

# AMERICAN THORACIC SOCIETY DOCUMENTS

## Reducing Chronic Obstructive Pulmonary Disease Hospital Readmissions

### An Official American Thoracic Society Workshop Report

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#### Abstract

Chronic obstructive pulmonary disease (COPD) is the third leading cause of hospital readmissions in the United States. The quality of care delivered to patients with COPD is known to be lacking across the care continuum, and may contribute to high rates of readmission. As part of the response to these issues, the Centers for Medicare and Medicaid instituted a penalty for 30-day readmissions as part of their Hospital Readmission Reduction Program in October 2014. At the time the penalty was instated, there was little published evidence on effective hospital-based programs to reduce readmissions after acute exacerbations of COPD. Even now, several years later, few published programs exist, and we continue to lack consistent approaches that lead to improved readmission rates. In addition, there

was concern that the penalty would widen health disparities. Despite the dearth of published evidence to reduce readmissions beyond available COPD guidelines, many hospitals across the United States began to develop and implement programs, based on little evidence, due to the financial penalty. We, therefore, assembled a diverse group of clinicians, researchers, payers, and program leaders from across the country to present and discuss approaches that had the greatest potential for success. We drew on expertise from ongoing readmission reduction programs, implementation methodologies, and stakeholder perspectives to develop this Workshop Report on current best practices and models for addressing COPD hospital readmissions.

**Keywords:** COPD; readmissions; quality of care; value-based care; evidence-based care

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##### Summary

## Overview

Chronic obstructive pulmonary disease (COPD) is currently the third leading cause of hospital readmissions in the United States (1). Because the quality of care for hospitalized patients with COPD is often inconsistent and does not always follow guideline-recommended care, there is potential to reduce excessive readmissions after hospitalization for COPD exacerbations (2, 3). To address the need for improved care quality and reduced readmissions, the Centers for Medicare and Medicaid (CMS) began penalizing hospitals with excess readmissions after acute exacerbations of COPD (AECOPD) as of October 2014 (start of Fiscal Year 2015) (4). At the time of penalty implementation, there was a lack of published evidence that pointed to effective hospital-based programs to reduce AECOPD admissions and readmissions (5). In addition, there was concern that the CMS Hospital Readmission Reduction Program (HRRP) would widen health disparities, because readmissions occur more commonly among economically disadvantaged communities, and CMS penalties for other diseases are greatest in hospitals with the highest proportion of dually eligible patients (6–9). To avoid a potential penalty, many hospitals across the United States began to develop and implement programs despite the dearth of published evidence. Because details of quality improvement programs are not always published, and many years may pass before the publication of outcomes (10), we sought to synthesize current evidence (both published and unpublished) and describe best practices and models for addressing and reducing AECOPD readmissions across the United States.

These proceedings reflect the results of an official American Thoracic Society (ATS) workshop at the 2016 ATS International Conference.

## Results

This workshop provided an opportunity for experts to review and analyze the literature, hear from key stakeholders, including the patient, clinician, and payer perspectives, and review existing readmission reduction programs to summarize the state of practice and identify key barriers and facilitators for success. The following key themes arose:

1. Communication is critical. Our patient and patient advocate stakeholders identified that poor communication at the time of diagnosis, care transitions, and clinical deterioration leads to a worsened patient experience and poor outcomes.
2. Readmissions may be a proxy for other important health factors or outcomes, such as quality of life, social determinants of health (11), adherence deficit, or multimorbidity. Interventions to reduce readmissions may need to expand beyond this single focus regarding COPD-specific treatments to also include improvements in patient education, behavior modification through health coaching, and facilitation of prompt access to outpatient healthcare expertise when needed to impact overall health and quality of life.
3. Implementing COPD guidelines is a necessary, but insufficient, step in reducing readmissions and/or reducing health costs (12). Most previous programs have been successful in improving process measures related to decreasing COPD care variation and increasing the provision of guideline-recommended care for COPD (13). However, due to the readmission penalty targeting all-cause, not just COPD-related, readmissions, efforts to address multimorbidity and social determinants of health are also needed for increased success.
4. The success of readmission reduction programs is difficult to evaluate, due to lack of rigorous study design, such as valid comparators (e.g., randomized parallel studies), and complicated cost frameworks, including variations in diagnostic coding leading to variation in the specific population of interest (13, 14). Programs should embrace randomized schemas or other high-quality program evaluation designs.
5. It is important that programs address quality of care, not just quantity of readmissions. The 30-day readmission metric may not be the most salient measure; the timeframe may need to be adjusted and additional metrics needed to show whether hospital-based interventions improve COPD care and impact patient-centered outcomes, such as mortality, patient satisfaction, adherence, self-efficacy, symptoms, and exercise tolerance. This is particularly important, given the recent association between increased mortality and

