Interview

Transformative Technology: A Conversation With E. James Potchen And Bill Clarke

Connections between academe and industry are keys to progress in health care technology and innovation.

by John K. Iglehart

ABSTRACT: In this interview, a representative of academe (E. James Potchen) and one from industry (Bill Clarke) discuss the ways in which their interests intersect for the good of U.S. patients. The focus here is on imaging, which shows great promise in transforming medical treatment from invasive practices involving hospital stays to imaging procedures that can be performed easily and safely on outpatients. Subjects include the state of the industry, coming innovations, and the contributions payers (including Medicare) can make as they struggle with rising costs and difficult-to-quantify payoffs. [Health Affairs 26, no. 2 (2007): w227–w235 (published online 13 February 2007; 10.1377/hlthaff.26.2.w227)]

John K. Iglehart: I suspect that many of our readers are not steeped in the biomedical imaging enterprise, nor do they know what a formidable component it has become in clinical medicine. What is its size now, based on measurements that you consider important: annual sales revenue, total profits, advanced imaging machines in place per 100,000 population, current estimated expenditures by government and private insurers who pay for medical imaging procedures in the many forms they take, and other measures that would give readers a firm grasp of the growth of this sector of the medical economy?

Bill Clarke: The estimates for the 2005 sales of imaging devices in the United States are $8.1 billion. This is a significant amount of money, but, to put this in perspective, the estimate for 2005 U.S. sales for all medical devices is $108 billion, and the estimate for pharmaceuticals is in the range of $500 billion. Thus, imaging equipment is small relative to all devices and to pharmaceuticals.

Iglehart: What do we know about the amount and type of imaging technology per capita in the United States and other countries?

Clarke: I am not aware of solid data for countries outside of the United States. It is true that there is more imaging equipment per capita in the United States than in most western European countries. As for the United States, the best data I know of indicate that in aggregate there are about five or six CT [computed tomography] scanners, MRI [magnetic resonance imaging] scanners, and PET [positron-emission tomography] scanners per 100,000 population in the United States.

E. James Potchen is the University Distinguished Professor and chairman of radiology at Michigan State University in East Lansing. At the time of this interview, Bill Clarke was executive vice president and chief technology and medical officer, GE Healthcare, in Chalfont St. Giles, United Kingdom, and Waukesha, Wisconsin. Clarke is now president and CEO of Cellectar, a Madison, Wisconsin–based company developing radiopharmaceuticals for cancer therapy. John Iglehart is the founding editor of Health Affairs.
Iglehart: Would you consider that an excessive amount or about the right amount in terms of the value of these technologies to clinical medicine?

Clarke: That’s the crucial question: an excessive amount compared to what? Is it more than other countries? Yes. Is that a sign of bad health care investment? I really don’t think it is. It is my strong feeling that noninvasive imaging has so revolutionized medical practice by leading to early, more precise, and much less morbid diagnosis that this is a good health care investment. I would posit that there is a lot more waste and lack of beneficial impact on health care outcomes and health care finances for poorly prescribed or poorly utilized pharmaceuticals than is the case for imaging.

Iglehart: Medical imaging has made great strides in the past decade in improving physicians’ capacity to diagnose and treat disease. In lay terms, how will these advances help patients?

Clarke: The technology can have a profound effect on patients by allowing much earlier and more precise diagnosis of disease. More importantly, there is real potential to use new imaging technology—especially imaging of real-time molecular processes—to monitor response to therapy. Thus, instead of waiting many days or weeks, or frequently months, to determine if a therapy is working, there is a strong likelihood that in a few years’ time we will be able to see if therapy is working in days.

Iglehart: What advances in research and development have paved the way for the progress that you have described?

E. James Potchen: It is the marriage of applied engineering, applied physics, and applied mathematics in relation to medicine, in addition to just biology alone.

Clarke: That’s true, but if there is one single brief answer to the question of what is driving advances in imaging, it would be computing power—the ability to bring to bear massive amounts of computing power in real time—that has made the most difference.

Potchen: I agree.

Iglehart: Do most of these strides forward come out of large university research settings?

