



Center for  
**Connected**  
Health Policy

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**The National Telehealth Policy Resource Center**

## Patient Satisfaction Research Catalogue

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August 2018

To increase and organize the evidence for the use of telehealth, the Center for Connected Health Policy (CCHP) has been examining published studies that have been designed to measure the use of telehealth in achieving one or more of the goals of the Triple Aim. CCHP has been cataloguing studies published in peer reviewed journals that meet certain criteria. This catalogue of patient satisfaction studies is one result.

CCHP employed several search parameters when selecting patient satisfaction studies. All studies selected were U.S. based, published post 2007, had a sample size of no less than 50 (for studies with control groups, there needed to be a minimum of at least 30 subjects per group), and a primary focus on the quality (satisfaction) of a selected telehealth modality. Because most studies in telehealth patient satisfaction are survey-based, there was no requirement for length of the study period.

DiscoverLibrary, Pub Med, Google Scholar, Science Direct, SAGE, JSTOR, ProQuest, WorldCat and EBSCO were used in the peer-reviewed articles search. Search terms included but were not limited to: telehealth patient satisfaction, telemedicine patient satisfaction, telehealth consumer satisfaction, telemedicine consumer satisfaction, telehealth patient perception, telemedicine patient perception, telehealth clinical satisfaction, and eConsult patient satisfaction.

The original catalogue was prepared by Claire Rice and the work supervised by Mei Wa Kwong and Christine Calouro. This catalogue was updated in July 2018 by McKenna Thompson.

**Marchell, R., Locatis, C., Burgess, G., Maisiak, R., Liu, W.-L., & Ackerman, M. (2017). Patient and Provider Satisfaction with Tele dermatology. *Telemedicine and E-Health*, 23, 8, 684-690.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
SC	2690	Store-and-Forward; Live Video	Quasi-randomized Control Trial		X	

#### Summary

**Background:** There is little research comparing dermatologist and patient satisfaction with in-person, store-and-forward, and live interactive examinations.

**Objective:** To compare satisfaction with in-person examinations to store-and-forward and live interactive consultations having two types of video.

**Methods:** A controlled study was conducted where patients referred for dermatology consultations were examined in-person, by video, and by store-and-forward methods. Video changed between compressed and uncompressed on alternate clinics. Patients and dermatologists rated encounters after each examination. Dermatologists doing store-and-forward evaluations rated the quality of information provided. After experiencing all methods patients ranked their preferences. Dermatologists ranked their preferences at the end of the study.

**Results:** In-person examinations were preferred by both patients and dermatologists. Overall, satisfaction with tele dermatology was still high. Patients were evenly divided in preferring store-and-forward workups or live interactive video. Dermatologists were also divided on store-and-forward and uncompressed video, but tended toward the latter. Compressed video was the least preferred method among dermatologists.

**Limitations:** Dermatology residents took store-and-forward photos and their quality was likely superior to those normally taken in practice.

**Conclusions:** Patients and dermatologists prefer in-person examinations and diverge on preferring store-and-forward and live interactive when video is not compressed. The amount of video compression that can be applied without noticeable image degradation is a question for future research.

**Access:** <https://www.ncbi.nlm.nih.gov/pubmed/28375822>

**Pflugeisen, B. M., & Mou, J. (2017). Patient Satisfaction with Virtual Obstetric Care. *Maternal and Child Health Journal*, 21, 7, 1544-1551.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
WA	1173	Live Video Conferencing	Survey Study		X	

#### Summary

**Introduction:** The importance of patient satisfaction in US healthcare is increasing, in tandem with the advent of new patient care modalities, including virtual care. The purpose of this study was to compare the satisfaction of obstetric patients who received one-third of their antenatal visits in videoconference (“Virtual-care”) compared to those who received 12–14 face-to-face visits in clinic with their physician/midwife (“Traditional-care”).

**Methods:** We developed a four-domain satisfaction questionnaire; Virtual-care patients were asked additional questions about technology. Using a modified Dillman method, satisfaction surveys were sent to Virtual-care (N = 378) and Traditional-care (N = 795) patients who received obstetric services at our institution between January 2013 and June 2015. Chi-squared tests of association, t-tests, logistic regression, and ANOVA models were used to evaluate differences in satisfaction and self-reported demographics between respondents.

**Results:** Overall satisfaction was significantly higher in the Virtual-care cohort ( $4.76 \pm 0.44$  vs.  $4.47 \pm 0.59$ ;  $p < .001$ ). Parity  $\geq 1$  was the sole significant demographic variable impacting Virtual-care selection (OR = 2.4, 95% CI: 1.5–3.8;  $p < .001$ ). Satisfaction of Virtual-care respondents was not significantly impacted by the incorporation of videoconferencing, Doppler, and blood pressure monitoring technology into their care. The questionnaire demonstrated high internal consistency as measured by domain-based correlations and Cronbach’s alpha.

**Discussion:** Respondents from both models were highly satisfied with care, but those who had selected the Virtual-care model reported significantly higher mean satisfaction scores. The Virtual-care model was selected by significantly more women who already have children than those experiencing pregnancy for the first time. This model of care may be a reasonable alternative to traditional care.