reduced 30-day readmissions in programs addressing patients with heart failure (15).

6. Improvements in identifying risk factors for readmission and/or “high-risk” patients are needed. Currently, there is no 30-day, COPD-specific risk-prediction tool to identify patients at high risk of 30-day readmission that specifically addresses the CMS HRRP penalty (16). To date, there has been one published tool for 90-day readmissions—the PEARL (Previous admissions, eMRCD score, Age, Right-sided and Left-sided heart failure) score; however, its c-statistic was only around 0.7 (17). Therefore, there is significant room for improvement with regard to developing and validating tools to identify at-risk patients and aid in triaging appropriate care. In the meantime, there are patient characteristics that have been identified as increasing risk, including comorbid anxiety, multimorbidity, and delays to follow-up with primary care physicians (PCPs) that are not addressed by this tool (18–20).

## Introduction

COPD is the third leading cause of hospital readmissions in the United States (1). Excess morbidity and mortality associated with acute exacerbations (AECOPD) represents a major public health challenge with a high degree of burden on patients, their families, and society (21–23). Patients with frequent and/or severe AECOPD experience decreased quality of life (21–25), depression (21, 26, 27), and even death up to 1 year after hospitalization (28–30). Direct COPD-related costs are more than \$15.5 billion (31). AECOPD and associated hospitalizations account for over half of direct costs, with hospitalizations alone accounting for up to 70% of all costs (22, 31). Therefore, efforts to reduce index and recurrent AECOPD hospitalizations are imperative to improve patient outcomes and reduce societal burden (30).

The quality of care delivered to patients with COPD is known to be lacking across the care continuum, and may contribute to high rates of readmission (2). For example, a minority of patients receive spirometry to confirm a COPD diagnosis (32, 33), despite evidence supporting the usefulness of confirmatory spirometry to reduce admissions and even death (34). In addition,

among patients who undergo diagnostic testing, clinicians frequently do not incorporate the results of these tests into care decisions, and may continue COPD-directed therapies, even after pulmonary function tests refute the diagnosis (3). Patients are both under- and overdiagnosed, both with respect to their COPD diagnosis and with respect to exacerbations of COPD (35, 36). Patients hospitalized for AECOPD may not receive all recommended treatments (2). Furthermore, despite the fact that the vast majority of hospitalized patients misuse their respiratory inhalers, evidence-based education during hospitalization to correct this misuse is rarely delivered (37–39). In addition, lack of affordability of medications likely impacts readmissions, because most respiratory inhalers are not tier one on insurance formularies (40). These gaps in care quality may be important targets for interventions designed to reduce readmissions after a hospitalization for COPD.

CMS instituted a penalty for 30-day readmissions as part of their HRRP in October 2014 (4, 41). At the time the penalty was instated, there was little published evidence on effective hospital-based programs to reduce readmissions after AECOPD (5, 42). Even now, only a handful of published programs exist (5, 14, 43–45). In an attempt to avoid the potential for a financial penalty, many hospitals across the United States began to develop and implement programs based on little evidence.

