Chapter 1 : Telemedicine Bibliography

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Chapter 2 : Telemedicine and e-Health | Mary Ann Liebert, Inc., publishers

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Chapter 3 : Introduction - Emedicine & Telemedicine Law Info

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Chapter 4 : Telemedicine - Wikipedia

In: Bashshur RL, Armstrong PA, Youssef Zl, eds. Telemedicine: explorations in the use of telecommunications in health care. Springfield IL: Charles Thomas, If it is necessary to cite an abstract, this should be so designated.

Telepharmacy Telepharmacy is the delivery of pharmaceutical care via telecommunications to patients in locations where they may not have direct contact with a pharmacist. It is an instance of the wider phenomenon of telemedicine, as implemented in the field of pharmacy. Telepharmacy services include drug therapy monitoring, patient counseling, prior authorization and refill authorization for prescription drugs , and monitoring of formulary compliance with the aid of teleconferencing or videoconferencing. Remote dispensing of medications by automated packaging and labeling systems can also be thought of as an instance of telepharmacy. Telepharmacy services can be delivered at retail pharmacy sites or through hospitals, nursing homes, or other medical care facilities. The term can also refer to the use of videoconferencing in pharmacy for other purposes, such as providing education, training, and management services to pharmacists and pharmacy staff remotely. Neuropsychological tests are used to evaluate the cognitive status of individuals with known or suspected brain disorders and provide a profile of cognitive strengths and weaknesses. Through a series of studies, there is growing support in the literature showing that remote videoconference-based administration of many standard neuropsychological tests results in test findings that are similar to traditional in-person evaluations, thereby establishing the basis for the reliability and validity of teleneuropsychological assessment. Telerehabilitation Telerehabilitation or e-rehabilitation [36] [37] is the delivery of rehabilitation services over telecommunication networks and the Internet. Most types of services fall into two categories: Some fields of rehabilitation practice that have explored telerehabilitation are: Telerehabilitation can deliver therapy to people who cannot travel to a clinic because the patient has a disability or because of travel time. Telerehabilitation also allows experts in rehabilitation to engage in a clinical consultation at a distance. Most telerehabilitation is highly visual. As of , the most commonly used mediums are webcams , videoconferencing , phone lines , videophones and webpages containing rich Internet applications. The visual nature of telerehabilitation technology limits the types of rehabilitation services that can be provided. It is most widely used for neuropsychological rehabilitation ; fitting of rehabilitation equipment such as wheelchairs , braces or artificial limbs ; and in speech-language pathology. Rich internet applications for neuropsychological rehabilitation aka cognitive rehabilitation of cognitive impairment from many etiologies were first introduced in This endeavor has expanded as a teletherapy application for cognitive skills enhancement programs for school children. Tele-audiology hearing assessments is a growing application. Currently, telerehabilitation in the practice of occupational therapy and physical therapy is limited, perhaps because these two disciplines are more "hands on". Two important areas of telerehabilitation research are 1 demonstrating equivalence of assessment and therapy to in-person assessment and therapy, and 2 building new data collection systems to digitize information that a therapist can use in practice. Ground-breaking research in telehaptics the sense of touch and virtual reality may broaden the scope of telerehabilitation practice, in the future. Only a few health insurers in the United States, and about half of Medicaid programs, [40] reimburse for telerehabilitation services. If the research shows that teleassessments and teletherapy are equivalent to clinical encounters, it is more likely that insurers and Medicare will cover telerehabilitation services. Teletrauma care[edit] Telemedicine can be utilized to improve the efficiency and effectiveness of the delivery of care in a trauma environment. Telemedicine for trauma triage: They can provide clinical assessments and determine whether those injured must be evacuated for necessary care. Remote trauma specialists can provide the same quality of clinical assessment and plan of care as a trauma specialist located physically with the patient. Telemedicine is also being used in some trauma ICUs to reduce the spread of infections. Rounds are usually conducted at hospitals across the country by a team of approximately ten or more people to include attending physicians, fellows, residents and other clinicians. This group usually moves from bed to bed in a unit discussing each

