Tele-urgent Care for Low-acuity Conditions: A Systematic Review

April 2022

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

Recommended citation: Boucher, N, Van Voorhees, E, Vashi, A, et al. Tele-urgent Care for Low-acuity Conditions: A Systematic Review. Washington, DC: Evidence Synthesis Program, Health Services Research and Development Service, Office of Research and Development, Department of Veterans Affairs. VA ESP Project #09-010; 2022.

AUTHORS

Author roles, affiliations, and contributions to the present report (using the CRediT taxonomy) are summarized in the table below.

Author	Role and Affiliation	Report Contribution
Nathan Boucher, DrPH, PA, MS, MPA, CPHQ	Research Health Scientist, Durham Center of Innovation to Accelerate Discovery and Practice Transformation, Durham VA Health Care System Durham, NC Associate Research Professor, Sanford School of Public Policy, Duke University Durham, NC	Conceptualization, Investigation, Methodology, Writing – original draft, Writing – review & editing
Elizabeth Van Voorhees, PhD	Psychologist, Durham VA Medical Center Durham, NC Assistant Professor in Psychiatry and Behavioral Sciences, Duke University School of Medicine Durham, NC	Investigation, Methodology, Writing – original draft, Writing – review & editing
Anita Vashi MD, MPH, MHS	Physician Investigator, Center for Innovation to Implementation (Ci2i), VA Palo Alto Health Care System Palo Alto, CA Assistant Professor, Department of Emergency Medicine, University of California San Francisco San Francisco, CA	Conceptualization, Investigation, Methodology, Writing – review & editing
Olivia Dong, PhD, MPH	Fellow, Center for Applied Genomics and Precision Medicine, Duke University School of Medicine Durham, NC Fellow, Durham VA Health Care System Durham, NC	Conceptualization, Investigation, Methodology, Writing – review & editing
Perri Morgan, PA-C, PhD	Professor, Department of Family Medicine and Community Health, Duke University Medical School Durham, NC	Conceptualization, Investigation, Methodology, Writing – review & editing

Author	Role and Affiliation	Report Contribution
Janeen E. Smith, MD	Chief, Tele Urgent Care VISN (Veterans Integrated Service Network) 21 Veterans Health Administration Staff Physician, Emergency Department, San Francisco VA Medical Center San Francisco, CA Associate Clinical Professor, Department of Medicine, University of California San Francisco, CA	Conceptualization, Investigation, Methodology, Writing – review & editing
Soheir Adam, MD	Associate Professor, Department of Medicine Division of Hematology, Duke University Durham, NC	Conceptualization, Investigation, Methodology, Writing – review & editing
Amir Alishahi Tabriz, MD, PhD, MPH	Assistant Member, Department of Health Outcomes and Behavior, Moffitt Cancer Center, Tampa, FL Department of Oncological Sciences, University of South Florida Tampa, FL	Conceptualization, Investigation, Methodology, Writing – review & editing
Michael J. Mulholland, PA	Physician Assistant, Samuel S. Stratton VA Medical Center Albany, NY	Conceptualization, Investigation, Methodology, Writing – review & editing
Jessica R. Dietch, PhD, DBSM	Assistant Professor, Oregon State University School of Psychological Science Corvallis, OR	Conceptualization, Investigation, Methodology, Writing – review & editing
John D. Whited, MD, MHS	Health services researcher, Durham Center of Innovation to Accelerate Discovery and Practice Transformation, Durham VA Health Care System Durham, NC Associate Professor, Department of Medicine, Duke University School of Medicine Durham, NC	Conceptualization, Investigation, Methodology, Writing – review & editing
Joel C. Boggan, MD	Associate Professor of Medicine, Department of Medicine, Durham VA Health Care System Durham, NC	Conceptualization, Investigation, Methodology, Writing – review & editing

