VA versus Non-VA Quality of Care: A Living Systematic Review

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AUTHORS

Author roles, affiliations, and contributions (using the CRediT taxonomy) are listed below.

Author	Role and Affiliation	Report Contribution
Paul Shekelle, MD, PhD, MPH*	Co-Director, VA Greater Los Angeles Evidence Synthesis Program (ESP) Center Los Angeles, CA	Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing
Isomi Miake-Lye, PhD, MPH*	Co-Director, VA Greater Los Angeles Evidence Synthesis Program (ESP) Center Los Angeles, CA	Conceptualization, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing – original draft, Writing – review & editing
Meron Begashaw, MPH*	Project Coordinator, VA Greater Los Angeles ESP Center Los Angeles, CA	Data curation, Project administration, Software, Validation, Visualization, Writing – original draft, Writing – review & editing
Melinda Maggard-Gibbons, MD	Staff Surgeon, VA Greater Los Angeles Assistant Professor, Surgery UCLA School of Medicine Los Angeles, CA	Conceptualization, Formal analysis, Investigation, Methodology, Supervision, Validation, Writing – original draft, Writing – review & editing
Mariah Blegen, MD	Research Fellow, VA Greater Los Angeles Fellow, National Clinician Scholars Program, UCLA Los Angeles, CA	Conceptualization, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing – original draft, Writing – review & editing
Eric Apaydin, PhD, MPP, MS	Core Investigator, Center for the Study of Healthcare Innovation, Implementation and Policy, VA Greater Los Angeles Los Angeles, CA	Conceptualization, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing – original draft, Writing – review & editing
Neil Paige, MD, MSHS	Staff Physician, VA Greater Los Angeles Los Angeles, CA	Conceptualization, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing – original draft, Writing – review & editing
Jamie Ko, MPH	Research Associate on Surgical Team, VA Greater Los Angeles ESP Center Resident in Department of Surgery, David Geffen School of Medicine at UCLA Los Angeles, CA	Conceptualization, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing – original draft, Writing – review & editing
Jesus Ulloa, MD, MBA, MSHPM	Staff Physician, Vascular Surgery, VA Greater Los Angeles Assistant Clinical Professor, Health Sciences, David Geffen School of Medicine, UCLA Los Angeles, CA	Conceptualization, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing – original draft, Writing – review & editing

Author	Role and Affiliation	Report Contribution
Garrett Salzman, MD, MS	Resident in Department of Surgery, David Geffen School of Medicine at UCLA Los Angeles, CA	Conceptualization, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing – original draft, Writing – review & editing
Mark D. Girgis, MD	Staff Surgeon, VA Greater Los Angeles Assistant Professor of Surgery, UCLA Los Angeles, CA	Conceptualization, Investigation, Methodology, Supervision, Validation
Emily Lawson, MSLIS, AHIP*	Research and Consulting Librarian, RAND Corporation Santa Monica, CA	Data curation

Notes. *Authors who contributed to the current October 2024 update.

PREFACE

The VA Evidence Synthesis Program (ESP) was established in 2007 to conduct timely, rigorous, and independent systematic reviews to support VA clinicians, program leadership, and policymakers improve the health of Veterans. ESP reviews have been used to develop evidence-informed clinical policies, practice guidelines, and performance measures; to guide implementation of programs and services that improve Veterans' health and wellbeing; and to set the direction of research to close important evidence gaps. Four ESP Centers are located across the US. Centers are led by recognized experts in evidence synthesis, often with roles as practicing VA clinicians. The Coordinating Center, located in Portland, Oregon, manages program operations, ensures methodological consistency and quality of products, engages with stakeholders, and addresses urgent evidence synthesis needs.

Nominations of review topics are solicited several times each year and submitted via the ESP website. Topics are selected based on the availability of relevant evidence and the likelihood that a review on the topic would be feasible and have broad utility across the VA system. If selected, topics are refined with input from Operational Partners (below), ESP staff, and additional subject matter experts. Draft ESP reviews undergo external peer review to ensure they are methodologically sound, unbiased, and include all important evidence on the topic. Peer reviewers must disclose any relevant financial or non-financial conflicts of interest. In seeking broad expertise and perspectives during review development, conflicting viewpoints are common and often result in productive scientific discourse that improves the relevance and rigor of the review. The ESP works to balance divergent views and to manage or mitigate potential conflicts of interest.

ACKNOWLEDGMENTS

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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.

Amy Kilbourne, PhD, MPH
Director of VA Health Systems Research
Veterans Health Administration (VHA)

Gerard Cox, MD, MHA
Assistant Under Secretary for Health for Quality and Patient Safety
VHA

Kristin Cunningham, PMP
Executive Officer to the Deputy Under Secretary for Health for Community Care
VHA

Julianne Flynn, MD
Acting Deputy to the Assistant Under Secretary for Health for Office of Community Care Performing the Delegable Duties to the Assistant Under Secretary for Health Office of Community Care
VHA
Chief of Staff
VA South Texas Health Care

Main Report

Evidence Synthesis Program

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ABBREVIATIONS TABLE

Abbreviation	Definition
AHRQ	Agency for Healthcare Research and Quality
AMI	Acute myocardial infarction
BEST	Beta-blocker Evaluation of Survival Trial
CABG	Coronary artery bypass graft
CAUTI	Catheter-associated urinary tract infection
CC	Community care
CDW	Corporate Data Warehouse
CKD	Chronic kidney disease
CLC	Community living center
CMS	Centers for Medicare & Medicaid Services
CNH	Community nursing home
COPD	Chronic obstructive pulmonary disease
CVD	Cardiovascular disease
ED	Emergency department
EOL	End of life
ER	Emergency room
ESRD	End-stage renal disease
FY	Fiscal year
HCAHPS	Hospital Consumer Assessment of Healthcare Providers and Systems
HF	Heart failure
MISSION	Maintaining Internal Systems and Strengthening Integrated Outside Networks
NCDB	National Cancer Database
NH	Nursing home
NSCLC	Non-small cell lung cancer
NSQIP	National Surgical Quality Improvement Program
PCI	Percutaneous coronary intervention
PCP	Primary care provider
PE	Pulmonary embolism
SEER	Surveillance, Epidemiology and End Results
SHEP	Survey of Healthcare Experience of Patients
THA	Total hip arthroplasty
TKA	Total knee arthroplasty
VA	United States Department of Veterans Affairs
VASQIP	Veterans Affairs Surgical Quality Improvement Program
VCP	Veterans Choice Program
VISN	Veterans Integrated Service Network
VTE	Venous thromboembolism

BACKGROUND

The Department of Veterans Affairs (VA) is the nation's largest integrated health care system, providing care for millions of US military Veterans. Providing high quality care is a commitment VA makes to Veterans. Comparisons of VA-delivered care to care delivered in non-VA settings are central to assessing the quality of VA care. Prior reviews comparing outcomes between VA and non-VA care included data through 2014, and found that VA care performed similarly to or better than non-VA care in most, but not all, aspects of quality.[7-9]

Since that time, concerns about access to care led to the Veteran Access, Choice, and Accountability ("Choice") Act of 2014, which allowed Veterans to seek medical care in the community if the VA was unable to schedule a visit within 30 days or if the Veteran lived greater than 40 miles from their closest VA. This program also required independent performance assessments of VA's health care services related to access and available expertise.[10] Choice Act funding ended in 2017 and was followed by the VA Maintaining Internal Systems and Strengthening Integrated Outside Networks (MISSION) Act of 2018 that further addressed concerns regarding Veteran access to care by expanding eligibility for VA-reimbursed community care (CC) options.[11]

These acts greatly expanded the potential for care delivered to Veterans and paid for by VA to be from community providers, raising additional questions about comparisons of quality of care. To address these gaps, the VA Office of the Assistant Under Secretary for Health for Quality and Patient Safety requested a systematic review of evidence comparing quality and safety, access, patient experience, and cost between VA and non-VA care settings.

METHODS

REGISTRATION AND REVIEW

A preregistered protocol for this review can be found on the PROSPERO international prospective register of systematic reviews (CRD42022314154). A draft of the original version of this report was reviewed by external peer reviewers; their comments and author responses are located in the Appendix.

KEY QUESTIONS AND ELIGIBILITY CRITERIA

The aim of this review was to compare and contrast studies published from 2015 to the present that assess VA and non-VA quality of care for non-surgical and surgical conditions. Eligible studies were required to assess outcomes in any Institute of Medicine health care domain (clinical quality, safety, efficiency, access, patient experience, or equity[12]) among Veterans receiving care in VA, and to compare outcomes in this population to those of 1) Veterans receiving care in the community (either VA-paid or not VA-paid) or 2) members of the general population receiving care in the community. Health care costs and length of stay were considered efficiency outcomes for the purposes of this review. Studies were permitted to use any research design but must have been conducted in the United States (*ie*, compared VA care to another US health care provider/setting).

SEARCHING AND SCREENING

To identify relevant articles, a research librarian conducted broad searches using terms relating to *Veterans health* and *community health services* or *private sector* in the PubMed, APA PsycINFO, and Web of Science databases (1/1/2015–11/14/2024). Compete search strategies are provided in the Appendix. The start date was chosen to match the end date of the most recent review by O'Hanlon.[8] 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.

Two sets of team members (1 team specializing in surgical titles and the other specializing in non-surgical titles) working independently screened the titles of retrieved citations for relevance. For titles deemed relevant by at least 1 person, abstracts were then screened independently in duplicate by team members. All disagreements were reconciled through group discussion. Full-text review was conducted in duplicate by independent team members with any disagreements resolved through discussion.

DATA ABSTRACTION AND RISK OF BIAS ASSESSMENT

At the abstract stage, information on the medical or surgical condition, type of outcome reported, populations under comparison, and years of data were collected. Articles meeting inclusion criteria underwent a second screening and additional information was abstracted: whether study years were contemporaneous, sampling approach, geographic representativeness, similarity of outcomes between the comparison groups, sample size, years of data collected, control variables, outcomes, findings, and statistical methods. All data abstraction and internal validity ratings were first completed by 1 reviewer and then checked by another; disagreements were resolved by consensus or discussion with an additional reviewer.

The risk of bias for studies eligible for this review centers around the representativeness of the samples being assessed and whether the measures of performance are valid and applied equally across both groups. For this review we adapted the 6 items originally used in the 2010 review to the following:

1) Whether the time frames for the measurement are contemporaneous for both groups;
2) Whether the samples are national or representative for both groups;
3) Whether the quality measures used to assess care in both groups are identical or nearly identical;
4) Whether the analysis had enough sample size and appropriate statistical methods to test the hypothesis.

Studies could fully meet a criterion, partially meet a criterion, or fail a criterion. Studies fully meeting all of these criteria were considered to be "good" quality and given greater weight than studies not meeting all of the criteria, which were considered to be "fair" quality. Studies failing 1 or more criteria were not included in the analysis. See Appendix for complete risk of bias ratings.

SYNTHESIS

We narratively synthesized available evidence because studies differed too substantially in comparison groups, outcome domains, and/or procedure types or health conditions to allow for meta-analysis. Studies were first classified by the domain(s) of reported outcomes (quality and safety, access, patient experience, efficiency/cost, and equity). Within domains, studies were grouped by surgical discipline or by clinical condition (cardiovascular, mental health, *etc*). If multiple cost outcomes were reported, total cost was abstracted. Studies were grouped into 2 categories based on their quality assessment: those that had no obvious flaws limiting their internal validity (risk of bias) or external validity (generalizability), and those that had some flaws limiting internal or external validity. Studies with serious internal validity flaws were not included in the synthesis (see Appendix).

RESULTS

LITERATURE FLOW DIAGRAMS

The literature flow diagram summarizes the results of the study selection process. A full list of excluded studies is provided in the Appendix. As the surgical literature was considered separate from the non-surgical literature, we have 2 flowcharts.

