

***Advancing Healthcare Through Broadband:
Opening Up a World of Possibilities***

A White Paper for the Internet Innovation Alliance

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About The Internet Innovation Alliance

The Internet Innovation Alliance is an association of nonprofit groups, business associations, consumer advocates, think tanks, corporations and technology leaders who believe in the power of the broadband Internet to improve Americans' lives by enabling innovation, next generation services and service providers, and more competitive American jobs and firms. IIA members are committed to enabling Internet-based innovations by identifying and generating consumer support for wise public policy decisions.

Executive Summary

As the United States works to improve the quality of and access to its health care system, it is increasingly clear that expanded broadband service can enable improved care at a reduced cost for more people.

Among the most advanced initiatives using broadband to improve health care is enhanced medical recordkeeping that knits together electronic databases, giving patients and authorized providers instant and centralized access to information such as health histories, treatment regimens and medical images.

Digital records available over high speed networks can reduce waste, improve patient outcomes, and cut costs. Telemedicine applications that enable real-time clinical care involving geographically distant patients and providers can deliver the highest quality care to even the most remote communities. Remote monitoring made possible by broadband can facilitate post-operative care and chronic disease management without hospitalization or institutionalization.

Small pilot projects have produced significant reductions in hospital admissions and the cost of care. A Veterans Administration study of one remote monitoring program showed a 40 percent cut in emergency room visits and a 63 percent reduction in hospital admissions. Penn State University estimated that remote home health monitoring for one group of diabetes patients cut costs for hospital care 69 percent, from almost \$283,000 to approximately \$87,000 per patient. And a study by economist Robert Litan projected that broadband-based monitoring could cut medical costs for senior citizens by about 30 percent.

As Jon Linkous of the American Telemedicine Association observes: “Broadband Internet access to hospitals is becoming a critical tool in the delivery of medical services.”

For example:

- The Alaska Federal Healthcare Access Network (AFHCAN) links more than 248 sites including: military installations; Alaska Native health facilities; regional hospitals; small village clinics; and, state of Alaska public health nursing stations for a range of healthcare services using a variety of high-speed broadband services including satellite.
- The Downstate Illinois Regional Telehealth Program uses T1 lines, DSL, and Cable to develop community-institutional partnerships to strengthen local health care capacity through the use of advanced technologies. They provide medical education and training to 52 rural hospitals through videoconferencing, satellite broadcasts and web streaming.
- The 82-site Missouri Telehealth Network provides services in more than 15 different medical specialties, with a majority of the work coming from radiology, mental health, dermatology and cardiology. To date, more than 11,000 interactive video encounters and 57,500 Teleradiology exams have been conducted. The Missouri Telehealth Network uses T1 (Frame Relay) connections to each site to provide dynamic bandwidth allocation for voice, video and data.

- The University of Arkansas' ANGELS program connects physicians at more than 40 sites with pregnant women in rural communities to improve pre-natal care and reduce the number of low birth weight babies. In 2005, the program's call center received an average of 2,500 calls a month and facilitated more than 400 critical hospital transports.
- The REACH program, initially established by the Medical College of Georgia, puts stroke specialists in touch with rural hospitals and physicians statewide for consultation on key treatment options during the critical three hours after a stroke.

Despite these exciting individual initiatives, telemedicine programs in the United States have barely scratched the surface and large barriers remain before we see meaningful, widespread results. Capital investment in health care IT falls far short of what is needed. Insurance reimbursement, including Medicare and Medicaid, have yet to embrace broadband-based clinical interventions. The broadband networks on which telemedicine depends do not reach enough people, nor are they robust enough to deliver the full benefits in either care or costs.

What's needed now is a *national* commitment to developing telemedicine technologies and strategies – a commitment that builds on the successful individual programs underway at the state and local level to push broadband adoption and also define a national plan for telemedicine. Key to this commitment is the understanding that investment in the continued development and expansion of the U.S. broadband is a fundamental prerequisite for the long-term ability of telemedicine to enhance America's health care system.

As a first step, IIA urges Congress to establish a National Commission on Telemedicine. Within a year, this Commission should design a program that would accelerate the development of telemedicine; provide financial incentives, including supportive insurance reimbursement, for the universal embrace of telemedicine by medical institutions and practitioners; and remove regulatory or statutory barriers to telemedicine programs.

At the same time, the United States also must push ahead with efforts to deliver high-speed broadband to every corner of America – especially to remote communities that lag behind in both high speed Internet access and healthcare. The ability of broadband-powered technology to help deliver better quality and more cost-effective health care is one reason why the Internet Innovation Alliance is working to bring affordable broadband access to every American. We must not delay.

