

# medicine

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Spring 1999

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# Could **telemedicine** turn out to be as **revolutionary** as the **technology** that makes it possible?

by Jeffrey Mortimer

**W**hen asked about the medical profession's less than passionate embracing of telemedicine to date, Rashid Bashshur likes to tell the story of the stethoscope's stormy entry into the practice of medicine.

"The doctors who were using it initially," he says, "had to hide it under their tall hats. Before the stethoscope, the doctor would put an ear right on the patient's chest. Now there was a wooden device that separated them, so the argument was that this would destroy the doctor-patient relationship because of the lack of touch."

Needless to say, the stethoscope, with many improvements, eventually gained acceptance and became an essential tool in clinical practice. Bashshur's point is that physicians today are at least as resistant to new technology as others have been in the past and are, in this respect, no different from professionals in other fields. From his own perspective, he predicts that people will some day be telling such stories about telemedicine, and that that day may not be so far off.

Bashshur, a professor of health management and policy in the U-M School of Public Health who over the course of his teaching life has helped launch about 50 Ph.D.s into public health careers around the world, has also been, since last July, the director of telemedicine for the U-M Health System. This was largely a matter of formalizing a pre-existing arrangement: Medical School physicians testing the waters of information technology in their practices would solicit the names of experts in the field from their colleagues around the country, who would tell them, "Well, there's this professor in public health right in Ann Arbor..."

## Will E-Mail Help Doctor-Patient Communication? A New U-M Study Hopes to Find Out

How does e-mail affect the satisfaction of patients and physicians? How does e-mail affect volume of telephone calls, visits and overall efficiency of a health care organization? What are the most compelling reasons for using e-mail as a health care consumer?

These and other related questions are the focus of a 3-year study under the direction of David Stern, M.D., assistant professor of internal medicine. Resident physicians in the U-M Department of Internal Medicine will be the subjects for the study as it looks at ways that e-mail communication can provide a more efficient flow of information while improving patient and physician satisfaction. The study, entitled "The Effect of Enhanced Patient E-mail Access on Patient-Physician Communication and Satisfaction," is being funded by the Intel Corporation. For more information on the study, call 734-647-8094 or e-mail [camoyer@umich.edu](mailto:camoyer@umich.edu)

He became, as he puts it, an "informal consultant" to a handful of initiatives by individual faculty members: Dr. Norman Alessi in child and adolescent psychiatry, Dr. Michelle Nypaver in pediatric emergency care, Dr. Riley Rees in chronic wound management, and Dr. Daniel Teitelbaum in pediatric surgery. "These individuals piloted telemedicine projects pretty much on their own," says Bashshur. "What we are now trying to do is to develop an institutional framework for supporting these various initiatives and to make sure that the infrastructure that needs to be put in place can be shared by the various applications."

In addition to his other duties, Bashshur is also the editor-in-chief of *Telemedicine Journal*, the official publication of the American Telemedical Association. Twenty-five years ago, in Ann Arbor, he convened the first national conference on telemedicine, under the auspices of the National Science Foundation. All of a dozen people showed up.

But, for various reasons both social and political, the idea of "practicing medicine at a distance," the literal meaning of telemedicine and a good starting point (there are both broad and narrow defini-

tions), did gain increased acceptance. In the 70s, the concept was tested in a number of sites, such as urban clinics in Massachusetts and Illinois, rural networks in Maine, Minnesota, New Hampshire and Puerto Rico, prison systems in Florida and Indian health facilities in Arizona. Then, almost as suddenly and long before any truly meaningful scientific work could be completed, the funding ended and experimental programs ceased to exist. Out of this early experience, Bashshur edited the first book on telemedicine and maintained his interest by continuing to publish papers on the topic. A few other individuals around the country, including Ken Bird in Massachusetts, Jay Sanders in Florida and Max House in Newfoundland, Canada, also continued working in the area.

"We didn't learn much that was relevant to policy from the first generation of telemedicine because the experiments were not allowed to mature," says Bashshur. "We got into it, got out of it, spent quite a bit of money as a nation, and we dropped it as if it were a bad idea. We didn't really reach that decision because of scientific study but because the money ran out."