Figure 1A: Literature Flowchart for Non-Surgical Care

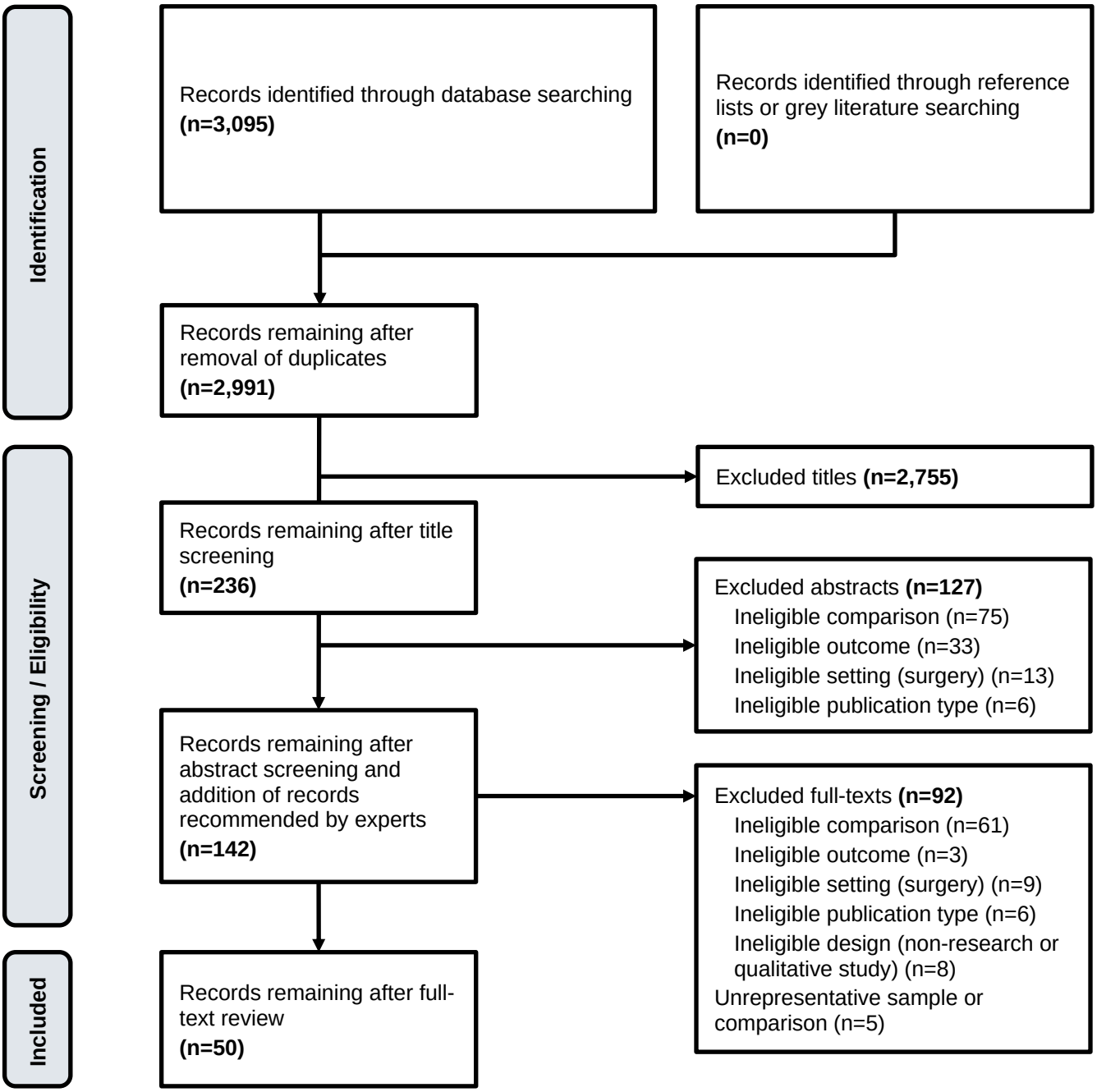
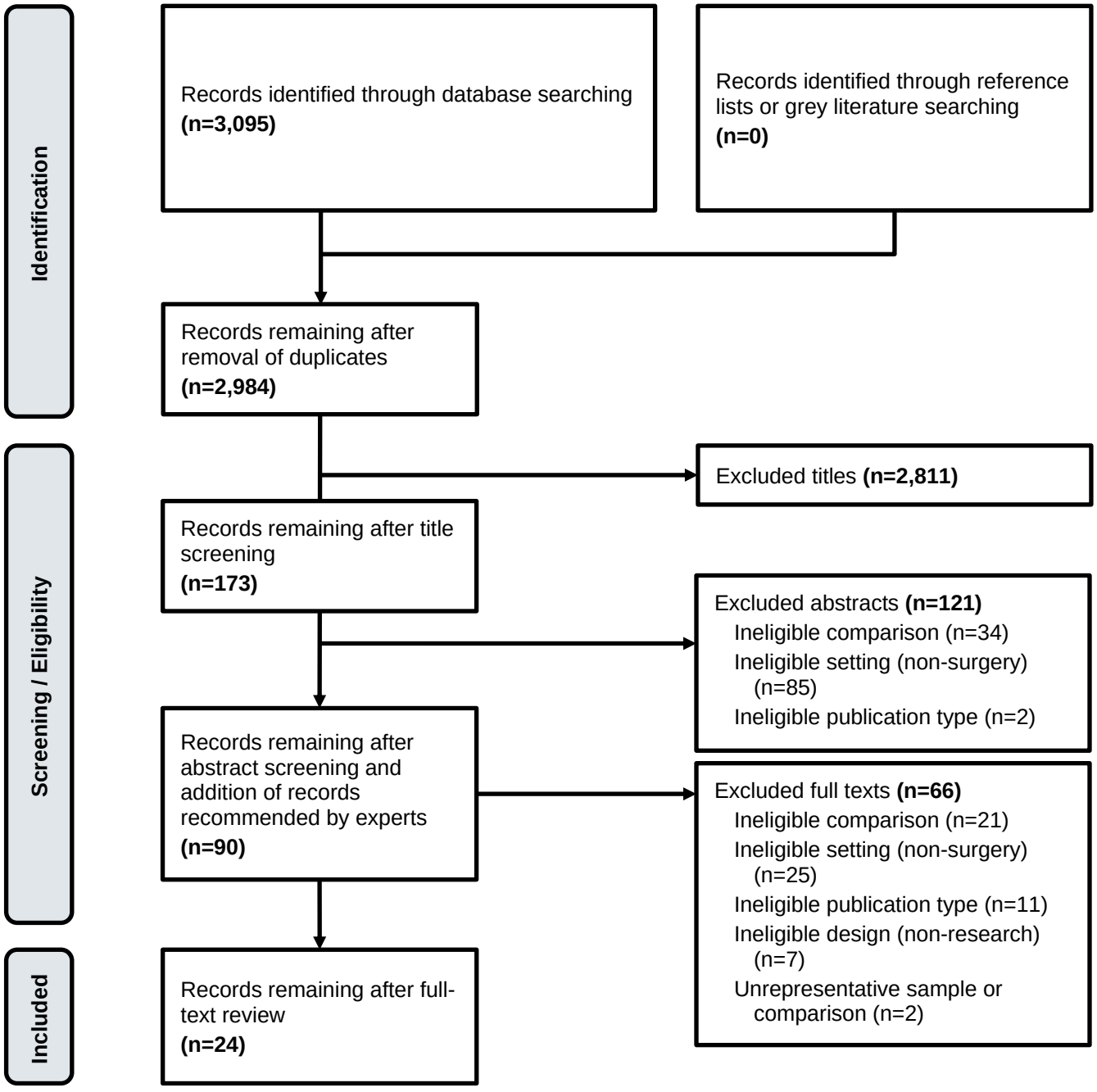


Figure 1B: Literature Flowchart for Surgical Care



OVERVIEW OF INCLUDED STUDIES

The non-surgical literature search identified 2,991 potentially relevant citations after deduplication, 236 of which were included at the abstract screening level. From these, a total of 127 abstracts were excluded for the following reasons: ineligible comparison (*N* = 75), ineligible outcome (*N* = 33), ineligible setting (surgery) (*N* = 13), and ineligible publication type (*N* = 6). With an additional 33 recommended by operational partners, this left 142 publications for full-text review, of which 92 publications were excluded for the following reasons: ineligible comparison (*N* = 61), ineligible outcome (*N* = 3), ineligible setting (surgery) (*N* = 9), ineligible publication type (*N* = 6), ineligible design (non-research or qualitative study) (*N* = 8), and unrepresentative sample or comparison (*N* = 5). A total of 50 publications were identified at full-text review as meeting initial inclusion criteria.

The surgical literature search identified 2,984 potentially relevant citations after deduplication, 173 of which were included at the abstract screening level. From these, a total of 121 abstracts were excluded for the following reasons: ineligible comparison (*N* = 34), ineligible setting (non-surgery) (*N* = 85), and ineligible publication type (*N* = 2). With an additional 38 recommended by operational partners, this left 90 publications for full-text review, of which 66 publications were excluded for the following reasons: ineligible comparison (*N* = 21), ineligible setting (non-surgery) (*N* = 25), ineligible publication type (*N* = 11), ineligible design (non-research) (*N* = 7), and unrepresentative sample or comparison (*N* = 2). A total of 24 publications were identified at full-text review as meeting initial inclusion criteria.

Characteristics of included studies are summarized in the Appendix.

QUALITY OF NON-SURGICAL CARE

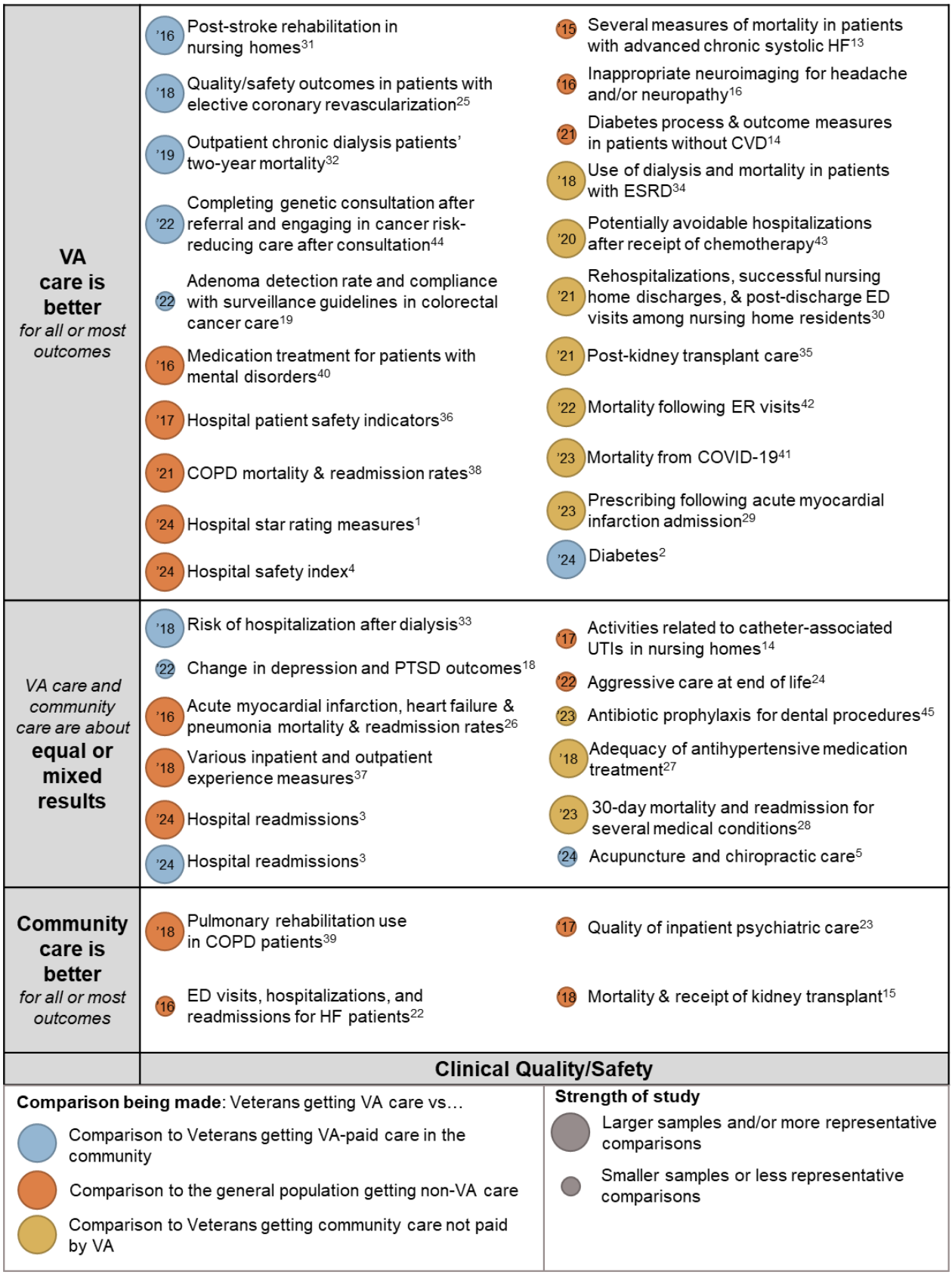
After dual review of identified publications, 50 publications met inclusion criteria (see Figure 1A). Key findings from each study were organized into 5 quality domains and are presented in the following order: (1) quality and safety, (2) access, (3) patient experience, (4) cost and efficiency, and (5) equity. Most studies reported outcomes in only 1 quality domain; studies that reported findings in multiple domains will appear in multiple sections below. Within domain, studies are organized by their clinical condition.