Health Care and the Power of Broadband

As America moves deeper into the 21st century, it has become increasingly evident that improving the healthcare system has climbed near the top of the nation's agenda. The key challenges have been evident for some time – providing access to care for every American, assuring a high quality of care across the system, reducing medical errors, and finding the resources to pay for it. Consensus on a solution has been harder to come by.

For health care, advances in technology have produced great benefits, but they also have contributed to rising costs and contributed to a quality gap between those with health insurance (or personal wealth) and those without. New imaging technologies have enabled earlier and more accurate diagnosis; new machinery, new drugs and a range of implant devices have extended life and enhanced its quality. But these breakthroughs also have raised costs and fueled intense debate about who should have access to the new medical miracles and how to pay for enhanced care.

But about one area of technology there is little debate. The emergence of the Internet and the expansion of broadband service have opened vast new areas of opportunity for better health care and improved cost management. Even as the nation struggles toward comprehensive reform of its health care system, broadband communication holds the power to improve the quality of care, cut costs and reduce the medical service gap among American communities.

Enhanced medical recordkeeping and paperwork management made possible by broadband-linked networks, can reduce waste, improve patient outcomes, and reduce costs. Telemedicine applications that enable real-time clinical care involving geographically distant patients and providers, can bring quality care to remote rural communities, save lives, and reduce dangerous and costly patient transport. And, remote monitoring, possible only because of broadband, reduces hospital admissions and costs by enabling post-operative care and chronic disease management to take place safely at home or as people go about their daily routines.

While no study has yet estimated the total cost savings possible from these broadband-enabled techniques, results from a variety of small programs make clear the potential. A Veterans Administration study of one remote monitoring effort showed a 40 percent cut in emergency room visits, a 63 percent reduction in hospital admissions and a 60 percent reduction in the number of hospitalizations.¹ A Penn State University study of one group of diabetes patients showed¹ estimated hospital costs of \$87,327 for patients monitored through telehome health compared to \$232,872 for patients that received traditional homecare from a visiting nurse.² And, a health care study by economist Robert Litan projected that remote broadband-based monitoring had the potential to cut hospital, drug and out-patients costs by 30 percent.³

While not a cure-all for systemic problems and insurance coverage issues that limits health care access for 40 million or more Americans, the potential health benefit of telemedicine and other initiatives made possible by high-speed Internet connections is yet another powerful argument for national policies that accelerate the availability and adoption of broadband in every part of America.

This paper examines trends in telemedicine and “e-Health”, considers the ways in which broadband is enhancing health care, and details some of the ways build on success to date.

Broadband Delivers Better Health Care – Today and Tomorrow

From every part of the political spectrum and almost every major interest group, America is hearing calls to fix a complex multi-tiered financing system that leaves many in rural and inner-city America without timely access to needed health services. Aside from questions of fairness, the gap in care ultimately leads to increased long-term costs as disadvantaged patients often defer treatment while their health deteriorates. Later intervention typically means greater and more costly care and also places increased burdens on an already strained delivery system.

The health care system is also strained by the aging of the Baby Boom generation, a development that will exacerbate financial pressures. The US Centers for Disease Control has recently predicted (March, 2007) that the cost of care for seniors will add 25% to the nation’s health bill by 2030 unless steps are taken to stem the increase. The elderly consume a disproportionately large percentage of every health dollar -as much as three to five times as much according to CDC - (The State of Aging and Health in America 2007,) and because of longer life spans, they also account for a growing share of the American population.⁴

In 1997, one in eight Americans were elderly (age 65 and over). By 2030, one in five could be elderly. As the Baby Boom generation reaches age 65 (between 2010 and 2030), this trend towards an elderly population explosion poses a variety of challenges to U.S. policy makers. [SOURCE POPULATION RESOURCE CENTER].⁵

What’s more, continued escalation in medical outlays is not being matched by better outcomes. In its landmark 2000 study, *“To Err is Human: Building a Safer Health System”* the Institute of Medicine found that there are as many as 98,000 avoidable deaths in any given year due to medical errors in hospitals.⁶

In the words of one acclaimed report *“Redefining Health Care: Creating Value-Based Competition on Results”* the U.S. Health Care System “is on a dangerous path, with a toxic combination of high costs, uneven quality, frequent errors, and limited access to care.”⁷

Systemic reforms have proven elusive to date, and a comprehensive national overhaul of the health care system may take years more to achieve. But information technology tools, including broadband, are already improving care, expanding access and cutting costs in a variety of locations across America. We know how to use Telemedicine and advanced information technologies to help close the economic and geographical gaps in coverage that routinely separate many rural and inner city poor patients from needed medical services. Today there are literally thousands of successful examples of new communications and IT services being pressed into service for patient care, administration and management, improved service delivery, medical research, and teaching.