**Access:** <https://www.ncbi.nlm.nih.gov/pubmed/28176034>

**Alessi, S. M., & Rash, C. J. (2017). Treatment Satisfaction in a Randomized Clinical Trial of mHealth Smoking Abstinence Reinforcement. *Journal of Substance Abuse Treatment, 72*, 103-110.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
CT	84	mHealth	Randomized Clinical Study		x	

**Summary**

The importance of patient satisfaction in modern healthcare is widely recognized, but research on satisfaction in the context of smoking cessation has not kept pace. The purpose of this study was to explore treatment satisfaction in a sample of smokers (N = 84) randomized to one of two smoking cessation treatment interventions (mHealth reinforcement and mHealth monitoring) that used cell phone-based procedures to monitor smoking status in individuals' natural environments for 4 weeks. Starting on the target quit date, participants received usual care smoking cessation treatment consisting of 8 weeks of transdermal nicotine and 4 weeks of twice weekly telephone counseling were also prompted 1 to 3 times daily (with exact number and timing not disclosed beforehand) to use a study cell phone and CO monitor to complete a CO self-test, video-record the process, and submit videos using multimedia messaging within 2 hours. mHealth reinforcement participants could earn prizes for smoking-negative on-time CO tests. A treatment satisfaction survey was completed at the end of the 4-week monitoring/reinforcement phase. Results indicate that participants overwhelmingly endorsed high levels of overall satisfaction in both conditions. Treatment adherence did not differ between conditions, but was positively associated with endorsing the highest satisfaction with help quitting with the intervention (p b .01 to .03). mHealth reinforcement was associated with increased longest duration of abstinence (p b .01). Controlling for relevant participant characteristics and treatment adherence, longest duration of abstinence robustly predicted highest satisfaction with help quitting and mediated the effect of treatment condition on that satisfaction. Further research on treatment satisfaction may aid the development of effective abstinence reinforcement and other smoking cessation interventions.

**Access:** <https://www.ncbi.nlm.nih.gov/pubmed/27449226>

Pozza, E. D., D'Souza, G. F., DeLeonibus, A., Fabiani, B., Gharb, B. B., & Zins, J. E. (2017). Patient Satisfaction With an Early Smartphone-Based Cosmetic Surgery Postoperative Follow-Up. *Aesthetic Surgery Journal*, 38, 1, 101-109.

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
OH	52	mHealth	Survey Study; Prospective Observational Study	x	X	

#### Summary

**Background:** While prevalent in everyday life, smartphones are also finding increasing use as a medical care adjunct. The use of smartphone technology as a postoperative cosmetic surgery adjunct for care has received little attention in the literature.

**Objectives:** The purpose of this effort was to assess the potential efficacy of a smartphone-based cosmetic surgery early postoperative follow-up program. Specifically, could smartphone photography provided by the patient to the plastic surgeon in the first few days after surgery allay patient's concerns, improve the postoperative experience and, possibly, detect early complications?

**Methods:** From August 2015 to March 2016 a smartphone-based postoperative protocol was established for patients undergoing cosmetic procedures. At the time of discharge, the plastic surgeon sent a text to the patient with instructions for the patient to forward a postoperative photograph of the operated area within 48 to 72 hours. The plastic surgeon then made a return call/text that same day to review the patient's progress. A postoperative questionnaire evaluated the patients' postoperative experience and satisfaction with the program.

**Results:** A total of 57 patients were included in the study. Fifty-two patients responded to the survey. A total of 50 (96.2%) patients reported that the process improved the quality of their postoperative experience. The protocol allowed to detect early complications in 3 cases. The physician was able to address and treat the complications the following day prior to the scheduled clinic follow up.

**Conclusions:** The smartphone can be effectively utilized by the surgeon to both enhance the patient's postoperative experience and alert the surgeon

to postoperative problems.

**Access:** <https://www.ncbi.nlm.nih.gov/pubmed/29117293>

**Maa, A. Y., Wojciechowski, B., Hunt, K. J., Dismuke, C., Shyu, J., Janjua, R., Lu, X., Lynch, M. G. (2017). Early Experience with Technology-Based Eye Care Services (TECS): A Novel Ophthalmologic Telemedicine Initiative. *Ophthalmology*, 124, 4, 539-546.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
GA	2690	Store-and-Forward	Prospective Observational Study		x	x

#### Summary

**Purpose:** The aging population is at risk of common eye diseases, and routine eye examinations are recommended to prevent visual impairment. Unfortunately, patients are less likely to seek care as they age, which may be the result of significant travel and time burdens associated with going to an eye clinic in person. A new method of eye-care delivery that mitigates distance barriers and improves access was developed to improve screening for potentially blinding conditions. We present the quality data from the early experience (first 13 months) of Technology-Based Eye Care Services (TECS), a novel ophthalmologic telemedicine program.

**Design:** With TECS, a trained ophthalmology technician is stationed in a primary care clinic away from the main hospital. The ophthalmology technician follows a detailed protocol that collects information about the patient's eyes. The information then is interpreted remotely. Patients with possible abnormal findings are scheduled for a face-to-face examination in the eye clinic.

**Participants:** Any patient with no known ocular disease who desires a routine eye screening examination is eligible.

**Methods:** Technology-Based Eye Care Services was established in 5 primary care clinics in Georgia surrounding the Atlanta Veterans Affairs hospital.

**Main Outcome Measures:** Four program operation metrics (patient satisfaction, eyeglass remakes, disease detection, and visit length) and 2 access-

to-care metrics (appointment wait time and no-show rate) were tracked.

**Results:** Care was rendered to 2690 patients over the first 13 months of TECS. The program has been met with high patient satisfaction (4.95 of 5). Eyeglass remake rate was 0.59%. Abnormal findings were noted in 36.8% of patients and there was >90% agreement between the TECS reading and the face-to-face findings of the physician. TECS saved both patient (25% less) and physician time (50% less), and access to care substantially improved with 99% of patients seen within 14 days of contacting the eye clinic, with a TECS no-show rate of 5.2%.

**Conclusions:** The early experience with TECS has been promising. Tele-ophthalmology has the potential to improve operational efficiency, reduce cost, and significantly improve access to care. Although further study is necessary, TECS shows potential to help prevent avoidable vision loss.

**Access:** <https://www.ncbi.nlm.nih.gov/pubmed/28081944>

**Davis, A. M., Sampilo, M., Gallagher, K. S., Dean, K., Saroja, M. B., Yu, Q., He, J., Sporn, N. (2016). Treating rural paediatric obesity through telemedicine vs. telephone: Outcomes from a cluster randomized controlled trial. *Journal of Telemedicine and Telecare*, 22, 2, 86-95.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
KS	103	Live Video	Randomized Controlled Trial	x	x	

#### Summary

**Objective:** The objective of the current study was to examine the feasibility of telemedicine vs. telephone for the delivery of a multidisciplinary weekly family based behavioral group intervention to treat pediatric obesity delivered to families living in rural areas using a randomized controlled trial methodology.