Potchen: The initiation is largely academic, but the proof of practice is rapidly observed among physicians and developed within industry. When you see a dramatic new virtual image of the heart, are able to turn it around in three dimensions, see its structure and how it works without invasive surgery or waiting for the autopsy, to clarify what went wrong—that represents real progress. It dramatically changes the capacity of what a clinician can learn about a patient without invading the patient’s body. You no longer have to open the patient up and rummage around. These imaging advances rapidly diffuse out to the community—too rapidly in some instances—when technology is adopted prematurely. That’s where the tension is in the system. You can make such dramatic strides in what you can see that people say, “My God, we’ve got to do that,” without really testing the implications of the additional information.

Clarke: I agree; the vast majority of time, the ideas come from academe. However, the technology is so complicated that in most cases there has to be an industry partner to actually pull all of the bits and pieces of the technology together, even in the experimental stage.

Coming Advancements In Imaging

Iglehart: Medical imaging seems to be entering a golden era where it has a great deal more to offer the practice of medicine in both diagnostic and therapeutic regimens. What’s next on the horizon, in terms of advancements?

Potchen: The big progression in imaging technologies now is going to be minimally invasive oncology. For example: surgery is now a standard approach for the excision of uterine fibroids. Focused ultrasound ablation of the tumor is now possible and feasible without invasive surgery. We can now remove tumors and treat the disease with a noninvasive procedure—this is interventional oncology. Radiofrequency ablation of breast tumors can be effective without undertaking a surgical excision. Patients no longer have to go through the somewhat more risky and more costly procedures. In addition to oncology, other noninvasive approaches are making a dramatic
change in the way patients' conditions can be managed with less cost and greater safety. Coronary artery patients are now frequently managed with statins or stents—the stents having replaced more invasive coronary bypass surgery. However, whether or not a statin is working effectively to change regional myocardial blood flow is not readily evident without an imaging technique. Coronary CTA [computed tomography angiogram] can clearly define the effect of a drug on the coronary blood supply without necessitating invasive angiography. This is considerably less expensive than coronary angiography and bypass surgery. The uses of these technologies enhance diagnostic accuracy and enable less invasive types of treatment—be they statins or stents. While these treatments may be less expensive and less invasive, the charges do not always fall by a commensurate amount.

Iglehart: How are these improvements changing radiology as a specialty in terms of incomes and workforce issues? Are teaching institutions training as many radiologists as may be required, given the advances in imaging?

Potchen: Incomes have increased. They are higher than other medical practices largely because of the professional component. This component—paid to the physician for performing and interpreting an examination—has historically been in part related to the total cost of the procedure. Thus, as the technical cost of the equipment increases, the total monies generated by the procedure increase, and the relative amount a physician can earn also increases. However the income earned from diagnostic imaging in part relates to what people perceive of as value. And the value that other people have seen in these technologies has been greater than some other things that doctors do. This value is based upon what is the perceived opportunity cost in that the approach using imaging technologies is frequently safer and less costly than what was previously considered standard practice.

There has been a concern by some that radiologists have enjoyed a monopoly in hospitals. Where and when this has occurred, other physicians have readily jumped in to seize the opportunity to generate revenues through imaging procedures. For example, cardiologists perform a major share of the coronary angiography. However, with the advent of less invasive imaging of coronary arteries, this, too, might be changing, in that the total income for physicians from these procedures used in diagnosing coronary disease is likely to diminish.

Overall, money has shifted to imaging technologies. Has the shift been too great? That is for others to judge, but income shifts are not all that unusual across medical specialties. Take cardiology. For years, the cardiac surgeons were in the driver's seat, performing invasive procedures like open-heart surgery and earning large incomes. Now the cardiologists have jumped into that fray with less invasive therapeutic approaches—prescribing statins and stents—that are replacing open-heart procedures and taking business and thus income away from cardiac surgeons. Cardiologists have also entered the diagnostic imaging world in a major way, in essence taking business away from radiologists. But you should recognize that clinical medicine is an ever-changing enterprise.

**Radiology Workforce Implications**

Iglehart: Given that cardiologists, orthopedists, and other physicians are moving into clinical space that traditionally was the exclusive province of radiologists, what are the implications for the physician workforce? Is there a surplus, a shortage, or just about the right number of practicing radiologists?