In addition to the challenges posed to all hospitals due to the lack of known effective interventions, concerns existed that safety net hospitals providing care to underserved populations may be at risk for facing excessive penalization (6–9, 46, 47). Published data support these concerns; individuals with lower socioeconomic status are more likely to have COPD, be hospitalized for COPD, be readmitted after a COPD-related hospitalization, and have higher mortality (48, 49).

In this setting, we organized a workshop to identify current best practices and understand unique challenges faced across diverse hospitals and health systems.

## Methods

This Workshop Report was prepared according to the standards of the ATS.

### Workshop Objectives

To describe best practices and models for addressing and reducing AECOPD readmissions across diverse hospitals and health systems informed by critical stakeholders.

### Methods Overview

We assembled a diverse group of stakeholders, including patients, clinicians, researchers, payers, and program leaders, to present and discuss approaches to reducing readmissions. We drew on existing programs, implementation methodologies, and published evidence across COPD and other disease-related readmission reduction programs to develop a workshop program (see Table E1 in the online supplement). This Workshop Report highlights evidence-based best practices to reduce COPD readmissions of significant benefit to clinicians, researchers, hospital administrators, and policymakers. The full methods, including the preworkshop literature review (Table E2), are available in the online supplement.

## Results: Summaries and Findings

### Stakeholder Perspectives

A primary objective of the workshop was to elicit input on reducing COPD-related readmissions from diverse workshop participants, including patients, patient advocates, purchasers, and members of the international community.

**Patient perspective.** Although each patient experience is unique, our patient representative identified several common themes that resonated with workshop participants. First, patients with COPD may experience skepticism and disdain from clinicians regarding their diagnosis and outcomes; they have also been blamed for their tobacco use. This negative experience with the healthcare system can complicate care for patients with already high rates of comorbid depression and anxiety, and can compound feelings of guilt that patients have regarding their disease. Second, poor care coordination and clinicians' lack of knowledge regarding best practices can prevent patients from receiving quality care. For example, our patient workshop member coordinated and activated his own multidisciplinary care

team, including a primary care clinician, pulmonologist, and cardiologist. He sought a referral for pulmonary rehabilitation (PR) from his primary care clinician who had not previously informed him of the program or of its benefits for patients with COPD. Other patients might have much more difficulty navigating the healthcare system when faced with multiple barriers, as in the presented example, particularly during the vulnerable period after an AECOPD hospitalization. Our patient representative identified peer support as a valuable tool for patients living with COPD. He provided examples of providing support to others by sharing his own experiences in quitting smoking and attending PR, and he encouraged others to be active partners and to advocate for their own care.

Supporting the perspective provided by our workshop patient participant, the COPD Foundation's Chronic Obstructive Pulmonary Experience (COPD) Survey found that nearly two-thirds of patients did not have adequate knowledge about COPD exacerbations, and 16% did not know what an exacerbation was at all, highlighting the fundamental inadequacy of current patient education (50).

**Patient advocate perspective.** The COPD Foundation is a nonprofit organization, the mission of which includes advocating for the COPD community. The Foundation held summits in 2013 and 2015, which were focused on patient-centered approaches to understanding issues related to COPD readmissions, including barriers to receipt of quality care and identification of best practices (51). Barriers identified by the COPD foundation included: 1) issues with transitions from hospital to home; 2) financial obstacles; 3) a lack of availability within COPD programs, such as PR and peer support; and 4) underutilized tools, such as the electronic health record and dissemination of existing resources (Table 1). In addition, some patients reported a lack of caregiver support at home, which made recovery difficult during posthospitalization periods due to increased emotional and physical stress. Best practices identified by summit participants addressed these barriers, and are summarized in Figure 1.