At the most basic level, broadband enables enhanced information sharing among medical facilities, practitioners and patients. Broadband linkages mean that individuals’ medical history, test results, and medical images can – with the patients’ permission and privacy safeguards – be made quickly available to health care professionals to guide diagnosis and treatment decisions.

Access to comprehensive records improves care decisions, cuts errors and reduces redundant testing by enabling reliance on previous results.

Broadband also enables patients and caregivers to overcome geographic barriers to care. Indeed, the broadband-supported Internet service has given birth to the emerging field of “telemedicine” to link medical experts to patients and practitioners in remote locales hundreds or even thousands of miles away. New telemedicine applications ranging from remote monitoring of chronic diseases to robotic surgery are delivering new hope and better life quality to patients who would otherwise be beyond the reach of the highest levels of care.

Even as we work for overall reforms, we can accomplish much by taking advantage of broadband to share information and deliver clinical solutions.

Here’s some of what broadband can help us do:

- Enhance quality and decision making by connecting patients and practitioners to information sources about best practices, health care innovation, quality care measures, and data on the effectiveness of medical institutions and practitioners.
- Reduce costs and create efficiency in health care management by streamlining recordkeeping and administration
- Empower patients by improving access to information and enabling them to control their personal health record
- Close the medical care gap between urban and rural America and expand access to care through the use of telemedicine for a range of clinical care programs
- Improve the quality of care for all Americans by linking patients and practitioners to the top specialists in every branch of medicine through real-time Internet consultations
- Reduce medical care costs and improve life quality through remote monitoring that brings more care directly into the home
- Overcome healthcare provider shortages through Internet-based care that connects distant practitioners to communities where local medical resources are in short supply
- Enhance disaster preparedness and recovery with seamless communication that can help medical care givers respond quickly to areas of greatest need.

Connecting Patients and Practitioners to Critical Information

The Internet has become a critical source of information in every realm of American life, but for consumers few areas have drawn as much participation as health care. According to the Pew Internet & American Life Project, 80 percent of American Internet users – or about 113 million American adults -- have turned to the Web for healthcare information. Americans have used

the Web to learn about specific diseases, obtain information about health care providers, or review public data about the effectiveness of medical institutions and protocols.

Although consumers need to learn how to use the data judiciously (Pew says only 15% of users say they always check the source of the information), the Internet has become the “go-to” resource for consumers in their search to healthcare answers.⁸

Users search specific diseases and/or treatments; advice on diet and nutrition; exercise and fitness; information regarding medications; information regarding doctors, hospitals and insurers; alternative treatments and much more.

While simple searches have been available at slower Internet speeds – expanded uses of audio and now video will require many fold increases in the bandwidth available to consumers. Audio “Podcasts”; streaming video for patient care education; and, two-way interactive real time video for physician Tele-homehealth consultations also require many times more bandwidth than provided by dial-up connections or lower speed broadband. Just recently physicians have demonstrated how iPhones may be used to send or view high-quality heart images.⁹ With each new application, high-speed, always-on broadband connections will become increasingly important to maximize the opportunities for enhanced health outcomes.

Practitioners, too, are taking advantage of broadband to learn in real time about the experience the other clinicians at institutions and facilities of all sizes and in all parts of the world.

That is why officials of the National Library of Medicine -- who have led federal government efforts to promote the next generation of Internet services for healthcare -- maintain that timely access to information about best medical practices is fundamental to quality patient care and good outcomes. Managing this information is critical to transforming healthcare so that can patients can make informed decisions; administrators can facilitate the orderly flow of patients through an increasingly complex healthcare system, and clinicians can keep up-to-date about best treatment and practice options on behalf of their patients.

The sheer volume of accumulated healthcare and medical information is daunting. The NLM MEDLINE database contains more than 15 million records from 5,000 selected publications. More than 600,000 peer-reviewed medical journal articles were added in 2006.¹⁰

Moreover, there are millions of clinician consults, and billions of healthcare insurance claims filed annually in the United States.

