

The Evolving Role of Videoconferencing in Healthcare

*Pushing the Boundaries of
Knowledge Transfer*



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April 2004



Contents

Executive Summary	4
Videoconferencing-Based Knowledge Transfer in Healthcare: The People Equation.....	6
Interactivity as key to preserving people equity	8
Types of videoconferencing-based knowledge transfer	9
Continuing Medical Education	12
Medical Education	15
Training and Advanced Practices	16
Grand Rounds	16
Specialization Boards	17
Telehealth	17
Advanced Techniques	19
Patient Education.....	20
Cost-Benefit Analysis.....	21
Conclusion — Videoconferencing’s Potential for Enhancing Healthcare Knowledge Transfer	22
About the Author.....	23
About Wainhouse Research	23
About Polycom, Inc.....	23
Appendix A –Acknowledgments.....	24
Appendix B – Bibliography.....	25

The Evolving Role of Videoconferencing in Healthcare: Pushing the Boundaries of Knowledge Transfer

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Executive Summary

This white paper discusses a gradual evolution taking place in the healthcare field, one so subtle it is occurring “below the radar screen” of many healthcare professionals. This evolution is about the use of videoconferencing technology to speed and improve the transfer of knowledge in the healthcare field. Knowledge transfer is a critical issue for healthcare providers, educators, and institutions alike as the industry seeks to resolve a set of monumentally challenging problems — a looming shortage of trained physicians and nurses, a quickening pace of globalization that brings with it outbreaks of new diseases like SARS and Asian flu, a rapidly aging population, an exploding body of new medical knowledge, spiraling healthcare costs, and more.

Over the past 10 to 15 years, two-way interactive videoconferencing technology has increasingly been adopted for a variety of healthcare knowledge transfer applications, including:

- Physician training toward the continuing medical education (CME) credits that are a yearly licensure requirement in every state in the U.S.
- Primary healthcare education, particularly for growing numbers of nursing students who receive all or part of their undergraduate coursework through videoconferencing.
- A wide range of professional training and advanced practice activities, including videoconferencing-based grand rounds; tumor and other specialization boards; telehealth initiatives; and patient education programs.

All of these applications rely on the *interactive* aspect of videoconferencing to produce successful knowledge transfer. Because videoconferencing allows for real-time, two-way interaction, the technology effectively simulates the learning experience traditionally obtained in the bricks-and-mortar healthcare classroom, examination room, and operating room. It enables expert physicians to demonstrate techniques and communicate concepts, in real time, with doctors who might not otherwise be exposed to advanced medical knowledge. It connects physicians and their patients — throughout the world — with specialists at remote medical centers and large hospitals, who provide advanced diagnostic expertise and share new information. It expands the healthcare classroom, making coursework accessible to an increasingly wide, dispersed population of students. It makes required CME training available to physicians who no longer need to leave the clinical setting for a day or more to acquire this training.

By streamlining and expanding the transfer of healthcare knowledge, videoconferencing has a demonstrated potential to save many millions of dollars in travel time and provider value for hospitals, insurers, and others with a vested interest. The technology also has the potential to improve care, as it quickens the time to disseminate advanced diagnostic and treatment knowledge.

Videoconferencing-Based Knowledge Transfer in Healthcare: The People Equation

It is now a 21st-century commonplace that the healthcare system in the United States is in trouble, even while other developed and developing countries face their own challenges. Consider the following facts and predictions, a small subset of the many statistics that suggest we are in the midst of a severe healthcare crisis:

- Since 1965, the per-person expenditure in the U.S. on health and healthcare has risen over 300% (Gingrich, 2003), with per-capita healthcare spending likely to rise to 18.4% of the gross domestic product by 2013 (Clinton, 2004). These rising costs put ever greater pressure on healthcare providers to keep costs down while maintaining and improving care.
- By 2030, the number of people living in long-term care will double or triple (Gingrich, 2003). The long-term care profession has neither the workforce nor the institutions to meet this rising demand, and current trends suggest a projected shortfall of 25,000 gerontologists by 2030. By 20 years later one in five Americans will be 65 or older (Clinton, 2004) — meaning many elderly people will go without adequate care.
- In 2001 there were more than 126,000 RN vacancies, a shortage expected to rise to 400,000 by 2020 (Gingrich, 2003) — a cause for further reduction in quality of care.
- A 200,000 physician shortage is expected by 2020 (Cooper, 2002), resulting in lack of care for thousands of Americans.
- It takes, on average, 17 years for newly discovered medical knowledge to be disseminated throughout the profession (Institute of Medicine, 2003) — and medical breakthroughs in the next five to 10 years are expected to *double* those achieved throughout human history. If a doctor absorbed one white paper a day on a new technique or process, by the end of the year he would be 10,000 white papers behind (Brady, 2004).

An in-depth discussion of these problems is outside the scope of this paper. And the many possible solutions will undoubtedly be debated with increasing intensity as the United States confronts the crisis. At the same time, healthcare institutions and practitioners are increasingly looking at a technology that shows promise for helping to ameliorate some of the more critical problems, especially as regards knowledge transfer: **two-way, interactive videoconferencing**.

Videoconferencing is far from a panacea for the ills that beset the healthcare industry. But as this paper will demonstrate, over the past 10 to 15 years, the technology has begun to challenge or extend conventional methods of transferring healthcare knowledge, and on several fronts.

Over the past 10 to 15 years, videoconferencing has begun to challenge or extend conventional methods of transferring healthcare knowledge, and on several fronts.

For example:

- Doctors increasingly earn required continuing medical education (CME) credits through videoconferencing, which enables them to link, interactively and in real time, with the best and the brightest in their fields, regardless of distance.
- Many of the nation's leading mentoring hospitals, including Mt. Sinai, Johns Hopkins, Columbia Presbyterian, and Boston's Children's, now tie in to sophisticated videoconferencing and satellite networks, enabling physicians to exchange leading-edge expertise with widely dispersed colleagues across the country and around the globe.
- A wide range of state and federal grants fund distance e-healthcare initiatives that connect isolated rural doctors and patients with experts in teaching hospitals and medical centers.
- A growing number of nursing, dental, and other students participate in videoconferencing-based "virtual medical classrooms" as they work toward their healthcare degrees.
- More and more patients are hooking up, through videoconferencing, with remote specialists to receive up-to-the-minute information about managing chronic illnesses such as diabetes and high blood pressure — information that might not otherwise be available.

Before examining these and other knowledge transfer applications in depth, it's worth discussing why one key feature of videoconferencing has led many in the field to perceive the technology as one possible solution to some of the healthcare problems. That feature is **interactivity**.

Interactivity as key to preserving people equity

The importance of interactivity for healthcare knowledge transfer cannot be overestimated. According to studies conducted by the National Labs, which investigated general learning outcomes, those who listen to an audio lecture retain five percent of what they hear. Reading the material raises retention to 10 percent. Actually viewing the teacher — while seeing hands-on demonstrations of the material presented, *and while also having an opportunity to interact* — increases overall retention to as high as 90 percent (Brady, 2004).

This is why person-to-person interaction has been such a key component of medical education and ongoing training, which, for obvious reasons, requires the highest possible retention rate.

In the lecture hall and in the examination room, healthcare learners have traditionally relied on in-person, flesh-and-blood teachers to convey concepts and demonstrate techniques.

Asynchronous distance learning technologies — online courses, web sites, videotapes, and the like — have made more of this information available to an ever-widening audience of healthcare students and practitioners, but these other technologies lack the real-time interactivity made possible by videoconferencing.

With its critical interactivity component, videoconferencing effectively simulates the real-time, two-way visual and verbal interaction of conventional bricks-and-mortar knowledge transfer — and produces a similar high retention rate.

