

Telehealth In Practice

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Literature Review in Telemedicine

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Webinar Series Topics

- Why You Should Develop a Telemedicine Practice
- How to Choose a Telemedicine Platform
- Telemedicine Pre-Visit Workflow
- Telemedicine Visit Workflow and Documentation
- Urgent Care in Telemedicine
- Chronic Care in Telemedicine

Webinar Series Topics

- Marketing Your Telemedicine Practice
- Value Metrics in Telemedicine
- Disparities in Care: Telemedicine Potential
- Hardware in Telemedicine
- **Literature Review in Telemedicine**
- Special Considerations in Telemedicine

Webinar Series Topics: On Demand

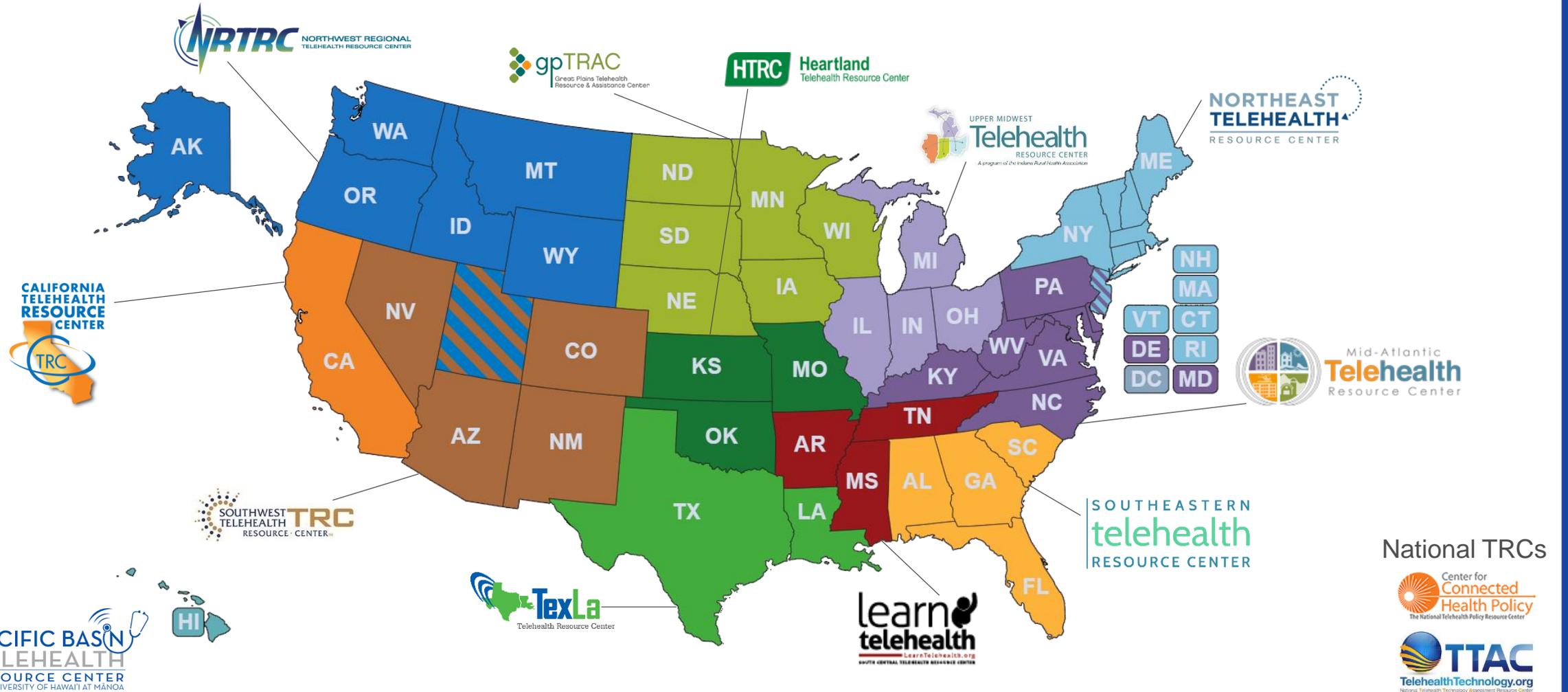
- On Demand: Team Troubleshooting
- On Demand: Professionalism & Legal Considerations
- On Demand: Best Practices & Caring Communication
- On Demand: Telemedicine Billing

TexLa Telehealth Resource Center

- The TexLa Telehealth Resource Center is a federally-funded program designed to provide technical assistance and resources to new and existing Telehealth programs throughout Texas and Louisiana.
- The F. Marie Hall Institute for Rural and Community Health at Texas Tech University Health Sciences Center is the support representative for Texas. Well-Ahead Louisiana, the chronic disease prevention and healthcare access arm of the state Department of Health, is the support representative for Louisiana.

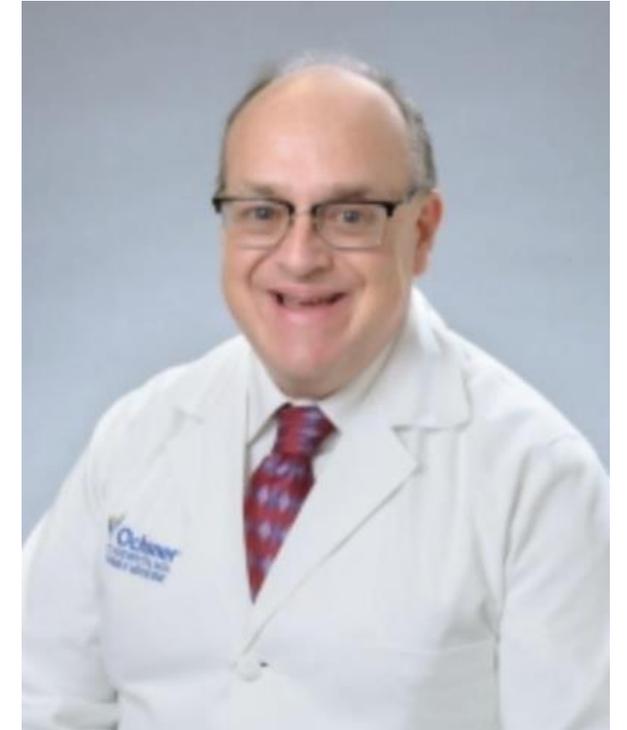
This project is supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) under grant number G22RH30359, the TexLa Telehealth Resource Center, in the amount of \$325,000.00. This information or content and conclusions are those of the author and should not be construed as the official position or policy of, nor should any endorsements be inferred by HRSA, HHS, or the U.S. Government.