Information technology can help America meet the challenge. It’s all part of what the *Center for Healthcare Transformation* calls “an Intelligent Health System” that can turn the problem of inadequate outcomes and rising costs into two great 21st century opportunities:

- An Intelligent Health System (that) will improve health outcomes, improve the quality of life, lead to longer lives at lower cost and save individuals, companies and governments billions of dollars.
- An Intelligent Health System (that) will be the greatest single 21st century source of high paying jobs and foreign exchange earnings as people across the world discover they want

the quality of life, the level of health, and the effectiveness of health care which the American Intelligent Health System will make possible.¹¹

Improving Patient Care Administration

Information technology also can help with the dizzying array of paperwork including hand written referrals, prescriptions, authorizations, insurance claim forms, doctors orders and more. The paper blizzard adds up to huge system inefficiencies and needless costs. Researchers have estimated that bureaucracy alone may account for as much as 1/3 of all US health system costs -- an amount that now likely exceeds well over \$300 billion annually.¹²

Patient care administrative information is often inaccurate, redundant, and difficult to share across the system. The results for patients can be disastrous. Among the risks: dangerous treatment delays; inadvertent disclosure of sensitive personal information; patients lost in the system; missing critical information like drug allergies; or, people who (on rare occasion) tragically receive the wrong care because they may have been misidentified.

Part of the answer lies with the secure integration of information technologies across the healthcare enterprise for patient care administration and management.

Broadband computer-based network systems can help provide a range of administrative tools and control of patient care management and medical records

Examples include: online call scheduling for clinicians; online provider resource directories for patients; and sophisticated appointment software for patients and healthcare administrators to better communicate.

Electronic claims submission and processing via high-speed networks is critical given the sheer volume and complexity of today's billing environment. VOIP (voice over Internet Protocol) offers remote rural patients a low-cost way in which to communicate with their provider regarding scheduling, adherence to treatment plans, and follow-up care.

The promise is exemplified by experience at the University of Illinois Chicago Medical Center, where implementation of its electronic record system has produced dramatic improvements for patient care management:

- The number of patients seen without a medical record on hand was reduced by 40 percent, and physicians spent 30 percent less time looking for chart.
- More than 5,000 annual radiologist hours went to patient care, which meant that each radiologist spent about five fewer hours per week reviewing medical records.
- Physicians saved five hours per week reviewing resident orders, because they can be accessed on computers in real time.
- Chart pull requests dropped 75 percent and should decrease more as the providers automates it across the entire enterprise.
- The elimination of 12 paper forms.

- Universal availability of patient records. Before installing the system, patient records were not available about 40 percent of the time when a patient first arrived for care. The records are now available 100 percent of the time.¹³

Better recordkeeping also can improve clinical outcomes. St. Luke's Health System in Kansas City, Missouri reports that digitizing record keeping across its 11-hospital system meant its medical staff had immediate access to patient data, test results, and lab work. St. Luke's credits the advance in information technology with a stunning 38 percent stroke reversal rate, which compares to a national average of four percent. [SOURCE ATT CASE STUDY].¹⁴

Administrators also estimate that establishment of a regional information network that links all health care institutions in the Kansas City area would ultimately save \$13-\$20 million a year.¹⁵

Empowering Patients - The Personal Health Record

Broadband also facilitates better record management by consumers themselves.

In our highly mobile society, healthcare consumers are constantly challenged to find appropriate care when and where it is needed. People move, change jobs, or may face multiple conditions that necessitate a variety of healthcare providers over time. The system is highly diffuse and largely uncoordinated.

And yet patients are increasingly being viewed as an integral part of their own care giving *team* – challenged to work closely with their physicians, allied healthcare professionals and advocates in a collaborative manner.

Under these circumstances, access to accurate and timely patient care data may be crucial to successful outcomes. And yet all of a patient's longitudinal healthcare information is rarely found together in one place – let alone readily available from *any* place when needed.

An Internet-based set of tools known as the Personal Health Record (PHR) offers a forward-looking opportunity to help track and organize this information for ready access by the care giving team.

