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## Health Care Rationing: What it Means

HENRY J. AARON

The United States spends more on health care than any other nation.

In 2003, medical spending made up more than 15 percent of U.S. GDP, and if historical trends persist, this share will climb to more than one-third of GDP by 2040.

With medical technology advancing at an ever-increasing rate, the potential for spending on procedures not worth their costs is growing. But there are

few good ideas for reining in medical costs without hurting patients.

One approach, used in Britain for many years, is rationing. This brief examines many of the issues involved with rationing health care by applying its principles to radiology, using examples from the budget-limited British health system. There, policymakers and medical providers routinely grapple with two difficult and value-laden questions: How much should be spent on the expensive but life saving technology? And how much should be spent on very costly research to evaluate that investment?

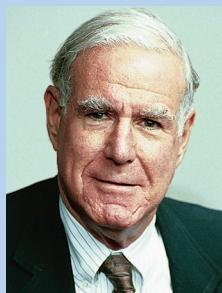
The United States has not had to confront such issues. But as outlays rise, the need for the government, private insurers or employers to set health care spending priorities will intensify. It is time for the United States to begin investing in the knowledge it will need to control growth of health care spending.

Markets operate in a simple way to encourage efficient consumption. Consumers buy things if they are

worth more than they cost. The key to efficient market outcomes is that prices reflect costs of production. The



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market for health care does not operate that way. Once health bills exceed insurance deductibles, patients pay little or nothing for their care, however high the cost and however small the benefit.

Managed care sought to curtail high-cost/low-benefit care—that is, to ration—by various forms of private regulation. It failed principally because consumers' incentives to seek all beneficial care overwhelmed administered limits managers sought to impose. Other nations have rationed health care for years by setting health care budgets or regulated fees, effectively controlling the numbers of hospitals or the amount of medical equipment, or other devices. None spends nearly as much as the United States does, and many achieve dramatically superior health outcomes, at least as measured by such gross indicators as life expectancy and infant mortality.

If per capita health care spending continues to outpace income growth by the same margins as have prevailed for the past forty years, current projections indicate that total health care spending will claim more than one-third of national output by 2040. The increase in health care spending would absorb half of all economic growth by 2022 and all of it by 2051. Medicare and Medicaid spending as a share of GDP in 2040 would be as large as all income and payroll taxes are today.

Most spending will be for services well worth what they cost. In a recent article, Kevin Murphy and Robert Topel determined that increases in longevity between 1970 to 2000 added to national welfare about as much as did all economic growth. There is every reason to anticipate that future medical advances will be equally beneficial. But as total spending grows, so too will the scope for spending on care worth less than it costs. Even now, it would be desirable to curtail low-benefit/high-cost care—that is, to ration. As spending rises, the incentive to ration will intensify.

This brief and a companion to follow examine some of the issues that health care rationing raises. First, how can rationing be done "rationally"? As British economist Alan Williams put it: "Only when we can be satisfied that the most valuable thing that we are not doing is less valuable than the least valuable thing that we are doing, can we be sure that we are being efficient in the pursuit of welfare." This brief will apply that principle to diagnostic and interventional radiology to illustrate how difficult this standard is to meet. How can one decide whether spending on a particular technology is too high, too low, or about right? The second brief draws on a comparison of the treatment of coronary artery disease in the United States and Great Britain to see what happens when rationing is excessive. It concludes by arguing that extension of health insurance to virtually all Americans is

necessary not only because it is fair and just, as many have argued, but as a precondition for imposing effective and equitable cost control. Essentially, universal coverage is necessary to enable health care administrators to squeeze out waste and inefficiency.

### DIAGNOSTIC AND INTERVENTIONAL RADIOLOGY: HOW MUCH IS ENOUGH?

All competent doctors and well-informed patients realize that physicians are usually at least a bit unsure about the precise cause of various signs and symptoms, as well as about the best method of treatment. Doctors try to improve information in various ways, frequently by prescribing tests. An ideal test is cheap, produces no adverse side effects, and is accurate in two senses: it always identifies a pathology when it is present and confirms its absence when it is not present. Even accurate and safe tests can be worthless—for instance, when no effective treatment is available.

Resource limits are likely to raise the standards that new diagnostic methods must meet before adoption. Although British scientists pioneered the development of computed tomography (CT) scanning, the United Kingdom was slower to adopt this technology than was the United States. The same has been true of adoption of the next imaging devices—magnetic resonance imaging (MRI) and positron emission tomography. The critical question is

whether the British wisely conserved limited health care resources for more important services or needlessly sacrificed patient welfare.

The differences between use of computed tomography and magnetic resonance imaging in the United States and in Great Britain illustrate the dilemmas of health care rationing. If resources dedicated to health care are limited, something has to be sacrificed. But what? And exactly how much? The answers to these questions require large amounts of information that is very costly to develop and is not currently available.

