

De-implementing Inhaled Corticosteroids to Improve Care and Safety in COPD Treatment: Primary Care Providers' Perspectives



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BACKGROUND: Chronic obstructive pulmonary disease (COPD) is among the most common medical diagnoses among Veterans. More than 50% of Veterans diagnosed with mild-to-moderate COPD are prescribed inhaled corticosteroids despite recommendations for use restricted to patients with frequent exacerbations.

OBJECTIVE: We explored primary care providers' experiences prescribing inhaled corticosteroids among patients with mild-to-moderate COPD as part of a quality improvement initiative.

DESIGN: We used a sequential mixed-methods evaluation approach to understand factors influencing primary care providers' inhaled corticosteroid prescribing for patients with mild-to-moderate COPD. Participants were recruited to participate in qualitative interviews and structured surveys.

PARTICIPANTS: We used a purposive sample of primary care providers from 13 primary care clinics affiliated with two urban Veteran Health Administration healthcare systems.

MAIN MEASURES: Interviews were transcribed and analyzed using content analysis. Qualitative findings informed a subsequent survey. Surveys were administered through REDCap and analyzed descriptively. Key qualitative and quantitative findings were compared.

KEY RESULTS: Participants reported they were unaware of current evidence and recommendations for prescribing inhaled corticosteroids; for example, 46% of providers reported they were unaware of risks of pneumonia. Providers reported they are generally unable to keep up with the current literature due to the broad scope of primary care practice. We also found primary care providers may be reluctant to change inherited prescriptions, even if they thought inhaled corticosteroid therapy might not be appropriate.

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CONCLUSIONS: Inhaled corticosteroid prescribing in this patient population is partly due to primary care providers' lack of knowledge about the potential harms and availability of alternative therapies. Our findings suggest that efforts to expand access by increasing the number of prescribing providers a patient potentially sees could make it more difficult to de-implement harmful prescriptions. Our findings also corroborate prior findings that awareness of current evidence-based guidelines is likely an important part of medical overuse.

KEY WORDS: de-implementation; quality improvement; mixed methods; de-prescribing; COPD.

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INTRODUCTION

Inhaled corticosteroids are widely used for treatment of mild-to-moderate chronic obstructive pulmonary disease (COPD) in the United States (U.S.) despite recommendations for use restricted to patients with frequent exacerbations.¹ These recommendations are based on evidence of harm, the availability of safer alternative medications, and the lack of evidence for benefit to patients with less severe disease.^{2–4} More than 50% of patients with mild-to-moderate COPD in the U.S. are prescribed inhaled corticosteroids.⁵

The greatest harm associated with inhaled corticosteroid therapy is an increased risk of severe pneumonia.^{6–8} For every 62 patients with mild COPD who are taken off an inhaled corticosteroid, we prevent one new case of severe pneumonia.⁴ Prolonged exposure to inhaled corticosteroids is also associated with higher fracture risk,⁹ cataracts,^{10, 11} and poor diabetes control.¹² These risks drop precipitously once inhaled corticosteroid therapy is discontinued (adjusted rate ratio = 0.63).¹³

There are currently efforts underway to de-implement inhaled corticosteroids among patients with mild-to-moderate COPD.¹⁴ De-implementation is the process of discontinuing an inappropriate therapy under the supervision of a healthcare provider with the goal of improving the patient's outcomes.¹⁵ This process is referred to as deprescribing when addressing medications.¹⁶

In terms of efforts to reduce low-value care, like inhaled corticosteroids in the U.S. Veteran patient population, we know that multifaceted interventions are more likely to be effective in reducing overuse than single interventions.¹⁷ However, we do not know if this is because multifaceted interventions are more likely to include an effective component (i.e., a single effective intervention), as opposed to interventions only being effective in combination. We know that systems of care that might be expected to inhibit overuse (i.e., capitated insurance structures) appear to deliver as much low-value care as fee-for-service systems.¹⁸ There is also some reason to believe that providers have a range of misperceptions related to overuse, including a belief that provision of care is generally superior to holding off; lack of awareness of harms of overuse; and misapprehending patient preferences.¹⁹

