Evidence Brief: Video Telehealth for Primary Care and Mental Health Services

February 2019

Prepared for:
Department of Veterans Affairs
Veterans Health Administration
Health Services Research & Development Service
Washington, DC 20420

Prepared by:
Evidence Synthesis Program (ESP)
Coordinating Center
Portland VA Health Care System
Portland, OR
Mark Helfand, MD, MPH, MS, Director

Authors:
Investigators:
Stephanie Veazie, MPH
Donald Bourne, MPH
Kim Peterson, MS
Johanna Anderson, MPH

U.S. Department of Veterans Affairs
Veterans Health Administration
Health Services Research & Development Service

PREFACE

The VA Evidence Synthesis Program (ESP) was established in 2007 to provide timely and accurate syntheses of targeted healthcare topics of importance to clinicians, managers, and policymakers as they work to improve the health and healthcare of Veterans. These reports help:

- Develop clinical policies informed by evidence;
- Implement effective services to improve patient outcomes and to support VA clinical practice guidelines and performance measures; and
- Set the direction for future research to address gaps in clinical knowledge.

The program is comprised of four ESP Centers across the US and a Coordinating Center located in Portland, Oregon. Center Directors are VA clinicians and recognized leaders in the field of evidence synthesis with close ties to the AHRQ Evidence-based Practice Center Program and Cochrane Collaboration. The Coordinating Center was created to manage program operations, ensure methodological consistency and quality of products, and interface with stakeholders. To ensure responsiveness to the needs of decision-makers, the program is governed by a Steering Committee comprised of health system leadership and researchers. The program solicits nominations for review topics several times a year via the program website.

Comments on this evidence report are welcome and can be sent to Nicole Floyd, Deputy Director, ESP Coordinating Center at Nicole.Floyd@va.gov.

Recommended citation: Veazie S, Bourne D, Peterson K, Anderson J. Evidence Brief: Video Telehealth for Primary Care and Mental Health Services. VA ESP Project #09-199; 2019. Posted final reports are located on the ESP search page.

This report is based on research conducted by the Evidence Synthesis Program (ESP) Center located at the **Portland VA Health Care System, Portland, OR**, funded by the Department of Veterans Affairs, Veterans Health Administration, Health Services Research and Development. The findings and conclusions in this document are those of the author(s) who are responsible for its contents; the findings and conclusions do not necessarily represent the views of the Department of Veterans Affairs or the United States government. Therefore, no statement in this article should be construed as an official position of the Department of Veterans Affairs. No investigators have any affiliations or financial involvement (*eg*, employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties) that conflict with material presented in the report.

TABLE OF CONTENTS

TABLES AND FIGURES

EXECUTIVE SUMMARY

Key Findings

- Video delivery of mental health treatments are likely similar to in-person treatments in terms of patient satisfaction (for both Major Depressive Disorder [MDD] and Post-Traumatic Stress Disorder [PTSD]), number of sessions completed (PTSD), quality of life (both MDD and PTSD), response (MDD), and remission rates (both MDD and PTSD).
- Video delivery of mental health treatments are associated with lower or similar implementation costs (PTSD and MDD) and health care utilization costs (MDD only) compared to in-person treatments.
- Evidence is emerging on the use of video for diagnosis of mental health conditions as well as the use of video for treatment of chronic pain.
- There is a lack of evidence on the use of video in primary care for conditions other than chronic pain, as well as a lack of information on the impact of video in both mental health and primary care on important access outcomes, including wait times, frequency of use, and provider productivity.

Background

The ESP Coordinating Center (ESP CC) is responding to a request from the Veterans Health Administration (VHA) Office of Connected Care/Telehealth for an evidence brief on video telehealth in mental health/primary care. Findings from this evidence brief will be used to inform the VA MISSION Act questions as directed by Congress.

Methods

To identify studies, we searched MEDLINE®, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, and other sources up to October 2018. We used prespecified criteria for study selection, conducted data abstraction, and rated internal validity and strength of the evidence.

PROSPERO Registration: CRD42019120145

The telehealth-related provisions in the Veterans Affairs (VA) Maintaining Systems and Strengthening Integrated Outside Networks (MISSION) Act of 2018 allows VA providers to administer care to Veterans using telehealth, regardless of where in the United States the provider or Veteran is located – including care that occurs across state lines or outside a VA facility. The goal is to expand access and increase patient satisfaction, while providing equal or better quality of care. Telehealth can be provided for many different clinical conditions and through many different technologies, and primary care and mental health have been identified as 2 priority areas for VA telehealth services. In this review, we evaluated synchronous video conferencing versus in-person delivery of health care for Veterans treated in primary care or mental health settings on key access, process, cost, and clinical outcomes.

Among the 30 included articles (1 systematic review, 23 randomized controlled trials (RCTs)/follow-up analyses and 6 observational studies/follow-up analyses, sample size range:16-839), most examined mental health treatments for post-traumatic stress disorder (PTSD) and major depressive disorder (MDD). Five articles examined diagnosis of a range of mental health conditions, and 1 examined treatment of chronic pain.

Overall, evidence suggests that video treatment is similar to in-person treatment on outcomes of patient satisfaction, number of sessions completed, cost and cost-effectiveness, and clinically significant outcomes such as quality of life. Evidence was strongest (moderate strength) for the treatment of PTSD and MDD for patient satisfaction and certain clinically significant outcomes. Strength of evidence was low or insufficient for other conditions and outcomes, as they were

reported in single, small studies of fair to poor quality. The most important methodological limitations that lowered our confidence in the findings were inadequate information on randomization and allocation procedures, inadequate control for potential confounders in observational studies, high (> 20%) overall attrition rates, and potential for biased assessment due to knowledge of treatment group assignment. We did not identify any studies that directly examined the access outcomes of interest such as wait times, frequency of use, or provider productivity.

Future research should explore the use of video for diagnosis and treatment of mental health disorders on these access outcomes, as well as for the use of video in primary care. Future research should also address the methodological limitations of the existing literature, specifically by better reporting of randomization and allocation procedures, masking outcome assessors, ensuring better adherence to the intervention, and using techniques to better minimize the possibility of a placebo effect, for example through a sham telehealth control group.

Table 1. Summary of Findings

Condition/ Treatment or diagnosis	KQ 1: Process and access outcomes	KQ 2: Costs	KQ 3: Clinically significant outcomes
PTSD/ Variety of treatments	Moderate SOE Video treatments are similar to in-person treatments on patient satisfaction and number of sessions completed based on 1 fair-quality SR of 14 studies and 1 poor-quality cohort study (Total N=886). No studies examined access outcomes.	Low SOE Video treatments are associated with reduced implementation costs compared to in-person treatments due to reduced personnel travel costs based on 1 fair-quality RCT (N=74).	Low SOE Video treatments are similar to in-person treatments on quality of life and treatment remission based on 4 fair-quality RCTs (Total N=321).
MDD/ Variety of treatments	Moderate SOE Video treatments are similar to in-person treatments on patient satisfaction based on 1 good-quality and 2 fair-quality RCTs (Total N=481). No studies examined access outcomes.	Low SOE Video treatments are associated with similar or lower health care costs than in-person treatments and are cost-effective even when accounting for costs of providing Veterans with laptops or videophones based on 1 good-quality and 1 fair-quality RCT (Total N=362).	Low SOE Video treatments are similar to in-person treatments on quality of life, response, and remission based on 1 good-quality and 1 fair-quality RCT (Total N=360).
Chronic pain/ Acceptance and commitment therapy	Low SOE Video acceptance and commitment therapy is similar to in-person therapy	No studies on costs.	Low SOE Video acceptance and commitment therapy is similar to in-person therapy

	on patient satisfaction in 1 fair-quality RCT (N=128). No studies examined access outcomes.		on quality of life in 1 fair-quality RCT (N=128).
MH conditions/ Diagnostic batteries	Low SOE There is good agreement and similar patient satisfaction outcomes associated with video and in-person clinical interviews for a range of mental health disorders, although the evidence on diagnostic agreement for PSTD is mixed, based on 2 fair and 1-poor quality studies (Total N=99) No studies examined access outcomes.	Low SOE Video diagnosis is associated with reduced implementation costs for both new and established telehealth clinics compared to in-person diagnosis based on 1 fair-quality study (N=53).	No studies on clinically significant outcomes.