**Payer's perspective.** Payers experience tension between a desire to encourage the best evidence-based practices or interventions, and the expediency with which care models need to move forward

**Table 1.** Barriers to optimal care (breakout sessions, Second Chronic Obstructive Pulmonary Disease Summit)

Transitions	Finances	Tools/Resources Needed
<ul style="list-style-type: none"> <li>● Poor communication</li> <li>● Ineffective discharge guidance</li> <li>● Lack of effective follow-up</li> <li>● Limited efforts to engage patients and family</li> <li>● Patient not being placed at center of care</li> <li>● Fragmentation of system/ differences in where individual seeks care</li> </ul>	<ul style="list-style-type: none"> <li>● Inadequate reimbursements for time-intensive, proper transitional care</li> <li>● Affordability of prescribed treatments and follow-up</li> <li>● Incentives not aligned across the system</li> <li>● Recognition of nonmedical barriers &amp; availability of solutions</li> <li>● Policies that limit access to educators, respiratory therapists and others outside the hospital</li> <li>● Insufficient time for meaningful physician/patient engagement</li> </ul>	<ul style="list-style-type: none"> <li>● Limited empirical evidence</li> <li>● Lack of compliance with existing guidelines</li> <li>● Ineffective use of EHR</li> <li>● Diagnostic tool limitations/under and over diagnosis</li> <li>● Inadequate monitoring</li> <li>● Access and monitoring for issues related to oxygen</li> <li>● Access and referral to pulmonary rehabilitation limited</li> <li>● Use of ER as a treatment center</li> <li>● Insufficient physician and patient education</li> <li>● Lack of dissemination of existing tools</li> </ul>

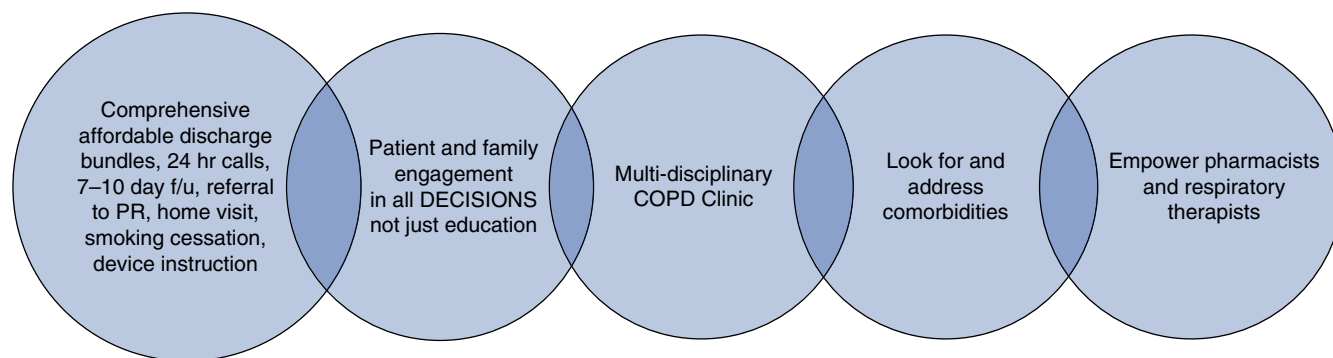
Definition of abbreviations: EHR = electronic health record; ER = emergency room. Data from Reference 51.

without first waiting for a “perfect solution” to the readmission problem. Dr. Daniel Lessler, Chief Medical Officer for the Washington State Health Care Authority (WSHCA), provided a payer’s perspective to workshop participants. The WSHCA is the largest healthcare purchaser in Washington, representing 1.8 million Medicaid enrollees and 350,000 public employees and their dependents (52). Hospital care constitutes a significant proportion of the \$10 billion in healthcare costs incurred by WSHCA enrollees annually, with more than \$100 million dollars spent on readmissions alone in 2011. From a purchaser perspective, variability in readmissions across hospitals after adjusting for case mix indicates that reducing average readmission rates is likely achievable. Moreover, a system redesign that includes value-based, rather than volume-

based, payment is key to sustaining expanded access to healthcare made possible through recent policy changes, such as the Affordable Care Act (53). Strategies employed by the WSHCA to move toward a value-based, and eventual population-based, payment system emphasize the importance of connecting existing community resources to the healthcare system to facilitate care transitions as patients move from hospital to home. For public employee beneficiaries, the WSHCA has partnered with accountable care organizations in a new “total cost of care model” that is designed to reward improvement in healthcare quality and achievement of targeted core performance measures. The program goals include: 1) improving patient experience; 2) integrating physical and mental health programs for comprehensive care; and 3) financial

accountability for organizations. By moving away from encounter-based reimbursement to financing “total cost of care,” purchasers hope to encourage innovative care pathways, such as telemedicine, that allow providers to have more flexibility in where and how they care for patients, while improving overall value of care. Whether these types of care models lead to reductions in readmissions is not yet known.

