

Organizational Structure for Chronic Heart Failure and Chronic Obstructive Pulmonary Disease

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Broad organizational efforts have led to implementation and dissemination of programs that drive quality and measurement of performance within healthcare organizations. These performance measures have guided a higher quality of care for patients with numerous chronic conditions, including chronic heart failure (CHF).¹⁻³ Over the past 30 years, greater adoption of organizational structure for the management of CHF has been associated with a decline in CHF-related mortality.⁴ During this same period, mortality rates due to chronic obstructive pulmonary disease (COPD) have been steadily increasing, with COPD becoming the third most common cause of death.^{5,6}

Between 2007 and 2011, the United States' prevalence of CHF and COPD were 5.1 million and 12.7 million cases, accounting for \$34.4 billion and \$49.9 billion in annual healthcare spending, respectively.⁷ Within Veterans Affairs (VA), more patients have a diagnosis of COPD than CHF and there is higher total spending on COPD.⁸ However, organizational programs promoting guideline concordance for management of COPD, analogous to those for CHF, have not been systematically implemented.^{8,9} Recent studies in the United Kingdom have shown an unacceptable variation in the organization and delivery of care for patients with COPD.¹⁰ Contrasting how facilities structure their clinical practices and programs in managing CHF versus COPD could shed light on future directions to improve care for COPD at the organizational level. Applying the lessons learned from CHF could ensure a consistent and homogeneous approach to conditions that typically do not receive as much attention as CHF.

We compared the organizational structures for CHF and COPD patients within VA facilities across the United States. We focused on differences in number and type of clinicians, specialty clinics, performance measures, and discharge practices. Identifying these differences in clinical practices and organizational structure could highlight methods for improving quality

ABSTRACT

Objectives: In contrast to chronic heart failure (CHF), measures of quality of care for chronic obstructive pulmonary disease (COPD) are poor. Our objective was to examine differences in organizational structure available to support quality of care for patients with CHF and COPD.

Study Design: We performed 2 nationwide surveys exploring organizational structure for the management of CHF and COPD. We surveyed the chief of medicine and the chief of cardiology and pulmonary medicine at 120 Veterans Affairs facilities in the United States.

Methods: Analogous questions about organizational structure that enhanced adherence to guideline-based care were compared between CHF and COPD surveys.

Results: We found large and notable differences in the organizational structure for disease management, with systematically less attention given to COPD than CHF. These differences were evident in multiple processes of care. Key differences included fewer facilities: having COPD clinics than CHF clinics (12.7% vs 50.8%; $P < .01$), relating performance measures with COPD providers than CHF providers (17.1% vs 70%; $P < .01$), and having home monitoring programs for COPD than for CHF (50.5% vs 87.4%; $P < .01$).

Conclusions: Despite the growing burden of COPD, less organizational structure existed for COPD than CHF. Lack of organizational structure for COPD likely impedes an organization's abilities to encourage high-quality care and avoid recently implemented hospital readmission penalties. Our results suggest the need to develop a systematic approach for healthcare systems to provide essential organizational structure based on the burden of disease in the population.

Am J Manag Care. 2016;22(3):e82-e87

of care for COPD and pinpoint areas where clinical resources for COPD are insufficient.

METHODS

We performed a nationwide, cross-sectional study of VA facilities to evaluate the clinical practices and organizational structure of COPD and CHF care. We surveyed chiefs of medicine, as well as cardiology and pulmonary medicine, of VA facilities with acute inpatient units. Respective CHF and COPD surveys asked about clinical support that enhanced adherence to guideline-based care. The CHF survey was developed by the CHF Quality Enhance Research Initiative (QUERI), a VA-based effort to improve the quality of evidence-based care. The COPD survey was developed by this study team to mirror questions in the CHF survey and target evidence-based practices identified from the National Quality Forum and the Agency for Health Research and Quality clearinghouse.¹¹⁻¹⁵ Responses were compared between analogous questions from the 2 surveys.

The VA Puget Sound Health Care System Institutional Review Board approved the study.

