Reverse Translation in Health Policy and Management: from Bedside to Bench and Beyond

If there has been one enduring theme in the 21 research meetings of Academy Health and its predecessor organizations, it is the importance of translating new knowledge into practice—the practice of policy makers, of managers, and of the millions of professionals who daily tend to the needs of the sick and the well throughout this country’s vast health care system. This translational task is tough and important work. It taxes our imaginations and our stamina. It is in many ways the essence of what we are about.

Today, however, I want to take a very different perspective on the translation challenge. I want to explore the equally important, but perhaps less recognized and discussed challenge of reversing the flow of knowledge, of moving insights from practice—in this case clinical practice—into the language and work of health services research and health policy making. This task is about connecting with and learning from the daily work of health care, or what systems analysts and safety theorists call the “sharp end” of the health care enterprise.

Every year, like thousands of physician colleagues in academic medicine, I spend a month attending on the medical service of a teaching hospital. I become the physician of record for patients who do not have private physicians. I supervise interns and residents who actually provide the great bulk of the care and make most of the decisions, subject to my (hopefully) gentle and diligent review.

Attending is hard work. It adds 5–6 hours a day, six days a week, to the already busy life of—in my case—a health services researcher and academic administrator, a life familiar to many in this audience.

But on balance, I get a great deal more than I give. I have a good excuse for saying no to talks and meetings I don’t want to give or attend. I learn a tremendous amount of medicine (some of it, unfortunately, once known and since forgotten). I get to know a group of remarkable young people—students and residents—whose intelligence, earnestness and ethnic and racial diversity are exciting and inspiring. I get to regale them with stories about how much harder it was when I was a resident, in the days when training was really tough (and probably less safe for patients). I earn my stripes with my physician

colleagues, who, having seen me wandering the halls with seven or eight young people in white coats and scrubs, are reminded that I am still one of the tribe.

But most of all, these yearly experiences illuminate for me—personally, indelibly—the ways in which our health care system is changing, its problems, and the shape of potential solutions. Frequently, I am astonished, even stunned, by what I observe as a health services researcher plunged into the maelstrom of inpatient care on a busy hospital teaching service. It occurred to me that if this is true for me after decades of attending, then perhaps some of my nonclinical colleagues in the health services research and health policy world may find these experiences informative as well.

Stated in the terminology of our field, my goal is to take advantage of an enduring insight from the theory of continuous quality improvement, an insight that dates back to the seminal early- and mid-20th century work of Shewhart, Deming, Juran, Feigenbaum, and Ishikawa. A profound knowledge of the processes of production in any system is essential to improving it. I would also argue that such an understanding can valuably inform health services research and health policy. Once a year, I immerse myself as a participant observer in the processes of production and care in the system that we call the American teaching hospital. My goal is to share some lessons, large and small, of that experience in the hopes that they may in some way be useful to your work, or at a minimum, entertain you as the 21st Annual Research Meeting draws to a close.

In particular, I would like to share observations relevant to three areas of policy and management: workforce policy, safety, and quality; and cost and value management. Let me start with workforce policy.

WORKFORCE POLICY

Every morning, the teams of house staff on our medical teaching services make so-called “work” rounds on their patients, who on our teaching service usually number between 15 and 22. Work rounds are intense, pressured and busy. They start at 7:30 and last until 10:00 or 10:30 A.M. They are where the core work of the day gets done and the care gets provided.

The residents visit and talk with each patient, do the relevant area of the physical exam, review data that have become available since the previous day,

discuss the patient's situation among themselves, make a plan for the day, and, if time allows, write a note on the patient. After work rounds are completed, the attending (that's me) joins the team, and together they retreat to a conference room where the situation of each previously admitted patient is reviewed, and each new admission from the night before is presented in detail. For new patients, the house staff care plan is critiqued and modified if necessary and salient teaching points are made. Then, collectively, we visit each new patient, and the attending checks key points of the history and physical exam.

Several times a week, I participate in the actual work rounds, and a few years ago I noticed that something was different. They seemed to be going slower, we seemed to be spending more time in each patient room, and the discussion had somehow changed. It took me a few days to figure out what was happening, and then it struck me. The house staff were actually talking to the patients—not the perfunctory “hi, how are you, how's your breathing, how's your pain?” discussion that I was accustomed to, but something different. They were talking with patients about all kinds of things: whether they could take their medicines, whether they could ambulate, whether they could eat, whether they were depressed or sad. This was new. And something else was new. I was the only male member of the team.