There are also important gaps in this literature. Most researches on interventions to reduce low-value care have occurred in hospital settings, and much has implicitly focused on either provider awareness or motivation, such as pay-for-performance incentives, report cards, and education.¹⁷ Less is known about providers' experience of overuse and deprescribing. One of the few studies that explores this looked at deprescribing in older adults and found a key issue was simply understanding alternatives.²⁰ Much of the literature that does exist on provider perspectives on overuse¹⁹ comes from assessments of overuse in general, which, divorced from specific clinical settings and decisions, might inadvertently reinforce conventional wisdom and miss important real-world factors.

COPD is among the most common medical diagnoses Veterans receive.^{21, 22} In the present paper, we explored Veterans Health Administration (VHA) primary care providers' experiences with prescribing inhaled corticosteroids among patients with mild-to-moderate COPD to understand factors influencing providers' prescribing which might inform efforts to improve care.

METHODS

We conducted this work as part of a larger ongoing evaluation of a U.S. Department of Veterans Affairs (VA) quality improvement program to discontinue inappropriate inhaled corticosteroid prescribing in patients with mild-to-moderate COPD.²³ We used sequential mixed methods using qualitative interview findings to inform subsequent development of quantitative survey questions.²⁴ Following survey data collection, we used convergent mixed methods²⁵ to identify qualitative

data that enhanced the understanding of the survey findings or indicated potential generalizability of the qualitative findings. This work was sanctioned as quality improvement and exempt from Institutional Review Board oversight in accordance with VHA Handbook 1058.05.²⁶ Employee unions reviewed and approved the survey instrument and interview guide prior to administration.

Participants and Setting

We purposively sampled primary care providers from 13 primary care clinics affiliated with two urban Veteran Health Administration healthcare systems. Primary care providers were recruited to participate in interviews and complete surveys. Eligible primary care providers included medical doctors, doctors of osteopathic medicine, nurse practitioners, and physician assistants. Resident physicians were excluded.

Qualitative Interviews

We used VA email to contact 177 primary care providers from both medical center sites to participate in an anonymous telephone interview for quality improvement purposes. Providers were excluded if they left the VA, no longer practiced Primary Care, or relocated to a new VHA site. Interviews were conducted with primary care providers from both sites from May 2016 to October 2017. Interviewers used a semi-structured interview guide ([Appendix A online](#)) to explore provider's experiences with prescribing inhaled corticosteroids for COPD, familiarity with evidence and guidelines for prescribing inhaled corticosteroids, and views on discontinuation. The interview guide was informed by key constructs derived from literature on implementation and de-implementation, and a conceptual model that guided this work^{19, 27-29}; these included understanding of evidence for and against use of a clinical practice²⁷⁻³⁰; psychological reactance,^{19, 30} or negative reaction to external efforts to change or limit a provider's behavior; and organizational contexts that support clinical change.^{19, 27-29} The interview guide included open-ended questions and semi-structured probes to assure uniform data collection of key topics and allowed exploration of emerging unanticipated themes generated by participants. Grounded prompts using participants' words and phrases were used to elicit details. The interview guide was updated iteratively, a standard practice in qualitative evaluations.^{31, 32} Interviews lasted approximately 20–30 min. Interviews, coding, and analyses were completed by the project's qualitative team (C.G., G.S., K.S., S.W.) possessing backgrounds in psychology and sociology.

Interviews were audio-recorded and transcribed verbatim. ATLAS.ti 7 software (Scientific Software Development GmbH, Berlin, Germany) was used for data management and coding. We collected and analyzed data concurrently. Data analyses were conducted using iterative deductive and inductive content analysis methods.³³ Deductive analysis involved application of a priori codes ([Appendix B online](#)) based on key

construct definitions from de-implementation literature^{19, 27–29} and the interview guide questions. Inductive content analysis consisted of open and unstructured coding to capture data that did not fit into a priori categories. Emergent codes were added throughout the analysis, allowing us to identify emergent and previously unidentified or unexpected themes. Broad themes were identified based on representative interview responses and grouped to describe distinct aspects of participants' experiences. The qualitative team met weekly to discuss data and reach consensus on interpretation of themes and findings. Findings informed the subsequent survey.