With its critical component of interactivity, videoconferencing effectively simulates the real-time, two-way visual and verbal interaction of conventional bricks-and-mortar knowledge transfer — and produces a similar high retention rate. In the face of a looming shortage of doctors, nurses, and other practitioners, not to mention an explosion in new medical knowledge, this technology can be used to:

- Maximize the expertise of existing practitioners, keeping them abreast of breakthroughs in disease management and patient care.
- Expand the pool of practitioners, making effective medical education available to those would not otherwise be able to receive it.
- Dramatically reduce the costs of required CME and other ongoing training by eliminating travel expenses and time away from the clinical setting.

The impact both for the quality of patient care and for the economic bottom line is potentially large. Consider, for example, that a single hour of physician time can be worth \$500 or more to a hospital. Every potentially productive hour away from a clinical setting (and instead behind a windshield or on an airplane) is an hour of lost productivity. A hospital is labor-intensive; its single most important source of equity is the pool of people it employs. When that equity deteriorates, so does the quality of care, and so does the value of the institution.

It is quite likely that the technology may one day be as commonplace as conventional face-to-face methods, as hospitals, governments, and other institutions with a vested interest look for ways to improve the efficacy and reach of high quality care.

Interactive videoconferencing technology has the potential to help preserve that value. It has been around for years in a number of healthcare environments, but the pace of its use is quickening. It is quite likely that the technology may one day be as commonplace as conventional face-to-face methods, as hospitals, governments, and other institutions with a vested interest look for ways to improve the efficacy and reach of high quality care.

Types of videoconferencing-based knowledge transfer

As the rest of this paper will show, hospitals, nonprofit organizations, and institutes of higher learning now rely on videoconferencing technology for an increasing array of knowledge transfer activities. These applications range from formal, regularly scheduled CME courses and symposia, to videoconferencing-based classes as part of the primary healthcare education curriculum, to training and advanced learning sessions that often occur on an ad hoc, as-needed basis.

In general, videoconferencing-based knowledge transfer takes place today in the following healthcare arenas, each of which is discussed more fully in the sections to follow:

- *Continuing medical education.* Every state in the U.S. requires that in order to keep a license to practice, practitioners must complete a given number of CME credits. There are now many opportunities to receive this required education through videoconferencing — in the process, avoiding the monetary and time costs that travel entails.
- *Medical education.* Several academic programs now offer students an opportunity to complete at least some of their primary training through videoconferencing. Nursing in

particular is an early adopter of the technology for this purpose, with several colleges of nursing expanding course offerings in this format and studies showing a growing acceptance of distance learning, including videoconferencing-based education, for the completion of RN and BSN programs.

- *Training and advanced practices.* This broad category of videoconferencing-based knowledge transfer includes activities that do not usually (but might) offer CME credits. These activities include the following:
 - *Grand rounds.* Regularly scheduled videoconferencing sessions offer dispersed physicians — and often, interns as well — a chance to meet and discuss complex cases, sharing their expertise and sharpening their awareness of recent breakthroughs.
 - *Specialization boards.* Tumor boards, cardiology boards, OB-GYN boards, and other specialization boards bring together a variety of practitioners — specialist and generalist doctors, nurses, psychologists, and others — to collaborate through videoconferencing on effective approaches to individual cases.
 - *Telehealth.* Videoconferencing connects rural or remote physicians and patients, including those in the third world, with specialists in large teaching hospitals or medical centers, resulting in the interactive exchange of up-to-the-minute knowledge and improved patient care.
 - *Advanced techniques.* As advanced teaching hospitals and other leading medical institutions discover innovative techniques for minimally invasive surgery, robotics, and other medical procedures, they can use videoconferencing to rapidly and widely disseminate this new knowledge to remote groups of physicians.
 - *Patient education.* Experts in such illnesses as diabetes, heart disease, prenatal or neonatal care, and other areas can use videoconferencing to reach hundreds of patients remotely, sharing new guidance and late-breaking developments, and offering potentially life-saving advice.

Keep in mind that there is some overlap among the categories. For instance, training and advanced practices activities sometimes include the opportunity to acquire CME credits, even though the activities may not have been designed with CME specifically in mind. Adding to the complexity, the terminology used to denote the different activities often varies from program to program and from practitioner to practitioner. The burgeoning landscape of videoconferencing-based knowledge transfer is as diverse as the healthcare industry itself, with applications

springing up in a wide variety of settings and in response to a wide range of needs. The nomenclature is evolving as well.