**Methods:** 103 rural children and their families were recruited. Feasibility measures included participant satisfaction, session attendance and retention. Treatment outcome measures included child BMIz, Parent BMI, 24-hour dietary recalls, accelerometer data, Child Behavior Checklist and the Behavioral Pediatrics Feeding Assessment Scale.

**Results:** Participants were highly satisfied with the intervention both via telemedicine and via telephone. Completion rates were much higher than for other pediatric obesity intervention programs, and both methodologies were highly feasible. There were no differences in telemedicine and telephone groups on primary outcomes.

**Conclusion:** Both telemedicine and telephone intervention appear to be feasible and acceptable methods of delivering pediatric obesity treatment to rural children.

**Access:** <https://www.ncbi.nlm.nih.gov/pubmed/26026186>

**Portnoy, J. M., Waller, M., De, L. S., & Dinakar, C. (2016). Telemedicine is as effective as in-person visits for patients with asthma. *Annals of Allergy, Asthma & Immunology: Official Publication of the American College of Allergy, Asthma, & Immunology*, 117, 3, 241-5.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
MO, KS	169	Live Video	Prospective Observational Study; Survey Study	x	x	

#### Summary

**Background:** Access to asthma specialists is a problem, particularly in rural areas, thus presenting an opportunity for management using telemedicine.

**Objective:** To compare asthma outcomes during 6 months in children managed by telemedicine vs in-person visits.

**Methods:** Children with asthma residing in 2 remote locations were offered the choice of an in-person visit or a telemedicine session at a local clinic. The telemedicine process involved real-time use of a Remote Presence Solution (RPS) equipped with a digital stethoscope, otoscope, and high-resolution camera. A telefacilitator operated the RPS and performed diagnostic and educational procedures, such as spirometry and asthma

education. Children in both groups were assessed initially, after 30 days, and at 6 months. Asthma outcome measures included asthma control using validated tools (Asthma Control Test, Childhood Asthma Control Test, and Test for Respiratory and Asthma Control in Kids) and patient satisfaction (telemedicine group only). Noninferiority analysis of asthma control was performed using the minimally important difference of an adjusted asthma control test that combined the 3 age groups.

**Results:** Of 169 children, 100 were seen in-person and 69 via telemedicine. A total of 34 in-person and 40 telemedicine patients completed all 3 visits. All had a small, although statistically insignificant, improvement in asthma control over time. Telemedicine was noninferior to in-person visits. Most of the telemedicine group subjects were satisfied with their experience.

**Conclusion:** Children with asthma seen by telemedicine or in-person visits can achieve comparable degrees of asthma control. Telemedicine can be a viable alternative to traditional in-person physician-based care for the treatment and management of asthma.

**Access:** <https://www.ncbi.nlm.nih.gov/pubmed/27613456>

**Polinski, J.M., Barker, T., Gagliano, N., Sussman, A., Brennan, T.A., Shrank, W.H. (2015). Patients' Satisfaction with and Preference for Telehealth Visits. *Journal of General Internal Medicine*, 31(3), 269-275.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
CA, TX	1734	Live Video	Cross-sectional		x	

**Summary**

**Background:** One-quarter of U.S. patients do not have a primary care provider or do not have complete access to one. Work and personal responsibilities also compete with finding convenient, accessible care. Telehealth services facilitate patients' access to care, but whether patients are satisfied with telehealth is unclear.

**Objective:** To assess patients' satisfaction with and preference for telehealth visits in a telehealth program at CVS MinuteClinic.

**Participants:** Patients were aged ≥18 years, presented at a MinuteClinic offering telehealth in January-September 2014, had symptoms suitable for

telehealth consultation, and agreed to a telehealth visit when the on-site practitioner was busy.

**Measures:** Patients reported their age, gender, and whether they had health insurance and/or a primary care provider. Patients rated their satisfaction with seeing diagnostic images, hearing and seeing the remote practitioner, the assisting on-site nurse's capability, quality of care, convenience, and overall understanding. Patients ranked telehealth visits compared to traditional ones: better (defined as preferring telehealth), just as good (defined as liking telehealth), or worse. Predictors of preferring or liking telehealth were assessed via multivariate logistic regression.

**Results:**

In total, 1734 (54%) of 3303 patients completed the survey: 70% were women, and 41 % had no usual place of care. Between 94 and 99% reported being "very satisfied" with all telehealth attributes. One-third preferred a telehealth visit to a traditional in-person visit. An additional 57% liked telehealth. Lack of medical insurance increased the odds of preferring telehealth (OR = 0.83, 95 % CI, 0.72-0.97). Predictors of liking telehealth were female gender (OR = 1.68, 1.04-2.72) and being very satisfied with their overall understanding of telehealth (OR = 2.76, 1.84-4.15), quality of care received (OR = 2.34, 1.42-3.87), and telehealth's convenience (OR = 2.87, 1.09-7.94)

**Conclusions:** Patients reported high satisfaction with their telehealth experience. Convenience and perceived quality of care were important to patients, suggesting that telehealth may facilitate access to care.

**Access:** <http://www.ncbi.nlm.nih.gov/pubmed/26269131>

**Becevic, M., Boren, S., Mutrux, R., Shah, Z., Banerjee, S. (2015). User Satisfaction with Telehealth: Study of Patients, Providers, and Coordinators. *The Health Care Manager, 34(4), 337-349.***

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
MO	286	Live Video	Survey Study		x	

**Summary**

**Background:** As the use of videoconferencing in health care is rapidly increasing to allow adequate and timely access to care for patients from rural areas, it is important to examine how these technologies are perceived and utilized.

**Objective:** To examine the satisfaction with telehealth technologies of all users-patients, health care providers, and telehealth presenters.

**Methods:** Three separate surveys were used to collect data: patient, provider, and telehealth coordinator. Patient surveys were collected in a paper format, while provider and coordinator surveys were done using REDCap (Research Electronic Data Capture) application.