Author	Role and Affiliation	Report Contribution
Jessica J. Fulton, PhD	Psychologist, Durham VA Health Care System Durham, NC Assistant Professor in Psychiatry and Behavioral Sciences, Department of Psychiatry and Behavioral Sciences, Duke School of Medicine Durham, NC	Conceptualization, Investigation, Methodology, Writing – review & editing
C. Blake Cameron, MD, MBI	Medical Director for Telehealth and Access Innovation at Duke Health, Private Diagnostic Clinic, Duke University Medical Center Durham, NC	Conceptualization, Investigation, Methodology, Writing – review & editing
Adelaide Gordon, MPH	Project Coordinator, Durham Evidence Synthesis Program (ESP) Durham, NC Research Health Science Specialist, Durham Center of Innovation to Accelerate Discovery and Practice Transformation, Durham VA Health Care System Durham, NC	Conceptualization, Methodology, Investigation, Data curation, Formal analysis, Writing – original draft, Project administration
Karen M. Goldstein, MD, MSPH	Co-director, Durham ESP Durham, NC Core Investigator, Durham Center of Innovation to Accelerate Discovery and Practice Transformation, Durham VA Health Care System Durham, NC General Internist, Durham Veterans Affairs Medical Center Durham, NC Associate Professor, Department of Medicine, Division of General Internal Medicine, Duke University Durham, NC	Conceptualization, Investigation, Methodology, Supervision, Writing – original draft, Writing – review & editing
Belinda Ear, MPH	Research Assistant, Durham ESP Durham, NC Research Health Science Specialist, Durham Center of	Conceptualization, Investigation, Methodology, Visualization, Data curation, Software, Writing – original draft, Project administration

Author	Role and Affiliation	Report Contribution
	Innovation to Accelerate Discovery and Practice Transformation, Durham VA Health Care System Durham, NC	
John W. Williams, MD	Scientific Advisor, Durham ESP Durham, NC Investigator, Durham Center of Innovation to Accelerate Discovery and Practice Transformation, Durham VA Health Care System Durham, NC Staff Physician, Durham VA Medical Center Durham, NC Professor, Department of Medicine, Division of General Internal Medicine, Duke University Durham, NC	Conceptualization, Investigation, Methodology, Writing – review & editing
Sarah Cantrell, MLIS, AHIP	Associate Director for Research & Education, Duke University Medical Center Library & Archives, Duke University School of Medicine Durham, NC	Conceptualization, Methodology, Writing – review & editing
Sarah W. Dickerson, PhD, MS	Adjunct Instructor and Postdoctoral Research Associate, Sanford School of Public Policy, Duke University Durham, NC	Investigation, Writing – review & editing
Jennifer M. Gierisch, PhD, MPH	Co-director, Durham ESP Durham, NC Core Investigator, Durham Center of Innovation to Accelerate Discovery and Practice Transformation, Durham VA Health Care System Durham, NC Associate Professor, Department of Population Health Sciences, Duke University School of Medicine Durham, NC	Conceptualization, Methodology, Investigation, Formal analysis, Visualization, Writing – original draft, Writing – review & editing, Supervision

This report was prepared by the Evidence Synthesis Program Center located at the **Durham VA Health Care System, Durham, NC,** directed by **Jennifer M. Gierisch, PhD, MPH and Karen M. Goldstein, MD, MSPH** and funded by the Department of Veterans Affairs, Veterans Health Administration, Health Services Research and Development.

PREFACE

The VA Evidence Synthesis Program (ESP) was established in 2007 to provide timely and accurate syntheses of targeted health care topics of importance to clinicians, managers, and policymakers as they work to improve the health and health care 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 comprises 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. The Coordinating Center was created to manage program operations, ensure methodological consistency and quality of products, interface with stakeholders, and address urgent evidence needs. To ensure responsiveness to the needs of decision-makers, the program is governed by a Steering Committee composed of health system leadership and researchers. The program solicits nominations for review topics several times a year via the program website.

The present report was developed in response to a request from Department of Emergency Medicine (Specialty Services). The scope was further developed with input from Operational Partners (below), the ESP Coordinating Center, the review team, and the technical expert panel (TEP). The ESP consulted several technical and content experts in designing the research questions and review methodology. In seeking broad expertise and perspectives, divergent and conflicting opinions are common and perceived as healthy scientific discourse that results in a thoughtful, relevant systematic review. Ultimately, however, research questions, design, methodologic approaches, and/or conclusions of the review may not necessarily represent the views of individual technical and content experts.

