2026 GOLD Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease: Key Points of the Update (Postprint)

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Abstract

The Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2026 report, while maintaining the fundamental framework for the diagnosis, treatment, management, and prevention of chronic obstructive pulmonary disease (COPD), has systematically updated aspects including disease burden, case finding, risk stratification, maintenance therapy, exacerbation management, comorbidity assessment, and the application of emerging technologies. This update further highlights the importance of early identification, exacerbation prevention, and long-term dynamic assessment in COPD management, clearly distinguishing between screening and case finding while emphasizing active case finding among individuals with symptoms and/or exposure to risk factors. Defining the occurrence of $ $1 moderate or severe exacerbation in the past year as the criterion for Group E further reinforces the central role of exacerbations in risk stratification and treatment decision-making. The concept of "disease activity" is introduced for the first time, proposing a low disease activity state—characterized by the absence of exacerbations, no worsening of symptoms, and no accelerated decline in lung function—as a key management goal. The report also further clarifies the distinct decision-making pathways for initial treatment versus follow-up treatment, strengthens precise assessment and individualized intervention during acute exacerbations, and promotes a shift in comorbidity assessment from a single-disease perspective toward integrated multi-morbidity management. Overall, the GOLD 2026 report further emphasizes the forward-shifting of the management threshold and the prevention of exacerbations in COPD, which is of great significance for optimizing early diagnosis, early treatment, and long-term standardized management of COPD in China.

Full Text

Preamble

Interpretation of the Global Strategy for the Diagnosis, Treatment, Management, and Prevention of Chronic Obstructive Pulmonary Disease 2026 Report

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Abstract

The Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2026 Report maintains the fundamental framework for the diagnosis, treatment, management, and prevention of chronic obstructive pulmonary disease (COPD) while providing systematic updates on disease burden, case finding, risk stratification, maintenance therapy, exacerbation management, comorbidity assessment, and the application of emerging technologies. This update further highlights the importance of early identification, prevention of exacerbations, and long-term dynamic assessment in COPD management. It clearly distinguishes between screening and case finding, emphasizing active case finding among individuals with symptoms and/or exposure to risk factors.

The criteria for Group E have been updated to include patients who have experienced ≥ 1 moderate or severe exacerbation in the past year, further reinforcing the central role of exacerbations in risk stratification and treatment decision-making. For the first time, the concept of "disease activity"is introduced, proposing a "low disease activity state"—characterized by the absence of exacerbations, no worsening of symptoms, and no accelerated decline in lung function—as a critical management goal. The guidelines also further clarify the distinct decision-making pathways for initial treatment versus follow-up treatment, strengthen precision assessment and individualized intervention during acute exacerbations, and promote a shift in comorbidity assessment from a single-disease perspective to comprehensive multi-morbidity management. Overall, the GOLD 2026 Report emphasizes moving the management window forward and prioritizing the prevention of exacerbations, which is of great significance for optimizing early diagnosis, early treatment, and long-term standardized management of COPD in China.

Keywords: Chronic obstructive pulmonary disease; Acute exacerbation; Disease activity; Guidelines; COPD

Introduction

The Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2026 Report represents a significant evolution in the global strategy for managing COPD. While preserving the core diagnostic and therapeutic pillars established in previous iterations, the 2026 update integrates recent clinical evidence to refine patient categorization and treatment goals. The report places a heightened emphasis on the proactive identification of at-risk individuals and the mitigation of disease progression through more aggressive management of exacerbations and the introduction of novel clinical metrics.

Key Updates in the GOLD 2026 Report

Case Finding and Risk Stratification

A pivotal change in the 2026 update is the explicit distinction between population-wide screening and targeted case finding. The report advocates for active case finding specifically within populations exhibiting respiratory symptoms or those with significant exposure to environmental and occupational risk factors. This approach aims to improve the efficiency of diagnosis and ensure that clinical resources are directed toward those most likely to benefit from intervention.

Furthermore, the risk stratification framework has been refined. The criteria for Group E (the high-risk group) now include any patient who has experienced at least one moderate or severe exacerbation within the previous year. By lowering this threshold, the guidelines underscore that even a single exacerbation event is a critical indicator of future risk and necessitates intensive management.

The Concept of Disease Activity

The GOLD 2026 Report introduces "disease activity" as a novel clinical construct in COPD management. This concept shifts the focus from static severity assessments to a dynamic evaluation of the patient' s current disease state. The ultimate management objective is defined as achieving a "low disease activity state," which is characterized by: - The absence of acute exacerbations. - Stability in respiratory symptoms (no clinical worsening). - The absence of accelerated decline in lung function (forced expiratory volume in one second, FEV_1).

This paradigm shift encourages clinicians to monitor patients more closely and adjust therapies proactively to maintain this stable state, rather than reacting only when significant deterioration occurs.

Maintenance and Follow-up Treatment

The guidelines provide clearer differentiation between initial treatment strategies and follow-up care. Initial treatment is guided by the patient' s baseline symptoms and exacerbation history (the ABE assessment tool). In contrast,

follow-up treatment is increasingly personalized, focusing on two distinct “traits” : persistent dyspnea and the occurrence of further exacerbations. This dual-pathway approach allows for more precise escalations or adjustments in pharmacological therapy, such as the strategic use of inhaled corticosteroids (ICS) based on blood eosinophil counts and clinical response.

Management of Acute Exacerbations and Comorbidities

The 2026 update reinforces the need for precision during the management of acute exacerbations. It emphasizes individualized interventions that account for the severity of the event and the patient’ s underlying health status. Additionally, the report advocates for a holistic approach to comorbidities. Recognizing that COPD rarely exists in isolation, the guidelines promote a transition from managing individual conditions to a comprehensive multi-morbidity management strategy, particularly concerning cardiovascular health, metabolic disorders, and mental health.

Conclusion

The GOLD 2026 Report marks a transition toward more proactive, personalized, and comprehensive care for patients with COPD. By emphasizing early case finding, refining risk stratification through exacerbation history, and introducing the goal of low disease activity, the guidelines provide a robust framework for reducing the global burden of the disease. For healthcare providers in China, these updates offer a valuable roadmap for optimizing early diagnosis and improving the long-term prognosis of COPD patients through standardized and evidence-based management.

Abstract

Building on the established framework for the diagnosis, treatment, management, and prevention of chronic obstructive pulmonary disease (COPD), the 2026 report of the Global Initiative for Chronic Obstructive Lung Disease (GOLD) provides systematic updates to key aspects including disease burden, case finding, risk stratification, maintenance treatment, acute exacerbation management, comorbidity evaluation, and the application of emerging technologies. This revision further highlights the importance of early identification, acute exacerbation prevention, and long term dynamic assessment in COPD care; clearly differentiates screening from case finding and underscores proactive case identification in individuals with symptoms and/or risk factor exposure; defines the occurrence of one or more moderate or severe acute exacerbations within the previous year as a criterion for Group E assignment, thereby reinforcing the central role of acute exacerbations in risk stratification and therapeutic decision making; and introduces for the first time the concept of “disease activity” , proposing a low disease activity state, defined by the absence of acute exacerbations, no symptomatic deterioration, and no accelerated decline in

lung function, as a major management goal. The guideline also clarifies distinct decision pathways for initial and follow up treatment, strengthens precise evaluation and individualized intervention during acute exacerbations, and advances comorbidity assessment from a single disease focus to an integrated multimorbidity management paradigm. Collectively, GOLD 2026 places greater emphasis on early intervention and acute exacerbation prevention in COPD management, carrying important implications for optimizing early CHEN D, LONG H Y, CHU L H, et al. Interpretation of global strategy for the diagnosis, treatment, management and prevention of chronic obstructive Editorial Office of Chinese General Practice.

Chinese General Practice https diagnosis and treatment as well as long term standardized management of COPD in China.

Keywords: Chronic obstructive pulmonary disease; Exacerbations; Disease activity; Guideline

The Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2026 Report was released on November 11, 2025, marking the most significant revision since the 2023 update. This update systematically incorporates 330 new references published between January 2024 and July 2025, including 14 studies led or co-authored by Chinese experts. The release coincides with the advocacy efforts of the 24th World COPD Day in 2025, held under the theme "Know Your Lung Function" [**?**]. While maintaining the fundamental principles regarding the definition, diagnosis, and treatment of COPD, the GOLD 2026 Report features a systematic optimization of its structure and core content. The report has been expanded into six core chapters, beginning with Chapter 1, "Definition and Overview."

第二章"慢阻肺病诊断、评估和监测"、第三章"慢阻

Chapter 3: Prevention and Management of Chronic Obstructive Pulmonary Disease (COPD)

The prevention and management of Chronic Obstructive Pulmonary Disease (COPD) require a comprehensive, multi-faceted approach aimed at reducing risk factors, slowing disease progression, and improving the quality of life for patients. Primary prevention focuses on the elimination or reduction of exposure to environmental triggers, most notably tobacco smoke, which remains the leading cause of COPD globally. Public health initiatives and smoking cessation programs are critical components of this strategy. For individuals already diagnosed with COPD, management strategies emphasize long-term pharmacological therapy, pulmonary rehabilitation, and regular monitoring to prevent the decline of lung function.

In addition to smoking cessation, vaccinations against influenza and pneumococcal disease are highly recommended to reduce the risk of respiratory infections,

which can trigger severe complications. Patient education plays a vital role in effective management, ensuring that individuals understand their medication regimens, proper inhaler techniques, and the importance of physical activity. Integrated care models that involve multidisciplinary teams—including primary care physicians, pulmonologists, and respiratory therapists—have been shown to optimize patient outcomes and reduce the overall burden on the healthcare system.

Chapter 4: Management of Acute Exacerbations of COPD

Acute exacerbations of COPD (AECOPD) are characterized by a sudden worsening of respiratory symptoms, such as increased dyspnea, cough, and sputum production, beyond normal day-to-day variations. These episodes are significant clinical events as they contribute to accelerated lung function decline, increased mortality, and a substantial decrease in patient well-being. The primary goals of managing an acute exacerbation are to minimize the impact of the current event and prevent the development of subsequent episodes.

Treatment for AECOPD typically involves the intensification of bronchodilator therapy, often using short-acting beta-2 agonists with or without anticholinergics. Systemic corticosteroids and antibiotics are frequently prescribed to reduce inflammation and treat underlying bacterial infections, respectively. In cases of severe exacerbations leading to respiratory failure, non-invasive mechanical ventilation (NIV) may be required to support gas exchange. Following an exacerbation, it is essential to review the patient' s long-term maintenance therapy and implement strategies, such as pulmonary rehabilitation and self-management plans, to mitigate the risk of future hospitalizations.

第五章“慢阻肺病合并症”及新增的第六章“慢阻肺病

and emerging technologies." Simultaneously, to enhance the logical clarity and readability of the guidelines, a significant portion of the main text and several tables have been integrated into the appendices, and a comprehensive list of abbreviations has been introduced for the first time. The key updates in the GOLD 2026 guidelines are reflected in the following 13 aspects:

(1) Updated the latest epidemiological data and references regarding the global burden of Chronic Obstructive Pulmonary Disease (COPD); (2) revised the content related to "Screening and Case Finding," including the addition of [Figure 2: see original paper].8 and [Figure 2: see original paper].9; (3) updated vaccination recommendations for Respiratory Syncytial Virus (RSV) and influenza based on the latest evidence-based data; (4) adjusted the GOLD A, B, and E classification criteria based on new observational research evidence, establishing "one moderate exacerbation" as a critical decision threshold for initial treatment or treatment escalation, with the goal of achieving a low disease activity state free of exacerbations; (5) added new content regarding "Disease Activity"

; (6) further clarified the distinction between initial pharmacological treatment and follow-up pharmacological treatment in Chapter 3, and updated [Figure 3: see original paper].7 through [Figure 3: see original paper].9; (7) added [Figure 3: see original paper].11 to summarize the evidence-based data for the use of biological agents in COPD treatment; (8) performed a comprehensive revision of Chapter 4, "Management of COPD Exacerbations" ; (9) performed a comprehensive revision of Chapter 5, "COPD and Comorbidities" ; (10) added a new Chapter 6, "COPD and Emerging Technologies" ; (11) moved extensive text and tables to the appendices to improve flow and clarity while reducing content redundancy; (12) standardized the use of abbreviations throughout the document to enhance readability; and (13) systematically verified and updated all references throughout the text.