**Results:** Findings indicate high satisfaction with telehealth, as well as confidence in providing care via distance.

**Conclusions:** With such high satisfaction, as well as the addition of other specialties offering telehealth services during the past decade, it was not surprising to see a corresponding growth of patients using the services. However, to understand the full impact on telehealth, it is proposed to expand this study to include a comparative study of telehealth patients and in-person patients in each specialty.

**Access:** <http://www.ncbi.nlm.nih.gov/pubmed/26506296>

**McCarty, C., Stoep, A., Violette, H., Myers, Kathleen. (2015). Interventions Developed for Psychiatric and Behavioral Treatment in the Children’s ADHD Telemental Health Treatment Study. *Journal of Child and Family Studies*, 24(6), 1735-1743.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
WA, OR	111	Videoconferencing, Caregiver Behavior Training	Survey Study		x	

#### Summary

Telemental health (TMH) is one approach to rectifying geographic disparity in access to evidence-based mental health treatment for ADHD. We describe a brief (6-session) intervention for the TMH delivery of medication treatment with psychoeducation and Caregiver Behavioral Training to families of children with ADHD from underserved communities. Information on family engagement, satisfaction, and fidelity to intervention protocols are presented. Overall, both parts of the intervention were well-received by families who engaged with the treatment, who learned information and skills, and who indicated very high levels of satisfaction with treatment, even though it was relatively brief in nature. Mean ratings of satisfaction for the combined ADHD treatment was 38 (range = 27–40) out of a possible total score of 40 on the Client Satisfaction Questionnaire. Both telepsychiatrists and therapists were highly faithful to the intervention protocols, as demonstrated by their independently-rated fidelity. Telepsychiatrists adhered to the intervention protocol with 91.6 ± 9.5% reliability, and therapists adhered to their intervention protocol with 94.3% (SD: 9.7%) reliability. This brief stabilization model of intervention is particularly relevant to working with a remote population where treatment resources are scarce. This study demonstrates that it is possible to provide direct psychiatric and behavioral services through telepsychiatry and to

train and supervise therapists remotely.

**Access:** <http://link.springer.com/article/10.1007%2Fs10826-014-9977-5>

**Grant, L., Rockwood, T., Stennes, L. (2015). Client Satisfaction with Telehealth in Assisted Living and Homecare. *Telemedicine and e-Health*, 21(12), 987-991.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
IA, MN, NE, ND, SD (exact location not specified)	409, 450	Remote Patient Monitoring	Randomized Control Trial, Survey Study		x	

#### Summary

**Background:** The Evangelical Lutheran Good Samaritan Society launched LivingWell@Home (LW@H) to provide telehealth services to clients in assisted living and home healthcare. LW@H assures client safety through remote monitoring of physiological parameters and assessment of nonbiometric parameters. Public policies increasingly support aging in place by allowing older adults with greater levels of impairment avoid or delay nursing home placement through alternative services offered in assisted living facilities and home healthcare agencies. Provider organizations face challenges caring for frail seniors with complex medical needs. Telehealth services may be helpful in supporting frail seniors living at home.

**Materials and Methods:** Seniors were recruited into a randomized trial. Telehealth services were provided to 820 experimental subjects. Control subjects (n=762) received usual care. Clients rated their satisfaction at three points in time post-implementation: baseline, 6 months, and 12 months. Fisher's exact test compared client ratings at each measurement interval.

**Results:** No statistically significant differences were found between experimental and control subjects at baseline. Statistically significant differences emerged at follow-up. Experimental subjects in home healthcare agencies reported higher levels of satisfaction relative to controls, whereas experimental subjects in assisted living facilities reported lower levels of satisfaction.

**Conclusions:** Telehealth services increased the probability that clients will be more satisfied compared with those without telehealth in homecare

agencies. The opposite effect resulted among assisted living residents. Value propositions among community-dwelling older adults may influence their satisfaction with telehealth services post-implementation. More research is needed to examine the clinical efficacy and cost-effectiveness of these services.

**Access:** <http://www.ncbi.nlm.nih.gov/pubmed/26126079>

**Dixon, R., Rao, L. (2014). Asynchronous Virtual Visits for the Follow-Up of Chronic Conditions. *Telemedicine and e-Health*, 20(7), 669-672.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
MA	175	Store-and-Forward	Case Study		x	

#### Summary

**Background:** Both primary care and specialty care in many areas face access constraints. Tools to evaluate and engage patients with chronic disease, without having them present to the clinic, are needed. Asynchronous virtual care has been explored as one of the ways to deliver care more efficiently, yet this has not been integrated into a busy practice environment. This pilot study aims to assess the utility of a Web platform that allows patients with chronic disease to be evaluated for follow-up care, thereby avoiding an office visit.

**Materials and Methods:** Patients with 10 common chronic conditions were recruited into the study at a busy primary care clinic. Instead of booking an in-office follow-up visit, they were directed online to complete a questionnaire pertaining to their condition 7-28 days after their office visit. Their physician would review their responses and make treatment decisions, informing the patient online. Patient and physician satisfaction was measured using a validated Likert scale after each visit.

**Results:** Patients were satisfied with the Web site and process as a way to receive their follow-up care. Clinicians were satisfied in making clinical decisions with the information received via the Web site. The clinician time spent for the overall encounter was significantly shorter than for an in-person follow-up visit.

**Conclusions:** Clinicians and patients are interested in tools that improve patient health, are convenient, and save time for both parties. Targeting patients with chronic illness and leveraging available technology to deliver the care are very satisfactory to both clinicians and patients. Asynchronous virtual visits for patients with chronic medical conditions are an effective way to evaluate and manage patients, while providing physicians significant

time savings. These visits have the potential to reduce in-office follow-up visits across primary care, potentially improving access and reducing costs.