### CT SCANNERS

Until the late nineteenth century, the internal workings of the human body could be observed only through exploratory surgery. Then, Wilhelm Roentgen discovered x-rays. X-ray photographs readily distinguished bone and fat from other tissue but can not differentiate among types of soft tissue. In 1972, Godfrey Hounsfield of EMI Laboratories and Allan McLeod Cormack of Tufts University independently invented what was initially called computed axial tomography—now shortened to computed tomography (CT). A CT image, or scan, starts with multiple x-rays generated by an x-ray tube rotating around the patient's body. Computer software then integrates these photographs into a single image or “slice.” Sequential slices made by a CT scanner can distinguish normal tissue

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from tumors or abscesses, thereby identifying the size and pinpointing the location of such abnormalities.

The speed and clarity of CT scans have improved dramatically since early applications. Modern scanners can take up to 192 slices a second. They can now be used on any part of the body, such as the lungs, during a single breath-hold of five to ten seconds. Improved software enables three-dimensional images of whole organs. Radiology has split into two distinct medical fields: diagnostic and interventional radiology. Diagnostic radiologists, for example, identify the presence, size, and location of tumors. Interventional radiologists can now guide biopsies, place some stents, and guide the ablation of cancerous tissue. Experiments are under way to use CT scanning to replace invasive colonoscopy and angiography of coronary arteries. CT scans have rendered obsolete several more costly, riskier, and more uncomfortable procedures.

Adjusted for population, the United States currently has about four times as many scanners as Britain does—29.4 versus 7.1 per million in 2001—and performs about four times as many scans—128,000 per million versus 30,297 scans per million. Two decades ago one radiologist said that any hospital with 200 or more beds and a diverse caseload could justify having a CT scanner. U.S. hospitals reached this standard in 1985. The United Kingdom had not reached this standard in 2004.

## MAGNETIC RESONANCE IMAGING

Magnetic resonance imaging (MRI) first entered medical practice in the early 1980s. The procedure was first called nuclear magnetic resonance imaging. In fact, MRI does not use ionizing radiation. It is actually safer than other imaging techniques, such as common x-ray and CT scanners. Nevertheless, MRI practitioners jettisoned the “radioactive” adjective because of concern that the word “nuclear” would scare off patients wary of dangerous radioactive substances. MRI exposes the body to a strong magnetic field that causes the nuclei of hydrogen atoms—a major constituent of water, the principal constituent of human bodies—to line up along one axis. A radio beam is then focused in a particular direction through a virtual “slice” of the body, causing a tiny fraction of these nuclei to absorb energy and change rotational direction along two axes. When the radio beam is turned off, the nuclei return to their original alignment. In the process, they emit the radio energy they have previously absorbed. Different tissues emit energy at various rates, permitting sensors to form an image of the slice. The radio beam can be aimed at different angles through the body, a feature that permits a picture in any desired orientation without requiring the patient to change position. MRI images are sometimes superior to those generated by other imaging methods.

As hardware and complementary software improved and knowledge accumulated, more and more uses of magnetic resonance imaging have emerged. Magnetic resonance spectroscopy can identify the chemical composition of tissues. Magnetic resonance angiography is used to measure blood flow and map the anatomy of larger arteries. Functional magnetic resonance is used extensively in research on neural activity inside the brain. These technically dazzling advances leave open the central question—whether and in what situations MRI improves patient outcomes.

As with CT scanners, the United States has far more MRI machines than do the British (17.4 versus 6.74 per million population) and performs more procedures (63,200 exams per million of U.S. population, nearly five times the rate in England—12,874 per million). MRI exams in the United States represented just under one-third of the worldwide total in 2001.

### HOW MUCH IS ENOUGH?

British radiologists I consulted all reported that machines were less of a constraint than trained personnel and sufficient budget to keep available machines running. Staff shortages force British facilities to rely on radiographers, rather than physicians, to read films. According to British standards, every film is supposed to be read by at least two people, one of whom should be a physician. Radiologists admit that

failure to meet this standard is common. One radiologist reported that thousands of films at the facility where he had worked were never read at all. Because of meager staffing, British radiologists are unable to specialize on particular organ systems to the degree that is common in the United States.

Repeated interviews produce a composite picture in which British radiologists believe that they are simply unable to provide high quality care for everyone. Waiting lists are the most visible manifestation of shortages. According to official guidelines, all cancer patients requiring scans are to receive them within two weeks. But patients with conditions that are merely painful often wait much longer.

So we were running big long waiting lists. But, in practice, there were only certain types of diseases where you could wait ten months or two years for your MRI or your CT scan. Lumbar back problems, knee problems. If it was a case of cancer, some other solution had to be found.

When asked what criteria are used to screen candidates for interventional radiology, one practitioner answered bluntly:

Lottery. ...Near St. Thomases [a major London teaching hospital] is a district general hospital. You're admitted with a complete... inability to swallow because of a narrowing due to cancer, then you

*"That the scarcity of machines, staffing, and money have reduced availability, eroded quality, and influenced clinical standards of therapy seems inescapable."*



won't get an esophageal stent, a tube that will open that narrowing, today or tomorrow or for the next two weeks, because there's no radiologist there that can do the procedure.

Who undergoes "lottery rationing" depends in part on where one lives, as facilities are unevenly distributed across the nation.