1.1.1 关键点

Definition and Characteristics of Chronic Obstructive Pulmonary Disease (COPD)

Chronic Obstructive Pulmonary Disease (COPD) is defined as a heterogeneous lung condition characterized by chronic respiratory symptoms, including dyspnea, cough, expectoration, and/or acute exacerbations. These symptoms result from abnormalities in the airways (such as bronchitis or bronchiolitis) and/or the alveoli (emphysema), which typically lead to persistent and progressive airflow obstruction.

The pathogenesis of COPD is rooted in the complex interaction between genetic factors (G), environmental exposures (E), and events occurring across the entire life course (T). This "GET" interaction can cause direct damage to lung tissue or interfere with the normal processes of lung development and aging. The primary environmental risk factors include cigarette smoking and the inhalation of toxic particles and gases from both indoor and outdoor air pollution. Additionally, other environmental and host factors, such as abnormal lung development and accelerated pulmonary aging, contribute significantly to the onset of the disease.

The standard diagnostic criterion for COPD, within an appropriate clinical context, is a post-bronchodilator ratio of forced expiratory volume in one second to forced vital capacity (FEV_1/FVC) of less than 0.7. This measurement indicates the presence of airflow obstruction that is not fully reversible. Clinically, patients typically present with dyspnea, activity limitation, and/or cough with or without sputum production. Patients may also experience acute worsening of respiratory symptoms, known as acute exacerbations of COPD (AECOPD), which necessitate specific preventive and therapeutic strategies.

COPD frequently co-occurs with various comorbidities that can significantly impact a patient' s clinical status and prognosis. These comorbidities require targeted management and can often mimic or exacerbate the clinical presenta-

tion of acute exacerbations. Despite being a common, preventable, and treatable disease, COPD remains significantly underdiagnosed and misdiagnosed. This leads to many patients receiving either no treatment or inappropriate care. Consequently, early and accurate diagnosis carries substantial public health importance.

Recent advancements in the understanding of COPD have clarified that environmental factors beyond tobacco smoke play a critical role in disease development. It is now recognized that the disease can originate early in life and affect younger populations. Furthermore, the identification of precursor states, such as pre-COPD and Preserved Ratio Impaired Spirometry (PRISm), provides new opportunities for prevention, early diagnosis, and timely, appropriate therapeutic intervention.

1.1.2 更新要点

The GOLD 2026 report has updated the epidemiological data in the section on the burden of Chronic Obstructive Pulmonary Disease (COPD) in Chapter 1. Compared to the GOLD 2025 guidelines, it incorporates the latest global COPD burden data based on the Global Burden of Disease (GBD) 2021 study. Furthermore, it supplements evidence from systematic reviews and modeling studies based on spirometry to contrast and calibrate estimation differences arising from various data sources.

Simultaneously, the GOLD 2026 guidelines place a greater emphasis on the underdiagnosis of COPD compared to the GOLD 2025 version, adding quantitative estimates of global underdiagnosis rates and descriptions of their determinants. In addition, the GOLD 2026 guidelines have refined predictive data regarding the mortality burden, Disability-Adjusted Life Years (DALYs), and economic burden of COPD, while introducing new content related to the effectiveness of public health interventions and the reduction of disease burden in China.

The Disease Burden of COPD

COPD remains a leading cause of morbidity and mortality worldwide, characterized by a continuously increasing economic and social burden. Compared with the GOLD 2025 guidelines, the GOLD 2026 guidelines more systematically present differences in prevalence, incidence, and mortality across various countries and regions. They emphasize that, in addition to tobacco exposure, outdoor, occupational, and indoor air pollution (including biomass fuel combustion) contribute significantly to the disease burden in certain countries, particularly in Low- and Middle-Income Countries (LMICs). The GOLD 2026 guidelines state that:

The number of COPD patients globally will continue to rise over the coming decades, with estimates suggesting nearly 600 million cases by 2050; this growth is expected to be more pronounced among women and patients in LMICs. Re-

garding prevalence assessment, the GOLD 2025 guidelines noted that variations in prevalence across studies were related to differences in survey methods, diagnostic criteria, and analytical strategies, emphasizing that self-reported prevalence is the lowest and indicates widespread underdiagnosis. The GOLD 2026 guidelines further strengthen the methodological explanation for these data source discrepancies, explicitly suggesting that model-based GBD data may, in some cases, underestimate the true burden of COPD. This is particularly evident when compared with results from population-based studies using spirometry , and the guidelines provide a centralized discussion of possible reasons for these differences (such as variations in definitions, age inclusion ranges, and predictive model construction). By incorporating GBD 2021 data, the GOLD 2026 guidelines report the latest estimates of global COPD patient numbers and prevalence (in 2019, the prevalence among people aged 30–79 was 10.3%, with the majority of patients residing in LMICs), reflecting the current global prevalence of COPD more comprehensively. These updates transition underdiagnosis from a conceptual description to a quantifiable public health issue, providing evidentiary support for the subsequent "Screening and Case Finding" chapter updates. Regarding mortality and the comprehensive burden, the GOLD 2025 guidelines were supported by GBD 2017 data, estimating approximately 3 million deaths globally from COPD each year and predicting that annual deaths could exceed 5.4 million by 2060. The GOLD 2026 guidelines update this to GBD 2021 data, reporting that COPD remains the third leading cause of death globally. They provide the latest estimates for COPD-related deaths and age-standardized mortality rates for 2021, emphasizing that although age-standardized mortality rates have declined since 1990, the total number of deaths, prevalent cases, and DALYs continue to trend upward. In terms of social burden, the GOLD 2026 guidelines update DALY-related data and note, when reporting global burden trends, that China has achieved a reduction in COPD-related deaths and DALYs through comprehensive measures such as tobacco control, air quality improvement, promotion of clean energy, and increased accessibility to high-quality medical services. Regarding the economic burden, the GOLD 2025 guidelines primarily presented direct cost estimates for the European Union and the United States, alongside WHO reports on the lack of accessibility to inhaled medications in LMICs. While retaining this framework, the GOLD 2026 guidelines supplement it with long-term global forecasts based on multi-source data, updating direct and indirect cost estimates through 2050. They emphasize that acute exacerbations contribute most significantly to health system costs and that structural deficiencies in LMICs—such as limited medication accessibility, affordability, and spirometry resources—may amplify the social and economic impact of COPD. In summary, by updating the evidence chain for the disease burden, the GOLD 2026 guidelines suggest that COPD prevention and control require coordinated advancement across multiple dimensions: risk factor control, early identification, and standardized management. Particular attention should be paid to optimizing prevention and control strategies in LMICs and countries with a heavy burden of disease.

2.1.1 关键点

Diagnosis and Assessment of COPD

(1) **Diagnosis**: Chronic Obstructive Pulmonary Disease (COPD) should be considered in any patient presenting with dyspnea, chronic cough or sputum production, a history of recurrent lower respiratory tract infections, and/or exposure to known risk factors for the disease. The essential criterion for establishing a clinical diagnosis of COPD is the confirmation of persistent airflow limitation, defined as a post-bronchodilator $FEV_1/FVC < 0.7$ via pulmonary function testing.

(2) **Screening**: Pulmonary function testing performed prior to the administration of inhaled bronchodilators may be utilized to effectively rule out a diagnosis of COPD.

(3) **Initial Assessment**: The primary objectives of the initial assessment for COPD are to determine the severity of airflow obstruction, evaluate the impact of current symptoms on the patient' s quality of life, and assess the risk of future adverse events, such as acute exacerbations, hospitalizations, or mortality. These findings provide the necessary evidence base for formulating an individualized treatment strategy.

(4) **Monitoring and Follow-up**: Regular follow-up of patients with COPD is critical. This includes the systematic monitoring of lung function, symptom progression, and the frequency of exacerbations. Such longitudinal data are vital for determining when treatment adjustments are required and for the early identification of complications and/or comorbidities.

(5) **Healthcare Delivery Models**: Digital health interventions, including online and integrated "online-to-offline" medical management models, may enhance the accessibility of healthcare services, improve clinical outcomes, and reduce the economic burden of the disease. However, the implementation of these models should be guided by robust evidence-based practices.

(6) **Supplemental Diagnostic Evaluations**: In cases where a significant discrepancy exists between the degree of airflow obstruction and the patient' s subjective symptoms, further clinical evaluation should be considered. This may include measurements of lung volume, diffusing capacity (DLCO), exercise stress testing, and/or advanced thoracic imaging.

(7) **Comorbidities**: Patients with COPD frequently present with multiple chronic comorbidities, including cardiovascular disease, skeletal muscle dysfunction, metabolic syndrome, osteoporosis, depression, anxiety, and lung cancer. These conditions should be proactively screened for and managed appropriately, as they can impact health status, increase hospitalization risk, and raise mortality rates independently of the severity of airflow limitation.

2.1.2 更新要点

The GOLD 2026 report has updated its content regarding "Screening and Case Finding," placing greater emphasis on the scale of undiagnosed Chronic Obstructive Pulmonary Disease (COPD) and its adverse clinical outcomes compared to the GOLD 2025 guidelines. It systematically summarizes the factors associated with the underdiagnosis of COPD. The GOLD 2026 guidelines clearly distinguish between the concepts of "screening" and "case finding," emphasizing that universal screening is not recommended for low-risk, asymptomatic populations. Instead, efforts should focus on active and opportunistic case finding among high-risk groups. The report proposes a standardized case-finding workflow, clarifying identification criteria for high-risk individuals, screening tools, and diagnostic pathways across different clinical settings. Within the disease assessment framework, the GOLD 2026 guidelines have made a critical adjustment to the definition of exacerbation risk. Based on evidence from recent observational and interventional studies, it explicitly states that even a single moderate or severe exacerbation can significantly increase the risk of subsequent events. Consequently, the definition of Group E (high risk of exacerbations) has been revised from the previous "≥ 2 moderate or ≥ 1 severe exacerbations" to "≥ 1 moderate or severe exacerbation in the past year."This revision further highlights the central role of exacerbations in the natural history and long-term prognosis of COPD. This adjustment facilitates the earlier identification of high-risk patients and provides a basis for developing more proactive, early-intervention individualized treatment strategies.

Screening and Case Finding

The underdiagnosis of COPD is a global phenomenon. GOLD 2026

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[8]. A collaborative study across 27 countries found that when COPD is defined by an FEV1/FVC ratio below the lower limit of normal, approximately 81% of patients remain undiagnosed; in low- and middle-income countries (LMICs), this proportion can reach as high as 90%–95%.

The guidelines indicate that approximately 70% of COPD patients have not yet been diagnosed. Distinguishing itself from the GOLD 2025 guidelines, which emphasized the phenomenon of underdiagnosis itself, the GOLD 2026 guidelines further point out that undiagnosed COPD patients are not necessarily asymptomatic or low-risk individuals. Instead, they suffer from impaired quality of life, an increased incidence of acute exacerbations, and are closely associated with an elevated risk of pneumonia and respiratory-related mortality [**?**]. To clarify the reasons for long-term underdiagnosis of COPD, the GOLD 2026 guidelines systematically summarize the potential mechanisms of underdiagnosis across three levels: patient-related factors, healthcare system-related factors, and healthcare provider-related factors ([Figure 1: see original paper]A). Patient-level factors include a lack of awareness of their own symptoms and/or failure to fully inform

doctors, the mitigation of shortness of breath by adjusting daily activities, and the fact that undiagnosed patients may have milder illness or less severe lung function impairment. Healthcare system-level factors include poor accessibility to pulmonary function testing, uneven medical insurance coverage, and a lack of high-quality respiratory specialty services in LMICs. Healthcare provider-level factors include an insufficient understanding of COPD diagnostic criteria, a lack of training in performing and interpreting pulmonary function tests, inadequate examination of respiratory symptoms, and delayed referrals to specialists. At the strategic level, the GOLD 2026 guidelines make a clearer distinction between screening and case-finding. Screening involves performing pulmonary function tests on the general population (mostly asymptomatic individuals), which is costly and offers limited diagnostic yield; consequently, both the U.S. Preventive Services Task Force (USPSTF) and GOLD do not recommend COPD screening for low-risk, asymptomatic populations. In contrast, case-finding focuses assessments only on individuals with unexplained respiratory symptoms or COPD risk factors, which is more aligned with resource allocation and clinical practice needs.