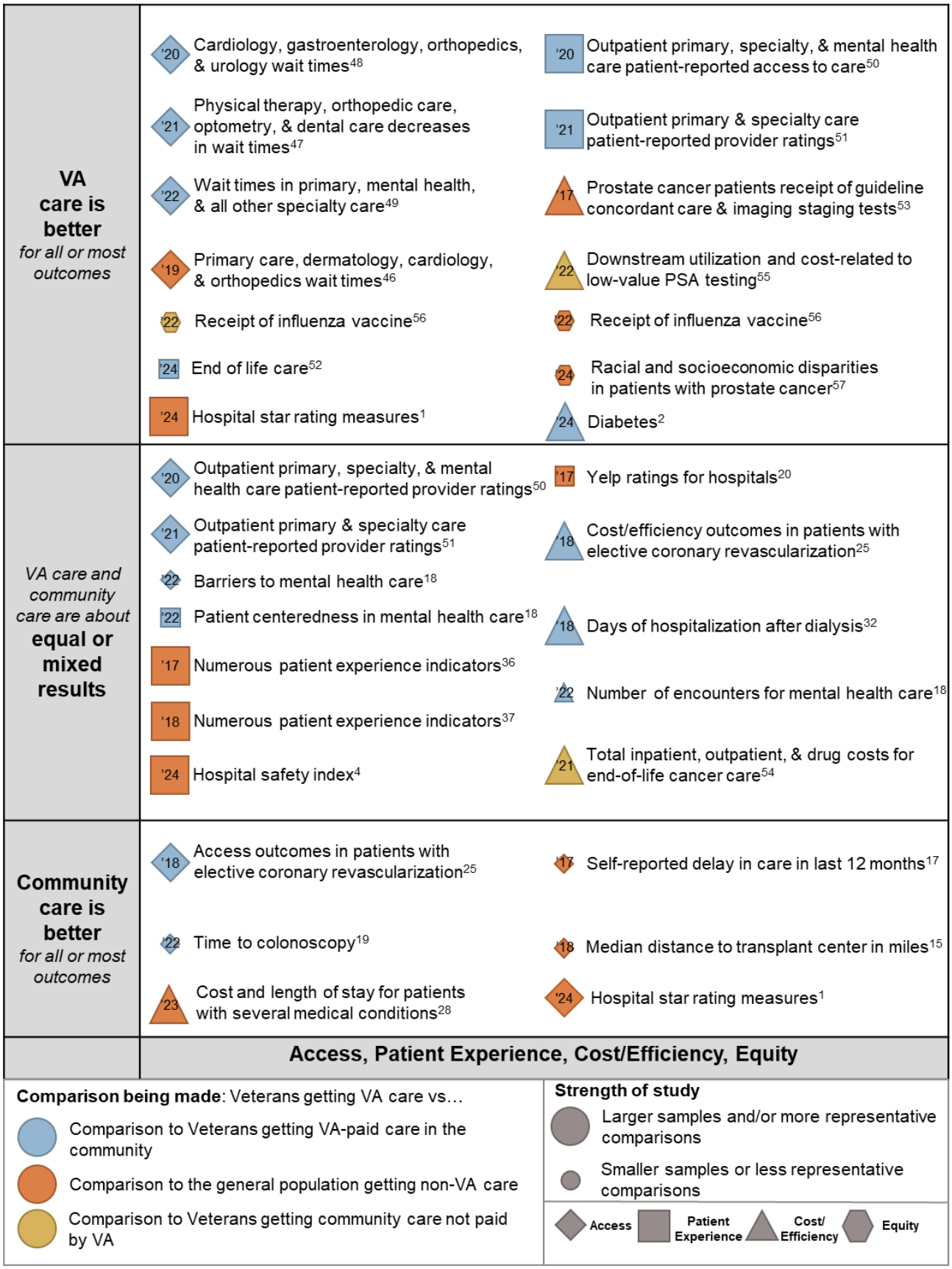
Risk of Bias/Quality

Thirty two of the included studies met all our risk of bias criteria. These studies were given more weight in our narrative synthesis than studies that did not meet 1 or more criteria. Of the studies not meeting all our criteria, 2 of these studies analyzed preexisting samples from clinical trials.[13,14] Three studies had very unbalanced samples; either VA or non-VA groups were much smaller than the others.[15-17] Three studies had balanced but small samples, and one of these only analyzed data from 1 site and did not adjust for patient characteristics in their models, while another study relied on patient self-report via survey for clinical outcomes.[5,18,19] Heidenreich and colleagues only analyzed the Yelp ratings of 39 VA hospitals (out of a possible 131) and their university affiliates due to the lack of reviews of the remaining facilities.[20] Mody et al only had data on VA and non-VA nursing homes from approximately half of all states.[21] Another study only analyzed VA and non-VA facilities in the state of South Carolina.[22] Shields and colleagues were not able to adjust for patient characteristics in their analysis of quality of inpatient psychiatric care, so different patient populations between VA and non-VA facilities may have biased their results.[23] Presley and colleagues also did not adjust for patient characteristics in their analysis of aggressive end-of-life care for non-small cell lung cancer, and the composition of their multi-component outcome was unclear.[24] We included all of these studies but gave them less weight when reaching our conclusions. Complete risk of bias ratings are provided in the Appendix.

Our overall results for nonsurgical care are presented in the bubble plot/evidence map in Figure 2. Studies are listed by domains of care of the outcomes they report by shape: circles for clinical quality/safety, diamonds for access, squares for patient experience, triangles for cost/efficiency, and octagon for equity. Studies are also listed on the vertical axis by their qualitative results (VA care is better than community care, VA care and community care are about equal or results are mixed, and community care is better than VA care), and then each study is entered as a shape, with larger shapes being studies of better quality and representativeness than studies depicted by smaller shapes. The color of the shape indicates the type of comparison: blue for studies comparing Veterans getting care from VA to Veterans getting VA-paid care in the community; orange for studies comparing Veterans getting care from VA and non-Veterans, or a general population, getting care in the community; and yellow for studies comparing Veterans getting care from VA to Veterans getting community care not paid by VA. Next to each shape is a brief thumbnail of what the study was about, and inside the shape is the year of publication (’18 = 2018, ’19 = 2019, *etc*).

Figure 2. Evidence Map of Studies on the Quality of Non-Surgical Care




VA care is better for all or most outcomes
'20 Cardiology, gastroenterology, orthopedics, & urology wait times[48]
'21 Physical therapy, orthopedic care, optometry, & dental care decreases in wait times[47]
'22 Wait times in primary, mental health, & all other specialty care[49]
'19 Primary care, dermatology, cardiology, & orthopedics wait times[46]
'22 Receipt of influenza vaccine[56]
'24 End of life care[52]
'24 Hospital star rating measures[1]
'20 Outpatient primary, specialty, & mental health care patient-reported access to care[50]
'21 Outpatient primary & specialty care patient-reported provider ratings[51]
'17 Prostate cancer patients receipt of guideline concordant care & imaging staging tests[53]
'22 Downstream utilization and cost-related to low-value PSA testing[55]
'22 Receipt of influenza vaccine[56]
'24 Racial and socioeconomic disparities in patients with prostate cancer[57]
'24 Diabetes[2]
VA care and community care are about equal or mixed results
'20 Outpatient primary, specialty, & mental health care patient-reported provider ratings[50]
'21 Outpatient primary & specialty care patient-reported provider ratings[51]
'22 Barriers to mental health care[18]
'22 Patient centeredness in mental health care[18]
'17 Numerous patient experience indicators[36]
'18 Numerous patient experience indicators[37]
'24 Hospital safety index[4]
'17 Yelp ratings for hospitals[20]
'18 Cost/efficiency outcomes in patients with elective coronary revascularization[25]
'18 Days of hospitalization after dialysis[32]
'22 Number of encounters for mental health care[18]
'21 Total inpatient, outpatient, & drug costs for end-of-life cancer care[54]
Community care is better for all or most outcomes
'18 Access outcomes in patients with elective coronary revascularization[25]
'22 Time to colonoscopy[19]
'23 Cost and length of stay for patients with several medical conditions[28]
'17 Self-reported delay in care in last 12 months[17]
'18 Median distance to transplant center in miles[15]
'24 Hospital star rating measures[1]
Access, Patient Experience, Cost/Efficiency, Equity
Comparison being made: Veterans getting VA care vs…
Comparison to Veterans getting VA-paid care in the community
Comparison to the general population getting non-VA care
Comparison to Veterans getting community care not paid by VA
Strength of study
Larger samples and/or more representative comparisons
Smaller samples or less representative comparisons
Access
Patient Experience
Cost/ Efficiency
Equity

Quality and Safety

Cardiovascular Disease Outcomes

We identified 7 studies that compared cardiovascular outcomes. The first study[25] compared the quality of cardiovascular revascularization procedures between VA and VA-paid community care (CC) hospitals between 2008–2011. Adjusted 30-day mortality after percutaneous coronary intervention (PCI) was lower in VA (0.65%) compared to community care (1.54%, $p < 0.001$). There was no difference in 30-day adjusted readmission rates.

In the second study,[26] the authors compared patient outcomes between 2010–2013 for admissions to VA hospitals versus non-VA hospitals for acute myocardial infarction (AMI), heart failure (HF), and pneumonia. In a national sample, 30-day risk adjusted mortality was lower in VA for Veterans with AMI (13.5%) compared to patients in the community (13.7%, $p < 0.02$). This was also true for HF outcomes (11.4% vs 11.9%, $p = 0.008$). Mortality rates were higher in the VA for pneumonia (12.6% vs 12.2%, $p = 0.045$). VA had slightly higher readmission rates for all 3 conditions. When VA hospitals were compared to community hospitals in their same metropolitan statistical area, VA hospitals had again lower 30-day mortality rates for AMI and HF; mortality rates for pneumonia were not significantly different. Overall, the differences between the VA hospitals and non-VA hospitals were small.

In the third study,[27] the authors examined a national cohort of Veterans with dementia to determine the effect of dual use of VA and Medicare on their supply of antihypertensive medication. When compared to dual users, VA-only users had lower adjusted odds ratios for undersupply, oversupply, and oversupply and undersupply for at least 1 class. When compared to VA-only patients, Medicare-only patients had a higher adjusted odds ratio for undersupply (1.13, 95% CI [1.03, 1.25]), but lower adjusted odds ratio for oversupply (0.39, 95% CI [0.32, 0.47]) or oversupply and undersupply of 1 class (0.48, 95% CI [0.40, 0.57]).