Abbreviations: KQ = key question; MDD = major depressive disorder; MH = mental health; PTSD = post-traumatic stress disorder; RCT = randomized controlled trial; SOE = strength of evidence; SR = systematic review

EVIDENCE BRIEF

BACKGROUND

The Evidence Synthesis Program (ESP) Coordinating Center (ESP CC) is responding to a request from the Veterans Health Administration (VHA) Office of Connected Care/Telehealth for an evidence brief on video telehealth (VT) in mental health/primary care. Findings from this evidence brief will be used to respond to Congressional inquiry regarding the Veterans Affairs (VA) Maintaining Systems and Strengthening Integrated Outside Networks (MISSION) Act.

INTRODUCTION

Among their many innovative efforts to increase Veterans' access to high-quality health care services – particularly for Veterans living in rural and remote locations – the US Department of Veterans Affairs has built a telehealth program that has recently been described as the largest in the nation.[1] Telehealth in the VHA is defined as: "The wider application of care and case management principles to the delivery of health care services using health informatics, disease management and telehealth technologies to facilitate access to care and improve the health of designated individuals and populations with the intent of providing the right care in the right place at the right time."[2] Telehealth (also referred to as telemedicine, telecare, teletherapy, eHealth, and mHealth)[3] encompasses a wide range of technologies (*eg*, real-time or 'synchronous' interactive teleconferencing or videoconferencing, 'asynchronous' acquisition of data, images, sounds, and/or video that are stored and forwarded for later clinical evaluation, messaging), clinical applications, and settings (*eg*, home, another health care site, community).[4]

VA Telehealth Services are available for more than 50 clinical uses,[5] and mental health and primary care are among the most frequently used.[6] There is a high prevalence of mental illness,[7] chronic disease,[8] and multi-morbidities[8] among Veterans, as well as transportation barriers to accessing care for those living in rural areas.[9] Only about half of those who indicate that they want care actually receive it,[10] and national surveys of US military Veterans indicate that living in rural areas is one of the greatest barriers impeding access to health care.[11] To address these issues, beginning in 2011, VA has launched a number of telemental health expansion efforts, such as adding millions of dollars in telehealth equipment and new types of telehealth staff.[12] In 2016, VA established 4 regional telemental health (TMH) hubs to enhance mental health care access for Veterans living in rural areas or in areas with identified access challenges.[13] These expansion efforts have led to continued increases in telehealth encounters.[13] For example, in the Western Telehealth Network, from fiscal year 2017 to 2018, the number of new telehealth referrals increased from 810 to 2,696 (232.84%), and 81.2% of Veterans served in 2018 were from rural areas [5]

However, qualitative interviews with VA telemedicine providers indicate the following as barriers to use of telehealth services: technical challenges, inadequate patient and provider education and training, need for additional telehealth providers, and patient and provider preferences for in-person (IP) care.[14] One additional barrier to the growth of VA telehealth delivery is clinic space, as historically patients have been required to be physically present in a VA clinic or medical center to receive telehealth care. In 2018, several key initiatives were introduced to help reduce these barriers and improve Veteran access to VA health care. First, Section 151 of the US Department of Veterans Affairs MISSION Act of 2018 was enacted into

law to extend legislative authority to clinicians working at any VA facility to offer care through telehealth, regardless of clinician or patient location – including across state lines. Second, on June 11, 2018, the "Anywhere to Anywhere" regulation was published through the Office of Management and Budget, which provided more specific guidance on how to implement the MISSION Act. Third, the encrypted VA Video Connect App was developed to provide Veterans with secure and private access to telehealth from any mobile or web-based device.[15] Finally, in December 2018, after hosting an Anywhere to Anywhere Together Summit with the public sector, VA announced the development of some new partnerships with T-Mobile, Walmart, and Phillips designed to further increase access by offering free hosting of VA Video Connect Apps on all service devices and creating new remote examination spaces at Veterans Service Organization posts across the nation.[1] Together, the legislation and regulation provide the foundation for telehealth to improve access, capacity, and quality across VA. Within 1 year of its enactment, the MISSION Act requires VA to submit a report to Congress to provide data on provider and patient satisfaction, the effect of telemedicine on patient wait times, health care utilization, and other measures.

To assist in answering VA MISSION Act questions and to inform evidence-based development of new initiatives and strategic planning approaches to manage the additional increased volume of telehealth encounters projected under the “Anywhere to Anywhere” regulation and legislation, the VA Office of Connected Care and the Office of Telehealth is interested in identifying the Veterans, conditions, treatments, and/or implementation strategies in which telehealth are most likely to be beneficial. In 2016, the Agency for Healthcare Research and Quality Evidence-based Practice Center (AHRQ EPC) program used an evidence map approach to provide an overview of 58 telehealth systematic reviews published through 2015.[16] It broadly concluded that there is sufficient evidence to support the effectiveness of telehealth for psychotherapy as part of behavioral health based on the availability of a sizable quantity of evidence with some consistency in benefits. A 2018 evidence map produced by the VA Durham ESP Center focusing specifically on telehealth for women found that outside of postpartum depression, little evidence is available focusing on use of telehealth for women’s mental health needs.[17] These evidence maps provide an overall interpretation of where the evidence was adequate, but were not designed to provide a comprehensive review of any specific aspect application of telehealth – including identification of the most promising uses of synchronous VT between patient and provider for primary care and mental health in Veterans.

PURPOSE

The purpose of this report is to synthesize the evidence on VT in mental health/primary care.

SCOPE

This evidence brief will address the following key questions and inclusion criteria:

Key Questions

Key Question 1: How do VT and usual IP mental health or primary care treatment modalities compare on certain process and access outcomes?

Key Question 2: How do VT and usual IP mental health or primary care treatment modalities compare in the costs, including travel costs, from furnishing health care?

Key Question 3: How do VT and usual IP mental health or primary care treatment modalities compare in clinically significant patient health outcomes?

Eligibility Criteria

The ESP included studies that met the following criteria:

- **P**opulation: US Veterans receiving mental health or primary care services
- **I**ntervention: Synchronous VT (excluding asynchronous, add-on, and multifaceted interventions)
- **C**omparator: IP care of same service (excluding telephone, IP of a different service, or studies with no comparator)
- **O**utcomes: Access/wait times, frequency of use, productivity of health care providers, patient/provider satisfaction, cost, clinically significant patient health outcomes (*ie*, response, remission)
- **T**iming: Any
- **S**etting: Mental health/primary care
- **S**tudy design: Any. Using a best evidence approach, we will prioritize evidence from systematic reviews and multisite comparative studies that adequately controlled for potential patient-, provider-, and system-level confounding factors. Inferior study designs (*eg*, single-site, inadequate control for confounding, noncomparative) will only be accepted to fill gaps in higher-level evidence.

METHODS

To identify articles relevant to the key questions, our research librarian used keyword and MeSH terms on telehealth and Veterans to search Ovid MEDLINE, PsycINFO, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, Evidence-Based Medicine (EBM) Reviews- Health Technology Assessment, National Institute for Health Care and Excellence (NICE), and the National Library of Medicine. We searched for articles published from 1994 (initiation of the first telehealth studies in VA[18]) to October 2018. We searched PROSPERO as well as telehealth and health care websites for in-progress studies (see Appendix A in Supplemental Materials for complete search strategies). Additional citations were identified from hand-searching reference lists and consultation with content experts. We limited the search to published and indexed articles involving human subjects available in the English language.

Study selection was based on the eligibility criteria described above. We included parent studies of follow-up analyses (either subgroup analyses or analyses of multiple studies), even if the parent study did not report an outcome of interest. For frequency of use, we sought data on whether VT enabled Veterans to access care more easily or frequently. However, in the absence of these outcomes, we considered number of sessions completed to be a relevant proxy outcome. For clinically significant outcomes, we considered mean differences in quality of life and functionality, as well as the percent of participants that met clinical thresholds for response and remission. In some cases, we report study results that were not outcomes of interest if they were important to the interpretation to the study (*eg*, diagnostic agreement). Titles and abstracts were reviewed by one investigator and checked by another. Full-text articles were reviewed by one investigator and checked by another. All disagreements were resolved by consensus.