Survey Development

The CHF QUERI developed the CHF survey to evaluate processes of care, clinical practices, and discharge practices at VA facilities (see [eAppendix 1](#) [eAppendices available at www.ajmc.com]). The CHF survey included 19 questions and was expected to take 5 to 10 minutes to complete. Survey questions elicited information on the number of cardiologists, standardized heart failure programs, standardized computer order sets for CHF, and compliance with CHF guidelines. Questions relating to CHF practices and guidelines were developed based on existing recommendations for the treatment of heart failure.¹⁶ The CHF survey was conducted in 2008 by VA Patient Care Services at all 144 VA facilities, with a response rate of 100%.

We developed the COPD survey to parallel questions in the CHF survey, assessing organizational factors related to the management of COPD (see [eAppendix 2](#)). Analogous questions asked about the number of pulmonologists, standardized COPD programs, standardized computer order sets for COPD, compliance with COPD guidelines, and COPD discharge practices. Questions relating to COPD practice and guidelines were based on current recommendations for the treatment of COPD.¹¹⁻¹⁴ The COPD survey was administered in 2011 to 122 VA facilities with acute inpatient units (120 of which were

Take-Away Points

Using 2 nationwide surveys to assess the organizational structure available for chronic disease management at Veterans Affairs facilities, we found systematically less attention given to management of chronic obstructive pulmonary disease (COPD) than to chronic heart failure (CHF).

- We identified key differences in the management of patients with COPD and CHF.
- Recognizing differences in organization structure for disease management may help health systems to prioritize quality improvement efforts for patients with COPD.
- Our study highlights how disparities in quality improvement can develop in the absence of a systematic approach based on the burden of disease.

also sent the CHF survey); 111 facilities responded (91%). Although the 2 surveys were conducted in 2 different time periods, the VA organization structures remained stable without major policy changes for COPD during that time.

Population

The final study sample included 120 VA facilities with acute inpatient units that were sent both CHF and COPD facility surveys. For facilities that had responses from both the chief of medicine and the chief of cardiology and pulmonary medicine, we used the responses from the chief of cardiology and pulmonary medicine in our study because they would have more detailed knowledge of clinical practices as the leader of the department.

Statistics

We conducted a descriptive analysis to compare survey responses for analogous questions from the CHF and COPD surveys using a 2-sample *t* test of proportions. None of the survey questions had more than 2 missing responses, and missing responses were excluded from the analysis. All statistical analyses were performed using Stata version 14.1 (StataCorp, College Station, Texas).

RESULTS

There were notable differences in organizational structure for managing CHF and COPD reported by the facility leaders ([Table 1](#)). The majority of facilities had staffed pulmonologists and cardiologists (91% vs 93.3%; $P = .51$), and there was no significant difference between the proportion of pulmonologists specializing in COPD care and that of cardiologists specializing in CHF care (32.4% vs 39.2%; $P = .28$). However, there were significantly fewer facilities that reported having COPD clinics than having CHF clinics (12.7% vs 50.8%; $P < .01$).

For programs that were typically led by specialty services, there were no significant differences between management of COPD and CHF for most standardized practices and protocols in the outpatient setting. Facilities reported

Table 1. CHF and COPD Survey Responses Related to Organizational Structure of VA Facilities

Element of Organizational Structure	CHF n (%)	COPD n (%)	P
Facilities with cardiologist/pulmonologist	112 (93.3)	101 (91.0)	.51
Specialist focused on CHF/COPD	47 (39.2)	36 (32.4)	.28
Clinic that specializes in CHF/COPD	61 (50.8)	14 (12.7)	<.01
Standardized outpatient management			
Protocols for CHF/COPD management	22 (18.5)	30 (27.0)	.12
Protocols for patient self-management	30 (25.2)	26 (23.4)	.75
Patient education program	81 (67.5)	76 (68.5)	.87
Exercise program	47 (39.2)	33 (29.7)	.13
Pharmacist available for CHF/COPD	64 (53.8)	51 (45.9)	.23
Any home monitoring program			
Telemedicine device	92 (88.5)	42 (75.0)	.03
Nurse calls patient for follow-up	62 (59.6)	32 (57.1)	.76
Patient phones data in	36 (34.6)	15 (26.8)	.31
Provider who adjusts meds for telemedicine			
Specialist MD	33 (31.7)	26 (46.4)	.07
PCP	69 (66.3)	36 (64.3)	.79
Nurse	33 (31.7)	6 (10.7)	<.01
Standardized order sets for exacerbations			
Inpatients seen by CHF/COPD specialists	30 (25.0)	23 (20.7)	.44
Specialist MD	17 (56.7)	17 (73.9)	.19
NP	15 (50.0)	5 (21.7)	.04
RN	4 (13.3)	2 (8.7)	.60
Provide feedback on performance measures			
	84 (70.0)	19 (17.1)	<.01