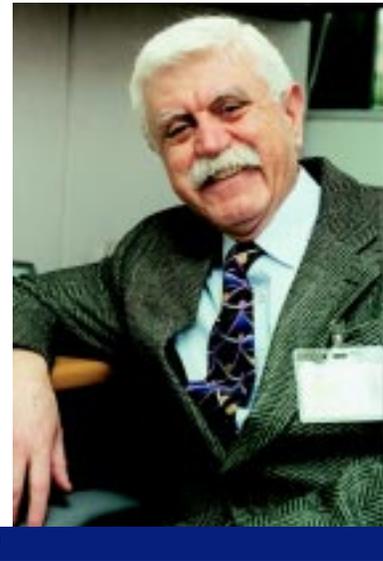
In the 70s, telemedicine was seen largely as a social mission, a way to neutralize geographic inequities in the distribution of medical care. In addition to the Department of Health and Human Services (then Health, Education and Welfare), one of its backers was the late Office of Economic Opportunity. In the 70s, too, the available technology was only a primitive shadow of what it was to become, and cumbersome and expensive to boot. Most of the tools now within the scope of

telemedicine — including the Internet, digitized audio and video, fiber optic transmission lines, and personal computers — either didn't exist or were not yet available in the marketplace.

The development of such technologies, and their ongoing evolution, is one of the factors Bashshur cites for telemedicine's resurgence. "The extraordinary speed of advances in information technology and accompanying decreases in cost made the argument for looking at telemedicine anew more and more compelling; there was no longer any question about the wisdom or the appropriateness of trying to establish these systems and test them and utilize them," he notes. Moreover, these advances could still serve societal ends, including the very ends for which telemedicine was initially envisioned.

"We in the United States claim that we have the best medical care in the world, which is only partly true," says Bashshur. "While we generally have the finest quality care available anywhere, not everyone has access to it."

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Rashid Bashshur

"Overall, we don't do as well as 13 or 14 other countries by major indicators of quality outcomes, such as infant mortality or life expectancy," he says. "Certain segments of the population still have limited access to care — the uninsured, the remote, the isolated. We have been dealing with these kinds of problems for at least five decades and haven't solved them yet. Quality of care is geographically uneven, and costs continue to escalate. Telemedicine offers an attractive technological solution that might — I use the word advisedly — address all three problems simultaneously. Disparities in quality can be diminished through ongoing interactions between remote providers and consultants, the underserved may be helped by making care available closer to where they live, and cost inflation may be contained by substitutions, by eliminating unnecessary visits to the emergency room, and by reducing unnecessary and redundant diagnostic tests."

These factors, and the educational possibilities, soon made a telemedicine advocate of Dr. James Woolliscroft, now associate dean for graduate medical education and then the assistant dean for clinical affairs. "None of these efforts was coordinated and they all required the same infrastructure," he says. "If you're going to be successful, you have to have bureaucratic support to keep the machine running. In addition, we had an internationally renowned expert in telemedicine in Rashid, whom individuals here would contact, but we had never built on the expertise he had developed."

An experience with one of his children helped lift the veil from Woolliscroft's eyes. Two years ago, when his son was in seventh grade, he participated in a program where students were given laptops for six months. The youngster was assigned to do a report on Gen. George Patton and "pulled pictures off the Web of real battles, pictures of Patton, sound bites, and while he talked, he had this device that showed all this stuff on a screen behind him," Woolliscroft marvels. "And that was just the norm; that's what every kid in the class did.

"When I saw that is when I sort of got interested in this," he says. "I said, whoa, if that's what they're doing and that's where they're used to going for information, it's just a whole different mind set."

He chuckles. "Maybe that's what it will take [for telemedicine to be accepted]. All the old fogies have to die off."

"The number one barrier is people and previous ideas and beliefs about the way they should practice medicine," says Nypaver, who is preparing a report on the successful linkage of the U-M Health System's pediatric emergency clinic and the emergency room at Foote Hospital in Jackson. "Telemedicine isn't a new specialty in medicine, it's just a medium for doing what we already do."

Actually, just as Bashshur's appointment was an acknowledgment of what was already happening informally, many in the field anticipate that telemedicine will become as ordinary as stethoscopes and as ubiquitous as pagers. Its use is already routine in some areas, like the transmission and sharing of test results, radiological data, and any other information that can be digitized. Those who have tested the waters at U-M say it will continue to grow because the technology will improve, it will serve institutional goals by expanding the reach of existing resources, and patients will demand it.

