

A Proposed Checklist for Optimizing COPD Patient Discharge Processes in Italian Internal Medicine Wards

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Abstract: Chronic obstructive pulmonary disease (COPD) is a major cause of hospital admissions and readmissions, particularly following acute exacerbations. The immediate post-discharge period is a vulnerable phase, often marked by clinical instability, poor adherence, and unaddressed needs related to inhaler use, comorbidities and rehabilitation. Despite guideline recommendations, key evidence-based interventions are often overlooked in hospital discharge processes, particularly in internal medicine wards where COPD may not be the primary focus. We conducted a targeted literature search using Medline/PubMed, screening approximately 240 relevant articles that support interventions across key domains of COPD discharge care. Building on this evidence, this narrative review and expert opinion aims to raise awareness and prompt systematic implementation of essential post-discharge care components and propose a structured COPD discharge checklist aimed at standardizing care and improving post-discharge outcomes. These include initiation of smoking cessation support, optimization of maintenance therapy, assessment and correction of inhaler technique, evaluation of vaccination status, referral to pulmonary rehabilitation, scheduling of early follow-up visits, and structured patient education on self-management strategies. The checklist is grounded in current evidence demonstrating that comprehensive discharge bundles reduce 30-day readmissions, enhance quality of life, and prevent further clinical deterioration. Early pulmonary rehabilitation, particularly within 3 weeks post-discharge, and timely initiation of appropriate pharmacotherapy, including triple inhaled therapy when indicated, further reduce exacerbation risk and healthcare utilization. By integrating these elements into a concise and actionable format, the checklist aims to support internists in delivering high-quality, standardized COPD care during hospital discharge. Broad adoption may improve care transitions, promote adherence to best practices, and ultimately enhance outcomes for patients with COPD.

Keywords: chronic obstructive pulmonary disease, hospital readmission, treatment optimization, patient discharge, discharge checklist

Introduction

Chronic obstructive pulmonary disease (COPD) is one of the leading causes of morbidity and mortality worldwide, affecting approximately 300–400 million people.^{1–3} According to the 2025 Global Initiative for Chronic Obstructive Lung Disease (GOLD) report, COPD is defined as “a heterogeneous lung condition characterized by chronic respiratory symptoms (dyspnea, cough, sputum production and/or exacerbations) due to abnormalities of the airways (bronchitis, bronchiolitis) and/or alveoli (emphysema) that cause persistent, often progressive, airflow obstruction”.²

Hospitalizations for COPD represent a major clinical and economic burden. Among chronic diseases, COPD has the highest rate of hospital admissions,^{4,5} largely due to acute exacerbations of COPD (AECOPD), which affect 20–50% of patients.^{6,7} Moreover, 14–47% of patients experience two or more AECOPD episodes within a year, depending on the stage of the disease.^{8,9} Exacerbations frequently require urgent medical attention: up to 31% lead to emergency department visits and 19% result in hospital admission.¹⁰ Notably, influenza virus infection has been reported to significantly increase the risk of

pneumonia, respiratory failure, AECOPD, and ischemic stroke, with detrimental effects on respiratory health in patients with COPD that extend beyond the acute phase of infection and may persist for up to 1 year.¹¹ These risks are not only clinical but also economic, with higher rates of hospitalizations, prolonged inpatient stays, and increased health care costs; mechanisms include both direct viral injury and enhanced susceptibility to secondary bacterial pneumonia, underscoring the importance of preventive strategies, such as annual influenza vaccination.^{11,12}

Rehospitalization following an AECOPD is common and associated with poor outcomes.^{13–22} Approximately 6–26% of patients are readmitted within 30 days of discharge,^{23–28} 7–39% within 60 days²⁸ and 10–41% are either readmitted or die within 90 days.^{27–30} Approximately 18–76% are readmitted within 1 year.^{13,14,28,31} Greater efforts should be directed towards preventing hospitalizations due to AECOPD. Recurrent exacerbations are not only markers of disease severity but also drivers of clinical deterioration,³² contributing to a faster decline in lung function³³ and increased risk of future exacerbations, cardiovascular complications and mortality.^{13–22,34}

AECOPD is widely recognized as the primary contributor to the economic burden of COPD, accounting for approximately 45–70% of the total costs associated with disease management.^{35,36} In particular, hospital admissions for AECOPD account for approximately 50% of total disease-related costs, contribute significantly to COPD-related healthcare utilization, and are associated with reduced quality of life and increased mortality.^{5,37–47} Despite this, exacerbations are often under-recognized, under-treated, and inadequately prevented in routine clinical practice.^{48–50}

There is strong evidence supporting structured post-discharge care in reducing these adverse outcomes.²² Timely follow-up visits, patient education, inhaler technique training, optimization of maintenance therapy, smoking cessation support, vaccination, referral to pulmonary rehabilitation (PR), and case management have all been shown to reduce readmissions and improve recovery.^{51–54} These interventions are also associated with decreased healthcare costs, reduced patient economic burden, and improved adherence.^{24,51–63}

Discharge bundles, concise, evidence-based protocols designed to be implemented before discharge, have emerged as a practical tool to ensure consistency and quality in transitional care in COPD. Their use is endorsed by the British Thoracic Society and supported by numerous studies that suggest that these structured interventions may help to reduce readmissions and improve post-hospital outcomes.^{24,51–55,57–62,64–70}

Internal medicine wards face unique challenges in COPD discharge care, as they often treat elderly, multimorbid patients reliant on caregivers. Limited time and resources can hinder in-hospital therapy optimization and patient education, with treatment adjustments often postponed to outpatient settings. This highlights the value of structured discharge checklists to support clinical decision-making.

Recent international guidelines, including GOLD 2025,² National Institute for Health Care and Excellence (NICE),⁷¹ American Thoracic Society (ATS)⁷² and the 2025 New Zealand recommendations,⁷³ emphasize a comprehensive, multidisciplinary approach to COPD discharge care. Key priorities include assessment of smoking status at every visit,^{2,71,73} optimization of inhaled therapy (with clear criteria for escalation to triple therapy based on symptom burden, exacerbation history, and eosinophil count),^{2,73,74} cardiovascular risk evaluation,^{2,71,73} and routine vaccination against influenza, pneumococcus, COVID-19 and varicella zoster.^{2,71,73} Nutritional screening is increasingly recognized as essential, particularly at hospital discharge, given its strong association with mortality and recovery outcomes.^{2,71,73,75} PR is universally endorsed following AECOPD hospitalization to improve exercise capacity and reduce readmissions.^{2,71,73,74,76,77} Follow-up care is another area of focus: while NICE advises flexible, locally coordinated review schedules, GOLD 2025 provides more specific timelines (1–4 weeks and 12–16 weeks post-discharge).^{2,71} Despite this strong framework, evidence gaps remain regarding the impact of discharge bundles on long-term outcomes such as mortality and quality of life,^{26,66,67} and real-world implementation continues to be hampered by constrained staffing, time pressures, resource limitations, inconsistent application, and logistical challenges such as scheduling follow-up appointments, maintaining clear and consistent communication, and delineating responsibilities across multi-disciplinary care team members.^{26,78,79}

The limited and inconsistent implementation of discharge bundles further complicates the assessment of their true clinical impact, while also undermining potential patient benefits.^{80–82}

As highlighted in the qualitative study by Shaw et al, the modest improvements observed in clinical outcomes may be attributable to these systemic barriers, particularly the inconsistent application of bundles, lack of electronic integration, and poor coordination between hospital and community care settings.⁸³

The successful deployment of discharge bundles relies on local healthcare context, adequate resources, dedicated training, and strong leadership to ensure consistent and effective delivery.

In Italy, the healthcare system is a public, universalistic model with approximately 20% private sector involvement. Internal Medicine wards are present in all hospitals and currently number around 1200 nationwide. These wards manage approximately one million hospital admissions per year, representing about 16% of total hospitalizations.

This context underscores the relevance of developing a structured COPD discharge checklist tailored to the needs of internal medicine physicians, who often care for elderly, multimorbid patients and face specific logistical and organizational challenges in delivering post-exacerbation care.

Recognizing these implementation challenges, and in an effort to support more consistent application of evidence-based discharge practices, the authors drew from both the existing literature and their clinical experience to develop a structured discharge checklist. The checklist was conceived as a clinical tool derived from guideline-based recommendations (eg, GOLD 2025²) and practical considerations observed in daily hospital practice, designed to assist internal medicine physicians in addressing key elements of COPD discharge, including therapeutic optimization, vaccination, patient education, and follow-up planning. Although not formally validated in a multicenter study, the checklist has been adopted in the authors' clinical workflows. It is proposed as a standardized model for improving care transitions and reducing preventable readmissions in routine practice across Italy. Its goal is to ensure the implementation of evidence-based interventions that may reduce readmission rates and improve patient outcomes following COPD-related hospitalization.