CHF indicates chronic heart failure; COPD, chronic obstructive pulmonary disease; MD, medical doctor; meds, medications; NP, nurse practitioner; PCP, primary care provider; RN, registered nurse; VA, Veterans Affairs.
CHF survey was conducted in 2008 and COPD survey was conducted in 2011.

similar proportions of having protocols for outpatient management (27.0% vs 18.5%; $P = .12$), patient self-management (23.4% vs 25.2%; $P = 0.75$), and patient education programs (68.5% vs 67.5%; $P = .87$) for COPD and CHF, respectively. Compared with CHF outpatient disease management, COPD outpatient management included slightly fewer facilities that reported having a disease specific exercise program (29.7% vs 39.2%; $P = .13$) and less access to specialized pharmacists (45.9% vs 53.8%; $P = .23$).

A significantly lower proportion of facilities reported having COPD home monitoring programs than CHF home monitoring programs (50.5% vs 87.4%; $P < .01$). Among facilities that did have home monitoring programs, fewer telemedicine devices were used for monitoring data transmission for COPD than CHF (75% vs 88.5%; $P = .03$). Among facilities with home monitoring programs, COPD management also had significantly low-

er use of nurses for adjusting medications (10.7% vs. 31.7%; $P < .01$) and relied more heavily on physicians (46.4% vs 31.7%; $P = .07$) compared with CHF management.

There were no significant differences in reporting the use of standardized order sets for disease exacerbations (COPD: 29.7% vs CHF: 25%; $P = .42$), as well as inpatients routinely seen by a specialist (physicians, nurse practitioners, or nurses) during an inpatient stay (20.7% for COPD patients vs 25% for CHF patients; $P = .44$).

Although the majority of facilities reported routinely sharing disease-related performance measures with providers for CHF, less than one-fifth of hospitals reported sharing COPD-related performance measures (70% vs 17.1%; $P < .01$). Overall, facilities were more likely to share CHF-specific performance reminders than COPD-related performance reminders with providers. The majority of facilities reported sharing CHF-related performance reminders with providers, including 94.3% for angiotensin-converting enzyme (ACE) inhibitors, 78.4% for beta blockers, and 85.1% for ejection fraction (EF) (Table 2). Provider feedback for COPD management was much lower, and included 64% of hospitals providing feedback on appropriate use of oxygen therapy, 57.7% on smoking cessation counseling, 34.2% on spirometry assessment, and 16.2% on steroids for exacerbations.

Although a similar proportion of facilities reported assessing any quality measure prior to discharge for COPD and CHF patients (95.5% vs 95.8%; $P = .90$), there were notable differences in the specific quality measures that were assessed (Table 3). The majority of facilities reported assessing specific CHF measures, including EF assessment (83.3%), ACE inhibitors for (90%), beta blockers (80%), and spironolactone (51.7%). Assessing specific COPD measures occurred in 30% of facilities for prior confirmation of COPD by spirometry, 74.2% for assessment of smoking status, 70% for providing smoking cessation intervention, and 69.2% for oxygen for room air saturations of less than 88%.

DISCUSSION

In comparison to CHF, we found consistent and large systematic differences in the organizational structure

available to support the high-quality management of COPD. These differences were evident across processes of care, including clinic structure, type of provider involved in patient care, home monitoring programs, provider feedback on performance measures, and quality measures assessed during hospitalization. A comparative lack of organizational structure for COPD likely contributes to documented concerns about quality of care for patients with COPD.^{9,17} The VA has hundreds of measures of quality, though there are no measures specifically adopted for COPD. Our findings identify a gap in disease-specific focus that may help prioritize quality improvement efforts at a system level for patients with COPD.