The GOLD 2026 guidelines further subdivide case-finding into active case-finding and opportunistic case-finding. The former identifies high-risk individuals proactively through questionnaires or risk assessment tools, while the latter identifies individuals at risk for COPD when they seek medical attention or undergo examinations for other reasons (such as lung cancer screening).

To improve the operability of case-finding, the GOLD 2026 guidelines propose a standardized case-finding workflow ([Figure 1: see original paper]B). This workflow first defines the target populations that require focused attention, including those with incidental findings of parenchymal or airway lesions during lung cancer screening or imaging, as well as individuals with COPD risk characteristics. The identification criteria for the latter are more specific than in the 2025 version, explicitly stating that individuals aged ≥ 35 years with exposure to risk factors such as tobacco or air pollution, genetic factors, prematurity, early-life adverse events, and respiratory symptoms should be prioritized for assessment. It is recommended to first use screening questionnaires—such as the Lung Function Questionnaire (LFQ), COPD Diagnostic Questionnaire (CDQ), COPD Population Screener (COPD-MS), Prevalence Study and Regular Practice, Diagnosis and Treatment, and Management of COPD in Primary Care in Latin America (PUMA), and COPD Assessment in Primary Care to Identify Undiagnosed Respiratory Disease and Exacerbation Risk (CAPTURE)—for pre-assessment. In primary care settings, those who screen positive on questionnaires can be further evaluated using portable devices [such as Peak Expiratory Flow (PEF)]. Note: Figure A shows factors related to the potential underdiagnosis of COPD, and Figure B is a flowchart for case-finding; COPD = chronic obstructive pulmonary disease, LFQ = Lung Function Questionnaire, CDQ = COPD Diagnostic Questionnaire, COPD-MS = COPD Population Screener, PUMA = Prevalence Study and Regular Practice, Diagnosis and Treatment, and Management of COPD in

Primary Care in Latin America, CAPTURE = COPD Assessment in Primary Care to Identify Undiagnosed Respiratory Disease and Exacerbation Risk, PEF = Peak Expiratory Flow, COPD-6 = COPD-6 micro-spirometer, PIKO-6 = PIKO-6 micro-spirometer.

Reasons for COPD underdiagnosis and the case-finding flowchart

Further screening should be conducted using micro-spirometers, such as the COPD-6 or PIKO-6. In specialist medical settings, pre-bronchodilator pulmonary function tests should be performed to confirm the diagnosis. Once a diagnosis is established, standardized comprehensive management should be initiated; for those who remain undiagnosed, symptoms should continue to be monitored and risk factors should be addressed. The GOLD 2026 report also supplements evidence-based findings from recent years that support active case-finding strategies.

The UCAP study was the first to combine community-based active case finding with a randomized controlled intervention. It suggested that actively identifying symptomatic but undiagnosed individuals and implementing comprehensive interventions can reduce healthcare utilization and improve patient quality of life and health outcomes. Based on this evidence, the GOLD 2026 report explicitly advocates for active case finding among populations with symptoms and/or risk factors—specifically, performing pulmonary function tests in target populations to achieve early diagnosis. At the same time, the report notes that the long-term impact of case finding on patient outcomes in primary care settings still requires further validation through research. It also objectively presents the divergent results of the CAPTURE tool across different studies, suggesting that the implementation of case-finding strategies must be adapted to specific clinical contexts.

Individualized assessment and treatment of Chronic Obstructive Pulmonary Disease (COPD) have consistently remained the core focus of the GOLD report updates. Since the introduction of the combined assessment strategy in 2011, the GOLD guidelines have progressively shifted from a framework centered on spirometric grading to one oriented toward symptom burden and exacerbation risk. The GOLD 2023 report introduced the A, B, and E groups; while keeping groups A and B unchanged, it merged the former groups C and D into group E to highlight the independent clinical significance of exacerbations in COPD management. While maintaining the overall structure of the A, B, and E groups, the GOLD 2026 report has made a critical adjustment to the definition of the high-exacerbation-risk Group E: the criterion has been revised from "≥ 2 moderate or ≥ 1 severe exacerbations in the past year" to "≥ 1 moderate or severe exacerbation in the past year" [Figure 2: see original paper]. This adjustment is based on evidence from several recent observational and interventional studies, which consistently demonstrate that even a single moderate or severe exacerbation significantly increases the risk of subsequent exacerbation events; this risk further escalates if exacerbations are more frequent or severe. Compared to the GOLD 2025 report, GOLD 2026 explicitly translates this evidence into ac-

tionable risk stratification criteria, allowing patients who might previously have been classified into Group A or B to be re-identified as high-risk. This change facilitates the earlier identification of patients with high disease activity and provides a basis for moving exacerbation prevention and treatment strategies forward, thereby optimizing long-term management goals for COPD. Notably, GOLD 2026 emphasizes that the technical standards for spirometric grading (GOLD grades 1–4) remain unchanged; their value in disease description and population-level prognostic assessment persists. However, due to their limited individual predictive power in guiding initial treatment and determining exacerbation risk, they remain excluded from the A, B, and E grouping system. Regarding symptom assessment tools, the CAT has been renamed the CAAT, though its content and scoring methodology remain substantially unchanged, resulting in limited impact on clinical practice.

3.1 关键点与更新要点

GOLD ABE assessment tool

3.1.1 关键点

(1) Risk Factor Control, Lifestyle Intervention, and Patient Education: All smokers should be strongly encouraged and supported to quit. Nicotine replacement therapy and pharmacological treatments can significantly increase long-term smoking cessation success rates. Legislative smoking bans and cessation counseling provided by healthcare professionals can further improve quit rates. Currently, there is no evidence to support the effectiveness and safety of electronic cigarettes as a smoking cessation aid. (2) Patients with chronic obstructive pulmonary disease (COPD) should receive all recommended vaccinations in accordance with local guidelines. (3) COVID-19 vaccines are highly effective in preventing SARS-CoV-2 infection; patients with COPD should complete their COVID-19 vaccination series according to national recommendations. (4) Influenza, pneumococcal, and respiratory syncytial virus (RSV) vaccines have been proven to reduce the incidence of lower respiratory tract infections. (5) Immunization committees recommend that COPD patients who did not complete their vaccinations during adolescence should receive the Tdap vaccine (dTaP/dTPa; pertussis, tetanus, and diphtheria) and routinely receive the herpes zoster vaccine. (6) Maintenance Pharmacological Treatment for COPD:

Initial pharmacological treatment for COPD should adopt an individualized strategy, comprehensively considering symptom severity, risk of exacerbation, adverse effects, comorbidities, drug accessibility, and economic costs, as well as patient preferences and their ability to use different inhalation devices. (7) Following the initiation of treatment, patients should undergo follow-up assessments at appropriate intervals: those with more severe disease require more frequent follow-ups, while those with milder disease may have extended intervals

to evaluate whether treatment goals have been achieved and to identify factors affecting therapeutic efficacy. (8) Inhalation device technique and treatment adherence should be assessed regularly. (9) Non-pharmacological Treatment for COPD: Non-pharmacological treatments for COPD should be integrated with pharmacological maintenance therapy into a comprehensive management plan. (10) Pulmonary rehabilitation (including exercise training combined with disease-specific education) can improve exercise capacity, symptoms, and quality of life across all levels of COPD severity. (11) Routine long-term oxygen therapy is not recommended for stable COPD patients with resting or exercise-induced moderate hypoxemia; however, long-term oxygen therapy may improve survival in patients with severe resting chronic hypoxemia [$PaO_2 \leq 55$ mmHg (1 mmHg = 0.133 kPa), or $PaO_2 < 60$ mmHg combined with cor pulmonale or secondary polycythemia]. (12) Long-term non-invasive ventilation (NIV) may offer some benefit to specific patient populations, particularly those with significant daytime hypercapnia who have been recently hospitalized for COPD. (13) Palliative,

Interventional, and Surgical Treatment: In patients with advanced emphysema whose symptoms remain difficult to control despite optimized medical therapy, surgical procedures or bronchoscopic interventions may provide benefits. (14) Palliative care can effectively alleviate symptoms in patients with advanced COPD.

3.1.2 更新要点

3. Prevention and Management of COPD

The GOLD 2026 report introduces significant updates to Chapter 3, "Prevention and Management of COPD." Compared to the GOLD 2025 guidelines, the new report emphasizes a long-term individualized management approach centered on exacerbation risk and disease activity. Regarding prevention, while the overall vaccination framework remains stable, the guidelines specifically update recommendation strategies for influenza and Respiratory Syncytial Virus (RSV) vaccines, notably lowering the recommended age threshold for RSV vaccination from ≥ 60 to ≥ 50 years. In terms of pharmacological treatment, GOLD 2026 introduces a new "Diagnosis and Management Cycle" to further distinguish between initial treatment and follow-up treatment pathways. While maintaining the A, B, and E group structure, the threshold for identifying Group E (high risk of exacerbation) has been moved forward to "≥ 1 moderate or severe exacerbation in the past year" to promote earlier implementation of intensive treatment strategies. Furthermore, GOLD 2026 introduces the concept of "disease activity" for the first time, proposing the achievement of "low disease activity" as a primary management goal and distinguishing between two related but distinct clinical states: "disease stability" and "disease control." The guidelines also summarize evidence-based medical data for biologics in COPD, supplementing previous recommendations for dupilumab with research results for mepolizumab,

thereby clarifying the role of biologics in specific high-risk populations.

3.1 Updates to Vaccination Recommendations

The GOLD 2026 guidelines provide substantive updates to vaccination content within the prevention and management chapter, although the general framework remains consistent. The focus of this update is primarily on influenza and RSV vaccines.

GOLD 2026 explicitly recommends routine annual influenza vaccination for all individuals aged $\geq$ 6 months without contraindications, emphasizing that COPD patients should be prioritized as a chronic disease population. Compared to previous versions, GOLD 2026 incorporates new evidence suggesting that beyond reducing the risk of severe lower respiratory tract infections, stroke, and death [**?**], regular long-term influenza vaccination may also reduce the risk of ischemic heart disease. Furthermore, vaccination during hospitalization for acute heart failure has been shown to improve survival rates and reduce the risk of readmission within the following 12 months. The RSV vaccine represents the most significant update in Chapter 3. Adopting the latest recommendations from the U.S. Advisory Committee on Immunization Practices (ACIP) and the European Commission, GOLD 2026 has lowered the recommended age for RSV vaccination from $\geq$ 60 to $\geq$ 50 years.

The guidelines specify that vaccination should be universal for individuals aged $\geq$ 75 years [**?**]. For those aged 50–74 years, vaccination is recommended if risk factors are present, such as chronic heart or lung disease, compromised immune function, or residence in nursing facilities.

Studies indicate that RSV causes a significant number of hospitalizations and deaths among the elderly annually [**?**] and is associated with COPD exacerbations and acute cardiovascular events. Follow-up studies have confirmed that a single dose of the adjuvanted pre-fusion F protein vaccine provides sustained protection across multiple RSV seasons. Multiple studies demonstrate that the RSV vaccine significantly reduces the risk of RSV-related hospitalization while maintaining efficacy and a favorable safety profile in high-risk populations. In summary, the updated vaccination strategies in GOLD 2026 reflect a shift in COPD prevention from merely controlling respiratory infections to comprehensively reducing the risk of exacerbations and systemic adverse outcomes. In clinical practice, clinicians should more proactively assess the vaccination status of COPD patients during routine management, with particular attention to the influenza and RSV vaccination needs of patients aged $\geq$ 50 years to better prevent exacerbations and improve long-term outcomes.