“Keeping your own personal healthcare record allows you to provide doctors with valuable information that can help improve the quality of care you receive,” according to the American Health Information Management Association. A PHR can help reduce or eliminate duplicate tests and allow you to receive faster, safer treatment and care in an emergency. In short, a PHR helps you play a more active role in your healthcare.”¹⁶

Many companies have produced sophisticated, yet easy to use, PHRs that will help further drive the consumer movement in healthcare. In a bid to cut health costs through better patient outcomes, a number of major U.S. companies are participating in a non-profit venture, called Dossia <http://www.dossia.org/home> to speed the use of PHRs.¹⁷

Telemedicine: Quality Care Courtesy of Broadband

Perhaps the most exciting and far reaching link between broadband and health care is the emerging area of telemedicine – real-time clinical interventions involving caregivers and patients in geographically distant locations. Telemedicine programs include emergency intervention, such as a Georgia program that enables stroke specialists to provide potentially life-saving assistance to victims in remote areas; the transmission of medical images for diagnosis by distant experts; remote in-home monitoring for post-operative care and chronic disease; and even robotic surgery.¹⁸

These clinical programs deliver care to patients in underserved communities, connect patients to specialists at remote locations, cut down on long-distance transport of sick patients, and generally narrow the care gap between communities. As the Alliance for Public Technology summarized in a recent report on broadband:

“Using broadband connections, patients can check their pulse, screen their vision, monitor blood pressure, blood oxygenation, temperature, glucose levels and heart function and send this information in real-time to the medical staff. Patients and providers also can interact online through videoconference activated by touching the appropriate icon. Once connected, a clinician can use a stethophone to expand examination of the patient.” (Alliance for Public Technology. Achieving Universal Broadband: Policies for Stimulating Deployment and Demand)¹⁹

Jon Linkous of the American Telemedicine Association put it this way: “Broadband Internet access to hospitals is becoming a critical tool in the delivery of medical services.”

There are now hundreds of clinical telemedicine programs throughout the nation that rely on broadband connections.

- The Alaska Federal Healthcare Access Network (AFHCAN) is linking more than 248 sites including: military installations; Alaska Native health facilities; regional hospitals; small village clinics; and, state of Alaska public health nursing stations for a range of healthcare services using a variety of high-speed broadband services including satellite.
- In Ware County Georgia, the public health department is using T1 connections over a Wide Area Network to link 16 county health departments in Southeast Georgia to establish critical service links for children with special health care needs.
- The Downstate Illinois Regional Telehealth Program is using T1 lines, DSL, and Cable to develop community-institutional partnerships to strengthen local health care capacity through the use of advanced technologies. They provide medical education and training to 52 rural hospitals – including 32 critical access hospitals – using videoconferencing, satellite broadcasts and web streaming.
- Although still in its infancy, remote robotic surgery has been successfully demonstrated on many occasions including recently at the 86th Annual Congress of the American College of Surgeons, where Johns Hopkins physicians at McCormick Place in Chicago performed a remote-controlled and computer assisted minimally invasive procedure on a patient located in Baltimore.

- The 82 site Missouri Telehealth Network has provided services in more than 15 different medical specialties, with a majority of the work coming from radiology, mental health, dermatology and cardiology. To date, more than 11,000 interactive video encounters and 57,500 Teleradiology exams have been conducted. The Missouri Telehealth Network uses T1 (Frame Relay) connections to each site to provide dynamic bandwidth allocation for voice, video and data.
- Since its inception in 1993, the Eastern Montana Telemedicine Network has conducted 15,728 clinical encounters averaging over 1200 encounters annually. Tele-mental Health services are EMTN's leading medical application. Other clinical applications include specialty areas of cardiology, nephrology, diabetes education, emergency medicine, ENT and radiology. The program uses T1 connections for videoconferencing.
- The Tillamook, Oregon *Lightwave Telehealth Technologies* project is designed to provide broadband service between emergency care providers, the county health department and hospital using a virtual private network to share critical information in support of emergency care services.
- University of South Dakota Health System is using T1 terrestrial lines and Satellite connections to frontier rural areas of the state to provide teleconsultation for high-risk newborns.
- University of Tennessee Health Sciences Center is using Satellite links to provide Telehealth services for diabetic patients in largely Hispanic and underserved frontier communities.
- The University of Arkansas' ANGELS program connects physicians at more than 40 sites with pregnant women in rural communities to improve pre-natal care and reduce the number of low birth weight babies. In 2005, the program's call center received an average of 2,500 calls a month and facilitated more than 400 critical hospital transports.
- Sentara Norfolk General Hospital was the first hospital in the nation to fully deploy and independently test a highly sophisticated remote Intensive Care Unit monitoring system to promote team work on-line, so that expert care may be available 24/7 even when the clinicians are not at the patient's bedside. An elaborate network of cameras, monitors, and two-way communication links, using high-speed T1 lines enables doctors and critical care nurses at the eICU® command center to make virtual rounds of patients.
- The REACH program, initially established by the Medical College of Georgia, puts stroke specialists in touch with rural hospitals and physicians statewide for consultation on key treatment options during the critical three hours after a stroke.
- In concert with the Virginia Tech *Network Virginia* program, the Southwest Virginia Alliance for Telemedicine is using ATM T1 connections at each site to provide clinical consultations for pediatric cardiology, diabetic retinopathy, radiology, and dermatology.