Potchen: There definitely is a shortage of radiologists. Part of the reason is that diagnostic imaging has become a 24/7 activity, and a facility needs far more personnel to cover it. Another big reason is that while some of the diagnostic interventional procedures are
decreasing in number, the number of images to be read has increased dramatically. The time it now takes to read a multislice CT is considerably greater than it was just a few years ago. These imaging tools have also become important in therapy as well as diagnosis. While invasive angiography is declining, it is being replaced by noninvasive studies like MRI angiography. But what has really increased is the amount of data per patient: hundreds of images rather than one or two. And it takes more time to go through these thoroughly.

**Iglehart:** As cardiologists and other specialists have moved into the traditional space of radiologists, how do you view this development?

**Potchen:** In my opinion, the person most knowledgeable who can deliver the greatest value to the patient ought to be doing whatever work needs to be done. I think it’s measurable. I think you can see where value is added. In imaging, the business is reduction of uncertainty. So, I have no turf battles with anybody. As a chair of radiology, I am an outlier; most of my peers think there is a lot of competition roiling the imaging space. I see no competition. There’s so much to do, and there’s no need for the competition. I don’t feel competitive with anybody.

**Imaging Capacity**

**Iglehart:** Is the United States anywhere near the point at which there’s too much capacity in the system to perform imaging services?

**Clarke:** The question of capacity really hinges on the question of “capacity to do what?” There is certainly a lot of capacity to do imaging in the United States, and it is unequally distributed. Thus, one might argue that there is too much capacity for certain types of imaging in certain geographies. One approach some states have pursued is the use of certificate-of-need to blunt capacity growth. However, I think the more important issue from a health policy standpoint is this: “What is the demonstrable value of imaging in improving health care and in substituting imaging in diagnostic processes for other, less effective diagnostics or even in substituting imaging for certain interventions and therapies?” The short and unfortunate answer is that we really don’t know when imaging is the most effective next step in health care—and when we use too much or too little. We simply don’t know.

**Potchen:** Wow! What a question. There is not too much capacity in people who have expertise at it. There is, no question, a lot of capacity—it is so profitable to buy a machine and put it in your office—that it becomes the dominant source of income for many physicians independent of their training. For example, ultrasound is being done widely by a lot of physicians, and it becomes a very important part of their revenue stream. Then there is the issue of physicians who self-refer their patients to facilities in which they have an ownership interest. It’s only human to expect people to want to use equipment they own or are invested in once it is installed in their office. When I was in general practice, I had an x-ray machine. And there’s no question: I would weigh in my mind whether to order an x-ray based upon whether I could do it on the machine in my office. That’s just the way people’s brains function.

**Does The Setting Matter?**

**Iglehart:** Over the past decade, the growth in the number of freestanding diagnostic facilities has accelerated rapidly, many owned by radiologists, cardiologists, and investors. Is that as appropriate a setting for imaging as a teaching hospital or any other kind of inpatient or outpatient hospital facility?

**Potchen:** There is no question that the free-standing imaging center is becoming an increasingly important part of the entire diagnostic imaging activity. One reason is that hospitals are not needed for an awful lot of medical care. If anything, there is too much inpatient capacity because so much care has shifted to ambulatory settings. There is no longer a need for patients to spend the night in a hospital to get something diagnosed. For example, not long ago we used to do laparotomies to investigate what’s going on in the abdomen. Now, a patient can undergo an outpatient CT scan at far less expense, pain, and inconvenience, and the physician can glean
more information than previously possible from an invasive laparotomy. In the past, when most imaging was conducted in a hospital, an important part of the hospital revenue stream from this service would come from a technical component. Now, the technical component is earned by physician-owners of freestanding facilities. That is part of the reason why these facilities have become attractive investments for physicians and others.

Clarke: Jim has made two important points here that I want to underscore. First, he talks about how imaging has replaced a number of things we used to do in medicine. The example I give is the same one he has just used: When I was in clinical training, we used to do a very great number of so-called exploratory laparotomies. This was a large surgical procedure where the entire abdomen was opened to determine the problem. These were expensive and very morbid operations. They are virtually unheard-of now. This is a prime example of what I call “substitutive technology.” CT and MRI of the abdomen have virtually replaced these morbid, expensive, and often not very illuminating procedures with quick and safe diagnostic exams. Yet since we don’t have the historical data on the aggregate direct and indirect costs of exploratory laparotomies, we have no idea how much we have substituted for. What we do know is only the current cost side of the equation: that the costs for abdominal CT and MRI are rising rapidly. This development might in fact be very good health economics and provide great health care efficiency. But, as I’ve said before, we simply don’t know. And there are scores of examples like this. Unfortunately, standard health economics doesn’t have good methodology for these examples of “substitutive technology.” It is a huge opportunity for great academic, industry, clinical practice, and health policy cooperation. What a great project for AHRQ [Agency for Health care Research and Quality]!