This expert opinion review aims to highlight key evidence-based interventions at hospital discharge and to propose a structured COPD discharge checklist to support internal medicine physicians in optimizing transitional care and reducing preventable readmissions.

Methods

We conducted a comprehensive literature search on Medline/PubMed using the search string “COPD” AND “discharge”, retaining articles relevant to interventions assessed at the time of hospital discharge to optimize transitional care and reduce preventable readmissions. We also identified additional articles through targeted searches with the terms “COPD” AND “smoking cessation” OR “therapy optimization” OR “inhaled therapy” OR “oxygen therapy” OR “cardiovascular risk” OR “vaccination” OR “nutritional status” OR “corticosteroid tapering” OR “pulmonary rehabilitation” OR “follow-up”.

Searches were conducted up to December 2025. In addition, the reference lists of retrieved articles were screened to identify further relevant publications. There were no restrictions regarding study design or publication year, and only articles published in English were included.

We assessed the eligibility of retrieved articles by screening titles and abstracts, ultimately retaining approximately 240 articles for analysis. Data were then extracted and narratively synthesized, with evidence prioritized based on clinical relevance and methodological rigor.

The literature selection process is summarized in an algorithm (Figure 1).

The proposed checklist has not been previously published or presented in conference abstracts or institutional reports. At the time of manuscript submission, a preliminary feasibility assessment of the checklist is ongoing in several Italian internal medicine departments to explore its usability and current discharge practices. A prospective study is planned to formally evaluate its impact on post-discharge outcomes, including hospital readmissions.

Integrated Transitional Care in COPD

Several studies support the implementation of structured discharge bundles and care pathways that encompass early post-discharge follow-up, verification of inhaler technique, patient education on self-management, scheduling of follow-up visits, smoking cessation support, spirometry reassessment, vaccination status review, and referral to PR.^{24,51–55,57–62,76} These components have been shown to reduce 30-day readmissions, prevent clinical deterioration, and improve quality of life in patients with COPD.^{24,51–55,57–62,67,69,76,84–88}

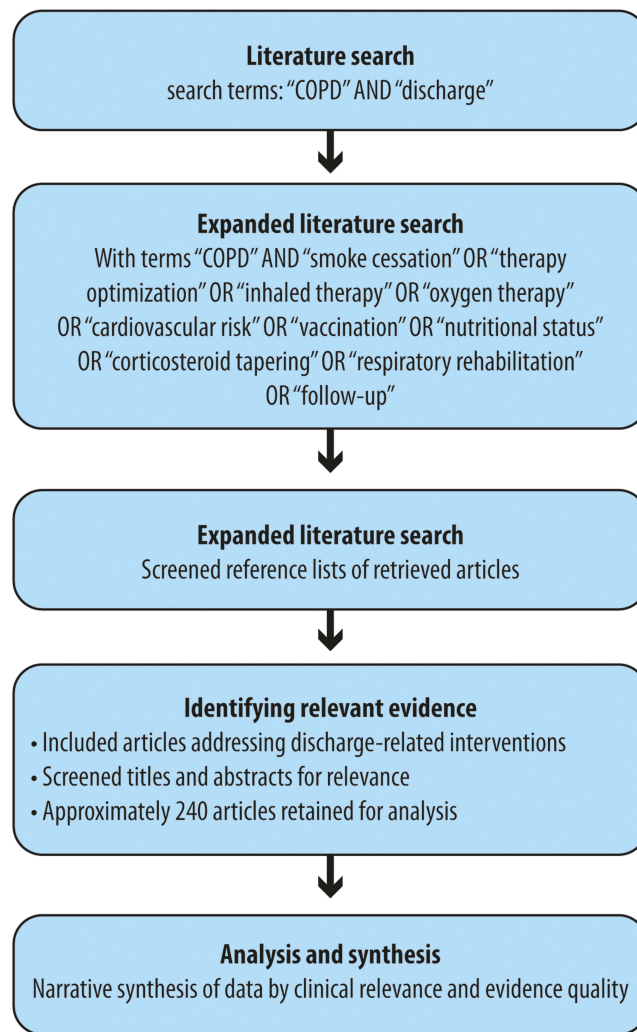


Figure 1 Literature search flowchart.

A systematic review found that the implementation of COPD discharge care bundles was associated with a reduction in hospital readmissions, reporting a pooled risk ratio of 0.80 (95% CI, 0.65–0.99), without significant improvement in mortality or health-related quality of life.⁶⁶ Several individual studies have failed to demonstrate reductions in readmission or mortality rates following bundle implementation.^{65,70,89,90} In one randomized clinical trial, the use of a transition bundle led to substantial reductions in both 7-day and 30-day readmissions (83% and 26% relative risk reduction, respectively).⁵³ Despite this, patients in the intervention group experienced a 7.3% increase in hospital length of stay, and emergency department revisits rose by 76% within 30 days. The authors hypothesized that this increase may reflect greater symptom awareness resulting from enhanced education during hospitalization.⁵³

In contrast, a pilot study by Hopkinson et al did not show a significant reduction in 30-day readmission rates but did report marked improvements in care delivery processes.⁶⁵ After bundle implementation, the provision of smoking cessation support increased from 18% to 100%, referrals to PR rose from 14% to 68%, the distribution of self-management plans improved from 55% to 98%, and inhaler technique reviews increased from 59% to 91%.⁶⁵ Notably, referrals to PR grew by 158%.⁶⁵

In another study, Epstein et al integrated a clinical decision support tool into the electronic health record system to promote adherence to discharge recommendations for acute exacerbations of COPD.⁹¹ This intervention significantly improved discharge practices, with appropriate recommendations provided to 80.5% of patients, compared to 25.4% previously.⁹¹

Patients in the intervention group were also more likely to receive prescribed medications within 60 days (54% vs 20%), had higher vaccination rates (92% vs 13%), and were almost universally scheduled for follow-up visits (98%).⁹¹

Building on this foundation, comprehensive self-management programs, including smoking cessation interventions, personalized action plans for exacerbations, monthly follow-up calls by case managers or nurses, regular general practitioner visits, encouragement of PR, and influenza vaccination, have demonstrated efficacy in reducing the risk of future AECOPD events and hospital readmission.^{59–61,63,92}

Notably, in patients with COPD who had a prior hospitalization, participation in a disease-specific self-management program, delivered alongside structured education and supported by healthcare professionals, led to a 39.8% reduction in hospital admissions and a 41.0% decrease in emergency department visits.⁶¹ These patients also experienced significantly greater improvements in quality of life compared to those receiving standard care.⁶¹

In parallel, telehealth interventions can also serve as valuable components of the post-discharge strategy. In particular, early video-based PR programs delivered via telemedicine have been associated with significant reductions in 30-day readmission rates for both all-cause and COPD-related hospitalizations.⁹³

To translate these evidence-based strategies into routine clinical practice, a structured discharge checklist, based on a COPD discharge algorithm (Figure 2), can provide a practical and systematic approach to ensure consistent implementation of key elements of transitional care.