In the fourth study,[13] the authors from the Insights from the Beta-blocker Evaluation of Survival Trial (BEST) evaluated outcomes of patients with heart failure and reduced ejection fraction receiving care at VA versus non-VA hospitals. The BEST trial took place from 1995–1999. The authors concluded that patients with heart failure and reduced ejection fraction receiving care in the VA were older and sicker, yet their risk of mortality and hospitalization was similar to the younger and healthier patients receiving care at non-VA hospitals.

In the fifth study,[22] the authors examined the use of dual systems of care from 2007–2011 on rates of hospitalization and readmission in Veterans with HF. They found that dual use was associated with higher rates of emergency department (ED) visits, hospitalizations, and 30-day readmissions for patients with HF diagnosis at admission when compared to VA-only users and non-VA-only users. This persisted for patients with HF admitted for any diagnosis. When compared to VA-only users, non-VA-only patients had lower rates of ED visits (0.62, 95% CI [0.60, 0.64]), hospitalizations (0.98, 95% CI [0.95, 1.02]), and 30-day hospital readmissions (0.87, 95% CI [0.83, 0.90]). While this study was able to adjust for the presence or absence of more than a dozen comorbidities and service-connected status, it was not able to adjust for severity of heart failure.

In the sixth study, Yoon and colleagues used data from VA and from 11 states with all-payer discharge data about non-VA care to compare mortality following Veterans being hospitalized for acute myocardial infarction, CABG (discussed in surgery, below), gastrointestinal hemorrhage, heart failure,

pneumonia, and stroke at VA or non-VA hospitals.[28] In models adjusted for numerous clinical factors, Veteran patients treated in VA hospitals had lower 30-day mortality for stroke and for heart failure, although the latter was only seen in patients 65 years of age and over. There were no statistically significant differences in mortality outcomes for patients discharged for the other conditions.

The last study compared "medication safety events" after acute myocardial infarction among Veterans treated at VA or non-VA hospitals.[29] Medication safety events were defined as "omissions in outpatient medications with compelling indications for secondary prevention after myocardial infarction" and included drugs like statins and beta-blockers. Using merged VA and Medicare data, the authors identified 118,456 Veterans hospitalized for acute myocardial infarction between 2013-2018 who survived to discharge. About 14% of patients received care from VA hospitals. The adjusted odds of omissions in any drug class were 3 times higher among patients treated at non-VA hospitals as compare with patients treated at VA hospitals (example: beta-blocker omission in 47.4% of non-VHA hospital admissions, versus 23.7% of VHA hospital admissions).

Nursing Home Care Outcomes

We identified three studies that compared a national sample of quality and safety outcomes in VA Community Living Centers (CLC) versus nursing homes (NH) in the private sector from 2015–2016. In the first study,[30] the authors compared risk-adjusted claims-based measures including unplanned rehospitalization and emergency department visits within 30 days of admission and successful discharge within 100 days of nursing home admission. Risk-adjusted emergency department visits and successful discharges were statistically significantly better in VA than the private sector (8.27 vs 11.85, $p < 0.001$), and (67.74 vs 57.04, $p < 0.001$). Adjusted rehospitalizations were slightly worse in the VA versus the private sector (22.5% vs 21.1%, $p < 0.001$). When aggregated, the authors noted that combined rehospitalization rates and emergency room visits were lower in the VA CLC group (30.8%) compared to the community (33.0%).

In the second study,[31] the authors compared post-stroke rehabilitation therapy and restorative nursing among Veterans residing in VA Community Living Centers (CLC) versus those Veterans in VA-paid community nursing homes from 2006–2009. In a national sample, Veterans at CLCs were significantly more likely to receive rehabilitation therapy and restorative nursing care. This study adjusted for sociodemographic characteristics, baseline depression, activities of daily living, cognition, and comorbidities. In the third study,[21] the authors compared programs to prevent catheter-associated urinary tract infection (CAUTI) in VA versus non-VA nursing homes. In a national representative sample of nursing homes participating in an AHRQ-funded safety program, the VA reported more hours/week devoted to infection prevention-related activities (31 vs 12 hours, $p < 0.001$), and a higher percentage of tracking CAUTI rates (94% vs 66%, $p = 0.014$). In contrast, fewer VA nursing homes reported having polices for appropriate catheter use (64% vs 81%, $p = 0.04$) and catheter insertion (83% vs 94%, $p = 0.004$).

Dialysis and End-Stage Renal Disease Outcomes

We identified 5 studies that compared mortality outcomes for Veterans receiving care for end-stage renal disease (ESRD) or for dialysis through the VA versus outside the VA. In the first study,[32] the authors examined 2-year mortality among 27,241 Veterans who initiated chronic dialysis in 2008–2011 at the VA, at a dialysis center being paid by the VA, at a private sector clinic under Medicare, or in dual settings. Adjusted 2-year mortality was lowest (28.9%) in dual care and in the VA (32.4%) versus Medicare (36.7%) or VA-purchased care (36.0%). This study adjusted for sociodemographic

characteristics, as well as pre-dialysis clinical status and care, type of vascular access, cause of ESRD, comorbidities, and prior utilization.

A similar cohort of 27,301 Veterans in the second study[33] compared rates of utilization of dialysis in VA settings and VA-paid purchased care settings. The authors noted that sites of utilization were similar to the above study. Furthermore, they noted in their main outcome that risk of hospitalization was similar across all settings ($p < 0.0001$, but authors noted that the differences found were so small as to not be clinically meaningful).

The third study[34] evaluated pre-ESRD care from 2008–2011 in Veterans receiving care in the VA or through Medicare. Two-year mortality was lower for Veterans who received pre-ESRD care in the VA (44%) than in those who received their care using Medicare (53%). Likewise, patients who received that pre-ESRD nephrology care with the VA (53%) were less likely to transition to dialysis than if they had their care under Medicare (82%).

Furthermore, we found 1 study[15] that studied rates of kidney transplantation among Veterans with VA as the primary insurance versus patients with Medicare or other private insurance. Although the VA was the payor in only 1.2% of the 302,457 patients analyzed who underwent kidney transplant, the authors noted that the VA had a lower hazard ratio for transplant (lower rate of transplant) when compared to privately insured (0.72, 95% CI [0.68, 0.76]) or Medicare-insured patients (0.85, 95% CI [0.81, 0.90]). There was no difference found between VA and Medicaid patients.

In a related study,[35] authors examined mortality among Veterans who received VA-paid and Medicare-paid post-kidney transplant care. After 5 years, mortality was 11% among the 792 Veterans who received post-transplant care in VA, but 20% among the 2092 Veterans who received care paid by Medicare. After adjusting for covariates, the hazard ratio of 5-year mortality was over twice as high among Veterans receiving post-transplant care paid by Medicare compared to those receiving care in VA (2.2, 95% CI [1.5, 3.1]).

Hospital Patient Safety Indicators and Outpatient Quality of Care

We identified 4 studies that compared a number of quality indicators between Veterans getting VA care and non-Veterans getting non-VA care.[1,4,36,37] All 4 studies assessed national samples for both VA and non-VA care, including more than 100 VA facilities and hundreds or thousands of non-VA facilities. Three of the studies compared hospital patient safety indicators, such as 30-day risk-standardized mortality rate for 2 conditions, iatrogenic pneumothorax and post-operative wound dehiscence. One study also assessed outpatient quality using measures from the Healthcare Effectiveness Data and Information Set, such as process and intermediate outcome measures for patients with diabetes, screening and prevention, and control of blood pressure and lipids.[37] One study compared Centers for Medicare & Medicaid Star Ratings for VA and non-VA hospitals.[1] All 4 studies were in general agreement: quality of care in VA was better than non-VA care for most measures. In 1 study, however, VA had higher 30-day risk-standardized readmission rates than non-VA care,[37] and in another study patients treated in VA hospitals were more likely to have readmissions than patients treated in non-VA hospitals.[1]

Chronic Obstructive Pulmonary Disease (COPD) Outcomes

We identified 2 studies that compared outcomes for patients with COPD using a national sample of VA hospitals versus non-VA hospitals. In 1 study[38] that evaluated readmission rates and mortality post

hospitalization after a COPD exacerbation from 2015 to 2018, 30-day readmissions rates were significantly lower in VA (15.3 days) versus non-VA hospitals (19.5 days, $p < 0.001$). Thirty-day mortality rates were also significantly lower in VA (6%) versus non-VA hospitals (8.5%, $p < 0.02$). These differences persisted no matter the type of non-VA hospital including teaching hospitals, non-teaching hospitals, and safety net hospitals. The study itself was not limited to Veteran patients, as it compared Veteran patients in VA to CMS-derived risk adjustment models in non-VA hospitals.

In the second study,[39] the authors compared the rates of participation in pulmonary rehabilitation by Veterans and Medicare beneficiaries after they were hospitalized for COPD. Pulmonary rehabilitation can improve symptom burden and morbidity associated with COPD. In the study, utilization by Medicare beneficiaries was low, approximately 2% of discharges. In the VA it was slightly lower, at 1.5% of hospital discharges.

Mental Health Conditions

We identified 3 studies that assessed quality and safety outcomes for persons with mental health conditions[23,40]. Both studies compared Veterans getting care within VA to non-Veterans getting care in non-VA settings. Both were national studies. One study[40] assessed the quality of medication treatment, which was probably mostly outpatient care, using 7 measures such as "proportion of schizophrenia patients who filled prescriptions for a 12-week supply of an antipsychotic medication in the 12 weeks following the start of a new treatment episode." This study stratified patients by their mental health condition, namely bipolar disorder, major depressive disorder, posttraumatic stress disorder, schizophrenia, and substance use disorder. This study found much better quality in VA-treated patients than in non-VA-treated patients. The second study assessed only inpatient psychiatric care, using 7 of the Joint Commission's Hospital-based Inpatient Psychiatric Services measures, which are used both for accreditation and in a pay-for-reporting initiative.[23] Included measures were "Admission screening for violence risk, substance use, psychological trauma and patient strengths completed" and "hours of physical restraint used," *etc*. This study found worse quality in VA hospitals as compared to non-VA hospitals. This study was not able to stratify or adjust for potential differences in case mix between different hospitals; for example, the potential use of physical restraints might differ between patients admitted for major depressive disorder as compared to patients admitted for schizophrenia. The last study found lower depression symptoms and equivalent posttraumatic stress disorder symptoms among Veterans receiving in-person, VA-paid community care compared to those who received VA tele-mental health care.[18]

Cancer Outcomes

Two studies[19,24] of cancer care also met our inclusion criteria. In the first study[19] of colorectal cancer care, the adenoma detection rate (OR = 0.39, 95% CI [0.25, 0.63]) and compliance with surveillance guidelines (OR = 0.21, 95% CI [0.09, 0.45]) was worse in non-VA compared to VA. In the second study[24] of non-small cell lung cancer, aggressive care at end of life in some measures declined more significantly in VA ($p < 0.001$) compared to non-VA from 2006 to 2012. For other measures, there was no difference between systems.

COVID-19 Outcomes

One study assessed mortality among Veterans admitted to community hospitals and Veterans admitted to VA hospitals during the COVID-19 pandemic.[41] VHA and Medicare data were merged for the period 3/2020 – 12/31/2021, and included 64,856 Veterans (nearly entirely men) who had 127,156

hospitalizations. VHA enrollees admitted to community hospitals were more likely to be older, White, and less likely to live in urban areas than VHA enrollees admitted to VA hospitals, and to have somewhat more comorbidities such as heart failure, stroke, and kidney disease. In both unadjusted and adjusted analyses, Veterans admitted to community hospitals had higher mortality – 27.1% versus 17.7% in the unadjusted analysis, and risk-adjusted odds ratio of 1.37 (95% CI [1.21, 1.55]). Readmission within 30 days was lower in community hospitals (12.6% vs 14.0%).

