tablished in 1984. AMIA was established as a unifying association in 1988 and AAMSI, ACMI, and SCAMC dissolved and transferred their assets into AMIA over the course of the next two years. Several excellent journals, each with its own niche and style, already exist in medical informatics. The sustained growth of AMIA since its inception makes it possible to bring to fruition early dreams of a more broad-based journal devoted solely to the development of medical informatics as a field. From the pragmatic to the theoretical, *JAMIA* will serve the needs of AMIA's members as well as those of the medical informatics community at large.

The Journal will reach beyond the medical informatics community to educate the public about the potential of the field for improving the health care environment and the challenges that must be overcome to achieve that potential. It will also serve as a vehicle for technology transfer from the developers of ideas and techniques to the administrators, practitioners, educators, and researchers who need new ways to do their work.

Our goals for the Journal are ambitious, but achievable. A distinguished group of experts from the disciplines that are integrated into medical informatics have agreed to serve as Associate Editors for the Journal and as members of its Editorial Board. Those appointments are working appointments, not honorary ones. We recognize that a thoughtful and rapid review process is an essential ingredient for a journal that seeks to blaze new trails. We hope that the readers of the Journal will provide an active correspondence section as the final step in the broad-based peer review process that we strive for.

Although we are committed to doing our best, the future of the Journal rests with you, the people working in the varied areas that make up the field. Submit your best work for consideration by the Journal. The pages of *JAMIA* will be read by a much broader audience than those of a more narrowly focused publication. Please give us your support and guidance in helping us to meet our objectives—we want to know what you think. Our future is yours.

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Dehumanization of Patient Care—Are Computers the Problem or the Solution?

The writers of stories in the lay press on the clinical use of computers, eager to attract the readers' attention to the article, predictably begin with an image that plays to both our fears and our fascination with the computer and its societal impact:

> The semiconscious patient lies in a futuristic intensive care unit, tubes protruding, wires emerging from under the sheets and connecting to a host of monitor carts or wall-mounted devices, and intravenous fluids with computer-controlled infusion pumps circling the bed. The beeps of the monitors are not interrupted by footfalls of caregivers, for they seldom have to enter the room. Instead, intelligent devices measure every pertinent physiologic parameter, deciding how to adjust infusion rates, when to alter the respirator settings, and whether to sound alarms for the intervention of nurses or physicians.

The message is clear: We are entering an era of computer-controlled therapy that will drive a wedge between clinicians and patients, offering potentially competent but sterile, impersonal, and dehumanizing care.

It is time to question the common assumption that the increasing use of computers will necessarily dehumanize health care. Current cultural phenomena show that we *do* accept other possible scenarios. Consider, for example, the way in which medical topics and "sick bay" figure prominently in the popular television program "Star Trek, The Next Generation." We see portrayed a future with an array of gadgets that could indeed allow medicine to be practiced with minimal laying on of hands. Yet the portrayal of physicians on this program is not cold or impersonal, despite the technological wonders that are imagined. Rather we see kind and caring individuals who talk to patients, hold their hands in times of need, and provide precisely the kind of comfort and support that we envision were widely available when country doctors made house calls a half century ago. Are we seeing twentieth-century values unrealistically projected into the future, or is it possible that the mere introduction of technology need not have a dehumanizing effect on relationships between patients and their caregivers?

The last two decades have seen remarkable changes regarding the role and acceptance of computers in our society,[2] and I suspect that few patients today would question information technology's logical place in assisting the physicians and nurses who care for them. The personal computer revolution, and the subsequent development of office-management and clinical software, have made it rare to find a medical practice without some automation in place. Yet the number of physicians who personally use computers when providing clinical care remains small. We see physicians adopting other technologies with great enthusiasm, a point that is frequently cited as accounting in part for the explosive growth in the cost of health care. Yet there is something very different about computers. Sherry Turkle has written a fascinating book, *The Second Self: Computers and the Human Spirit*,[3] which deals not so much with the nature of computers as with the way in which people react to them and change under their influence. Computers are not like the conventional devices that we grew up trying to understand. A Sunday afternoon on the floor with a toaster and a screwdriver could permit an inquisitive 8-year-old to figure out a great deal about how a toaster works. But open up a computer and further mystery abounds. How do the wires, transistors, and intricate circuit boards possibly permit the behavior that we see on the screen? How can the machine seem almost life-like in its interactive capabilities, its manipulation of symbols, and its evident ability to understand its environment, when in fact it is cold, unmoving, and sterile on the inside?