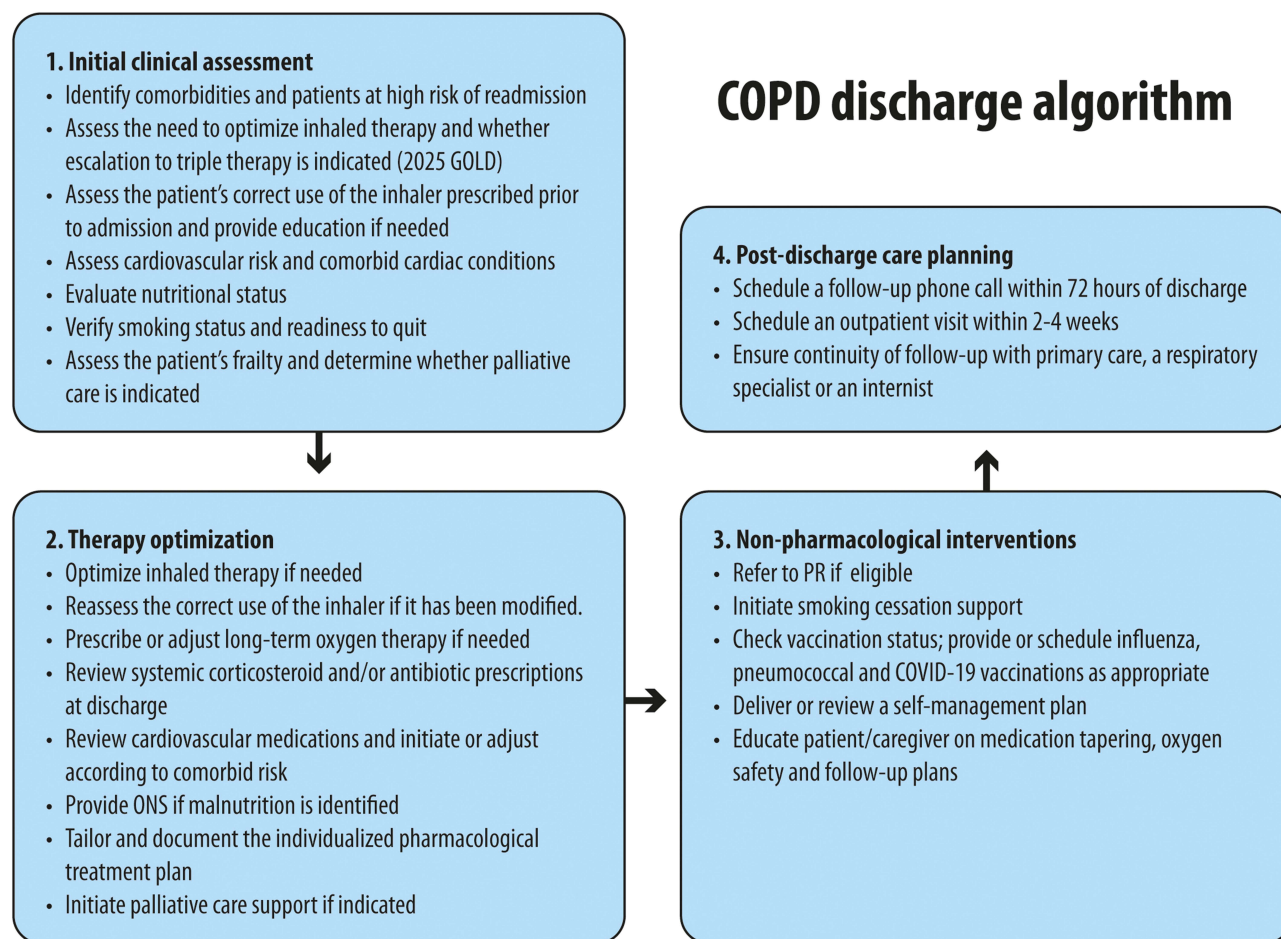


Figure 2 COPD discharge algorithm.

Abbreviations: ONS, oral nutrition supplements; PR, pulmonary rehabilitation.

Proposed COPD Discharge Checklist

A comprehensive discharge checklist should provide a structured framework to ensure that key domains, including smoking cessation, therapy optimization and comorbidity management, PR, education and care continuity, are adequately addressed.²⁶

The authors developed and implemented a structured discharge checklist during their clinical practice, informed by both guideline recommendations² and clinical experience, which may serve as a valuable tool to promote consistency and comprehensiveness in COPD discharge planning (Table 1).

Table 1 Checklist for Key Interventions at COPD Hospital Discharge

COPD management in an internal medicine setting – discharge checklist				
Cause of admission				
<input type="checkbox"/>	Exacerbation of COPD			
<input type="checkbox"/>	COPD in medical history, but admitted for unrelated reasons			
<input type="checkbox"/>	Hospitalization due to acute exacerbation of COPD, or presence of COPD in medical history, with evidence of unmanageable disease			
	<input type="checkbox"/> Cognitive decline <input type="checkbox"/> Terminal condition <input type="checkbox"/> Other			
Area	Key actions	Completed	Declined	Not applicable (specify the reason)
Smoking/ environmental exposure	Propose a smoking cessation plan to the patient (pharmacological or referral to a smoking cessation center)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Cognitive decline <input type="checkbox"/> Terminal condition <input type="checkbox"/> Nonsmoker <input type="checkbox"/> Other
Therapy optimization	Assess the need to optimize inhaled therapy compared to the regimen at admission, in line with the latest GOLD recommendations ²	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Patient already on triple therapy <input type="checkbox"/> Cognitive decline <input type="checkbox"/> Terminal condition <input type="checkbox"/> Other
	If therapeutic escalation* was warranted, it has been carried out with appropriate documentation through a therapeutic plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Cognitive decline <input type="checkbox"/> Terminal condition <input type="checkbox"/> Other
	Ensure the correct use of the prescribed inhalers or those already in use by the patient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Cognitive decline <input type="checkbox"/> Terminal condition <input type="checkbox"/> Other
	Assess the need for long-term oxygen therapy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Cognitive decline <input type="checkbox"/> Terminal condition <input type="checkbox"/> Other
	Assess the patient's cardiovascular risk and verify the need to optimize cardiovascular therapy (particularly for HF, if present) in accordance with recent guidelines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Cognitive decline <input type="checkbox"/> Terminal condition <input type="checkbox"/> Other
	Verify the patient's vaccination status (COVID, influenza, pneumococcus, varicella zoster virus, respiratory syncytial virus, pertussis)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Cognitive decline <input type="checkbox"/> Terminal condition <input type="checkbox"/> Already vaccinated <input type="checkbox"/> Other

(Continued)

Table 1 (Continued).

	If not vaccinated, recommend vaccination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Cognitive decline <input type="checkbox"/> Terminal condition <input type="checkbox"/> Other
	Assess the patient's nutritional status, and if needed, initiate supplementation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Cognitive decline <input type="checkbox"/> Terminal condition <input type="checkbox"/> Other
To be filled out only in the event of hospitalization due to COPD exacerbation				
	Ensure the patient or his/her caregiver understands how to taper off systemic corticosteroids after discharge and/or when to discontinue antibiotics if ongoing at discharge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Cognitive decline <input type="checkbox"/> Terminal condition <input type="checkbox"/> Other
Pulmonary rehabilitation	Assess eligibility for a potential respiratory rehabilitation program, either at home or in a rehabilitation facility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Cognitive decline <input type="checkbox"/> Terminal condition <input type="checkbox"/> Not necessary <input type="checkbox"/> Other
	If eligible, activate the rehabilitation pathway**	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Cognitive decline <input type="checkbox"/> Terminal condition <input type="checkbox"/> Other
Follow-up management	Verify that the patient has a follow-up appointment scheduled within 30 days of discharge	<input type="checkbox"/> Internal medicine ward <input type="checkbox"/> Treating pulmonologist <input type="checkbox"/> Other	<input type="checkbox"/>	<input type="checkbox"/> Cognitive decline <input type="checkbox"/> Terminal condition <input type="checkbox"/> Other
Palliative care	If the checklist is not applicable in several areas due to cognitive decline or a terminal condition, have you considered initiating palliative care support?	<input type="checkbox"/>	<input type="checkbox"/>	

Notes: *eg, from dual to triple inhaled therapy. **Fields to be completed only if the previous question was answered affirmatively.

Abbreviations: AECOPD, acute exacerbation of COPD; COPD, chronic obstructive pulmonary disease; COVID-19, coronavirus disease 2019; HF, heart failure.

The use of the proposed COPD discharge checklist may support improved adherence to the GOLD 2025 recommendations,² as well as enhance clinical outcomes and reduce resource utilization in internal medicine wards across Italy. In particular, the checklist is designed to prompt internists discharging COPD patients to consider a series of actions that have been shown to reduce the risk of subsequent hospitalizations, thereby improving prognosis and mitigating the economic burden associated with readmissions. Notably, in patients with cognitive impairment, the degree of cognitive decline needs to be considered when planning discharge interventions. Caregiver education should be emphasized, particularly in cases of mild-to-moderate impairment, where a meaningful benefit in treatment adherence and symptom management was expected.

In advanced cognitive decline or terminal conditions, educational and therapeutic interventions should be individualized in accordance with goals of care.

Of course, the proposed checklist should undergo external validation before it can be used as a clinical tool. We are currently conducting a preliminary test with several Italian internal medicine departments, in collaboration with the Italian Society of Internal Medicine (SIMI), to assess the checklist and to capture a snapshot of the current situation.

