Evidence Brief: Staffing Models in Specialty Care

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This report was prepared by the Evidence Synthesis Program Coordinating Center located at the **VA Portland Health Care System**, directed by Mark Helfand, MD, MPH, MS 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 three 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 the VHA Office of Specialty Care Services (SCS) and Chiefs of Medicine Field Advisory Council. The scope was further developed with input from Operational Partners (below) and the ESP Coordinating Center review team.

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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.

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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 (see Appendix E in Supplemental Materials for disposition of comments). 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.

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Key Findings

- The addition of new or use of specific types (*ie*, advanced practice nurses, nurse case managers) of existing specialty care staff in outpatient specialty care may be related to lower utilization, higher access, improved outcomes, reduced costs, and high patient/provider and staff satisfaction. Our confidence in these findings is low due to limitations in study design (*ie*, lack of comparison groups), lack of information on patient populations, and lack of statistical analysis.
- It is unclear whether the addition of new clinics to support existing specialty care clinics is associated with improvement in productivity or patient-important outcomes.
- Contextual characteristics could not be directly compared across studies, but high patient, provider, and staff satisfaction were consistently associated with the evaluated staffing models or interventions across specialties.
- Future staffing research could be better directed by a conceptual model of outpatient specialty care. Research should also be more rigorous and be designed to explicitly assess how staffing models/interventions affect productivity and patient-important outcomes.

Background

The Evidence Synthesis Program Coordinating Center is responding to a request from the VHA Office of Specialty Care Services (SCS) and Chiefs of Medicine Field Advisory Council, for an Evidence Brief on staffing models used in outpatient specialty care settings. Findings from this Evidence Brief will be used to inform SCS and the Specialty Care Integrated Clinical Community in their support of field-based specialty care programs.

Methods

To identify studies, we searched MEDLINE®, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, and other sources up to October 2021. We used prespecified criteria for study selection, data abstraction, and rating internal validity and strength of the evidence. See the Methods section and our PROSPERO protocol for full details of our methodology.

Staffing models in outpatient specialty care are strategies to match the demand for tasks within a clinic or organization with the supply of appropriate staff, with the goals of minimizing staff shortages by increasing the availability and use of staff expertise, and maximizing work outputs. These strategies could increase productivity and improve patient-important outcomes by ensuring that staff who can complete tasks in a clinic or organization are almost always available. By improving staffing models, managers can ensure that inefficiencies or non-value-added time are minimized in a clinical workflow (*eg*, patients are not stuck waiting for a specific staff member to complete a task), and that more highly trained clinicians and staff are working to the full extent of their expertise and licensure (*eg,* providers are not performing tasks that could be done by clerks). In this Evidence Brief, we focus our analysis of staffing models and staffing interventions that add or reorganize staff, in new or existing clinics, rather than examining practices to lower staffing demand (*ie,* changing patient panel sizes or seeking to treat lower-acuity patients).

In outpatient primary care, many strategies for staffing are influenced by the patient-centered medical home (PCMH) model, which suggests that a primary provider lead a team of non-provider staff to collaboratively care for all the healthcare needs of a panel of patients. In the Veterans Health Administration (VHA), this model is formalized as the patient-aligned care team (PACT), which prescribes a *teamlet* of 1 provider, 1 registered nurse care manager, 1 licensed

practical nurse or medical assistant, and 1 administrative clerk. In outpatient specialty care, staffing models are not as well formalized, but several competing strategies exist (*eg,* adding new staff vs adding new clinics).

For this Evidence Brief, we sought to synthesize the evidence in the literature on the relationships between staffing models, productivity, and patient-important outcomes in outpatient specialty care. Our second goal was to document the variation in these models and their relationships to outcomes by contextual characteristics (*eg*, program type or rurality).

Evidence from 8 studies (in 10 publications) suggests that staffing models that add or integrate existing non-physician staff in specialty care outpatient clinics may be associated with lower utilization, higher access, improved outcomes, reduced costs, and high patient/provider and staff satisfaction. However, our confidence in these findings is low due to limitations in study design (*ie*, lack of a comparison group), methodological limitations within studies, and lack of comparable staffing models or outcome measures across studies. It is unclear whether adding new clinics to support existing specialty care outpatient clinics is associated with improved productivity or patient-important outcomes. Only 2 studies assessed adding new clinics and were limited by lack of information about the study and comparison populations, and lack of analysis. Contextual characteristics of staffing models were not compared within studies directly. We did find that different staffing models or interventions were related to high patient satisfaction and positive provider and staff satisfaction across specialties when these models/interventions were compared indirectly between studies.

Most studies evaluated in this review were of fair or poor quality. Of the 8 studies included, only 2 studies employed either a comparison group or statistical analysis alone. Most studies presented their results as a case study, instead of describing detailed methods and analyses. This lack of detail made it difficult to ascertain the associations between staffing models or interventions, productivity, and patient-important outcomes.