Access: <http://www.ncbi.nlm.nih.gov/pubmed/24784174>

**Davis, L., Coleman, J., Harnar, J., King, M. (2014). Teleneurology: Successful Delivery of Chronic Neurologic Care to 354 Patients Living Remotely in a Rural State. Telemedicine and e-Health, 20(5), 473-477.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
NM, CO, AZ, TX	283	Videoconferencing	Survey Study		x	

#### Summary

**Background:** Delivery of specialty healthcare to rural citizens in the United States remains largely unmet. The Veterans Health Administration is in a unique position to deliver specialty care to rural Veterans because it is mandated to deliver medical care to all eligible Veterans regardless of residence. To accomplish this, the VHA developed large national telehealth networks that provided over 1 million episodes of care in 2012. We investigated whether clinical video telehealth technologies can provide quality efficient neurologic follow-up care to Veterans living in the rural southwest United States.

**Patients and Methods:** Veterans with chronic neurologic conditions living remotely in New Mexico, southern Colorado, eastern Arizona, and western Texas were offered follow-up teleneurology care at 11 rural community-based outpatient clinics following initial evaluation at the Albuquerque, NM, neurology outpatient clinic.

**Results:** Over a 2-year period, 87% of 354 consecutive patients returned a performance improvement satisfaction questionnaire. Ninety percent of the patients were fully satisfied with their visit, and 92% felt teleneurology saved them time and money. We calculated an average time savings of 5 h and 325 miles driven, plus at least \$48,000 total cost savings. Ninety-five percent reported they wanted to continue their neurologic care by teleneurology.

**Conclusions:** Our study confirms earlier pilot studies of successful follow-up care through telemedicine. Our patients were highly satisfied with the convenience and quality of their teleneurology visit, and the neurology providers were convinced that neurologic care to both teleneurology and clinic follow-up patients was equivalent. Teleneurology to rural Veterans can provide quality neurologic care and overwhelming patient satisfaction and save considerable time and money.

Access: <http://www.ncbi.nlm.nih.gov/pubmed/24617919>

McIntosh, S., Cirillo, D., Wood, N., Dozier, A., Alarie, C., McConnochie, K. (2014). *Telemedicine and e-Health*, 20(12), 1121-1126.

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
NY	372	Videoconferencing, Store-and-Forward	Survey Study		X	

#### Summary

**Background:** Telemedicine has enhanced care for children with illness in Rochester, NY, since May 2001, enabling 13,568 acute illness visits through December 2013. Prior findings included high parent satisfaction with childcare- and school-based telemedicine (“school telemedicine”) and potential to replace 85% of office visits for illness. Urban neighborhood telemedicine (“neighborhood telemedicine”) was designed to offer convenient care for illness episodes that school telemedicine often cannot serve because illness arises when children are at home or symptoms preclude attendance. This study was designed to characterize health problems prompting neighborhood telemedicine use and to assess parent perceptions of its value.

**Materials and Methods:** A parent satisfaction instrument was developed with input from parents and providers. Neighborhood telemedicine was initiated in January 2009 and totaled 1,362 visits through November 2013. During a 29-month survey period through January 2012, 3,871 acute illness telemedicine visits were completed, 908 (23.5%) of them via neighborhood telemedicine. Instruments were completed for 392 (43.2%) of the 908 visits.

**Results:** Neighborhood telemedicine comprised 27% of all telemedicine visits during the year of peak neighborhood activity. Almost all survey respondents were satisfied or highly satisfied with neighborhood visits (97.6%) and endorsed greater convenience than alternatives (94.5%).

**Conclusions:** Family preferences and the high value placed on neighborhood telemedicine suggest such service is important, especially in health systems driven by patient values. Service provided by neighborhood telemedicine holds potential to meet a large demand for care of acute childhood illness. Financing reform to support patient-centered care (e.g., bundled payments) should encompass sustainable business models for this service.

Access: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4270158/>

Palen, T., Price, D., Shetterly, S., Wallace, K. (2012). Comparing virtual consults to traditional consults using an electronic health record: an observational case-control study. *BMC Medical Informatics and Decision Making*, 12(65), 1-10.

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
CO	267	Store-and-Forward	Observational Case-Control Study		X	

### Summary

**Background:** Patients have typically received health care through face-to-face encounters. However, expansion of electronic communication and electronic health records (EHRs) provide alternative means for patient and physicians to interact. Electronic consultations may complement regular healthcare by providing "better, faster, cheaper" processes for diagnosing, treating, and monitoring health conditions. Virtual consultation between physicians may provide a method of streamlining care, potentially saving patients the time and expense of added visits. The purpose of this study was to compare physician usage and patient satisfaction with virtual consultations (VCs) with traditional consultations (TCs) facilitated within an EHR.

**Methods:** We conducted an observational case-control survey study within Kaiser Permanente, Colorado. A sample of patients who had VCs requested by physicians (N = 270) were matched with patients who had TCs requested by physicians (N = 270), by patient age, gender, reason for the consult, and specialty department. These patients (VC and TC), were invited to participate in a satisfaction survey. In addition, 205 primary care physicians who submitted a VC or TC were surveyed.

**Results:** During the study period, 58,146 VC or TC were requested (TC = 96.3%). Patients who completed a satisfaction survey (267 out of 540 patients, 49.4% response rate) indicated they were satisfied with their care, irrespective of the kind of consult (mean 10-point Likert score of 8.5). 88 of 205 primary care physicians surveyed (42.9%) returned at least one survey; VC and TC survey response rates and consulted departments were comparable (p = 0.13). More TCs than VCs requested transfer of patient care (p = 0.03), assistance with diagnosis (p = 0.04) or initiating treatment (p = 0.04). Within 3 weeks of the consultation request, 72.1% of respondents reported receiving information from VCs, compared with 33.9% of the TCs (p < 0.001). Utility of information provided by consultants and satisfaction with consultations did not differ between VCs and TCs.

**Conclusions:** Referring physicians received information from consultants more quickly from VCs compared with TCs, but the value and application of information from both types of consultations were similar. VCs may decrease the need for face-to-face specialty encounters without a decrease in the patient's perception of care.