The technology itself fuels that demand, as patients have access to an abundance of Web sites offering medical information (of widely varying quality, to be sure, but that's another story). "The patients as consumers are going to demand different things from medicine and they're going to become the driving force in the next 20 years," says Alessi, who has been involved in several telemedicine projects, including helping to develop the Web site for the American Academy of Child and Adolescent Psychiatry (AACAP). The AACAP Web



**Norman Alessi**

**"The patients as consumers are going to demand different things from medicine and they're going to become the driving force in the next 20 years."**

site's surprising popularity was an eye-opener for Alessi. "In the first year and a half, its usage went from 2,000 hits a month to 300,000," he says, noting that "people are going to force medicine to adopt the technology. They want their medical care to be at least as good and responsive as amazon.com (the popular on-line bookseller). People are going to force medicine to adopt the technology."

Dr. James Woolliscroft says he doesn't think diagnosis will be a useful application of telemedicine for him. "For most of us, I don't see doing that long-distance, other than dealing with data, and that's being done right now," says the Josiah Macy, Jr. Professor of Medical Education, professor of internal medicine and associate dean for graduate medical education.

But Dr. Michelle Nypaver, clinical assistant professor of surgery and clinical assistant professor of pediatrics and communicable diseases, already has used it many times for just that. Just as telemedicine takes many forms, it serves some masters better than others. What Nypaver is heavily reliant on is data; she needs as much information she can get as quickly as possible about someone she probably doesn't know. What Woolliscroft does is based more on his long-term knowledge of, and relationship with, his patients.

"I see a whole different type of patient and do a whole different type of medicine than Michelle does, or than a surgeon does," he says. Not that this excludes telemedicine: One of the applications that many physicians, including Woolliscroft, seem to accept

# medicine: Caveats and Questions

fairly readily is the use of e-mail to communicate with patients. "I think e-mail is a superb way of doing followup," he says. "Some of our docs use e-mail to check up on patients when they're traveling."

## **Do only Luddite dinosaurs express concerns about telemedicine? Or are there potential pitfalls that even the converted concede?**

No one is a greater champion of telemedicine than Dr. Rashid Bashshur, the U-M's director thereof, but he is far from pretending to have all the answers. "What we know today is much more than we knew 25 years ago," he wrote in *Telemedicine Journal* in 1997. "However, what we don't know now in this field is much greater than what we will know in the future."

One concern that harkens back to telemedicine's roots as an arm of social policy is what might be called the "two-tier fear." As Bashshur wrote in the same article: "Does telemedicine introduce yet another tier in health care delivery, whereby those who, by virtue of their geography, economic status, or other factors, are able to get in-person care and all others get telemedicine? Surely, telemedicine would be doomed if it emerged, or was even perceived, as the alternate system for the have-nots."

A more specific, "nuts and bolts" consideration is proper documentation. "I know of two lawsuits that involve telemedicine right now," says Dr. Daniel Teitelbaum. "I'm serving as an expert witness in one of them, and

I'll tell you a lot of the problems have to do with documentation and how that documentation is done, and the image that that physician is actually seeing on the other end of the telemedicine unit. These are aspects that we have not dealt with right now, which is why we're pushing hard to develop a very formal telemedicine facility here that has the capability of documenting our consultations and documenting what we're seeing and how we're seeing it. I think that's really, really critical."

## **Cost, too, must necessarily rear its ugly head: equipment, training, staffing, and, of course, reimbursement.**

"Telemedicine is severely constrained at present by restrictive reimbursement policies," Bashshur has written. Principal among them are those of the U.S. Health Care Financing Administration (HCFA). "HCFA's standing policy is to deny reimbursement for any medical service that is not conducted face to face," he wrote, "and, at least tacitly, it seems that some elements within HCFA would not be disappointed if telemedicine were to fade away, never to be heard from again."

## **Moreover, who will "own" this? Who will save how much, and how will that be measured?**

"I worry about the politicization of these kinds of opportunities," says Nypaver. "The reason I became involved in this from the get-go is I want it to be about patients, I want it to be about sharing of knowledge. I don't

want it to become a power tool in companies and all about money and mergers. I'm hoping that our involvement early on will help shape that future rather than waiting until it becomes mandated upon us."