The second point Jim makes is that the site of imaging—inpatient versus outpatient—shouldn’t make a difference for quality. I couldn’t agree more. I worry greatly about the current focus on costs of “outpatient” imaging. These two themes come together in the exploratory laparotomy example. We have substituted a large inpatient operation with seven to ten days of hospital stay and a low yield of diagnostic information for a forty-five-minute CT scan of the abdomen with and without contrast. I suspect that the patient, hospital administrator, CMS [Centers for Medicare and Medicaid Services], and academic health economists would all agree that this is great!

Iglehart: You mentioned that imaging in the physician’s office is a very profitable line of business. But if you look at that setting not on the basis of money but, say, on the basis of patient safety or the quality of the reading of the image, what’s your view on that, Jim?

Potchen: There is no reason for it to be less safe or have less quality—there’s no reason for that, OK? The trouble is, it’s so profitable that many people with less-than-adequate knowledge enter the business because there are no restrictions on who does it. That’s a policy issue that should be addressed. Let me cite mammography as an example of where new policies in Michigan have led to the elimination of people who were engaged in mammography screening without adequate training. It is well documented that mammography can detect breast cancer, and thus the public clamors for this technology. In Michigan, some generalist physicians set up storefront mammogram machines. And a few general practitioners did mammograms on a chest x-ray machine. When we saw those images when the patients eventually did get cancer, we saw what images they had. They were unreadable, uninterpretable, but still the docs got paid for...
them. The governor of Michigan appointed a committee to oversee mammography quality control. Michigan was the first state to require that mammograms be performed under specific rules that required machines to be in good working order and that those who operated them knew what they were doing. Policies can affect quality, and mammography is the best single example of where government policy has made a real difference for the better. After Michigan took this step, Kentucky did it. Now there is a National Mammography Quality Control policy that has improved the use of mammography and helped us demonstrate on a wide-scale public basis that mammograms made a great deal of difference in preventing deaths from breast cancer.

**Determining Appropriate Use**

**Iglehart:** If you were the CMS administrator, where Medicare spending for radiology services has increased from $5.6 billion in 1998 to somewhere around $10.2 billion in 2003, how would you deal with this growth? Obviously Congress took a step in the Deficit Reduction Act by directing the CMS to reduce Medicare payments for selected imaging procedures. But how can the CMS determine what is appropriate use, what's misuse, what's overuse? How do you do that on a macro level?

**Potchen:** Appropriate use is very much tougher to come by. The proper indications for a procedure are much tougher. We have not measured the marginal utility of alternative indications for diagnostic procedures. But it isn’t hard to measure results. And you could set rules that improve use. The value added by any diagnostic procedure is “diminished uncertainty,” which can be measured as “information.” For example, the CMS could establish a rule that the observer has to be in the top 95 percent on the ROC [receiver operating curve] to get paid for reading the film. With radiology, you’ve got the image after the fact. You can actually see it and see what happened. With internal medicine, for example, you don't know exactly all of the information that the physician had at the time of the interaction. But you do have all of the information the radiologist had. So you can measure what value the radiologist added to the information available for a particular patient. This could be made available through the widespread use of the electronic medical record. If an agency did that, I think it would have a dramatic impact on the inappropriate growth of imaging. Because you could control use, this is rational. This is reasonable. This is not a political survey for radiologists versus cardiologists. Whoever does the job well should be paid. The American College of Radiology has a project under way that will lead to greater documentation of which imaging studies provide the greatest value.

**Clarke:** From my standpoint, in industry, the larger imaging community has to start showing demonstrable clinical value. In GE Healthcare, we started doing prospective randomized clinical trials because we just think it’s the right thing to do. I don't know if it’s fair to say that radiology or imaging as such has been more remiss than other medical specialties about showing the value of what they do. I do think it’s accurate to say that unless and until that’s done with imaging, the huge opportunities that the new biology and the new technology bring forward aren’t going to actually go into clinical practice because of concerns over the cost of these advancements. So, to facilitate what I think is going to be a transformation of medicine, we are simply going to have to do high-quality clinical trials to show the value.