**Access:** <http://www.ncbi.nlm.nih.gov/pubmed/22769592>

**Hsueh, M., Eastman, K., McFarland, L., Raugi, G., Reiber, G. (2012). Teledermatology patient satisfaction in the Pacific Northwest. *Telemedicine and e-Health*, 18(5), 337-381.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
AK, ID, OR, WA	196, 504	Store-and-Forward	Survey Study		X	

### Summary

**Background:** The aim of this quality improvement project is to assess patient satisfaction with a store-and-forward teledermatology project and to identify factors associated with patient satisfaction and dissatisfaction.

**Subject and Methods:** Veterans receiving care in rural clinics in the Pacific Northwest were surveyed using a 5-point Likert scale about satisfaction with face-to-face care for a skin complaint prior to any teledermatology exposure. One year later, veterans in the same rural clinics were surveyed about satisfaction with teledermatology care using a more comprehensive survey. Ninety-six patients completed the face-to-face satisfaction survey questions, and 501 completed the teledermatology satisfaction survey.

**Results:** Most (78%) of surveyed patients were highly satisfied or satisfied with face-to-face dermatology care. After 1 year of teledermatology, 77% of patients were highly satisfied or satisfied with teledermatology care. The mean patient satisfaction score for teledermatology was equivalent to face-to-face care (4.1±1.2 and 4.3±1.0, p=0.4). Factors associated with teledermatology patient satisfaction included short wait times for initial consultation, a perception that the initial wait time was not too long, a perception that the skin condition was properly treated, and the belief that adequate follow-up was received. Factors associated with teledermatology patient dissatisfaction included perceptions that the skin condition was not properly treated and that inadequate follow-up was received.

**Conclusions:** Teledermatology was widely accepted by the majority of patients receiving care at rural clinics. Patient satisfaction with care received through teledermatology was equivalent to that with face-to-face dermatology.

**Access:** <http://www.ncbi.nlm.nih.gov/pubmed/22489931>

**Golembeski, S., Willmitch, B., Kim, S. (2012). Perceptions of the Care Experience in Critical Care Units Enhanced by a Tele-ICU. *AACN Advanced Critical Care*, 23(3), 323-329.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
FL	259	Tele-ICU	Survey Study		x	

**Summary**

The purpose of this study was to determine patients' and families' perceptions of care in 10 critical care units enhanced by a tele-intensive care unit (ICU) in a 5-hospital health care system. Patients and family members who had a critical care experience were approached for participation. An adapted version of the Schmidt Perception of Nursing Care Survey was administered. The Schmidt Perception of Nursing Care Survey factors--seeing the individual patient, explaining, responding, and watching over--were analyzed for 637 participants (263 before and 374 after the tele-ICU implementation). Analysis of data from patients and family members indicated significantly higher means for the following factors: seeing the individual patient (P =.004), responding (P =.002), and watching over (P =.006) only when there was an awareness by the patient and family members that the care team was at the bedside and at the tele-ICU command center. The perceptions of care in these cases may suggest an improved patient experience when a tele-ICU is part of the care team.

**Access:** <http://www.ncbi.nlm.nih.gov/pubmed/22828066>

**Parikh, R., TouVelle, M.N., Wang, H., Zallek, S.N. (2011). Sleep Telemedicine: Patient Satisfaction and Treatment Adherence. *Telemedicine and e-Health*, 17(8), 609-614.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
IL	90	Live Video	Prospective Survey Analysis	X	X	

**Summary**

**Objective:** Obstructive sleep apnea is common, but access to diagnosis remains limited. Telemedicine may allow greater access to care; however, its effect on patient satisfaction and treatment adherence is unknown. This study compares patient satisfaction and continuous positive airway pressure (CPAP) adherence of patients seen by videoconference with those seen in person.

**Materials and Methods:** New patients seen via video or in-person at a sleep center completed a survey, with three questions pertaining to satisfaction with the provider. Questions were scored 1-5; the sum was the patient satisfaction score. CPAP adherence was retrospectively analyzed in patients who met the physician via video or in person. Percentage of nights CPAP was used for  $\geq 4$  h and average minutes of CPAP use per night over 2 consecutive weeks were compared.

**Results:** A Mann-Whitney test compared patient satisfaction of the 90 subjects (of whom, 56 met a physician in-person and 34 via video). Mean scores (in person, 14.82; video, 14.91;  $p=0.851$ ) did not differ between groups. Mann-Whitney tests compared CPAP adherence in the 172 subjects (of whom, 111 met a physician in-person and 61 via video). Mean percentage of nights CPAP was used  $\geq 4$  h (in person, 71%; video, 65%;  $p=0.198$ ) and the average minutes per night of CPAP use (in person, 340.55; video, 305.31;  $p=0.153$ ) did not differ between groups.

**Conclusions:** The findings indicate that patients were equally satisfied with their provider and adherent to CPAP treatment whether they were seen in person or via video. Videoconferencing may improve access to patient care without reducing patient satisfaction or treatment adherence.

**Access:** <http://www.ncbi.nlm.nih.gov/pubmed/21859348>

**McConnochie, K., Wood, N., Herendeen, N., Hoopen, C., Roghmann, K. (2010). Telemedicine in Urban and Suburban Childcare and Elementary Schools Lightens Family Burdens. *Telemedicine and e-Health*, 16(5), 533-542.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
NY	96	Videoconferencing, Store-and-Forward	Survey Study		X	

**Summary**

**Background:** Acute illness challenges all families with young children. The Health-e-Access Telemedicine Network in Rochester, NY, has enabled >7,000 telemedicine visits since 2001 among children in childcare or elementary schools, predominantly from Rochester's inner city. Large reductions in illness-related absence and emergency department use among Health-e-Access participants have occurred.

**Objective:** The study was aimed to assess parent perception of telemedicine as a means to reduce burdens associated with childhood illness.

**Design/Methods:** A total of 800 parents were surveyed before (578) or after (318) a child had at least one Health-e-Access visit. Queries addressed access to healthcare, conflicts between work/school and child's care during illness, and concerns and likes about telemedicine. Perceptions were elicited through open-ended and direct queries.

