

Telemedicine Literature Review

Antoniotti NM. Current trends and opportunities in TeleHealth: The Jetsons have arrived! Region 4 Genetics Collaborative Regional Meeting. May 3, 2005, Lansing, MI.

TeleHealth is a tool for access. Can be asynchronous (store and forward) or synchronous (interactive). Technology needed includes: patient exam camera, digital electronic stethoscope, fiber-optic otoscope, fiber-optic ophthalmoscope, digital camera, document camera, intra-oral camera, laser caries detector, clinical video (Polycom, Vcom), and clinical exam rooms. In regards to transmission spectrum, you need to have good quality (ISDN and LAN) while maintaining secure lines. Maritime Medical Genetics Service (MMGS) serves about 2 million people (Babineau and Ludman, 2004). Reimbursement can be an issue: some third party payers reimburse, Medicare pays universal (although only from certain sites), and Medicaid does not reimburse. State licensure is an additional issue, although it was suggested that the consultation exception could be used. Future directions of telemedicine include more investigation of reimbursement, transmission costs, financial state of federal and state budgets, interoperability, new compression algorithms, asynchronous patient driven consultations, and internet medicine.

Babineau T and Ludman MD. The Applications of Telehealth in Medical Genetics. In Telepaediatrics: Telemedicine and Child Health. Wooten, R. and Batch, J. (eds.), Royal Society of Medicine Press, London, pp 53-62, 2004.

The study reports on the Maritime Medical Genetics Service based in Halifax, Nova Scotia, which delivers care to ~2 million people (only regional genetic services). The furthest point is 7.5 hours away by car. The program was developed out of necessity, as some patients were not willing to travel that far. Phone discussions were started but not felt to provide optimal services. At the time of the article, there were 8 locations with telehealth links to the IWK Health Centre where MMGS is located. The MMGS carried out pilot project with cancer genetics. Satisfaction with services was good, and therefore they moved on to other types of genetic cases where a physical exam was not required (includes prenatal genetic counseling and follow-up of metabolic disorders). They also allowed the option of having a second visit and result session for HD predictive testing counseling via videoconference (the first session was required to be face-to-face). Health care providers did not feel as much of a connection with patients, but the patients reported high levels of satisfaction. A special protocol was developed for individuals with hereditary hemochromatosis, since most patients were treated at time of referral and genetic counseling was not considered urgent. To provide education, a group session was held with a hematologist, hepatologist, geneticist and genetic counselor. 70 people attended in person, 27 went to a telehealth site and participated via videoconference. MMGS has not done telemedicine for consultations where a physical exam would be required due to cost of high resolution cameras and special training to the support staff. They may reconsider since more clinics are obtaining high-resolution cameras. Telemedicine in Maine and Florida has been used for diagnosis of genetic disorders, although it was noted that training of onsite care provider and patient willingness to cooperate influenced the quality of the exam. Overall, the MMGS reports good experiences with telegenetics, although equipment malfunctions periodically occurred. Even in Canada, licensure and liability across province lines and reimbursement issues can be a limitation.

Caputo M. Telemedicine: linking patients and providers. University of Wisconsin Hospital, Pediatrics Grand Rounds. January 19, 2005.

This paper reported on the experiences of telemedicine in Vermont. The program was divided by phases. In Phase 1, they reported failed and dropped connections and lack of confidence by the

doctors in the new technology. In Phase 2, they used ISDN lines with daily testing, multiple cameras, and new ceiling-mounted telemedicine units. The top 10 specialties using telemedicine included: mental health, cardiology, pediatrics, dermatology, neurology, orthopedics, radiology (military bases), home care, endocrinology, surgery (wound care). Pediatric applications included: cardiology, diabetes, asthma, ophthalmology, ENT, school-based, orthopedics, trauma & critical care. The Vermont telemedicine project also has contracts with prisons. It was noted that Store & Forward medical care was not reimbursable.

Center for Telemedicine Law. Telemedicine licensure report. Office for the Advancement of Telehealth, HRSA, 2003?

This report gives an overview of existing laws regarding telemedicine by state. Endorsements are the most common method used to allow an individual licensed in another state to practice in their state, although it can be a lengthy and complicated process. The Federation of State Medical Boards (FSMB) developed an act for abbreviated licensure process for outside doctors providing telemedicine to their state. 8 states have approved similar acts. The National Council of State Boards of Nursing (NCSBN) developed a mutual recognition model, and 20 states are using the interstate compact.

Center for Telemedicine Law. Telemedicine reimbursement report. Office for the Advancement for Telehealth, HRSA, June 2003.

Edwards MA and Patel AC. Telemedicine in the State of Maine: a model for growth driven by rural needs. *Telemed J e-Health* 2003, **9**, 25-39.

Description of the Northern Main Telehealth Network (NMTN), used for clinical, educational, and administrative purposes. Includes satisfaction surveys and cost analysis.

Coelho JJ, Arnold A, Nayler J, *et al.* An assessment of the efficacy of cancer genetic counseling using real-time videoconferencing technology (telemedicine) compared to face-to-face consultations. *Eur J Cancer* 2005, **41**, 2257-2261.

An English study of comparing telemedicine to face-to-face encounters with cancer genetic counseling. 16 telemedicine and 21 face-to-face encounters showed a similar increase in knowledge, decrease in anxiety, and satisfaction levels.

Gray J, Brain K, Iredale R, *et al.* A pilot study of telegenetics. *J Telemed Telecare* 2000, **6**, 245-247.