The lack of organizational structure that we observe may be due to a lack of research to identify appropriate process measures for COPD. COPD is ranked as the most underfunded condition relative to disease-specific mortality.¹⁸ National Institutes of Health (NIH) funding for COPD research has not grown in many years and is still only 6% of the funding available for heart disease.¹⁹ Nevertheless, over the past 30 years, mortality due to COPD has doubled, whereas death due to heart disease has decreased by more than half.⁵ This decline in the burden of cardiovascular disease followed substantial increases in research funding.¹⁹ To better allocate research spending, the Institute of Medicine in the United States has recommended that the NIH explicitly associate the amount of research funding with the burden of disease—an approach that is relevant to how health systems prioritize clinical quality efforts.²⁰

Despite the relative lack of research funding for COPD, there is a body of literature that supports the implementation of organizational structure for COPD management. Systematic reviews of integrated disease management programs for COPD have demonstrated many parallels to CHF programs, with reduced hospital admissions, improved quality of life, and improved exercise capacity.^{21,22} Similarly, COPD and CHF studies on exercise programs have demonstrated better patient outcomes with participation in pulmonary and cardiac rehabilitation.^{23,24} Although there are still many deficiencies and controversies in COPD research, improving the organizational structure of disease management can lead to meaningful improvements in patient outcomes.²⁵

In our study, we found significantly less organizational structure available, even among COPD interventions that have been well studied. There was less feedback for guideline-based performance measures and fewer quality

■ **Table 2.** Feedback to Providers on Specific CHF and COPD Performance Measures

CHF Performance Measures		COPD Performance Measures	
Measures	n (%)	Measures	n (%)
ACE inhibitors in CHF	83 (94.3)	Oxygen therapy	71 (64.0)
Beta blockers in CHF	69 (78.4)	Smoking cessation	64 (57.7)
EF measurement	74 (85.1)	Spirometry performed	38 (34.2)
		Steroids for exacerbation	18 (16.2)

ACE indicates angiotensin-converting enzyme; CHF, chronic heart failure; COPD, chronic obstructive pulmonary disease; EF, ejection fraction.

measures assessed prior to hospital discharge for COPD than for CHF. Previous studies have demonstrated that awareness of COPD guidelines and adherence to guideline recommendations is low.²⁶⁻²⁸ Among 69,820 patients hospitalized in 360 different hospitals for acute COPD exacerbations, only 33% received appropriate guideline-based care.²⁸ Similarly, only 46% of ambulatory patients received appropriate chronic COPD management.²⁹ In contrast, previous studies have estimated that as many as 72% of ambulatory patients receive appropriate chronic CHF management.³⁰ Developing and aligning quality and performance measures to widely accepted guidelines has driven the implementation of these practices into care for multiple clinical conditions, and would likely improve the quality of care for COPD.

Patients who receive healthcare at the VA tend to receive higher quality of care compared with patients who receive healthcare elsewhere.³¹ Much of this difference is seen in areas where the VA has adopted performance measures for disease management. The VA has instituted several performance measures for CHF and has developed the CHF QUERI to identify and apply best practices for CHF care.³² Despite more VA patients being affected by COPD than CHF, no similar programs exist to improve quality for COPD.⁹ The specific payment metrics that tend to focus on heart disease outcomes in the private sector do not affect the VA healthcare system, allowing for a broader approach to improving health quality.

We have shown that in a large, nationwide healthcare system, there is a relative deficiency of organizational structure available for the management of COPD patients. Nevertheless, new policies have recently been implemented that impact COPD care and have focused attention to the disease. CMS has expanded the Hospital Readmission Reduction Program to include COPD.³³ Hospitals that have high risk-adjusted 30-day readmission rates are subject to a penalty with reduced reimbursement for Medicare patients. This penalty is being implemented without evidence demonstrating that re-