I have noticed something else different about the composition and skills of the house staff teams with whom I have worked. Without fail, they have included at least one member fluent in Spanish. Not infrequently, they have also included house staff proficient in other languages (Mandarin, Portuguese, and Russian, to name a few). They often include trainees who have seen and managed malaria and other infectious illnesses of underdeveloped regions. And something else: Caucasians of European descent are more often than not a minority on the house staff teams with whom I work.

I know the difference between correlation and causality, and I know the difference between an anecdote and data. But let me advance some workforce-related hypotheses from my personal experience with the teaching service of one well-known teaching hospital.

First, the shifting gender and ethnic balance among physician trainees could have a profound effect on professional mores and behavior, much of it positive. William Osler, a revered and consummate physician and medical philosopher, once said that the key to caring for the patient is caring for the patient. If Osler was right, the likelihood that a majority of American physicians will be female by the middle of this century will make our health care system better in ways we may not have anticipated. Furthermore, we have

devoted far too little attention to understanding the implications of this development for the future of our physician workforce and for the quality and cost of care in our 1.6 trillion dollar health care system.

Second, the physician workforce in the United States is becoming more diverse and more culturally competent. This is happening in part through diligent efforts by advocates and training programs to make it happen, and in part because of the remarkable achievements of the children of Americans of all racial and ethnic backgrounds who are earning their way not only into medicine but into the most elite training programs and the most senior leadership positions by virtue of their own skills and hard work.

Third, there is much that remains to be done in opening the doors of the profession to racial and ethnic minorities, especially those struggling under the burden of long-standing discrimination in this country. There is also much to be done in making way for women and minorities to occupy positions of leadership. However, for what they are worth, my experiences as an attending suggest that our educational establishment is, in fact, opening its doors to these minorities, and working hard to keep them once they arrive. Because of my attending experience, I am more optimistic that we will have a medical workforce during the 21st century that is more representative of, and capable of caring for, our diverse population than the workforce we had at the end of the 20th century.

Before we leave the area of workforce policy, I want to share another observation that struck me particularly strongly this last March, during my last attending experience. There was one person during that time who seemed omnipresent on the hospital floor. She seemed always at the next computer when I was writing patient notes. I frequently interrupted her at the bedside of patients on whom I was checking. Her name tag identified her. She was the physical therapist.

It is not by chance that physical therapists are omnipresent on the floors of an acute care hospital at this time in the evolution of our health care system. Our patients are older and more debilitated than ever before. More and more, the chief barrier to their discharge and to staying out of the hospital is their inability to perform activities of daily living. At this point, members of the long-term care research and policy community in the audience today are probably rolling their eyes. An acute care physician has finally glimpsed the glaringly obvious. I have glimpsed another thing at the same time. There is a pressing need for more research and for improvement in the rehabilitation services available to our patients. My rehabilitation colleagues tell me that efficacy of physical therapy has never been proven definitively in controlled trials.

By the way, my comment on physical therapists and their increasing role in health care does not imply that other personnel, especially nurses, are any less important than they have traditionally been for patient care, or that their personal knowledge of patients has diminished. The point is rather that the ecology of the inpatient medical floor is changing to reflect the complexity of patients and their needs, and nurses can no longer do it all by themselves.

QUALITY AND SAFETY

On the quality and safety front, I want to start with some good news.

Information technology is transforming hospital practice. On the rounds I mentioned previously, some changes are stunningly obvious. The computer terminal is now the center of patient care. The house staff enter orders into it, find patient data on it, enter their notes into it. They call up references in real time as questions arise on rounds. What is the dose of drug X? Does it interact with drug Y? How long should patient Z be anticoagulated? What is the sensitivity and specificity of a computed tomographic scan compared with an ultrasound for a pancreatic mass? Their hands dance across the keyboards, the images flash and disappear on the terminal, and the answers often materialize.

Meanwhile, those flapping, unwieldy black and grey celluloid X-rays in their tan or grey paper folders are a distant memory. It is all online. By clicking on a tab called "Image", physicians can call up simple X-rays, computer-assisted tomographic (CAT) scans of the abdomen or the chest, magnetic resonance images (MRIs) of the knee or the brain. House staff turn the images around, magnify areas of interest, and compare them with previous films, all with the flick of an index finger. They can do so standing outside a patient's door, with the real person visible out of the corner of their eye. (Meanwhile, the hospital is electronically outsourcing reading of some X-rays during night shifts to India where U.S.-trained radiologists are standing by during the middle of their work day.)

