body and measuring what comes back out like other imaging devices, Magnes measures the faint electromagnetic fields emitted when pinpoint-sized bundles of neurons wink on and off. Its cost is enormous—well over $2 million—and so is its potential.

Its manufacturer hopes that before long, Magnes will take its place alongside the x-ray machine, Computerized Tomography, Magnetic Resonance Imaging, and Positron Emission Tomography as a standard diagnostic tool. *The Journal of the American Medical Association* reports that the new scanner potentially can aid in the diagnosis of epilepsy, schizophrenia, stroke, and migraines, as well as language, motor, and sensory disorders.[1]

That's the good news. The bad news is that the explosion of health care technologies like Magnes during the past 25 years has been responsible for many of the system's cost problems and, arguably, much of its inequity. Advances in transplantation, intensive care, and diagnostic imaging, to name just a few areas, have sent the cost of caring for the most expensive patients into the stratosphere. While the medical value of these technologies is incontestable, such measures ultimately translate into higher insurance premiums, pricing more and more people out of the market. At the same time, overburdened public health care providers have become less generous as the cost of caring for individual patients has skyrocketed.

Three primary factors drive medical technology's cost momentum.

- First, the cutting edge of medicine represents some of the world's most sophisticated research, so most of it is expensive.
- Second, the way we pay for health care in America invites indulgence in health technology by shielding those who receive the care from its true costs.
- Third, our expectations of what medicine can and should do for any one patient have expanded dramatically through the technological revolution of the past 20 years or so.

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Making matters more complicated, American medicine is being hit with a technological tidal wave driven by breakthroughs in molecular biology, communications, miniaturization, data manipulation, computer graphics, and lasers. We are cataloging the entire human gene map, promising cures for hereditary illness. The Japanese are spending $100 million per year on micro-robots that one day might sail around the bloodstream removing arterial plaque with lasers. Organ cloning may soon eliminate the problem of rejection after transplants. Companies are devel-

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Biomagnetic Technologies, Inc.

Magnes, a high-tech diagnostic tool whose potential—and $2 million price tag—is enormous.

oping bio-chips, little living computers that might exist in symbiosis with the brain.

Demand Takes Off

These advances promise unprecedented control of the chronic illnesses which kill most of us, such as heart disease and cancer. But this remarkable progress finds itself at odds with the broader public policy goal of making basic health care available to everyone. We expect doctors to provide every ill patient with the best treatment medical science has to offer, but the sheer number of ways to run up a $100,000-plus hospital bill has made that impossible. Very soon, we must recognize that turning every discovery into a clinical use, while possible, is prohibitively expensive—roughly the medical equivalent of a manned space mission to Saturn. We could do it, but we'd have to give up spending on other things like pollution control or replacing infrastructure.

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Our health care system could not be designed to absorb new technology any faster or more enthusiastically. Indeed, it seems to provide a ready market for any new drug, device or procedure which might offer better, faster, safer, or less invasive care—regardless of its cost.[2]

Hospitals adopt the new almost as fast as our technology-minded society can invent it. To be sure, some technologies replace more expensive ways of doing things and save money in the long run. Magnetic Resonance and CT scans have replaced much exploratory surgery, and half of all surgery is now done on an outpatient basis—saving billions of dollars. More often than not, however, the new technologies are additive, expanding the possible, rede-

fining the state-of-the-art. This in turn sets new standards and expectations as to what could—or should—be done for any paying patient.

The problem is not the technology itself, but the way we pay for it. For decades, our massive and decentralized health care system has hidden the true cost of care from patients and doctors alike. That's because, in most cases, a third party—usually the government or an insurance company—pays the bill. Insured patients might have to pay a deductible on their claim, but they know that whether their hospital bill is $3,000 or $30,000 or even $300,000, they will be covered for the insured procedures and situations outlined in their policies.

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Because third-party-payer medicine makes the demand for high tech medicine almost insatiable, technology proliferates faster in America than anywhere else in the world. There are more than 900 Magnetic Resonance (MR) scanners in the United States, but only 12 in Canada (which has a national health care system with many cost controls in place). And where technology is abundant, it may be overused. America performs 10 times more coronary bypass operations per capita than the British, and seven times more hysterectomies.[3] American doctors would defend these operations as medically necessary, but it's equally likely that Americans undergo all these operations because it's so easy to get them. Studies have shown similar variations in the frequency of various procedures in the United States.

At a societal level, health care costs are hidden because the system allows them to squeeze quietly into other parts of the economy. Since 1950, while national expenditures on medical care as a percentage of the Gross National Product have nearly tripled, the percentage of after-tax income families devote directly to health care has actually declined.[4] This leaves a gap between what we seem to be paying for cutting-edge medicine and what we're actually paying.

Ultimately, of course, the costs wind up in our lap one way or another. Some are obvious. Federal taxes fund outlays of more than $170 billion per year for Medicare, workers' compensation, veterans' hospitals and more. State and local revenues finance local hospitals, clinics, and state Medicaid programs. All in all, public funding for health care jumped about 150 percent in the 1980s alone.[5]

Other parts of the health care burden are borne in ways we don't even realize. We pay a sort of hidden health care tax every time we end up in the hospital because as much as a third of many hospital bills is devoted to covering the hospital's losses for care given to those who can't pay. Finally, we pay every time we buy anything, because private employers which insure their own work forces pass that cost along to consumers. Consider the Ford Motor Company: It spent one billion dollars in 1989 on employee health insurance,[6] adding $700 to the price of a new car.