Continuing Medical Education

Healthcare practitioners understand the importance of CME as a precondition to maintaining a high quality of care, professional standards, and — given state licensure requirements — even employment. For today's practitioners, CME is a yearly necessity. Doctors in particular rely heavily on CME to hone their clinical expertise and advance their careers.

Because hands-on experience is such a crucial component of medical school education, physicians are normally trained locally for their basic MD degrees. Traditionally, practicing doctors earn their CME credits by traveling to some of the many lectures and symposia that are organized yearly for this purpose. A growing number of physicians, however, are taking advantage of videoconferencing-based course offerings to earn the credits — and to save time and money in the process. Videoconferencing technology lends itself very successfully to CME, which requires interactive, real-time training (regular videotapes, for example, will not suffice).

Most of the videoconferencing-based CME offerings available today are part of a larger videoconferencing-based training program operated by a parent institution — normally a teaching hospital or medical school. As long as an institution disseminates course information in advance and adheres to the pre-planning and course evaluation guidelines required by state licensing agencies, virtually any videoconferencing-based training activity can be accredited for CME.

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Increasingly, institutions are incorporating formal CME as a component of comprehensive videoconferencing networks that are also used for telehealth, remote consultation, tumor boards, and more.

For example, the Continuing Medical Education office of University Hospitals Health System (UHHS) in Cleveland, Ohio, offers 35 CME credit hours a year as an adjunct to its extensive grand rounds, tumor boards, and OB-GYN boards (Whitbeck, 2004). The UHHS CME office currently has 17 videoconferencing hookups with sites around the state, with plans to expand to 20. Videoconferences are scheduled for noon or around the edges of the day, accommodating physicians who are required by insurance companies and hospitals to treat an ever-growing

number of patients daily. The benefits of these CME opportunities are many. Not only are participating physicians able to earn required credits, but the lecturers “only need to speak once, without even leaving the hospital, to reach 125 people,” says CME director Rick Whitbeck. “You can’t do that with a live conference today.”

Another large initiative that incorporates CME opportunities into its larger knowledge transfer curriculum is the Missouri Telehealth Network, operated by University of Missouri Health Care in Columbia, Missouri. The Missouri Telehealth Network connects experts at the University of Missouri with physicians in 30 rural sites throughout the state, which requires doctors to complete 25 CME credit hours a year. Like UHHS in Cleveland, the Missouri network operates a videoconferencing-based tumor board and conducts grand rounds. It also provides frequent CME opportunities. For example, one group of about 16 providers dispersed among seven clinics in southeast Missouri requested a cardiology program, and the network arranged for a cardiologist at University of Missouri Health Care to conduct an hour-long session featuring “lots of interactivity,” says Joe Tracy, the network’s executive director (Tracy, 2004).

The Missouri Telehealth Network is also in the process of launching a new CME program funded by a grant from the Donald W. Reynolds Programs in Geriatric Medicine, which was awarded to the MU Department of Family and Community Medicine. As a part of this new program, says Tracy, CME credits will be offered for geriatric consultations — functioning as “a way for a rural physician and a special-needs patient to consult with a specialist, and for the rural physician to earn CME credits at the same time.” When they occur, videoconferencing-based consultations are a particularly fruitful use of the technology for knowledge transfer; in the case of the Department of Family and Community Medicine’s new initiative, the combination of consultation with CME credit doubles the value for the remote physician.