3.2 Initial and Follow-up Pharmacological Treatment

Building upon the A, B, and E grouping and the revised definition of high exacerbation risk, GOLD 2026 systematically organizes and optimizes the pharmacological treatment pathway for COPD, further reinforcing the dynamic manage-

ment philosophy of "Assess–Treat–Reassess–Adjust."The focus of this update is not a fundamental change in single-drug recommendations, but rather the clarification of different decision-making logics for initial versus follow-up treatment, ensuring strategies better align with changes in disease activity and individual risk profiles. GOLD 2026 outlines the overall management pathway through a "Diagnosis and Management Cycle" [Figure 1: see original paper], which clearly distinguishes between newly diagnosed patients who have not yet received maintenance therapy and patients previously on treatment, assigning them to different management pathways. This cycle emphasizes that during follow-up, clinicians should systematically review symptom burden, exacerbation history, inhaler technique and adherence, implementation of non-pharmacological treatments, and comorbidity management to dynamically adjust treatment strategies. This approach highlights the continuity and individualized nature of long-term COPD management.

Regarding initial pharmacological treatment [Figure 3A: see original paper], GOLD 2026 continues to use the A, B, and E groups as the basis for decision-making. However, based on new evidence, it explicitly sets "$\geq$ 1 moderate or severe exacerbation in the past year" as the threshold for Group E, thereby moving intensive treatment strategies forward. Randomized controlled trials have shown that compared to LABA monotherapy, both LABA+ICS and triple therapy (LABA+LAMA+ICS) can significantly reduce the rate of subsequent exacerbations in patients who experienced one moderate or severe exacerbation in the previous year [**?**]. Observational and interventional studies consistently show that even a single moderate or severe exacerbation significantly increases the risk of future events; the more frequent or severe the exacerbations, the higher the future risk. Based on this evidence, GOLD 2026 emphasizes that for Group E patients, treatment plans capable of reducing future exacerbation risk should be prioritized at the initial stage. When peripheral blood eosinophils (EOS) are $\geq$ 300 cells/μL, initial triple therapy may be considered to achieve a low disease activity state characterized by the absence of exacerbations as early as possible. This strategy shift reflects a transition from "intensifying treatment after repeated exacerbations" to "intervening early upon the first moderate-to-severe exacerbation."

For follow-up pharmacological treatment, GOLD 2026 provides an independent and clearer adjustment pathway [Figure 3B: see original paper], identifying two core treatable traits as the starting points for adjustment: persistent dyspnea and the occurrence of exacerbations. For patients with persistently poor symptom control, the guidelines emphasize optimizing bronchodilator therapy after confirming inhaler technique, adherence, and the impact of comorbidities. For patients who continue to experience exacerbations, the guidelines provide instructions for the addition, maintenance, or cautious withdrawal of ICS based on previous treatment regimens and peripheral EOS counts [**?**, **?**].

Notably, in the follow-up exacerbation pathway, GOLD 2026 supplements and expands the options for intensive treatment. Building on previous recommen-

dations, the guidelines now include biologics as a follow-up treatment option. In addition to dupilumab, mepolizumab has been added as a biological option for specific high-risk populations. Simultaneously, the guidelines continue to emphasize caution regarding ICS de-escalation, suggesting it only be considered in cases of clear non-response or significant adverse effects (such as recurrent or severe pneumonia). It is noted that withdrawing ICS in patients with high EOS is more likely to be associated with an increased risk of exacerbation. Overall, GOLD 2026 constructs a logically clear pharmacological decision-making pathway: starting with whether the patient is treatment-naive, using exacerbation risk as the core stratification factor, and dynamically adjusting based on symptoms and exacerbations during follow-up. This update resonates with the forward-shifted definition of Group E, highlighting the central role of exacerbations in COPD management and providing an actionable pathway for earlier identification and intervention in high-risk patients.

3.3 Disease Activity

GOLD 2026 formally introduces the concept of "disease activity" into the COPD management framework for the first time, positioning it following the treatment goals. This marks a significant expansion of the guidelines' philosophy regarding disease assessment and long-term management. The guidelines define disease activity as the biological processes that drive pathological outcomes but are potentially reversible or controllable through treatment.

Without effective intervention, persistent disease activity leads to disease progression, accompanied by irreversible structural organ damage and functional impairment. GOLD 2026 emphasizes that COPD is not a static disease but is driven by continuous, active pathophysiological processes. In pharmacological treatment, anti-inflammatory therapies can reduce disease activity by inhibiting relevant inflammatory pathways, potentially delaying the onset of organ damage. Additionally, certain non-pharmacological interventions—such as smoking cessation, pulmonary rehabilitation, and lung volume reduction surgery for patients with hyperinflated emphysema—are also considered capable of reducing disease activity. This suggests that disease activity is not determined by a single modality but is the result of multiple integrated interventions.

At the assessment level, monitoring disease activity relies on biomarkers associated with reversible or adjustable biological processes. Currently, EOS is used to identify Type 2 inflammation-related phenotypes, though further exploration and validation of other biomarkers reflecting disease activity are required. Beyond biomarkers, GOLD 2026 explicitly identifies several clinically observable indicators as manifestations of disease activity, including the occurrence of exacerbations, persistent worsening of chronic respiratory symptoms, and objective evidence of disease progression, such as a rate of lung function decline exceeding normal age-related loss. GOLD 2026 proposes "low disease activity" as a core therapeutic goal. Clinically, low disease activity is characterized by a period without exacerbations, without symptom worsening, and without accel-

erated lung function decline. The guidelines explicitly recommend achieving low disease activity as a key management objective, with the fundamental aim of preventing any exacerbations in both the short and long term. To further describe different clinical states achieved over time, GOLD 2026 distinguishes between two similar but distinct concepts: (1) **Disease Stability**: A state of low disease activity characterized by no exacerbations, no symptom worsening, and no accelerated lung function decline. (2) **Disease Control**: Also a state of low disease activity, but in addition to the absence of exacerbations and symptom worsening, it requires the disease to have a minimal impact on the patient, meaning the symptom burden is below a preset threshold. While disease control is conceptually more ideal than disease stability, for late-stage patients with extensive structural damage and high symptom burden, achieving stability may be a more realistic goal.

[Note: In Figure 3A (Initial Treatment), options are listed in the order of US approval; single-inhaler regimens may be more convenient and effective than multiple-inhaler regimens, potentially improving adherence. Exacerbations refer to the number of events per year; EOS = blood eosinophil count; mMRC = Modified Medical Research Council Dyspnea Scale; CAT™ = COPD Assessment Test™. In Figure 3B (Follow-up Treatment), single-inhaler regimens are similarly noted for convenience; chronic bronchitis refers to a patient-reported history of 3 months of chronic productive cough in the year prior to screening, excluding other known causes. ICS de-escalation may be considered if pneumonia or other significant side effects occur; if EOS $\geq$ 300 cells/μL, de-escalation is more likely to be associated with exacerbations.]

Drug treatment pathway for COPD

This goal may be difficult to achieve. However, even in the advanced stages of the disease, integrated pharmacological and non-pharmacological interventions may still reduce disease activity to some extent, thereby slowing further deterioration. Notably, the GOLD 2026 guidelines emphasize the clinical significance of the disease activity concept during the early stages of the disease. While late-stage diagnosis of COPD is often accompanied by significant structural damage and a high symptom burden, identifying and intervening in disease activity early holds the potential to maximize the delay of disease progression and reduce the accumulation of irreversible damage, ultimately improving long-term symptom levels and reducing disability [**?**]. This new paradigm suggests that COPD management should shift from a sole focus on disease severity to a dual assessment of disease activity and its trends, providing a theoretical basis for early diagnosis, early treatment, and proactive intervention.

Biologic Therapy: Biologic therapy has become a focal point of COPD research and management in recent years. Following the initial inclusion of dupilumab in the follow-up pharmacological treatment pathway in the GOLD 2025 guidelines, the GOLD 2026 guidelines further supplement and systematically present the evidence-based medical data for mepolizumab in COPD, providing a centralized overview of the research results for currently available biologics.

The guidelines summarize the randomized controlled trials currently supporting the use of biologics in COPD, focusing on a comparison of inclusion criteria and primary clinical outcomes—including the incidence of moderate-to-severe exacerbations, improvements in lung function, and changes in quality of life—across different studies . It should be noted that the included studies focused on patients who had experienced exacerbations in the previous year and remained poorly controlled despite triple inhalation therapy. This suggests that the potential target population for biologics is primarily concentrated in a specific subgroup characterized by high disease activity and an inadequate response to conventional treatment.

Regarding dupilumab, the BOREAS and NOTUS studies demonstrated that in patients with concomitant chronic bronchitis and peripheral blood eosinophil (EOS) counts $\geq$ 300 cells/μL, dupilumab significantly reduced the incidence of moderate-to-severe exacerbations and showed consistent benefits in lung function and quality of life. In contrast, studies related to mepolizumab (METREO, METREX, and MATINEE) also showed some efficacy in reducing exacerbations; however, the results for lung function improvement and quality-of-life outcomes were inconsistent, with some endpoints failing to reach statistical significance [**?**]. Based on this, the GOLD 2026 guidelines suggest in their follow-up pharmacological treatment recommendations that for patients who experience recurrent exacerbations despite LABA+LAMA+ICS therapy—particularly those with peripheral EOS $\geq$ 300 cells/μL—the addition of a biologic may be considered. Specifically, dupilumab may be considered for patients with chronic bronchitis, while mepolizumab serves as a potential option for patients regardless of chronic bronchitis status. It must be emphasized that the GOLD 2026 guidelines also point out that differences in study populations, endpoint settings, and research designs across various biologic trials mean that results cannot be directly compared. The role of biologics in COPD remains a supplementary treatment strategy targeting specific inflammatory phenotypes and high-risk populations; their clinical application requires rigorous individualized assessment and dynamic evaluation of efficacy and safety during long-term follow-up.

4.1.1 关键点

(1) Acute exacerbation of chronic obstructive pulmonary disease (AECOPD) is characterized as an acute event occurring within a period of several days (up to 14 days). It is defined by a worsening of dyspnea and/or cough and sputum production, which may be accompanied by increased respiratory and/or heart rates. These exacerbations are typically associated with elevated levels of local and systemic inflammation and are triggered by factors such as airway infections, air pollution, or other pulmonary insults.

(2) While AECOPD is most frequently caused by infections (viral or bacterial) or environmental pollutants, other conditions may mimic or exacerbate symptoms similar to an acute exacerbation. These include pneumonia, pulmonary embolism, acute heart failure, and pneumothorax. In some

patients, the precise trigger for the exacerbation remains unidentified.

(3) The severity of an acute exacerbation is classified as mild, moderate, or severe based on the patient' s clinical characteristics, in accordance with the Rome proposal.

(4) To prevent complications and subsequent adverse events, pharmacological treatment should be initiated as early as possible. Primary interventions include the recommendation of short-acting β_2-agonists (SABA), with or without short-acting muscarinic antagonists (SAMA), as the initial bronchodilator therapy for moderate or severe exacerbations. For patients with moderate to severe exacerbations, systemic corticosteroid therapy is recommended for a duration not exceeding 5 days. Antibiotics are recommended for a total course of 5 days in patients presenting with purulent sputum or those with a history of pulmonary infections. The use of methylxanthines is not recommended due to the high risk of adverse effects.

(5) For COPD patients presenting with acute respiratory failure, high-flow oxygen therapy systems and non-invasive ventilation (NIV) may be employed. These interventions improve gas exchange, reduce the work of breathing, and decrease the requirement for endotracheal intubation, while simultaneously shortening hospital stays and improving survival rates.

(6) Maintenance therapy based on long-acting bronchodilators (LABD) should be initiated as early as possible. For patients with a history of $\geq$ 1 moderate or severe exacerbation and elevated peripheral blood eosinophil counts, the addition of inhaled corticosteroids (ICS) to dual bronchodilator therapy should be considered at the time of discharge.

(7) Recovery time following an acute exacerbation varies among individuals, typically requiring 4 to 6 weeks. However, some patients may fail to return to their pre-exacerbation functional status.

(8) Following an acute exacerbation, the management of COPD and its comorbidities should be reassessed, and appropriate preventive measures for future exacerbations should be implemented.