Miscellaneous Conditions

We identified 9 studies that reported quality and safety outcomes in miscellaneous conditions. Five studies compared care of Veterans getting VA care with Veterans getting non-VA (community) care,[2,5,42-44] and 3 studies compared Veterans getting VA care with non-Veterans getting non-VA care.[14,16] One study compared Veterans getting VA care both to non-Veterans getting non-VA care and to Veterans getting VA-paid care in the community.[3] Five of the studies were national in scope, whereas 3 studies were narrower, in 1 case comparing Veterans and non-Veterans with diabetes who enrolled in a large comparative effectiveness trial, providing answers to a survey about clinical outcome after receiving acupuncture or chiropractic care, and in the other comparing a large number of VA cases with a very much smaller number of Medicare cases.

In the first study, more than 500,000 Veterans making more than 1 million ED visits between 2001 and 2018 and being transported by ambulance were classified as to whether they got ED care at a VA facility (*N* = 231,611) or a non-VA facility (*N* = 1,238,546). After adjusting for a number of patient, clinical, and ED transport characteristics, the 30-day mortality rate was less for patients seen in VA hospitals than for patients seen at non-VA hospitals (9.15 vs 11.67 deaths per 100 patients). For patients who had received prior care at the index hospital, the mortality advantage for ED care at a VA hospital was even greater.

In the second study, investigators used Centers for Medicare & Medicaid Services measures for avoidable hospitalizations following chemotherapy to assess the care of 27,443 Veterans dually enrolled in Medicare and VA, of whom 9,522 received their chemotherapy in VA. Veterans receiving care through Medicare were more likely than Veterans receiving chemotherapy through VA to have an avoidable hospitalization, with an odds ratio of 1.58 (95% CI [1.41, 1.78]). The most common reasons for hospitalization were pneumonia, sepsis, and anemia.

In the third study, Veterans completed genetic consultations they were referred for less often in VA-paid community care (OR = 0.43, 95% CI [0.28, 0.65]), compared to VA care)[44]. Patients who had VA-paid community care genetic consultations were also less likely to receive follow-up cancer surveillance and risk-reducing procedures (OR = 0.64, 95% CI [0.52, 0.78]) than patients in VA care.

The fourth study compared the use of guideline-concordant antibiotic prophylaxis prior to dental procedures in patients with prosthetic joints or cardiac conditions being treated at VA or non-VA dental settings.[45] VA administrative data was used for the VA sample (*N* = 18,292) and Marketscan data were used for the non-VA sample (*N* = 42,832). Guideline-concordant antibiotic prophylaxis was low across all groups, being 32.7% of visits, with slightly higher use of guideline concordant care in VA-treated patients as compared to non-VA treated patients (adjusted prevalence ratio of 1.21, 95% CI [1.16, 1.25]). The results varied by the reason for antibiotic prophylaxis, with lower rates in VA care for patients without a prosthetic joint and higher rates in VA care for patients with a prosthetic joint, compared to non-VHA care.

The fifth study used data from the Corporate Data Warehouse (CDW) and from CMS to identify more than 1.7 million Veterans with at least 1 hospitalization and at least 2 VA primary care visits between 2016-2021.[3] After controlling for numerous covariates, regression models showed that during this time period, which includes when the MISSION Act went into effect, VA-paid community care hospitalizations increased while hospitalizations at VA facilities and non-VA facilities decreased. Hospitalization at a community care facility was associated with a 47% greater risk of 7-day readmission and a 20% increased risk of 30-day readmission compared to hospitalization at a VA facility, while by the end of the time period 30-day ED visits were less in community care (5.5% lower).

The sixth study compared quality, costs and outcomes of Veterans with diabetes receiving care at VA or at VA-paid community care clinics.[2] Data came from the CDW and patients were required to have had at least 2 primary care visits in a 12-month period during fiscal years 2021–2022. The investigators identified 652,648 patients in VA care and 3,650 patients in community care. Patients receiving VA care were more likely to have received diabetes-related tests such as hemoglobin A1c, a urine microalbumin test, and an eye exam than were patients receiving community care. There were no differences between patients in ambulatory care sensitive hospital admissions, but there was a slight statistically significant increased odds of any acute care hospitalization for Veterans receiving community care.

The last 3 studies looked at, respectively, measures of control of diabetes among enrollees in a large national comparative effectiveness study, the self-report of clinical outcomes by several hundred patients who received VA-delivered or community care-delivered acupuncture or chiropractic care,[5] and linked data from VA, the Health and Retirement Survey, and Medicare to assess possibly inappropriate neuroimaging studies in patients presenting with headache or neuropathy. The first and last studies reported better care quality in VA care than in non-VA care. The middle study reported no differences in outcomes.

Access

Eleven studies reported outcomes related to access. Five of these studies described wait times, 4 listed different patient-reported access outcomes, 1 reported median distance to a transplant center, and 1 noted self-reported delays in care. Seven of these studies were of good quality that met all 4 risk of bias criteria, while 3 were of fair quality and did not meet 1 or more criteria to a minor degree.

Wait Times

Five studies evaluated wait times in various primary and specialty care settings. Wait times were shorter in VA care in the 4 good quality studies and longer in VA care in the sole fair quality study.[19]

The first study evaluated differences in wait times to the next appointment for outpatient primary care, dermatology, cardiology, and orthopedics visits at VA medical centers and in the private sector in 15 major metropolitan areas from 2014–2017.[46] VA data were pulled from VA medical center scheduling systems, and private sector data were obtained via the secret shopper method. Consultant Merritt Hawkins had their research associates call 10–20 randomly selected physician offices in each metropolitan area in each of the above specialties and schedule new appointments. VA wait times decreased from a mean of 22.5 days (SD 7.3 days) in 2014 to 17.6 days (SD 4.9 days; $p = 0.046$) in 2017. Private sector wait times did not significantly change over the same time period. By specialty, wait times did not change in VA or the private sector for primary care, dermatology, or cardiology. In

orthopedics, VA wait times declined from 23.9 to 18.5 days ($p = 0.05$). Private sector orthopedic wait times did not change.

In the second study, Gurewich and colleagues examined differences in wait times in rural and urban Veterans for outpatient physical therapy, cardiology, optometry, orthopedics, and dental care between VA and VA-paid community care (CC) between fiscal year (FY) 2015 and 2018.[47] Using data from the VA Corporate Data Warehouse, these authors found that both rural and urban Veterans saw declines in wait times for VA and VA-paid CC care across all 5 services during this time period, with some small exceptions. Wait times did not change for urban Veterans seeking VA-paid CC physical therapy, rural and urban Veterans seeking VA-paid CC cardiology care, and rural and urban Veterans seeking VA-paid CC dental care. VA wait times declined more significantly for all services ($p < 0.001$) other than cardiology. In FY18, VA-paid CC wait times were 2–3 days longer than VA wait times, for all services except for orthopedics, where they were 4–5 days longer.

In the third study, authors used VA administrative data to examine differences in VA and Veterans Choice Program (VCP; a version of VA-paid community care) wait times in outpatient cardiology, gastroenterology, orthopedics, and urology between 2018 and 2019.[48] Average VA wait times were lower than VA-paid VCP wait times for cardiology (33.0 [SD 8.7] days vs 38.0 [SD 9.2] days), gastroenterology (53.9 [SD 15.9] vs 60.3 ([SD 16.0] days), orthopedics (36.2 [SD 9.3] vs 43.6 [SD 12.9] days), urology (36.1 [SD 9.5] vs 50.5 [SD 14.5] days), and overall (41.1 [SD 15.9] vs 49.0 [SD 15.5] days).

In the fourth study,[49] Feyman and colleagues examined VA Corporate Data Warehouse data to analyze differences in VA and VA-paid community care wait times in primary, mental health, and all other specialty care. They found that mean wait times were lower for VA versus VA-paid community care in unadjusted analyses for primary care (29 [SD 5.5] days vs 38.9 [SD 8.2] days), mental health care (33.6 [SD 4.6] days vs 43.9 [SD 9.0] days), and all other specialty care (35.4 [SD 2.7] days vs 41.9 [SD 5.9] days). In Veterans Integrated Service Network (VISN)-level adjusted analyses, VA wait times were shorter in 15 of 18 VISNs for primary care, in 16 of 18 VISNs for mental health care, and in 17 of 18 VISNs for all other specialty care.

In the last study,[19] time to colonoscopy was significantly longer in VA (83.8 days, 95% CI [45.2, 122.4]) compared to VA-paid community care (58.4 days, 95% CI [24.7, 92.1]; $p < 0.0001$).

Patient-Reported Access Outcomes

Patient-reported access to care was mixed in 4 studies. Three studies were of good quality, and 1 was of fair quality.[18]

Vanneman and co-authors used VA's 2016-17 Survey of Healthcare Experience of Patients (SHEP) to analyze differences in patient-reported access outcomes between VA and VA-paid CC patients receiving outpatient primary, specialty, and mental health care.[50] In the second quarter of 2016, patients rated access to care as better in VA-paid CC, as evaluated by multivariate models adjusting for patient and facility characteristics. These evaluations of access in that quarter did not differ between VA and VA-paid CC for primary or mental health care. Access scores for specialty care increased by about 2% for both VA and VA-paid CC by the end of the study period in the fourth quarter of 2017. Scores for primary and mental health care did not change.

In another analysis of SHEP data, Davila and colleagues analyzed differences in patient-reported access among urban and rural Veterans receiving VA and VA-paid CC primary and specialty care from FY16–FY19.[51] Compared with VA-paid CC primary care, rural Veterans reported greater satisfaction with access to VA primary care in FY16 (adjusted standardized mean difference [aSMD] = 0.17) and FY19 (aSMD = 0.21). Rural Veterans reported similar satisfaction with access to VA and VA-paid-CC specialty care. The study did not provide adjusted effect sizes for urban Veteran comparisons, but average access satisfaction scores were higher in both years for urban VA primary care compared with VA-paid CC primary care (FY16: 3.18 vs 2.91; FY19: 3.27 vs 3.12). Average scores were lower in both years for access to urban VA compared with VA-paid CC specialty care (FY16: 3.09 vs 3.17; FY19: 3.17 vs 3.28). Despite these differences, all average scores correspond to satisfaction scale ratings of "usually" to "always." In a study previously included in quality, above, Bagshaw and colleagues compared CMS Star Rating scores for VA and no-VA hospitals.[1] In the domain of timely and effective care, VA hospitals scored worse (mean standardized group score of -0.44 compared with 0.01) than non-VA hospitals.

In the last analysis, VA patients reported more access-related barriers to mental health care compared to patients receiving VA-paid community care ($p < 0.001$).[18]

Other Access Outcomes

A good quality study using VA health care record and cost data, VA-paid CC claims, and mapping software analyzed Veteran patient travel distance to and cost of percutaneous coronary intervention (PCI) and coronary artery bypass graft (CABG).[25] Authors found that VA patients traveled farther than VA-paid CC patients for both PCI (90.8 miles vs 60.1 miles; $p < 0.001$) and CABG (123.2 miles vs 81.5 miles; $p = 0.02$). Patients also incurred higher travel costs in VA versus VA-paid CC for both PCI ($238 vs $198; $p = 0.004$) and CABG ($958 vs $630; $p < 0.001$).

In 2 final fair quality studies, VA patients lived farther away from kidney transplant centers than patients using Medicare or private insurance,[15] and were more likely to report delays in seeking care than patients using Medicare, Medicaid, or commercial insurance.[17]

Patient Experience

Nine studies reported patient experience outcomes. Two studies described ratings of providers, 3 studies reported various patient experience measures, 1 compared VA's SHEP ratings with similar patient experience ratings from non-VA hospitals, 1 compared CMS Star Ratings for patient experience, 1 study used SAIL and HCAPHPS scores, and another reported Yelp ratings of hospitals. VA care was better in 3 studies and equal or mixed compared to non-VA care in 4 studies. Four of these studies were good quality and 3 were fair quality.

Provider Ratings

The Vanneman study described above also used 2016-17 SHEP data to report differences in provider ratings between patients receiving VA and VA-paid CC.[50] Provider ratings were higher in VA in the second quarter of 2016 for primary, specialty, and mental health care. VA and VA-paid CC ratings did not significantly change by the fourth quarter of 2017.