ACKNOWLEDGMENTS

The authors are grateful to Stacy Lavin, PhD, and Liz Wing, MA, for editorial and citation management support, and the following individuals for their contributions to this project:

Operational Partners

Operational partners are system-level stakeholders who help ensure relevance of the review topic to the VA, contribute to the development of and approve final project scope and timeframe for completion, provide feedback on the draft report, and provide consultation on strategies for dissemination of the report to the field and relevant groups.

Leonie Heyworth, MD MPH
Director of Synchronous Telemedicine, Office of Connected Care
San Diego VA Medical Center

Chad Kessler, MD
National Program Director, Emergency Medicine
Durham VA Health Care System

Joshua Geiger, **MSPsy**
Health System Specialist, Specialty Care Service
Executive Officer for Emergency Medicine
VACO 10P11

Technical Expert Panel

To ensure robust, scientifically relevant work, the TEP guides topic refinement; provides input on key questions and eligibility criteria, advising on substantive issues or possibly overlooked areas of research; assures VA relevance; and provides feedback on work in progress. TEP members are listed below:

Irwin Barr, MD,
Medical Advisor
Montana VA Health Care System

Maria C Bouchard, NP,
Nurse Practitioner
VA Greater Los Angeles Healthcare System

Laurie K. Conti, MPT,
Health System Specialist
Clinical Resource Hub Business Operations Director
VISN 4

Stephanie Deaner, PhD,
Telehealth Program Manager
VISN 12

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 works to balance, manage, or mitigate any potential nonfinancial conflicts of interest identified.

EXECUTIVE SUMMARY

INTRODUCTION

Approximately 1 in 3 emergency department (ED) visits in the United States are nonemergent, potentially leading to unnecessary testing, treatment, and cost. Payers have long struggled to discourage nonemergent ED visits through patient education and higher copayments for ED visits. Delivery systems have built alternatives like same day or after-hours primary care, urgent care centers, retail clinics, and tele-urgent care.

Until recently, care delivered via telephone or videoconferencing platforms (*ie*, virtual care) has largely supplemented traditional in-person urgent and non-urgent care visits. The COVID-19 pandemic, however, has transformed the health care landscape, as virtual care rapidly became the primary option to provide medical care to enforce social distancing, while improving healthcare access and using resources efficiently. Because virtual care, particularly video-based visits, is a relatively new care option, evidence related to quality and outcomes is limited. There are also concerns about the effectiveness of virtual visits and their impact on subsequent health care utilization as a result of unresolved medical concerns.

The Veterans Health Administration (VHA) is the country's largest integrated health system and, as such, has a mandate to care for Veterans across the entire United States and associated territories. Yet Veterans seeking care for urgent medical conditions may still experience barriers to accessing timely care. Effective June 6, 2019, VHA began offering a new urgent care benefit that provides eligible Veterans with greater choice and access to care for the treatment of minor injuries and illnesses in their local communities. A growing subset of these visits has utilized virtual urgent care. VHA is also currently undergoing a modernization of their Clinical Contact Centers, which will ultimately be available to Veterans 24 hours a day, 7 days a week. VHA Clinical Contact Centers will include services like nurse advice, triage, and virtual visits with providers and is intended to serve as an alternative to ED, urgent care centers, or primary care clinics for many low-acuity conditions. VA-wide implementation of Clinical Contact Centers is planned for late 2022 and could have significant implications for Veterans facing temporal and geographic barriers to acute care.

The VA Office of Connected Care requested this review to identify the current evidence base and the effect of tele-urgent care for low-acuity, nonemergent conditions on key outcomes such as health care utilization, patient satisfaction, cost, access, and safety. For this report, we define tele-urgent care as health care delivered remotely (*eg*, telephone, video conferencing) that includes medical services intended to provide on-demand initial treatment of an illness or injury that is considered urgent (but is not primary care for chronic conditions nor emergency-level care) and that is initiated by a patient with a provider.