Surveys

Surveys were administered through REDCap³⁴ to 134 primary care providers between July and August 2016 (first medical center sites) and December 2016 and January 2017 (second medical center sites). Site department leads notified providers in advance that survey invitations would be sent to the providers' VA email accounts. Survey invitations were staggered by site.

Surveys ([Appendix C online](#)) evaluated provider experiences, perceptions of discontinuing inhaled corticosteroids in mild-to-moderate COPD, and intention in use of inhaled corticosteroids for treating patients with COPD. The survey also asked about leadership and management behaviors, job-related feelings, turnover intentions, and demographics. Select questions from Maslach Burnout Inventory³⁵ were adopted. This variation in question content was included to assess trends and direct future quality improvement initiatives.

Survey responses were exported from REDCap to Microsoft Excel 2010 for descriptive analysis. We used chi-squared tests to analyze differences between physicians and nurse practitioner responses.

RESULTS

The two sites included a population of 8495 patients with COPD diagnoses at the time the evaluation began in August 2016. Of these patients diagnosed with COPD, 3527 (42%) diagnoses were confirmed with pulmonary function test, and 1299 (15%) patients were prescribed an inhaled corticosteroid. However, 792 (61%) of these prescriptions were not clinically indicated.

Interviews were completed with 15 primary care providers comprised of two nurse practitioners, both female, and 13 physicians (nine male and four female). Surveys were completed by 46 of 134 providers (34% response rate; 10 from one site, 36 from the other) and were included in the analytic sample. Respondents' characteristics are presented in Table 1. Findings were aggregated across sites and respondent types. We report convergent and sequential exploratory findings.

Knowledge of Evidence and Guidelines

Qualitative analysis revealed that primary care providers were generally unaware of current evidence and recommendations

Table 1 Survey Respondents' Characteristics

Survey respondents (N = 46)				
Provider type	Female	Male	Age, M years	Tenure with VA, M years
Physician	17 (52%)	16 (48%)	48	9.3
Nurse practitioner	10 (77%)	3 (23%)	54	8.5
All	27 (59%)	19 (41%)	49.7	9.1

for prescribing inhaled corticosteroids; this finding is related to several of our a priori codes including knowledge of guidelines, evidence strength against prescribing inhaled corticosteroids, and medication side effects. Most providers described inhaled corticosteroids as benign. Providers reported an inability to keep up with the current literature due to the broad scope of primary care practice.

"I think it's fair to say I have no idea what the guidelines say"

"...if things don't appear in what you normally read to stay current, then you don't get familiar with it. It's not like 'I'm going to prescribe ICS, let me go read the guidelines about that'. You just don't do that. One, you don't have time, and two, you can't necessarily go find that all out... in a busy, day-to-day practice, it's not something you'd look up."

Survey results (Table 2) showed 65% of responding providers prescribed an inhaled corticosteroid for one or more patients with mild-to-moderate COPD in the prior month.

Table 2 Survey Results. Statements Are Derived from Survey Question Stems

Statement derived from survey question	% agree*
Prescribed an inhaled corticosteroid to patient with COPD in the prior month	65% ³⁰
Experience	
Unlikely to take patients off an inhaled corticosteroid prescription placed by another provider	39% ¹⁸
Unaware that inhaled corticosteroids were associated with a higher risk of pneumonia	46% ²¹
Unaware that LAMAs/LABAs are as effective as inhaled corticosteroids in reducing breathing exacerbations	52% ²⁴
Intention	
Would make an effort to make greater use of long-acting agents	50% ²³
Would make an effort to reduce the use of inhaled corticosteroids	52% ²⁴

*The first statement's response options were "Yes" and "No." All other statements' responses were collapsed so that only responses indicating agreement or disagreement ("Strongly Disagree," "Disagree," or "Agree," "Strongly Agree") were counted towards the total in "% agree"

Forty-six percent reported they were unaware of the association between inhaled corticosteroids and a higher risk of pneumonia, and 52% were unaware that long-acting muscarinic antagonists (LAMAs) and long-acting beta-agonists (LABAs) are as effective as inhaled corticosteroids in reducing breathing exacerbations. Fifty percent of respondents reported they would make an effort to make greater use of long-acting agents, and 52% reported they would make an effort to reduce the use of inhaled corticosteroids.