patient. This aids in the transition of care for patients from the night shift to the morning shift, but also serves as an educational experience for new residents to the team. A new approach features the team conducting rounds from a conference room using a video-conferencing system. Video-conferencing allows the remote viewers two-way communication with clinicians at the bedside. Each lecture provides fundamental principles, firsthand knowledge and evidenced-based methods for critical analysis of established clinical practice standards, and comparisons to newer advanced alternatives. The various sites collaborate and share their perspective based on location, available staff, and available resources. This capability allows the attending to view the residents in real time. The remote surgeon has the capability to control the camera pan, tilt and zoom to get the best angle of the procedure while at the same time providing expertise in order to provide the best possible care to the patient. Telecardiology[edit] ECGs, or electrocardiographs , can be transmitted using telephone and wireless. This was because the hospital did not allow him to move patients outside the hospital to his laboratory for testing of his new device. In Einthoven came up with a way to transmit the data from the hospital directly to his lab. Mantri using an indigenous technique for the first time in India. Transmission using wireless was done using frequency modulation which eliminated noise. Transmission was also done through telephone lines. At the other end a demodulator reconverted the sound into ECG with a good gain accuracy. This system was also used to monitor patients with pacemakers in remote areas. The central control unit at the ICU was able to correctly interpret arrhythmia. This technique helped medical aid reach in remote areas. There are many examples of successful telecardiology services worldwide. Three hub stations through were linked via the Pak Sat-I communications satellite, and four districts were linked with another hub. Three hubs were established: These 12 remote sites were connected and on average of 1, patients being treated per month per hub. The project was still running smoothly after two years. Telepsychiatry Telepsychiatry, another aspect of telemedicine, also utilizes videoconferencing for patients residing in underserved areas to access psychiatric services. It offers wide range of services to the patients and providers, such as consultation between the psychiatrists, educational clinical programs, diagnosis and assessment, medication therapy management, and routine follow-up meetings. As of , the following are some of the model programs and projects which are deploying telepsychiatry in rural areas in the United States: In , the South Carolina Department of Mental Health established a partnership with the University of South Carolina School of Medicine and the South Carolina Hospital Association to form a statewide telepsychiatry program that provides access to psychiatrists 16 hours a day, 7 days a week, to treat patients with mental health issues who present at rural emergency departments in the network. There is an independent comparison site of current technologies. Links for several sites related to telemedicine, telepsychiatry policy, guidelines, and networking are available at the website for the American Psychiatric Association. This is a Commercial, For-Profit business. In the United States, the American Telemedicine Association and the Center of Telehealth and eHealth are the most respectable places to go for information about telemedicine. For this reason, most companies provide their own specialized videotelephony services. In June the U. Veterans Administration announced expansion of the successful telemental health pilot. Their target was for , cases in There is an independent comparison site that provides a criteria-based comparison of telemental health technologies. The most typical implementation are two computers connected via the Internet. The computer at the receiving end will need to have a high-quality display screen that has been tested and cleared for clinical purposes. Sometimes the receiving computer will have a printer so that images can be printed for convenience. The teleradiology process begins at the image sending station. The radiographic image and a modem or other connection are required for this first step. The image is scanned and then sent via the network connection to the receiving computer. Therefore, they do not need particular workstations to view the images; a standard personal computer PC and digital subscriber line DSL connection is enough to reach keosys central server. No particular software is necessary on the PC and the images can be reached from wherever in the world. Telepathology Telepathology is the practice of pathology at a distance. It uses telecommunications technology to facilitate the transfer of image-rich pathology data between distant locations for the purposes of diagnosis ,