- Now, through the Office of Telemedicine of the University of Virginia Health System, the Alliance has been able to offer connectivity to soldiers deployed in Iraq with family members at home in Virginia through the telemedicine network.

Disease Management

Some of the biggest challenges facing our healthcare system include the ongoing care and treatment of millions of American patients with chronic conditions and diseases including arthritis, asthma, cancer, diabetes, heart disease, and complications of obesity.

A report for the California Health Care Foundation found that use of a particular type of clinical information system known as a *disease registry* can greatly improve care by helping physicians and allied care givers to better identify and then reach out to patients in support of ongoing intervention.

Computers are used to capture and manage information on specific conditions. Reports may be generated internally or – if adequate communications are available – within or across networks. Increasingly, disease registries are being maintained on securely accessed web sites for ease of access.

- Providence Health System, a network of more than 50 medical centers in the Pacific Northwest, maintains an active disease registry reporting system that is fully integrated into its electronic system of health records for more than 300,000 patients.
- The University of Washington Physicians Network has implemented a diabetes management program using registry systems as part of an electronic medical records system.

Other examples cited by CHCF include an Asthma Registry of the Cambridge Health Alliance, the Central Jersey Physician Network, and the Disease Registry of Intermountain Healthcare, and a Diabetes Registry of Sutter Medical Center in Santa Rosa, California.²⁰

Remote Monitoring: Bringing Care Home; Keeping Patients Active

Increasingly, healthcare providers are working with patients to provide disease management services and patient care monitoring directly into patients homes, at alternate care delivery sites, and even during work and play.

Telehomecare has emerged as one of the most important applications of broadband communications. Using two-way audio and/or video consultations into the home Telehealth has been shown to be extremely safe, effective, and convenient for patients, families, and healthcare providers. Remote monitoring of EKG, oxygen levels, vital signs, heart and lung sounds and weight are all now routinely available. Handheld devices allow patients to help manage their chronic diseases through better compliance with treatment plans.

With reliable monitoring, patients can go home sooner after hospitalization and stay home longer before returning to a medical care institution. Always-on broadband monitoring means changes

in vital signs or key disease indicators can be spotted when they happen – not just when a visiting nurse or other health care professional takes a measurement. In essence, monitoring devices mean the patient and caregivers are connected between visits.

And, early empirical evidence suggests that dollar savings are large and medical outcomes are better.

The Pennsylvania Homecare Association has compiled research results from across the nation. In Pennsylvania, homecare agencies including visiting nurse associations, hospices and home health agencies are using more than 2000 telehealth monitors in people's homes. As indicated, a Penn State cost analysis of diabetes patients showed monitored through telehealth visits showed estimated hospital costs of \$87,327 for patients monitored through telehome health, and \$232,872 for patients that only received traditional homecare by a nurse.²¹

A University of Tennessee Medical School Telehomecare Study found that 98 percent of patients were satisfied with telehomecare, and that 100 percent said the equipment was easy to use.²²

A study by the Veterans Administration found that remote monitoring of health conditions could reduce the number of emergency room visits by 40 percent, cut hospital admissions by 63 percent, and reduce the number of days in the hospital by 60 percent.²³

Remote monitoring also boosts the productivity and effectiveness of medical care. In Eddy New York, the visiting nurse service has installed more than 200 patient units in home and uses four central nursing stations to improve nurse productivity by reducing the need for in-person visits. One nurse may monitor more than 100 patients daily. Patient care has improved as hospital and emergency room visits have decreased.²⁴

In a December 2005 study, Economist Robert Litan of the non-profit Kaufman Foundation observed: "Savings from broadband-based remote monitoring for all chronically ill patients are potentially quite remarkable – as much as 30 percent of all hospital, out-patient, and drug expenses."²⁵

Remote monitoring has enormous potential beyond the home. Wireless broadband can enable patients of any age to live fully active lives outside the home – to pursue their careers and leisure interests secure in the knowledge that chronic health issues are under silent observation by various monitoring devices.

For example, new wireless broadband-enabled devices can be implanted in patients' chests to enable remote monitoring of cardiac-related events such as blood pressure changes, heart rate changes and fluid buildup. Physician alerts can be automatically generated, and patient symptoms addressed quickly. A study by Medtronic, which is seeking FDA approval for one such devices showed a 41 percent reduction in hospitalizations in its study group²⁶ The Medical Center of South Carolina is already running a program in which implanted cardiac defibrillators are beaming data back to doctors on a regular basis.