America has accepted these hidden taxes for a long time, because it looks as if we're getting something priceless—lifesaving health care—for nothing. But it's an illusion passed off by a giant organization which, as one observer, David Eddy of the Center for Health Policy Research and Education at Duke University, put it, "launders costs to the point of invisibility."[7] We speak of a health care *system* in America, but there really is no such thing. Instead, we make do with a loose, sprawling network of private hospitals, state Medicaid programs, federal regulatory agencies, biotechnology firms, health maintenance organizations, county health clinics, insurance companies, charity providers, pharmaceutical firms, academic medical centers, research foundations and so on. The problem is that there is no mechanism built in to ensure that the $600 billion we spent on health care in 1990 truly reflected how much we actually value the service.

Usually, we leave the job of finding the right amount to spend on goods and services to markets, but the health care industry doesn't behave that way. For one thing, consumers of health care don't make decisions about what they want or need; physicians do. Nor do patients weigh one mode of treatment against another on the basis of cost when the government or an insurer or other third-party payer is picking up the bill. Doctors frequently have less incentive to think about cost than the patient.

Society vs. the Individual

The specific ways in which high technologies run up costs all spring from a law of our health care system which is about as constant as the law of gravity. Once a cure, or even the promise of a cure, is discovered for a particular ailment, we cannot or will not let it sit unused just because it costs a lot. Because life and health are priceless, we cringe at making price an issue. And it's easy to pursue money-as-no-object health care when it's a third-party payer's money.

Consider the case of autologous bone marrow transplants for metastatic breast cancer. This very new procedure gives otherwise terminally ill women about a 20 percent chance of being cured. Bone marrow is temporarily removed to allow huge doses of chemotherapy. It takes at least three weeks in isolation, puts the woman at about a 10 percent risk of dying from the procedure itself, and costs roughly $150,000.

It's disconcerting to think about, but this is about as clear an example as there is of how modern medicine has pitted the interests of the individual against the interests of society. From the patient's point of view, and her family's, the $150,000 is well spent—an expensive life raft. From society's point of view, that money might be better spent on vaccinations and primary care for hundreds of sick, uninsured children.

The use of radiologic contrast media is another case in point. Prior to some imaging procedures, doctors inject substances into patients which are designed to make tissue or concentrations of chemicals show up on an x-ray or a scan. Until now, out of the 10 million patients receiving contrast media annually, 300 have died from severe allergic reactions. A new agent which is 10 to 15 times as expensive will soon save those 300 lives, while costing the health care system at least $1 billion annually, or over $30 million per life saved.[8]

Successful technology breeds yet another problem. Because measuring the real medical value of a new procedure or diagnostic tool takes many years, dubious technology may become part of the standard medical repertoire. For instance, the use of monitors to keep track of a child's heartbeat prior to, and heartbeat and respiration during, childbirth can be life-saving in high-risk pregnancies. But it has been shown to be virtually useless in normal pregnancies. In addition, many doctors hypothesize that oversensitivity to the machines led to the dramatic increase in caesarean sections over the same period. Nevertheless, widespread use of the procedure is the status quo.[9]

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Perhaps the most difficult technology-versus-cost problem springs from our ability to save and prolong the lives of ever-younger premature infants and ever-older comatose patients. Care and research at the frontiers of birth, life, and death cost thousands of dollars a day per patient. Meanwhile, ethical and legal debates rage over whether the care offered is beneficial or just a cruel and artificial prolongation of lives which offer no change and no hope for the future. Former N.C. Secretary of Human Resources Sarah T. Morrow, a physician, puts it this way: "Doctors will continue to save lives at all costs until it becomes accepted by society that we should not prolong death." These questions of ethics may not be settled for years, but, as one futurist writes, "Controlling the high cost of dying will become [a] focus of third-party expenditures in the 1990s."[10]

FOOTNOTES

[1] Andrew Skolnick, "Biomagnetometry Provides a New Compass for Exploring the Brain and Heart," *Journal of the American Medical Association,* Vol. 263, No. 5, Feb. 2, 1990, p. 623.

[2] Victor R. Fuchs, "The Health Sector's Share of the GNP," *Science,* Vol. 247, No. 4942, Feb. 2, 1990, p. 537.

[3] "Warning: doctors can damage your wealth," *The Economist,* Oct. 20, 1990, p. 18.

[4] Joseph D. Bronzino, et al., *Medical Technology and Society,* MIT Press, Cambridge, Mass., 1990, p. 57.

[5] *Health Care Financing Review,* U.S. Health Care Financing Administration, Winter 1990, Vol. 12, No. 2, p. 14, Table 10.

[6] Katherine Barrett and Richard Greene, "Health Care Triage," *Financial World,* June 27, 1989, p. 42.

[7] David Eddy, "The Individual vs. Society: Is There a Conflict?" *Journal of the American Medical Association,* Vol. 265, No. 11, March 20, 1991, p. 1146.

[8] Henry Aaron and William B. Schwartz, "Rationing Health Care: The Choice Before Us," *Science,* Vol. 247, No. 4941, Jan. 26, 1990, p. 206.

[9] Interview with Robert Sprinkle, M.D., Ph.D., assistant professor, Center for Health Policy Research and Education, Duke University, January 1991.

[10] Russell C. Coile Jr., "Technology and Ethics: Three Scenarios for the 1990s," *Quality Review Bulletin,* June 1990, p. 442.