Telehealth Resource Centers



Speaker

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 - Grew up in Amite, LA
 - BS in Microbiology at LSU Baton Rouge
 - Doctorate at LSUMC in New Orleans
 - Family Practice Residency at LSUMC Shreveport
 - Practices at Ochsner Health Center Hammond and Ochsner Hospital of Baton Rouge since 1993
 - Currently serving as the Ochsner Medical Director of Informatics of the Baton Rouge Region



Q&A FROM PREVIOUS SESSION

“We’re entering this era where if you don’t have an outcome, you’re not gonna have an income!”

—Sandra Nichols, AstraZeneca

OVERVIEW

Overview

- Acute disease specific research
 - Infectious illnesses and antibiotic stewardship
 - Urinary tract infection (UTI) care
- Chronic disease specific research
 - Hypertension
 - Diabetes
 - Hyperlipidemia
 - Asthma-adult and pediatric
- Other healthcare providers impact
- Healthcare delivery research
 - Consultations
 - Technology Literacy
 - Patient Satisfaction
 - New Modalities

**ACUTE
DISEASE-SPECIFIC
RESEARCH**

Antibiotic Stewardship

Antibiotic Use with an Antibiotic Stewardship

- Antibiotic stewardship in direct-to-consumer telemedicine consultations leads to high adherence to best practice guidelines and a low prescription rate
 - **Objective:** Analyze the antibiotic prescription rate in low-risk patients evaluated via telemedicine program that adopts antibiotic stewardship protocols.
 - **Methods:** 5 diagnostic groups: URI, pharyngotonsillitis, sinusitis, UTI, and acute diarrhea. Physicians trained on the current guideline recommendations supported by institutional antibiotic stewardship protocols. Analyzed the antibiotic prescription rate among patients, referral rate, and antibiotic class through descriptive statistics.
 - **Results:** A total of 2328 patients were included in the study. A total of 2085 (89.6%) patients were discharged with usual recommendations, medication (if needed), and instructions about red flags, while 243 (10.4%) were referred to a face-to-face consultation. Among the discharged patients, the antibiotic prescription rates by the diagnostic group were URI 2.5%, PT 35.0%, AS 51.8%, UTI 91.6%, and AD 1.6%. In most cases, prescribed antibiotics were in line with institutional stewardship protocols.
 - **Conclusions:** Low prescription rate of antibiotics can be achieved using antibiotic stewardship protocols at direct-to-consumer telemedicine consultations, showing high adherence to international guidelines. These results reinforce telemedicine as a cost-effective and safe strategy for the initial assessment of acute non-urgent symptoms.

Antibiotic Use Education vs. Education and Feedback

- [Education vs. Clinician Feedback on Antibiotic Prescriptions for Acute Respiratory Infections in Telemedicine: a Randomized Controlled Trial](#)
 - **Background:** Antibiotics prescribed for acute respiratory tract infections in the telemedicine setting are often unwarranted.
 - **Objective:** Education plus individualized feedback vs. education alone, would significantly reduce antibiotic prescription rates for URI, bronchitis, sinusitis, and pharyngitis in a telemedicine setting.
 - **Results:** Reduction of antibiotic prescriptions for URI and bronchitis was greater for the group receiving education plus individualized feedback compared with that for the group receiving education alone but not sinusitis and pharyngitis.
 - **Conclusion:** Education plus individualized feedback in a telemedicine practice significantly decreased antibiotic prescription rates for URI and bronchitis, compared with education alone.

UTI Care

Antibiotic Use for UTI

Virtual vs. In-person Care

- Comparison of diagnosis and prescribing practices between virtual visits and office visits for adults diagnosed with uncomplicated urinary tract infections within a primary care network
 - **Objectives:** This study compares antimicrobial prescribing in a primary care network for uncomplicated UTIs treated through virtual visits and at in-office visits.
 - **Design:** Retrospective cohort study
 - **Setting:** Primary care network composed of 44 outpatient sites and a single virtual visit platform.
 - **Methods:** Virtual visit prescribing was compared to office visit prescribing, including agent, duration, and patient outcomes. The health system ASP provides annual education to all outpatient providers regarding local antibiogram trends and prescribing guidelines. Guideline-concordant therapy was assessed based on the network's ASP guidelines.
 - **Results:** In total, 350 patients were included, with 175 per group. Patients treated for a UTI through a virtual visit were more likely to receive a first-line antibiotic agent (74.9% vs 59.4%; $P = .002$) and guideline-concordant duration (100% vs 53.1%; $P < .001$). Patients treated through virtual visits were also less likely to have a urinalysis (0% vs 97.1%; $P < .001$) or urine culture (0% vs 73.1%; $P < .001$) ordered and were less likely to revisit within 7 days (5.1% vs 18.9%; $P < .001$).
 - **Conclusions:** UTI care through a virtual visit was associated with more appropriate antimicrobial prescribing compared to office visits and decreased utilization of diagnostic and follow-up resources.