4.1.2 更新要点

The GOLD 2026 guidelines have updated Chapter 4, "Management of COPD Exacerbations," placing a stronger emphasis than the GOLD 2025 guidelines on completing a severity assessment at the patient' s initial presentation for acute symptom worsening to guide early treatment decisions. The guidelines systematically reinforce the pathways for differential diagnosis and the selection of treatment settings, highlighting the identification of infections, cardiovascular events, and pulmonary embolism—conditions that can mimic or exacerbate the clinical presentation of an acute exacerbation. Regarding pharmacological treatment, while maintaining the existing framework, GOLD 2026 emphasizes

individualized medication strategies guided by biomarkers. Specifically, it underscores the value of blood eosinophil counts (EOS) in predicting response to corticosteroid therapy and the role of point-of-care C-reactive protein (CRP) testing in optimizing antibiotic use; notably, the guidelines no longer recommend using procalcitonin to guide antibiotic decision-making. In terms of respiratory support, GOLD 2026 incorporates high-flow nasal therapy (HFNT) and clarifies its application across various clinical scenarios during acute exacerbations, while reaffirming the primary role of non-invasive ventilation (NIV) for hypercapnic or high-risk patients.

Chinese General Practice

4.2 慢阻肺病急性加重期的识别和评估

Recognition and Assessment of COPD Exacerbations

The GOLD 2026 report introduces significant updates to the recognition and assessment framework for chronic obstructive pulmonary disease (COPD) exacerbations. The core shift lies in moving the determination of exacerbation severity forward to the point of the patient' s initial medical contact and assessment due to acute symptom worsening, rather than relying primarily on retrospective grading based on treatment interventions or healthcare resource utilization. In previous versions of the guidelines, exacerbation severity was largely defined by whether oral corticosteroids or antibiotics were used, or whether hospitalization occurred. While this classification method offered convenience for research, it was difficult to use for guiding treatment decisions during the initial assessment phase and was susceptible to regional variations in healthcare resources and hospitalization thresholds. Consequently, the GOLD 2026 guidelines have formally adopted the Rome proposal, recommending that exacerbations be classified as mild, moderate, or severe based on objective clinical parameters—including the degree of dyspnea, vital signs, oxygenation status, and inflammatory markers—at the time of the patient's first medical evaluation [Figure 4: see original paper]. This grading system emphasizes the use of indicators available at the point of care, incorporating arterial blood gas analysis when feasible to identify more severe states of respiratory failure. This approach has demonstrated prognostic value across multi-country studies regarding hospitalization outcomes, ICU admission, and mortality risk [**?**], thereby aligning severity grading more closely with the patient' s immediate clinical condition.

The GOLD 2026 guidelines significantly strengthen the systematic requirements for differential diagnosis during exacerbations. It notes that when COPD patients experience acute symptom worsening, clinicians must remain highly vigilant for a range of acute events that can mimic or aggravate exacerbation manifestations, beyond infection and environmental factors. These include respiratory viral or bacterial infections, pneumonia, decompensated heart failure, myocardial ischemia or arrhythmias, and pulmonary embolism. These comorbidities may not only necessitate fundamental changes in acute management

strategies but are also closely associated with a persistently elevated risk of major adverse cardiovascular events for a significant period following the exacerbation. To enhance clinical operability, the GOLD 2026 guidelines systematically summarize the key diseases requiring differential diagnosis and their corresponding diagnostic tools, transforming comorbidity identification from suggestive descriptions into a more pathway-oriented assessment framework .

Furthermore, the GOLD 2026 guidelines introduce a new decision-making flowchart for selecting the treatment setting for patients with exacerbations. It emphasizes that the determination of the management site should not be based solely on the severity of the exacerbation event itself, but should involve a comprehensive assessment of the patient' s overall status. This includes the severity of the underlying COPD, the burden of comorbidities, mental status, and the availability of home and social support. The update explicitly states that even for relatively mild exacerbation events, hospitalization may be required if comorbidities are complex or the patient' s overall condition is significantly impaired. Conversely, patients who are stable, respond well to treatment, and have adequate follow-up conditions may be discharged after short-term management in the outpatient or emergency department, provided with clear indications for reassessment. By constructing an assessment system centered on initial evaluation while balancing severity determination, differential diagnosis, and site selection, the GOLD 2026 guidelines make acute-phase decision-making more prospective and consistent.

Treatment of COPD Exacerbations

The GOLD 2026 guidelines systematically integrate and update treatment strategies for COPD exacerbations, clarifying that the core objective of acute-phase management is to mitigate the clinical impact of the current event and reduce the risk of subsequent exacerbations and associated adverse outcomes. (Note: VAS = Visual Analogue Scale for dyspnea, RR = respiratory rate, HR = heart rate, SpO_2 = oxygen saturation, CRP = C-reactive protein, ABG = arterial blood gas, PaO_2 = partial pressure of arterial oxygen, $PaCO_2$ = partial pressure of arterial carbon dioxide.)

Classification of the severity of COPD exacerbations

The guidelines continue to emphasize that over 80% of exacerbation events can be managed in an outpatient setting. However, at the time of the patient' s initial presentation, the treatment site should be determined by synthesizing the severity of the exacerbation, comorbid conditions, and social support. For patients presenting with hypoxemia, controlled oxygen therapy should be initiated immediately. Simultaneously, clinicians must assess whether the exacerbation is life-threatening and whether there is a significant increase in the work of breathing or impaired gas exchange to determine the necessity of non-invasive ventilation (NIV) support. If continuous monitoring or respiratory support is

required, the patient should be placed in a medical unit equipped with appropriate monitoring and respiratory support capabilities; those with milder conditions who stabilize after initial treatment may be managed in the emergency department or a general ward.

Regarding pharmacological treatment, the GOLD 2026 guidelines maintain bronchodilators, systemic corticosteroids, and antibiotics as the three core drug classes for exacerbation management, but emphasize greater refinement and safety in specific administration strategies. The guidelines recommend inhaled short-acting β_2-agonists (SABA), which may be combined with short-acting anticholinergics, as the initial bronchodilator therapy for moderate-to-severe exacerbations. It explicitly states that high-dose SABA should be avoided to reduce the risk of cardiovascular and other adverse effects. There is no significant difference in efficacy between pressurized metered-dose inhalers (pMDI) and nebulization; nebulized administration is reserved more for patients with poor inhalation coordination or more severe illness.

If nebulization is employed, the use of air-driven nebulization is recommended to reduce the risk of carbon dioxide retention. The GOLD 2026 guidelines emphasize that long-acting bronchodilators (LABD) should be continued during the exacerbation or initiated as early as possible before discharge once the condition is stable to ensure a smooth transition to subsequent stable-phase treatment.

For systemic corticosteroid therapy, the GOLD 2026 guidelines continue to reinforce a short-course strategy. The guidelines recommend a prednisone-equivalent dose of 40 mg/d for a duration of 5 days. This regimen effectively shortens recovery time, improves lung function and oxygenation, and reduces the risk of early relapse and the duration of hospitalization. Meanwhile, the guidelines clearly point out that extending the course of corticosteroids may increase the risk of pneumonia and mortality, and even short-term treatment can lead to infection-related adverse outcomes. Therefore, their use should be strictly limited to patients with clear clinical indications for exacerbation. Compared to previous versions, the GOLD 2026 guidelines highlight the value of blood eosinophil counts (EOS) in predicting the response to corticosteroid treatment. The STARR2 study suggested that in some patients with low blood eosinophil levels, biomarker-guided corticosteroid reduction or avoidance did not increase the risk of treatment failure or adverse outcomes; however, the applicability of this strategy in hospitalized patients with exacerbations requires further validation.

In terms of antibiotic therapy, the GOLD 2026 guidelines are more stringent in defining indications than in the past. They reiterate that antibiotics are primarily indicated for patients with evidence of bacterial infection, particularly those whose sputum changes from non-purulent to purulent, and emphasize reducing unnecessary antibiotic use by combining clinical manifestations with biomarkers. Point-of-care CRP testing is considered helpful in reducing antibiotic prescription rates without compromising clinical outcomes. Research suggests that in patients with purulent sputum and elevated CRP levels, the risk of treatment

failure is relatively high if antibiotics are not administered; thus, this combination of indicators serves as an important reference for identifying populations requiring antibiotic treatment. In contrast, the guidelines explicitly state that current evidence does not support the use of procalcitonin to guide antibiotic decision-making, as it may be associated with adverse outcomes, especially in critically ill patients. Regarding the duration of treatment, the GOLD 2026 guidelines emphasize the principle of short-course therapy, noting that $\leq$ 5 days of antibiotic treatment for outpatient exacerbations is equivalent in efficacy to traditional longer courses and helps reduce the risk of resistance and related complications. Therefore, routine application of longer courses is not recommended.

Regarding respiratory support strategies, GOLD 2026 has systematically updated the positioning of High-Flow Nasal Therapy (HFNT) and clarified its clinical application scenarios . The guidelines state that HFNT can be used for oxygenation support during hospitalization, suitable for patients who cannot tolerate NIV or have contraindications to NIV. Additionally, HFNT can be used to prevent re-intubation after extubation and as an adjunctive strategy to reduce future moderate-to-severe exacerbations in certain stable patients with a high risk of exacerbation. Randomized controlled trials further suggest that HFNT is generally non-inferior to NIV in improving gas exchange, and some studies show better patient comfort; however, in clinical practice, a significant proportion of patients still need to transition from HFNT to NIV. Furthermore, in populations with hypercapnia or a high risk of extubation failure, NIV is still clearly recommended as the preferred mode of respiratory support. Overall, the GOLD 2026 guidelines further strengthen the application of evidence-based medicine in clinical decision-making for exacerbation treatment, highlighting the concept of guiding individualized therapy with biomarkers and clinical phenotypes. By introducing decision-making criteria based on eosinophils and CRP, the guidelines aim to ensure efficacy while reducing the risk of unnecessary corticosteroid and antibiotic exposure. Meanwhile, the systematic inclusion and refinement of indications for HFNT reflect the clinical translation of recent advances in respiratory support technology for COPD exacerbation management.

These updates help optimize the acute-phase treatment pathway, improve the safety and precision of therapy, and lay the foundation for subsequent stable-phase management.

5.1.1 关键点

(1) Patients with chronic obstructive pulmonary disease (COPD) frequently present with multiple comorbid chronic conditions, the presence of which significantly increases the risk of adverse clinical outcomes. (2) Comorbidities in COPD patients are often underdiagnosed or undertreated; therefore, clinical practice should involve proactive screening for relevant comorbidities in every patient. (3) The presence of comorbidities should not alter the fundamental treatment principles for COPD itself; various comorbidities

should be managed according to their respective standard clinical guidelines within the context of COPD. (4) Cardiovascular disease is particularly prevalent among COPD patients, specifically including hypertension, ischemic heart disease, heart failure, and atrial fibrillation. The risk of major cardiovascular events increases significantly during and up to one year following a moderate or severe acute exacerbation. (5) Lung cancer is a leading cause of mortality in patients with COPD. For COPD patients with a history of smoking, annual screening with low-dose spiral CT is recommended in accordance with general population standards; however, there is currently a lack of evidence to support routine screening for COPD patients whose condition is unrelated to tobacco exposure. (6) Bronchiectasis is common in COPD patients; when complicated by infection, it can significantly impact disease progression, the frequency of acute exacerbations, and the risk of mortality. (7) Depression and anxiety are common and critical comorbidities in COPD that are frequently underdiagnosed and undertreated, and they are associated with poor health status and an increased risk of death. (8) In patients with COPD, a low body mass index ($BMI < 21\ kg/m^2$) is associated with an elevated risk of mortality. Conversely, obesity is often associated with metabolic syndrome and obstructive sleep apnea (OSA); in cases where OSA is present, continuous positive airway pressure (CPAP) therapy can reduce the risk of death. (9) Gastroesophageal reflux disease (GERD) is associated with an increased risk of acute exacerbations and poor health status.

(2) Multi-organ lineage transition (MOLT), manifesting as osteoporosis, sarcopenia, anemia, and emphysema, is closely associated with poor prognosis; outcomes can be improved through nutritional support, pulmonary rehabilitation, and targeted management. (11) When COPD is integrated into a comprehensive management framework for comorbidities, key management objectives should include simplifying treatment regimens and reducing polypharmacy.