Future research should focus on evaluating the addition of a specific type of non-physician staff member or new clinic across specialties in the VHA. A conceptual model of VHA specialty care would also aid in developing and evaluating new staffing models. Stakeholders should develop such a model to aid in future staffing research. Also, future research should involve more rigorous study designs to assess how staffing models affect productivity and patient-important outcomes (*ie,* via randomized interventional study designs). Future publications should also include more methodological detail. More rigorous and well-documented staffing research with high quality study designs based on an agreed upon conceptual model could aid in developing more productive and higher quality outpatient specialty care.

EVIDENCE BRIEF

INTRODUCTION

PURPOSE

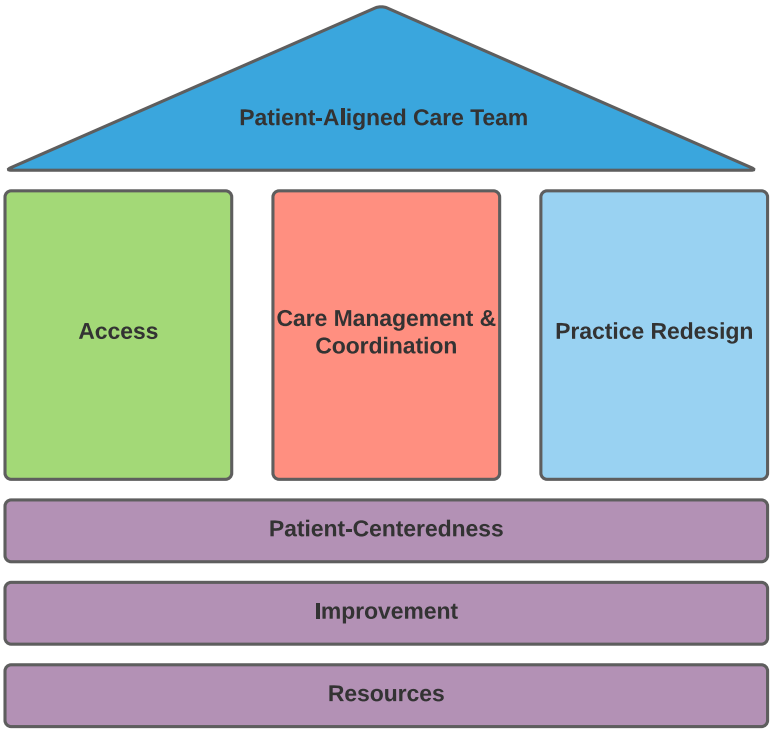
The Evidence Synthesis Program (ESP) Coordinating Center is responding to a request from the VHA Office of Specialty Care Services (SCS) and Chiefs of Medicine Field Advisory Council, for an Evidence Brief on staffing models used in outpatient specialty care settings. Findings from this brief will be used to inform SCS and the Specialty Care Integrated Clinical Community in their support of field-based specialty care programs.

BACKGROUND

Staffing models are strategies to match the demand of tasks in an organization with the supply of staff, with the goals of minimizing staffing shortages, increasing the availability and use of staff expertise, and maximizing work outputs.[1] Tasks that are nonrepetitive in nature can be challenging to effectively staff; in healthcare settings in particular, nonrepetitive and complex tasks are prevalent and often reach across staff specializations. A common solution to addressing this challenge is the creation of healthcare teams.[2] Although teamwork in healthcare settings is associated with better staff performance (*eg*, improved processes or outcomes),[3] research on and use of staffing models has generally been limited to inpatient and primary care settings. For example, a previous Cochrane review examined the relationships between inpatient nursing staffing levels/models and patient-important outcomes, but only found that staffing advanced or specialist nurses was not related to patient mortality.[4]

In primary care, the dominant staffing model is based in the patient-centered medical home (PCMH) care model. In PCMH, patients have a personal relationship with a primary care physician (PCP) who is responsible for all patient healthcare needs and for coordinating care across specialties.[5] PCPs lead a team of, on average, 4 non-provider staff to collaboratively care for a panel of patients; non-provider staff can include nurse care managers, pharmacists, and nutritionists.[6] In the VHA, the PCMH model was adapted into the patient-aligned care team (PACT),[7] where a provider and 3 additional non-provider staff (1 registered nurse care manager, 1 licensed practical nurse or medical assistant, and 1 administrative clerk) are organized into a *teamlet*. As shown in Figure 1, the PACT is conceptually supported by 3 pillars: access, care management and coordination, and practice redesign; these elements are further supported by patient-centeredness, [system] improvement, and resources.[8] The goals of each pillar are to increase appointment availability and non-appointment options (access), ensure that high-risk transitions are well-managed (care management and coordination), and to improve communication and work processes (practice redesign).

