Improving Outcomes after a Chronic Obstructive Pulmonary Disease Hospitalization

Lessons in Population Health from the U.S. Department of Veterans Affairs

Although cigarette smoking among U.S. adults has been declining for decades, chronic obstructive pulmonary disease (COPD) remains one of the nation's most common chronic conditions, particularly among those over the age of 65. Exacerbations of COPD lead to more than a million emergency room visits and some 750,000 hospitalizations annually in the United States, and millions more worldwide. The Centers for Disease Control and Prevention reported that costs for caring for people with COPD reached $49 billion in 2020, with the majority spent on care during and after an exacerbation (1). For patients with COPD, the days and weeks after hospitalization are a time of great vulnerability, characterized by a heavy burden of symptoms, diminished quality of life, and high amounts of healthcare usage. Within 1 year of hospitalization, nearly two out of three patients are readmitted to the hospital, and mortality averages 20% (2).

Given these troubling statistics, it is little wonder that COPD has become the subject of a number of high-profile efforts at the federal, state, and local levels to improve outcomes. To some extent, these can be traced to the decision of the Centers for Medicare and Medicaid Services to add COPD to the list of conditions included in its Hospital Readmission Reduction Program. This occurred concomitant with an increase in the maximum penalty to 3% of total reimbursement for hospitals with excessive readmissions, pressuring hospitals and health systems to take steps to limit rehospitalizations. Although the Hospital Readmission Reduction Program focused the attention of hospital administrators on the problem of readmissions, and has been associated with a decline in COPD readmission rates over time, it remains controversial, in part, owing to the lack of solid evidence upon which to guide improvement efforts (3, 4). Not only has it been difficult to identify effective strategies for preventing readmission, but prior delivery system innovations that have used nurse care managers have, in some instances, led to paradoxically worse clinical outcomes (5, 6). More encouraging results have been reported by programs that used health coaches trained in motivational interviewing and by early pulmonary rehabilitation (7, 8).

Set against this backdrop, the study by Au and colleagues (pp. 1281–1289) represents a novel and important contribution to the fields of population health and pulmonary medicine in this issue of the *Journal* (9). The researchers sought to "realign specialty care services to work in an interdisciplinary fashion with primary care providers using population management tools and addressing common geospatial and temporal barriers." Unlike earlier studies in which the subjects were patients, the subjects in this trial were 365 primary care physicians (PCPs) working at U.S. Department of Veterans Affairs (VA) primary care clinics in the Puget Sound and Boise areas, of whom 18% were resident trainees. A total of 352 patients received treatment over the course of the trial, including 161 during intervention periods and 191 during control periods. The intervention itself involved using the VA data warehouse to conduct active surveillance for COPD discharges. Once a discharged patient was identified, a multidisciplinary team comprised of a pulmonologist, PCP, and pharmacist completed a structured chart review and provided tailored recommendations for diagnostic testing and pharmacologic and nonpharmacologic treatments intended to optimize clinical management—without waiting to be consulted. These recommendations were placed in the electronic medical record and delivered as presigned orders to facilitate provider acceptance. The study was highly pragmatic in that 98% of the 372 physicians who were invited to participate joined the study, and few exclusions were applied at the patient level.

On average, the multidisciplinary team made 5.5 recommendations per patient. Rates of order activation by primary care providers approached 80%, a testament to the acceptability of the intervention. Using a rigorous stepped-wedge cluster-randomized design, the authors found that 6 weeks after discharge, patients treated during intervention periods had significantly lower symptom scores than those in the control group. These results exceeded the reported minimal important difference and corresponded to a difference in Clinical COPD Questionnaire values observed in patients with Global Initiative for Chronic Obstructive Lung Disease III versus IIb and between IIb and IIa disease (10). At 6 months, patients treated in the intervention periods had a lower risk of readmission and readmission or death; however, there were fewer hospital discharges during the study period than anticipated, and thus the study was underpowered for these outcomes.

Although the results of this intervention were encouraging, several limitations are worth noting. First, the trial was performed within the VA, a fully integrated system that shares a single electronic medical record, uses primary care and specialty providers, and operates under a different financial model than the predominant fee-for-service approach in the U.S. healthcare system. Nevertheless, many Americans receive care within health systems that conceivably could implement a similar program, especially those that operate accountable care organizations, or for which value-based contracts tied to quality outcomes represent a significant portion of their business. Second, although we know that providers activated most of the presigned orders, we were not provided with data about the extent

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to which patients complied with these orders. Making more referrals to pulmonary rehabilitation and smoking cessation programs, and recommending new inhaler regimens, have the potential to improve outcomes, but only if patients adhere to these recommendations. Third, a curious finding was that similar clinical benefits were observed regardless of whether patients were considered to have COPD, raising questions about the mechanism of action of the intervention.

Beyond the results presented in this manuscript, the study raises as many questions as it answers, begging further investigation. For example, qualitative methods could be used to assess the perspective of PCP and health system administrators to better understand acceptability, feasibility, and sustainability to strengthen the intervention for future applications. Second, the application of implementation frameworks might generate additional insights regarding how and why the program succeeded and failed (11). Theoretical frameworks can "enable knowledge to emerge out of seeming chaos and for translation of that knowledge to be widely and reliably implemented" (12).

Ultimately, the most significant aspect of this trial was that it yielded clinical benefits without burdening busy PCPs with a cascade of "best practice alerts" and other forms of workflow interruption. Surveillance, hovering, and proactive e-consultation like those tested here are population health management techniques that have shown promise in other settings and may represent a path toward better outcomes for patients with COPD and other chronic conditions (13). We look forward to future research aimed at evaluating the costs and benefits of such approaches. ■

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Less Haste, More Speed, More Science: Lessons to be Learned from COVID-19 Studies

Coronavirus disease (COVID-19) emerged in Wuhan, China, in late 2019; hit Italy in February 2020; rampaged across Europe and North America from March 2020; and subsequently struck other continents. A pandemic was declared on March 11, 2020. The biomedical research community sprang into action in a quest to save humanity. Anything sitting on the shelf with an immunomodulatory profile could be considered. A search of www.clinicaltrials.gov on July 3, 2020, identified 1,366 registered studies, of which 279 were randomized controlled trials assessing immunomodulatory therapies (1) Thirty-nine immune pathways were targeted with 90 separate interventions. By April 2021, 2,981 interventional trials had been

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