The Role of Smoke Cessation

Among the key domains included in the discharge checklist, smoking cessation holds a foundational role, as it directly influences disease progression, symptom burden, and long-term outcomes in patients with COPD. The GOLD 2025 guidelines recommend assessing current smoking status and exposure at every visit, followed by appropriate intervention as needed

Table 2 Alignment of COPD Discharge Checklist Items with International Guidelines

Checklist Item	Supporting Guidelines	Included in the Following Discharge Bundles:	Not Included in the Following Discharge Bundles:
Propose a smoking cessation plan for the patient (pharmacological or referral to a smoking cessation center)	2025 GOLD, ² NICE, ⁷¹ 2025 NZ ⁷³ All guidelines strongly advise smoking cessation advice, pharmacotherapy, and referral to cessation services	Salvi et al ¹⁰⁰ Dumra et al ¹⁰¹ Miravittles et al ²⁶ Rendon et al ⁷⁹ Atwood et al ⁵³ Hopkinson et al ⁶⁵ BTS discharge care bundle ¹⁰²	
Assess the need to optimize inhaled therapy compared to the regimen at admission, in line with the latest GOLD recommendations ²	2025 GOLD, ² CTS, ⁸³ ATS, ⁷² 2025 NZ ⁷³ GOLD and NZ recommend escalation to triple therapy based on eosinophils and exacerbation history; ATS and CTS support escalation when symptoms persist despite dual therapy	Salvi et al ¹⁰⁰ Dumra et al ¹⁰¹ Miravittles et al ²⁶ Rendon et al ⁷⁹ Atwood et al ⁵³ BTS discharge care bundle ¹⁰²	Hopkinson et al ⁶⁵
If therapeutic escalation* was warranted, it has been carried out with appropriate documentation through a therapeutic plan	2025 GOLD, ² 2025 NZ ⁷³	Rendon et al ⁷⁹ Atwood et al ⁵³ Hopkinson et al ⁶⁵	Salvi et al ¹⁰⁰ Dumra et al ¹⁰¹ Miravittles et al ²⁶ Atwood et al ⁵³ BTS discharge care bundle ¹⁰²
Ensure the correct use of the prescribed inhalers or those already in use by the patient	2025 GOLD, ² CTS, ⁸³ NICE, ⁷¹ 2025 NZ ⁷³ GOLD advises checking inhaler technique at every visit; NICE and NZ recommend regular technique review	Salvi et al ¹⁰⁰ Dumra et al ¹⁰¹ Miravittles et al ²⁶ Rendon et al ⁷⁹ Atwood et al ⁵³ Hopkinson et al ⁶⁵ BTS discharge care bundle ¹⁰²	
Assess the need for long-term oxygen therapy	2025 GOLD, ² NICE, ⁷¹ 2025 NZ ⁷³ GOLD advises reassessing oxygen need 1–3 months post-discharge; NICE supports structured oxygen assessment during care transitions	Salvi et al ¹⁰⁰ Dumra et al ¹⁰¹ Rendon et al ⁷⁹ Miravittles et al ²⁶ (at 30-day follow-up) BTS discharge care bundle ¹⁰²	Salvi et al ¹⁰⁰ Atwood et al ⁵³ Hopkinson et al ⁶⁵
Assess the patient's cardiovascular risk and verify the need to optimize cardiovascular therapy (particularly for HF, if present) in accordance with recent guidelines	2025 GOLD, ² NICE, ⁷¹ 2025 NZ ⁷³ GOLD, NZ and NICE recommend screening and managing cardiovascular disease	Salvi et al ¹⁰⁰ Dumra et al ¹⁰¹ Miravittles et al ²⁶ (partially) Rendon et al ⁷⁹ (partially)	Atwood et al ⁵³ Hopkinson et al ⁶⁵

(Continued)

Table 2 (Continued).

Checklist Item	Supporting Guidelines	Included in the Following Discharge Bundles:	Not Included in the Following Discharge Bundles:
Verify the patient's vaccination status (COVID, influenza, pneumococcus, varicella zoster virus, respiratory syncytial virus, pertussis). If not vaccinated, recommend vaccination	2025 GOLD, ² NICE, ⁷¹ 2025 NZ ⁷³ GOLD and NZ recommend vaccination against influenza, pneumococcus, COVID-19, and herpes zoster; NICE mandates influenza and pneumococcal vaccines	Salvi et al ¹⁰⁰ Dumra et al ¹⁰¹ Rendon et al ⁷⁹	Miravittles et al ²⁶ Atwood et al ⁵³ Hopkinson et al ⁶⁵ BTS discharge care bundle ¹⁰²
Assess the patient's nutritional status, and if needed, initiate supplementation	2025 GOLD, ² NICE, ⁷¹ ERS, ⁷⁵ 2025 NZ ⁷³ All recommend nutritional screening, especially at discharge	Salvi et al ¹⁰⁰ Dumra et al ¹⁰¹ Miravittles et al ²⁶ Rendon et al ⁷⁹	Atwood et al ⁵³ Hopkinson et al ⁶⁵ BTS discharge care bundle ¹⁰²
Ensure the patient or his/her caregiver understands how to taper off systemic corticosteroids after discharge and/or when to discontinue antibiotics if ongoing at discharge	ATS, ⁷² CTS, ⁷⁴ 2025 GOLD, ² NICE, ⁷¹ 2025 NZ ⁷³ While none of the guidelines explicitly address caregiver or patient education on tapering or discontinuation at discharge, NICE emphasizes providing a written management plan with medication instructions. GOLD and NZ support short treatment durations for corticosteroids and antibiotics in AECOPD, while ATS, NZ, and CTS advise against maintenance oral corticosteroids	Atwood et al ⁵³ Dumra et al ¹⁰¹ Miravittles et al ²⁶ BTS discharge care bundle ¹⁰²	Salvi et al ¹⁰⁰ Rendon et al ⁷⁹ Hopkinson et al ⁶⁵
Assess eligibility for a potential respiratory rehabilitation program, either at home or in a rehabilitation facility If eligible, activate the rehabilitation pathway**	2025 GOLD, ² NICE, ⁷¹ 2025 NZ ⁷³ All recommend pulmonary rehabilitation post-hospitalization and for stable patients	Salvi et al ¹⁰⁰ Dumra et al ¹⁰¹ Miravittles et al ²⁶ Rendon et al ⁷⁹ Atwood et al ⁵³ Hopkinson et al ⁶⁵ BTS discharge care bundle ¹⁰²	
Verify that the patient has a follow-up appointment scheduled within 30 days of discharge	2025 GOLD, ² NICE, ⁷¹ 2025 NZ ⁷³ 2025 GOLD advises visits at 1–4 weeks and again at 12–16 weeks post-discharge; NZ and NICE emphasize timely primary care follow-up	Salvi et al ¹⁰⁰ Atwood et al ⁵³ Dumra et al ¹⁰¹ Miravittles et al ²⁶ Rendon et al ⁷⁹ Hopkinson et al ⁶⁵ Atwood et al ⁵³ BTS discharge care bundle ¹⁰²	
If the checklist is not applicable in several areas due to cognitive decline or a terminal condition, have you considered initiating palliative care support?	2025 GOLD, ² NICE, ⁷¹ 2025 NZ ⁷³ 2025 GOLD, ² NZ, and NICE recommend integrating palliative care into COPD management in cases of high burden of symptoms	Salvi et al ¹⁰⁰ Dumra et al ¹⁰¹	Rendon et al ⁷⁹ Miravittles et al ²⁶ Atwood et al ⁵³ Hopkinson et al ⁶⁵ BTS discharge care bundle ¹⁰²

Abbreviations: ATS, American Thoracic Society; CTS, Canadian Thoracic Society; ERS, European Respiratory Society; GOLD, Global Initiative for Chronic Obstructive Lung Disease; ONS, oral nutritional supplementation; NZ, New Zealand.

(Table 2).² In addition, the NICE and the 2025 New Zealand guidelines recommend offering smoking cessation advice and treatment, along with referral to specialist stop-smoking services (Table 2).^{71,73} Addressing tobacco dependence and environmental exposures during hospitalization presents a critical opportunity to initiate behavior change. Smoke cessation is the only evidence-based intervention proven to slow the progression of COPD; it can decelerate the decline in lung function and disease progression, alleviate respiratory symptoms, improve nocturnal sleep disturbances, and reduce mortality compared to continued smoking.^{2,94,95} Former smokers were found to have a 22% lower risk of experiencing exacerbations compared to individuals who continued smoking.⁹⁶ A combination of behavioural support and pharmacological therapy has been shown to be effective in helping COPD patients quit smoking.^{2,97} A 10-week smoking cessation program led to a lower mortality rate when assessed 14.5 years later, compared to those who received usual care in a randomized trial.⁹⁸ Therefore, it is essential that healthcare professionals actively offer cessation counseling to strengthen patients' confidence and ability to quit and emphasize this intervention prior to the discharge of patients with COPD.⁹⁹

In addition to active smoking, exposure to secondhand smoke, indoor air pollutants, and occupational hazards, such as chemicals and fumes, are significant contributors to the development and progression of COPD² and should be carefully considered at the time of discharge.