Antibiotic Use for UTI eVisit vs. Face-to-face or Nurse Protocol

- Comparison of eVisit Management of Urinary Symptoms and Urinary Tract Infections with Standard Care
 - **Purpose:** To compare antibiotic prescribing, follow-up rates, and clinical outcomes between F2F visits at a retail clinic, nurse phone protocol encounters, and eVisits for the assessment and management of urinary symptoms and UTIs.
 - **Methods:** A retrospective chart review of primary care empaneled patients at Mayo Clinic Rochester was conducted of females, 18 to 65 years old, who sought care for urinary symptoms via phone, eVisit, or F2F visit from August 1, 2016, through May 1, 2017. A total of 450 encounters, 150 from each of the 3 encounter types, were manually reviewed and compared for antibiotic prescribing rates, clinical outcomes, and 30-day follow-up rates.
 - **Results:** Antibiotic prescribing rates for all three encounter types were similar. Referral for follow-up at initial encounter was more likely to be recommended from phone and eVisit encounters than F2F. No significant differences in follow-up rates or clinical outcomes were noted between the three encounter types.
 - **Conclusions:** eVisits for urinary symptoms and UTI offer patients a convenient option for care without an increased use of antimicrobials, follow-up, or adverse clinical outcomes when compared with F2F visits or nurse-administered phone protocols.

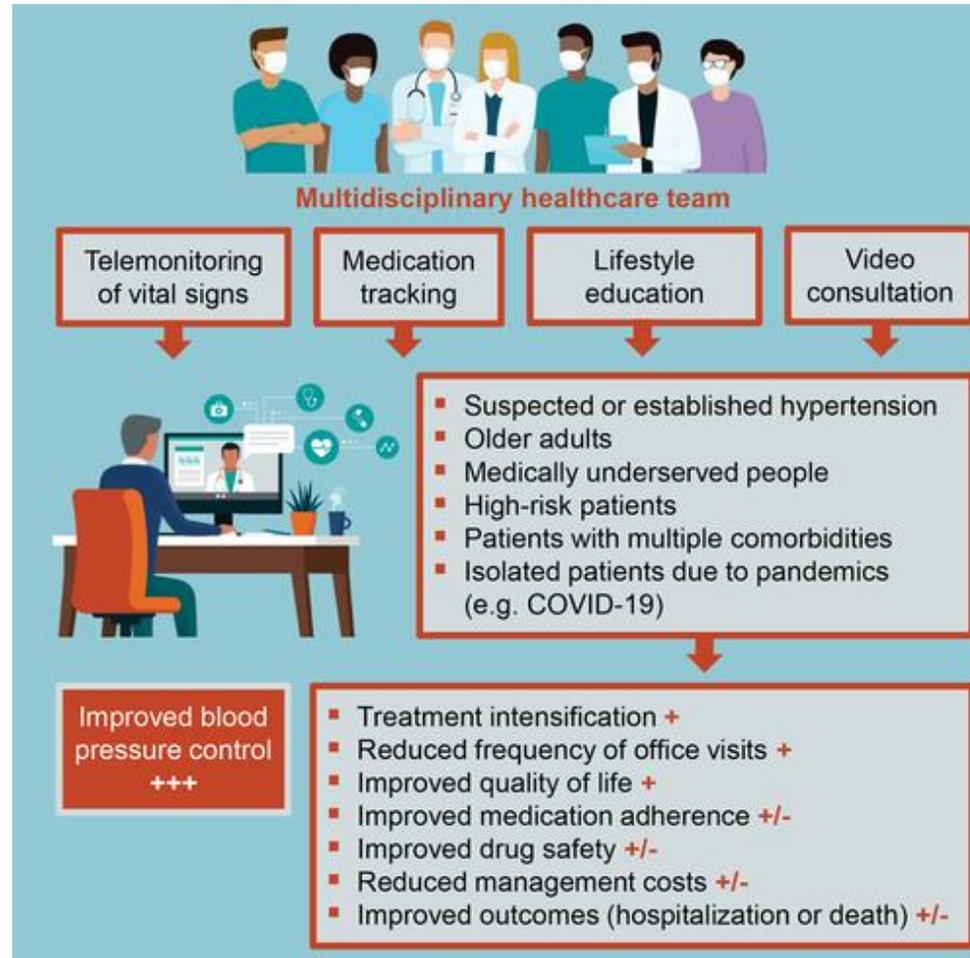
**CHRONIC
DISEASE-SPECIFIC
RESEARCH**

Hypertension

Hypertension

- [Evidence and Recommendations on the Use of Telemedicine for the Management of Arterial Hypertension: An International Expert Position Paper](#)
 - The best model hypertension management via telemedicine includes:
 - Remote monitoring and transmission of vital signs
 - Medication adherence
 - Education on lifestyle and risk factors
 - Video consultation as an option
 - Use of mixed automated feedback services with supervision of a multidisciplinary clinical team (physician, nurse, or pharmacist) is the ideal approach
 - Indications include:
 - Screening for suspected hypertension
 - Management of older adults
 - Medically underserved people
 - High-risk hypertensive patients
 - Patients with multiple diseases
 - Isolated due to pandemics or national emergencies

Hypertension



Hypertension

- Improving Hypertension Control and Patient Engagement Using Digital Tools

- **Objective:** Evaluated blood pressure control in 156 patients with uncontrolled hypertension enrolled into a home-based digital-medicine blood pressure program and compared them with 400 patients (matched to age, sex, body mass index, and blood pressure) in a usual-care group after 90 days.
- **Methods:** Digital-medicine patients completed questionnaires online, were asked to submit at least one blood pressure reading/week, and received medication management and lifestyle recommendations via a clinical pharmacist and a health coach. Blood pressure units were commercially available that transmitted data directly to the electronic medical record. Digital-medicine patients averaged 4.2 blood pressure readings per week.
- **Results:** At 90 days, 71% of digital-medicine vs 31% of usual-care patients had achieved target blood pressure control. Mean decrease in systolic/diastolic blood pressure was 14/5 mm Hg in digital medicine, vs 4/2 mm Hg in usual care ($P < .001$). Excess sodium consumption decreased from 32% to 8% in the digital-medicine group ($P = .004$). Mean patient activation increased from 41.9 to 44.1 ($P = .008$), and the percentage of patients with low patient activation decreased from 15% to 6% ($P = .03$) in the digital-medicine group. A digital hypertension program is feasible and associated with significant improvement in blood pressure control rates and lifestyle change. Utilization of a virtual health intervention using connected devices improves patient activation and is well accepted by patients.