■ **Table 3.** Quality Measures Assessed Prior to Hospital Discharge

CHF Quality Measures	n (%)	COPD Quality Measures	n (%)
Influenza vaccine	104 (86.7)	Influenza vaccine	99 (82.5)
Pneumococcal vaccine	102 (85.0)	Pneumococcal vaccine	96 (80.0)
EF assessment	100 (83.3)	Prior spirometry	36 (30.0)
Use of ACE inhibitor	108 (90.0)	Assessment of smoking status	89 (74.2)
Use of beta blocker	96 (80.0)	Smoking cessation intervention	84 (70.0)
Use of spironolactone	62 (51.7)	Oxygen for RA sats <88%	83 (69.2)

ACE indicates angiotensin-converting enzyme; CHF, chronic heart failure; COPD, chronic obstructive pulmonary disease; EF, ejection fraction; RA sats, room air saturation.

admissions are a function of the quality of COPD care, preventable, or lead to poor health outcomes.³⁴ Despite the lack of a clear path to reduce readmissions, healthcare systems may attempt to develop and adopt organizational structure and practices for COPD management to offset the potential financial penalties.³⁵ Adoption of carefully thought out processes that emphasize a culture of quality may improve outcomes, even with evidence to suggest that the individual processes may not be effective.^{36,37}

Limitations and Strengths

We had a number of potential limitations that may affect the inferences we can draw from this study. We performed surveys that could be affected by response, recall, and social desirability bias, and we were unable to ascertain whether responses to the survey reflected true practice. In addition, the COPD survey was conducted several years after the CHF survey and we cannot account for any secular changes in practice during this period or between the time of the COPD survey and this publication. However, there was no systemwide intervention targeting COPD management in the VA during this period, and it is unlikely that organizational structure for COPD changed significantly. We believe that if a bias does exist, it likely reflects a greater discrepancy for organizational structure if both surveys had been taken in 2008. Although previous studies have found benefits from increased organizational structure, we were not able to assess whether individual practices were effective at improving outcomes. The time from initial surveys to publication may also limit the application of these results as increasing attention on COPD outcomes may have resulted in more organizational structures for COPD care. Lastly, the study setting was limited exclusively to VA facilities; therefore, our findings may not directly generalize to other healthcare systems.

This study also had important strengths. First, we engaged national VA clinical leaders to disseminate our surveys, which may have contributed to our high response

rates and minimal missing data. Second, we surveyed all facilities, thereby minimizing any opportunity to introduce bias by the type of facility or the regional variations in care. Third, we addressed questions that were based on the National Quality Forum or other developed standards, enhancing the ability to utilize in real-world settings.

CONCLUSIONS

In our national comparative study on the organizational structure available for treatment of COPD and CHF, we found less organizational structure available for COPD than for CHF management, which highlights the value placed on health systems for developing these structures for COPD. We suspect that these deficiencies exist throughout various health systems, in part because of the paucity of research and quality improvement efforts that currently exist for COPD. Our study highlights how disparities in quality measurement can develop in the absence of a systematic approach to identify health conditions that warrant closer monitoring. With continuous emphasis placed on value of care, accountable care organizations and other integrated healthcare settings will need to develop processes to address conditions that lead to poor patient outcomes and significant financial risk.

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Source of Funding: Funding for this research was provided by a Veterans Affairs clinical research grant IIR-09-354. The views expressed here are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs.

Author Disclosures: The authors report no relationship or financial interest with any entity that would pose a conflict of interest with the subject matter of this article.

Authorship Information: Concept and design (STR, C-FL, LAB, ESW, DHA); acquisition of data (STR, C-FL, DHA, PH); analysis and interpretation of data (STR, C-FL, ESW, PLH); drafting of the manuscript (STR, C-FL, LAB, DHA, PLH, PH); critical revision of the manuscript for important intellectual content (STR, C-FL, LAB, DHA, PLH, PH); statistical analysis (STR, C-FL, ESW, PLH); provision of patients or study materials (STR); obtaining funding (C-FL, DHA, PH); administrative, technical, or logistic support (C-FL, PH, DHA); and supervision (C-FL, PH, DHA).

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eAppendix 1

VA FACILITY SURVEY FOR HEART FAILURE

Part A

(To be completed by Chief of Cardiology or Chief of Medicine)

Please respond to the questions below regarding current processes of care at YOUR VA Facility for heart failure patients. Respond by checking the most appropriate answer.