Therapy Optimization Upon Discharge

In addition to addressing tobacco dependence and environmental exposures, effective discharge planning for COPD must also focus on optimizing pharmacological treatment. While smoking cessation is the only intervention proven to slow disease progression, appropriate therapy plays a central role in controlling symptoms, reducing exacerbation frequency, and improving patients' functional status in the short to medium term. Failure to promptly optimize bronchodilation may lead to persistent negative impacts on patient-reported outcomes.¹⁰³ Despite hospitalization, a substantial proportion of patients continue to receive inadequate treatment for COPD. In a retrospective, population-based cohort study conducted in Sweden, 16.6% of individuals hospitalized for an exacerbation did not receive any form of maintenance therapy for COPD within the four months following their initial admission.¹⁰⁴

Triple therapy with long-acting β -agonists, long-acting muscarinic antagonists and inhaled corticosteroids has been shown to significantly improve symptoms and lung function in real-world COPD populations, as reported in recent systematic reviews and meta-analyses.^{105–107} In patients with moderate to very severe COPD who experience frequent exacerbations, triple therapy has been shown to more effectively reduce exacerbation rates and potentially lower mortality, compared to dual bronchodilation alone.^{74,106–111} Moreover, initiating triple therapy promptly after hospital discharge has been associated with a reduced risk of subsequent exacerbations and a notable decrease in healthcare resource utilization, particularly when compared to delayed or late initiation strategies.¹¹² Although inhaled corticosteroids are associated with an increased risk of pneumonia, the overall clinical benefit, particularly the observed reduction in mortality, has been considered to outweigh this risk.⁷⁴ Accordingly, several published discharge protocols recommend initiating or maintaining triple-therapy, preferably as a single-inhaler regimen, in COPD patients with recurrent exacerbations,^{79,100} consistent with recent COPD management guidelines.^{2,26,71–74} The GOLD 2025 report² recommends initiating triple therapy as a first-line option in patients at high risk of exacerbations with a blood eosinophil count ≥ 300 cells/ μ L. For those with a blood eosinophil count between 100 cells/ μ L and 300 cells/ μ L who continue to experience exacerbations despite dual bronchodilator (long-acting β -agonist + long-acting muscarinic antagonist), escalation to triple therapy is also advised.² The 2025 New Zealand guidelines recommend escalation to triple therapy for patients with COPD who experience frequent exacerbations (more than one per year), have been hospitalized for an AECOPD, or continue to suffer from breathlessness and limited exercise capacity despite treatment with LABA+LAMA dual bronchodilation (Table 2).⁷³ Escalation is also advised for individuals with blood eosinophil counts ≥ 300 cells/ μ L while on dual therapy.⁷³ In comparison, the ATS guidelines provide a conditional recommendation for initiating triple therapy in patients with ongoing dyspnea and exercise limitation who have experienced at least one exacerbation in the previous year requiring antibiotics, corticosteroids, or hospitalization.⁷² Additionally, the 2023 Canadian Thoracic Society COPD Pharmacotherapy Guideline,⁷⁴ which relies solely on a systematic review of randomized controlled trials, recommends initiating triple therapy for all symptomatic patients at high risk of exacerbations, irrespective of their eosinophil count. The NICE guidelines recommend weighing the risk of pneumonia against the expected clinical benefits

of triple therapy.⁷¹ For patients with less severe symptoms, they advise a time-limited (3-month) trial of triple therapy to assess treatment response, with the option to step back to LAMA+LABA if no clear benefit is achieved.⁷¹

Evidence from real-world studies indicates that single-inhaler triple therapy leads to better lung function, fewer exacerbations, improved treatment adherence, and lower mortality rates, without raising the risk of pneumonia when compared to multiple-inhaler triple therapy.^{113,114} Given these advantages, early use of single-inhaler triple therapy should be considered in symptomatic COPD patients who are at risk of exacerbations.¹⁰³

The selection of inhalation devices for patients with COPD should be personalized and guided by multiple patient-specific factors, including cognitive status and manual skills.^{2,115} Lung deposition efficiency and the patient's inspiratory flow capacity are critical parameters in determining the suitability of a given device.¹¹⁶ Optimizing device selection not only supports effective drug delivery but also plays a pivotal role in promoting medication adherence and improving overall clinical outcomes.¹¹⁵

Education on proper inhaler technique is another critical yet suboptimally addressed aspect of COPD management. In patients with COPD, improper inhaler technique and poor adherence to prescribed medications are frequently observed and have been linked to worse clinical outcomes.¹¹⁷ These include increased rates of hospital admissions, emergency department visits, suboptimal disease control, higher mortality, and elevated healthcare expenditures.^{118,119} Notably, patients treated by GPs may be less likely to receive both pharmacological and non-pharmacological therapies, and may perform inhalation techniques less accurately than those managed by pulmonologists.¹²⁰ Correct inhaler use is essential for achieving therapeutic efficacy, particularly given the chronic nature of COPD and the dependence of outcomes on long-term adherence.¹²¹ Educational interventions, including demonstrations of inhaler technique and reinforcement over time, have been consistently associated with increased adherence, better disease control, and reduced hospital readmission rates.^{40,55,56,59–61}

The indication for long-term oxygen therapy should be evaluated on an individualized basis.² Its greatest clinical benefit is observed in COPD patients with severe resting hypoxemia, in whom it has also been shown to improve survival.^{122–127} By contrast, the benefits are more limited in cases of moderate hypoxemia, and the evidence remains inconsistent for patients with exertional or nocturnal hypoxemia.^{122,123}

Oral corticosteroids are effective in the acute treatment of AECOPD, contributing to faster symptom resolution, reduced hospital length of stay, and improved recovery of lung function.^{128–131} Despite their short-term benefits, oral corticosteroids are not recommended for chronic use in COPD management due to their association with significant adverse effects, including an elevated risk of pneumonia.¹³²

When appropriately prescribed, antibiotics can also facilitate a more rapid recovery from exacerbations, reduce the duration of hospital stay, and lower the likelihood of early relapse and therapeutic failure.^{2,131} Limiting the duration of antibiotic therapy may help mitigate the emergence of antimicrobial resistance and minimize related complications.²

Upon discharge, it is essential to verify that patients understand the intended discontinuation of acute-phase medications, such as oral corticosteroids and antibiotics. If gaps in understanding are identified, clear explanations should be provided to ensure patients are aware of the rationale behind medication withdrawal.

Cardiovascular Comorbidities

Comorbidities should be systematically addressed during discharge planning, as they influence treatment decisions, prognosis, and the risk of readmission.

Among comorbidities, cardiovascular events represent the predominant cause of hospitalization for patients with COPD,^{2,133} accounting for as many as half of admissions in smokers with mild-to-moderate disease.^{123–136} COPD itself represents a risk factor for cardiovascular disease,¹³⁷ and mortality patterns confirm this strong association: up to one-third of patients with COPD die from cardiovascular disease, a proportion that increases to nearly 40% in those with pre-existing cardiac conditions.^{134,138} Additionally, an AECOPD is associated with a marked increase in the risk of cardiovascular events, including acute coronary syndrome and stroke, peaking in the first 10–30 days and remaining elevated for up to 1 year.^{2,19,139}

The most prevalent comorbidity observed in COPD is elevated systolic blood pressure,² which is more common in individuals who experience frequent exacerbations.^{140,141} Reported prevalence estimates vary widely, ranging from roughly 28–65%.^{142–145} Moreover, hypertension acts as a major vascular risk factor, contributing to the development of heart failure (HF) and ischemic heart disease (IHD), thereby worsening prognosis.¹⁴⁶

The prevalence of HF among patients with COPD is consistently higher than in the general population, ranging from 5% to 40%,^{142,147–149} underscoring its role as a frequent and clinically significant comorbidity.²² The burden is particularly marked during acute events: HF is present in approximately 30% of patients hospitalized for COPD exacerbations and in up to 75% of those requiring mechanical ventilation.^{150–152} HF also represents the leading cause of hospital readmission in this population and significantly worsens both short- and long-term outcomes following COPD exacerbations.¹⁵⁰

From the perspective of HF, the coexistence of COPD is also frequent: the prevalence of COPD in patients with HF lies between 13% and 39%.^{22,134,153,154} Notably, concomitant COPD negatively influences prognosis in HF patients as it is associated with poorer health status, an increased risk of hospitalization for both cardiovascular and non-cardiovascular causes,¹⁵⁵ higher rates of acute exacerbations, and mortality.^{156–159} From a therapeutic standpoint, continuation of β -blocker therapy remains essential in HF patients, as these drugs are not contraindicated in individuals with COPD.^{100,160–162}

Despite some variability among studies, it is estimated that between 20% and 60% of individuals with COPD are affected by coronary artery disease.^{142,143} Evidence from the 2017 Global Burden of Disease Study further underscores the impact of this association, identifying coronary artery disease as the leading cause of premature death in COPD, responsible for more than 1 million deaths globally.¹⁶³