Figure 1. PACT Conceptual Model



Note. Figure adapted from Bidassie et al.[8]

A meta-analysis of 19 PCMH interventions found that the model had small-to-moderate positive effects on the delivery of preventive care and a small positive effect on patient experience, with moderate strength of evidence.[9] The review also found low strength of evidence for a small-to-moderate positive effect of PCMH on staff experience, and reduced emergency department visits. In the VHA, a nationwide observational study of 913 clinics, 5404 primary care staff, and 5.6 million Veterans found that clinics with better PACT implementation (*ie,* clinics that best adhere to the optimal PACT model) were associated with higher patient satisfaction, higher performance on clinical quality measures, lower staff burnout, and lower hospitalization and emergency department use.[10] A rapid review of different team-based primary care structures found moderate strength of evidence for a nurse chronic care manager on improved patient outcomes, and low strength of evidence for nurse practitioner team co-managers on increased patient access, retrained medical assistants on increased screening rates, and variable team staff professions to match patient populations on higher quality of care.[11]

Use of staffing models in outpatient specialty care settings may have similar benefits to productivity and patient-important outcomes by better matching staff to tasks appropriate for their skillsets, and by ensuring that staff are most efficiently utilized to avoid shortages. As in primary care, these models could make use of new or existing non-provider staff to complete different tasks or could be used to create new clinics to reorganize how all providers and staff collectively complete tasks to deliver patient care. No single staffing model is dominant in outpatient specialty care, but it is possible that similar models could be effective across specialties. In Table 1, we present possible outpatient specialty care staffing models or

interventions, organized after the abovementioned Cochrane review[4] on inpatient staffing models.

Table 1. Example Staffing Models/Interventions in Healthcare

Type	Description
New Staff	Adding new staff members *Example: addition of a nurse case manager to optimize patient management and care*
Different Use of Staff	Changing staff duties to increase efficiency *Example: specialist nurse now engages in regular patient follow-up visits instead of a specialist physician*
New Clinic	Adding a new clinic or integrating new functions into an existing clinic to meet a specific clinic need *Example: addition of a new clinic to treat specific symptoms or triage patients into different types of care*
New Teamwork	Implementing new teams of staff to optimize staff and resource utilization *Example: creating a specific team of clinicians and staff to meet clinic needs*
Improved Teamwork	Reorganizing staff to increase efficiency *Example: assigning staff specific roles in a clinic to improve their workflow*
Change in Working Hours	Shifting or increasing/decreasing working hours for some or all staff to meet patient demand *Example: opening a night clinic for several nights a week so that patients can see their specialty provider after normal business hours*
Change in Staffing-Related Clinic Resources	Adding or removing clinic resources to help staff maximize their productivity *Example: adding additional exam rooms to a clinic so that lack of space is no longer an impediment to staff workflow*

In summary, PCMH and PACT staffing models in primary care have been associated with increases in quality, access, patient and staff experience, and with fewer hospital admissions and emergency department visits. Compared with inpatient and primary care staffing models, however, the effects of different staffing models in outpatient specialty care are not well understood. The aim of this report is to summarize the literature on the relationships between outpatient specialty care staffing models, staff productivity, and patient-important outcomes, and describe how these models vary by program and contextual characteristics. In this Brief, we focus on supply-side changes to staffing (*ie,* new or different staff or clinics), rather than demand-side changes (*ie,* fewer or less complex patients).

METHODS

PROTOCOL

A preregistered protocol for this review can be found on the PROSPERO international prospective register of systematic reviews (http://www.crd.york.ac.uk/PROSPERO/; registration number CRD42021285060).

KEY QUESTIONS

The following key questions were the focus of this review:

Key Question 1: What staffing models for outpatient specialty care clinical support staff and clinicians are associated with increased staff productivity and improved patient outcomes?

Key Question 2: How do staffing models for outpatient specialty care clinical support staff and clinicians vary by program or contextual characteristics (*eg*, program type, rural or urban setting, *etc*)?

ELIGIBILITY CRITERIA

The ESP included studies that met the following criteria:

***P**opulation*	Outpatient specialty care programs (allergy/immunology, cardiology, critical care/pulmonary, dermatology, endocrinology/diabetes, gastroenterology, HIV/hepatitis, infectious disease, nephrology, neurology, oncology, optometry, pain management, rheumatology, sleep medicine)
***I**ntervention*	Staffing models (*ie*, practices for adding/removing staff, expanding or reducing work hours, or altering allocation of clinic resources [*eg*, clinic room availability]) for outpatient specialty care program clinical support staff and clinicians (excluding administrative staff)
***C**omparator*	Alternative staffing models (*ie*, implemented in comparable setting), pre/post implementation of staffing model, or no comparator
***O**utcomes*	• Productivity outcomes (healthcare utilization [*ie*, reduction in emergency department visits, number of patients seen], provider and staff satisfaction, cost-effectiveness), quality [*ie*, meeting a quality measure]) • Patient-important outcomes (patient satisfaction, healthcare access [*eg*, wait times for appointments], equity [*eg*, disparities in care], patient health outcomes [*eg*, HIV viral suppression])
***T**iming*	Any
***S**etting*	United States
***S**tudy Design*	Any, but we may prioritize articles using a best-evidence approach to accommodate Evidence Brief timeline

DATA SOURCES AND SEARCHES

To identify articles relevant to the key questions, a research librarian searched Ovid MEDLINE, CINAHL, Cochrane Database of Systematic Reviews, and ClinicalTrials.gov as well as AHRQ and HSR&D databases through October 2021 using terms for *outpatient specialty care programs (ie, immunology, oncology, cardiology), staffing* and *workload* (see Appendix A in Supplemental Materials for complete search strategies). Additional citations were identified from hand-searching reference lists and consultation with content experts. We limited the search to published and indexed articles involving human subjects available in the English language. Study selection was based on the eligibility criteria described above. Models involving medical scribes were excluded, as a recent ESP systematic review[12] covered this intervention type in cardiology, orthopedic, and emergency departments. Titles, abstracts, and full-text articles were reviewed by 2 investigators. All disagreements were resolved by consensus or discussion with a third reviewer.