**Results:** Among all respondents, 16% had high-school education and 25% had a college education. Race/ethnicity of the respondents included black (43.6%), Hispanic (22.9%), white (30.0%), and other (3.5%). All identified a primary care practice as a source for well childcare. Most (58%) had given antipyretics to their child to avoid being called by childcare or elementary school staff about illness. Likert scale interview items addressing quality of care elicited low levels of worry or concern. Worry scores trended lower after experience. Among 532 comments about Health-e-Access elicited through open-ended probes, positive ones (likes) predominated (84.6%). Likes most commonly included convenience/time saved (33.6% of all comments), parent stayed at work (13.5%), drug delivered to child site (7.1%) or called ahead to pharmacy (4.9%), and confidence in care (2.3%). Negative responses (concerns) totaled 15.4% of comments and most commonly included reliability of diagnosis (2.6%), technical problems (1.3%), and preference for in-person care (0.8%).

**Conclusions:** Health-e-Access was well accepted by a substantial, diverse group of parents despite unfamiliarity with this approach to care. Convenience and convenience-related experience dominated perceptions. This model enables service beyond that mandated by payers and beyond that generally provided by medical practices.

**Access:** <http://www.ncbi.nlm.nih.gov/pubmed/20575720>

**Cardozo, L., Steinberg, J. (2010). Telemedicine for Recently Discharged Older Patients. *Telemedicine and e-Health*, 16(1), 49-55.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
MI	851	Remote Patient Monitoring	Observational Study	X	X	

**Summary**

**Background:** Congestive heart failure, chronic obstructive pulmonary disease, diabetes, and hypertension are common causes of hospitalization in the elderly. Short-term post-discharge clinical outcomes regarding compliance, symptom control, readmission, functional status, and mortality rates

are in need of improvement.

**Objective:** To document the results of a home-based case-managed telemedicine (CMTM) program delivered over a 2-month period post-discharge.

**Methods:** A population of 851, predominantly elderly (over age 60), recently discharged patients were enrolled in the program. They received a nurse visit up to 3 times/week and home telemedicine monitoring (weight, blood pressure, pulse rate, blood glucose, and oximeter recordings) on a daily basis. Patient education was provided by the nurse and reinforced through telemedicine. Compliance rates, quality of life parameters, patient satisfaction with telemedicine, and data regarding nine quality of care measures (QCM), hospital readmission, and mortality rates were documented. Patient demographics and outcomes of care were analyzed.

**Results:** There were 68% females and 56% African Americans. The readmission rate was 13% and mortality 2%. Treatment goals were met in 67%, patient compliance rate was 77%, and the average improvement in the nine QCM indicators was 66%. A majority of patients showed improved quality of health perception, better disease understanding, and high satisfaction rates with telemedicine.

**Conclusions:** A home-based CMTM care system is cost-effective and improves health outcomes in older patients who are at risk from deteriorating health and further deconditioning as a consequence of repeated hospital admission.

**Access:** <http://www.ncbi.nlm.nih.gov/pubmed/20064067>

**Agha, A., Schapira, M., Laud, P.W., McNutt, G., Roter, D.L. (2009). Patient Satisfaction with Physician-Patient Communication During Telemedicine. *Telemedicine and e-Health*, 15(9), 830-839.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
WI	199	Live Video	Randomized Control Trial		X	

**Summary**

**Background:** The quality of physician—patient communication is a critical factor in treatment outcomes and patient satisfaction with care. To date, few studies have specifically conducted an in-depth evaluation of the effect of telemedicine (TM) on physician—patient communication in a medical setting.

**Objectives:** To determine whether physical separation and technology used during TM have a negative effect on physician—patient communication.

**Methods:** In this noninferiority randomized clinical trial, patients were randomized to receive a single consultation with one of 9 physicians, either in person (IP) or via TM. Patients (n = 221) were recruited from pulmonary, endocrine, and rheumatology clinics at a Midwestern Veterans Administration hospital. Physician—patient communication was measured using a validated self-report questionnaire consisting of 33 items measuring satisfaction with visit convenience and physician’s patient—centered communication, clinical competence, and interpersonal skills.

**Results:** Satisfaction for physician’s patient—centered communication was similar for both consultation types (TM = 3.76 versus IP = 3.61), and noninferiority of TM was confirmed (noninferiority t-test p = 0.002). Patient satisfaction with physician’s clinical competence (TM = 4.63 versus IP = 4.52) and physician’s interpersonal skills (TM = 4.79 versus IP = 4.74) were similar, and noninferiority of TM was confirmed (noninferiority t-test p = 0.006 and p = 0.04, respectively). Patients reported greater satisfaction with convenience for TM as compared to IP consultations (TM = 4.41 versus IP = 2.37, noninferiority t-test p < 0.001). Patients were equally satisfied with physician’s ability to develop rapport, use shared decision making, and promote patient—centered communication during TM and IP consultations.

**Conclusions:** Despite physical separation, physician—patient communication during TM is not inferior to communication during IP consultations.

**Access:** <http://www.ncbi.nlm.nih.gov/pubmed/19919189>

**Whitten, P., Bergman, A., Meese, M.A., Bridwell, K., Jule, K. (2009). St. Vincent’s Home Telehealth for Congestive Heart Failure Patients. *Telemedicine and e-Health*, 15(2), 148-153.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
IN	50	Unspecified	Survey Study	X	X	

**Summary**

**Objective:** To determine whether telehome health patients exhibit enhanced clinical outcomes and patient perceptions of telehome healthcare.

**Materials and Methods:** Fifty congestive heart failure patients (n = 50) participated in this program. Data collection included pre and post Outcome and Assessment Information Set items, 12-Item Short-Form Health Survey and Minnesota Living with Heart Failure Questionnaire, and data from patient charts were used to capture demographic information. In addition, interviews were conducted in order to assess overall perceptions and

attitudes.