Also offering participants a chance to earn CME credits through videoconferencing is the Medical Missions for Children Global Telemedicine and Teaching Network (GTTN). The primary charter of this innovative network is to provide remote telemedicine services to underserved children in Latin America, Africa, and (soon) eastern Europe. Medical specialists in a network of 26 major mentoring hospitals in the U.S., including Johns Hopkins, Yale Medical School, Columbia Presbyterian, and others, consult in interactive videoconferencing sessions with the remote physicians on patient diagnosis, sharing new techniques and treatments and answering questions. In addition, the network sponsors live symposia conducted at mentoring hospitals and simultaneously beamed via satellite to the videoconferencing endpoints around the globe. CME credits are often offered for the symposia, says Frank Brady, Medical Missions for Children

founder and Chairman of the Board. “We issue the credits through the hospital offering the symposium,” says Brady. “For example, for a recent symposium offered by Mt. Sinai on pediatric diabetes and endocrinology, participants were able to apply to Mt. Sinai for the CME credits, because the symposium had been accredited” (Brady, 2004).

Medical Education

As noted earlier in this paper, nursing is the discipline in which videoconferencing currently has the biggest impact on primary healthcare education. One frequently cited study investigated *professionalization* as it occurred in a distance learning RN-BSN program (Faison, 1999).

Professionalization — the acquisition of values, skills, and attitudes that support the role of the professional nurse — is a process that begins in nursing school and continues throughout a nurse’s career. It is considered a major outcome of nursing education.

Students participating in Faison’s study were enrolled in a synchronized distance learning program which prepared RN students to complete the baccalaureate degree, with *all* instruction occurring at a distance learning site located in a community college setting. At the end of the study, the students reported a change in values, beliefs, and attitude as influenced by the videoconferencing-based program.

Faison concludes that “distance learning is becoming an acceptable mode of nursing education.” Indeed, several schools of nursing now offer primary instruction through videoconferencing. A notable example is Vanderbilt University School of Nursing.

They also reported that co-workers had noticed a positive change in their professional behavior. Furthermore, the students said the distance learning faculty had had a positive influence on their professionalization process. In general, there was consensus that this increased professionalization was a very positive outcome of the videoconferencing-based learning experience.

Faison concludes that “distance learning is becoming an acceptable mode of nursing education.” Indeed, several schools of nursing now offer primary instruction through videoconferencing. A notable example is the Vanderbilt University School of Nursing (Vanderbilt, 2004). Vanderbilt employs online videoconferencing as one of the main formats for delivering courses in its Master of Science in Nursing program. Students can use videoconferencing to complete courses in clinical management, health systems management, neonatal nursing, pediatric nursing, and more. The students can participate in a synchronous, real-time videoconferencing class, or they can choose to view the captured video files post-class.

Training and Advanced Practices

Videoconferencing technology is assuming an increasingly large role for ongoing physician training and the dissemination of advanced practices — and these telemedicine-related activities make up some of the most innovative healthcare applications. Because there are no formal government guidelines — as there are with CME healthcare education — practitioners can freely adapt the technology to fit their own unique needs and meet the needs of their colleagues and patients.

Grand Rounds

Videoconferencing-based grand rounds are regularly scheduled meetings at which remote physicians meet to share their expertise, presenting and discussing complex cases. Johns Hopkins is the “granddaddy” of grand rounds. The term itself originated at this renowned medical center, originally built as a circle with balconied rooms opening out into a large natural-lit atrium. Interns moved from room to room around the circle, completing their “grand rounds” as they received instruction from experienced physician mentors (Brady, 2004).

Johns Hopkins has continued this tradition in the “virtual” space, conducting weekly videoconferencing-based grand rounds for various specialties at which physicians present tough cases and participants ask questions. Another Johns Hopkins International program, the Colleague Information Exchange, functions as a biweekly “mini rounds” that connects Hopkins doctors with their counterparts overseas. For example, Hopkins Internal Medicine specialists meet virtually with their counterparts in Switzerland to cover two or three Internal Medicine cases per session. “The physicians in Switzerland present these cases to our physicians,” says Alex Nason, Senior Manager of Business Development at Johns Hopkins. “It’s a great learning experience for the physicians on both sides of the Atlantic” (Nason, 2004).