For studies that were included in the Turgoose 2018 systematic review, we relied on their prior data abstraction and internal validity assessments. We contacted the first author of this review requesting information on how they rated the internal validity of their included studies. Although they were willing to disclose this information, unfortunately, the data were no longer available. For all other published studies and additional outcome data used in our review, such as costs and clinically significant outcomes, we used predefined criteria to rate the internal validity of unique included studies. We used the ROBIS tool to rate the internal validity of systematic reviews,[19] the Drug Effectiveness Review Project (DERP) tool to rate controlled trials,[20] and the United States Preventive Services Task Force criteria to rate cohort studies.[21] In this report, we used study quality as a proxy for risk of bias, where a good-quality study is at low risk of bias, a fair-quality study is at unclear risk of bias, and poor-quality study is at high risk of bias. We abstracted data from all studies and results for each included outcome. All data abstraction and internal validity ratings were first completed by one reviewer and then checked by another. All disagreements were resolved by consensus.

We informally graded the strength of the evidence based on the AHRQ Methods Guide for Comparative Effectiveness Reviews by considering study limitations (includes study design and aggregate quality), consistency, directness, and precision of the evidence.[22] Ratings typically range from high to insufficient, reflecting our confidence that the evidence reflects the true effect.

Because data were heterogenous, we synthesized data qualitatively by grouping treatment studies by condition.

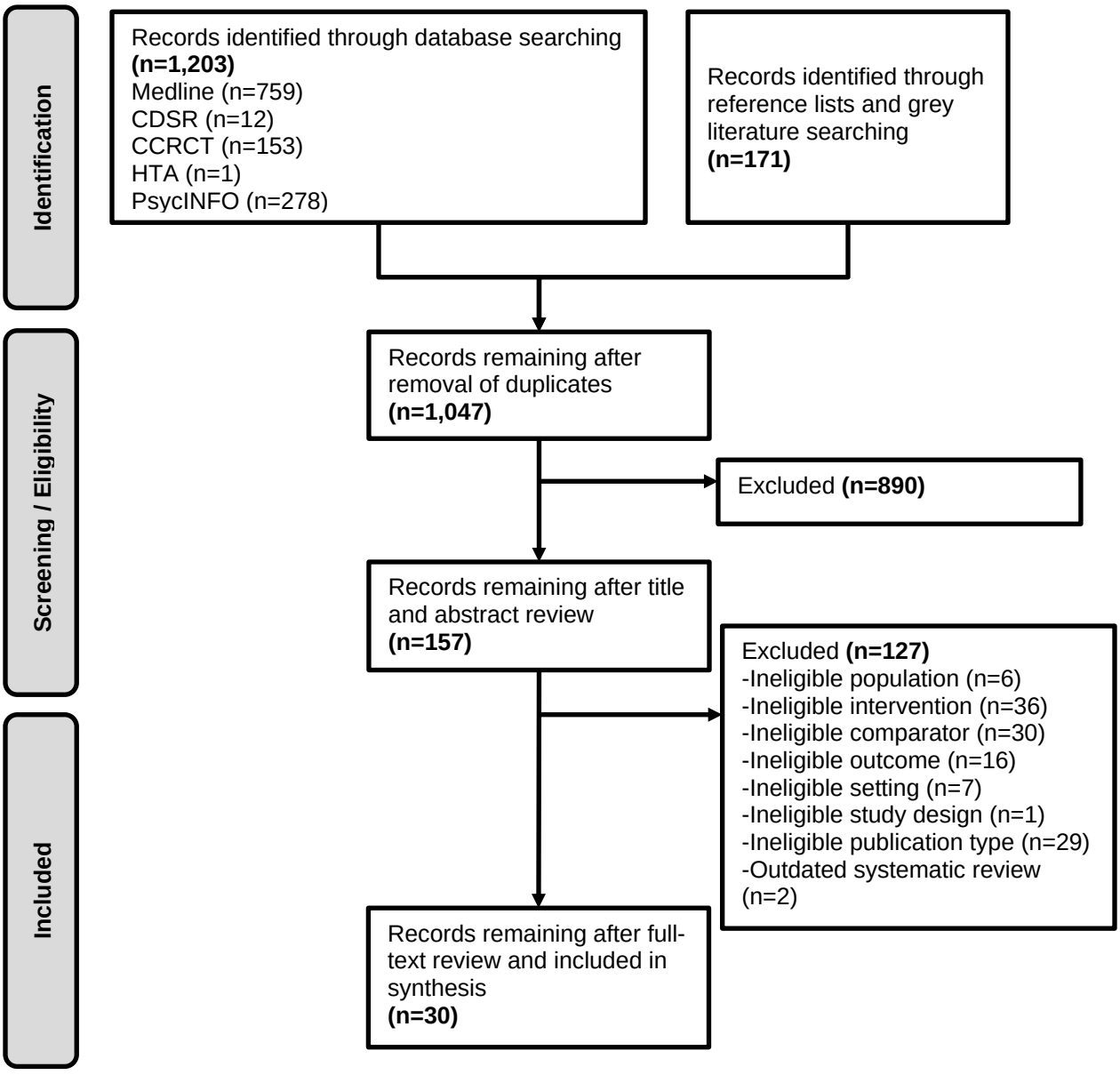
The complete description of our full methods can be found on the PROSPERO international prospective register of systematic reviews (http://www.crd.york.ac.uk/PROSPERO/; registration number CRD42019120145). A draft version of this report was reviewed by peer reviewers as well as clinical leadership. Their comments and our responses are presented in the Supplemental Materials (see Appendix E).

RESULTS

LITERATURE FLOW

The literature flow diagram (Figure 1) summarizes the results of the search and study selection processes (see Appendix B in Supplemental Materials for full list of excluded studies).

Figure 1: Literature Flowchart



Searches resulted in 1,407 unique and potentially relevant articles. We included 30 total relevant articles.[23-51] This included 1 recent systematic review,[48] 23 randomized controlled trials and follow-up analyses (RCTs),[23-33,35-42,49-51] and 6 observational studies and follow-up analyses.[34,43-47] Fourteen of the included RCTs/analyses[27,28,30,31,33,36-41,49-51] were captured by the recent systematic review,[48] but we elected to include them separately because we analyzed additional

outcomes not covered in the review. For a list of excluded and ongoing studies, see Appendices 2 and 4 in Supplemental Materials.

TREATMENT OF POST-TRAUMATIC STRESS DISORDER (PTSD)

We identified 12 total relevant studies[27-31,33,34,36-41,43-45,47-51] (1 systematic review,[48] 9 RCTs,[27-31,33,36-41,49-51] and 2 cohort studies[43-45,47]) that examined VT versus IP treatment for PTSD (Table 2). Eight of these studies[27,28,30,31,33,36-41,49-51] were included in the systematic review.[48]

KQ 1: Process and Access Outcomes

No studies reported on direct access outcomes such as wait times, frequency of use, or productivity of health providers. However, a fair-quality 2018 systematic review[48] found that VT was similar to IP treatment for PTSD on the proxy outcome of number of sessions completed as well as patient satisfaction.

This systematic review summarized evidence on Veterans receiving telehealth (40 articles on VT therapy and 1 article on telephone-based therapy) for PTSD, including prolonged exposure therapy, cognitive processing therapy, cognitive behavioral therapy, behavioral activation, eye-movement desensitization and reprocessing, anger management, mindfulness, and general coping and psychoeducation interventions. Of 41 included studies, 28 were experimental (including 11 strong quality, 8 moderate quality, 8 weak quality, and 1 whose quality was not reported). Of these, 14 articles of 839 participants met inclusion criteria for our review.

The review reports that “no studies found significant differences in attrition between tele-therapy and in-person treatments, with one finding that those receiving tele-therapy attended significantly more sessions” and “there were no differences in the number of sessions attended before dropout occurred, except for one study which suggested that those receiving tele-therapy attended more sessions before dropping out of treatment." The review also found that “no studies found any significant differences in satisfaction and acceptability between tele-therapy and in-person treatment groups, with most reporting high levels of satisfaction with both.”

The main strengths of the review were its broad inclusion of all studies examining video or telephone-based treatment for PTSD, including both RCT and observational studies, as well as a synthesis of a variety of outcomes relevant to patients, providers, and health systems. Limitations of the review include not reporting on data extraction processes; not reporting which studies had strong, moderate, and weak quality ratings; and not incorporating quality ratings into the interpretation of studies. Although we could not determine which studies received particular quality ratings, we did repeat quality assessment on a convenience sample of 5 studies[30,36,38,39,41,50,51] included in the Turgoose 2018 review that reported additional outcomes on costs or clinically significant outcomes. We rated all 5 studies as fair quality due to a lack of information on randomization procedures, high overall attrition rates or differential attrition rates between groups, and lack of information on whether outcome assessors were masked. These ratings were on average more critical than the Turgoose 2018 review ratings. It is therefore possible that we would have rated the studies more critically than Turgoose 2018; however, given there was a large number of studies and they all showed consistent results on patient satisfaction and number of sessions completed, this difference had little impact on our interpretation of the findings.