DATA ABSTRACTION AND ASSESSMENT

Effect information and population, intervention (or staffing model, if study involved no intervention), and comparator characteristics were abstracted from all included studies. The internal validity (risk of bias) of each included study was rated using the Cochrane Risk of Bias tools for randomized controlled trials[13] and unrandomized studies,[14] as well as the Joanna Briggs Institute (JBI) Checklist for cross-sectional and repeated cross-sectional studies.[15] 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 a third reviewer.

We graded the strength of the evidence (SOE) for each outcome based on the AHRQ Methods Guide for Comparative Effectiveness Reviews.[16] This approach provides a rating of confidence in reported findings based on trial methodology (design, quality, and risk of bias), consistency (whether effects are in the same direction and have a consistent magnitude), and directness (whether assessed outcomes are clinically important to patients and providers). When information on precision of findings (*eg*, confidence intervals) is available, certainty of evidence is also evaluated. Because of substantial variation in outcomes across studies, we assessed strength of evidence for each intervention type/model rather than for each outcome type. For this review, *high strength* evidence consisted of multiple, large trials with low risk of bias (or good quality) and consistent and precise findings. *Moderate strength* evidence consisted of multiple trials with low or unclear risk of bias (mostly good or fair quality), and consistent and precise findings. *Low strength* evidence consisted of a single study or multiple small studies with unclear, some concerns for, or high risk of bias (or mostly fair or poor study quality) and inconsistent or imprecise findings. *Insufficient* evidence consisted of a single study or multiple small studies with unclear, some concerns for, or high risk of bias (or mostly fair or poor study quality) and inconsistent interventions/models and/or outcomes.

SYNTHESIS

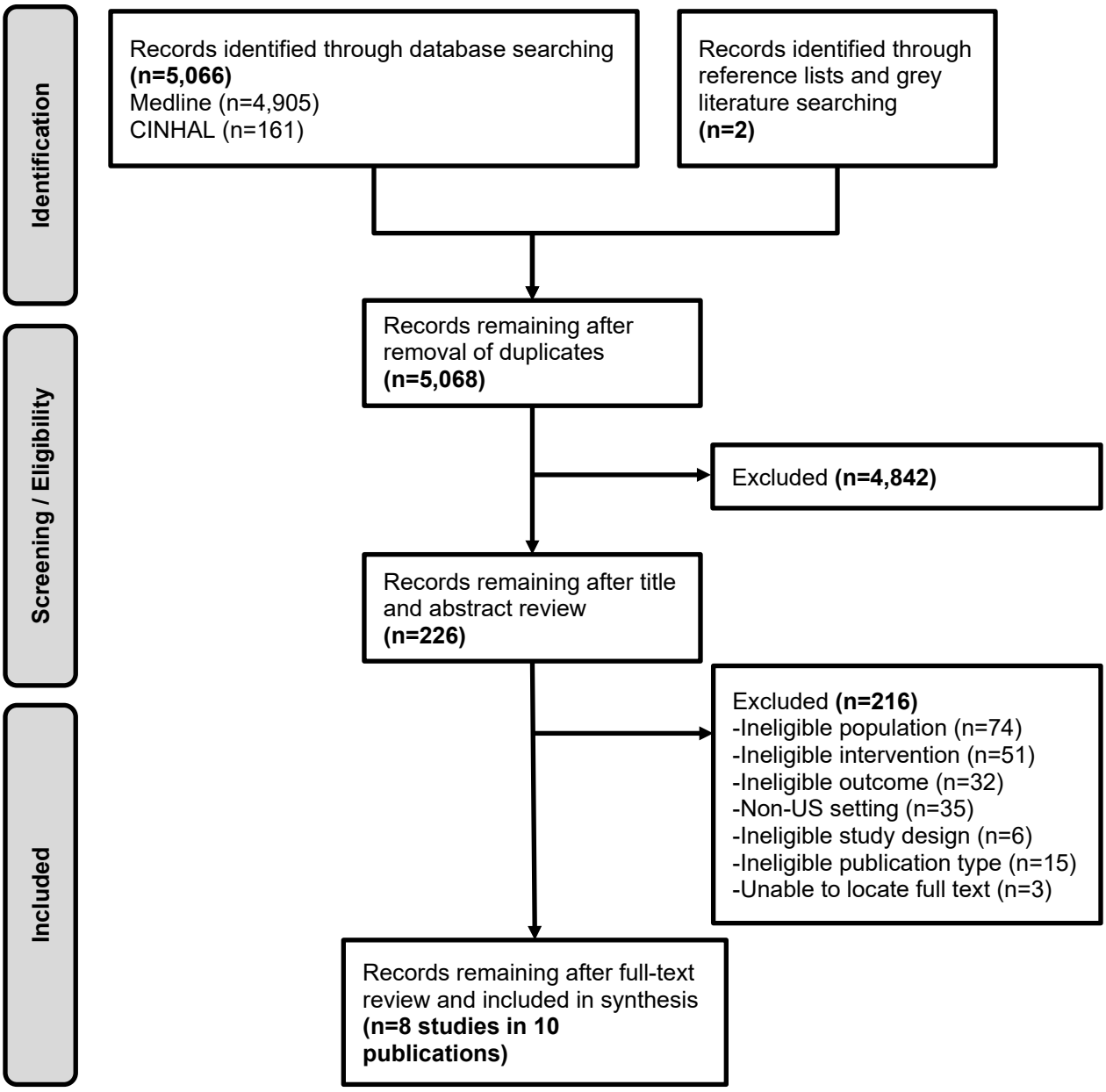
We synthesized available evidence narratively by staffing model type (addition of new staff or redefined roles of existing staff, or establishment of a new clinic), describing patient and staffing characteristics and outcomes.