Name of Your Facility:

1. Do you have cardiologists providing care in your hospital?

YES NO

1a. If YES: please write the current status for each of these positions for your facility.

Full time VA employed cardiologists

Part time VA employed cardiologists

Full time equivalent VA employed cardiologists

Full time contract cardiologists

Part time contract cardiologists

Full time equivalent contract cardiologists

At YOUR VA facility do you currently—

2. Have a clinic with special focus on heart failure..... YES NO

3. Have a cardiologist with special focus on heart failure..... YES NO

4. Have the following standardized heart failure program/activities...

a. Protocol for diuretic titration by provider..... YES NO

b. Protocol for diuretic titration by patient..... YES NO

c. Heart failure related patient education program... YES NO

d. Instruction on activity..... YES NO

e. Exercise program..... YES NO

f. Involvement by dietician..... YES NO

g. Use of pharmacist..... YES NO

h. Home monitoring..... YES NO

hi. If YES, for home monitoring how are the monitoring data transmitted? (Check ALL that apply):

- Telemedicine device
- Nurse calls patient for follow-up
- Patient phones data in
- Other

hii. For telemedicine patients, who adjusts medicine based on the telemedicine data received from the patient? (Check ALL that apply):

- Cardiologist
- Primary care provider
- Heart failure nurse
- Other
- No medication adjustments are done

eAppendix 2

VA Facility Survey for Chronic Obstructive Pulmonary Disease
To be completed by Chief of Pulmonary/Critical Care or Chief of Medicine

Please enter your Subject ID. Your Subject ID is provided in the text of the email message.

Subject ID#: _____

PART A

Please respond to the questions below regarding current processes of care at YOUR VA Medical Center for patients with Chronic Obstructive Pulmonary Disease (COPD). Respond by checking the most appropriate answer.

1. Do you have pulmonologists providing care in your medical center?

YES NO

If YES, please indicate the current number for each at your medical center:

- _____ # Full time equivalent (FTEE) VA employed pulmonologists
- _____ # VA employed pulmonologists
- _____ # Full time equivalent (FTEE) contract pulmonologists
- _____ # Contract pulmonologists

Currently at YOUR VA Medical Center,

2. Do you have a clinic with a special focus on COPD, not including a regular pulmonology clinic?

YES NO DON'T KNOW

3. Do you have a pulmonologist with a special focus on COPD?

YES NO DON'T KNOW

4. Do you have the following standardized COPD programs/activities in the outpatient setting?

a. Protocols for management of COPD by providers (MDs, nurses, or NP)	<input type="checkbox"/> YES	<input type="checkbox"/> NO
b. Protocols for self-management of COPD by patients	<input type="checkbox"/> YES	<input type="checkbox"/> NO
c. Home oxygen	<input type="checkbox"/> YES	<input type="checkbox"/> NO
d. COPD related patient education	<input type="checkbox"/> YES	<input type="checkbox"/> NO
e. Pulmonary Rehabilitation	<input type="checkbox"/> YES	<input type="checkbox"/> NO
f. Access to a pharmacist specifically for COPD medications:		
At pulmonary clinics	<input type="checkbox"/> YES	<input type="checkbox"/> NO
At primary care clinics	<input type="checkbox"/> YES	<input type="checkbox"/> NO
g. Home monitoring	<input type="checkbox"/> YES	<input type="checkbox"/> NO
<p>If YES for <u>home monitoring</u>, <u>how</u> are the monitoring data transmitted? (Check ALL that apply):</p> <p><input type="checkbox"/> Telemedicine device <input type="checkbox"/> Nurse calls patient for follow-up</p> <p><input type="checkbox"/> Patient phones data in <input type="checkbox"/> Other _____</p>		
<p>If <u>telemedicine device</u> is used, <u>who</u> adjusts medicine based on the telemedicine data received from the patient? (Check ALL that apply):</p> <p><input type="checkbox"/> Pulmonologist <input type="checkbox"/> Pulmonary nurse specialist</p> <p><input type="checkbox"/> Primary care provider <input type="checkbox"/> Other _____</p> <p><input type="checkbox"/> No medication adjustments are done</p>		