**International perspective.** Readmission rates for COPD are high across other countries. Across the international community, a handful of efforts have been reported to address the problem of COPD readmissions and improve COPD quality of care. In Canada, the Ontario Ministry of Health and Long-Term Care established the Health System Funding Reform in 2012 (54). Patients with COPD were among the



**Figure 1.** Chronic obstructive pulmonary disease (COPD) Foundation Second COPD Readmission Summit: “A few ‘best practices’.” f/u = follow-up; PR = pulmonary rehabilitation.



first to be targeted (54). Under the reform, provider funding is based on the types and quantities of patients treated, the services delivered, the quality of care delivered, and patient experiences and outcomes (54). The goal is to incentivize providers to become more efficient and effective by adopting best practices and ensuring that patients in Ontario get “the right care, at the right time, and in the right place.” (54). Initial anecdotal reports indicate that hospitals showed early interest in this initiative and responded by implementing programs to improve COPD care and outcomes. However, costs, process measures, and patient outcomes had not been published at the time of the workshop. Australia and New Zealand have produced a set of guidelines called the COPD-X Plan (55), and Australia has a program that provides training, support, and incentives to primary care providers, surveillance efforts, and medication subsidies (56). These resources are similar to those available in the United States, including a review of COPD care by Han and colleagues (3) and a COPD toolkit developed by a Society of Hospital Medicine Task Force (57).

In summary, both within the United States and across countries around the world, efforts are being made to reduce readmissions after exacerbations of COPD. However, the literature is lacking published data and program descriptions. Most programs identified appear to address overall quality of care, not solely readmissions, and, for the most part, do not address disparities. More work is needed to access information about program experiences in non-U.S. countries, as most of the work is in early stages.

### Case Presentations

Five case presentations of COPD readmission reduction programs were presented to illustrate the state of current programs and to address the breadth and depth of COPD readmission reduction programs across the United States. Programs were based on expert opinion and were to be inclusive of diverse geography and type of hospital/health system. The hospitals and health systems included urban academic and community teaching institutions. The interventions discussed varied in scope (multisite vs. single center) and design (ranging from standard quality improvement [QI] frameworks to value-based care models). Two of the programs improved identification of

patients with AECOPD upon admission, a critical step in being able to provide program components. Two of the programs developed and used an order set/pathway to deliver their program components. Three of the programs reported reductions in readmission rates. Key lessons, best practices, and comparisons across the programs are described in Table 2.

**One health system: a tale of two hospitals.** The importance of tailoring programs to specific practice settings was highlighted by the review of a readmissions reduction program implemented at two sites within a single health system (Table 2). The first site, a 200-bed community teaching hospital with a dedicated pulmonary service for patients with COPD with strong ties to primary care, instituted a COPD community care manager to help patients navigate between inpatient and outpatient settings. The care manager interacts directly with the patient and family, documents the care plan, including a customized education assessment, facilitates referrals to PR care, and makes home visits to the patients 2–3 days after discharge. The introduction of the care manager was associated with a 1-year decline in readmissions after a COPD exacerbation from 12% to 6.7%. The health system’s other site was a much larger 800-bed academic university hospital with a fellow-run academic pulmonary service with numerous attendings. In this large hospital, a dedicated COPD care manager was not feasible. Rather, electronic health record-based tools were implemented, including a COPD treatment pathway/order set and a real-time calculation of risk for readmission using a published tool to identify patients at high risk for readmission with the intent of motivating vigilance to identify modifiable factors during admission and after transition (58). Although readmissions still decreased over the course of a year, the magnitude of change was more modest. Specific issues that were identified included low utilization of the pathway/order set and limited variation and predictive ability of the general disease readmission tool when applied to a COPD-specific population. This highlights the need for better, disease-specific tools that use all aspects of the patient past and current admission data to calculate real-time risk predictors.