**Iglehart:** Would this be the value, say, of one of the products that GE wants to bring on line and sell commercially? Give me an example of a clinical trial that would be attractive to GE.

**Clarke:** GE Healthcare has new CT technology, which we think can replace coronary angiography in a lot of cases. Noninvasive, much faster. We know we need to show that...
this has a very good and acceptable sensitivity and specificity if it’s going to replace certain aspects of coronary diagnosis now. Would it be specific to our product? Yes. Can it be across several companies if the technology is reasonably similar or if there is the need for huge clinical trial of many thousands and thousands of patients? The company would certainly be open to collaborating in that way. And I think that the CMS has done some pretty creative things about how to acquire data about the value of diagnostic procedures and make coverage determinations. They should be applauded for that.

Iglehart: Give me an example of where you think the CMS has done it right in a particular technology.

Clarke: The approach that they are taking with coverage of evidence generation is very creative. And they are doing that in PET scanning. The agency wants to strike a balance between reimbursing PET scanning in all oncologic conditions, open-ended, and doing an incremental approach, which is the way we were doing it. They’re also wanting to show whether or not PET scanning works, if you will, in the real world. So they are compiling databases of pre- and postscan information and understanding how that affects decision making, reimbursing while those PET scans are being done. I think it’s a very creative way to get very solid information about how to use this technology in a large population. And the payment for the innovation obviously dramatically accelerates the uptake of that innovation.

I think it is more of a problem than it was ten years ago because there’s more emphasis on cost, and the incremental cost of innovation is rising very rapidly. I’ve been in the industry for a little over a decade now. The incremental cost of innovation becomes very high.

Rising Cost Of Innovation

Iglehart: Why is it increasing?

Clarke: In the imaging business, it’s increasing because we’re having to push the technology to the outer limits of the physics and engineering sciences, so it’s extremely difficult to create the technology and then make it in a robust fashion. In other parts of the biomedical sciences, it’s because we’re doing such complicated biomedicine that it is very difficult to find molecules that work or find procedures to work now. Where imaging is going—combining biomedicine and hardware physics software engineering into what we call molecular imaging—means that it’s going to be extraordinarily expensive and very difficult to bring that innovation forward, because in some ways we’re combining the most difficult aspects of the imaging physics hardware engineering software with the most difficult aspects of the pharmaceutical innovation around biology and chemistry. And we all know how much of a struggle that’s been for pharmaceutical companies. So the incremental cost of innovation is getting higher and higher. The time to market for these innovations is getting longer and longer, too. So your payback period is deferred. Having said that, I would say that the good news is that the sort of innovation that’s coming forward, I truly believe, is going to be transformative of the way we practice medicine.

Potchen: I believe that.

Clarke: I truly believe we will look back in fifteen years and say, I can’t believe we gave people two and a half months of chemotherapy before we looked to see whether or not it was actually helping them. We are going to be able to diagnose diseases much earlier in the course of the disease, and based on that early diagnosis, we will be able to define an individual patient’s subtype of disease and choose a much more targeted and rational therapy. What comes next is the point most people miss. The first two, I think, most people talk about. Then we will be able to do this in an iterative fashion, and we will try to understand on an ongoing basis: Is that therapy still working in this patient? We don’t do this now; we choose a therapy and hope.

Roles Of Industry And Academe

Iglehart: One of the reasons I wanted to engage both of you in this conversation is the importance that I know both of you attach to a close working relationship between academic
institutions such as Michigan State and leadership companies such as GE. You have both emphasized that these academic/industry collaborations are at the crux of making progress in medical innovation.

Potchen: I certainly agree with that. I think neither academe nor industry can do it alone. We [in academe] have the patients and a lot of the ideas. They [in industry] have ideas but not direct access to patients. Together we add great value to the processes of innovation.

Clarke: I agree. I am struck with how interdependent academe and industry are in imaging. The vast majority of the really innovative ideas and techniques come from academe. However, all of the ability to turn those into an industrialized, reproducible, high-quality, reasonably priced, readily available technology comes from industry.

Potchen: Implementation.