Cleveland’s University Hospitals Health System (UHHS) also operates an extensive grand rounds program. The UHHS grand rounds involve about 120 dispersed participants at up to 17 remote sites per event. Similarly, the Medical Missions for Children Global Telemedicine and Teaching network (GTTN), with its videoconferencing connections to 26 major mentoring hospitals and 40 third-world countries, is able to tap into any of the grand rounds programs and events that are sponsored by the network’s mentoring hospitals. GTTN broadcasts many of these events throughout the mentoring hospital network and to its constituents overseas.

Specialization Boards

Specialization boards explore tough cases in specific disciplines. Tumor boards are the most common examples of this activity, which brings together physicians, RNs, and other specialists to discuss complex cases and jointly design treatment plans. Videoconferencing-based specialization boards represent one of the fastest-growing applications of the technology for healthcare knowledge transfer.

For example, the Missouri Telehealth Network conducts a regularly scheduled tumor board that connects University of Missouri oncologists with the staff at the Ft. Leonard Wood army installation 100 miles south of Columbia. The Ft. Leonard Wood doctors show x-rays and other data and interact extensively with the University of Missouri physicians, often joined by another oncologist who is located 140 miles north of Columbia (Tracy, 2004).

The University Hospitals Health System in Cleveland created a series of specialization boards in 2001, predicting that videoconferencing technology would be a good medium for connecting small groups and bridging space. The UHHS network quickly built network-wide momentum for its tumor and OB/GYN boards, the latter of which regularly reaches 10 sites — including an Ohio county that, says CME director Rick Whitbeck, “never would have been involved otherwise” (Whitbeck, 2004).

Whitbeck’s comment brings us to an important point about these boards. They have long been seen as an effective hands-on method of transferring discipline-specific knowledge among practicing physicians. With videoconferencing, larger groups than before can collaborate and share insights and opinions, and can do so regardless of distance — thereby increasing knowledge transfer opportunities and ultimately improving the quality of care.

Telehealth

The general public is more likely to know about telehealth initiatives than the other videoconferencing-based knowledge transfer applications — and for a couple of reasons. First, many of today’s telehealth networks offer consultative services around the world, echoing with interactive videoconferencing technology the kinds of work performed by well-known groups such as Physicians Without Borders. Second, telehealth involves actual patients — so a small but growing number of Americans have participated directly in one or more sessions.

Telehealth initiatives connect rural or remote physicians and their patients with expert counterparts in large teaching hospitals or medical centers, transferring up-to-the-minute knowledge to the participating doctors and leading to more effective treatment for the patient. Virtually all of the grant-funded state videoconferencing networks — including the Missouri Telehealth Network, the University Hospitals Health System in Cleveland, the University of Virginia Health System, and many more — operate extensive telehealth programs. The remote physicians typically request a session to present a difficult case, and network administrators connect the doctor with a specialist.

The state telehealth networks represent only a subset of the programs of this type. Johns Hopkins International, for instance, conducts an extensive international program whereby “our physicians meet with a patient and his/her physician in their country and consult back and forth,” says Alex Nason of Hopkins. Hopkins conducts a few dozen teleconsultation sessions a year, charging a minor fee that is “minimal compared with the total cost of traveling here,” says Nason.

“The knowledge transfer goes not just from physician to patient but from physician to physician when we do these teleconsultations,” he continues. “It takes an intimate phone conversation to the next level. Often, a session produces a continuing relationship with the remote physician, who says ‘I have colleagues who want to learn more.’”

Hopkins also works extensively with Medical Missions for Children, participating as one of the nonprofit’s U.S. mentoring hospitals. The Medical Missions for Children GTTN is a prime example of the creative use of videoconferencing for global telehealth. The network connects medical specialists in the U.S. with third-world counterparts in around 40 countries. These telehealth sessions function as a forum for exchanging vital information on techniques and treatment options. The mentoring physicians often even participate remotely in operations, viewing procedures over the videoconferencing network and talking the remote doctor through techniques. In addition, when a remote doctor is scheduled with a mentoring specialist, he or she will often use the opportunity to present several cases at once.

“The knowledge transfer part of all this can be aggregated, because every month the remote doctors bring to bear the knowledge they acquired in prior sessions,” says Medical Missions for Children founder Frank Brady. “Considered that way, we touch 100 children a month, and help 1200 children a year, per mentoring hospital.”