Key Questions

The key questions (KQs) for this report were:

KQ 1:

A. Among adults, what are the effects of tele-urgent care for low-acuity conditions on key clinical and health system outcomes (*ie*, health care utilization, patient satisfaction, cost, health care access, case resolution, and patient safety)?

B. Do the effects of tele-urgent care for low-acuity conditions differ by (1) provider characteristics (*ie*, specialty, amount of telehealth experience, training) or (2) mode of delivery (*ie*, telephone, video, web, short message service)?

KQ 2:

A. Among adults, what are the adverse effects of tele-urgent care for low-acuity conditions (*ie.*, inappropriate treatment, misdiagnosis, delayed diagnosis, patient deaths, provider burnout)?

B. Do the adverse effects of tele-urgent care for low-acuity conditions differ by (1) provider characteristics (*ie.*, specialty, amount of telehealth experience, training) or (2) mode of delivery (*ie.*, telephone, video, web, short message service)?

METHODS

We developed and followed a standard protocol for this review in collaboration with operational partners and a Technical Expert Panel (PROSPERO registration number CRD42020191454).

Data Sources and Searches

We searched MEDLINE (via Ovid), Embase (via Elsevier), and CINAHL Complete (via EBSCO) from inception to February 13, 2020. We also hand searched previous systematic reviews conducted on this or a related topic for potential studies.

Study Selection

The major eligibility criteria for KQ 1 and KQ 2 were comparative interventional or observational study designs evaluating the effect of remote health care conducted by a prescriber who was not the patient's primary care provider. Investigators and the DistillerSR Artificial Intelligence tool (DistillerSR; Evidence Partners Inc., Manotick, ON, Canada) evaluated titles and abstracts using the prespecified inclusion/exclusion criteria to identify potentially eligible studies. Studies that met all eligibility criteria at full-text review were included for data abstraction.

Data Abstraction and Quality Assessment

Key characteristics abstracted included patient descriptors (*eg*, age, sex, race), intervention characteristics (*eg*, provider type, tele-urgent service modality), comparator, and outcomes, as described previously. Multiple reports from a single study were treated as a single data point, prioritizing results based on the most complete and appropriately analyzed data. Although counted as 1 single study, we cited data from each paper separately. Key features relevant to applicability included the match between the sample and target populations (*eg*, age, Veteran status).

For randomized trials, we used the RoB 2 (Risk of Bias 2) tool. For cross-sectional study designs, we used the NIH risk of bias tool. For other designs, we used the ROBINS-I. These risk of bias (ROB) criteria are: adequacy of randomization and allocation concealment, comparability of groups at baseline, blinding, completeness of follow-up and differential loss to follow-up, whether incomplete data were addressed appropriately, validity of outcome measures, protection against contamination, selective outcomes reporting, and conflict of interest. We assigned a summary ROB score to individual studies based on the guidance for each of the evidence-based ROB tools used in this review.

Data Synthesis and Analysis

We summarized the primary literature using relevant data abstracted from the eligible studies. Summary tables describe the key study characteristics of the primary studies: study design, patient demographics, and details of the intervention. We then determined the feasibility of completing a quantitative synthesis (*ie*, meta-analysis) to estimate summary effects. For meta-analyses, feasibility depends on the volume of relevant literature, conceptual homogeneity of the studies, and completeness of results reporting. We grouped outcomes into similar outcome types (*eg*, outpatient care utilization, emergency department utilization, hospitalization, total cost, index cost), comparison (*eg*, comparison by organizational structure of tele-urgent care, comparison by urgent care site), and study design (*eg*, randomized vs nonrandomized).

Quantitative synthesis was not feasible given study heterogeneity. Thus, we synthesized the data narratively. We gave more weight to the evidence from higher quality studies with more precise estimates of effect. A narrative synthesis focuses on documenting and identifying patterns in efficacy and safety of the interventions across conditions and outcome categories.