We identified one additional poor-quality prospective cohort study[47] of VT versus IP prolonged exposure therapy for 47 Veterans with combat-related PTSD that was not included in Turgoose 2018 which found similar results on number of sessions completed.

We have moderate confidence that VT is similar to IP treatment on outcomes of patient satisfaction and number of sessions completed. The main limitations of this evidence include a lack of information on randomization procedures, high overall attrition rates or differential attrition rates between groups, and lack of information on whether outcome assessors were masked and that number of sessions is an indirect measurement for access outcomes.

KQ 2: Costs

One fair-quality RCT[36,41] assessed costs of VT versus IP anger management treatment for 74 male Veterans with PTSD and anger problems living in remote areas of Hawaii. The study evaluated the costs as of 2012 of personnel (clerk, information technician, and psychologist) for both groups, costs of procuring video equipment (2 Tanberg clinical videoconferencing units) for the VT group, and travel costs for a psychologist to travel from Honolulu to remote Hawaiian clinics for the IP group. The study found that mean costs per patient were significantly lower for VT than IP treatment ($79 vs $792), and the effect was still seen after adjusting for improvements in patient anger outcomes (savings of $703 to $710 in VT group depending on the anger scale used). In both treatment groups, participants traveled to a local VA to receive treatment, so there were no potential savings to Veterans in terms of travel time or costs.

We have low confidence that VT is associated with reduced costs compared to IP PTSD treatment. Evidence is limited to 1 small fair-quality RCT conducted among Veterans living in Hawaii, who may have unique geographical access issues that may not be representative of rural Veterans living in the contiguous US.

KQ 3: Clinically Significant Outcomes

Evidence from 4 fair-quality RCTs[29,38,39,50,51] suggests that VT and IP treatment of PTSD result in similar quality of life and remission outcomes after 8-12 sessions. One RCT[50] of 52 Veterans examined the effect of 8-12 sessions of VT versus IP prolonged exposure therapy and found no differences between groups on PTSD remission (46% vs 40% no longer had diagnosis of PTSD post-treatment). Another RCT[51] of 18 Operation Enduring Freedom/Operation Iraqi Freedom Veterans examined the effect of 10 sessions of VT versus IP cognitive behavioral therapy. This study found no difference between groups in SF-36 physical health (4.4% vs 4.5% improvement) or SF-36 mental health (45.8% vs 37.9% improvement), although no statistical analyses were conducted due to the small sample size. Another analysis[29] combined data from 2 RCTs,[38,39] one of 125 male Veterans with PTSD and one of 126 female civilians and Veterans with PTSD, receiving 12 sessions of cognitive processing therapy. There were no differences between VT and IP groups on the Quality of Life Inventory, with both groups showing improvements at post-treatment and 6-month follow-up.

We have low confidence that VT is equivalent to IP treatment on clinically significant outcomes. Major methodological limitations of the evidence include a lack of information on randomization procedures and attrition rates greater than 20%. Of note, many additional studies reported mean differences in symptoms between VT versus IP groups; however, these data did not meet criteria for clinically significant outcomes.

Table 2. Outcomes for Comparison of VT Versus IP Visits for PTSD

Author Year Sample Size Mean age % male Therapy type	KQ1: Process and access results	KQ2: Cost results	KQ3: Veteran health outcomes
Turgoose 2018[48] N (14 relevant studies)=886 Mean age: NR % male: NR Various therapies	Patient satisfaction: NSD, "with most reporting high levels of satisfaction with both" treatments	NR	NR
Tuerk 2010[47] N=47 Mean age: 39.0 years % male: 94% Prolonged exposure treatment	Treatment completion (telemedicine vs in-person): 75% vs 83% Sessions attended by completers (mean ± SD): 10.0 ± 6.3 vs 10.1 ± 3.8	NR	NR
Greene 2010,[30] Morland 2010,[36] Morland 2013[41] N=125 Mean age: 55 years % male: 100% Anger management therapy	Reported in Turgoose 2018	Unadjusted mean costs: Significantly lower for telemedicine ($79, CI $73-84) than in-person ($792, CI $727-856) delivery (*P*=.01)	NR
Yuen 2015[50] N=52 Mean age: 44 years % male: 98% Prolonged exposure therapy	Reported in Turgoose 2018	NR	No differences in post-treatment rates of PTSD diagnoses between telemedicine and in-person groups: 46% vs 40% no longer had diagnosis of PTSD, 27% vs 30% had subclinical symptoms, 27% vs 30% had diagnosis, $\chi 2(2)=.62$, *P*=.73
Ziemba 2014[51] N=18 Mean age: NR % male: 90% Cognitive behavioral therapy	Reported in Turgoose 2018	NR	Both telemedicine and in-person groups improved on physical health (SF-36 physical health) 4.4% vs 4.5% improvement (*P*=NR) and mental health (SF-36 mental health) 45.8% vs 37.9% improvement (*P*=NR).
Glassman 2017[29], Morland 2014[38], Morland 2015[39] N=251 Mean age: 50.8 years % male: 50%	Reported in Turgoose 2018	NR	No effect of treatment modality on QoL over the treatment and follow-up period for men and women (*P*>.33)

Group (men) or individual (women) cognitive processing therapy	

Abbreviations: CI = confidence interval; IP = in-person; NSD = described as not significantly different, but *P*-value not reported; NR = not reported; PTSD = posttraumatic stress disorder; QoL = quality of life; SF = short form; VT = video telemedicine

TREATMENT OF MAJOR DEPRESSIVE DISORDER

We identified 3 RCTs[23-26,35,42,52] that examined VT versus IP treatment for Major Depressive Disorder (MDD) (Table 3).

All Outcomes

The strongest evidence supporting the use of VT as an alternative to IP care comes from 1 good-quality RCT of 241 elderly Veterans with MDD.[24,25,52] This study found that VT was similar to IP care in patient satisfaction, quality of life, response, remission, and cost-effectiveness at the 12-month post-baseline assessment. Treatment involved 8 weeks of Behavioral Activation Therapy (BAT), and outcomes were assessed at 12 months post-baseline. Strengths of this study include: it met the highest standards for randomization, allocation concealment, and outcome assessor blinding methods; drop-outs were below 20%; it evaluated a wide range of clinically important outcomes over the longest-term follow-up period of 12 months; and it was the most applicable to the Anywhere to Anywhere initiative in that it was the only RCT of MDD VT to evaluate home-based delivery. However, as it focused specifically on elderly Veterans and, like all other RCTs, used a technology that is now obsolete (replaced by the new VA Video Connect encrypted app for mobile devices), it is ultimately unclear how the findings apply to current care delivery conditions in a broader range of Veterans. However, it would be reasonable to anticipate that use of newer technology in younger Veterans might only be more favorable.

Otherwise, overall, the 3 fair- to good-quality RCTs (N = 481) demonstrated that, compared to IP care, telehealth for MDD was consistently comparable in patient satisfaction,[24,35,42] quality of life,[24] response,[42,52] remission,[42] and cost-effectiveness.[23,25,26] None of the RCTs reported any access, wait times, frequency of use, or health care provider productivity outcomes. One RCT reported similar average numbers of visits for VT versus IP treatment.[42] However, the relevance of this finding to home-based telehealth is unclear, as in this RCT Veterans randomized to telehealth were still seen in the same clinic they initially presented to for care – just by a psychiatrist in different locations.[42] Also in this same RCT, psychiatrist satisfaction, as measured by a 17-item scale developed for the RCT, was statistically significantly greater when seeing Veterans for IP care versus by VT ($t = –2.2$, $df = 79$, $P < .05$). However, authors questioned the clinical importance of the difference, noting that satisfaction was still high in both groups.