RESULTS

LITERATURE FLOW

The literature flow diagram (Figure 2) summarizes the results of the study selection process (full list of excluded studies available in Appendix B in Supplemental Materials).

Figure 2. Literature Flowchart



Abbreviation. CINAHL=Cumulative Index of Nursing and Allied Health.

LITERATURE OVERVIEW

Our search identified 5,068 potentially relevant articles. We included 8 studies in 10 publications,[17-26] which are summarized in Table 2 (see Appendix C in Supplemental Materials for full study details). Most studies[17,20,22,24-26] examined the impact of new or additional mid-level staff or advanced practice providers (*ie*, nurses, advanced practice nurses [APNs], nurse practitioners [NPs], or physician assistants [PAs]) on productivity (*ie*, number of patients seen, ED visits or hospitalizations, or staff satisfaction) or patient outcomes (*ie*, patient satisfaction or symptom management). Two studies[21,23] examined the impact of new clinics developed to meet a specific clinical need (*eg*, symptom management among patients with breast cancer). Among the 5 studies reporting patient sample size, the median sample size was 199 (range: 55-15,381), with all but 2 studies including fewer than 200 patients. We identified 1 study in progress (see Appendix D in Supplemental Materials), which examined the use of a specially trained aid to support outpatient care for patients with congestive heart failure.

We excluded 51 studies after full-text screening for examining an ineligible intervention. Most of these studies evaluated interventions that were completely unrelated to staffing or work, but we did exclude a few intervention categories that were close to our topic but did not meet our inclusion criteria. These ineligible intervention categories included: telemedicine or telehealth interventions, descriptions of staffing interventions that did not include an evaluation, non-intervention measures of staffing, and non-staffing resource interventions (*eg*, changing patient registration procedures). We also excluded 32 studies for containing ineligible outcomes. Several of these studies did describe a staffing model or intervention but reported no eligible quantitative outcomes. The full list of excluded studies is available in Appendix B.

Of the studies that met inclusion criteria, most were cross-sectional[17,20,25] or repeated cross-sectional design.[21,24,26] Common limitations among the cross-sectional studies included lack of information on the patient population and lack of statistical analysis. Two cohort studies[22,23] were limited by lack of data provided on the samples, making it difficult to assess whether observed outcome changes were more likely due to the intervention or other sample characteristics.

No evidence was rated as high or moderate strength due to variability in staffing models and outcome measurement and study design limitations (*eg*, lack of comparison groups and/or statistical analysis). Our overall confidence in the evidence is low or insufficient due to limitations in study design (*eg*, lack of comparison group), other methodological limitations of the studies, and inconsistency in staffing models and outcome measurement. Additionally, lack of methodological detail made it difficult to evaluate reported associations between staffing models, productivity, and patient-important outcomes.

Table 2. Characteristics of Included Studies

Author, Year	Study Design	Sample Size *Follow-up*	Specialty Area	Population	Staffing Characteristics	Productivity Outcomes [a]	Patient-Important Outcomes [b]
New or Existing Staff							
Albert 2010[17]	Cross-sectional	N=15,381 patients in 167 practices *NA*	Cardiology	Patients with chronic HF or previous MI	Number of APNs or PAs/ practice	None	Compliance with guideline-recommended therapy
Garnett 2020[20]	Cross-sectional	N=1,790 patients in 1 practice (12 NCMs) *NA*	Hematology	Adult patients with complex hematologic cancer	Existence of NCMs	ED visits; Hospital admission or readmission	Patient self-management; Patient treatment adherence; Change in health behavior; Improved continuity of care
Huang 2018[22]	Uncontrolled Pre/post	N=55 patients in 1 practice *5 weeks/1.33 months [40 days]*	Hematology/ oncology	Patients in an outpatient chemotherapy unit	Schedule optimization to reduce staffing violations of nurse-to-patient ratios	Patient volume; Average chair utilization; Provider and staff satisfaction; Resource constraint violations	Patients wait time to treatment initiation; Wait time between provider visit and infusion
Ross 2014[24]	Repeated cross-sectional	NR *32 weeks/8 months*	Neurology	Patients referred for new neurologic symptoms	A new clinical team to evaluate patients with new neurologic symptoms or signs and provide direction for patients to: primary care physician, a subspecialty clinic, or a general neurology physician who provides ongoing care	Lead time (time to 3rd available appointment)	Patient satisfaction
Ruder 2011[25]	Cross-sectional	N=199 patients in 1 practice *NA*	Oncology	Ambulatory oncology clinic patients: Diagnoses included solid	Addition of an oncology pharmacist to an outpatient oncology clinic to provide patient and	Number of patients seen by pharmacist; Number of pharmacist clinical interventions;	Patient satisfaction; Adverse events;