“If Someone Is Doing Well, Why Rock the Boat?”

Some providers expressed reluctance to change or discontinue medications if the provider perceived the patient is doing well. This was an inductive finding.

“Generally, on one hand I’d like to say in someone who’s on medication they don’t need, you should try to stop it. But deep down there’s a little hesitation that if someone is doing well, why rock the boat?”

“I’ve got patients on drugs that I wouldn’t have them on, but they insist it works, so, unless it’s a hazard to the patient, oral inhaled corticosteroids are pretty benign. They’re obviously not cheap necessarily, but they also do have side effects. But they’re not terrible... if the patient is really insisting that they’re helpful, I would tend to continue them.”

The Impact of Multiple Prescribers

Two inductive themes related to the impact of multiple prescribers on de-implementing inhaled corticosteroids emerged: inherited prescriptions and deference to experts.

Inherited Prescriptions. Participants reported reluctance to discontinue inhaled corticosteroid prescriptions patients receive from other VA or non-VA providers.

“If someone came in on ICS [inhaled corticosteroids] or if someone sees a pulmonary provider who prescribed it, I would probably be reluctant to stop it. But, most likely I would not initiate it.”

“... if they come to me and they have no adverse event on them and they are already on it, I may just leave it.”

Reluctance to discontinue inherited prescriptions was an emergent qualitative finding which informed the survey question on this topic. Thirty-nine percent of survey respondents reported they were unlikely to take patients off an inhaled corticosteroid prescription placed by another provider. There was no significant difference between physician and nurse practitioner respondents.

Deference to Experts. When pulmonologists were involved in a patient’s care, some primary care providers perceived the specialist to be responsible for discontinuing inhaled corticosteroids. Providers reported reluctance to discontinue inhaled corticosteroids; even in cases they would otherwise discontinue inhaled corticosteroids.

“I definitely have counted on pulmonology colleagues to give that guidance.”

“Would I make a recommendation for a pulmonary medication to a pulmonologist? Probably not.”

DISCUSSION

Our findings are consistent with our hypothesis that inhaled corticosteroid prescribing by primary care providers in this patient population is due, in part, to lack of knowledge about the potential harms and availability of alternative therapies. However, we also found that even when primary care providers might not think an inhaled corticosteroid prescription is appropriate for their patient, they may be reluctant to make a change to the prescription when the patient presents without problems or because other providers are involved. Specifically, primary care providers reported reluctance to act when the inhaled corticosteroid prescription originated with another provider, and when they perceived the pulmonologist as having the responsibility to discontinue the patient’s medication. Although causality cannot be determined based on these findings, it is interesting to observe that deference to other providers and reluctance to discontinue inherited medications were concurrent with lack of knowledge about the harm of inhaled corticosteroids and availability of alternatives.

Our findings are consistent with and expand on previous studies that found multiple prescribing providers to have an impact on de-implementing medications. In their synthesis of qualitative studies of patient and provider perspectives on reducing medication overuse in the elderly, Bokhof and Junius-Walker³⁶ identified deficient multidisciplinary cooperation as one of the key cross-study themes from the provider perspective; providers recognized poor cooperation as an obstacle to reducing overuse of prescriptions. This included both studies that reported dissent among providers over competing guidelines, and a preference among general practitioners that there be a clear hierarchy in terms of who was responsible for addressing patients being on too many medications. The latter appears similar to our finding of deference to experts, and a preference that the specialist takes responsibility for making changes to medications in their domain. Similarly, Ailabouni and colleagues²⁰ reported British general practitioners are reluctant to take a patient off a medication prescribed by a specialist, e.g., a statin prescribed by a cardiologist. In our

work, we found a general reluctance to de-implement an inhaled corticosteroid prescription made by another provider, without distinguishing whether that prescription came from another primary care provider or a specialist. Luymes and colleagues³⁷ also found when specialists are perceived to disapprove, general practitioners are less willing to de-implement the medication. We found a different dynamic, in which the primary care providers felt it was the specialists' responsibility to take action on de-implementation of inhaled corticosteroid as opposed to a fear of disapproval.