For those physicians who did not grow up in the computer age, this sense of mystery breeds mistrust, and even fear. "How can I possibly learn about these devices? How will my use of them, or failure to use them, affect the way in which I am perceived by my colleagues or, more importantly, by my patients? Will the nature of my work be changed over time by this machine? Is it a threat to the traditional role of the physician as caregiver?" Doctors are, of course, aware of the role that computers and high-speed communications have played in enabling the creation of automatic teller machines and the elimination of thousands of banking jobs. No one *really* believes that computers will replace physicians, but there is still a gnawing concern that such machines will detract from those aspects of medical practice that have drawn physicians to the field in the past, possibly negatively affecting the esteem of the profession and the kinds of people who will be attracted to it in the future. It is ultimately the sense of control *over* the technology, rather than *by* the technology, that will allow practitioners to feel comfortable in adopting computer-based tools for record keeping and decision support.

We tend to anticipate the future influence of computers on society by imagining their introduction into social settings drawn from our current world. In imagining the impact of twenty-first-century computers on the relationship between doctors and patients, we err if we simply imagine individuals from the 1990s thrust into a future world with the technologies that will be available at that time. Instead, as Turkle argues effectively in her book, we must realize that people will change just as much as computers do. The resulting impact on human relationships must be anticipated in the context of the way in which people have come to expect and value the role of information technologies in their lives.

It is becoming common for children to encounter computers before they begin school. I remember my amazement in the mid-1980s when my 3-year-old daughter quickly learned how to use one of the drawing programs on my home computer. Within a short time she realized that the mouse pointing device was just another kind of crayon, and the notion that movements on the desk top would generate corresponding movements on the screen seemed obvious and natural to her. Soon she was drawing pictures on the display screen, pictures that despite their

computer-based implementation were identical to the kinds of scribbles and stick figures that she would have drawn with a crayon and a piece of paper. The transition in media had been natural for her, introduced at a time in her life when she had no preconceived notions about how drawing ought to be done. I might add that there is nothing unique about my daughter in this story. Turkle describes several similar anecdotes. They provide an obvious contrast with my experiences teaching seasoned clinicians how to use mouse pointing devices. Such observations suggest that facility and familiarity with computing technology are easier to acquire as a child, rather like a second language.

Any effort to anticipate the effect of information technology on relationships between patients and physicians must be viewed in this larger context of social change. Both doctors and patients will be very different. They will have grown up with computers and will be surrounded by computing technologies very different from those that often seem to intrude on our lives today. As the computer becomes increasingly woven into the fabric of our society, if there is any resulting dehumanization it will occur because we allow it to happen, not because there is something inherently dehumanizing in the technology itself.

For us to imagine the doctor's office of the future, and its ability to attend to the human needs of patients, we must try to envision the future of computing itself. We now anticipate a rapid merging of technologies that were previously considered to be distinct: television, video, computing, networking, telephones, and paging. By the turn of the century, our television sets (which have already become our video display devices for films, video games, and some computers) will become an optional interface to our telephones and to networks that will provide two-way digital communication for applications such as information retrieval and, quite possibly, sending queries or receiving advice from our physicians. As computing devices become both mobile and smaller, their chances of physically intruding on the encounter with patients will decrease. Many patients will have their own hand-held computers, descendants of the "personal digital assistants" that are now appearing, and will use such devices to record health information at home or work so that it can later be shared with their personal physicians. When one recalls the pace of computing progress in the *past* ten years, even the wildest expectations for the next decade do not seem unreasonable.

I have argued that the mere existence of computers as tools for physicians and other health care workers need not be a threat to our goal of humane care, with close relationships developing between patients and caregivers. The greatest threats to these ideals in our current world are the fiscal, organizational, and time pressures that can prevent even the most well-meaning clinicians from finding the time to sit with their patients, to listen and teach, and to demonstrate the kind of concern and caring that was, ironically, probably one of the reasons that they entered the health care field in the first place. As computers recede into the environment, but increasingly help physicians find information quickly and easily, the result may be a release of time that will become available for building precisely the kind of caring relationships that both patients and physicians have always sought.

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