From a clinical standpoint, coronary artery disease manifests as IHD, which represents the spectrum of symptoms and complications arising from reduced coronary blood flow. Patients with COPD exhibit a significantly higher risk of developing IHD compared with the general population, and IHD is a major contributor to mortality, particularly in those with mild-to-moderate airflow limitation.^{164–167}

Reported prevalence rates of IHD vary between 7% and 33%^{168–170} in stable COPD, and approximately 17–22% among patients hospitalized for exacerbations.¹⁷¹ When COPD and IHD coexist, the likelihood of hospital admission doubles,¹⁷² and short-term mortality is increased.¹⁵⁰

Conversely, COPD is also frequently observed in individuals with IHD. A study reported a prevalence of 20% for moderate-to-severe airflow obstruction in a group of patients with IHD and undiagnosed airflow obstruction, a subgroup in which one-third also had concomitant HF.¹⁷³ Accordingly, a recent systematic review and meta-analysis reported a COPD prevalence of about 12% in a population of over 18 million IHD patients; COPD leads to a greater comorbidity burden, worse acute outcomes, higher long-term mortality, and lower β -blocker prescription rates in these patients.¹⁷⁴

Long-term data from a nationwide cohort further confirm the bidirectional link: over a median of 8 years, 2.5% of participants with COPD developed IHD, compared with only 0.8% of those without COPD.¹⁷⁵ Notably, the study included 86 participants with incident COPD and 4128 participants without COPD.¹⁷⁵

Within the IHD spectrum, acute myocardial infarction represents one of the most severe clinical outcomes. Among individuals with COPD, the likelihood of developing an acute myocardial infarction is markedly increased; estimates suggest a 1.4- to 4-fold elevation in risk, particularly in patients with severe disease.^{147,176,177} Between 10% and 17% of patients with a confirmed COPD diagnosis have a history of myocardial infarction, which is associated with adverse clinical outcomes and poorer survival.^{136,178}

This same risk profile extends to cerebrovascular disease, with stroke representing another major outcome of systemic vascular involvement. COPD increases the likelihood of stroke, which affects approximately 10% of stable patients and up to 20% of those hospitalized for AECOPD.¹⁷⁹

Beyond ischemic complications, COPD has also been identified as an independent risk factor for ventricular tachyarrhythmias and sudden cardiac death, irrespective of the presence of traditional cardiovascular risk factors.^{133,180}

Patients with COPD have a heightened susceptibility to cardiac arrhythmias, particularly during AECOPD, which contributes to increased all-cause mortality.^{181–183} An analysis of 21.5 million COPD-related hospitalizations in the USA between 2010 and 2014 revealed that approximately 30% were complicated by arrhythmias.¹⁸⁴ Available data indicate that 5–15% of patients with stable COPD experience arrhythmias, with the proportion rising to 20–30% among those with advanced disease.¹⁶⁸ Two systematic reviews similarly reported a prevalence ranging from 5% to 29%, with higher rates associated with more severe impairment in lung function.^{142,143}

Among the various rhythm disorders, atrial fibrillation (AF) is the most common supraventricular arrhythmia observed in COPD.^{185,186} Patients with COPD face nearly a fivefold higher risk of AF compared with individuals without COPD.^{185,186} The estimated prevalence of AF in stable COPD is between 4.7% and 15%, but this figure escalates to 15–30% in cases of very severe disease.^{187,188} In the setting of AECOPD, when AF is more likely to occur,¹⁸⁸ AF has been documented in about 21% of hospitalized patients, and overall arrhythmias in 27%.¹⁷¹

The coexistence of AF in COPD carries significant clinical implications. Patients with both conditions report poorer health-related quality of life, and mortality among those hospitalized for exacerbations is higher when AF is present.^{189,190} Evidence also suggests a bidirectional relationship: AECOPD may precipitate AF episodes, while AF itself can act as a trigger for AECOPD.¹⁹¹ Moreover, COPD increases the likelihood of hospitalization for AF.¹⁹² For these reasons, systematic ECG monitoring and individualized risk stratification should be considered essential components of care to improve outcomes in this high-risk population.

COPD can also be complicated by systemic vascular diseases. Peripheral artery disease (PAD), such as coronary artery disease, is driven by atherosclerotic plaque formation that progressively obstructs arterial flow, particularly in the lower limbs. Reported prevalence rates of PAD in COPD vary widely, from 8.5% to over 80%, depending on population characteristics, such as ethnicity, disease severity, and whether analyses excluded nonsmokers or asymptomatic individuals.^{150,171,193–195} Conversely, COPD is also frequent in patients with PAD: one study reported a prevalence of 27.2%,¹⁹⁶ while another found COPD in 37.5% of hospitalized smokers with PAD.¹⁹⁷ From a clinical standpoint, the coexistence of COPD and PAD is unsurprising given their shared risk factors, particularly tobacco exposure.¹⁹³ Chronic systemic inflammation, a hallmark of COPD, also plays a central role in the pathogenesis of atherosclerosis and likely contributes to the strong association between these conditions.¹⁹⁸ Importantly, COPD is associated with elevated in-hospital mortality among patients treated for PAD.¹⁹⁹

The current GOLD guidelines highlight the need to actively identify and manage cardiovascular comorbidities in patients with COPD, both in the stable phase and during AECOPD (Table 2).²

Given the heightened risk of cardiovascular events following an AECOPD, routine monitoring of cardiovascular markers is advised, despite limited supporting evidence, as any abnormalities observed during an exacerbation should prompt further evaluation and management in accordance with established cardiovascular disease guidelines.²

Similarly, the 2025 New Zealand and NICE guidelines recommend conducting cardiovascular assessments, including electrocardiography, echocardiography, and measurement of natriuretic peptides, particularly when cardiac disease or pulmonary hypertension is suspected (Table 2).^{71,73}

In line with these recommendations, cardiovascular evaluation is also incorporated into discharge protocols published in the literature.^{22,26,101}

Vaccination

In addition to optimizing pharmacologic therapy, preventive strategies aimed at reducing infection-related exacerbations are critical in the post-discharge period. Among these, vaccination represents a key preventive strategy to reduce the frequency of exacerbations, which are frequently triggered by respiratory infections.²⁰⁰ Importantly, no increase in exacerbation rates has been reported following influenza vaccination.²⁰¹ COVID-19 vaccination is strongly recommended, as COPD patients are more susceptible to SARS-CoV-2 infection due to increased ACE2 receptor expression and face a higher risk of severe disease, hospitalization and mortality.²⁰⁰ The GOLD 2025 guidelines² and the 2025 New Zealand guidelines⁷³ recommend vaccination against COVID-19, influenza, pneumococcus, and varicella zoster virus in all COPD patients (Table 2). The NICE guidelines advise that all individuals with COPD should receive pneumococcal vaccination and an annual influenza vaccine⁷¹ (Table 2). Pertussis, tetanus and diphtheria vaccination status should also be reviewed, with immunization recommended for individuals who have not been previously vaccinated.² Additionally, vaccination against the respiratory syncytial virus is advised in COPD patients aged over 60 years and/or in those with coexisting cardiovascular or pulmonary disease.²

Evaluation of Nutritional Status

Beyond infection prevention, nutritional status is another often-overlooked but clinically important determinant of outcomes in COPD, particularly at hospital discharge. Malnutrition is a common complication in COPD patients, with estimates ranging from 30% to 60% among patients hospitalized for an AECOPD, and results from chronic systemic inflammation, increased energy expenditure, and reduced dietary intake.^{202–204} These factors contribute to the loss of both fat and lean body mass, which may manifest as malnutrition, sarcopenia, cachexia or frailty, all of which have been associated with longer hospital stays and increased mortality risk.^{26,202,203} Malnutrition in particular negatively affects clinical symptoms, including greater lung hyperinflation, reduced pulmonary function, diminished exercise capacity, and weakened respiratory muscles, which can impair effective coughing and secretion clearance, and worsen the overall prognosis.^{100,202,203}

Nutritional status should be assessed on an individual basis, as it varies depending on disease stage and severity.²⁰²

Weight loss in patients with respiratory disease was traditionally considered an unavoidable and irreversible condition, and even viewed as a protective adaptation aimed at reducing the body's metabolic burden.¹⁰⁰ However, recent evidence has overturned this perspective, demonstrating that malnutrition in COPD is both treatable and responsive to targeted nutritional interventions.²⁰⁵ Recent national and international guidelines underscore the importance of nutritional screening and intervention in COPD (Table 2).² GOLD 2025 recommends that nutritional screening and counseling be part of routine COPD care, noting that unintentional weight loss is associated with increased mortality.² The European Respiratory Society (ERS),⁷⁵ NICE,⁷¹ and 2025 New Zealand⁷³ guidelines all emphasize the use of standardized screening tools, such as BMI, weight history, or the Malnutrition Universal Screening Tool (MUST),²⁰⁶ especially during hospital admissions or exacerbations (Table 2). Notably, NICE⁷¹ and 2025 New Zealand⁷³ guidelines specifically highlight the importance of assessing nutritional status at hospital discharge and integrating this into rehabilitation planning (Table 2).