Hypertension Treatment Through mHealth

- [The Effectiveness of Self-Management of Hypertension in Adults Using Mobile Health: Systematic Review and Meta-Analysis](#)
 - **Objective:** This systematic review aimed to measure the effectiveness of mHealth in improving the self-management of hypertension for adults. The outcome measures were blood pressure (BP), BP control, medication adherence, self-management behavior, and costs.
 - **Methods:** A systematic search was conducted using 5 electronic databases. 24 studies were chosen.
 - **Results:** A greater reduction in both Systolic BP and Diastolic BP was observed in the mHealth intervention groups compared with control groups. Subgroup analyses showed consistent reductions in SBP and DBP across different frequencies of reminders, interactive patterns, intervention functions, and study duration subgroups. A total of 16 studies reported better medication adherence and behavioral change in the intervention groups, while 8 showed no significant change. Six studies included an economic evaluation, which drew inconsistent conclusions. However, potentially long-term financial benefits were mentioned in all economic evaluations. All studies were assessed to be at high risk of bias.
 - **Conclusions:** This review found that mHealth self-management interventions were effective in BP control. The outcomes of this review showed improvements in self-management behavior and medication adherence. The most successful mHealth intervention combined the feature of tailored messages, interactive communication, and multifaceted functions. Further research with longer duration and cultural adaptation is necessary. With increasing disease burden from hypertension globally, mHealth offers a potentially effective method for self-management and control of BP. mHealth can be easily integrated into existing health care systems.

Diabetes

Diabetes: Effectiveness

- Clinical Effectiveness of Telemedicine in Diabetes Mellitus: A Meta-Analysis of 42 Randomized Controlled Trials
 - **Methods:** Randomized controlled trials (RCTs) reporting a change in HbA1c after usual care and telemedicine intervention were retrieved from electronic databases.
 - **Results:** Data on 6,170 participants (mean age 13.3 to 71.0 years), with 3,128 randomized to usual care and 3,042 to telemedicine intervention, were retrieved from 42 RCTs. Eight studies used teleconsultation, while 34 used telemonitoring (device based). Nine studies enrolled both type 1 and type 2 diabetes patients, 21 focused on type 2 diabetes patients, and 12 on type 1 diabetes patients. The mean reduction in HbA1c was significantly higher in the telemedicine groups (Hedges' $g = -0.37$, $p < 0.001$). Type 2 diabetes patients experienced a higher reduction in HbA1c compared to type 1 diabetes patients (Hedges' $g = -0.48$, $p < 0.001$ vs. -0.26 , $p < 0.05$; $Q = 1935.75$, $p < 0.0001$). Older patients (41-50 years, Hedges' $g = -1.82$, $p < 0.001$; >50 years, Hedges' $g = -1.05$, $p < 0.001$) benefited more than their younger counterparts (Hedges' $g = -0.84$, $p = 0.07$). Telemedicine programs lasting >6 months produced a significantly greater reduction in HbA1c levels (Hedges' $g = -2.24$ vs. -0.66 , $p < 0.001$).
 - **Conclusion:** Telemedicine interventions are more effective than usual care in managing diabetes, especially type 2 diabetes. Furthermore, older patients and a longer duration of intervention provide superior results.

Diabetes: Complex Management

- Telemedicine in Complex Diabetes Management
 - **Purpose:** Explore the landscape of telemedicine approaches and evidence for incorporation into general practice
 - **Findings:**
 - Telemedicine for diabetes care is feasible based on over 100 randomized clinical trials.
 - Evidence shows modest benefits in A1c lowering and other clinical outcomes that are better sustained over time vs. usual care.
 - While telemedicine interventions are likely cost-effective in diabetes care, more research is needed using implementation science approaches.
 - Telehealth platforms have been shown to be both feasible and effective for health care delivery in diabetes, although there are many caveats that require tailoring to the institution, clinician, and patient population.
 - Research in diabetes telehealth should focus next on how to increase access to patients who are known to be marginalized from traditional models of health care.

Diabetes: Cost-effectiveness

- [Clinical- and cost-effectiveness of telemedicine in type 2 diabetes mellitus: a systematic review and meta-analysis 2014](#)
 - **Purpose:** We sought to evaluate the clinical effectiveness and cost effectiveness of telemedicine approaches on glycemic control in patients with type 2 diabetes mellitus.
 - **Methods:** MEDLINE, Cochrane, EMBASE, and CINAHL Plus were searched to identify relevant studies published through February 28, 2014. Data from identified clinical trials were pooled according to telemedicine approach, and evaluated using conventional meta-analytical methods. We identified 47 articles, from 35 randomized controlled trials, reporting quantitative outcomes for hemoglobin A1c (HbA1c). Twelve of the 35 studies provided intervention via telephone, either in the form of a call or a text message; 19 studies tested internet-based programs, employing video-conferencing and/or informational websites; and four studies used interventions involving electronically transmitted recommendations made by clinicians in response to internet-based reporting by patients.
 - **Findings:** Studies revealed a small, but statistically significant, decrease in HbA1c following intervention, compared to conventional treatment (pooled difference in means=-0.37, 95% CI=-0.49 to -0.25, Z=-6.08, P<0.001). Only two of the 35 studies included assessment of cost-effectiveness. These studies were disparate, both in terms of overall expense and relative cost-effectiveness. Optimization of telemedicine approaches could potentially allow for more effective self-management of disease in type 2 diabetes patients, though evidence to-date is unconvincing. Furthermore, significant publication bias was detected, suggesting that the literature should be interpreted cautiously.