**Use of interprofessional teams.** A program at an academic hospital serving a primarily African American, underserved population aimed to address the CMS

HRRP by developing an interprofessional, evidence-based approach to reducing COPD readmissions. Using COPD guidelines and readmission programs for other chronic diseases, such as congestive heart failure, as a guide, they developed a systematic approach to a pulmonary consult program with the goal of reaching all patients admitted to the hospital with AECOPD. To ensure that the needs of a large volume of patients could be met, the program included a dedicated, advanced-practice nurse to provide specialized pulmonary care in the hospital and follow-up appointments with patients 1 week after discharge. There were similarities between this program and the programs in the health system example described previously here (Table 2). On the one hand, this hospital was larger in size than the community hospital in the prior example; however, this program incorporated the concept of a single lead practitioner providing care across inpatient and outpatient settings. In addition, the lead practitioner worked with an interprofessional team to ensure that all care elements were completed. The program reduced readmissions by just under 50% in the second half of the first program year compared with the first half. Although these results were promising, this was a quality improvement program and, as such, there was not a control group. Therefore, these results could be due to a secular trend.

**Value-based care: a center for Medicare and Medicaid service-bundled payments for care-improvement initiative.** The Center for Medicare and Medicaid Services (CMS) offered bundled payments for care improvement (BPCI) as an optional real-risk care model to provide single payments based on historical data with case mix adjustments and discount the payments up to 3% less than what was paid for the 3 years before for hospital care and extending for care up to 90 days post-discharge (49, 59). If predefined quality metrics are achieved and the participating hospital demonstrates cost savings beyond the negotiated discount, the stakeholders (hospital/physicians/home-health agency) are rewarded with additional payments. The incentive for hospitals to join was to obtain experience with this type of real-risk payment model. The hospital in this example implemented this CMS optional BPCI initiative for COPD, and their program included many similar elements, as described previously here, including an interprofessional team consisting of a single nurse practitioner

**Table 2.** Hospital Readmission Reduction Programs

Hospital Type	Health System			
	U.S. Northeast		U.S. Midwest Academic	U.S. South Academic
	Community Teaching	Academic		
Characteristics	200+ beds, 15,000 admissions	800+ beds, 32,000 admissions	811 beds, 30,000 admissions	1,150 beds; 49,000 admissions
Service	Single pulmonary service	Fellow based; multiple attendings	APN led	One NP
Care manager(s)	COPD dedicated CM inpatient/outpatient with close ties to pulmonary practice	Inpatient-specific general CMs	Multiple	Two RNs
Physician role	Standard pulmonary consult on all COPD admissions	Pulmonary champions care path development, but not routinely involved in individual patient care	Three physician champions (pulmonologist, hospitalist, pulmonary fellow)	Four COPD leads
Program type	QI	QI	QI	BPCI
Program elements	CM-led documentation of care plan, education assessment, PR, home visit	Care pathway-led program  Real time score for General Health Readmission Risk tool	APN-led inpatient consult, pharmacy-led medication reconciliation and inhaler education, RN 48 h phone call, APN follow-up visit, APN/MD 24/7 pager, EHR alert for ED visits	RN/NP inpatient consult  Medication reconciliation  Follow-up pulmonary visit Automated and in person post-D/C calls Referral to PR, palliative care, home health, electronic order set
System to identify inpatients with AECOPD	N	N	Y	Y
Inpatient consult	Single pulmonary service; all seen	Fellow-based	Y—APN	Y—RN or NP
Care plan documentation	Y—CM	Y—Routine Hospital D/C	Y—APN	Y—powerplan
Education assessment/teaching	Y—CM	Y—Routine Hospital D/C	Y—APN and pharmacists	Y RN or NP
RH assessment/referral	Y—CM	N	Y—APN	Y
Medication reconciliation	Y—Routine Hospital D/C	Y—Routine Hospital D/C	Y—pharmacists	Y—pharmacists
Post-D/C home visit	Y—CM	N—except those qualifying for home VNA	N	N
Post-D/C phone call	Y	N—not routine	Y—RN	Y—automated and person-person
Post-D/C clinic visit	Y—1–2 wk	Y—pathway recommended 1–2 wk	Y—APN +/- pharmacists 1–2 wk	Y—COPD Clinic, 1–2 wk