In the previously described Davila study, authors examined SHEP data to distinguish differences in provider ratings between rural Veterans receiving primary and specialty VA and VA-paid CC care during FY16 and FY19.[51] Ratings for providers were higher for rural Veterans receiving primary and

specialty care in VA compared to VA-paid CC in FY16 and FY19. Rural Veterans reported higher provider ratings for primary care (FY16 aSMD = 0.35; FY19 aSMD = 0.19) and specialty care (FY16 aSMD = 0.16; FY19 aSMD = 0.12) in VA compared to CC. Authors also provided data on provider ratings for urban Veterans but did not report adjusted effect sizes for VA and VA-paid CC comparisons. Average provider ratings (0-10, with 10 being the best) were higher for urban Veterans receiving VA care compared to those receiving VA-paid CC care for both primary (FY16: 8.83 vs 7.28; FY19: 8.92 vs 8.30) and specialty (FY16: 8.69 vs 8.46; FY19: 8.88 vs 8.70) care.

In a study based on responses by family members to the VA Bereaved Family Survey, Wachterman and colleagues compared data on Veterans receiving end-of-life (EOL) care in VA CLCs or in VA-contracted community nursing homes (CNH).[52] On all 15 items in the survey, family members of Veterans receiving EOL care in CLCs rated the care as superior to families of Veterans treated in CNHs (such as "staff always took time to listen," "staff were always kind, caring and respectful," staff always provided enough emotional support," *etc*). The findings, however, are limited by the low response rates (overall = 35%) to the survey.

SHEP Outcomes

In a third study, authors analyzed 2014 VA SHEP and private sector Hospital Consumer Assessment of Healthcare Providers and Systems Hospital Survey (HCAHPS) data to examine differences in patient experience between VA and non-VA inpatient care.[37] Each VA hospital was matched to 3 private sector non-VA hospitals using propensity score matching by bed size, geography, teaching hospital status, and urbanicity. Non-VA hospitals had higher ratings overall for hospital quietness, pain management, responsiveness of hospital staff, and communication with doctors or nurses. VA hospitals had higher ratings for communication about medicine, hospital cleanliness, and care transitions. Scores were very close for discharge information.

Patient Experience Outcomes

The fourth study,[36] previously described in the Quality and Safety section above, assessed national samples from VA and non-VA hospitals for patient-reported patient experience outcomes. About half of the 10 domains of patient experience had small but statistically significant better ratings for non-VA care, whereas there was no statistical difference in ratings for the other half of the domains.

In the fifth study, patient centeredness was not different ($p = 0.243$) between VA tele-mental health care and VA-paid, in-person mental health care in the community.[18]

Hospital Ratings

In a sixth study, authors analyzed differences in Yelp ratings between VA hospitals and their local university affiliates.[20] After adjusting for bed size, teaching hospital and graduate medical education status, and The Joint Commission certification, VA and non-VA Yelp ratings did not differ.

The previously discussed study by Bagshaw and colleagues compared Medicare Star Ratings between VA and non-VA hospitals. VA hospitals tended to score better than non-VA hospitals in the domain of patient experience (mean standardized group score 0.64 vs -0.02).[1]

Lastly, Eid and colleagues used patient experience data from SAIL and from HCAHPS to compare a nationwide sample of 133 VA hospitals and 1116 non-VA hospitals.[4] In the overall hospital ratings, VA had a very slight but statistically significant better score (88.3 vs 87.7, $p = 0.04$).

Cost/Efficiency

We identified 7 studies reporting on efficiency or cost outcomes: 1 study was about patients with cardiac disease,[25] 1 study was about imaging in patients with prostate cancer,[53] 1 study was about end-of-life care,[54] 1 study was about hospitalization after dialysis,[33] 1 study was about low-value PSA testing,[55] 1 study was about hospitalizations for 6 common conditions,[28] and 1 study was about telemental health care.[18] Six studies were good quality studies, and the seventh was fair quality.[18]

Cardiac Disease

One study assessed many outcomes among nearly 20,000 Veterans less than age 65 who had elective coronary revascularization, either bypass surgery (N = 5,818) or a percutaneous coronary intervention (N = 13,273) at either a VA hospital or a community hospital with care paid for by VA.[25] About 80% of patients received care at VA. Quality and access outcomes from this study are already reported in the appropriate sections of this report. Costs for VA care came from the VA Managerial Cost Accounting System, while costs for community care are what VA paid for the care. Costs were lower in VA than what VA paid for community care for patients receiving percutaneous coronary interventions ($15,683 vs $22,025) but higher in VA than what VA paid for community care for patients receiving bypass surgery ($63,144 vs $55,526).

Prostate Cancer Imaging

One study assessed agreement between guideline-suggested imaging in patients with prostate cancer among nearly 100,000 Veterans with prostate cancer.[53] Patients were classified as receiving VA-only care (28% of the total), Medicare-only care (57%), or as dual users (14%). The comparison made was the rate of prostate cancer imaging in low-risk and high-risk patients, by the system of care. Comparing just the Medicare-only to the VA-only patients, low-risk prostate cancer patients in VA were less likely to receive guideline-discordant imaging (relative risk = 0.79, 95% CI [0.67, 0.92]), whereas VA patients with high-risk prostate cancer were no less likely to have imaging in VA compared to Medicare-only patients.

End-of-Life Care

One study assessed costs of care for 36,401 patients dying of cancer between 2010 and 2014 who were dually enrolled in Medicare and VA.[54] In adjusted models, total costs of care were similar between patients who were Medicare reliant and those who were VA reliant.

Dialysis

In the fourth study, days of hospitalization after dialysis were similar in VA and non-VA settings.[33]

PSA Testing

In the fifth study, low-value PSA testing was associated with 9.9 fewer downstream services per 100 Veterans (95% CI [9.7, 10.1]) and $11.9 less spending per Veteran (95% CI [$7.6, $16.2]) in VA compared to non-VA care.[55]

Common Hospital Conditions

Yoon and colleagues[28] (described above in clinical quality) used VA data and data from 11 states with all-payer hospital discharge data for non-VA care to compare costs and length of stay for Veteran

patients discharged with 5 common conditions: acute myocardial infarction, gastrointestinal hemorrhage, heart failure, pneumonia, and stroke (as well as CABG, discussed under surgery). Length of stay and costs were consistently higher for patients treated in VA as compared to non-VA hospitals.

Equity

We identified 2 studies assessing the equity of VA-delivered care compared to non-VA-delivered care.[56,57] The study used the 2019-2020 National Health Interview Survey to assess the self-report of having received the influenza vaccine in the prior 12 months. Among 2,277 Veterans with VA coverage and 46,456 non-Veteran adults, statistically significant differences in the self-reported receipt of vaccine between the racial groups classified as White, Black, and Hispanic were seen for non-VA care but were small and statistically non-significant in VA-delivered care. The gap between Hispanic and White vaccination rates was statistically larger among non-Veterans compared to Veterans receiving VA care. Middle-income patients were less likely than high-income patients to be vaccinated among non-Veterans and Veterans in non-VA care. Low-income patients were less likely to be vaccinated across all categories. The gap in vaccination rates between low- and middle-income and high-income non-Veterans was larger than among Veterans in VA care.

A second study, which did not directly measure care but did assess long-term outcomes, used VA and California cancer registry data to assess 10-year survival, rate of metastatic disease, and prostate-cancer-specific mortality in patients who received care at the Greater Los Angeles VA Healthcare System or in non-VA community care in California.[57] Outcomes in the community care cohort were worse for Black patients on all 3 dimensions, whereas within VA there were no statistically significant disparities in outcomes between Black and other racial/ethnic groups. The authors speculate that the differences in disparities between the 2 systems of care may be more than just clinical quality, and could possibly also reflect better access and short-term interventions aimed at social determinants of health.

Tele-Mental Health Care

In the last study, the numbers of encounters did not significantly differ ($p = 0.276$) between patients receiving VA tele-mental health care or VA-paid, in-person mental health care in the community.[18]

QUALITY OF SURGICAL CARE

After dual review of identified publications, 24 met inclusion criteria (see Figure 1B), using national data with heterogenous designs and statistical methods to adjust for group differences with varying rigor (see Appendix). The majority of studies analyzed surgery- or patient-level outcomes on specific conditions or operations (22 of 24), while 2 studies reported hospital-level outcomes. The evidence reported orthopedic procedures (7 articles), cataract surgery (3 articles), pulmonary resections (2 articles), kidney transplant (2 articles), and CABG (2 articles). In addition, 2 studies analyzed all non-cardiac surgeries, 1 study assessed hernia repair, 1 study assessed colectomy, and another study evaluated access in urologic and orthopedic outpatient clinics.

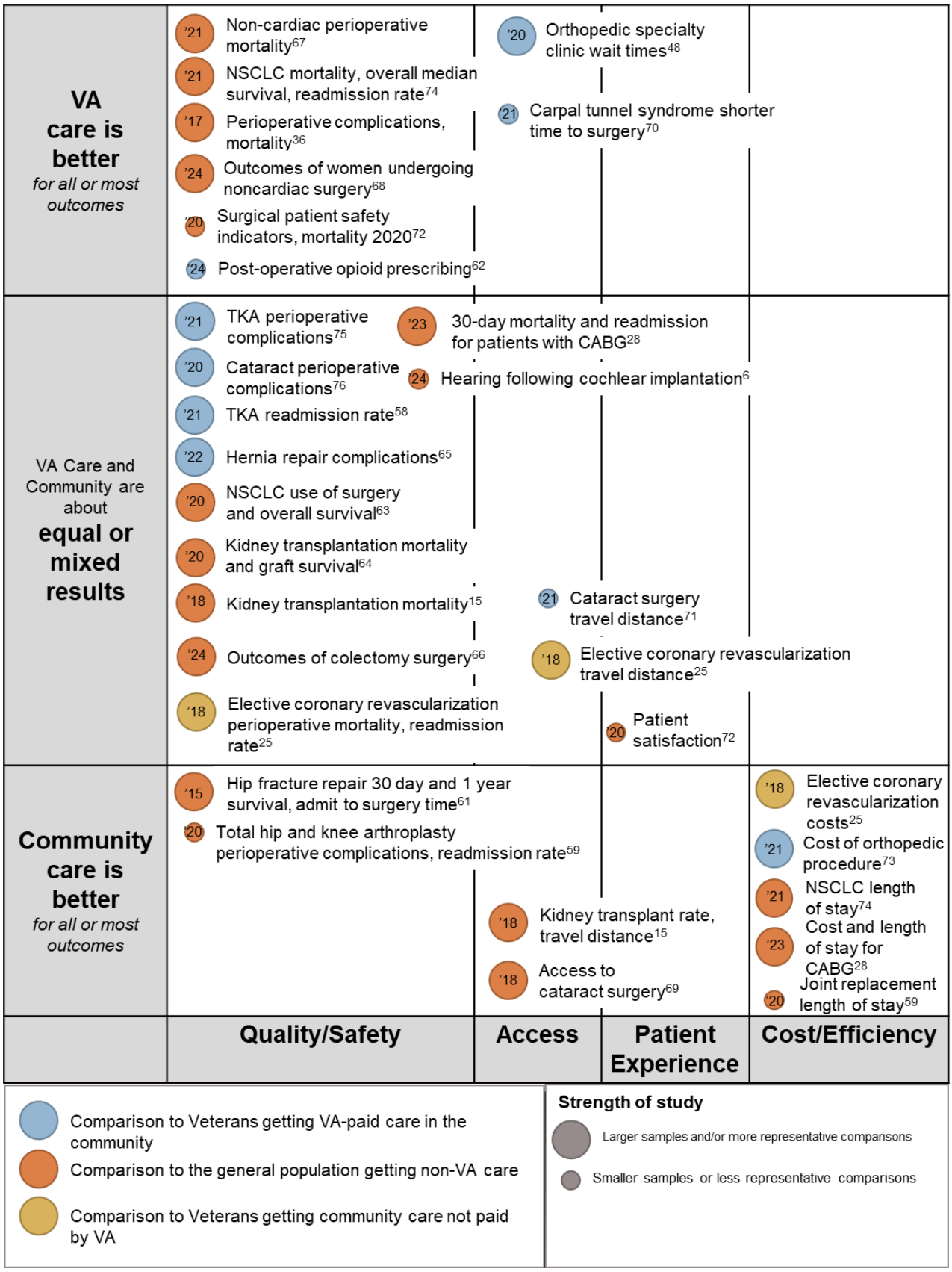
Key findings from each study were organized into 4 quality domains and are presented in the following order: (1) quality and safety, (2) access, (3) patient experience, and (4) cost and efficiency. Most studies (13 of 19) reported outcomes in only 1 quality domain, while 4 studies covered 2 domains and 1 study reported 3 domains. The 5 studies that reported findings in multiple domains will appear in multiple sections below.