Diabetes: Cost-effectiveness

- [Telemedicine Cost-Effectiveness for Diabetes Management: A Systematic Review 2018](#)
 - **Background:** Telemedicine has been utilized increasingly worldwide for diabetes management, due to its potential to improve healthcare access and clinical outcomes. Few studies have assessed the economic benefits of telemedicine, which may contribute to underfunding in potentially important programs. We aim to systematically review the literature on economic evaluations of telemedicine in diabetes care, assess the quality, and summarize the evidence on driver of cost-effectiveness.
 - **Materials and methods:** A literature search was performed in 10 databases from inception until February 2018. All economic evaluations assessing the economic evaluation of telemedicine in diabetes were eligible for inclusion. We subsequently evaluated the study quality in terms of effectiveness measures, cost measure, economic model, as well as time horizon.
 - **Results:** Of the 1877 studies identified, 14 articles were included in our final review. The healthcare providers' fees are a major predictor for total cost. In particular, the use of telemedicine for retinal screening was beneficial and cost-effective for diabetes management, with an incremental cost-effectiveness ratio between \$113.48/quality-adjusted life year (QALY) and \$3,328.46/QALY (adjusted to 2017 inflation rate). Similarly, the use of telemonitoring and telephone reminders was cost-effective in diabetes management.
 - **Conclusions:** Among all telemedicine strategies examined, teleophthalmology was the most cost-effective intervention. Future research is needed to provide evidence on the long-term experience of telemedicine and facilitate resource allocation.

Pharmacist-led Diabetes Management

- Evaluation of the Impact of a Pharmacist-Led Telehealth Clinic on Diabetes-Related Goals of Therapy in a Veteran Population
 - **Objectives:** Telemedicine has been offered as a way to ensure that all patients, including those who live in rural areas, have access to the same health care. This study was performed to evaluate the benefit of a real-time, clinic-based video telehealth (Clinical Video Telehealth [CVT]) program and the impact of a pharmacist-led CVT clinic for chronic disease state management. The primary objective was to evaluate changes from baseline values, in veterans referred by primary care providers to this clinic.
 - **Methods:** This was a single-center, prospective, pre-post pilot study that also included a post-patient satisfaction survey. The study was conducted at the Tennessee Valley Healthcare System, which is composed of two medical centers and 12 community-based outpatient clinics (CBOCs) located away from the two main facilities. Fifteen clinical pharmacy specialists (CPSs)-seven at the two main facilities and eight at the CBOCs-provide disease state management clinical pharmacy services. One of the seven CPSs at the main facilities works via telemedicine and provides services to the CBOCs where on-site clinical pharmacy services did not exist. The primary outcomes were changes from baseline in A1C, LDL level, systolic blood pressure, and diastolic blood pressure after 6 months of CVT services by the CPS. Secondary outcomes were the percentages of patients meeting American Diabetes Association treatment goals for hemoglobin A1c (A1C), low-density lipoprotein level, and blood pressure, both individually and in combination after attending a pharmacist-led CVT program; the level of patient satisfaction with pharmacists' care and with CVT as a method of receiving chronic disease management, specifically for diabetes; and medication additions or changes made by the pharmacist.
 - **Results:** Twenty-six patients completed the 6-month evaluation. A significant decrease in A1C of 2% from baseline was observed ($p=0.0002$), and the percentage of patients meeting goal A1C significantly increased from 0% at baseline to 38% at 6 months ($p=0.0007$). Overall patient satisfaction scores were also high, with a median score 39.5 (interquartile range 36-40) of a maximum score of 40.
 - **Conclusion:** Six months of CVT clinic attendance significantly improved A1C values and the overall percentage of patients meeting their goal A1C values in this veteran population. In addition, patient satisfaction scores also indicated a high level of satisfaction with the pharmacist-led CVT service.

Diabetes Retinopathy

- Telemedicine-based digital retinal imaging vs standard ophthalmologic evaluation for the assessment of diabetic retinopathy
 - **Objective:** To study the cost benefit analysis of using a telemedicine-based digital retinal imaging evaluation compared to conventional ophthalmologic fundus examination of diabetic patients for diabetic retinopathy.
 - **Methods:** diabetic patients were evaluated by teleophthalmology. The images were later evaluated by retinal specialists at the Yale Eye Center. The costs for the standard of care ophthalmic examinations were calculated based on 2009 Medicaid reimbursement rates. The process of telemedicine-based diagnosis was based on a take-store-forward-visualize system. The cost of telemedicine-based digital retinal imaging examination included cost for devices, training, annual costs and a transportation fee. Current Medicaid reimbursement, transportation, and staff labor costs were used to calculate the conventional retinal examination cost as a comparison.
 - **Results:** Among the 611 patients digital retinal images screened in the first year of this program and for whom data are available, 166 (27.2%) cases of diabetic retinopathy were identified. Seventy-five (12.3%) patients screened positive with clinically significant disease and were referred for further ophthalmological evaluation and treatment. The primary direct cost of the telemedicine was \$3.80, \$15.00, \$17.60, \$1.50, and \$2.50 per patient for medical assistant, ophthalmologist, capital cost (Equipment and Training), equipment maintenance, and transportation fee, respectively. The total cost in the telemedicine-based digital retinal imaging and evaluation was \$40.40. The cost of conventional retinal examination was \$8.70, \$65.30, and \$3.80 per patients for round-trip transportation, 2009 national Medicaid Physician Fee Schedule allowable for bilateral eye examination, and medical assistant personnel, respectively. The total costs of conventional fundus examination were \$77.80. An additional conventional ophthalmologic retinal examination was required for 75 (12.3%) patients with clinically significant disease on telemedicine evaluation, which involves an averaged additional cost of \$ 9.55 per patient for all the patients in the study. If the cost of subsequent examination was added, the total cost of telemedicine-based digital fundus imaging was \$49.95 per patient in our group of 611 patients evaluated.
 - **Conclusions:** Our cost analysis indicates that telemedicine-based diabetic retinopathy screening cost less (\$49.95 vs. \$77.80) than conventional retinal examination and the telemedicine-based digital retinal imaging examination has the potential to provide an alternative method with greater convenience and access for the remote and indigent populations. Diabetes mellitus and diabetic retinopathy are growing problems in the United States and worldwide. Large scale adoption of telemedicine should be encouraged as a means toward providing improved access, increasing compliance with annual evaluation, at a low cost for patients with diabetes with direct access to an eye care specialist.