Dr. Riley Rees, too, is concerned about how telemedicine will be supported. "The problem here is that without a fair amount of significant financial resources, telemedicine will never reach its true potential," he says. "This is America. Unless you transfer this technology to the marketplace, it'll never go anywhere because there aren't enough resources in the public sector." Rees does feel a certain urgency about the matter. "A baby boomer turns 50 every seven seconds," he says. "The pressures to preserve quality and reduce costs in health care are going to increase, and the Internet is a very good way to meet some of those challenges."

Dr. Norman Alessi, a child and adolescent psychiatrist with a long-standing interest in telemedicine, is also concerned about funding in this fledgling arena, and the rationale that will support or not support it. "I can't find even one cost-effectiveness model in telemedicine today," he says. "It's very difficult to do. But soon the public is going to force medicine to ask with increasing frequency such questions as, 'How much is 10 more years of quality life worth? Is it worth \$150 more? Is it worth \$10,000 more? Telemedicine will come into play as people are forced to ask these quality issues, not just the cost issues. In some ways that will be the bane of HMOs. They weren't health management companies, they were cost management companies."

Dr. Alessi recalls that when he started medical school in 1972, "patients weren't allowed to go into medical libraries and read textbooks. They were almost like the Holy Grail." Now they can point, click, and access everything from the John Hopkins newsletter to sites devoted to specific diseases. "According to at least one survey, 70% of doctors don't like the Web," says Dr. Alessi, "but I think it's probably the greatest thing that's ever happened for patients, and will only get better."

"Information technology has a life of its own that is not dependent on health care," says Bashshur. "The best health care can do is catch up with information technology, not lead it."



**Michelle Nypaver**

“All you have to do is look at the Internet and you will see that 90% of telemedicine is educational.”

So far, physicians on the Medical School faculty have caught up with it sufficiently to: provide some “just in time” learning options for students, and other providers as well. (“Just in time” is a phrase borrowed from the auto industry which, in the case of medical education, means giving practicing physicians information when they need it as opposed to asking them to commit to memory information that they may never need or will need only rarely.) “All you have to do is look at the Internet and you will see that 90% of telemedicine is educational,” says Nypaver. “In a teaching hospital we see a highly variable population. What if you now had a tool where you could see all kinds of things no matter where you were?” She uses as an example a case she incorporated into a study: a young infant with an unusual reaction to poison ivy, not a common thing in such a young child. “You take pictures, save them, and then in your next dermatology lecture you say, ‘Look at this,’ and kind of pump the students with what age group would this be. And then you say, ‘No, it’s six weeks. Life’s not a textbook.’ This is really a powerful tool.”

“The long-term goal is for interesting or unusual procedures, as well as general procedures that all residents and medical students need to view, to be electronically stored

## Caveats and Questions

# Telemedicine:

### Some of the other open questions surrounding telemedicine may not have a definitive answer at all.

Considering the growing number of patients who use health-related Web sites, should physicians play a role in reviewing or rating them? “The whole concept of caveat emptor will always prevail, and now it’s going to be even more important, says Alessi. “It will be up to the patient to find what’s of value.” He does have a general caveat of his own: “I don’t see judgment on Web sites, the professional judgment you get from seeing thousands of cases,” he notes. “You can find information on the Web, but judgment is not part of the domain yet. Or wisdom.”

And then there’s the issue of the physician-patient bond. “What astounds me is how much you can do without touching the patient,” says Nypaver. “I think that’s quite intimidating for a lot of people. For people who use telemedicine in the future, their long-distance skills will become very, very

good. People will learn to take care of patients without touching them. Should we be afraid of that?”

Clearly, there are benefits that offset the new distancing between doctor and patient. “If you can get a consultation from a Mayo Clinic neurologist, why in the world should you send the patient to the neurologist down the street?” says Woolliscroft. “I don’t know how grounded those fears are, but the technology will only improve, it won’t plateau.”