education , and research. The use of " television microscopy ", the forerunner of telepathology, did not require that a pathologist have physical or virtual "hands-on" involvement is the selection of microscopic fields-of-view for analysis and diagnosis. A pathologist, Ronald S. In an editorial in a medical journal, Weinstein outlined the actions that would be needed to create remote pathology diagnostic services. A number of clinical telepathology services have benefited many thousands of patients in North America, Europe, and Asia. Telepathology has been successfully used for many applications including the rendering histopathology tissue diagnoses, at a distance, for education, and for research. Although digital pathology imaging, including virtual microscopy , is the mode of choice for telepathology services in developed countries, analog telepathology imaging is still used for patient services in some developing countries. Teledermatology Teledermatology allows dermatology consultations over a distance using audio, visual and data communication, and has been found to improve efficiency. In a scientific publication, they described the value of a teledermatologic service in a rural area underserved by dermatologists. Teledentistry Teledentistry is the use of information technology and telecommunications for dental care, consultation, education, and public awareness in the same manner as telehealth and telemedicine. Tele-audiology Tele-audiology is the utilization of telehealth to provide audiological services and may include the full scope of audiological practice. Teleophthalmology Teleophthalmology is a branch of telemedicine that delivers eye care through digital medical equipment and telecommunications technology. Today, applications of teleophthalmology encompass access to eye specialists for patients in remote areas, ophthalmic disease screening, diagnosis and monitoring; as well as distant learning. Teleophthalmology may help reduce disparities by providing remote, low-cost screening tests such as diabetic retinopathy screening to low-income and uninsured patients. These patients were examined by ophthalmic assistants locally but surgery was done on appointment after viewing the patient images online by Eye Surgeons in the hospital 6â€”12 hours away. Instead of an average 5 trips for say, a cataract procedure, only one was required for surgery alone as even post op care like stitch removal and glasses was done locally. There were huge cost savings in travel etc. Typically, states with restrictive licensure laws also have several exceptions varying from state to state that may release an out-of-state practitioner from the additional burden of obtaining such a license. A number of states require practitioners who seek compensation to frequently deliver interstate care to acquire a full license. If a practitioner serves several states, obtaining this license in each state could be an expensive and time-consuming proposition. In , the U. In this PrEP initiative, PlushCare does not require an initial check-up and provides consistent online doctor visits, regular local laboratory testing and prescriptions filled at partner pharmacies. Remote surgery Remote surgery also known as telesurgery is the ability for a doctor to perform surgery on a patient even though they are not physically in the same location.

Chapter 5 : Telemedicine: A New Horizon in Public Health in India

The use of telecommunications technologies to help deliver medical services has increased over the past few decades and is now well accepted. Called telemedicine, it involves medical diagnosis and management with the participants (doctors, nurses and patients) in different places.