Hyperlipidemia

Hyperlipidemia using mHealth

- Mapping the Evidence on the Effectiveness of Telemedicine Interventions in Diabetes, Dyslipidemia, and Hypertension: An Umbrella Review of Systematic Reviews and Meta-Analyses
 - Effect of Telemedicine on Lipid Profiles in Patients With Diabetes
 - Effect on LDL was small

Asthma

Asthma Control: Adult

- [The Effects of Telemedicine on Asthma Control and Patients' Quality of Life in Adults: A Systematic Review and Meta-analysis](#)
 - **Objective:** This study aimed to determine the effects of telemedicine on asthma control and the quality of life in adults.
 - **Methods:** An electronic search was performed from the inception to March 2018 on the following databases: Cochrane CENTRAL, CINAHL, ClinicalTrials.gov, EMBASE, PubMed, and Scopus. Randomized controlled trials that assessed the effects of telemedicine in adults with asthma were included in this analysis, and the outcomes of interest were levels of asthma control and quality of life.
 - **Results:** A total of 22 studies (10,281 participants) were included. Each of 11 studies investigated the effects of single-telemedicine and combined-telemedicine (combinations of telemedicine approaches), and the meta-analyses showed that combined tele-case management could significantly improve asthma control compared with usual care standardized mean difference [SMD] = 0.78; 95% confidence interval [CI]: 0.56, 1.01). Combined tele-case management and tele-consultation (SMD = 0.52 [95% CI: 0.13, 0.91]) and combined tele-consultation (SMD = 0.28 [95% CI: 0.13, 0.44]) also significantly improved asthma outcomes, but to a lesser degree. In addition, combined tele-case management (SMD = 0.59 [95% CI: 0.31, 0.88]) was the most effective telemedicine for improving quality of life, followed by combined tele-case management and tele-consultation (SMD = 0.31 [95% CI: 0.03, 0.59]), tele-case management (SMD = 0.30 [95% CI: 0.05, 0.55]), and combined tele-consultation (SMD = 0.27 [95% CI: 0.11, 0.43]), respectively.
 - **Conclusions:** Combined-telemedicine involving tele-case management or tele-consultation appear to be effective telemedicine interventions to improve asthma control and quality of life in adults. Our findings are expected to provide health care professionals with current evidence of the effects of telemedicine on asthma control and patients' quality of life.

Asthma Control: Pediatric

- Implementing Telehealth in Pediatric Asthma
 - **Background:** Pediatric patients with uncontrolled asthma often live in underserved areas such as rural communities where few pediatric asthma specialists exist. There are significant costs associated with acute asthma exacerbations, which are increasingly prevalent in these high-risk populations.
 - **Methods:** a comprehensive school based telemedicine intervention that included directly observed therapy for daily preventive asthma medications as well as telemedicine follow-up care visits with the child's primary care provider.
 - **Results:** Children in the intervention group had more symptoms free days and reduced acute health care use compared with an enhanced usual-care group. Other investigators have proved feasibility for implementing school based telemedicine interventions as well as their effectiveness in improving asthma outcomes, such as reduction in ED visits and improved quality of life.
 - **Conclusion:** Implementing telemedicine in schools and other local community settings, as well as implementing innovative technology such as smartphone applications, can reduce the burden of asthma; increase patient satisfaction; and, most importantly, improve pediatric asthma outcomes.

OTHER HEALTHCARE PROVIDERS IMPACT

Clinical Pharmacy Impact

- Impact of the clinical pharmacy specialist in telehealth primary care
 - **Purpose:** A telehealth-based chronic disease management program including clinical pharmacy specialists (CPSs) and the program's impact on primary care outcomes in a population of veterans are described.
 - **Summary:** A telehealth program including CPS services was developed to improve healthcare access and quality for veterans in rural areas of the Pacific Northwest. Outcomes of medication management services provided by a CPS team during both clinical video telehealth and telephone encounters with 554 patients from October 2014 to March 2017 were assessed. Patients were targeted for diabetes (DM), hyperlipidemia (HLD), and hypertension (HTN) control and tobacco cessation; the respective primary outcomes were the mean changes from baseline in glycosylated hemoglobin (HbA1c) and blood pressure values and rates of guideline-indicated statin therapy and tobacco cessation. Patients in the DM and HTN groups had a mean absolute HbA1c reduction of 1.61% (95% confidence interval [CI], 1.39-1.83%; $p < 0.0001$) and a mean systolic blood pressure reduction of 26.00 mm Hg (95% CI, 22.99-28.50 mm Hg; $p < 0.001$), respectively. In the HLD group, 93% of patients were discharged on a lipid-lowering medication. Tobacco cessation was achieved in 42% of targeted patients.
 - **Conclusion:** CPSs providing primary care comprehensive medication management services solely via telehealth improved disease management and access to healthcare in a population of rural veterans. Statistically significant improvements in DM and HTN outcomes were demonstrated along with clinically significant improvements in the areas of lipid management and tobacco cessation.

Clinical Pharmacist Services

- Impact of clinical pharmacist services delivered via telemedicine in the outpatient or ambulatory care setting: A systematic review
 - **Background:** Utilization of telemedicine allows pharmacists to extend the reach of clinical interventions, connecting them with patients and providers, but the overall impact of these services is under-studied.
 - **Objective:** Identify the impact of clinical pharmacist telemedicine interventions on clinical outcomes, subsequently defined as clinical disease management, patient self-management, and adherence, in outpatient or ambulatory settings.
 - **Methods:** A literature search was conducted from database inception through May 2016 in Medline, SCOPUS, and EMBASE. Broad terms “telemedicine,” “telehealth,” and “telephone” were used in combination with “pharmacist” or “pharmacy” and “telepharmacy.” The search and extraction process followed PRISMA guidelines. Results were screened for pharmacist interventions and reviewed to identify studies in outpatient or ambulatory settings. Studies of non-clinical outcomes (i.e. dispensing or product preparation) and with no comparator were excluded. The final studies were categorized by types of outcomes reported: clinical disease management, patient self-management, and adherence.
 - **Results:** Only 34 studies measured clinical outcomes against a comparator, consistent with the research question. The majority utilized scheduled models of care (n = 29). Telephone was the most common communication method (n = 25). The most utilized interventions were pharmacist-led telephonic clinics (n = 10). Most studies focused on chronic disease management in adults including hypertension, diabetes, anticoagulation, depression, hyperlipidemia, asthma, heart failure, HIV, PTSD, CKD, stroke, COPD and smoking cessation. Twenty-three studies had a positive impact with one reporting negative results. Higher positive impact rate was observed for scheduled (72.4%, 21/29) and continuous (100%, 2/2) models compared to responsive/reactive (25%, 1/4).
 - **Conclusions:** Clinical pharmacy telemedicine interventions in the outpatient or ambulatory setting, primarily via phone, have an overall positive impact on outcomes related to clinical disease management, patient self-management, and adherence in the management of chronic diseases. Commonalities among studies with positive impact included utilization of continuous or scheduled models via telephone, with frequent monitoring and interventions. Studies identified did not evaluate benefits of video capability over telephone or cost-effectiveness, both of which are useful directions for future study.