(Continued)

Table 2. (Continued)

Hospital Type	Health System			
	U.S. Northeast		U.S. Midwest	U.S. South
	Community Teaching	Academic	Academic	Academic
EHR alert			Y—ED	Y
Risk score	N	Y	N	Y
Direct patient call line/number	Y	Y—health plan based	Y—APN/MD pager	Y
Order set/pathway		Y		Y
Process measures	ALL	<20% utilization of pathway	Improved identification of patients with AECOPD 64–84%	Improved identification of patients with AECOPD 45–85%; improved PR from 5 to <20%; 0–100% phone calls
Readmissions	37% reduction	27% reduction	46% reduction	NS
Patient feedback				Patients liked program, did not want to be “discharged” from program
Other info		Site created after D/C trajectory tool being tested in patient subset		Asthma DRG included in BPCI

Definition of abbreviations: AECOPD = acute exacerbations of chronic obstructive pulmonary disease; APN = advanced practice nurse; BPCI = bundled payments for care improvement; CM = case/care manager; COPD = chronic obstructive pulmonary disease; D/C = discharge; DRG = diagnosis-related group; ED = emergency department; EHR = electronic health record; MD = medical doctor; N = no; NP = nurse practitioner; NS = nonsignificant; PR = pulmonary rehabilitation; QI = quality improvement; RN = registered nurse; VNA = visiting Nurse Association; Y = yes.

(NP) and two registered nurses (RNs), with four M.D. COPD leads. The patients received inpatient consults from the lead NP or RN, a postdischarge pulmonology visit within 2 weeks, automated and in-person RN follow-up phone calls and disease education, and referral to home health, PR, and palliative care, as appropriate (Table 2). A standardized electronic order set for AECOPD was also developed and used across the facility. The program found several improvements in process measures, including increased PR referrals and improved phone call rates, but no difference in all-cause readmission rates at 30 days

**The role of PR.** In a recent systematic review conducted for the ATS/European Respiratory Society statement on “Key Concepts and Advances in Pulmonary Rehabilitation,” PR was found to be associated with an approximate 50% reduction in all-cause readmission following AECOPD (60). When specifically examining the role of PR in 30-day readmissions, the results were mixed, demonstrating that it is difficult to impact short-term outcomes, as the program is traditionally conducted over weeks or months.

**The role of patient navigators.** Studies are also being conducted to evaluate

innovative and patient-centered interventions, such as patient navigators (43, 61). The PCORI (Patient-Centered Outcomes Research Institute)-funded PaRTNER (Patient Navigator to Reduce Readmissions) study is a pragmatic trial testing the role of community health workers serving as patient navigators to reduce anxiety and improve social support (coprimary outcomes); the study examines readmissions as a secondary outcome. The community health workers intervention begins in the hospital, then continues with home visits at 2–3 days after discharge plus patient-to-patient peer coaching by phone for another 8 weeks. An innovative feature of PaRTNER is the use of patient organizations to deliver the peer-to-peer coaching (e.g., COPD Foundation). Data are not yet published, but, if successful, this could be a model for programs moving forward.