Bibliography Introduction The development of telecommunications and computer technology since the s Space Age has implications for the improvement of the quality of health care for those who live in remote or isolated areas where access to quality health care has traditionally been a problem Samuelson, Zundel, Telemedicine, the use of two-way telecommunications technology, multimedia, and computer networks to deliver or enhance health care, is a growing trend internationally, with the United States, Canada, the United Kingdom, and Scandinavia among the leaders in developing this field Basher et al. Telemedicine also has military and urban applications, but this paper focuses on the development and use of telemedicine in home health and trauma care in rural areas of East Tennessee, an area of great need and with great potential for the improvement of health care and mortality rates. Definition of Telemedicine Telemedicine is defined by the Telemedicine Information Exchange as the "use of electronic signals to transfer medical data photographs, x-ray images, audio, patient records, videoconferences, etc. In emergency cases, this access can mean the difference between life and death. In particular, in those cases where fast medical response time and specialty care are needed, telemedicine availability can be critical. Physiological measurements of the astronauts were telemetered from both the spacecraft and the space suits during NASA space flights. These early efforts were enhanced by the development of satellite technology which fostered the development of telemedicine. NASA funded telemedicine research projects in the late s and early s. According to Basher, Armstrong, and Youssef , there were fifteen telemedicine projects active in The project, which ran from , was implemented and evaluated by the Papago people, the Indian Health Service , and the Department of Health, Education, and Welfare. The goal was to provide health care to the isolated Papago Reservation. A van, which carried a variety of medical instruments including electrocardiograph and x-ray machine, was staffed by two Indian paramedics. The van was linked to specialists at the Public Health Service Hospital by a two-way microwave transmission Telemedicine Research center, A high-quality videotape was made of an actual medical exam conducted by a nurse but supervised by a physician watching on closed-circuit television. These videotapes were systematically electronically degraded to less than broadcast quality. The original and degraded videos were then shown to randomly selected groups of physicians who attempted to reach a correct diagnosis Telemedicine Research center, The results, reported in "Final Report: An offer of medical consultation was extended to the Soviet Union by several medical centers in the United States. This project was extended to Ufa, Russia to aid burn victims there after a fiery railway accident Telemedicine Research center, Back to Top of Page Current Trends in US Telemedicine Telemedicine technology has increased and the cost of equipment has decreased in the past ten years, resulting in an increase in the number of telemedicine research projects and increase in the scope of those projects. The Telemedicine Information Exchange lists over telemedicine research sites. There are 1, total telemedicine sites hubs and spokes which performed 21, consultations, 91 percent 19, of which were interactive audio-visual and 9 percent 1, of which were store and forward. Since , when there were only twelve active programs in the US, the number of programs has doubled yearly, while program activity number of consultations has tripled since The top five types of consults in were: Emergency or trauma telemedicine emerged in as one of the fastest growing applications of this technology Ibid. Early projects using telemedicine in rural health care proved to have great beneficial effects on patient survival and recovery, but the equipment was expensive and rather cumbersome Park Grundy et al. As the cost and size of the equipment have come down, and the technical quality has gone up, telemedicine has become much more feasible to use in rural health care Dakins Grainger County has a population of 18, and no hospital. Primary medical care is provided by four clinics with three full-time and two part-time

physicians. The patient to physician ratio is One of the clinics has had 18 physicians in 22 years, which graphically illustrates the problem of retaining health care professionals in isolated rural areas. The geography of the area makes it difficult for people to go from their homes to medical care or for medical care to come to them. The Clinch Mountain, in the foothillls of the Appalachian Mountains, along with the Tennessee Valley Authority lake system, creates geographical barriers to health care delivery. There is severely limited road access, no public transportation, no taxi service, and long travel times within much of the county to the clinics. For emergency care, the county has only three ambulances and no service. Clinch Mountain divides the county, and, from 7: The focus of the telemedicine project was to improve access to quality health services and to reduce the isolation of rural health care professionals in Grainger County. During this three year project, each of the four clinics was provided with interactive audio-video telemedicine equipment and training for its use in patient consultations. This enabled a primary care physician in one of the rural clinics to examine a patient in another. In addition, the clinic patients have access to consultations with specialist physicians at UT Medical center in Knoxville. The EMS staff was trained on equipment use and procedures. Patients were able to communicate with healthcare providers using a small video camera with tripod and monitor, and videophone connected to a standard electric outlet and telephone line. A Rural Network of Health Services Information in East Tennessee" was a project funded by a grant from the federal government to share information among ambulances, rural emergency departments, and a Level I trauma center at the University of Tennessee Medical center during the "Golden Hour," the initial care of trauma patients in which the proper medical treatment can mean the difference between life and death. The project, which was funded through March 31, , served seventeen counties in Appalachian Tennessee, building on an existing telemedicine partnership the University of Tennessee Telemedicine Network between Woods Memorial Hospital, LaFollette Medical center, Morristown-Hamblin Hospital, and the University of Tennessee Medical center, Knoxville, and also including rural emergency medical services in Campbell, Hamblin, and McMinn counties in Tennessee. Emergency departments in the rural hospitals was equipped with interactive digital audio-video equipment and computers that are linked to the University of Tennessee Telemedicine Network located at the University of Tennessee Medical center trauma center by T-1 telecommunication lines. This connection allows the rural emergency department staff to have "real-time" consultations with specialists at the University of Tennessee trauma center. Medical patient information, such as x-rays, cardiograms, and diagnostic laboratory bloodwork, may be digitized and faxed to the trauma center via computers. Ambulances in the rural counties were equipped with digital cameras and cellular telephones capable of transmitting digital pictures of accident scenes and patients to the local emergency departments which could then forward them to the University of Tennessee. Emergency technicians in the ambulances were trained in the use of the equipment, which has a two-way effect. By transmitting digital photos of the accident scene to the local emergency departments, preparations can be made to receive and properly treat the accident victim or victims immediately on arrival at the hospital, with consultations done as needed with the UT trauma center. In addition, photos of the accident scene and victims expedites decision-making about whether the patient or patients can be treated locally or sent via Lifestar Helicopter Service to the UT trauma center in Knoxville.