Risk of Bias/Quality

Among the 24included studies meeting all our risk of bias criteria, 4 were deemed fair quality studies, marginally meeting the criteria. Complete risk of bias ratings are provided in the Appendix.

Our overall results for surgical care are presented in the bubble plot/evidence map in Figure 3. The plot is organized in the same fashion as the non-surgical plot as follows: the domains of care are listed on the horizontal axis (quality/safety, access, patient experience, cost/efficiency), the results of the study are listed on the vertical axis (VA care is better than community care, VA care and community care are about equal, or results are mixed, and community care is better than VA care), and then each study is entered as a shape, with larger shapes being studies of better quality and representativeness than studies depicted by smaller shapes. The color of the shape indicates the type of comparison: blue for studies comparing Veterans getting care from VA to Veterans getting VA-paid care in the community; orange for studies comparing Veterans getting care from VA and non-Veterans, or a general population, getting care in the community; and yellow for studies comparing Veterans getting care from VA to Veterans getting community care not paid by VA. Next to each shape is a brief thumbnail of what the study was about, and inside the shape is the year of publication (’18 = 2018, ’19 = 2019, *etc*).

Figure 3: Evidence Map of Studies on the Quality of Surgical Care



Quality and Safety

Eighteen studies reported quality and safety outcomes covering a broad range of procedures and will be discussed individually by surgical specialties including orthopedic (5 studies), lung resection (2), kidney transplant (2), CABG (2), hernia repair (1), cataract surgery (1), non-cardiac surgeries (2), and colectomy (1); 2 additional studies reported hospital-level patient safety indicators.

Orthopedic

Three studies reported outcomes for Veterans undergoing elective joint replacement (hip (THA) and knee (TKA)) and 1 for hip fracture repair, all meeting risk of bias criteria. While non-VA care was superior after hip fracture repair, outcomes for joint replacements were either equivalent between sites of care or reported some outcomes where VA care was better and others where CC/non-VA care was better (*ie*, mixed).

Harris et al reported that 24,407 VA Corporate Data Warehouse (CDW) patients had about half of the odds of developing any complication (such as joint or wound infection, myocardial infarction, and pulmonary embolism) compared to 18,964 Veterans who underwent TKAs in VA-paid CC identified through Medicare claims over 2017–2019 (adjusted OR of any complication = 0.45, 95% CI [0.38, 0.54]). However, in their local facility-level comparison, the adjusted odds of complications were higher in 5 of 130 VA facilities compared to their CC site (approximate ORs = 1.8–2.6, 95% CIs [1.1, 4.6]).

The second study of joint replacement outcomes from 2016–2019 by Rosen et al reported considerably lower readmissions nationally among 25,384 Veterans compared to 19,990 Veterans in VA-paid CC using combined VA CDW and Medicare (adjusted OR for all-cause readmissions = 0.35, 95% CI [0.30, 0.40]).[58] This trend varied at 3 individual CC sites that had lower readmissions compared to their corresponding VA (approximate ORs = 2.3–3.1, 95% CIs [1.0, 7.9]).

The third study of joint replacements found that VA care (*N* = 10,460) had substantially higher adjusted odds of complications (2.58, 95% CI [2.31, 2.89]) and readmissions (4.94, 95% CI [4.51, 5.41]) after elective primary TKA and THA at 30 days compared to 58,820 National Surgical Quality Improvement Program (NSQIP) database patients in 2014.[59] While the study by Harris and colleagues compared VA care to care delivered in the community via CHOICE, this study compared VA care to care in hospitals participating in NSQIP, which is a voluntary program consisting mostly of academic medical center hospitals, which differ from other hospitals on a number of characteristics.[60] Also, the methods for controlling for differences in patient characteristics and hospital setting were different between the 2 studies.

A study of timeliness of surgery and survival found that after hip fracture in patients 65 and older, the VA-NSQIP patients (*N* = 947) waited an average of 4 days more for surgery (mean admission date to date of surgery in VA = 5.64 [SD 43.25] and Medicare: 1.78 [SD 2.35]) compared to a propensity matched cohort of Medicare patients (*N* = 947) between 2003–2005. The Medicare cohort also had 70% higher odds of 30-day survival on average.[61]

A fifth study about joint replacement surgery compared the post-operative prescription of opioids. Between 2018 and 2021, there were 239 Veterans who received VA-paid care in the community and 323 Veterans who got surgery at the Salt Lake VAMC.[62] The median number of opioids prescribed at

discharge was 10 less at the VAMC (30.0, IQR = 10.0-47.5) compared to VA-paid community care (40.0, IQR = 30.0-60.0, $p < 0.01$).

Lung Resection

Two studies discussed quality and safety outcomes for Veterans undergoing pulmonary resection and/or non-small cell lung cancer (NSCLC) treatment. Both reported a measure of overall survival with VA based care experiencing superior or equal outcomes.

Heiden and colleagues found that Veterans in the VA CDW database had a small but significantly lower 30-day mortality rate (VA: 1.9% vs NCDB: 2.8%, $p < 0.001$) that persisted at 90 days compared to a matched non-Veteran population in the National Cancer Database (NCDB) between 2006–2016. Veterans in the VA also had longer adjusted median overall survival by about 6 months (71.4 vs 65.2 months, $p < 0.001$); they found no difference in unadjusted readmissions.

In a second study designed to assess racial disparities in management and outcomes of stage I NSCLC between Black and White patients, Williams et al compared 7,895 Veterans in VA CDW data with 8,744 non-Veterans in the SEER-Medicare database from 2001–2009.[63] They found that Black patients were 27% and 43% less likely to receive surgery in VA and non-VA cohorts, respectively. When they adjusted for treatment received and other patient-level covariates, there was no disparity in 5-year overall survival between Black and White patients in either setting.

Kidney Transplant

Two studies of kidney transplant quality and safety outcomes used data from the Scientific Registry of Transplant Recipients database; both studies met all our risk of bias criteria.

Augustine et al analyzed transplant rates, mortality, and delisting in 2,905 VA patients across 4 VA transplant centers with 3,751 privately insured and 3,109 Medicare patients from 2004 to 2016.[15] Compared to privately insured patients, VA patients had a lower adjusted hazard ratio (aHR) for deceased and living donor transplants combined (aHR = 0.72, 95% CI [0.65, 0.79]), slightly higher hazard ratio for delisting (aHR = 1.23, 95% CI [1.003, 1.50]), but no difference in adjusted mortality rates. Compared to Medicare patients, VA patients had a lower hazard ratio for mortality (aHR = 0.81, 95% CI [0.68, 0.96]) and were less likely to be removed from the waitlist (aHR = 0.82, 95% CI [0.68, 0.99]).

Kesseli et al found significantly lower observed versus expected (O:E) 30-day kidney transplant mortality rate in the 7 VA centers (N = 1,508) versus 286 non-VA centers (N = 117,680) (O:E VA = 0.27, 95% CI [0.05, 0.65]; O:E VA vs non-VA = 1.00, 95% CI [0.95, 1.06], $p = 0.03$).[64] Three-year mortality and graft survival, however, were not different between the VA and matched non-VA centers.

CABG

Barnett et al studied elective coronary revascularization in Veterans under 65 years old for 4,866 patients in VA hospitals and 952 Veterans in VA-paid CC sites using VA claims data.[25] Mortality and readmissions at 30 days after CABG were not different between VA care and CC. A second study by Yoon and colleagues compared CABG at VA and non-VA settings in 11 states; 30-day operative mortality was not significantly different, and 30-day all-cause readmission rates favored VA.[28]

Hernia Repair

Mull et al assessed nationwide the outcome of postoperative complications for patients getting hernia repair in VA and Veterans getting hernia repair in the community in 2018–2019.[65] Among 7,991 procedures nationwide, just under 10% were done in the community (772). Unadjusted comparisons showed postoperative complications were higher for community care patients than patients operated on at VA (6.6% vs 4.0%), but this difference was no longer present after adjusting for patient comorbidities, complexity of the hernia repair, and the historical pattern of community care referrals.

Colectomy

Simmonds et al used data from VASQIP and NSQIP to compare the outcomes of colectomy surgery.[66] After excluding emergency cases, there were 235,097 cases in NSQIP and 11,115 cases in VASQIP. In the non-emergency cases, there was no statistically significant difference in adjusted 30-day mortality (1.2% vs 1.4%, $p = 0.145$) but overall morbidity favored care at VA (17.7% vs 22%, $p < 0.001$). In unadjusted results, some outcomes favored VA (organ space infection, post-operative pneumonia, DVT, UTI) while others favored non-VA care (return to OR, wound dehiscence, prolonged use of ventilator, cardiac arrest, post-operative sepsis). Stratified analysis showed greater variability in outcomes after open surgery between VA and non-VA care compared to laparoscopic cases.

Non-Cardiac Surgery

George and colleagues[67] compared mortality after noncardiac surgery between VA NSQIP (N = 3,174,274) and NSQIP (N = 736,477).11 The authors found that VA care was associated with lower risk of overall postoperative death (adjusted relative risk 0.59, 95% CI [0.47, 0.75]; $p < 0.001$) and lower risk of postoperative death after a complication (adjusted relative risk 0.55, 95% CI [0.44, 0.68]). More recently, these authors updated this analysis to focus only on women Veterans, and observed similar results: adjusted relative risk of 30-day mortality was lower in VA (0.41, 95% CI [0.23, 0.76]; $p < 0.001$) and adjusted relative risk for failure to rescue was also lower in VA (0.41, 95% CI [0.18, 0.92]; $p < 0.001$).[68]

Cataract Surgery

One study reported similar adjusted 90-day complications for Veterans undergoing cataract surgery in the VA (N = 44,546) compared to Veterans obtaining VA-paid community care (N = 17,203) in Fiscal Year 2015 following complex and routine cataract surgeries (OR = 0.92, 95% CI [0.77, 1.10]).

Cochlear Implant Surgery

Tripathi and colleagues compared outcome of cochlear implant surgery between 83 Veterans receiving care at a single VA facility with 83 non-Veterans receiving care at non-VA hospitals.[6] The outcomes were several measures of hearing, the Consonant-Nucleus-Consonant Score, and the Arizona Biomedical Institute recognition score. At multiple time points, there were no statistically significant difference in scores between groups.

Patient Safety Indicators

Two studies used Hospital Compare data to evaluate VA hospital patient safety indicators (PSIs) with those reported by non-VA hospitals. Only Blay et al met all our criteria for risk of bias given its larger sample size.[36] They found lower postoperative inpatient deaths from a treatable complication in the 129 VA hospitals compared to 4010 non-VA hospitals between 2012–2015 (VA: 105.8 deaths per

1000 discharges, 95% CI [96.7, 114.92]; non-VA: 136.34 deaths per 1000 discharges, 95% CI [135.42, 137.26]) and found a slightly lower postoperative VTE rate by about 1 per 1000 discharges, but no difference in wound dehiscence rates.

The second study by Eid et al[41] reported lower postoperative inpatient deaths from treatable complications in the VA hospitals (*N* = 34) compared to non-VA hospitals (*N* = 319), similar to Blay et al. There was no difference in VTE rates but lower wound dehiscence rates among VA hospitals.

Access

We identified 6 articles reporting health care access. Three studies describe time to care (2 on time to surgery, 1 wait time to specialty appointment) and 3 studies measured geographic access in terms of distance to the provider; all met risk of bias criteria.