Although direct technology costs of providing Veterans with videophones[25] or laptops[35] were generally higher than travel costs of same-room care, because the VHA care utilization was consistently similar or lower[23,25,42] and improvements in Quality Adjusted Life Years (QALYs) were similar, Independent Cost Effectiveness Ratio (ICER) analyses found telehealth to be a cost-effective option.[23,25]

Because patient satisfaction was consistently similar across multiple studies, the strength of this evidence is moderate. For other outcomes reported by 1 or 2 small studies, the strength of that evidence is low. [23,25]

Table 3. Outcomes for Comparison of VT Versus IP Visits for MDD

Author Year Sample Size Mean age % male Therapy type	KQ1: Process and access results	KQ2: Cost results	KQ3: Veteran health outcomes
Egede 2015,[52] 2016,[24] 2017,[26] 2018[25] N=241 Mean age: 63.9 years % male: 97.5% Behavioral Activation Therapy	Patient satisfaction via CPOSS at 12 months: 36.7 vs 37.2; mean difference= -.01, *P*=.72	Direct costs: $800-900 (device costs) vs $437.92 (travel costs) Health care utilization costs: $687.91 vs $1,359.49 12-month ICER: (positive number favors telemedicine) Mean: 5,892.34 Median: -787.85	QoL (SF-36): No significant difference at 12 months on any of 8 subscales: mean difference ranged from -1.9 points (95% CI -8.3 to 4.5) for pain to 2.5 (95% CI -5.7 to 10.8) for physical health GDS Response (% reduction NR): 22% vs 20%; absolute difference, 2.06 (90% CI -7.46 to 11.58)
Luxton, 2016[35] Bounthavong, 2018[23] N=121 Mean age: 35.15 years % male: 82% Behavioral Activation Treatment (BAT)	Patient satisfaction via CSQ: 28.8 vs 29.3; NSD	Total direct cost per patient: Lower when technology provided by patients ($19,177 vs $20,322) vs by government ($71,974 vs $20,322) Cost per additional quality-adjusted life year gained: Lower when technology provided by patients (–$158,506) than by government (+$14,434,503), but telehealth dominant when both scenarios combined	NR
Ruskin 2004[42] N=119 Mean age: 50 years % male: 88% Psychotropic medication, psychoeducation, and brief supportive counseling	Average number of visits: 6.5; t=0.2, df=117, *P*=NS Patient satisfaction at visit 8 (4-point Likert scale rating agreements with 19-item scale developed for the study): fell between “agree” and “strongly agree”, mean NR (t=1.3, df=74, *P*=NS).	Per-session institutional costs: $86.16 vs $63.25 (t=3.2, *P*<.001). However, costs were equal if psychiatrist traveled 22 miles and less if they traveled >22 miles. VHA care utilization: “equal” (t=.7, *P*=NS).	Response (50% improvement on HDS): 49% vs 43%; $\chi 2$=0.4, df=1, *P*=NS Remission (HDS≤7): 39% vs 35%; $\chi 2$=0.2, df=1, *P*=NS

	Psychiatrist satisfaction (17-item scale developed for the study): greater for patients seen in person than by video (t=–2.2, df=79, *P*<.05)		

Abbreviations: CI = confidence interval; CPOSS = Charleston Psychiatric Outpatient Satisfaction Scale; CSQ = Client Satisfaction Questionnaire; GDS = Geriatric Depression Scale; HDS = Hamilton Depression Scale; ICER = Incremental Cost Effectiveness Ratio; IP = in-person; MDD = major depressive disorder; NS = non-significant; NSD = described as not significantly different, but *P*-value not reported; NR = not reported; QoL = quality of life; SF = short form; VHA = Veterans Health Administration; VT = video telemedicine

TREATMENT OF CHRONIC PAIN

We identified 1 RCT[32] examining VT versus IP treatment for chronic pain (Table 4).

All Outcomes

This fair-quality RCT of 128 Veterans found that a VT-delivered 8-week acceptance and commitment therapy was similar to IP delivery in terms of patient satisfaction at 8 weeks and quality of life at 6 months (Table 4).

Because the evidence on treatment for chronic pain on quality of life and patient satisfaction is limited to this single small study with differences in attrition (28% in VT vs 14% in IP group) between groups, the strength of evidence is low.

Table 4. Outcomes for Comparison of VT Versus IP Visits for Chronic Pain

Author Year Sample Size Mean age % male Therapy type	KQ1: Process and access results	KQ2: Cost results	KQ3: Veteran health outcomes
Herbert 2017[32] N=128 Mean age: 52 years % male: 82% Acceptance and commitment therapy (ACT)	Patient satisfaction via CSQ: 4.40 vs 4.47; NSD, *P*=.53	NR	Measured as mean difference (VT minus IP) in change (95% CI): SF12-MCS: -1.72 (-6.13 to 2.7) SF12-PCS: -2.2 (-5.46 to 1.07)

Abbreviations: CI = confidence interval; CSQ = Client Satisfaction Questionnaire; IP = in-person; NSD = described as not significantly different; NR = not reported; SF12-MCS = Mental Component Summary; SF12-PCS = Physical Component Summary; VT = video telemedicine

DIAGNOSIS OF MENTAL HEALTH CONDITIONS

We identified 3 studies[34,43-46] (2 within-subject cross-over design[34,43-45] and 1 prospective cohort)[46] that examined VT versus IP-delivered structured clinical interviews to diagnose mental health disorders (Table 5).

KQ 1: Process and Access Outcomes

Use of VT as an alternative to IP shows some promise for clinical interviews and diagnosis of mental health conditions in terms of diagnostic agreement and patient satisfaction based on 1 fair-quality crossover study[43-45] (N = 53) of multiple mental health conditions, 1 poor-quality crossover study[34] (N = 30) of PTSD, and 1 fair-quality prospective cohort study (N = 16) of dementia.[46] While there was disagreement between 2 studies of different PTSD clinical interview methods, the stronger findings from the higher-quality study that used the DSM-III Structured Clinical Interview did not find good agreement between VT and IP approaches.[53]

The fair-quality study[43-45] of multiple mental health conditions randomized 53 American Indian Veterans with a known prevalence of lifetime psychiatric disorders to 1 of 2 clinical interview sequences, receiving VT first or IP first. The clinical interview was conducted using the Structured Clinical Interview for DSM-III. The study found generally fair or good agreement in diagnoses between modalities, including substance abuse or dependence, MDD, dysthymia, and generalized anxiety disorder, but not PTSD, with no significant differences between modalities in terms of patient satisfaction. Study authors noted that the VT may not have worked as well for diagnosis of PTSD because it is an internalizing, rather than externalizing, disorder. The poor-quality study[34] of exclusively PTSD diagnosis utilized the same crossover design to assess VT versus IP administration of the Clinician-administered PTSD (CAPS) Scale to 30 trauma-exposed Veterans and found strong agreement between modalities on PTSD diagnosis and high levels of satisfaction with both groups. Both studies had issues related to selection bias, as they relied on participants already diagnosed with mental health disorders for the study sample. For the fair-quality study of multiple mental health conditions, 8 years had lapsed since the clinical interview was conducted for a previous study, which is likely long enough to "wash out" the effect of completing the interview. In the poor-quality study of exclusively PTSD, however, some participants were drawn from a group psychotherapy class and others from a participant recruitment database, and no analysis was conducted on the potential role of receiving treatment on the likelihood of receiving a diagnosis. It should also be noted that neither study used the DSM-V, which is the current standard for PTSD diagnosis,[53] although the fair-quality study used the DSM-III.

The fair-quality study of dementia diagnosis examined VT versus IP diagnosis of dementia in 16 residents 60 years and older of a Washington State Veterans' Home.[46] Diagnoses by VT agreed 100% with diagnoses by IP examinations. All patients agreed with statements indicating a preference to utilize VT versus traveling for an IP examination, and most patients (93.7%) reported understanding the video physician as well as if the examination had been in person. Physicians reported satisfaction with the VT 71.4% of the time.

Strength of evidence is low that administration of clinical interviews for mental health diagnosis by VT or IP are similar in terms of diagnostic agreement and patient satisfaction. Each clinical area was only supported by 1 or 2 fair- or poor-quality studies with considerable selection bias issues. There was also disagreement between studies on the utility of VT for diagnosis in PTSD.

KQ 2: Costs

One fair-quality study[44,45] among 53 American Indian Veterans in Colorado evaluated costs of delivering VT versus IP clinical interviews for mental health diagnoses. Study authors created 2 cost models: 1 for established telehealth clinics and 1 for new telehealth clinics. Both models

included costs of personnel for VT and IP groups, costs of data transmission for the VT group, and travel costs for IP group. The model for new clinics included the costs of procuring and installing videoconferencing equipment. Researchers found that the VT group was less expensive than IP (annual costs as of 2005 of $20,199 at established telehealth clinic vs $24,474 at new clinic vs $33,841 at IP clinic based on high salary costs). For both VT and IP groups, Veterans accessed care in their community at a Tribal Veterans Center (VT group) or a private office (IP group). It is unclear if there were any differences in distance traveled or costs to Veterans, as these were not measured.