The certainty of evidence for each KQ was assessed using the approach described by Grading of Recommendations Assessment, Development, and Evaluation (GRADE). We limited GRADE ratings to outcomes identified by VHA operations stakeholder and TEP as critical to decision-making, which were identified through discussion.

RESULTS

We identified 6,479 citations, of which 221 were reviewed at the full-text stage. Of these, 16 studies were retained for data abstraction. They consisted of 1 randomized controlled trial, 1 cluster-randomized trial, 2 controlled before-after studies, 8 cross-sectional studies, and 4 cohort studies. There were 13 studies that were included for KQ 1 and 3 studies for KQ 2.

Summary of Results for Key Questions

KQ 1A

Thirteen studies evaluated tele-urgent care across 5 outcomes of interest (*ie*, health care utilization, patient satisfaction, cost, health care access, and case resolution). They consisted of 1 RCT, 2 controlled before-and-after studies, 7 cross-sectional studies, and 3 cohort studies. Six studies reported health care utilization, 7 reported patient satisfaction, 4 reported cost, 2 reported health care access, 2 reported case resolution, and none reported on patient safety.

Utilization

Six studies assessed the impact of tele-urgent care on overall health care utilization and subsequent utilization after an urgent care visit. Most had at least moderate ROB. Two cohort studies assessed how introducing tele-urgent care into a health care system impacted overall patterns of care for low-acuity conditions. Results suggest that the introduction of tele-urgent care increased overall health care utilization (*ie*, "new utilization") that may not have been sought and accessed without tele-urgent care options. Four studies assessed subsequent health care utilization (*ie*, outpatient visits, ED, inpatient stays) after initial consultation from tele-urgent care. These studies were designed to address 2 different comparisons: (1) the impact by organization of the virtual care service and (2) the impact by initial site of care (*eg*, tele-urgent care services vs in-person urgent care clinics). Overall, we found no evidence that subsequent outpatient utilization significantly differs whether the tele-urgent care is delivered locally or regionally; nor did it differ with different staffing *(eg*, non-clinical call handler, nurse vs general practitioner) for the triage portion of the tele-urgent care interaction. When comparing the initial site of urgent care on subsequent health care utilization, care initiated virtually consistently demonstrated lower subsequent health care utilization than care initiated in the ED. Yet no clear pattern emerged when urgent care was initially sought virtually compared to other in-person venues (*eg*, urgent care centers, retail health clinics) outside the ED. All utilization outcomes were judged to have low or very low certainty of evidence (COE).

Patient satisfaction

Seven studies reported on patient satisfaction with tele-urgent care. Most studies were rated as good, moderate, or fair ROB. Two studies were rated as some concerns or serious ROB. All 7 were conducted in European medical systems where urgent care delivered after normal clinic hours *(ie*, "out-of-hours") is provided as part of a broad, integrated health system. Differences in patient satisfaction were not consistently observed by modality of urgent care interaction (in-person vs tele-urgent care) or by the relationship of the clinician providing tele-urgent care to the clinic organization (external physicians vs practice-based and/or cooperative physicians). Generally, patients expressed the greatest satisfaction when the care they received matched their expectations for care (*eg*, receiving in-person care when they expected to receive in-person care). Overall COE for this outcome was rated as low or very low.

Cost

Four studies assessed the cost of delivering tele-urgent care; all were conducted in the United States. All but 1 study were rated as moderate to serious ROB. Across included studies, index costs (low COE) and total costs (very low COE) for care associated with tele-urgent visits for low-acuity conditions were lower for tele-urgent visits compared with similar urgent care delivered within in-person settings (*eg*, ED, in-person urgent care centers). Yet 1 study supported that tele-urgent care may increase overall health care spending via increased access to on-demand care for low-acuity conditions. There was variability in how cost was estimated, making it difficult to compare across studies.