This is something dramatic, new and almost certainly positive, although I don't yet grasp its full implications. Indeed, the rate limiting step on getting work done around hospital floors is now sometimes the number of functioning computer terminals.

Some more good news. The 80-hour week for house staff has arrived, at least in my institution, and workloads are generally lighter than they used to be. On our general medical service house officers admit new patients at most every fourth night, and they are assisted on some services by night floats—

colleagues who work from, say, 10:00 P.M.–6:00 A.M. and who take some of the burden of new cases. Interns and residents who were on duty overnight are usually gone by noon the next day.

House staffs in my hospital are also interested in quality and safety and in health care policy issues generally. I don't know how generalized this is, but having trained in a time when my health policy interests were considered marginal at best, and perverse at worst, I am continually surprised and gratified by this change.

And there are many teachable moments about quality and safety during the routine work of a teaching hospital. In fact, once you look for them, quality and safety problems are glaringly apparent day in and day out.

Obviously, we have slipped over the edge here from good to not-so-good news. In the not-so-good news category, let me make one overwhelming observation. I think it is a miracle, given the way work is structured in teaching hospitals, that we don't harm patients more often. The sheer amount of data that house staff and busy clinicians must integrate, the amount of uncertainty they must manage, the number of decisions they must make—hundreds in a given morning and all under time pressure—create a staggering and impossible challenge even for bright and diligent human beings. Too much happens, too fast, with too few backups and too little margin of error. Ask yourself this: what would it feel like if, every morning, you had to make a hundred important decisions, each based on 20 data points you were seeing for the first time, in the face of major uncertainty, with no time to delay, under the scrutiny of colleagues watching you think out loud, and knowing that if you made a mistake, it could injure an identifiable human being?

To complicate matters, at least once during every month I have attended, the following utterly predictable scenario has unfolded. A fragile patient—and sometimes more than one—admitted the previous night suddenly deteriorates during work rounds. She develops chest pain or goes into septic shock or has a respiratory or cardiac arrest. Residents scatter to manage the crisis—and rounds are fatally disrupted for the day. The only reason disasters don't occur regularly as a result is that the house staff, nurses and other health professionals are talented, hardworking and caring and double back later in the day to catch up and fill in. In other words, medical rounds are predictably unreliable.

I use the term unreliable here in a somewhat technical sense. The rounding process is unreliable in that it changes significantly from one time to another. Such variability is often in itself inimical to quality and safety, but in this case, the predictable disruptions in the rounding process directly affect

quality and safety by distracting care givers, interrupting their work flow and reducing the amount of time they have to spend on patients who are not in crisis.

Information technology can somewhat improve the reliability of the rounding process, but ultimately, the work gets done in the brains of, and with the hands, eyes, ears, and mouths of, groups of people who are working at the absolute limits of their physical and mental capacities, under pressure and with an irreducible level of uncertainty, with patients who are getting sicker, older and more complex each year, and with an exploding knowledge base to integrate into their work. Computers do not revive patients in shock. If this care process is analogous in any way to an airline cockpit or to a nuclear power plant control room, then it is a cockpit in which hurricanes and wind sheers are routine and cannot be flown around, or a control room in which the klaxons are blaring meltdown on a weekly basis.

I think the fundamental processes of care and instruction on modern teaching services, at least on medical services, are flawed and must be redesigned with quality and safety in mind. We cannot assume that information technology will solve these problems, the fixes are not simple, and they cannot be slapped quickly on top of the existing processes. I believe the care processes of teaching hospitals are emblematic of the processes throughout our health care system, and the required changes will be costly, challenging, disruptive, and frustratingly slow in coming. It will also, regrettably, be very easy to do more harm than good without a profound knowledge of the processes of production.