Author, Year	Study Design	Sample Size *Follow-up*	Specialty Area	Population	Staffing Characteristics	Productivity Outcomes [a]	Patient-Important Outcomes [b]
				tumors (89%), hematological malignancies (3%), and miscellaneous diseases (8%)	family education, medication history and reconciliation, adverse drug event monitoring, symptom management, and chemotherapy regimen review	Number of pharmacist consultation interventions; Colleague satisfaction; Cost	
Smith 2004[26]	Repeated cross-sectional	NR *NA*	Nephrology	Huntsville Medical Group's rural ESRD patients on chronic dialysis	Advanced practice providers (PAs, NPs) integrated into the Huntsville Medical Consulting Group practice in a rural dialysis clinic to visit chronic dialysis patients 1x per week to review medications, treatment plans, and vascular access	Hospital admission; Number of inpatient days; Length of hospital stay	Mortality
New Clinic							
Graze 2014[21]	Repeated cross-sectional	NR *72 weeks/18 months*	Oncology	Breast cancer patients attending the Anne Arundel Medical Center DeCesris Cancer Institute	Symptom management clinic (SMC) led by advanced oncology NPs, embedded within oncology practice at medical center. Existing oncology nurse triage call system was integrated with the SMC to enhance coordination, communication, and patient education	Oncology unit admissions; ED visits; Breast Cancer Care Quality Measures set	Patient satisfaction

Author, Year	Study Design	Sample Size *Follow-up*	Specialty Area	Population	Staffing Characteristics	Productivity Outcomes [a]	Patient-Important Outcomes [b]
Reese 2021[23]	Retrospective cohort study	N=133 patients in 1 practice *NA*	Neurology	Patients presenting to outpatient neurology clinic deemed appropriate candidates for headache infusion by clinic nurse	Headache Infusion Center set up infusion patients following a multistep protocol to meet neurology team's clinical experience and patient needs	Duration of visit; Cost	Patient satisfaction; Pain relief

Notes. [a] Productivity outcomes include: Utilization (*ie*, number of visits, emergency department visits), cost, and provider and staff satisfaction, and quality (*ie*, meeting a quality measure); [b] Patient-important outcomes include patient satisfaction, healthcare access (*eg*, wait times for appointments), equity (*eg*, disparities in care), patient health outcomes (*eg*, symptom improvement).
Abbreviations. APN=advanced practice nurse; HF=heart failure; MI=myocardial infarction; NA=not available; NCM=nurse care manager; NP=nurse practitioner, NR=not reported; PA=physician's assistant.

EFFECTIVENESS OF STAFFING MODELS FOR OUTPATIENT SPECIALTY CARE

New or Existing Staff

Three studies[24-26] that examined adding *new staff* to outpatient specialty clinics reported high patient, provider, and staff satisfaction and reductions in appointment wait times, inpatient admissions, and mortality (Table 3). In 1 study,[24] a new clinical team (1 physician, 2 NPs, 1 PA, supporting nursing, and medical staff) added to an outpatient neurology clinic to evaluate new neurology referrals and direct them either to primary care, a subspecialty clinic, or a general neurology physician, reduced monthly lead time (defined as *time to third available appointment*) from 299 days pre-implementation to 10 days post-implementation. Patient satisfaction was unchanged, with the same mean score pre- and post-implementation. In another study,[26] the addition of a physician extender (*ie*, NP or PA) to provide weekly visits, medication review, symptom management, and outreach reduced inpatient admissions, number of inpatient days, and mortality among outpatient chronic dialysis clinic patients. One study in an outpatient oncology setting[25] reported high levels of patient, provider, and staff satisfaction with the addition of an oncology pharmacist providing patient education, medication reconciliation, adverse drug event monitoring, and symptom management. Our confidence in these findings is low as they come from cross-sectional or repeated cross-sectional studies with limited information on the study samples and limited or no analysis of data.

Among studies examining *existing staff* (Table 4), 1 study[17] assessed compliance to guideline-recommended heart failure measures among 167 outpatient cardiology practices based on the number of APNs or PAs on staff (0 vs >0 to <2 vs ≥2) and reported that practices with at least 2 APNs or PAs had greater compliance with 2 out of the 7 assessed measures compared to practices with less than 2 APNs or PAs; no significant differences were observed between practices in the other 5 measures. Another study[22] reported reduced staffing violations after implementing a scheduling optimization intervention in an outpatient chemotherapy unit, and a final included study[20] linked nurse case manager activities to various quality measures, including improved continuity of care, patient self-management, and treatment adherence among complex hematologic cancer patients. As with studies of added staff, our confidence in these findings is low as they come from mostly cross-sectional or repeated cross-sectional studies with limited information on the study samples and limited or no analysis of data.