**But it will still, like all technology, have its limits. At least, Woolliscroft thinks so.**

“With the Internet, you’re sort of like Mycroft Holmes [Sherlock’s brother, who never left his club],” he says. “You sit there and get all this information that’s brought to you, process it, and out you go. I think there’s still a role for the Sherlock Holmes in medicine, actually out there gathering it for himself, sniffing the cigarette butts.”

Michelle Nypaver doesn’t disagree. But her positive experiences with telemedicine have made her a brave and willing participant. “Technology is like a river,” she says. “You can jump in or you can stand on the shore. If it improves your practice of medicine, why not embrace it?”

on a database,” says Teitelbaum. “Then someone who wants to learn a particular procedure can simply go to a computer, click on an index, find the procedure they want to see and view it prior to performing it.”

**test** its value in monitoring home health care. “We’re increasingly sending home highly complex patients, with Mom having to perform difficult tasks such as giving tube feeds, IV nutrition and medication, and changing wound dressings—procedures with which she has no experience,” says Teitelbaum. “If we send our own nurses out, which we typically do, it costs a huge amount of money, little of which is reimbursable. Insurance companies are not only asking patients to leave the hospital earlier but they’re also not paying for many of these home visits. The families are stranded out there. What we would like to do is place a low-end telemedicine unit in many of these patients’ homes and keep the other end with our nurses in home care, and have them tune in a couple of times a day to the patients’ homes and watch what they’re doing, answer questions, make sure they’re doing procedures correctly.”

Rees’ wound care facility is visited annually by hundreds of disabled patients suffering from pressure sores. Ideally, such patients should be evaluated weekly, but they usually visit monthly because such trips are “a huge expense, both financially and emotionally, for me to say the wound is clean,” he says. The extended period of time between visits heightens the role of the home care giver, who is responsible for the daily dressing and monitoring that such lesions require.

And that’s why Rees and his associates sought, and received, funding from the Veterans Administration for a pilot project in which patients will be “seen” via digital cameras and the Internet. “In addition to developing data matrices to keep track of the status of the pressure sore, you also are able to use it as a powerful educational tool to teach nurses the standards of wound care practice, to apprise them of the dressings you’re using on these patients, and allow them to learn new technologies for the treatment of the patient,” he says.

“I’m convinced we can effectively manage the patients,” adds Rees. “You can tell, via digital camera and the Internet, when a wound looks bad. In patients who develop bone infections, the average hospital cost is about \$48,000. That’s not including home health visits or the antibiotics or outpatient or physician charges. If you can save four or five patients from that expense, you’ve saved enough money to make it worthwhile. And, most important, you’re improving the health outcomes for the patient.”

**lower** costs—financial, temporal and emotional—for patients by eliminating needless trips and reducing the number of patient visits. Teitelbaum has been teleconsulting for about a year with both a group of pediatricians in the Upper Peninsula and the REMEC telemedicine consortium based in Traverse City.

“I would say it has probably helped keep the patient in his or her home town more often than it has led to the transfer of patients,” he says. “Nevertheless, the patients it has brought in are patients who really need a children’s hospital for their level of care. Several other times, we’ve utilized the facility to follow up on patients who have already been cared for but are now back in their home town. Instead of having them come back for X-rays or a wound check, we simply examine them through the system.”



**Riley Rees**

“I’m convinced we can effectively manage the patients.”

**A**lessi, working closely with John Bennett, ACSW, has seen this borne out in two of his projects, one for the Michigan Department of Corrections and the other for the Huron Valley Child Guidance Clinic. "We installed units at the prison system and one in our department," he says of the first project. "We did a very detailed process analysis of its use in the evaluation of prisoners, and found that every time they used it they were potentially offsetting up to \$4,500 in cost. The transportation of a prisoner is no small feat. Potentially, for them, they could easily pay for the unit in three to four uses."



**Daniel Teitelbaum**

"The average clinical visit is 10-15 minutes. The average telemedicine consultation is 27 minutes. We actually spend more time with the family via one of these units."

At the child guidance clinic, all the Medicaid cases that came into the inpatient child and adolescent psychiatric unit were managed "with the patient's case manager being present at our meetings via teleconferencing," says Alessi. "We did this for maybe 48 to 50 cases, a total of a hundred or so sessions." Figuring that the review via teleconferencing of each patient saved two to four hours of "transition time, travel time, waiting time, finding-parking time" for each visit the social worker was spared, "we probably saved them several hundred hours," he calculates.