Because only 1 study was identified that had methodological limitations due to its crossover design (described above), strength of evidence is low that VT is associated with lower implementation costs than IP diagnosis of mental health disorders.

KQ 3: Clinically Significant Outcomes

No studies were identified.

Table 5. Outcomes for Comparison of VT Versus IP Visits for Diagnosis of Mental Health Conditions

Author Year Sample Size Mean age % male Therapy type	KQ1: Process and access results	KQ2: Cost results	KQ3: Veteran health outcomes
Shore 2007a,[45] Shore 2007b,[44] Shore 2008[43] N=53 Mean age: 54 years % male: 100% PTSD diagnostic assessment	Patient satisfaction: 4.59 vs 5.68; NSD	Assessment costs: Cheaper at established telemedicine clinic ($20,199) vs new clinic ($24,474) vs in-person clinic ($33,841), based on high salary costs	NR
Litwack 2014[34] N=30 Mean age: 53 years % male: 90% PTSD diagnostic assessment	Patient satisfaction: “high levels” with both, including: (a) “how comfortable they felt with the clinician” (t(28)=.95, *P*=.35) (b) “how comfortable they felt with the interview material” (t(28)=.00, *P*=1.00) (c) “the convenience of the assessment” (t(28)=1.31, *P*=.20)	NR	NR
Shores 2004[46] N=16 Mean age: 78 years % male: 94% Examination for dementia	Telemedicine patient survey (mean ± SD): (a) I understand what the health care provider told me as well as if it had been in person (4.5 ± 0.06) (b) The telemedicine visit was private enough for me to ask the questions I wanted to (4.7 ± 0.5) (c)The telemedicine technology saved me time (4.8 ± 0.4)	NR	NR

	(d) I would choose to have a telemedicine visit again (4.8 ± 0.4) (e) I would rather use telemedicine than travel to the clinic (4.8 ± 0.6)	

Abbreviations: CI = confidence interval; IP = in-person; NSD = described as not significantly different, but *P*-value not reported; NR = not reported; SD = standard deviation; VT = video telemedicine

SUMMARY AND DISCUSSION

This rapid review builds on previous evidence synthesis work on telehealth[16,17,48] by focusing specifically on the effectiveness of VT versus IP treatment for Veterans and by examining process and access outcomes (*eg*, patient satisfaction, frequency of use), costs, and clinically significant outcomes (*eg*, response, remission, and quality of life). Video delivery of mental health treatments are likely similar to IP treatments in terms of patient satisfaction (both MDD and PTSD), number of sessions completed (PTSD), quality of life (both MDD and PTSD), response (MDD), and remission rates (both MDD and PTSD). Video delivery of mental health treatments may also be associated with lower or equivalent implementation costs (PTSD and MDD) and health care utilization costs (MDD only) compared to IP treatments. Although we identified evidence on VT versus IP for treating chronic pain and diagnosing mental health disorders, our confidence in the findings are low. We did not identify any evidence on the effect of VT versus IP treatments on important access outcomes including wait times, panel size, or productivity of health care providers. We also did not identify any studies on the treatment of mental health disorders other than PTSD or MDD (*eg*, bipolar disorder), nor did we find any studies of other conditions treated in primary care other than chronic pain (*eg*, diabetes and hypertension).

It is perhaps not surprising that the large majority of studies in this review were focused on mental health conditions and about half were specifically focused on rural and remote populations, given VA's focus on utilizing telehealth to improve access to mental health care. Additionally, many mental health treatments, including cognitive behavioral therapy, anger management therapy, and behavioral activation, require multiple, frequent (1+ time a week), intensive (1+ hour) appointments that involve building trust and rapport between a clinician and a patient. Compared to other forms of telehealth, VT may be best suited for these conditions as it allows for incorporation of nonverbal communication cues including facial expressions and body language.

Along those lines, it is also not surprising that we did not identify many studies on VT for primary care. Primary care treatments can require physical examinations or lab tests which can be more difficult to conduct by video. In addition, many aspects of primary care treatment, such as following up on a patient's treatment progress or sending lab results, can be completed with less intensive communication such as messaging or phone calls. We identified several studies[54,55] that integrated video into a multimodal telehealth primary care intervention, such as home-based tele-monitoring or coordinated care. In these interventions, video was used to deliver counseling or otherwise check in with patients self-managing chronic conditions, while other aspects of self-management were completed via apps or monitoring devices. While outside the scope of this review, the utility of VT as one aspect of a multimodal primary care telehealth intervention is an important research question that is currently being explored.

LIMITATIONS

Limitations of Primary Studies

The majority of studies in this review were poor or fair quality. Most randomized studies did not adequately describe randomization processes (*ie*, by computer-generated number, drawing lots) or whether allocation was adequately concealed (*ie*, concealing group assignments in opaque

envelopes). Many studies also reported high levels of attrition (*ie*, above 20%) or did not report whether attrition varied between groups. Cohort studies had additional issues with selection bias, as they sometimes gave patients the option of whether they would like to receive VT or IP treatment and did not control for important confounders between these groups or, in the case of diagnosis, drew from patient groups that were already receiving treatment that may have resulted in reduced symptoms.

Because studies could not mask providers or patients to the treatment condition, there may have been a placebo effect favoring the VT intervention. A placebo effect can occur if patients, providers, and outcome assessors believe that the new treatment (VT) is more desirable or effective than usual care (IP). While no studies in this review included a "sham" intervention (*eg*, VT intervention that checked in periodically with participants or delivered general education but not a manualized treatment) that would have ruled out the possibility of a placebo effect, several noted that a non-inferiority design was sufficient as their primary concern was whether VT was at least as effective as IP. Furthermore, several studies[23-26,29,32,35,38,39,51] attempted to control for the potential that outcome assessors were influencing results by masking them to treatment condition. Several studies also attempted to minimize the effect that provider variation (*eg*, variation in experience, licensure, rapport, or fidelity to intervention) might have in driving differences in outcomes by having the same provider deliver both VT and IP treatments[30,32,36,41,51] and/or monitoring provider fidelity to intervention.[23,32,35,42-45]

Finally, while it is promising that patients reported high levels of satisfaction with both VT and IP treatments, satisfaction data can be unreliable as patients may be reluctant to criticize an intervention.

Limitations of Rapid Review Methods

First, when compared to dual independent review, our rapid review methods of single reviewer assessment of titles and abstract with second reviewer checking may have resulted in missing eligible studies. Second, our prioritization of best evidence meant that we did not extract and conduct data analysis on all 14 relevant studies from Turgoose 2018. Instead, for those 14 studies, we relied on the author's summary on patient satisfaction and number of sessions attended, as well as the overall quality of experimental studies. As discussed in the findings section, this may have resulted in a more optimistic assessment of the studies' quality; however, it likely would not have affected the final conclusions. Third, our rapid timeline meant we could not examine all important to the evaluation of VT, including safety, technological issues, and therapeutic alliance, so it is possible we are missing important information related to implementation of VT.

Gaps and Future Research

Although one of the main drivers for telemedicine is to reduce barriers to treatment, such as distance, information on access outcomes is lacking. No studies reported on the effect of telemedicine regarding wait times, panel size, productivity of health care providers or other direct access measures. We also found a dearth of studies on VT versus IP treatment conducted in the primary care setting, which, as discussed earlier, is likely due to the fact that telehealth delivered in primary care is more often used as 1 component among complex multimodal interventions, rather than as an overall replacement to IP care.

One key issue in this field is the advancement of technology. On one hand, the technology needed for VT continues to improve, and at the same time, the prices for products like webcams are decreasing. However, this often means that, between the time a study is conducted and the publication of its results, the technology has advanced, limiting the applicability of findings. In 2018, VA Video Connect became the standard application for VT delivery, a technology that was not examined in any of our included studies. Future research should explore the use of this technology, especially as it has the potential to increase access to care by enabling Veterans to receive treatment at home.