Time to Care

Wu and colleagues measured the proportion of 1,917,254 Veterans and 1,156,211 Medicare patients with documented cataract diagnoses who received cataract surgery within 1 and 5 years after diagnosis from 2002–2012.[69] About one-third fewer Veterans underwent surgery for cataracts within 1 year (VA: 6.3% vs non-VA: 18.5%; adjusted OR for receiving surgery = 3.39, 95% CI [3.36, 3.41]) and 5 years (VA: 12.6%, non-VA: 35.9%; adjusted OR = 3.89, 95% CI [3.87, 3.91]) compared to Medicare patients. This study did not assess the reasons why patients did not undergo cataract surgery.

Griffith et al compared wait times to specialty appointments among Veterans at VA versus Veterans in VA-paid CC using VA administrative data from 2013–2019 (orthopedic patients, VA: 506,945 and non-VA: 139,827; urology patients, VA: 353,019 and non-VA: 37,089).[48] Mean wait times declined over the study period, and on average were 6 days shorter in VA sites for orthopedics (VA: 36.2 days [SD 9.3] vs CC: 43.6 days [SD 12.9]) and 14 days shorter in VA sites for urology (VA: 36.1 days [SD 9.5] vs CC: 50.5 days [SD 14.5]).

The third study evaluated time from carpal tunnel referral to time of surgery. Due to a heterogenous comparison group that may overlap with the VA group, this study was deemed fair quality.[70] Veterans treated only within the VA had shorter median time from primary care provider (PCP) referral to carpal tunnel release by about 200 days compared to the group with mixed VA plus VA-paid community care.

Geographic Access

Three national studies found travel distance to be longer for VA care; all of these studies met the risk of bias criteria.

Augustine et al (discussed above in Quality and Safety) reported median distance to the 4 matched kidney transplant centers from Veteran residences.[15] Transplants at a VA required nearly 8-fold greater travel distance at 347.0 miles (interquartile range [IQR] 196.9–701.8) versus 42.5 miles (IQR 12.9–101.1) for privately insured patients and 55.6 miles (IQR 16.4–102.6) for Medicare patients. Similarly, the study of elective CABG operations by Barnett et al (see above) found that net travel distance was 73.3 miles less for VA-paid CC Veterans compared to Veterans undergoing surgery at the VA hospital.[25]

In a study using 2015 CDW data, Pettey and colleagues calculated median travel distances nationally for Veterans undergoing cataract surgery to be 31.2 miles for VA versus 19.7 miles for VA-paid CC.[71]

Patient Experience

One study describing patient experience was fair quality. Eid et al used Hospital Consumer Assessment of Healthcare Providers patient satisfaction scores in 2018 in 3 regions and found no differences in overall hospital rating, but the VA performed slightly worse when patients were asked if they would recommend the hospital compared to non-Veteran patients at non-VA hospitals.[72]

Cost/Efficiency

Three studies reported cost outcomes for knee replacements (TKA), cataract surgery, and elective CABG. Three studies reported efficiency measures as length of stay. All study designs were previously described in results about other outcomes above.

Costs

A study by Wagner et al compared VA hospital versus CC TKAs and cataract surgeries using VA CDW data from 2017–2018.[73] The mean total unadjusted inpatient cost of TKAs was substantially higher in VA care (6,179 VA patients: $28,969 [SD $10778] vs 6,337 VA-paid CC patients: $13,339 [SD $23,698]), and the pattern persisted after controlling for location of service and patient factors. Findings were the same for outpatient cataract surgeries, with the adjusted model demonstrating that, compared to VA-paid CC, VA hospital cataract procedures cost $2,680 more (standard error 15.8).

Barnett and colleagues (described above) found a lower mean adjusted total cost of elective CABG in Veterans receiving VA-paid CC by $8,525, which included index procedure, readmission, and extra travel costs compared to VA care (VA: $65,264 [SD $47,978] for VA vs CC: $56,749 [SD $77,283] for CC, $p < 0.01$).[25]

The study by Yoon comparing CABG between VA and non-VA care in 11 states found higher costs in VA; for Veteran patients age 65 or over this difference was a mean of $76,200 in VA compared with $53,100 in non-VA care.[28]

Length of Stay

Veterans at VA hospitals experienced longer lengths of stays compared to non-Veterans in 4 studies. For example, mean length of stay after lung resection was about 1 day shorter among non-Veterans (VA: 8.12 days [SD 6.59]; non-VA: 7.08 days [SD 7.54], $p > 0.001$).[74] Following elective THA, a higher proportion of patients had a length of stay 4 days or greater in the VA sample (47% vs 17%, $p < 0.001$).[59] For CABG, the study by Yoon and colleagues found a mean length of stay for Veteran patients 65 and older of 11.7 days in VA compared with 9.6 days in non-VA settings.[28]

DISCUSSION

Our systematic review identified 50 studies of non-surgical care and 24 studies of surgical care comparing quality, safety, access, patient experience, or efficiency/cost between VA-delivered care and non-VA-delivered care. The large majority of studies assessed quality and safety, followed by comparisons of access to care. Few studies assessed patient experience or cost/efficiency. We found no studies comparing VA to non-VA care on equity. We found 2 studies comparing VA to non-VA care on equity.

In the domain of quality and safety, the great majority of studies found that VA care is as good as, or better than, care in the community. This was the case for both surgical care and non-surgical care, and for community care of Veterans and community care of non-Veterans. For the domains of access and of cost/efficiency, the studies were more evenly distributed between the categories of VA care is better, VA and community care are about the same, and community care is better. The few studies of patient experience found that VA care and community care were about the same or VA care was better. We did not identify any study the found that patient experience was better in community care.

The studies best able to address implications of the CHOICE and MISSION acts were designed to capture data of Veterans receiving VA-paid community care. In these comparisons, quality and safety was generally better in VA-delivered care for studies of nonsurgical care and of about equal or mixed results for studies of surgical care. Differences between sites of care were more mixed for the other domains: access, patient experience, and cost.

Key among the quality and safety outcomes is mortality. Among studies of surgical care, the overall trend of the broader domain held. One study of Veterans in community care had equivalent mortality after CABG, and 5 other studies comparing mortality to non-Veterans were distributed between lower mortality in the VA (after lung resection, non-cardiac surgery, and surgical inpatient deaths) or a mixture of VA better and no difference (2 studies of kidney transplant); there were no cases of lower mortality in community care among the high-quality studies.

The few exceptions to these general findings deserve noting. For surgical care, there was a consistent finding that VA length of stay was longer than in non-VA care. In 4 studies of procedures, the investigators found that in some cases VA-purchased care was less expensive than the estimate of costs for VA to deliver the procedure. In several studies of both non-surgical care and surgical care, there was a greater travel distance to receive care from VA than from the community, although the importance of these differences may vary for different Veteran stakeholders. Lastly, even in studies that found, on average, that VA care was better than community care, there was some regional variation such that in a few geographic areas VA care had worse outcomes than community care or that a few measures of quality were better in the community than at VA.

These results notwithstanding, the overarching conclusion from the published studies since 2015 reinforces the conclusions of the 2 prior reviews of studies comparing VA care to non-VA care: on average, VA care performs better than or similar to non-VA care in the domain of quality and safety. While this relationship persists nationally, studies comparing local VA facilities to their community counterpart may reveal areas of local deviance from national trends. Identifying where there are such differences in care will be critical to ongoing comparisons in the future. In addition, these findings highlight focused areas for potential VA performance improvement, such as hip fracture repair.

This review expands those earlier conclusions to include the outcome domains of access, patient experience, and efficiency/cost. For these domains, we found more studies in this review (studies published since 2015) than in the prior review that covered 2005–2015. Thus, we believe we can draw some early conclusions about comparisons between VA and non-VA care: while not as striking as in the quality/safety domain, studies tended to find that VA care was about the same or better than non-VA care, with the exceptions of travel distance and length of stay.

How might these data be used? First, comparisons are useful in identifying possible quality issues where VA performance should be improved. Looking at specific outcomes is important. Second, comparisons of VA versus community care paid for by VA are critical to shaping decisions about the expansion of the program and determining whether sending Veterans out for care in an effort to improve timeliness or convenience comes at a cost in terms of clinical outcomes. Third, some comparisons are useful for judging the potential advantages of the VA's national system of integrated care versus care delivery in less organized settings, such as delivery of preventive care and control of chronic disease.

Limitations

In addition to the usual limitation of any systematic review, namely the quantity and quality of the original studies, we add the possibility of publication bias or subconscious investigator bias, in that most of the published studies are by VA authors. We scrutinized each study for objective evidence of bias and diminished the degree to which studies with such bias contributed to our overall conclusions. Nevertheless, we cannot assess the degree to which unmeasurable bias or the decision to undertake a comparative study and what topics to focus on are influenced by VA investigators. This may be something that can only be resolved with difficulty and waiting until other health systems adopt the same kind of learning health system culture that VA has, which results in self-inspection of quality of care compared to other health care systems.

Beyond this, the most important limitation to any of these comparisons is the possibility of confounding by choice of care delivery site—in other words, the comparability of the patients getting VA care to the patients getting care outside VA, whether they be Veterans getting community care or non-Veterans getting community care. Studies attempted to control for this by using multivariable methods to adjust for baseline differences between groups, but these methods are limited by the availability of baseline variables and the degree to which those variables are captured. Thus, 1 study of outcomes of heart failure care was able to adjust for the presence or absence of a large number of comorbidities, but not able to adjust for baseline differences in the severity of heart failure. Providers in fee-for-service health care have a financial incentive to code for comorbidities that VA providers do not have; thus, there may be differential capture of this between patients in VA and outside VA care. Likewise, most studies were not able to adjust for differences in the social determinants of health, which may affect everything from length of stay to readmission to outcomes of chronic illness. VA patients are known to bear a heavier burden of social determinants of health than patients outside VA care. To the extent these burdens are uncaptured and unadjusted for, this discrepancy places VA care at a disadvantage compared to patients outside VA care for such outcomes. The bias introduced by this heavier burden makes the findings that VA care was equivalent to or better than non-VA care even more exceptional.

An additional limitation in drawing overall conclusions is the relative value placed on different outcomes. For example, the small but statistically significant benefit of VA care in terms of mortality

seen in several studies would seem to be more "important" than the small but statistically significant benefit seen for community care in post-discharge receipt of pulmonary rehabilitation for patients with COPD—in other words, one study does not balance out the other. Similarly, the degree to which travel distance is an outcome of importance to Veterans is unknown; it was included as an outcome in this review since travel distance was a criterion of eligibility for care under the CHOICE act. But we did not attempt to classify the outcomes as "important" or "less important," since at the edges this would invariably require subjective decisions by the research team—for example, which is more important, a shorter wait time for a urology appointment or a longer length of stay after joint replacement surgery?—and the value of these outcomes maybe different to different stakeholders. Thus, we presented the outcomes without attempting to classify them by degree of importance.

An additional limitation in arriving at overarching conclusions is that the conditions and procedures for which such comparisons have been published are only a small fraction of the care Veterans receive; their results cannot be generalized to all kinds of care.

FUTURE RESEARCH

Despite several dozen publications comparing VA care with non-VA care, there are a number of clinical areas where there are large amounts of care delivered in the community through the MISSION act, such as physical medicine and rehabilitation, yet no studies comparing quality of care. In addition, studies that report lower cost for purchased community care for some procedures (joint replacement, CABG) than the estimates of cost for VA to deliver that care need to have more sophisticated analyses that model what would happen if VA increases the purchase of community care. It would greatly facilitate comparisons of VA care to non-VA care if non-VA care had the same degree of comprehensive performance data that are publicly available. Lastly, we expect that comparing VA care with non-VA care is a moving target, unlike, for example, the value of beta blockers after myocardial infarction, and thus this topic needs regular updating of published studies to keep this review up to date. This is now the third update since completion of the original review.

CONCLUSIONS

In general, most published studies of comparisons of quality of care show that Veterans getting care from VA get the same or better quality care than Veterans getting community care or the general public getting non-VA care.

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