Clarke: Yes. I don't want to minimize what industry brings to it, because there's an interesting, fairly free flow back and forth of engineers and physicists and scientists between academic imaging and industry. It's not a unilateral flow like it is in pharma and biotech, where people essentially get frustrated with academe and come into industry. I'm impressed with how people move back and forth. There's this wonderful cross-fertilization. And there is a skill and an intellectual challenge about taking an idea and figuring out how to make it logical, usable, practical, robust, that is very intellectually challenging. And there's also, as Jim says, a business aspect that says, Great idea—it just doesn't have enough utility in the real world. Many times, industry serves as a buffer, saying, “That's an interesting technological advance, but it doesn't have a heck of a lot of value, and we're not going to develop or commercialize it.” Trust me, we do lots of that.

Payer Relationships

Iglehart: Obviously, payers of technology services, be they Medicare, Aetna, or WellPoint, have a different view of innovation and its value. Generally, they are concerned about whether society can afford all of the advances that have come along and are emerging from company pipelines. If you had a magic wand, how would you change current relations with payers which seem, at the least, quite strained?

Clarke: I would like to see payers engage in an earlier assessment, an earlier statement of what they would like to see the technology do, and then we need to get to a point where there is a better collegial engagement among purchasers, payers, and technology innovation suppliers—a clear understanding that we have a shared responsibility or interdependence to assess this technology. Where we are now is that, by and large, payers say, “We'll make a payment determination when you prove to us at a fairly high statistical level that this technology has value.” There's a better way than that. I will say that in GE Healthcare we are having some discussions with one of the big payers, and we're seeing some reasonably innovative thinking about payment with evidence generation, where they will allow some technology to be paid for with evidence generation.

Iglehart: Is this essentially replicating with a private insurer Medicare's model of coverage with evidence development?

Clarke: Yes. It's replicating what Medicare has done. And that facilitates the technology, the innovation uptake cycle. It can also facilitate getting rid of technology that we have invested a lot of money in only to say it's actually not beneficial. I would rather know that earlier than later.

Iglehart: I take from your comments that there is no natural dialogue that occurs today between the stakeholders that innovate and those that pay for the innovation as it is used in patients?
Clarke: No, there is no natural dialogue.
Iglehart: And that you regard as a pity?
Clarke: It's absolutely a pity.
Potchen: I'd like to answer your question a slightly different way. What I would like to see payers do is do what they did when we changed mammography. All of this stuff gets going out there. Much of it is not adding value. And if it isn't adding value, they should find some way to measure the value and pay for performance. Because if they did that, you'd shift a tremendous amount of resource allocation toward making a meaningful difference to people.

Late Career Moves
Iglehart: Dr. Potchen, as I have spoken to your colleagues on campus, you have been described, in the most glowing of terms, as a “true Renaissance man.” In that context, I do have one question that fascinates me. After a highly successful career in academic medicine and research, what on earth possessed you to attend law school at the University of Michigan in your sixties? It apparently has to do with your friendship with former Supreme Court associate justice Sandra Day O'Connor, but please tell us the story.
Potchen: At the time, I was chairing the Liaison Committee on Medical Education, which accredits American and Canadian medical schools. It is a committee that is closely affiliated with the American Medical Association and the Association of American Medical Colleges. I thought that the committee performed socially responsible activities, weeding out schools that simply did not measure up. Sandra Day O'Connor was the public member. We were being sued for trying to close a very bad medical school in the minds of legitimate reviewers. The plaintiffs included alumni, the governor—I mean, everybody. And I was getting very angry about it. How could lawyers in all good conscience come out and do that? So, I complained a lot about lawyers, in part because my name was on the lawsuit, and, you know, $70 million would be a lot of money for me. The commission did not carry that kind of insurance. So, I was angry because a bunch of lawyers wanted a piece of the action. Sandra kept telling me, “You know, Jim, lawyers aren't all evil. You don't understand the law.” At one point, she said: “Well, rather than complain about lawyers, why don't you go out and be one?” So I took her up on it. I traveled from East Lansing to Ann Arbor something like 500 times to attend law school classes there [at the University of Michigan]. And I worked full time while I was doing it. Now that I am a lawyer, I am not so mad at them. There is something to understanding what you are talking about.

This interview is the fifth in a series of interviews with leaders in the biomedical sector, sponsored by the nonprofit Institute for Health Technology Studies, or InHealth, which recognizes that innovation in medical technology plays a vital role in better and more cost-effective health care. The series focuses on individuals who are either innovators in their own right or in a position to foster novel research.