HEALTHCARE DELIVERY RESEARCH

Consultation

Emergency Medicine

- Systematic review of telemedicine applications in emergency room
 - **Basic procedures:** 340 citations yielded 38 resulting articles based on four main categories: study setting, type of technology, research methods, and results.
 - **Main findings:** 11 studies focused on telemedicine for diffuse patient populations that typically present in ERs, 8 studies considered telemedicine in the context of minor treatment clinics for patients presenting with minor injuries or illnesses, and 19 studies focused on the use of telemedicine to connect providers in ERs to medical specialists for consultations on patients with specific conditions.
 - Overwhelmingly, tele-emergency studies reported positive findings especially in terms of technical quality and user satisfaction. There were also positive findings reported for clinical processes and outcomes, throughput, and disposition, but the rigor of studies using these measures was limited. Studies of economic outcomes are particularly sparse.
 - **Principal conclusions:** Despite limitations in their research methodology, the studies on tele-emergency indicate an application with promise to meet the needs of small and rural hospitals to address infrequent but emergency situations requiring specialist care. Similarly, studies indicate that tele-emergency has considerable potential to expand use of minor treatment clinics to address access issues in remote areas and overcrowding of urban ERs.

eConsults

- Building eConsult (Electronic Consults) Capability at an Academic Medical Center to Improve Efficiencies in Delivering Specialty Care
 - **Purpose:** The aim of this case study is to describe eConsults, how they differ from traditional in person models of care and other models of telemedicine and to review the evidence related to the effectiveness of eConsults by PCPs and clinicians from multiple specialties at the University of Colorado School of Medicine.
 - We have worked to develop an infrastructure, delivery system integration, and care model adaptations that aim to improve delivery system performance by ensuring proper care in appropriate settings and lowering costs through reduced utilization.
 - **Results:** eConsults have increased care coordination, improved collaboration and better care transitions through strengthening of relationships between community-based PCPs and academic medical center-based specialists. This work has resulted in cost savings to patients and positive provider satisfaction.

eVisits: Avoidance of in Person Care

- An Evaluation of eVisits at an Academic Medical Center
 - **Objective:** There is limited information on whether eVisits lead the avoidance of in-person care.
 - **Methods:** Reviewed 8627 eVisits
 - **Results:** 23.1% of eVisits required follow-up medical care within 14 days (22.6% with primary care physician, 0.3% with emergency department, 0.2% both).
 - **Conclusion:** eVisits are a feasible alternative to in-person care for low-complexity medical issues.

eVisits: Patient Demographics, Prescription Rates and Follow-Up Care

- Electronic Visits for Minor Acute Illnesses: Analysis of Patient Demographics, Prescription Rates, and Follow-Up Care Within an Asynchronous Text-Based Online Visit
 - **Methods:** Retrospective record review of Mayo Clinic Rochester primary care empaneled patients who had an eVisit for a minor acute illness and were reviewed for 30-day outcomes of follow-up.
 - **Results:** Of the 1,009 eVisits analyzed, a total of 340 (34%) had follow-up within 30 days, with a follow-up rate of 154 (20%) when those who were advised to follow-up were excluded. Factors significantly associated with any type of follow-up care included specific advice for follow-up given by the eVisit provider and lack of a prescription given at the eVisit. The majority of eVisits were requested by females (88%), although gender was not associated with likelihood of having follow-up care. Fourteen patients received follow-up care in the emergency department, one patient was hospitalized, and zero deaths occurred within 30 days of the eVisit. Most eVisits (70%) were requested during regular clinic hours. Four diagnoses (urinary tract infection, sinusitis, upper respiratory infection, and conjunctivitis) comprised 87% of all eVisits.
 - **Conclusion:** Most eVisits for minor acute illnesses can be completed without any further interaction with the healthcare system.

eVisits: Patient Characteristics

- Characteristics of patients who seek care via eVisits instead of office visits

- **Purpose:** Little is known on who chooses to seek care via an eVisit.
- **Materials and methods:** At four primary care practices, we used the electronic medical record to identify all eVisits and office visits for sinusitis and urinary tract infections (UTIs) between January 2010 and May 2011. From the electronic medical record we abstracted the necessary information on patient demographics. The population studied included 5,165 sinusitis visits (9% of which were eVisits) and 2,954 UTI visits (3% eVisits).
- **Results:** In multivariate models controlling for other patient factors, the variables most strongly associated with a patient initiating an eVisit versus an office visit were age (18-44 years of age versus 65 years of age and older: sinusitis, odds ratio 1.65 [0.97-2.81]; UTI, 2.97 [1.03-8.62]) and longer travel distance to clinic (>10 miles from patient home to clinic versus 0-5 miles: sinusitis, odds ratio 6.54 [4.68-9.16]; UTI, odds ratio 3.25 [1.74-6.07]). Higher income was not associated with higher eVisit use.
- **Conclusions:** At these four primary care practices, eVisits accounted for almost 7% of visits for sinusitis and UTI. eVisits attract a younger patient population who might use eVisits for convenience reasons.