**Results:** Results indicate significant changes occurring among respondents in three important aspects that impact their quality of life, namely, physical, behavioral, and emotional improvements. Specifically, statistical significance was documented at the 0.05 level regarding improvement for home telehealth patients in shortness of breath, management of oral medications, ability to engage in moderate activities, amount of energy, swelling in legs/ankles, need to sit/lie down during day, fatigue, need for hospitalization, side effects from treatment, and worry. Additionally, patients found the service easy to use and perceived the care they received via telehealth to be as good as regular in-person care.

**Conclusions:** Results indicate significant changes occurring among respondents in three important aspects that impact their quality of life, namely, physical, behavioral, and emotional improvements.

**Access:** <http://www.ncbi.nlm.nih.gov/pubmed/19292623>

**Varkey, P., Schumacher, K., Swanton, C., Timm, B., Hagen, P. (2008). Telemedicine in the work site: a study of feasibility, and patient and provider satisfaction. *Journal of Telemedicine and Telecare*, 14(6), 322-325.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
MN	100	Videoconferencing; Remote Patient Monitoring	Prospective Survey Study		x	

#### Summary

We examined the use of telemedicine for improving access to care in a work-site clinic. A prospective study of 100 patients was conducted over a four-month period in a work site that housed 700 employees. Sinusitis (10 visits), upper respiratory tract infections (9 visits), otitis media (9 visits), hypertension (9 visits) and back pain (8 visits) were the most common reasons for the visits. In 99 visits, clinicians were of the opinion that the telemedicine visit felt similar to a face-to-face visit. For most of the visits (67), patients strongly agreed or agreed that telemedicine had a positive effect on their relationship with the health-care provider. The otoscope, microscope and stethoscope telemedicine peripherals were important in aiding diagnosis (and ruling out other causes) in about 55% of the visits (upper respiratory tract infection, sinusitis, otitis media, cough, sore throat, nevi, rhinitis and ear wax related concerns). The ability for the patient to watch their ENT examination and see any associated abnormalities was appreciated by many patients. Physicians, nurses and patients were capable of using the technology with little training.

Access: <http://jtt.sagepub.com/content/14/6/322.abstract>

**Morgan, R., Patrick, A., Magaletta, P. (2008). Does the Use of Telemental Health Alter the Treatment Experience? Inmates' Perceptions of Telemental Health Versus Face-to-Face Treatment Modalities. *Journal of Consulting and Clinical Psychology*, 76(1), 158-162.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
TX	36, 50	Videoconferencing	Survey Study		x	

#### Summary

In corrections, where staffing limitations tax an overburdened mental health system, telemental health is an increasingly common mode of mental health service delivery. Although telemental health presents an efficient treatment modality for a spectrum of mental health services, it is imperative to study how this modality influences key elements of the treatment experience. In this study, the authors compared inmates' perceptions of the working alliance, post-session mood, and satisfaction with psychiatric and psychological mental health services delivered through 2 different modalities: telemental health and face-to-face. Participants consisted of 186 inmates who received mental health services (36 via telepsychology, 50 via face-to-face psychology, 50 via telepsychiatry, and 50 via face-to-face psychiatry). Results indicate no significant differences in inmates' perceptions of the work alliance with the mental health professional, post-session mood, or overall satisfaction with services when telemental health and face-to-face modalities were compared within each type of mental health service. Implications of these findings are presented.

Access: <http://www.ncbi.nlm.nih.gov/pubmed/18229993>

**Myers, K., Valentine, J., Melzer, S. (2008). Child and Adolescent Telepsychiatry: Utilization and Satisfaction. Telemedicine and e-Health, 14(2), 131-137.**

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
WA	248	Videoconferencing	Survey Study		x	

#### Summary

Access to psychiatric care for children and adolescents is limited outside of urban areas. Telepsychiatry provides one mechanism to bring needed services to youth. This investigation examines whether telepsychiatry could be successful in providing needed services. Using interactive video teleconferencing at 384 kilobits per second, psychiatrists based at a regional children’s hospital provided consultation and management services to patients at 4 sites across Washington State located 75,150 miles from the children’s hospital. Twelve-month review of billing records provided utilization data. Surveys of parents’ satisfaction over 12 months examined whether parents would accept and be satisfied with the care rendered to their children. Over the study year, 387 telepsychiatry visits were provided to 172 youth 221 years old with a mean of 2.25 visits per patient. The demographic and diagnostic profile of this sample was consistent with usual outpatient mental health samples. Parents endorsed high satisfaction with their children’s telepsychiatric care, with an indication of increasing satisfaction upon return appointments. Parents demonstrated some differential satisfaction, tending to higher satisfaction with their school-aged children’s care and lower satisfaction with their adolescents care. Telepsychiatry offered through a regional children’s hospital was well utilized and parents were highly satisfied with their children’s care. The stage is now set for integrating telepsychiatry into a system of care that meets youths overall needs and for controlled studies demonstrating the efficacy of telepsychiatry with youth.

**Access:** <http://www.ncbi.nlm.nih.gov/pubmed/18361702>

Hilty, D., Nesbitt, T., Kuenneth, C., Cruz, G., Hales, R. (2007). Rural Versus Suburban Primary Care Needs, Utilization, and Satisfaction with Telepsychiatric Consultation. *Journal of Rural Health, 23*(2), 163-165.

State	Sample Size	Telehealth Modality Type	Method	Outcome	Quality	Cost
CA	147	Videoconferencing	Survey Study		x	

#### Summary

**Context and Purpose:** Rural and suburban populations remain underserved in terms of psychiatric services but have not been compared directly in terms of using telepsychiatry.

**Methods:** Patient demographics, reasons for consultation, diagnosis, and alternatives to telepsychiatric consultation were collected for 200 consecutive, first-time telepsychiatric consultations at rural and suburban clinics.

**Findings:** Rural patients were more likely than suburban patients to be younger than 18 years, using Medicaid, and needing treatment planning (lest they be referred out of the community). Rural patient and primary care physician satisfaction was higher than that of suburban counterparts.

**Conclusions:** Telepsychiatry programs may enhance access, satisfaction, and quality of rural care.

**Access:** <http://www.ncbi.nlm.nih.gov/pubmed/17397373>