Chapter 6 : Telemedicine in the USA | Rashid Bashshur and Joseph Lovett - calendrierdelascience.com

Telemedicine: Explorations in the Use of Telecommunications Evaluating Telecommunications Technology in Communications Technology in Canadian Health Care.

Computer Technology Computer technology is transforming the ways in which health information is acquired, used, disclosed and stored. Fundamental changes in the organisation, delivery and financing of national health care services require sophisticated health information systems that facilitate information sharing [1]. Increasingly, individual patient records are stored in electronic databases by government, clinicians, medical practices, dental surgeries and medical insurance companies. The UK Government aims to enable patient medical records [2] to be recorded longitudinally from birth to death and accessed widely in a national health care information infrastructure [3]. Expanding communication technology has transformed the practice of telemedicine from its origins of transmitting clinical advice over the telegraph [8]. Many advantages exist in the systematic collection and use of electronic health data. Better data allows patients to make more informed decisions about health plans, medical insurance companies, clinicians, health care trusts, diagnoses, products and treatments. Clinical care is much improved through faster and more accurate diagnoses [9] , increased checks on medical procedures [10] , prevention of adverse drug events [11] , instantaneous research of medical conditions and the dissemination of expert medical information to areas traditionally under-served. Medical research on the causes of disease and injuries and health services research are improved through increased access to and more accurate information. Public health surveillance of morbidity and mortality across populations is facilitated [12] [13]. Despite some trepidation about using the telephone for such personal matters, patients quickly accepted the technological exigencies in order to receive better medical care. Telephone medicine has come further still with the telephone triage system [16]. In Canada, the United States, and Scandinavia, a range of nurse telephone-consultation services has been established [17]. When someone calls up, the experienced and specially trained nurses use their skills and experience, together with a comprehensive computer system [18] , to advise the caller on the most appropriate course of action to take. It allowed these places to have access to healthcare where once distance prevented this. This, in a nut-shell is telemedicine - healthcare carried out at a distance [20]. A more inclusive definition is the use of advanced telecommunications technologies to exchange health information and provide healthcare services across geographic, time, social and cultural barriers [21]. These early efforts and the enhancement in communications satellites fostered the development of telemedicine and many of the medical devices in the delivery of health care today. NASA provided much of the technology and funding for early telemedicine demonstrations. Telemedicine was not pioneered just by the US and in the US but all over the world. A few of these and some later projects are worth examining briefly. It ran from to Its goals were to provide healthcare to astronauts in space and to provide general medical care to the Papago Reservation. A van staffed by two Indian paramedics carried a variety of medical instruments including electrocardiograph and X-ray. The van was linked to the Public Health Service hospital and another hospital with specialists by a two-way microwave telemedicine and audio transmission [23]. The link was used for education, and for consultations between specialists and general practitioners. The Psychiatric Institute also experimented with group therapy [24]. Alaska ATS-6 Satellite Biomedical Demonstration In , 26 sites in Alaska were chosen to see if reliable communication would improve village healthcare. The primary purpose was to investigate the use of satellite video-consultation to improve the quality of rural health care in Alaska. It was determined that the satellite-system was workable, could be used effectively by clinicians at the various locations, and could be used for practically any medical problems except emergency care emergencies could not wait for scheduled transmission times. Since , the Telemedicine Centre at MUN worked toward developing interactive audio networks for educational programs and the transmission of medical data. There are installations in all provincial hospitals, community colleges, university campuses, high schools, town halls and education agencies. MUN has been active in international