Nutritional assessment is advocated as part of a multidimensional COPD management strategy, and targeted interventions, including high-protein and energy-dense nutritional supplements, have been shown to improve body weight, muscle strength, and physical performance.

Enhanced nutrition has been associated with improved respiratory muscle strength, increased functional capacity, and better quality of life, particularly when combined with PR.^{2,73,75,204,207}

An expanding body of research, along with the GOLD 2025 guidelines, advocates for the use of oral nutritional supplements (ONS) as a means to enhance energy intake, promote weight gain, increase muscle strength, and improve health-related quality of life.^{2,204,205} Notably, the use of oral nutritional supplements during AECOPD hospitalizations has been shown to significantly reduce 30-day readmission rates, likely by restoring energy balance.^{208,209} Meta-analyses indicate that in malnourished patients, gaining more than 2 kg, achievable with an intake of at least 45 kcal/kg/day and 1.2–1.5 g protein/kg/day, is linked to improved long-term survival.^{100,202,204} In addition, providing nutritional support to individuals undergoing PR, even those who are not clinically malnourished, may help prevent energy deficits and enhance the overall effectiveness of the intervention.^{210,211}

In obese patients with COPD, combining dietary energy restriction with resistance training has been shown to significantly improve BMI, exercise tolerance, and overall health status, while preserving muscle mass.²¹²

For these reasons, it is essential to increase internists' awareness of the importance of assessing nutritional status at the time of discharge and prescribing appropriate ONS when indicated. Equally important are the knowledge and training of healthcare professionals, together with adequate time devoted to patient education, to ensure that the prescription and adherence to oral nutritional supplements are clinically meaningful and sustainable in COPD management. A collaborative approach with dietitians is crucial, as structured dietary training can help educate both patients and caregivers, fostering long-term adherence and empowering them to actively participate in nutritional care.

Pulmonary Rehabilitation

PR is one of the most effective non-pharmacologic interventions in COPD; it has been shown to significantly improve exercise capacity, alleviate clinical symptoms, and enhance quality of life in COPD patients.^{2,76,77} It is strongly recommended by 2025 GOLD, 2025 New Zealand, NICE and Canadian Thoracic Society guidelines both in stable

disease and following hospitalization for AECOPD, as a means to interrupt the vicious cycle of disease progression and dyspnea-driven inactivity (Table 2).^{2,71,73,74,76,77} Discharge protocols in the literature have recommended incorporating PR as part of a broader multidisciplinary approach including physical training, education about the disease, and support addressing nutritional, psychological, and behavioural needs.^{26,53,79,86,100,101,213}

A cohort study involving 291 consecutive hospitalizations for AECOPD found that delivery of a COPD discharge bundle by PR practitioners, compared to non-PR staff, significantly increased both referral to PR (60% vs 12%, $p < 0.001$) and patient uptake (40% vs 32%, $p = 0.001$).²¹³ This study underscores the importance of stronger integration between hospital-based care and PR services.²¹³ Notably, the study also reported that when a discharge bundle was not administered, no patients were referred to or enrolled in PR, emphasizing the critical role discharge bundles play in facilitating access to post-hospital rehabilitation.²¹³

Importantly, recent evidence from a systematic review confirms that PR initiated within three weeks after hospital discharge for an AECOPD significantly reduces the risk of hospital readmissions and leads to clinically meaningful improvements in exercise capacity, dyspnea, and health-related quality of life, including fatigue and emotional well-being domains of the disease.²¹⁴ Similarly, a large cohort retrospective study reported reduced all-cause readmission 1 year after discharge and a reduced mean number of readmissions when PR was initiated within 3 months after discharge for an AECOPD.²¹⁵ Number of days spent in hospital per person-year was also lower in those who initiated PR within 90 days of discharge (11.5 vs 22.6), and those who initiated PR also spent fewer days in a nursing home after discharge.²¹⁵ Initiation of PR was also associated with a lower risk of COPD-specific rehospitalizations.²¹⁵ Despite its proven efficacy, PR remains markedly underutilized, with large cohort studies indicating that only 1.5% of COPD patients initiated PR within 90 days of discharge, a timeframe that is in contrast with current guideline recommendations.^{40,216,217} Other data have shown that this poor rate of uptake for PR continues longitudinally, with only 1.9% of patients receiving PR within 6 months of hospitalization and 2.7% of patients receiving PR at 12 months post-discharge.²¹⁸ Additionally, even patients discharged directly from the emergency department, who face a significantly higher risk of readmission compared to those discharged from inpatient care, often fail to receive appropriate referrals to PR.²¹⁹ This highlights the need to improve referral practices to PR services.

Beyond pulmonary improvements, PR also improves whole-body function, mental health, and quality of life in COPD.¹⁰³ The future lies in individualized PR, greater accessibility, and integrated delivery models to reach all patients in need. Notably, internet-based telerehabilitation has emerged as a safe, effective, and comparable alternative to conventional PR in terms of improving functional capacity and maintaining quality of life, particularly in settings where access to standard rehabilitation programs is limited.²²⁰

Post-Discharge Follow-Up

A retrospective cohort study in the USA reported that 66.9% of COPD patients had a follow-up appointment scheduled with their pulmonologist or primary care provider within 30 days.⁵¹ In contrast, a retrospective cohort study conducted in an Israeli hospital reported that only 44.1% of COPD patients had a follow-up appointment with a pulmonologist within 30 days post-discharge.⁵⁸ These gaps are clinically significant, as multiple studies have demonstrated that structured and timely follow-up care is associated with reduced hospital readmissions and improved long-term outcomes.^{51–55,58} The NICE guidelines recommend that people with COPD should be reviewed at least annually, or more frequently if clinically indicated.⁷¹ While they state that routine hospital follow-up is generally unnecessary for most people with stable, severe COPD, they emphasize the need for locally agreed mechanisms to ensure rapid access to hospital assessment when needed.⁷¹ For individuals with very severe COPD, the NICE guidelines advise at least two reviews per year in primary care, although they do not specify the appropriate timing for the first visit after hospital discharge (Table 2).⁷¹

In contrast, the GOLD 2025 guidelines provide clearer guidance, recommending a first follow-up assessment 1–4 weeks post-discharge, followed by a second visit at 12–16 weeks (Table 2).² These visits should include evaluation of treatment understanding, inhaler technique, reassessment of the need for long-term oxygen therapy, assessment of physical activity capacity and eligibility for pulmonary rehabilitation, as well as a review of symptoms and comorbidities.²

Similarly, the 2025 New Zealand guidelines advise that patients receive a primary care follow-up within two weeks of hospital discharge for patients hospitalized due to an AECOPD (Table 2).⁷³ Several studies recommending discharge protocols

emphasize the importance of scheduling follow-up appointments within 2–4 weeks after discharge,^{26,83,101} Other studies highlight the value of early post-discharge contact, including evidence that a hospital-initiated phone call within 72 hours can significantly reduce readmission rates, further supporting the need for prompt and proactive follow-up care.^{53,79}

Beyond care continuity, early follow-up also provides a critical window for diagnostic reassessment and treatment adjustment. According to the GOLD guidelines,² spirometries should be performed when the patient is clinically stable and free of respiratory tract infection. Interestingly, studies have shown no significant differences between spirometry obtained at the time of hospital admission for AECOPD and those repeated 1 month later.^{221,222} Despite this, spirometry remains significantly underused during hospitalization. It is essential, in patients who have never undergone spirometric evaluation, to confirm a COPD diagnosis and initiate prompt treatment.^{221,222} Spirometry is a reliable tool for detecting obstructive patterns,^{221,222} although it may overestimate disease severity during AECOPD due to transient pathophysiological changes.²²¹ Performing spirometry approximately 1 month after discharge is especially valuable to confirm that COPD was the underlying cause of hospitalization and to accurately assess disease severity.²²¹ This is particularly important in patients with comorbidities, such as HF, which may decrease forced vital capacity (FVC) and potentially obscure the diagnosis.²²¹ Identifying such cases early allows for timely re-evaluation and tailored management.