5.1.2 更新要点

Obesity (BMI $>$ 30 kg/m^2). Compared to the GOLD 2025 report, the GOLD 2026 report marks a definitive shift from a disease-centric description of comorbidities toward a patient-centered holistic management framework for multimorbidity. The update in Chapter 5 introduces and systematically presents the 4Ms assessment model—Mentation, Mobility, Medications, and Morbidities—for the first time.

This structured assessment system integrates mental state, physical mobility, medication status, and comorbidity identification into a unified framework to promote the management of multimorbidity and reduce the risks associated with polypharmacy. Furthermore, the GOLD 2026 report clarifies the definition of multimorbidity and introduces the concept of “synergistic clusters”to explain the shared risk factors and inflammatory mechanisms between chronic obstructive

pulmonary disease (COPD) and conditions such as cardiovascular disease and lung cancer.

Compared to previous versions, the GOLD 2026 report further isolates and emphasizes the clinical significance of frailty, explicitly linking it to increased risks of mortality, exacerbations, and hospitalization, while stressing the need for management through comprehensive interventions. Additionally, the GOLD 2026 report proposes, for the first time, a standardized assessment pathway for comorbidities covering both initial diagnosis and follow-up stages. This promotes a transition in COPD management from a lung-centered single-disease assessment to a multi-system, dynamic, and integrated evaluation.

The patient-centered GOLD 2026 report introduces the 4Ms systematic assessment framework to guide the comprehensive management of comorbidities in patients with COPD [Figure 5: see original paper]A. Derived from geriatric chronic disease management principles, this framework has been revised in the GOLD 2026 report to address the specific characteristics of COPD. It emphasizes promoting multimorbidity management and reducing polypharmacy risks through structured assessment, while incorporating functional status and quality of life into routine management goals. "Mentation" is explicitly identified as the primary component of this systematic assessment.

The report emphasizes that routine screening should be conducted for depression, anxiety, cognitive impairment, and severe mental illness, aligning psychological and cognitive status with the patient' s overall health goals. This update reflects the increased importance the GOLD 2026 report places on mental health in the long-term prognosis of COPD, addressing the high prevalence but long-standing underestimation of depression and anxiety in this population. The "Mobility" assessment emphasizes using quantifiable indicators to reflect a patient' s functional reserve and prognostic risk. The GOLD 2026 report specifically highlights the need to focus on balance and frailty status, recommending the 6-minute walk distance (6MWD) to evaluate exercise endurance as a critical predictor of survival. This reinforcement of functional status elevates management goals from mere symptom control to the maintenance of functional independence. Regarding "Medications," the GOLD 2026 report explicitly notes that over 90% of COPD patients face polypharmacy issues, and inappropriate polypharmacy is closely linked to adverse outcomes. The report stresses regular medication reviews and adherence to the principle of "minimal medication" to reduce unnecessary or potentially harmful drug combinations, thereby lowering the risk of adverse drug events. This update provides a clear direction for optimizing medication in comorbidity management. "Morbidities," a focal point of this chapter, are integrated into a systematic identification and management process. The GOLD 2026 report emphasizes proactive screening and standardized management of various comorbidities, ensuring that the treatment of other diseases is not weakened by the presence of COPD. Simultaneously, the report explicitly states that smoking itself should be regarded as an independent disease, requiring inclusion in the comorbidity management

framework and systematic intervention. This statement further reinforces the central role of smoking cessation in the management of multimorbidity.

In summary, by introducing the 4Ms systematic assessment model, the GOLD 2026 report provides a patient-centered, clearly structured, and actionable framework for managing COPD comorbidities. This model helps integrate psychological, functional, pharmacological, and comorbidity management into a single assessment system, driving the transition of COPD from single-disease management to multimorbidity treatment and long-term comprehensive care. The GOLD 2026 report establishes "multimorbidity" as the core concept of this chapter, defining it as the co-occurrence of ≥ 2 chronic diseases. It emphasizes that this state is highly common among COPD patients but has long suffered from underdiagnosis and undertreatment, requiring proactive identification and continuous monitoring at every follow-up. Unlike previous versions, the GOLD 2026 report moves beyond a simple list of common comorbidities. It proposes that comorbidities can influence each other through shared risk factors, common inflammatory pathways, or bidirectional interactions, forming "synergistic clusters." This provides a more systematic explanatory framework for the pathological links between COPD and diseases such as atherosclerosis and lung cancer. Based on this, the report clearly states that the presence of comorbidities should not alter the standardized treatment strategy for COPD itself, and all comorbidities should be managed according to their respective disease-specific guidelines. Another significant update in this section is the independent emphasis and systematic deepening of the concept of frailty. The GOLD 2026 report defines frailty as a syndrome of decreased physiological reserve across multiple systems, identifiable clinically through factors such as weakness, slowness, fatigue, decreased physical activity, and unintentional weight loss. It notes that frailty often coexists with cognitive impairment, cardiovascular disease, and multimorbidity, significantly amplifying the risk of adverse outcomes. The report cites cohort studies showing that the prevalence of frailty in COPD patients is significantly higher than in the non-COPD population; further evidence from meta-analyses indicates that frailty and pre-frailty are closely associated with increased risks of all-cause mortality, exacerbations, and hospitalizations [**?**, **?**, **?**]. At the intervention level, the GOLD 2026 report references an Evidence Review from the European Respiratory Society (ERS), emphasizing that frailty management should employ a comprehensive strategy. This includes multidimensional combined measures such as geriatric assessment, pulmonary rehabilitation, nutritional support, medication optimization, and psychological intervention, rather than intervening only on a single indicator. After completing the general 4Ms assessment, the GOLD 2026 report suggests that clinicians focus on screening for common comorbidities that may affect prognosis. Using a modified Delphi method, these are clustered by system into a five-category comorbidity framework [Figure 5: see original paper]B: cardiovascular diseases, respiratory-related diseases, mental/psychological and cognitive disorders, metabolic-related diseases, and the MOLT phenotype. The report specifically points out that, aside from respiratory failure, certain

cardiovascular diseases and lung cancer are among the leading causes of death in COPD patients. This suggests that the assessment and management of related comorbidities should span the entire long-term follow-up process of COPD, rather than being limited to periods of exacerbation or hospitalization. Building on this framework, the GOLD 2026 report further strengthens the focus on risk windows and management priorities for several key comorbidities. Regarding cardiovascular disease, the report explicitly states that the risk of major cardiovascular events—including death, myocardial infarction, stroke, arrhythmia, and unstable angina—is significantly elevated during an exacerbation and for at least one year thereafter. This risk further increases if the exacerbation requires hospitalization. Defining this risk timeline shifts follow-up management from a general concern about cardiovascular risk toward focused monitoring and intervention during the critical first year following an exacerbation. Regarding respiratory comorbidities, the GOLD

2026 report systematically elaborates on the shared mechanisms between COPD and lung cancer beyond smoking, including chronic inflammation, abnormal repair processes, and genetic and epigenetic factors. It reiterates that high-risk individuals meeting smoking-related criteria should undergo annual low-dose CT screening, while routine screening is currently not recommended for patients with non-tobacco-related COPD. Simultaneously, the report emphasizes that bronchiectasis is closely related to the chronic infection and inflammatory state of COPD. When they coexist, there is an increased risk of exacerbations, pneumonia, and mortality; clinicians should carefully weigh the use of inhaled corticosteroids based on an assessment of infection risk [**?**, **?**]. In the section on mental health and cognitive impairment, the GOLD 2026 report expands the management scope from depression and anxiety to a broader range of psychiatric disorders and cognitive deficits, including psychotic disorders and dementia. It recommends screening tools such as the Patient Health Questionnaire-2 (PHQ-2), the Generalized Anxiety Disorder-2 scale (GAD-2), and the Mini-Mental State Examination (MMSE), emphasizing that early identification and intervention improve clinical outcomes. Regarding metabolic diseases, the report notes that both low BMI and obesity are associated with poor prognosis. It adds a description of fatty liver disease (NAFLD/MASLD), noting its prevalence in the COPD population and its identification through imaging cues, with management centered on weight control and the regulation of metabolic risk factors such as blood glucose and lipids. Finally, the GOLD 2026 report introduces the "MOLT" concept for the first time, unifying emphysema, low BMI, osteoporosis, and sarcopenia into the MOLT phenotype. It points out that this phenotype is closely associated with decreased exercise capacity, impaired quality of life, and increased risks of exacerbation, hospitalization, and death, thereby highlighting the critical value of combined nutritional support and pulmonary rehabilitation in long-term COPD management. In summary, the updates in the comorbidity chapter of the GOLD 2026 report reflect a systematic shift in management philosophy—moving from a checklist-style description of comorbidities to an emphasis on identifying high-risk periods, stratifying comorbidity phenotypes, and

implementing clinical screening and management workflows. On one hand, new frameworks like frailty and MOLT strengthen the identification and intervention for populations with declining functional reserve; on the other hand, by clarifying critical windows such as the high cardiovascular risk period in the year following an exacerbation, the report pushes COPD follow-up management to be more proactive, precise, and continuous.

Initial and Follow-up Assessment of COPD and Common Comorbidities

The GOLD 2026 report adds and systematizes an initial and follow-up assessment framework for COPD and common comorbidities, marking an expansion from a respiratory-centric model to a comprehensive, multi-system, and multidimensional evaluation strategy. The report explicitly states that COPD patients often present with multiple chronic conditions, and their symptoms and functional impairments are frequently driven by multiple factors. A single-disease perspective cannot fully reflect a patient' s true health status; therefore, it is necessary to introduce structured multimorbidity assessment tools during both initial diagnosis and follow-up. In the initial assessment phase, GOLD 2026 proposes an "Initial Comorbidity Assessment Battery" to systematically identify key comorbidities affecting prognosis during the patient' s first comprehensive evaluation [Figure 5: see original paper]C. This assessment is no longer limited to pulmonary function but revolves around six core dimensions: (1) respiratory system and medication status (history, physical examination, lung function, imaging, oxygenation status); (2) cardiovascular system (ECG, NT-proBNP); (3) exercise endurance and musculoskeletal status (6MWD, SARC-F, bone mineral density); (4) psychological and cognitive function (PHQ-2, GAD-2, MMSE); (5) symptom burden and sleep-related issues [mMRC, CAT, Epworth Sleepiness Scale/STOP-BANG for sleep apnea screening]; and (6) metabolism and vital organ function (complete blood count, blood glucose, HbA1c, renal function, liver function).

The GOLD 2026 report emphasizes that not every patient requires every test; rather, tools should be applied selectively based on individual risk profiles and clinical complexity. Its core value lies in providing a clearly structured and actionable initial assessment framework for COPD patients with multimorbidity, preventing comorbidities from being overlooked in the early stages of diagnosis and treatment. GOLD 2026 also proposes a follow-up assessment strategy for comorbidities, clearly distinguishing between annual assessments and periodic re-evaluations every 3 to 5 years [Figure 5: see original paper]D. Building on the initial assessment framework, follow-up evaluation emphasizes continuous monitoring and dynamic adjustment to identify disease progression, new-onset comorbidities, and treatment-related risks. Annual follow-up priorities include history and physical examination, medication review, lung function and oxygenation status, ECG, exercise capacity, and symptom scale assessments. Conversely, tests such as lung volumes, diffusion capacity, bone mineral density, and

metabolic/organ function are recommended for re-evaluation every 3 to 5 years in stable patients to balance comprehensive assessment with clinical feasibility. The GOLD 2026 report specifically points out that in patients with multimorbidity, clinical manifestations during both stable periods and acute events are often the result of multiple diseases acting together; symptoms should not be simply attributed to COPD itself. Therefore, the report does not require specialists to replace physicians from other disciplines but emphasizes integrating key information during COPD management, identifying undertreated comorbidities, and guiding patients toward appropriate specialist pathways when necessary. Simultaneously, the report reiterates that there is currently no evidence suggesting that COPD in a state of multimorbidity requires respiratory treatment strategies different from standard care. However, when selecting treatments, clinicians should always remain mindful of polypharmacy risks, keeping regimens as simple as possible and minimizing unnecessary drug duplication.