Report on a pilot study of telegenetics in Wales for cancer genetics in 1998 with small sample size. Study involves only eight patients, although they rate high satisfaction with telemedicine genetic services (higher than satisfaction of genetic nurses providing onsite support, who did not feel needed). Establishing rapport was a concern of the genetic consultants.

Gattas MR, MacMillan JC, Meinecke I, *et al.* Telemedicine and clinical genetics: establishing a successful service. *J Telemed Telecare* 2000, **7**, 68-70.

Report on telemedicine with the Queensland Clinical Genetics Service in Australia, the only genetics service provider in the state (~3.5 million people). For the initial study, they only offered teleconferencing when physical exam was not required, mostly for cancer genetics. Telemedicine and face-to-face groups were both seen in Brisbane to remove advantage of travel time and cost.

A document camera was also used in the telemedicine visits. People involved with 24 encounters were surveyed (16 telegenetics and 8 face-to-face), demonstrating a positive response from doctors, genetic counselors, and patients. Limitations included: videoconferencing was more difficult when multiple family members present, and funding was problematic.

Hailey D, Roine R, and Ohinmaa A. Systematic review of evidence for the benefits of telemedicine. *J Telemed Telecare* 2002, **8 (S1)**, 1-30.

Review and classification of 66 “scientifically credible” studies on telemedicine that included comparison with alternative model of care. Each study is listed and classified in the appendix. Concludes that there are not many good-quality studies on the analysis of the benefits of telemedicine.

Karp WB, Grigsby RK, McSwiggan-Hardin, M, *et al.* Use of telemedicine for children with special health care needs. *Pediatrics* 2000, **105**, 843-847.

Early telemedicine project called the Georgia Statewide Telemedicine Program (GSTP) between the Medical College of Georgia and the Telemedicine Center with the Ware County Health Department. Study reports on 333 consults from 1995-1997, 16% were genetics. Of the response from the doctors, most thought it could be successful, 44% thought cost-effective, 48% thought time effective, 33% thought patients would find acceptable, and generally opinions of telemedicine improved over a year. Families were overall satisfied. It was noted that telemedicine was more likely to be successful when part of integrated health services delivery (not sole mode of patient care).

Lea DH, Johnson JL, Ellingwood S, *et al.* Telegenetics in Maine: Successful clinical and educational service delivery model developed from a 3-year pilot project. *Genet Med* 2005, **7**, 21-27.

The study reported on a 3 year pilot telegenetics project in rural Maine. They used ITV technology with existing ISDN phone lines. 4 barriers were identified: lack of knowledge of telemedicine services, lack of understanding of the role of genetic services, location of ITV unit, hospital credentialing and privileging processes for physicians. Many presentations to given to physicians to educate about telemedicine services. The study included 24 rural sites and 125 patients. Most patients were pediatric (64%). Patient satisfaction was good (3.56 on 4.0 scale), although there was only a 25% response rate.

Lobe TE. Telemedicine and the future of healthcare for our children. *Pediatrics* 2004, **113**, ?.

Commentary on Marcin *et al.* article that lists several obstacles to telemedicine, including: difficulting in having equipment and coordinator, willing specialists, knowledgeable local physicians; reimbursement issues; and medical liability.

Marcin JP, Ellis J, Mawis R, *et al.* Using telemedicine to provide pediatric subspecialty care to children with special health care needs in an underserved rural community. *Pediatrics* 2004, **113**, 1-6.

This needs assessment identified barriers in access to subspecialty care: traveling, missing work, and obtaining medications. The study looked at 130 telemedicine consultations for 55 CSHCN in rural areas. Specialties included endocrinology, psychiatry, gastroenterology, hematology-

oncology, nephrology, and infectious disease. Overall satisfaction was rated very high, although 2 of 22 did not feel that the telemedicine gave an adequate examination.

Mitchel JA and Demiris G. Telegenetics: The next phase in the provision of genetics services? *Genet Med* 2005, **7**, 1-2.

Editorial referring to Telegenetics in Maine article by Lea et al. "The need for innovative approaches to the provision of services arises from the increasing awareness of the need for genetics services in many aspects of health care, the continued shortage of genetics professionals, and the economics of the provision of genetics services dictating their primary location in tertiary care centers." The editorial notes that telemedicine does change delivery of care and calls for prospective studies of telegenetics consultations and face-to-face consultations looking at accuracy of diagnosis, diagnostic impact, and patient outcomes. Authors write that the challenges lie in "extensively evaluating telegenetics technologies, properly adopting them, and making informed decisions about their appropriate use".

U.S. Department of Health and Human Services. 2001 Telemedicine Report to Congress. Health Resources and Services Administration, Office for the Advancement of Telehealth. January 2001.

The report examines current key issues with telemedicine including payment issues, legal issues, privacy issues, infrastructure, evaluation, and emerging trends. Lack of reimbursement remains a large obstacle. Several organizations (such as the American Psychological Association and American Dermatology Association) have created specific telemedicine standards and guidelines for their fields of specialty. OAT is working with groups to expand clinical guidelines and promote safety and security. The Joint Working Group on Telemedicine (JWGT) is trying to work with states to assess feasibility of creating common licensure application forms.

Whitten PS, Mair FS, Haycox A, *et al.* Systematic review of cost effectiveness studies of telemedicine interventions. *BMJ* 2002, **324**, 1434-1437.

The authors reviewed 612 articles that presented data on cost benefit of telemedicine. Only 55 were categorized by cost topic, only 22 met quality criteria, 20 used simple cost comparisons (none used cost utility analysis), 7 looked at the level of use needed to compare to traditional services (none were found to be sufficient), and 15 of 24 did not provide details of sensitivity analysis. Conclusion was that there is no good evidence about the cost-effectiveness of telemedicine.