teleconferencing and played a significant role in the School of Medicine at the University of Nairobi, Kenya in the s. MUN has been a model for the judicious and low-cost use of telemedicine technology. They have proved that there is no need for the higher-end, higher-cost video-conferencing equipment [26]. The US offered tele-medical facilities to the Soviet Union for medical consultation from the disaster-site in Armenia to several medical centres in the US [27]. The programme was extended to Ufa Russia to facilitate burn victims after a terrible railway accident. This project demonstrated that medical consultation could be conducted over a satellite network crossing political, cultural, social, and economic borders [28]. The Internet is replete with medical information at every level of sophistication [29]. Digital models and virtual humans allow students to study and research anatomy, physiology and pathology [30]. Patients and healthcare providers can assess scientific peer journal articles [31] , government documents relating to health-care issues and guidance [32] and extensive disease-related information provided by advocacy groups [33]. A vibrant network of chat groups for patients, their family and friends exists as well [34]. Telemedicine remains linked to medical professionals, whilst e-health is driven by non-professionals, namely patients or, in the e-health jargon, consumers that with their interests, drive new services even in the healthcare field - mostly for their empowerment through access to information and knowledge. Telemedicine, e-health and cybermedicine present important legal and ethical issues such as privacy, network security, licensing malpractice, duty of care, access and equity, the quality and integrity of data, consent to treatment and the resolution of disputes. In this thesis, I hope to cover the more important legal issues arising from the rise of computers in medical practice with regards to e-health, tele-heath and cyber-health. Protecting Electronic Health Information. National Academy Press; Department of Health; For the health professionals: Published by University of Queensland Press as an e-book http: Developing countries find telemedicine forges links to more care and research. Effects of computer-based clinical decision support systems on physician performance and patient outcomes: Effect of computerised physician order entry and a team intervention on prevention of serious medication errors. A computer alert system to prevent injury from adverse drug events: The public health information infrastructure. FluNet as a tool for global monitoring of influenza on the Web. A Social History of the Telephone to Developing emergency services in the community. I and II London: Department of Health, Use of the telephone by pediatric house staff: A technique for pediatric care not taught. J Pediatr ; Telephone advice in the accident and emergency department: Arch Emerg Med ; Telemedicine; Explorations in the use of telecommunications in health care. Telemedicine fad or future? Innovative Medical Communications; Aviation Space and Environmental Medicine. Satellite communication for rural health care. Alaska Journal of Communication 27 4: Canadian Medical Association Journal. Legal Exposure for Cybermedicine. Shopping around the Internet today and tomorrow: Oxford Dictionary of New Words.

Chapter 7 : Rural Home Healcare Telemedicine & Trauma Telemedicine in East Tennessee

The purpose of our study was to investigate knowledge of, attitudes to, and use of interactive telemedicine for specialist consultation among rural practitioners in Kansas. We interviewed 28 rural primary-care practitioners at seven remote health-care facilities in six locations. Content analyses of.

Chapter 8 : References - Telemedicine - NCBI Bookshelf

Telemedicine also has military and urban applications, but this paper focuses on the development and use of telemedicine in home health and trauma care in rural areas of East Tennessee, an area of great need and with great potential for the improvement of health care and mortality rates.

Chapter 9 : Telemedicine Technology and Clinical Applications | JAMA | JAMA Network

TELEMEDICINE can be broadly defined as the use of telecommunications technologies to provide medical information and services. Although this definition includes medical uses of the telephone, facsimile, and distance education, telemedicine is increasingly being used as shorthand for remote electronic clinical consultation.