Advanced Techniques

One of the more exciting videoconferencing applications in healthcare involves programs that enable expert physicians to share advanced knowledge and techniques with connected counterparts around the country and across the globe. Alex Nason of Johns Hopkins International sums up the value of these programs: “As much as we push out our knowledge, there’s a lot out there that we can learn. That’s where two-way technology comes into play.”

This technology enables Hopkins to conduct a range of advanced learning activities. Some examples:

- The Global Access Lecture Series, where Hopkins doctors give talks on specialized topics — cardiology, diabetes, and more — to groups of physicians around the world. These sessions include an hour and 45 minutes of lecture and 15 minutes for questions and answers.
- An HIV program that connects a Hopkins AIDS specialist with five Maryland prisons to consult with HIV-positive inmates and their doctors. The Hopkins expert has also presented to all five prisons on the latest information on anti-retroviral drugs.
- A four-week program of educating and working with Ethiopian physicians on malaria — “a classic example of knowledge transfer to a place that really needs it,” Nason says.

Another intriguing example of the potential for of videoconferencing for sharing advanced techniques is the grant-funded Canadian Surgical Technologies and Advanced Robotics (CSTAR) program, which focuses on telesurgery, telementoring, and robotics. The expert surgeons at CSTAR are especially adept at minimally invasive surgery (MIS), a growing subspecialty aimed at minimizing the trauma of surgery. The CSTAR experts regular share their MIS knowledge — and other cutting-edge surgical expertise as well — with remote surgeons through the videoconferencing network (Rayman, 2004).

CSTAR operates one of only two telesurgery prototypes in the world. With telesurgery, a local surgeon can, over a console, perform surgery on a patient who is at an extremely remote location, such as Canada’s North Bay. Telesurgery is currently in its infancy, with much research underway to hammer out details. Robotics — telesurgery using a one-armed robot — is also in the early conceptual stage.

Patient Education

Patient education is a crucial part of the videoconferencing-based healthcare equation. As earlier sections of this paper suggest, patients receive a great deal of information as their physicians participate in telehealth sessions — a kind of “secondary” knowledge transfer that is nonetheless important.

In addition, several initiatives have sought to conduct more formal patient education through videoconferencing, and to evaluate the efficacy of these activities. Chronic conditions, such as diabetes and high blood pressure, are the ones that lend themselves most readily to such an approach. A study published in *Diabetes Care*, for example, concluded that “diabetes education via telemedicine and in person were equally effective in improving glycemic control, and both methods were well accepted by patients” (Izquierdo, 2003).

The use of videoconferencing technology to deliver patient instruction and education might well evolve into a widespread phenomenon over the next decades. Remember the statistics at the beginning of this document about looming geriatric needs and a shortage of geriatric specialists — as these alarming facts suggest, an aging population could benefit greatly from a technology that helps alleviate the problem.

Cost-Benefit Analysis

Now that videoconferencing technology is gaining a foothold for knowledge transfer in the healthcare industry, we need a great deal of research that quantifies the cost savings inherent in the use of this technology. There are, however, several things we already know about the costs vs. benefits of healthcare videoconferencing.

First, the price of adopting and installing a videoconferencing network is vastly less than it was when the technology was in its infancy. Circuit-switched networks used for transporting dedicated audio/video/data cost far less than they used to, and are being supplemented or replaced by newer Internet Protocol (IP)-based technologies that are even more low cost.

Second, since one estimate by some hospitals is that a physician's time is worth around \$500 an hour, we can extrapolate the cost savings of videoconferencing-based CME and advanced training vs. conventional travel-intensive education. If 125 doctors in a hospital network attend one hour a week of videoconferencing-based training — staying in their place of practice, with the only absence being the one training hour — the network stands to achieve a \$62,500 productivity gain every week. In a 52-week year, that would amount to \$3.25 million.

Third, consider some of the savings produced by, for example, a remote geriatric telemedicine consultation, which without videoconferencing would require Medicare-funded transportation to the specialist's office. Multiply those savings by several hundred geriatric consultations a year, and savings to the taxpayer are substantial indeed.