Our findings about awareness of evidence about harms and alternatives are also consistent with prior research on factors influencing over-prescribing.³⁸ Given the scope of primary care practice, there may be variation and clear gaps in primary care providers' awareness of evidence and current recommendations. While not a surprise, our findings are the first we know of that quantify the level of awareness about evidence related to inhaled corticosteroid use in a population of prescribing providers; approximately half of the primary care providers surveyed lacked awareness of harms from inhaled corticosteroids and the availability of alternatives. This is important in the context of efforts to decrease the use of inhaled corticosteroids for patients with mild-to-moderate COPD because in future data collection, we will assess changes over time in primary care provider awareness of harms related to inhaled corticosteroids and availability of LAMAs and LABAs.

We also wondered if nurse practitioners might be more likely to express reluctance to discontinue an inhaled corticosteroid prescribed by another provider, given the history of conflict over nurse practitioners' prescribing authority.³⁹ However, we found no difference in reluctance, nor in awareness of harms and alternatives treatments.

Limitations

This was an observational, self-report, cross-sectional mixed-methods approach, which limits our ability to draw causal inference. We do not know if any of the factors we identify are associated with actual prescribing and de-implementation of inhaled corticosteroids. However, this work is being conducted as part of an ongoing, randomized quality improvement effort, and future follow-up interviews and surveys will allow us to better understand how awareness of harms and alternatives change over time, and how proactive outreach by specialists influences inhaled corticosteroid prescription practices in this population.

Participation in the surveys and interviews was voluntary, and participants almost certainly differed from non-participants. Consequently, our findings may be colored by selection bias and may represent atypical views and awareness. Obtaining information on non-respondents was beyond the scope of this project, which was conducted as quality improvement, and therefore, we cannot characterize how respondents and non-respondents differed.

The provider represents only one, small—though essential—piece of the equation that leads to inappropriate inhaled corticosteroid therapy and influences de-implementation of inappropriate inhaled corticosteroid therapy. We have good reason to believe that patient knowledge and attitudes, medical culture, institutional policies, and reimbursement policies all play roles in over-prescribing and subsequent efforts at de-implementing inappropriate prescriptions.¹⁹

This work was conducted with primary care providers employed in the Veterans Health Administration, which differs in many respects from community outpatient settings, including how providers are paid and evaluated, the average severity of illness of patients being cared for, and access to specialist consultations. These differences may limit the generalizability of our findings. Nevertheless, the rate of prescriptions that were not clinically indicated that we observed in the participating clinics (61%) is similar to findings from the broader VA and the U.S.⁴⁰

Conclusions

We found a broad lack of awareness of the harms of inhaled corticosteroids, and reluctance to change patients' existing prescriptions, particularly when those prescriptions are made by another provider. Consequently, efforts to expand access by increasing the number of prescribing providers a patient potentially sees could make it more difficult to de-implement harmful prescriptions. By anticipating this, we might be able to build systematic methods for reviewing patient prescriptions. Our findings also corroborate prior findings that lack of awareness of current evidence-based guidelines, and harms related to low-value care, is likely an important contributor to medical overuse.

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Compliance with Ethical Standards:

Conflict of Interest: Dr. Feemster receives funding from NIH K23 HL111116. Dr. Au receives remuneration from Novartis Inc. for participation on a data safety monitoring board. He serves as a Deputy Editor for the *Annals of the American Thoracic Society* and is a member of the Exam Committee for the American Board of Internal Medicine Pulmonary Board, for which he receives remuneration. The remaining authors declare that they have no conflict of interest.

Disclaimer: The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the United States Government.

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