Health care access

Limited evidence was identified on the effects of tele-urgent care on access to health care. In 1 study, patient reports of timeliness (*ie*, wait times) did not differ by the relationship of the clinician providing telephone-based care to the clinic organization (*ie*, external physicians vs

local cooperative physicians). In contrast, 1 study reported that patients were more satisfied with the communications they received from their tele-urgent provider when that provider was a local practice-based GP compared to an external physician.

Case resolution

Evidence from 1 study suggested that local, practice-based telephone triage services have higher case resolution outcomes and refer fewer patients to in-person emergency or primary care services compared with regional/national telephone-based urgent care services. An additional study examined calls to a telephone-based urgent care where calls were triaged to the ED by the clinical support software. These same calls were then passed to an additional assessment service staffed by emergency physicians or a non-physician clinical advisor (*ie*, nurses or paramedics with a scope of practice that includes assessment, treatment, advice, and diagnosis). Transfer to the assessment service produced more case resolution on the first contact than calls assessed initially by a non-clinical call handler then moved to a prescribing provider.

KQ 1B

None of the studies that met KQ 1 eligibility criteria provided analysis by provider characteristics (*ie*, specialty, amount of telehealth experience, training), and studies did not provide sufficient information to conduct study-level subgroup analysis. There were insufficient studies to explore the role of tele-urgent care by mode (*ie*, telephone, video) for any outcome. As a result, we were unable to address KQ 1B.

KQ 2A

We found little evidence on the adverse effects prioritized by VHA operations partners (*ie*, inappropriate treatment, misdiagnosis, delayed diagnosis, patient deaths, provider burnout). We identified only 3 studies in total that met our prespecified eligibility criteria, and none addressed misdiagnosis or provider burnout. All included studies had ROB concerns. One moderate ROB retrospective cohort study explored inappropriate treatment outcomes and found similar or better guideline-concordant antibiotic use for acute upper respiratory infections when treatment was delivered via telemedicine compared to in-person primary care or ED visits. For misdiagnosis, 1 fair ROB cross-sectional study reported a small proportion of clinical safety complaints resulting from telephone-based after-hours care, many of which were not validated on structured review by the study authors.

KQ 2B

None of the studies that met KQ 2 eligibility criteria provided analysis by provider characteristics (*ie*, specialty, amount of telehealth experience, training), and studies did not provide sufficient information to conduct study-level subgroup analysis. There were insufficient studies to explore the role of tele-urgent care by mode (*ie*, telephone, video) for any outcome. As a result, we were unable to address KQ 2B.

DISCUSSION

Key Findings and Certainty of Evidence

We identified 13 studies that evaluated tele-urgent care across 5 outcomes of interest. Six studies reported health care utilization, 7 reported patient satisfaction, 4 reported cost, 2 reported health

care access, 2 reported case resolution, and none reported patient safety. None of the studies that met KQ 1 eligibility criteria were able to address KQ 1B. Overall, we found that subsequent outpatient utilization did not significantly differ by organizational level of the virtual care (*ie*, local vs regional systems) or by professional discipline of initial staff conducting the triage portion of the tele-urgent care interaction (*eg*, nonclinical call handler, nurse vs general practitioner). The certainty of evidence for the impact of tele-urgent care on subsequent health care utilization was, at most, rated as low COE. Two studies found that access to tele-urgent care increased use of overall health care utilization (very low COE). Differences in patient satisfaction were not consistently observed by outcomes of tele-urgent care interaction (telephone advice for self-care vs clinic visit vs home visit) or by relationship of treating provider to clinic organization (external physicians vs practice-based and/or cooperative physicians). Overall COE for this outcome was rated as low or very low. Across included studies, index costs (low COE) and total costs (very low COE) for care associated with tele-urgent visits for low-acuity conditions were lower for tele-urgent-type visits compared with similar types of visits for in-person settings (*eg*, ED, in-person urgent care centers). One study supported that tele-urgent care may increase overall health care spending via increased access to on-demand care for low-acuity conditions. Overall, we found limited evidence on the impact of tele-urgent care on other prioritized outcomes (health care access, 2 studies; case resolution, 2 studies; patient safety, no studies).