Finally, there are the cost savings already discussed in this document — savings in the cost of travel, primarily, and also (though less quantifiably, at present) savings produced when a lifesaving diagnosis is delivered through videoconferencing early in a disease process, when the illness can be more easily treated and heavier costs down the road are avoided.

Conclusion — Videoconferencing’s Potential for Enhancing Healthcare Knowledge Transfer

This paper is designed as an overview of the main types of applications of videoconferencing technology for knowledge transfer in the healthcare field. The discussion by no means covers all of the applications that are in operation today. Rather, it is meant as a bird’s-eye view of a dense, multifaceted landscape that is changing as rapidly as the healthcare field itself.

As discussed, the technology is a proven, effective mechanism for streamlining the transfer of knowledge — and for making leading-edge medical information available to a larger audience than ever before. It enables patients in remote, out-of-the-way locations, including those in the third world, to receive the kind of medical attention that would not otherwise be possible. It serves as a vehicle for delivering primary instruction to hundreds of nursing students, and as a way for practicing physicians to save time and money as they earn required CME credits.

Telemedicine sharpens the skills of the world’s premier medical experts and globally disseminates their unique expertise. Finally, an expanding population of patients can receive the up-to-the-minute education they need to achieve health and extend their lives.

While videoconferencing is not yet ubiquitous within the healthcare field, its use for knowledge transfer is increasingly widespread. Even more widespread adoption is probable in the near future, as the healthcare industry, governments, and individuals seek solutions to our society’s healthcare problems — solutions that must involve cost savings, better patient care, and a faster time to market for life-saving medical advances.

About the Author

Alan D. Greenberg is a Senior Analyst & Consultant at Wainhouse Research. As consultant, analyst, communicator, and strategist, Alan has worked in the telecommunications, videoconferencing, software and services, and multimedia arenas for 20 years, holding positions with VTEL, Texas Instruments, and several Austin, Texas-based startups, and consulting to many organizations. At VTEL he conducted research into dozens of distance learning networks, was product marketing manager for a set of turnkey classroom packages, and led a number of educational and training initiatives and research into healthcare networks. Most recently he was primary author on the segment report, *Video Communications Management Systems*, and author of the white papers *Navigating the Sea of Research on Videoconferencing-Based Distance Education*, and *Renegades and Rogues: How to Tame the Unsanctioned Web Conferencing 'Buy'*. He also has authored reports on conferencing endpoints & bridges, streaming video, distance learning, and voice/fax services. He specializes in primary end user research and is a trained focus group moderator and interviewer. Alan holds an M.A. from the University of Texas at Austin and a B.A. from Hampshire College, Amherst MA. He can be reached at agreenberg@wainhouse.com.

About Wainhouse Research

Wainhouse Research (www.wainhouse.com) is an independent market research firm that focuses on critical issues in rich media communications, videoconferencing, teleconferencing, and streaming media. The company conducts multi-client and custom research studies, consults with end users on key implementation issues, publishes white papers and market statistics, and delivers public and private seminars as well as speaker presentations at industry group meetings. Wainhouse Research publishes *Conferencing Markets & Strategies*, a three-volume study that details the current market trends and major vendor strategies in the multimedia networking markets, a variety of segment reports, and the free newsletter, *The Wainhouse Research Bulletin*. Its subscription content service can be found at www.wrplatinum.com.

About Polycom, Inc.

Polycom develops, manufactures and markets a full range of classroom, corporate training, and medical education solutions through its high-quality, affordable voice and video communication endpoints, video management software, web conferencing software, multi-network gateways, and multipoint conferencing and network access solutions. For additional information, visit www.polycom.com/.

Appendix A –Acknowledgments

The *Evolving Role of Videoconferencing in Healthcare* is based on its author's past experience working with distance learning and healthcare-focused organizations, along with in-depth interviews held with a number of programs. We wish to thank the following individuals and their organizations, without whose support this document could not have been written.

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