We identified 6 ongoing studies (see Appendix D in Supplemental Materials), all of which focused on the treatment for mental health or substance abuse disorders in Veterans. Unfortunately, it is not clear that any of these studies will directly and sufficiently address existing gaps in the literature. Therefore, concerted research of better quality is still needed in the specific limitation areas we outlined in detail above, including reporting on access outcomes and the use of up-to-date technology. Studies should also take measures to minimize performance and measurement biases by using masked raters to assess outcomes and ensure high fidelity to treatment protocol via external compliance monitoring.

CLINICAL AND POLICY IMPLICATIONS

Costs and Access Issues

While we found evidence that VT is associated with similar or reduced implementation costs as in-person care, the reality is that telemedicine is likely to lead to more implementation costs, at least initially, as it is serving new patients not currently being served, as opposed to patients switching from in-person to remote care. For example, 1 study found that lower costs for VT groups were driven largely by the reduced need to pay for clinicians to travel to remote areas to deliver care, and in the study where the VA provided laptops, VT was cheaper when clinicians had to travel more than 22 miles to provide care. However, paying clinicians to travel to remote areas does not typically happen in practice, so the reality is that those Veterans living in remote areas would likely not receive this care. This further iterates the need for future research to assess whether VT is increasing Veterans' access to care, as well as leading to reduction in other types of costs (such as health care utilization costs).

Along the same lines, as implementation of telehealth expands, consideration should be given to ensuring that Veterans who need access to health services have access to these services. One example is ensuring there are sufficient numbers of telehealth providers to meet demand. Another example is ensuring common processes between physical VA facilities and telehealth centers so that a patient does not need to complete similar assessments, for example an initial intake assessment, multiple times, or have a delay in treatment due to the need for multiple assessments.

Special Populations

Several studies[29,32,38,39,42,50,52] noted that they specifically excluded patients with substance abuse or dependence, active psychosis, or suicidal or homicidal ideation. One study[24] conducted in Veterans with depression noted that 10% of those with depression also have co-occurring substance abuse issues. Because these populations were excluded from these studies, we cannot say whether VT is safe or effective in these groups; however, it should be noted that these

criteria are consistent with what is currently being used to assess patients for suitability for telehealth care.

CONCLUSIONS

Findings from this rapid evidence brief indicate that VT is a promising alternative to IP treatments for a range of mental health conditions, especially PTSD and depression, in terms of patient satisfaction and clinically important outcomes. It is important to note there is a lack of evidence on how the availability of video treatments has affected important access and process issues, including wait times, frequency of use, and provider productivity. Evidence is emerging on the use of VT for diagnosis of mental health conditions, as well as the use of VT for chronic pain treatments.

ACKNOWLEDGMENTS

This topic was developed in response to a nomination by the Veterans Health Administration (VHA) Office of Connected Care/Telehealth for an evidence brief on VT in mental health/primary care. The scope was further developed with input from the topic nominators (*ie*, Operational Partners) and the ESP Coordinating Center.

In designing the study questions and methodology at the outset of this report, the ESP consulted several technical and content experts. Broad expertise and perspectives were sought. Divergent and conflicting opinions are common and perceived as healthy scientific discourse that results in a thoughtful, relevant systematic review. Therefore, in the end, study questions, design, methodologic approaches, and/or conclusions do not necessarily represent the views of individual technical and content experts.

The authors gratefully acknowledge Julia Haskin, MA and Emilie Chen, BA for their editorial support, Katherine Mackey MD MPP, Staff Physician at VA Portland Health Care System and Clinical Investigator for the VA ESP Coordinating Center, for her clinical input, and Sara Maspaitella, Business Operations Manager at Western Telemental Health Network (WTN) for her insights on VA telehealth implementation.

Operational Partners

Operational partners are system-level stakeholders who have requested the report to inform decision-making. They assure VA relevance; help develop and approve final project scope and timeframe for completion; provide feedback on draft report; and provide consultation on strategies for dissemination of the report to field and relevant groups.

Kevin Galpin, MD
Executive Director, Telehealth Services
Office of Connected Care/Telehealth

Leonie Heyworth, MD, MPH
Synchronous Telehealth Lead
Office of Connected Care/Telehealth

Peer Reviewers

The Coordinating Center sought input from external peer reviewers to review the draft report and provide feedback on the objectives, scope, methods used, perception of bias, and omitted evidence. Peer reviewers must disclose any relevant financial or non-financial conflicts of interest. Because of their unique clinical or content expertise, individuals with potential conflicts may be retained. The Coordinating Center and the ESP Center work to balance, manage, or mitigate any potential nonfinancial conflicts of interest identified.

REFERENCES

1. Ogrysko N. VA's telehealth program is already the largest in the nation. It's about to get bigger. *Federal News Network* https://federalnewsnetwork.com/veterans-affairs/2018/12/vas-telehealth-program-is-already-the-largest-in-the-nation-its-about-to-get-bigger/. Accessed January 14, 2019.
2. US Department of Veterans Affairs. About VA Telehealth Services. https://www.telehealth.va.gov/about/index.asp. Accessed January 14, 2019.
3. The Office of the National Coordinator for Health Information Technology. What is telehealth? How is telehealth different from telemedicine? https://www.healthit.gov/faq/what-telehealth-how-telehealth-different-telemedicine. Accessed January 14, 2019.
4. Hempel S, Taylor SL, Solloway MR, et al. Evidence Map of Tai Chi. VA-ESP Project. #ESP 05-226. 2014; https://www.hsrd.research.va.gov/publications/esp/taichi.cfm.
5. Western Telemental Health Network. *WTN | FY 2018 Final Report.* US Department of Veterans Affairs; 2018.
6. Office of Public and Intergovernmental Affairs. VA Announces Telemental Health Clinical Resource Centers During Telemedicine Association Gathering. https://www.va.gov/opa/pressrel/pressrelease.cfm?id=2789. Accessed January 14, 2019.
7. Seal KH, Metzler TJ, Gima KS, Bertenthal D, Maguen S, Marmar CR. Trends and risk factors for mental health diagnoses among Iraq and Afghanistan veterans using Department of Veterans Affairs health care, 2002-2008. *Am J Public Health.* 2009;99(9):1651-1658.
8. Yoon J, Zulman D, Scott JY, Maciejewski ML. Costs associated with multimorbidity among VA patients. *Med Care.* 2014;52 Suppl 3:S31-36.
9. Syed ST, Gerber BS, Sharp LK. Traveling towards disease: transportation barriers to health care access. *Journal of Community Health.* 2013;38(5):976-993.
10. Hoge CW, Auchterlonie JL, Milliken CS. Mental health problems, use of mental health services, and attrition from military service after returning from deployment to Iraq or Afghanistan. *JAMA.* 2006;295(9):1023-1032.
11. Weeks WB, Kazis LE, Shen Y, et al. Differences in health-related quality of life in rural and urban veterans. *Am J Public Health.* 2004;94(10):1762-1767.
12. VHA Telehealth Quarterly. In. *VHA Telehealth Quarterly*. Vol 11. Washington, DC: VHA Office of Telehealth Services; 2012.
13. Western Telemental Health Network. *WTN Background.* US Department of Veterans Affairs.
14. Hopp F, Whitten P, Subramanian U, Woodbridge P, Mackert M, Lowery J. Perspectives from the Veterans Health Administration about opportunities and barriers in telemedicine. *J Telemed Telecare.* 2006;12(8):404-409.
15. US Department of Veterans Affairs. VA Video Connect. https://mobile.va.gov/app/va-video-connect. Accessed January 14, 2019.
16. Totten AM, Womack DM, Eden KB, et al. Telehealth: mapping the evidence for patient outcomes from systematic reviews. 2016.
17. Goldstein KM, Gierisch JM, Alishahi A, et al. Telehealth Services Designed for Women: An Evidence Map. VA ESP Report. #09-010. 2017; https://www.hsrd.research.va.gov/publications/esp/womens-telehealth.cfm.

