William Schwartz’s survey of emerging medical technologies is a thoughtful and comprehensive review of innovation in biomedicine. It contains the first glimmer of optimism in his writing that definitive therapies, such as gene therapy for inherited disease, may actually lead not only to improved outcomes but to potential major cost savings. This is a welcome departure from the unremitting pessimism about the fiscal consequences of technological progress that has characterized his past writings.

It is clear from Schwartz’s review that we are crossing a technological divide, from in innovation driven by engineering (technologies that come in large boxes or on flatbed trucks) to biologically driven innovation (technologies that come in trays of vials). He is correct that the short-term cost impact of this transition could be explosive. As has been the case for the past century, diagnostic innovation will run far ahead of new therapies. This will be particularly true of gene probes and sophisticated blood testing. These technologies will be driven by consumer demand, more than by clinical activism, and represent the leading edge of a multi-billion-dollar new business.

We know frustratingly little about how technology affects health costs. The paper by Joseph Newhouse that Schwartz cites is an example of the current analytic approach: factoring out of aggregate cost increases the contribution of population growth, aging, inflation, and labor costs and declaring confidently that somewhere in the large residual increase lurks “technology.” This surely is not a satisfactory approach.

Technology is not a monolithic force, and its impact on cost is subtle and complex. Medical technologies are not inherently cost-increasing. Individual technologies differ markedly along a number of dimensions that, carefully delineated, could help predict their cost impact. Technologies may (1) expand or leave constant the population of those at risk for medical treatment; (2) reduce or increase the unit cost of treatment; (3) reduce or increase the risk of complications; (4) reduce or increase clinical incomes or hospital revenues; (5) require repetitive use or eliminate the need for further treatment; or (6) improve or complicate the patient’s quality of life. Until we have studied and quantified these effects, we cannot substitute a scientific for a largely religious view of technology’s impact, let alone create sensible, manageable payment strategies.

My impression is that of these effects, the population and provider-income factors are the most explosive. The latter explains why laparoscopic surgery did not aggressively expand beyond cholecystectomy into removal of other internal organs: Other specialists were not threatened with economic extinction as were the general surgeons, who seized on laparoscopic surgery to defend their franchise inside the main body cavity.

The population effect helps explain the late 1980s explosion in health costs, which was driven by the expansion of treatable illness stemming from less invasive diagnostic tools like magnetic resonance imaging (MRI), ultrasound, and flexible scopes. People with mildly symptomatic joint disease, who prior to less invasive technologies were
unwilling to subject themselves to long hospital stays and even longer rehabilitation, became candidates for arthroscopic treatment and repair. As this scenario repeated itself across other venues (eye, coronary artery, and lower bowel, to name only three), ambulatory services costs exploded, contributing to the late 1980s rise in health costs.

Genetic testing promises to expand the population at risk for treatment to everyone in the society, since each of us has a unique signature of inherited genetic risk. Despite the lack of a definitive causal link between a given pattern of genetic lesions and polygenic diseases such as cancer, and because of the predictable lag in development of effective gene therapies, we can anticipate an explosion of genetic testing and periodic monitoring, and intervention with less-than-conclusive technologies to ameliorate that risk. It will take great restraint by providers and payers to prevent the first twenty years of genetic testing from pushing our health care system over the edge.

The real prospect of Medicare coverage of prescription drugs also puts a powerful new tool for affecting the pace of innovation in the hands of policymakers who may not be ready to exert their power responsibly. Nervous financial markets have stripped away nearly $100 billion in market value from our nation’s biotechnology and pharmaceutical firms, as the new regime threatened them with the blunt instrument of price controls. As they staff up with pharmacoeconomists, these firms, which lead the world in biomedical innovation, correctly anticipate the need to defend the benefit/cost relationship for their products. Some way must be found of rewarding these firms in some measure proportionate to the cost and quality-of-life benefits their products confer. Firms that produce the vaccines and gene therapies that truly extinguish major disease risks are entitled to significant returns on their investment. Those that merely copy, with small molecular modification, an existing drug have a weak claim to any returns. Sorting out strong from weak claims to health dollars, unless we are willing to make explicit what we expect our citizens to do in managing their own health, and assure that everyone participates economically in the consequences of health care use (in proportion to their available resources), the twenty-first-century American health cost problem will be even less tractable than it has been during the past thirty years.