**Specialty care integration into primary care.** In the previous care models discussed, efforts were made to improve care transitions, including access to existing outpatient services for primary and specialty care. Although pulmonary specialists might provide more consistent guideline-recommended care, specialty care access can be particularly problematic (62). Our

current specialty care systems tend to be reactive and referral dependent, requiring PCPs to first recognize an issue and then ask for help from a specialty care system. This is not an efficient approach. Therefore, a system redesign that leverages existing healthcare resources to improve specialty care access for patients and their clinicians is being tested in an ongoing trial within the Department of Veterans Affairs. The program uses existing electronic health records to provide proactive, pulmonologist-facilitated, electronic consults (E-consults) for patients discharged after a hospitalization for an exacerbation of COPD. E-consult recommendations are recorded in chart notes and orders written for PCPs to sign, discontinue, or change as needed; these are timed to occur just before the patient’s follow-up visit when changes in care can be discussed. PCP autonomy, therefore, is maintained and the intervention minimally disrupts clinic workflow. If effective, E-consults could provide a template for interventions within other healthcare systems.

**Quality improvement and implementation framework to address COPD readmissions.** Several general frameworks have been proposed to improve care quality

and reduce readmissions that focus on hospital-to-home transitions. Identified (non-COPD-specific) examples include Project RED (Reengineered Discharge) (63), Project BOOST (Better Outcomes for Older Adults through Safe Transitions) (64), and the IDEAL (Include, Discuss, Educate, Assess, and Listen) Transition in Care Model programs (Table E3) (65). To date, no specific intervention has been designed that reduces COPD readmissions. It may be that a broader framework, which incorporates care for patients even before their first hospital admission, is what is needed to increase high-value care and improve population health for patients with COPD.

## Summary

This workshop provided an opportunity for experts to review and analyze the literature, hear from key stakeholders, and review existing readmission reduction programs to summarize the state of practice and identify key barriers and facilitators for a successful reduction of readmissions. The key themes include the following:

1. Communication is critical. Our patient and patient advocate stakeholders identified that poor communication at the time of diagnosis, care transitions, and clinical deterioration leads to a worsened patient experience and poor outcomes.
2. Readmissions may be a proxy for other important health factors or outcomes, such as quality of life, social determinants of health (11), adherence deficit, or multimorbidity. Interventions to reduce readmissions may need to expand beyond this single focus regarding COPD-specific treatments to also include improvements in patient education, behavior modification through health coaching, and facilitation of prompt access to outpatient healthcare expertise when needed to impact overall health and quality of life.
3. Implementing COPD guidelines is a necessary, but insufficient, step in reducing readmissions and/or reducing health costs (12). Most previous programs have been successful in improving process measures related to decreasing COPD care variation and increasing the provision of guideline-recommended care for COPD (13). However, due to the readmission penalty targeting all-cause, not just COPD-related, readmissions, efforts to address multimorbidity and social determinants of health are also needed for increased success.
4. The success of readmission reduction programs is difficult to evaluate, due to lack of rigorous study design, such as valid comparators (e.g., as randomized parallel studies), and complicated cost frameworks, including variations in diagnostic coding, leading to variation in the specific population of interest (13, 14). Programs should embrace randomized schemas or other high-quality program evaluation designs.
5. It is important that programs address quality of care, not just quantity of readmissions. The 30-day readmission metric may not be the most salient measure; the timeframe may need to be adjusted and additional metrics needed to show whether hospital-based interventions improve COPD care and impact patient-centered outcomes, such as mortality, patient satisfaction, adherence, self-efficacy, symptoms, and exercise tolerance. This is particularly important given the recent association between increased mortality and reduced 30-day readmissions in programs addressing patients with heart failure (15).
6. Improvements in identifying risk factors for readmission and/or “high-risk” patients are needed. Currently, there is no 30-day, COPD-specific risk prediction tool to identify patients at high risk of 30-day readmission that specifically addresses the CMS HRRP penalty (16). To date, there has been one published tool for 90-day readmissions—the PEARL score; however, its c-statistic was only around 0.7 (17). Therefore, there is significant room for improvement with regard to developing and validating tools to identify at-risk patients and aid in triaging appropriate care. In the meantime, there are patient characteristics that have been identified as increasing risk, including comorbid anxiety, multimorbidity, and delays to follow-up with PCPs that are not addressed by this tool (18–20). ■

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