Table 3. Outcomes of Adding New Staff to an Existing Model of Care

Author, Year *N*	Specialty Area	Staffing Intervention/Model	Productivity Outcomes	Patient-Important Outcomes
Ross 2014[24] *NR*	Neurology	New clinical team (1 physician, 2 NPs, 1 PA) to evaluate and direct new neurology referrals	Utilization Monthly Lead Time:[a] 299 days pre- vs 10 days post-implementation	Patient Satisfaction Mean score (out of 100) 89.25 pre- vs 89.25 post-implementation
Ruder 2011[25] *N=199*	Oncology	Oncology pharmacists providing patient education, medication reconciliation, and symptom management	Utilization Average of 2.9 visits with pharmacist per patient during treatment; 583 pharmacist clinical interventions Cost[b] Saved $210,000 in chemotherapy costs Provider and Staff Satisfaction 98% positive ratings	Patient Satisfaction 95% positive ratings
Smith 2004[26] *NR*	Nephrology	Advanced practice providers (NP or PA) providing weekly visits, medication and treatment review, and outreach	Utilization Hospital admission frequency: 1.75 pre- vs 1.27 post-implementation Inpatient days/dialysis patient: 14.25 pre- vs 7.3 post-implementation	Patient Health Mortality: 19.01% pre- vs 9.3% post-implementation

Notes. [a] Defined as time to 3rd available appointment; [b] Estimated from reduced chemotherapy mixing and reduced dosages.
Abbreviations. NP=nurse practitioner; NR=not reported; PA=physician assistant.

Table 4. Outcomes of Existing Staff on an Existing Model of Care

Author, Year *N*	Specialty Area	Staffing Intervention/Model	Productivity Outcomes	Patient-Important Outcomes
Albert 2010[17]	Cardiology	Number of existing APNs or PAs on staff	Quality Conformity to guideline-recommended HF measures: ≥ 2 APNs or PAs greater conformity (vs <2 APNs or PAs) for implantable cardioverter-defibrillator therapy and delivery of HF education, p<0.01 for both (NSD other measures)	NR
Garnett 2020[20]	Oncology/ Hematology	Nurse case manager activities	Utilization[a] Prevention of ED visits: 1% Prevention of admission or readmission to hospital: 1% Quality[a] Improved continuity of care: 52%	Patient Health[a] Patient self-management: 15% Patient treatment adherence: 7% Change in health behavior: 21%
Huang 2018[22]	Oncology	Scheduling optimization	Utilization (pre- vs post-implementation) Patient volume: 44.7 vs 44.7 Average chair utilization: 8.8 vs 8.3 Resource constraint violation: 20.1 vs 14.7 Provider and Staff Satisfaction Overall feedback from managers, physicians, nurses, pharmacists, and nurses was positive (data NR)	Healthcare Access Patient wait time to treatment initiation decreased from as much as 40 minutes to 5 minutes (data NR) Wait time between provider visit and infusion appointment: 5 to 15-minute increase (data NR)

Notes. [a] Percentage of occurrences of quality measures that were linked to nurse case manager activities.
Abbreviations. APN = advanced practice nurse; NCM = nurse case manager; NR = not reported; NSD = no significant difference; PA = physician assistant; RN = registered nurse.

New Clinics

Two studies[21,23] examined the effect of developing new clinics to meet specific needs within established outpatient clinics (Table 5).[21,23] In an outpatient oncology clinic, integrating a symptom management clinic led by oncology APNs into an existing oncology nurse triage system with the goal of enhancing coordination, communication, and patient education reduced oncology inpatient admissions and increased patient satisfaction scores. In another study,[23] a new headache infusion center staffed by RNs was able to reduce visit duration and cost by accommodating patients presenting to an outpatient neurology clinic meeting eligibility criteria for headache infusion with high patient satisfaction. However, we found these studies to provide insufficient evidence as they were limited by lack of information about the study and comparison populations, and lack of analysis.

Table 5. New Clinics Established Within an Existing Outpatient Setting

Author, Year *N*	Specialty Area	Staffing Intervention/Model	Productivity Outcomes	Patient-Important Outcomes
Graze 2014[21] *NR*	Oncology	Symptom management clinic integrated into nurse triage call system	Utilization Oncology unit admissions: 26 per month pre- vs 17 per month post-integration ED Visits: At least 40 ED visits prevented (data NR)	Patient Satisfaction 80% pre- vs 90% post-integration[a]
Reese 2021[23] *N=133*	Neurology	Headache infusion center added to outpatient neurology center	Utilization Duration of visit (mean) 2.51 hrs. infusion clinic vs 6.24 hrs ED[b] Cost Mean cost of visit $962 infusion clinic vs $10,375 ED	Patient Satisfaction Mean score (out of 5) 4.2 to 4.96 on all measures

Notes. [a] Percentages estimated from Figure 2 in Graze 2014; [b] Compared to patients with "comparable issues" seen in the ED.
Abbreviations. ED = emergency department; Hrs = hours; NR = not reported.