18. Darkins A. The growth of telehealth services in the Veterans Health Administration between 1994 and 2014: a study in the diffusion of innovation. *Telemed J E Health.* 2014;20(9):761-768.
19. Whiting P, Savović J, Higgins JPT, et al. ROBIS: A new tool to assess risk of bias in systematic reviews was developed. *Journal of Clinical Epidemiology.* 2016;69:225-234.
20. McDonagh MS, Jonas DE, Gartlehner G, et al. Methods for the drug effectiveness review project. *BMC Medical Research Methodology.* 2012;12:140-140.
21. Appendix VI. Criteria for Assessing Internal Validity of Individual Studies. https://www.uspreventiveservicestaskforce.org/Page/Name/appendix-vi-criteria-for-assessing-internal-validity-of-individual-studies. Accessed January 14, 2019.
22. Berkman ND, Lohr KN, Ansari M, et al. *Grading the Strength of a Body of Evidence When Assessing Health Care Interventions for the Effective Health Care Program of the Agency for Healthcare Research and Quality: An Update Methods Guide for Effectiveness and Comparative Effectiveness Reviews.* Rockville, MD; 2013.
23. Bounthavong M, Pruitt LD, Smolenski DJ, Gahm GA, Bansal A, Hansen RN. Economic evaluation of home-based telebehavioural health care compared to in-person treatment delivery for depression. *J Telemed Telecare.* 2018;24(2):84-92.
24. Egede LE, Acierno R, Knapp RG, Walker RJ, Payne EH, Frueh BC. Psychotherapy for depression in older veterans via telemedicine: effect on quality of life, satisfaction, treatment credibility, and service delivery perception. *J Clin Psychiatry.* 2016;77(12):1704-1711.
25. Egede LE, Dismuke CE, Walker RJ, Acierno R, Frueh BC. Cost-effectiveness of behavioral activation for depression in older adult veterans: in-person care versus telehealth. *J Clin Psychiatry.* 2018;79(5):28.
26. Egede LE, Gebregziabher M, Walker RJ, Payne EH, Acierno R, Frueh BC. Trajectory of cost overtime after psychotherapy for depression in older Veterans via telemedicine. *J Affect Disord.* 2017;207:157-162.
27. Frueh BC, Monnier J, Grubaugh AL, Elhai JD, Yim E, Knapp R. Therapist adherence and competence with manualized cognitive-behavioral therapy for PTSD delivered via videoconferencing technology. *Behav Modif.* 2007;31(6):856-866.
28. Frueh BC, Monnier J, Yim E, Grubaugh AL, Hamner MB, Knapp RG. A randomized trial of telepsychiatry for post-traumatic stress disorder. *J Telemed Telecare.* 2007;13(3):142-147.
29. Glassman LH, Mackintosh MA, Talkovsky A, et al. Quality of life following treatment for PTSD: comparison of videoconferencing and in-person modalities. *J Telemed Telecare.* 2017.
30. Greene CJ, Morland LA, Macdonald A, Frueh BC, Grubbs KM, Rosen CS. How does tele-mental health affect group therapy process? Secondary analysis of a noninferiority trial. *J Consult Clin Psychol.* 2010;78(5):746-750.
31. Gros DF, Lancaster CL, Lopez CM, Acierno R. Treatment satisfaction of home-based telehealth versus in-person delivery of prolonged exposure for combat-related PTSD in veterans. *J Telemed Telecare.* 2018;24(1):51-55.
32. Herbert MS, Afari N, Liu L, et al. Telehealth versus in-person acceptance and commitment therapy for chronic pain: a randomized noninferiority trial. *J Pain.* 2017;18(2):200-211.

33. Hernandez-Tejada MA, Zoller JS, Ruggiero KJ, Kazley AS, Acierno R. Early treatment withdrawal from evidence-based psychotherapy for PTSD: telemedicine and in-person parameters. *Int J Psychiatry Med.* 2014;48(1):33-55.
34. Litwack SD, Jackson CE, Chen M, et al. Validation of the use of video teleconferencing technology in the assessment of PTSD. *Psychol Serv.* 2014;11(3):290-294.
35. Luxton DD, Pruitt LD, Wagner A, Smolenski DJ, Jenkins-Guarnieri MA, Gahm G. Home-based telebehavioral health for U.S. military personnel and veterans with depression: A randomized controlled trial. *J Consult Clin Psychol.* 2016;84(11):923-934.
36. Morland LA, Greene CJ, Rosen CS, et al. Telemedicine for anger management therapy in a rural population of combat veterans with posttraumatic stress disorder: a randomized noninferiority trial. *J Clin Psychiatry.* 2010;71(7):855-863.
37. Morland LA, Hynes AK, Mackintosh MA, Resick PA, Chard KM. Group cognitive processing therapy delivered to veterans via telehealth: a pilot cohort. *J Trauma Stress.* 2011;24(4):465-469.
38. Morland LA, Mackintosh MA, Greene CJ, et al. Cognitive processing therapy for posttraumatic stress disorder delivered to rural veterans via telemental health: a randomized noninferiority clinical trial. *J Clin Psychiatry.* 2014;75(5):470-476.
39. Morland LA, Mackintosh MA, Rosen CS, et al. Telemedicine versus in-person delivery of cognitive processing therapy for women with posttraumatic stress disorder: a randomized noninferiority trial. *Depress Anxiety.* 2015;32(11):811-820.
40. Morland LA, Pierce K, Wong MY. Telemedicine and coping skills groups for Pacific Island veterans with post-traumatic stress disorder: a pilot study. *J Telemed Telecare.* 2004;10(5):286-289.
41. Morland LA, Raab M, Mackintosh MA, et al. Telemedicine: a cost-reducing means of delivering psychotherapy to rural combat veterans with PTSD. *Telemed J E Health.* 2013;19(10):754-759.
42. Ruskin PE, Silver-Aylaian M, Kling MA, et al. Treatment outcomes in depression: comparison of remote treatment through telepsychiatry to in-person treatment. *Am J Psychiatry.* 2004;161(8):1471-1476.
43. Shore JH, Brooks E, Savin D, Orton H, Grigsby J, Manson SM. Acceptability of telepsychiatry in American Indians. *Telemed J E Health.* 2008;14(5):461-466.
44. Shore JH, Brooks E, Savin DM, Manson SM, Libby AM. An economic evaluation of telehealth data collection with rural populations. *Psychiatr Serv.* 2007;58(6):830-835.
45. Shore JH, Savin D, Orton H, Beals J, Manson SM. Diagnostic reliability of telepsychiatry in American Indian veterans. *Am J Psychiatry.* 2007;164(1):115-118.
46. Shores MM, Ryan-Dykes P, Williams RM, et al. Identifying undiagnosed dementia in residential care veterans: comparing telemedicine to in-person clinical examination. *Int J Geriatr Psychiatry.* 2004;19(2):101-108.
47. Tuerk PW, Yoder M, Ruggiero KJ, Gros DF, Acierno R. A pilot study of prolonged exposure therapy for posttraumatic stress disorder delivered via telehealth technology. *J Trauma Stress.* 2010;23(1):116-123.
48. Turgoose D, Ashwick R, Murphy D. Systematic review of lessons learned from delivering tele-therapy to veterans with post-traumatic stress disorder. *J Telemed Telecare.* 2018;24(9):575-585.
49. Wierwille JL, Pukay-Martin ND, Chard KM, Klump MC. Effectiveness of PTSD telehealth treatment in a VA clinical sample. *Psychol Serv.* 2016;13(4):373-379.

50. Yuen EK, Gros DF, Price M, et al. Randomized controlled trial of home-based telehealth versus in-person prolonged exposure for combat-related PTSD in veterans: preliminary results. *J Clin Psychol.* 2015;71(6):500-512.
51. Ziemba SJ, Bradley NS, Landry LA, Roth CH, Porter LS, Cuyler RN. Posttraumatic stress disorder treatment for Operation Enduring Freedom/Operation Iraqi Freedom combat veterans through a civilian community-based telemedicine network. *Telemed J E Health.* 2014;20(5):446-450.
52. Egede LE, Acierno R, Knapp RG, et al. Psychotherapy for depression in older veterans via telemedicine: a randomised, open-label, non-inferiority trial. *Lancet Psychiatry.* 2015;2(8):693-701.
53. Department of Veterans Affairs, Department of Defense. VA/DOD Clinical Practice Guideline for the Management of Posttraumatic Stress Disorder and Acute Stress Disorder. 2017; https://www.healthquality.va.gov/guidelines/MH/ptsd/VADoDPTSDCPGFinal.pdf.
54. Chumbler NR, Neugaard B, Kobb R, Ryan P, Qin H, Joo Y. Evaluation of a care coordination/home-telehealth program for veterans with diabetes: health services utilization and health-related quality of life. *Eval Health Prof.* 2005;28(4):464-478.
55. Hopp F, Woodbridge P, Subramanian U, Copeland L, Smith D, Lowery J. Outcomes associated with a home care telehealth intervention. *Telemed J E Health.* 2006;12(3):297-307.