Beyond the savings in dollars, and wear and tear on patients and providers alike (Rees says his clinical coordinator has twice been treated for hernias from lifting patients), the perception is that the quality of care thus administered is at least as good, and possibly better, than what would be available from moving flesh and blood through time and space. "We can more effectively communicate with the person with no delay," says Alessi. "There don't seem to be any complaints, or any decay in the transfer of information. People are very interested in doing this as team management of complex cases."

This corresponds with Teitelbaum's observation. "Typically, when we do the consultations, one or both parents are there plus the child's pediatrician and the child and often the nurse," he says. "What's great about it is not only do they save themselves a visit, but we're able to spend more time talking to them. The average clinical visit is 10-15 minutes. The average telemedicine consultation is 27 minutes. We actually spend more time with the family via one of these units. Secondly, it's not uncommon to have more than one specialist down there at one time. Instead of this family having to make three clinical appointments and spend two days down here, they see all the physicians at one time, without leaving home. The parents really appreciate that." Telemedicine has also occasioned a greater collegiality and coordination of care than was hitherto possible, much less likely, between referring physicians and U-M consultants. "I think that's a big advantage, probably the biggest advantage of this for us," says Teitelbaum. "It develops a lot of ties throughout the state."

"Now they know who they're talking to when they call us," says Nypaver. "They're less worried about calling us and asking a question. I feel that every time I talk to that other physician, we share knowledge and we will both benefit from it as we treat other patients. You remember more from each case you see and the complications of that case than you will ever learn from a textbook. If we can share knowledge about every patient we have a question about, two heads rather than one, that helps both of us in the future. While it's difficult to put a price tag on that, I think the benefit is immeasurable."

# “Immeasurable” is how telemedicine’s most sanguine devotees would describe its potential.

Neighborhood clinics staffed by volunteers in remote regions could be linked electronically to leading specialists. Leading surgeons could sit at their desks and skillfully operate on patients thousands of miles away with extraordinary precision (thanks to robots).

“Exploring telemedicine has allowed me to live farther out in the future than I ever imagined,” says Alessi, “and I don’t know if it’s good or bad. The potential is overwhelming but the resistance by people who live in a ‘today’ time-frame is pretty stultifying.”

In the foreseeable future, Bashshur envisions an electronic, statewide, integrated health care network, organized in a hub-and-spoke site, making the clinical expertise of the U-M Health System available to patients throughout the network. The network would offer uniform quality as well as greater convenience.

He poses two questions whose answers, he says, “would be the truest test of the integration of a system: How do you take a multi-site, geographically dispersed system like the U-M Health System, that has 50-some clinics spread throughout the state of Michigan, and have it function as an integrated system? And how can patients who come to one of the remote sites in the system be assured they will get the same standard of care they would get if they were in Ann Arbor?”

“I’m not claiming we are there yet,” he says, “but once we have the system in place, patients coming into any of the sites would be connected with this network, triaged to the most appropriate site of care, and they would receive the services according to uniform standards of care. They will be given the same type of service regardless of their location, and they will have access to the expertise and intelligence available throughout the system.”

And, in the spirit of the Web’s fabled democracy, this will not, says Bashshur, be a top-down operation. “Our plan is not to design it from Ann Arbor and distribute it within the state, but rather talk to our partners, determine the nature of their needs, and figure out the best ways of satisfying those needs.”

Time is on his side. The tools of telemedicine fit more comfortably in the hands of younger caregivers. “I just think they’re ahead of us,” says Woolliscroft. “One of the hardest things is to not be limited by your experience. We’ve got a whole generation that’s at most five or six years removed from interacting with their college professors. They’ll blow right past the faculty when they get to campus, just as they’re blowing right past their teachers in the junior high and high schools right now.”

But as Bashshur and his colleagues constantly reiterate, the promise of telemedicine will only be realized if it leads to improved quality and accessibility of medical care at affordable prices. In the meantime, it’s already providing a wealth of satisfaction to those who have embraced it. Says Nypaver: “You see situations where it absolutely solves the problem and you say, “Oh, this is good! This is the way we’re supposed to do this.” [m](#)



**James Woolliscroft**

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