In summary, the GOLD 2026 report constructs a comorbidity assessment system through [Figure 5: see original paper]C and [Figure 5: see original paper]D that spans from initial diagnosis through long-term follow-up. This shifts COPD management from a lung-centered single-disease assessment to a patient-centered multi-system integrated evaluation. This update provides clinicians with a clear pathway for systematically identifying risks and optimizing the sequence of referrals and interventions in complex cases, laying the operational foundation for achieving multimorbidity treatment and improving long-term outcomes.

6.1.1 关键点

(1) AI facilitates the diagnosis, assessment, clinical management, and prognostic prediction of chronic obstructive pulmonary disease (COPD). (2) However, AI entails risks and limitations that necessitate careful evaluation before implementation in clinical practice. (3) Telemedicine encompasses both purely online medical services and hybrid models that combine online interactions with in-person, face-to-face care. (4) Telemedicine has the potential to improve healthcare accessibility, clinical outcomes, and cost-effectiveness for patients with COPD to a certain extent. (5) Pulmonary rehabilitation and self-management interventions can be implemented through online platforms. (6) Currently, there is insufficient evidence comparing the efficacy of online models with traditional

Note: Figure A summarizes the modified 4Ms patient-centered approach for COPD patients with multimorbidity; Figure B illustrates common comorbidity clusters in COPD patients that independently influence prognosis; Figure C outlines potential supplementary testing methods for the initial assessment of common comorbidities in all COPD patients; Figure D outlines potential supplementary testing methods for the periodic follow-up of common comorbidities in all COPD patients. SpO_2 = oxygen saturation, PHQ-2 = Patient Health Questionnaire-2 (depression screening), GAD-2 = Generalized Anxiety

Disorder-2 scale (anxiety screening). Regarding COPD and comorbidities, evidence comparing the efficacy of online versus face-to-face models remains insufficient; their effectiveness and suitable target populations require further clarification through research.

6.1.2 更新要点

The GOLD 2026 report marks a significant milestone by introducing content on Artificial Intelligence (AI) and telehealth for the first time. This addition reflects the expansion of Chronic Obstructive Pulmonary Disease (COPD) management toward decision-making assisted by digital technology. The report explicitly positions AI as a clinical decision support tool, outlining its potential roles in the early identification of COPD, the reduction of underdiagnosis and misdiagnosis, disease stratification, risk assessment, and the management of multimorbidity. However, the guidelines also emphasize that significant limitations remain regarding the current evidence base, interpretability, data quality, and ethical regulation, suggesting that clinical application must remain cautious.

Regarding telehealth, the GOLD 2026 report summarizes evidence for online and hybrid (online-offline) follow-up models. It notes that, overall, these models have not yet demonstrated a clear advantage over conventional care in terms of reducing exacerbations, hospitalizations, or mortality. Nevertheless, telehealth can serve as a supplementary tool to improve healthcare accessibility for specific populations and in certain contexts. The guidelines also clarify the applicable conditions and triage principles for remote follow-up.

In terms of specific implementation, the report distinguishes between the online application of pulmonary rehabilitation and self-management. In the field of pulmonary rehabilitation, where evidence is relatively robust, online models may serve as an alternative to facility-based (face-to-face) rehabilitation, provided that quality and safety are guaranteed. Conversely, in the area of self-management, current evidence is insufficient to support online models as superior to or as a replacement for traditional methods. In summary, this chapter update emphasizes that digital technology should center on evidence-based results and patient benefits to effectively serve the long-term management of COPD.

Applications in Chronic Obstructive Pulmonary Disease (COPD)

The GOLD 2026 guidelines introduce, for the first time, the potential applications of Artificial Intelligence (AI) in the management of Chronic Obstructive Pulmonary Disease (COPD). This integration spans multiple clinical stages, including disease diagnosis, assessment, clinical management, and prognostic prediction. The guidelines define AI as a technical system that utilizes algorithms to learn from and analyze data to assist in clinical decision-making, emphasizing its significant advantages in processing large-scale, multi-dimensional clinical

information. However, the guidelines also highlight critical limitations that cannot be ignored—specifically regarding data quality, interpretability, ethics, and regulatory compliance. Consequently, the guidelines maintain that clinical deployment must remain cautious (refer to via the QR code at the beginning of the article).

At the diagnostic level, the GOLD 2026 guidelines identify Artificial Intelligence (AI) as a potential tool for mitigating the issues of underdiagnosis, misdiagnosis, and diagnostic delays in Chronic Obstructive Pulmonary Disease (COPD). COPD is frequently diagnosed only in the later stages of disease progression, which significantly limits the effectiveness of treatment responses and clinical interventions. By analyzing Electronic Health Records (EHR), AI holds the promise of identifying high-risk, undiagnosed individuals within both primary and specialized healthcare settings.

5. Artificial Intelligence in COPD Management

The GOLD 2026 report highlights the transformative potential of Artificial Intelligence (AI) across the entire continuum of COPD care, from early screening and diagnosis to precision medicine and clinical decision support.

5.1 Screening and Diagnostic Innovation

AI-driven screening tools, particularly those integrated into primary care settings or social media platforms (e.g., health-focused groups), have demonstrated the ability to identify potential COPD patients even within existing programs like lung cancer screening. Furthermore, AI-assisted automated interpretation can perform deep analysis of complex data, such as pulmonary function curves, to reduce human interpretation bias. By extracting high-dimensional features that are difficult to identify using traditional methods, AI minimizes the risk of misdiagnosis. Recent studies also indicate that AI can predict lung function trajectories and an individual' s future risk of developing COPD, potentially shifting the diagnostic window forward [**?**].

Beyond traditional pulmonary function testing, the GOLD 2026 report outlines several AI-assisted alternative diagnostic directions. These include the analysis of respiratory sounds and speech, forced oscillation techniques, motion sensors, electronic noses for volatile organic compound detection, photoplethysmography, chest CT, and electrical impedance tomography [**?**]. However, the report explicitly notes that most of these technologies are currently based on small-sample studies and require validation in large-scale populations; thus, they cannot yet replace standard diagnostic protocols.

5.2 Phenotyping and Precision Medicine

Given the significant heterogeneity of COPD, the GOLD 2026 report emphasizes the potential value of AI in identifying disease phenotypes and achieving

precise stratification. Medical imaging is currently one of the most mature application areas. AI can be utilized to quantify the distribution and severity of emphysema and analyze features such as interlobar fissure integrity, mucus plugging, bronchiectasis, and pulmonary vascular characteristics, thereby assisting in risk assessment and phenotypic classification [**?**]. In the context of lung cancer risk management, AI-assisted nodule analysis helps reduce unnecessary invasive procedures and improves the efficiency of identifying high-risk populations. At the biological level, AI is being used to analyze multi-omics data to explore potential biomarkers and new therapeutic targets. Although long-term follow-up and external validation are still required, these advancements provide a critical direction for precision medicine [**?**].

5.3 Multimodal Models and Clinical Management

The GOLD 2026 report introduces the concept of multimodal AI models, which integrate imaging, biological data, clinical text, and structured data to more comprehensively characterize COPD risk and progression. Emerging foundation models, through the fusion of multi-source data, demonstrate the potential of AI to address the multidimensional complexity of COPD [**?**].

At the level of clinical management, the report emphasizes the potential role of AI in guideline integration and complex decision support, grounded in the reality of evidence-based medicine and multimorbidity. COPD patients often suffer from multiple chronic conditions, requiring clinicians to consult various guidelines simultaneously, which creates a heavy information integration burden. If AI is embedded into Electronic Health Record (EHR) systems, it could automatically aggregate interdisciplinary diagnostic and treatment information. Such systems could alert clinicians to polypharmacy issues, inappropriate treatments, or missing critical examinations, thereby assisting in the optimization of care. Finally, the report notes that improving the standardization of clinical documentation will be essential to enhancing the practical efficacy of AI tools.

In the realm of telemedicine and home management, the integration of AI with wearable devices supports remote patient monitoring, enabling the continuous collection of symptoms and physiological parameters. However, current evidence remains insufficient to confirm a stable improvement in key clinical outcomes; the value of these technologies still depends heavily on the healthcare system' s capacity for data interpretation and response. In contrast, digital intelligent inhalation devices have demonstrated significant potential in improving medication adherence and inhalation techniques. Furthermore, AI-supported online pulmonary rehabilitation and self-management programs are regarded as viable alternatives when traditional in-person visits are restricted. Well-validated conversational systems are also expected to serve as the initial interface for patients to engage with the healthcare system in home environments, providing health consultations and guiding subsequent medical pathways [**?**].

Regarding prognostic assessment, the GOLD 2026 guidelines maintain a rel-

atively cautious stance. Systematic reviews indicate that, at this stage, the predictive performance of AI prognostic models has not yet consistently outperformed existing disease severity indices [**?**]. Although some studies suggest potential for identifying populations at high risk for acute exacerbations, these findings generally require further validation through large-sample studies with long-term follow-up [**?**]. See .

In summary, GOLD 2026 positions Artificial Intelligence (AI) as a decision-support tool rather than a replacement for clinical judgment. In Chronic Obstructive Pulmonary Disease (COPD)—a highly heterogeneous condition frequently accompanied by multiple comorbidities—the value of AI is primarily reflected in information integration, risk stratification, and the enhancement of management efficiency. Its clinical translation remains dependent on high-quality data, clearly defined application scenarios, and rigorous validation. outlines the potential risks associated with medical AI and their corresponding mitigation strategies.

Telemedicine, Remote Monitoring, and Follow-up Management

The GOLD 2026 report introduces the concept of telemedicine in Chapter 6, primarily encompassing online and hybrid (online-offline) models. These are regarded as potential tools for improving healthcare accessibility, continuity, and cost-effectiveness. The guidelines emphasize that while telemedicine can serve as a supplementary method for the management of Chronic Obstructive Pulmonary Disease (COPD), its application in routine clinical practice must be grounded in evidence-based medicine rather than serving as a default replacement for traditional care.

At the level of evidence-based medicine, the GOLD 2026 guidelines highlight a Cochrane systematic review that summarizes various telemedicine models applied to Chronic Obstructive Pulmonary Disease (COPD) across 24 randomized controlled trials [**?**]. These studies primarily encompass three categories of strategies: (1) adding remote monitoring to routine care; (2) adding teleconsultation to routine care; and (3) using telemedicine to partially or fully replace traditional in-person follow-up visits.

The majority of these studies utilized asynchronous remote monitoring, where patients upload data for subsequent evaluation by medical personnel, while the number of studies achieving true real-time data feedback and intervention remains limited. Overall results indicate that, compared to conventional care, these telemedicine models have not demonstrated significant advantages in reducing exacerbations, lowering hospitalization rates, improving health status, or decreasing mortality. Furthermore, while current evidence does not suggest significant safety risks, it remains difficult to clearly identify which patients—based on disease severity or clinical subtype—are most likely to benefit from these interventions and which populations may be unsuitable for them.

Based on the aforementioned evidence, the GOLD 2026 guidelines maintain a rigorous stance on the positioning of telemedicine. To address concerns regarding misdiagnosis, over-reliance on Artificial Intelligence (AI), and potential outcome bias, the guidelines emphasize the necessity of strict validation, human oversight, and comprehensive bias testing.

Furthermore, the guidelines identify and propose mitigation strategies for several critical risk categories associated with AI and digital health integration:

Data-Related Risks

Issues such as poor data quality, bias in training datasets, and potential privacy breaches pose significant threats. These should be addressed through rigorous data cleaning processes, the utilization of diverse datasets, and the implementation of robust security protocols.

Technical Limitations

To overcome the challenges of "black-box" models, poor generalization capabilities, and data drift, the guidelines recommend the adoption of interpretable models, regular model retraining, and rigorous external validation.

Ethical and Legal Risks

Ambiguous liability frameworks, challenges in obtaining informed consent, and systemic inequities remain major concerns. Proposed solutions include establishing clear accountability frameworks, ensuring transparent communication with patients, and promoting equitable access to technology.

Operational and Implementation Challenges

Integration into clinical workflows is often hindered by regulatory complexity and high maintenance costs. The guidelines advocate for user-centered design, alignment with regulatory standards, and the establishment of continuous monitoring systems alongside sustained financial support.