Palliative Care

Patients with advanced COPD often experience symptom burdens that are comparable to, or even exceed, those of individuals with terminal cancer.²²³ Despite evidence showing that palliative care can reduce 30-day hospital readmission rates by as much as 50% and lower the risk of heart failure events by 73%,^{224–226} its use in COPD remains limited and frequently delayed until the very late stages of disease.^{227,228} Major guidelines recommend the integration of palliative care into discharge protocols for patients with a high symptom burden or persistent, refractory symptoms (Table 2).^{2,71,73} Increasingly, clinical consensus supports the early integration of palliative care alongside standard COPD management (Table 2),^{100,101} particularly in response to markers such as progressive lung function decline, frequent exacerbations, or escalating symptom burden.^{228,229} Early palliative care can address unmet needs related to breathlessness, pain, fatigue, poor nutrition, anxiety, and depression, symptoms that may persist despite optimal medical therapy.^{228,229} Moreover, timely intervention has been shown to enhance quality of life, reduce unnecessary hospitalizations, and provide essential support to caregivers.²²⁸ Nevertheless, several barriers hinder its implementation, including clinician misconceptions, limited training, time constraints, and systemic inequities in access to palliative services. Innovative approaches, such as targeted provider education, supportive policies, and telemedicine, offer promising pathways to broader adoption.^{228,230}

Importantly, for patients with advanced disease, cognitive impairment, or limited life expectancy, palliative care should be considered not only as a supportive component of post-discharge care but also as a framework for identifying interventions that may no longer align with the patient's goals or clinical status, such as PR, vaccinations, or long-term inhaled therapy optimization. In such cases, individualized care planning may involve the de-escalation or omission of certain checklist items, prioritizing comfort, quality of life, and caregiver support.

Individualized planning should thus allow for selective deimplementation of checklist items when appropriate. The experts support the integration of palliative care into COPD discharge protocols as a strategy to mitigate symptom burden, enhance patient-centered outcomes, and guide treatment decisions in more complex cases.

Existing COPD Discharge Bundles: A Comparative Perspective

A comparison of our proposed checklist with existing COPD discharge bundles highlights both commonalities and important distinctions (Table 2). Our checklist shares substantial overlap with the protocols proposed by Salvi et al and Dumra et al, including key components such as therapeutic optimization, patient education, assessment of nutritional status, and palliative care considerations.^{100,101} Additionally, Salvi's 7-point strategy does not directly address patient or caregiver education regarding corticosteroid tapering or antibiotic discontinuation,¹⁰⁰ an aspect explicitly included in our checklist in line with GOLD 2025 recommendations.²

The discharge checklist proposed by Miravittles et al²⁶ shares similarities with ours, but it refers only generally to comorbidities without explicitly emphasizing the need to assess cardiovascular risk and optimize cardiovascular therapy, an important consideration given the well-documented overlap between COPD and cardiovascular disease discussed

earlier. Despite stating that therapy should be individualized, it does not include the need to assess and update the vaccination status, nor does it include the role of palliative care in cases where multiple components of the discharge process may no longer be appropriate or feasible for the patient.

The discharge bundle developed by Rendon et al also aligns closely with our approach and emphasizes individualized care planning.⁷⁹ Nevertheless, it omits critical elements such as guidance on corticosteroid tapering or antibiotic discontinuation at discharge, cardiovascular risk assessment and treatment, and the consideration of palliative care when clinical interventions may no longer be appropriate.⁷⁹ These omissions may limit its applicability in complex or frail patients.

By contrast, the bundle proposed by Atwood et al⁵³ is less comprehensive. It does not address key aspects such as nutritional screening, cardiovascular evaluation, vaccination counseling, or long-term oxygen therapy and does not incorporate palliative care.⁵³ Compared to our checklist and others,^{79,101} it provides a more limited and less detailed framework.

The British Thoracic Society discharge care bundle, summarized by Shaw et al, likewise omits several essential components, including cardiovascular risk management, nutritional assessment, vaccination status, oxygen therapy needs, and palliative care planning, limiting its breadth in addressing the multidimensional needs of COPD patients.^{83,102}

Compared with the discharge bundle described by Hopkinson et al,⁶⁵ our checklist adopts a broader and more integrated approach. While both tools emphasize smoking cessation support, inhaler technique review, pulmonary rehabilitation referral, and scheduled follow-up,⁶⁵ our checklist expands on these foundations by incorporating guideline-based pharmacological strategies (including escalation to triple therapy), assessment of patient's of discharge medication instructions, cardiovascular risk assessment and optimization of related therapy, long-term oxygen therapy, vaccination review, nutritional support, comorbidity management, and the integration of palliative care planning when appropriate.

Regarding the timeframe for scheduling follow-up visits, Salvi et al¹⁰⁰ and Atwood et al⁵³ do not recommend a specific interval, whereas Dumra et al,¹⁰¹ Miravittles et al,²⁶ Rendon et al⁷⁹ and Hopkinson et al⁶⁵ highlight the need for a follow-up visit scheduled within 4 weeks or 30 days of discharge. In addition, Atwood et al,⁵³ the BTS discharge care bundle and Hopkinson et al⁶⁵ recommend a follow-up telephone call within 72 hours of discharge.¹⁰²

Designed specifically for the internal medicine setting, where time constraints, multimorbidity, and caregiver involvement pose significant challenges, our checklist aims to enhance the consistency and quality of post-discharge care. By facilitating structured decision-making and supporting adherence to international guidelines, it may help address the persistently low implementation rates of GOLD-recommended interventions,^{80,81,231} an issue associated with increased hospitalizations and emergency department visits.⁸²

Barriers to Implementing COPD Discharge Care

Although discharge bundles have shown promise in improving outcomes and reducing readmissions for patients with COPD, the authors highlight several important limitations to their real-world application. A major challenge is the lack of standardization; discharge bundles vary significantly in their structure, content, and delivery across different studies and healthcare settings, making consistent implementation and identification of which specific components drive improved outcomes difficult.^{26,79} Even where such bundles are available, they are often applied incompletely or inconsistently, with only a fraction of patients receiving all recommended components, due to resource limitations, time constraints, challenges with integration in electronic medical records, payer variability, staff availability, and generalizability outside of the local context.^{26,78,79,83,84,232} In many cases, successful implementation depends on the presence of particularly motivated individuals or teams, which limits scalability.²⁶ The logistical and organizational elements, such as scheduling follow-up appointments, ensuring consistent communication, and delineating responsibilities among care team members, have been identified as the most significant obstacles to successfully applying COPD discharge bundles.⁷⁸ Communication and engagement challenges, such as poor coordination between hospital and community-based providers and limited patient engagement in post-discharge self-management due to patients' perceived confusion about follow-up care, insufficient education, and difficulty accessing services, such as PR, have been reported.⁷⁸ Patient-related barriers, such as low health literacy, poor engagement, and socioeconomic challenges, also affect adherence to discharge recommendations.^{26,79,84} Moreover, poor communication and coordination between hospital and primary care services can create additional gaps during the transition of care.²⁶ Miravittles et al also point out that while discharge bundles may offer short-term benefits, evidence on their long-term effectiveness remains limited.²⁶ Importantly, they caution against

a one-size-fits-all approach and emphasize the need for discharge planning to be individualized, taking into account patient-specific risk factors, comorbidities, and care preferences.²⁶

Overall, the authors of this study stress the need for more standardized, evidence-based, and context-sensitive discharge protocols that are feasible to implement across diverse healthcare environments. Discharge bundles should be adapted to local contexts and available resources, and implementation must be supported by health system strengthening, local leadership, and policy commitment.

Conclusion

In summary, this narrative review highlights significant opportunities to improve and standardize discharge practices in COPD care in Italian internal medicine settings. The frequent coexistence of multiple comorbidities and the need for long-term oxygen therapy and palliative care activation highlight the complexity and clinical frailty of patients hospitalized for AECOPD, reflecting the typical case mix managed in internal medicine settings.

The discharge checklist proposed in this study integrates key domains critical to post-discharge outcomes, including smoking cessation, pharmacologic optimization, comorbidity management, vaccination, nutritional assessment, pulmonary rehabilitation, and early follow-up or palliative care activation when needed. By consolidating these evidence-supported interventions into a unified tool, the checklist may offer a practical, evidence-informed tool to guide internists in delivering comprehensive transitional care. Its integration into routine practice could help reduce variability, support guideline adherence, and ultimately improve outcomes for COPD patients transitioning from hospital to home.

Looking ahead, after this preliminary phase test, we plan to conduct a prospective study to assess the effect of this discharge checklist in reducing hospitalizations. Broader adoption may facilitate nationwide standardization, enhance interdisciplinary collaboration, and ultimately improve the quality of transitional care for patients hospitalized with COPD.

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