A range of other monitoring devices provide similar support for patients with other chronic ailments. One company is working on a bandage that can take glucose readings without puncturing the skin and relay key readings directly to a care providers office or monitoring

location – bypassing the lab analysis required with a traditional blood test *and* without requiring the patient to even pause whatever they are doing.

Overcoming Healthcare Provider Shortages

Broadband-enabled telemedicine can also help mitigate the impact of shortages and mal-distribution of specialty trained physicians, nurses and allied healthcare professionals – a problem that may grow more acute as the current caregiver population grows older.

For example, the National Rural Health Association notes that by 2010, 40 percent of all registered nurses will be 50 years old or older. It estimates that the United States will need 1.7 million nurses but only 635,000 will be available. The shortages are especially acute in rural and remote frontier areas and many inner-city communities.²⁷

By facilitating remote consultations, telemedicine can effectively expand the capacity of the healthcare system and help fill the gaps that exist in coverage, extending the reach of clinicians into shortage areas.

“First and foremost, Telehealth methodologies by their very nature are designed to address the problem of provider mal-distribution through providing clinical care at a distance in either rural or urban settings.” [Telehealth and Healthcare Provider Shortages Position Statement from the American Telemedicine Association, July 2007] ²⁸

These technologies also can be used to help mentor, train, and provide continuing education to busy healthcare professionals who cannot otherwise take the time from their remotely located practices to travel for education. Using well developed distance education technologies including two-way interactive audio and video, clinicians may now remain in their communities, while keeping current with the latest medical advances, protocols and procedures. Technology also may help address shortages by promoting new models of practice that improve the effectiveness and efficiency of the care process.

Healthcare Transformation - State and Federal Efforts

State and Federal assistance have played a valuable role in the early successes in telemedicine and IT-based health initiatives. Congress has provided hundreds of millions of dollars in grant funding through the Departments of Agriculture, Commerce, and Health and Human Services. State governments have also provided key resources. Thousands of ongoing “e-Health” programs trace their existence to the public-private sector research partnerships that have grown from government initiatives.

Government also has direct patient-care responsibilities for tens of millions of Americans, including military personnel, and is increasingly turning to IT-based solutions to support active duty military and veterans. For example, DoD Health Affairs is working to deploy its AHLTA electronic medical record system worldwide among more than 9 million service members, retirees, and their families. The Veterans Health Administration (VHA) – the largest integrated healthcare system in the world – has been a leader in this area.

Nearly 30,000 veterans are now cared for remotely using Telehome health provided by VHA. Soon nearly 200,000 patients per year will be screened for diabetes and eye conditions using Tele-retinal imaging. The VHA also uses high-speed connections to link up its 21 Polytrauma Rehabilitation Centers for military personnel who have experienced severe injuries, including Post Traumatic Stress Disorder. And its VistA (Veterans Health Information System and Technology Architecture) is the most widely used health information technology system in the world among 193,000 healthcare professionals and millions of veterans in care facilities. The VistA Imaging multimedia on-line patient record (available in most VA Medical Centers) is possible only because of robust broadband connections.

A new Federal Communication Commission Telemedicine pilot program seeks to facilitate the creation of a nationwide broadband network dedicated to health care, connecting public and private non-profit health care providers in rural and urban locations. Building upon existing Universal Service Fund efforts -- the FCC wants to encourage statewide and regional networks to connect government research institutions, academic medical centers, and public and private healthcare organizations that serve as repositories of medical expertise and information. California is seeking \$39 million from the FCC program for a "California Telehealth Network" that would employ broadband to link 319 health care sites throughout the state. Eventually, the state hopes to link every one of California's healthcare providers on a single broadband network.

Policy Adjustments Needed

Continued advances in health-related IT and telemedicine will require adjustments in federal, state and private sector rules and policies to encourage health care providers to fully embrace the opportunities and to lower some key barriers to telemedicine. Broadly, the emerging field faces a host of organizational, financing, regulatory, security, standards, and other related technology issues. In particular, health care practitioners need assurance that telemedicine interventions will be reimbursed by both public and private sector insurance programs.

To start, healthcare organizations must be committed to change, and open to adopting new technology-assisted approaches to improve access to quality and cost-effective services. Institutional policies must reflect a commitment to IT adoption. Patient-care advocates must appreciate how healthcare IT tools may help them achieve the proactive consumer services they seek. And payers -- including public and private sector insurers -- will have to significantly change their policies to account for the value-added benefit that healthcare information technologies bring to both benefits and care management.