Technology Literacy

Technology Literacy: Barrier to Care

- Technology Literacy as a Barrier to Telehealth During COVID-19
 - Although many older adults perceive benefits from technology,
 - Common barriers include self-efficacy, cost, and privacy concerns.
 - Prior research has shown that technology adoption can be improved through education and increasing perceived self-efficacy.
 - If patients can better navigate their web browsers and applications, they may feel empowered to message their providers through the patient portal or look up healthy recipes online.

Technology Literacy: Homebound Patients

- Homebound patients' perspectives on technology and telemedicine: A qualitative analysis
 - **Problem:** Telemedicine holds promise in bridging the gap between homebound patients and high quality health care, but uptake of such technology remains limited.
 - **Methods:** Qualitative interviews conducted with 17 homebound patients found two major barriers to telemedicine.
 - Participants who lack familiarity with technology are hesitant about telemedicine, as baseline use of technology in the home is limited, participants did not feel capable of learning, and the advantages of telemedicine were unclear.
 - Homebound patients place a high value on in-office visits due to therapeutic benefit, face-to-face communication, and the social aspect of medical appointments

Technology Literacy: Provider Experience

- [Telemedicine Usage Among Urologists During the COVID-19 Pandemic: Cross-Sectional Study](#)
 - **Background:** Prior to the COVID-19 pandemic, urology was one of the specialties with the lowest rates of telemedicine and videoconferencing use. Common barriers to the implementation of telemedicine included a lack of technological literacy, concerns with reimbursement, and resistance to changes in the workplace. In response to the COVID-19 pandemic declared in March 2020, the delivery of urological services globally has quickly shifted to telemedicine to account for the mass clinical, procedural, and operative cancellations, inadequate personal protective equipment, and shortage of personnel.
 - **Objective:** Investigate current telemedicine usage by urologists, urologists' perceptions on the necessity of in-person clinic appointments, the usability of telemedicine, and the current barriers to its implementation.
 - **Methods:** global, cross-sectional, web-based survey to investigate the use of telemedicine before and after the COVID-19 pandemic. Urologists' perceived usability of telemedicine was assessed. For the purposes of this study, telemedicine was defined as video calls only.
 - **Results:** A total of 620 urologists from 58 different countries and 6 continents participated in the survey. Prior to COVID-19, 15.8% (n=98) of urologists surveyed were using telemedicine in their clinical practices; during the pandemic, that proportion increased to 46.1% (n=283). Of the urologists without telemedicine experience, interest in telemedicine usage increased from 43.7% (n=139) to 80.8% (n=257) during the COVID-19 pandemic. Among urologists that used telemedicine during the pandemic, 80.9% (n=244) were interested in continuing to use it in their practice. The three most commonly used platforms were Zoom, Doxy.me, and Epic.
 - The top three barriers to implementing telemedicine were patients' lack of technological comprehension, patients' lack of access to the required technology, and reimbursement concerns.
 - Conclusions: In the face of this pandemic, urologists' usage of telemedicine nearly tripled, demonstrating their ability to adopt and adapt telemedicine into their practices, but barriers involving the technology itself are still preventing many from utilizing it despite increasing interest.

Patient Satisfaction

Patients' Satisfaction

- Patients' Satisfaction with and Preference for Telehealth Visits

- **Objective:** We assessed patients' satisfaction with and preference for telehealth visits in a telehealth program at CVS MinuteClinics.
- **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.
- **Main measures:** 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:** 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.
 - Predictors of liking telehealth were female gender and being very satisfied with their overall understanding of telehealth, quality of care received, and telehealth's convenience.
- **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.

New Modalities

Text Messaging

- [The Role of Text Messaging and Telehealth Messaging Apps](#)
 - Article focuses on the role of text messaging and messaging applications, discusses technical and legal issues, and reviews current examples of the application of text messaging in the clinical adult and pediatric practice.
 - Reviews of current examples of text messaging in adult and pediatric practice show uptake has been increasing substantially in recent years. In pediatric care text messaging has been used for behavior intervention and outcomes tracking.
 - Although applications are promising, the potential of non-synchronous messaging in the formal delivery of care is still in the neonatal phase compared with its grown-up existence in day-to-day modern life.

Summary

- Methods used to care for patients needs proof of outcomes
- There are many medical problems cared for virtually that have similar or better outcomes than in-person visits
- New workflows allow for care in ways we never used before
- Allows for improved access and sometimes reduced costs
- Medical professionals other than MDs/APPs can improve patient outcomes via telemedicine
- Many barriers to be cared for virtually still exist
- Research is still needed in almost every facet of telemedicine care

*“Learning is an
experience. Everything
else is just information.”*

—Albert Einstein

RESOURCES

Resources

- [Texas Medical Association Telemedicine Vendor Evaluation](#)
- [American Medical Association \(AMA\) Digital Health Implementation Playbook](#)
- [Centers for Medicare & Medicaid Services \(CMS\) General Provider Telehealth and Telemedicine Toolkit](#)
- [National Telehealth Technology Assessment Resource Center](#)
- [TexLa Telehealth Resource Center](#)
- [American Health Information Management Association Telemedicine Toolkit](#)

Resources

- [Center For Connect Health Policy Current State Laws And Reimbursement Policies](#)
- [CMS General Provider Telehealth and Telemedicine Tool Kit](#)
- [Patient Take Home Prep Sheet](#)
- [Consumer Technology Association Digital Health Directory](#)

References

- [The Best 10 Free and Open Source Telemedicine Software](#)
- [Comparing the latest telehealth solutions](#)
- [Technical Specifications for Selected Platforms](#)
- [Telemedicine Vendor Evaluation](#)
- [AMA Telehealth Implementation Playbook](#)
- [Picking The Right Telehealth Platform For a Small or Solo Practice](#)
- [Cleveland Clinic Digital Health Playbook](#)

References

- [Comparing 11 top telehealth platforms: Company execs tout quality, safety, EHR integrations](#)
- [Leading Age Technology Selection Tools](#)
- [Best telemedicine software of 2021](#)
- [National Telehealth Technology Assessment Resource Center \(TTAC\)](#)
- [Videoconferencing–Technology Overview](#)

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QUESTIONS?

Thank You for Joining Us!

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