We identified only 3 studies in total that met our prespecified eligibility criteria for KQ 2, which was focused on adverse effects of tele-urgent care (*ie.*, inappropriate treatment, misdiagnosis, delayed diagnosis, patient deaths, provider burnout). One moderate ROB retrospective cohort study found similar or better guideline-concordant antibiotic use for acute upper respiratory infections when treatment was delivered via direct-to-consumer telemedicine compared to in-person primary care or ED visits. One fair ROB cross-sectional study reported a small proportion of clinical safety complaints resulting from telephone-based after-hours care, many of which were not validated on objective review. No studies addressed provider burnout or misdiagnosis. None of the included studies addressed KQ 2B (*ie*, adverse effects by provider characteristics).

Applicability

None of the included studies were conducted in the VHA or specifically with Veterans. However, we limited eligibility to studies conducted in OECD countries, which improves applicability to the VHA. As stated above, many of the included studies were conducted in the United Kingdom, which improves the applicably to the VHA system. All included studies that evaluated cost were conducted in the US. The findings presented here likely have applicability to any large health care system, such as the VHA, seeking to implement tele-urgent care systems.

Future Research

Future research should address optimal modality of tele-urgent care (*eg*, telephone vs video), evaluate the impact of provider training and experience on clinical outcomes, and report whether tele-urgent care providers have access to electronic medical records during the delivery of care. Potential future comparative studies should focus on head-to-head comparisons of tele-urgent care modalities (*ie*, telephone vs video) and provider characteristics (physician providers vs non-physician providers). Future research should report on the outcomes prioritized for this review, specifically health care access, case resolution, patient safety, and adverse effects (including

provider burnout). Ideal settings for future research include the USA, the VHA, or similar large health care systems.

Conclusions

The promise of tele-urgent care is to improve access to timely health care for low-acuity conditions. Yet there are many unanswered questions about the effects of tele-urgent care on key clinical and health systems outcomes. The evidence is unclear whether tele-urgent care is best positioned as a substitute for, or complement to, other acute care modalities and settings. Some limited evidence supports that the introduction of tele-urgent care increases system-level health care utilization via enhanced access to a convenient source of on-demand care. These findings suggests that tele-urgent care may be more likely to increase access through use of additional resources rather than redirection of existing patient care utilization. We identified no studies on provider burnout or patient safety—outcomes worthy of careful consideration and study if tele-urgent care is to be readily adopted by providers, patients, and health systems. Of note, across all key outcomes, the identified literature was sparse and of variable quality. Further examination is needed to assess whether and how tele-urgent care can be used to attain the quadruple aim of improving the patient care experience, improving the health of a population, reducing per capita health care costs, and improving the work life of health care clinical staff.

ABBREVIATIONS TABLE

Abbreviation	Definition
AE	Adverse event
AI	Artificial intelligence
CAS	Computerized clinical assessment system
CDSS	Clinical decision support software/system
CeCC	CareEnhance Call Centre software
CI	Confidence interval
CINAHL	Cumulative Index to Nursing and Allied Health Literature
COE	Certainty of evidence
ED	Emergency department
EPOC	Effective Practice and Organization of Care
ESP	Evidence Synthesis Program
GP	General practitioner
HSR&D	Health Services Research & Development
KQ	Key Question
LPN	Licensed practical nurse
LV	Licensed vocational nurse
MD	Mean difference
MeSH	Medical Subject Heading
MMAT	Mixed Methods Appraisal Tool
NHS	National Health Service
NR	Not reported
OECD	Organization for Economic Cooperation and Development

Abbreviation	Definition
PACT	Patient-aligned care team
PCP	Primary care physician
PEI	Patient Enablement Instrument
PICOTS	Population, intervention, comparator, outcome, timing, and setting
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta Analyses
QUERI	Quality Enhancement Research Initiative
SMD	Standardized mean difference
SMS	Short message service
RCT	Randomized controlled trial
ROB	Risk of bias
RR	Relative risk
TEP	Technical Expert Panel
VA	Veterans Affairs
VHA	Veterans Health Administration