The staff didn't put up with this nonsense. So there was a bypass mechanism. If you had staff who needed a scan, they got it in a sensible time, and the staff's relatives would also bypass the whole system and get a scan done for them....[S]o, if you wanted something, had no money, it was best to have a relative in the hospital system who generated some goodwill, so that, again, they could bypass the waiting list and so on and get done pretty quickly.

Given the lack of radiology capacity in the National Health Service, money counts because it enables patients to buy scans privately.

Attitudes of British radiologists differ systematically from those of U.S. physicians regarding the need for and desirability of CT and MRI scans. In U.S. emergency rooms CT scans have become routine. In the largest hospital in the Washington, D.C. metropolitan area, for example, triage nurses routinely prescribe CT scans before

physicians have seen patients. In all, about one-third of all ER patients are scanned. The reactions of British radiologists to such free use of CT scanning vary. One who acknowledged that the United States was way ahead of Britain in emergency room radiology admitted chagrin that only in leading British trauma centers was scanning capacity routinely available at all times. Others expressed the view that U.S. physicians scanned more people than is medically or economically warranted.

### RATIONAL OR IRRATIONAL RATIONING?

That the scarcity of machines, staffing, and money have reduced availability, eroded quality, and influenced clinical standards of therapy seems inescapable. What is unclear is whether the large difference between British and U.S. spending on radiology reflects a sensible decision on how to allocate scarce medical resources. Although the anecdotal testimony of most British physicians I interviewed suggests significant loss of potential benefits, not all agree, and quantitative measures of impact on patient outcomes are nonexistent.

A formal framework for evaluating the worth of improvements in diagnosis illuminates the problem. U.S. analysts have suggested that a complete evaluation of improved technology, such as diagnostic imaging, requires six kinds of studies:

1. Does the test perform as intended in

a physical sense? For example, can a newer CT scanner distinguish tumor from normal tissue more effectively than an older model?

2. Is the test sensitive and specific? For example, does a stress test accurately show heart disease when it is present and clearly indicate its absence when it is not?
3. Does the test alter the clinician's diagnosis? When simple methods work, sophisticated techniques may add nothing but cost.
4. Does the test affect the patient's treatment? Accurately diagnosing a condition for which no effective treatment is available has little value.
5. Do the test and associated changes in treatment improve patient health?
6. What are the social consequences of the test as measured, for example, by cost effectiveness when compared to another procedure?

Evaluations of the first and second types are most common. A count of studies of magnetic resonance spectroscopy for brain tumors through 2004 revealed eighty-five level-one studies and eight level-two studies had been performed, but only two level-three studies, two level-four studies, and no level-five or level-six studies. Yet it is level-five and level-six studies that are most relevant for administering limited health budgets.

To further complicate matters, the findings of each of the six types of studies of efficacy are highly specific to particular illnesses. CT or MRI may significantly improve diagnosis or treatment of one type of cancer, but not another. Simply showing that a new machine produces sharper images in less time than an older machine means little. For example, imaging can distinguish whether a patient is suffering from the early stages of Alzheimer's disease or some other form of dementia. But the treatment, which is the same in either case, has only small benefits and negligible negative side effects. Therapy to slow the advance of Alzheimer's is therefore nearly always indicated whatever the outcome of screening. For that reason, the test is not worth the cost, even though it is diagnostically accurate. In still other cases, imaging is acknowledged to produce benefits, but the benefits are small relative to cost. Audiologists frequently prescribe an MRI for patients with hearing loss because there is a small chance—about 1 in 100,000—that the problem stems from an acoustic neuroma, a tumor that is ordinarily treatable and that the test will reveal. U.S. physicians will often prescribe the test. British physicians said they seldom would.

These two examples suggest the difficulty that planners face within a budget-constrained system. Judgments about the value of imaging vary widely and are highly specific to particular conditions. Furthermore, many costly studies, each



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of a particular condition, are needed to show whether the test improves patient outcomes at reasonable cost. Few such studies have been carried out relative to the huge number of discrete medical conditions.

The lack of such studies means that everyone is flying blind—or, at least, with obscured vision. Planners administering a limited budget do not know how many or what kinds of machines to buy or how extensively to staff them. And physicians do not know on which conditions the new equipment will produce demonstrable improvements in patient outcomes. Every British radiologist I interviewed expressed the view, usually with caution and invariably with courtesy, that the United States wastes a lot of money on diagnostic equipment and tests that produce little or no benefit to patients. They also indicated that the British spend too little on imaging, with

the result that physicians often lack the information to provide patients life-saving or pain-relieving care.

The British have faced the same problem in deciding how much to spend on diagnostic and interventional radiology that any budget-constrained system would face with respect to all discrete investments. How much should be spent on the investment? How much should be spent on very costly research to evaluate that investment? The United States has not had to confront such questions. But as outlays rise, the need to set health care spending priorities will intensify. It is time for the United States to begin investing in the knowledge it will need to control growth of health care spending. The information will be needed whether the controls come from the government, private payers, or new entities yet to be formed. 

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