Let me further illustrate the challenge by discussing the downstream consequences of one simple fix: the 80-hour work week. I find very plausible the results of human factors studies that suggest the importance of eliminating fatigue as a factor in causing medical errors, but I am not convinced at all that the 80-hour work week as it is being implemented will improve patient safety. Indeed, I am concerned that it will reduce safety in the short term. To limit resident work hours, my hospital has resorted to at least two devices: night floats and day floats. I described night floats before. Day floats do the same thing, but usually from noon until about 8:00 P.M. in the evening. What is the net effect of these changes? Two more people are added to the care team, two people who must hand-off patients to others, and who are not present daily during work rounds and so never quite know the patients as well. I suspect that opportunities for errors resulting from miscommunication, which may be the most important source of errors in hospitals, increases nonlinearly with the number of personnel sharing similar responsibilities in the care of any group of

patients. It seems eminently possible to me that the resulting increases in numbers of errors will be substantially greater and perhaps more serious than those avoided by sending tired residents home early. The 80-hour work week is a band-aid on a flawed, unreliable process of care that ideally should have been redesigned before residents' hours were limited. The health services research and health policy community has a critical role to play in helping managers and care givers to anticipate and minimize these unintended consequences of well-intentioned reforms.

COST AND VALUE MANAGEMENT

Before concluding, I want to share one additional insight from my attending experience. It is a lesson that is so widely understood in the health policy and health services research community that it is almost a cliché, but it struck me with such new, emotional force last March that I feel I must share it with you.

To say we are in the midst of a technological explosion in medicine hardly captures the daily experience of teaching hospital care. This is perhaps best illustrated with imaging technologies—CAT scans, MRIs, ultrasounds, and many derivative studies that constitute one of the greatest contributors to rising health care costs at the current time.

As I made rounds with my house staff team last March, two things became clear. First, we had barely to think of an imaging study before the study was done and flashing about under the guidance of someone's mouse on the computer screen.

Second, incremental innovations in our imaging capabilities—the increased resolution of the technologies, the addition of contrast agents and ultrasound technologies—are resulting in nonincremental, qualitative changes in the way medicine is practiced. We can learn so much, so much faster about what is going on in body cavities and organs that the pressure to use these technologies is overwhelming. To illustrate, it seems that virtually every patient who passes through the emergency room at our hospital gets some sort of imaging study before they arrives on the hospital floor.

Imaging is apparently useful, safe, easy to order, and quickly obtained. This makes it a veritable tsunami of new technology that seems likely to overwhelm whatever feeble efforts we make to regulate and control its introduction.

There are other comparable areas of technological explosion. Examples include laparoscopy, gastrointestinal endoscopy, and intravascular diagnostic and therapeutics (cardiac and noncardiac catheterization). They are making diagnosis and treatment more accurate and less dangerous, opening up invasive care to older and older, and sicker and sicker populations.

Many reforms are possible and necessary in our health care system to improve its quality and efficiency, and thereby the value we get from our health care dollar. Reducing moral hazard through so-called consumer directed health plans is the solution du jour, now that sharing financial risk by providers has been soundly rejected by doctors and patients. Care management, and public release of provider data on cost and quality may have some beneficial effects, as may efforts to pay for performance. All these constitute legitimate and important opportunities for improvement.

But it takes only a few moments on a modern hospital floor to see, with breathtaking clarity, that *Homo sapiens'* drive for health and immortality and their seemingly limitless technological ingenuity have fused to create a social force of unprecedented power. We are going to allocate more to health care unless someone tells those residents to stop using those new tests and treatments. Who among us will give that order? And who among us, in our heart of hearts, really wants that to happen if we or a loved one were the patient?

The development of computerized decision support for physicians to make decisions on the optimal use of imaging and other technologies should be the highest possible priority for health services research. The focus in the recent Medicare Modernization Act on drugs is a start, but only a start and should be extended to the full array of diagnostic and therapeutic tools available to modern medicine and health care.

However, we should not fool ourselves on one reality. We will always be playing catch up to the ingenuity of our technologists and care givers (urged on by health care industrialists) who are tasked with understanding urgently here and now the causes of pain and suffering in individuals lying on a bed or an exam table in front them.

I could go on. The lessons of participant observation in the modern teaching hospital are many and compelling. I encourage all of you whose work is meant to affect the future of our health care system to participate in the process of reverse translation that I have been describing, and to do so regularly. I realize that this is not simple for those of you who are not routinely involved in patient care. To make it possible, health professionals and health care institutions need to be convinced to work in partnership with the health services research and health policy community. Nevertheless, the effort would

be well worth it for all concerned. It is a bracing and humbling experience even for those who do it regularly. It is likely to remind you of why you do the work you do, and why your work is so important to the American people.

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