Below is some of what is needed from a policy perspective:

- Healthcare IT projects must be adequately capitalized – even when down stream program revenues are merely *projected*. Unfortunately, government healthcare financing agencies (i.e. CMS) are focused on year-to-year budgets and do not acknowledge forecasted "out-year" savings that should accrue from technology investments.
- Financial incentives must be aligned – so that organizations that pay for the technology are the same ones that realize the benefits. Small group practices, clinics, and hospitals

would be more willing to make capitol investments and incur ongoing costs if they knew that eventual system savings would be reflected in their payments.

- Reimbursement systems including Medicare and Medicaid should consider Telemedicine and e-Health provided care as “covered services” -- subject to the same program benefits and rules as other medically provided services.
- Capitol adjustments and tax incentives to encourage equipment purchases should also be enacted. Chronic care and disease management organizations should consider how IT adoption can reduce costs under capitated or managed care payment systems. For their part, healthcare organizations must start building advanced IT purchases into their budgets.
- FDA decisions about whether (and to what extent) Telemedicine and related hardware and software technologies constitute “medical devices” should be designed to encourage the introduction of new technologies that support telemedicine
- The Centers for Medicare & Medicaid Service should modify Stark Law self-referral prohibitions and also “safe harbors” to allow electronic health records and e-prescribing without fear of violating anti-kickback laws.
- To ensure safe, reliable and effective care delivery, the healthcare industry must help “self-regulate” the implementation of healthcare IT through the development and diffusion of new standards.
- Private sector organizations including: the American Healthcare Information Management Association (AHIMA); American Telemedicine Association (ATA); Continua Health Alliance; and, the Healthcare Information Technology Standards Panel (HITSP) are all working to address various aspects of practice guidelines and needed clinical and technical standards.
- Accreditation, certification, and licensure of healthcare facilities and of professionals must be adjusted to address telemedicine. The Joint Commission for the Accreditation of Healthcare Organizations (JCAHO) has established and continues to review its accreditation and certification policies in this area. State-based physician licensure system that has often been viewed as a major impediment to the growth of telemedicine services provided across state-lines and may require adjustment.
- Public policymakers and private institutions also must find ways to protect the confidentiality and security of medical records and individually identifiable health information in an increasingly electronic environment.

In a recent white paper entitled: *Telemedicine, Telehealth, and Health Information Technology*, the American Telemedicine Association put it this way:

“Much is yet to be done. Interoperability has not yet been achieved in the rapidly expanding applications in such areas as home Telehealth and remote monitoring for patients and consumers. Fortunately, recent expansion in the telemedicine market, falling costs in the development of

new technology and the convergence of telemedicine and other HIT applications provides new opportunities to create technical standards.”

ATA also noted: “the telemedicine community also needs to further develop unified protocols and guidelines for both clinical and administrative activities related to remote patient care.”²⁹

The Core Requirement: Broadband for All

But for all of the required policy and regulatory adjustments, telemedicine rides on the back of broadband, and the most critical prerequisite for success will involve spreading high-speed broadband to every corner of America – especially geographically remote communities that tend to lag behind in both Internet access and healthcare. If we succeed, we can resolve two challenges at once. When every American has broadband, every American will have more health care options as well.

In a 2006 paper, Telemedicine pioneer Max Stachura, a physician and Director of the Medical College of Georgia Center for Telehealth, explained it thusly:

“Many aspects of telehealth are dependent on access to high-speed broadband networks, bi-directional transmission speeds, and quality of service that will guarantee stable transmission of video and other health data. Without robust and ubiquitous broadband networks, Telehealth applications lose many of their important functionalities. Broadband network customization is also an important attribute of Telehealth applications.”³⁰

Telemedicine and the ability of broadband-powered technology to help deliver better quality and more cost-effective health care is one more reason why the Internet Innovation Alliance is working to bring affordable broadband access to every American.

With each passing day, the Internet assumes a more significant role in people’s daily lives. Maintaining it, keeping it robust, and expanding it so it can deliver more and better services to more Americans must be a national priority.

IIA does not have the solution to America’s health care crisis. We do not know the best way to deliver insurance coverage to every American or how to give every person in our country access to quality health care. But we do know that broadband can deliver enhanced medical services and that tens of thousands of Americans – many in chronically underserved communities – are already benefiting from better health care because of broadband. If we close America’s digital divide in broadband, we will help close the divide in health care as well.

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