STAFFING MODEL CONTEXTUAL CHARACTERISTICS

We did not identify any studies that compared different staffing models head-to-head, so we cannot make any direct conclusions about the relationship between staffing models and contextual characteristics (*eg*, specialty, rurality, adding staff vs clinics, *etc*). Studies did vary by specialty and rurality, but indirect comparisons of these characteristics across studies also could not be made for most outcomes, as they were not consistent between studies. However, patient, provider, and staff satisfaction were high or positive across studies of different specialties. Patient satisfaction was frequently measured (4 studies),[21,23-25] and was consistently high. Provider and staff satisfaction, measured in 2 studies,[22,25] was high in 1 study, and positive but not quantitatively reported in the other.

DISCUSSION

Staffing interventions/models that add or integrate existing non-physician staff in specialty care outpatient clinics may be linked to lower utilization, higher access, improved outcomes, reduced costs, and high patient/provider and staff satisfaction. Our confidence in these findings is low, as most are derived from studies using a cross-sectional, repeated cross-sectional, or uncontrolled pre-post study design, without a comparison group. It is unclear whether adding new clinics to support existing specialty care outpatient clinics is associated with improved productivity or patient-important outcomes. The 2 identified studies assessing the addition of new clinics were limited by lack of comparison groups and methodological detail. Direct comparisons between intervention types (*eg*, staff vs clinic interventions), interventions in different specialties, and interventions in urban versus rural areas were not found. Across studies of different specialties, patient, provider, and staff satisfaction were positive or high.

Interventions/models identified in this review either directed patients to an advanced practice provider or staff member rather than a specialist for some of their care or set up a specialty clinic intended to triage patients in some way. Theoretically, both types of interventions/models could improve productivity and patient outcomes, but the evidence is of limited quality to draw any firm conclusions on the topic. Moreover, interventions or models were generally ad hoc in nature, designed specifically for each specialty or even for each clinic. A model of optimal outpatient specialty care like PCMH or PACT in primary care would help in developing and evaluating new staffing models. More directed, focused research on well-defined staffing models in outpatient specialty care is needed.

LIMITATIONS

The studies found in this review were mostly of fair or poor quality, with only 1 employing a design that utilized a comparison group.[23] Without a comparison group, it was not possible to determine if the evaluated staffing models perform better than usual care. Further, only 1[17] of the 8 included studies[17,20-26] employed any type of statistical analysis. Such analyses may or may not have shown intervention effects, but without them, the strength of evidence is much lower. Studies without statistical analyses presented interventions and findings in a case study fashion that omitted many important details (*eg,* patient or staff characteristics), as noted in the study quality ratings (see Appendix C in the Supplemental Materials).

FUTURE RESEARCH

There is need for research on outpatient specialty care staffing in the VHA to examine the addition of a specific type of staff member or clinic across specialties. At present, the existing literature lacks a uniform model of outpatient specialty care staffing. It is unclear if this is due to different specialty needs or a paucity of research on staffing models. Research that focuses on analyzing the effects of advanced practice providers/clinical support staff or triage clinics on productivity and patient outcomes in specialty care could help the VHA optimize its staffing models. Stakeholders in VA should first define a conceptual model of specialty care delivery, like PACT in primary care, and then map ideal staffing and clinics to that model; researchers can then follow this conceptual model as a map to evaluate different staffing or clinic models to determine the best way to deliver specialty care. Without an overarching conceptual model, it would be difficult to direct future work in this area.

In addition, although case studies can be useful for management and practitioners, their findings are difficult to generalize. More rigorous staffing research, including studies with randomized interventional designs (such as the *randomized evaluation* model used by the VA's Partnered Evidence-based Policy Resource Center), relevant comparators, and guidance by a specialty care conceptual model, may aid the VHA in identifying effective outpatient specialty care staffing models. In addition, the COVID-19 pandemic, and the ensuing healthcare staffing shortages and shift towards telemedicine, has created new challenges for specialty care staffing. Future research should examine how changes to staffing models can respond to short-term staffing shortages or the need to maintain both in-person and virtual clinics. Even as the pandemic recedes, planning for responsive staffing models should be ongoing to ensure preparedness for future care disruptions.

Finally, many VA facilities and clinics, like other major healthcare systems with teaching hospitals, utilize healthcare trainees (including physician residents and fellows) to assist in providing patient care while receiving training. Research should examine how these trainees can augment existing specialty care staffing levels, while still maintaining quality of care and maximizing trainee education.

CONCLUSIONS

Little evidence is available on staffing models in the outpatient specialty care context. Existing models are generally ad hoc in nature, and research to date has lacked an overarching conceptual model analogous to those used in primary care settings and has been hampered by methodological inconsistency and other limitations. In the VA context, development and implementation of specialty care staffing models that improve productivity and patient outcomes would be facilitated through use of 1) an overarching conceptual framework that identifies key staffing model elements and outcomes across specialty care settings, and 2) more rigorous study designs and analysis methods that would increase the informativeness of evidence on specialty care staffing models

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