The guidelines suggest that remote follow-up and telemonitoring can serve as supplementary medical resources in scenarios characterized by limited medical resources, patient mobility constraints, or difficulties in fully implementing in-person programs. However, their applicability must be grounded in professional assessment and individualized patient needs, and their impact on long-term clinical outcomes requires further validation through research [**?**].

At the practical level, the GOLD 2026 guidelines propose clear principles for the implementation of remote follow-up. On one hand, the guidelines emphasize that remote follow-up is not suitable for all patients. It may be considered for patients who are clinically stable, have clear follow-up objectives, and where

both the patient and caregiver possess the necessary communication and cooperation skills, provided that medical records and prescription systems can support such a model. Conversely, in-person visits should be prioritized when symptoms worsen requiring differential diagnosis, when severe discomfort is present, or when physical examinations or in-person administration of medication are necessary.

On the other hand, the guidelines suggest that offline medical resources should be allocated rationally through triage and priority assessments. These assessments should comprehensively consider disease severity, recent history of emergency visits or hospitalizations, comorbidity burden, age, and social support status. The GOLD 2026 guidelines emphasize that regardless of whether follow-up is conducted online, via telephone, or in person, it must adhere to consistent clinical and ethical standards. This includes standardized medical record-keeping, informed consent, and privacy protection, with clinical decision-making guided by the principles of evidence-based medicine. To improve clinical operability, the guidelines provide standardized follow-up checklists in the appendix tailored for different follow-up formats. These tools are designed to standardize procedures, focus on core patient issues, and ensure the continuity of long-term management for Chronic Obstructive Pulmonary Disease (COPD).

In summary, the GOLD 2026 guidelines characterize telemedicine as a contextual tool within the comprehensive management system for Chronic Obstructive Pulmonary Disease (COPD). Its primary value lies not in the wholesale replacement of traditional face-to-face follow-ups, but rather in supplementing and extending existing medical services for appropriate patient populations and clinical scenarios. The application of telemedicine should be guided by patient benefit, maintaining a careful balance between evidence-based findings, clinical judgment, and the capacity of the healthcare system.

Pulmonary Rehabilitation and Self-Management: Face-to-Face vs. Online Modes

The GOLD 2026 guidelines identify pulmonary rehabilitation and self-management as the two intervention formats that have been most extensively researched and practically explored within the field of COPD telemedicine. During the COVID-19 pandemic, telemedicine and online interventions were rapidly integrated into clinical practice due to social distancing requirements. However, in the post-pandemic era, their scope of application, long-term efficacy, and appropriate positioning must be further clarified within an evidence-based medical framework.

Among all telemedicine interventions related to Chronic Obstructive Pulmonary Disease (COPD), pulmonary rehabilitation (PR) possesses the highest quality of evidence. Numerous studies have employed structured exercise protocols with well-defined training components to compare telerehabilitation against either conventional care or center-based (face-to-face) PR. A 2021 Cochrane system-

atic review established face-to-face, center-based PR as the "gold standard" for pulmonary rehabilitation in COPD [**?**]. Furthermore, a clinical practice guideline noted that for patients with stable chronic respiratory diseases, particularly COPD, telerehabilitation can achieve clinical outcomes similar to center-based PR in terms of improving exercise capacity, symptoms, and quality of life. Based on this, the guideline suggests that patients should be offered a choice between "center-based PR or telerehabilitation" (strong recommendation, moderate-quality evidence) [**?**].

It is important to emphasize that in the field of self-management, the GOLD 2026 report cites the conclusions of a 2022 Cochrane systematic review, stating that structured self-management interventions can improve the quality of life for COPD patients and reduce hospitalizations [**?**]. Telehealth education and self-management models based on Information and Communication Technology (ICT) theoretically help alleviate the workload of medical staff and transform the delivery of long-term monitoring and healthcare services. However, unlike pulmonary rehabilitation, there is currently a lack of direct evidence proving that technology-based remote self-management interventions provide additional benefits over traditional face-to-face self-management strategies [**?**].

Consequently, the GOLD 2026 report maintains a more cautious stance toward online self-management. The report suggests that while the application of digital technology in self-management shows great promise, many questions remain regarding its efficacy, target populations, and long-term value. Current evidence is insufficient to support it as an independent solution that is superior to or a replacement for traditional self-management models.

In summary, the GOLD 2024 Report adopts a differentiated, evidence-based stance regarding the implementation of pulmonary rehabilitation and self-management. In the field of pulmonary rehabilitation, telerehabilitation is recognized as an effective alternative to center-based (face-to-face) programs, provided that quality, comprehensive assessment, and professional support are guaranteed. Conversely, in the domain of self-management, remote technologies are viewed more as potential tools whose actual incremental benefits require further validation through research. This approach emphasizes that the mode of delivery should not supersede the scientific substance of the intervention itself; the core of COPD management must remain focused on clinical efficacy, safety, and patient outcomes.

7 中国好声音

Among the 330 references published between January 2024 and July 2025 newly incorporated into the GOLD 2026 report, a total of 14 studies were led by or featured deep participation from Chinese experts. Specifically, seven studies were led by research teams from Mainland China, one study originated from ethnic Chinese researchers in Taiwan, and six were international multicenter studies in which Chinese scholars served as key collaborators. Together, these works

constitute a significant academic contribution by Chinese and ethnic Chinese scholars to the field of chronic obstructive pulmonary disease (COPD). Regarding disease burden and epidemiology, Cao et al. [**?**] utilized GBD 2021 data and an age-period-cohort model to systematically analyze long-term trends in the prevalence, mortality, and disability-adjusted life years (DALYs) of chronic lung diseases globally and in China from 1990 to 2021. Their study emphasized the core roles of population aging and environmental exposure in the rising burden of COPD. Liao et al. [**?**] focused specifically on the Chinese population, systematically evaluating the evolution of the COPD disease burden and the contributions of major risk factors from 1990 to 2030, thereby providing a quantitative predictive basis for future prevention and control strategies in China.

Furthermore, from a global perspective, the trends in COPD and its attributable risk factors were analyzed, highlighting China' s critical data contributions to the Global Burden of Disease (GBD) research framework.

Wang et al. [**?**], based on a Chinese prospective cohort study, discovered that airway mucus plugs are significantly associated with the risk of moderate-to-severe exacerbations, providing direct evidence for using imaging phenotypes in exacerbation risk stratification. In the area of mechanisms and clinical phenotypes, the multicenter, double-blind, randomized controlled trial conducted by Li et al. [**?**] confirmed that high-dose N-acetylcysteine can reduce the incidence of exacerbations and improve lung function in patients with mild-to-moderate COPD, offering high-quality evidence-based support for antioxidant therapy strategies. In the field of rehabilitation and integrated management, a systematic review and meta-analysis by Dai et al. [**?**] demonstrated that pulmonary rehabilitation not only improves exercise capacity and symptoms but also significantly enhances sleep quality in COPD patients, expanding the evaluative dimensions of clinical benefits for pulmonary rehabilitation. Regarding comorbidities and related disease management, the AGA expert consensus co-authored by Chen et al. [**?**] systematically elaborated on the diagnosis and management strategies for extraesophageal reflux disease, providing an important reference for assessing gastroesophageal reflux-related symptoms in COPD patients. In terms of infection risk and medication safety, Huang et al. [**?**] utilized real-world data from Taiwan to find that COPD patients receiving fixed-dose LABA/ICS combination therapy face an increased risk of active pulmonary tuberculosis. This study provides a vital basis for risk assessment and individualized medication decision-making for COPD patients using inhaled corticosteroids in regions with a high prevalence of tuberculosis. Additionally, the GOLD 2026 report included six international multicenter studies involving Chinese scholars as key collaborators, covering cutting-edge directions such as early diagnosis of COPD, targeted biologic therapies, machine learning-based phenotype identification, lung function trajectory prediction, and novel imaging and digital screening technologies. This reflects the continuous participation and academic influence of Chinese research forces within the global COPD collaborative network. In summary, the systematic inclusion of research results from Chinese and ethnic Chinese scholars in

the GOLD 2026 report covers the complete chain of "epidemiology-mechanism-treatment-rehabilitation-infection risk-environmental prevention and control," marking the sustained increase in the contribution and discourse power of Chinese scholars within the global evidence-based medical system for COPD.

8 总结与展望

In summary, while maintaining the fundamental framework for the diagnosis and treatment of Chronic Obstructive Pulmonary Disease (COPD), the GOLD 2024 guidelines represent a systematic revision. These updates encompass several key areas: updated evidence on disease burden, optimized case-finding strategies, adjusted risk stratification criteria, refined pharmacological treatment pathways, a restructured management system for exacerbations, enhanced comprehensive assessment of comorbidities, and the inclusion of emerging technologies.

Of particular note is that the guidelines have lowered the threshold for identifying patients at high risk of exacerbation to "$\geq$ 1 moderate or severe exacerbation in the past year." Furthermore, the guidelines propose "low disease activity" — defined as the absence of exacerbations, no worsening of symptoms, and no accelerated decline in lung function—as a primary management objective. This shift emphasizes the necessity of proactive prevention of clinical events and dynamic monitoring of disease progression during long-term COPD management. These updates suggest that exacerbations should not merely be viewed as an inevitable "outcome" in the natural history of the disease, but rather as critical clinical events that can be minimized through early identification and standardized intervention.

Based on the clinical reality in China, one of the most practically significant updates in the GOLD 2026 guidelines is the further clarification of the concepts of "screening" versus "case finding," alongside a quantitative description of the scale of chronic obstructive pulmonary disease (COPD) underdiagnosis and its associated factors. Underdiagnosis of COPD remains prevalent in China. Early identification is collectively hindered by several factors, including the limited accessibility of pulmonary function testing, the degree of familiarity among primary care physicians regarding diagnostic criteria and test interpretation, and patients' tendency to underestimate symptoms or delay seeking medical consultation.

While the GOLD 2026 guidelines do not recommend universal screening for low-risk, asymptomatic populations, they place greater emphasis on case finding targeted at individuals with exposure to risk factors and/or respiratory symptoms. Furthermore, the guidelines provide more specific definitions for target populations and procedural recommendations. For general practice and primary care settings, key challenges for improving standardized management in the future include enhancing the sensitivity of identifying suspicious cases under resource-constrained conditions, increasing the utilization rate of pulmonary function testing, and ensuring timely diagnostic confirmation.

The updates in the chapter on comorbidities are equally enlightening. Supported by concepts such as the "4Ms" framework, frailty, and multi-system tissue degeneration, the GOLD 2026 guidelines incorporate psychological and cognitive status, functional and mobility capacity, polypharmacy risks, and comorbidity identification into a structured assessment framework. This emphasizes that the prognosis of patients with Chronic Obstructive Pulmonary Disease (COPD) is often determined by a combination of multi-system factors.

In the context of China's aging population, the follow-up management of COPD should more systematically focus on issues such as functional decline, depression and anxiety, malnutrition/sarcopenia, and the increased risk of cardiovascular events following acute exacerbations. Furthermore, smoother referral and collaboration mechanisms with relevant specialties should be established when necessary. These efforts do not imply a change in the fundamental treatment principles of COPD itself; rather, they suggest that the safety of multimorbidity and polypharmacy must be more fully considered when determining treatment options and scheduling follow-up frequencies.

Regarding pharmacological treatment, the GOLD 2026 guidelines utilize diagrams to distinguish between initial treatment and follow-up treatment. These guidelines emphasize two primary adjustment pathways based on persistent symptoms and the occurrence of acute exacerbations, while presenting research findings related to biologics more systematically through evidence-based data.

However, a cautious approach should be maintained toward these developments. At this stage, evidence for biologics is primarily derived from study populations with specific inclusion criteria—such as a history of frequent exacerbations, poor control despite triple inhalation therapy, and specific inflammatory phenotypic characteristics. Consequently, their clinical applicability may be relatively limited. Further research is still required to support their real-world efficacy, long-term safety, and cost-effectiveness, as well as to evaluate the risk-benefit ratio in regions with a high burden of infections, such as tuberculosis.

In contrast, updates to vaccination recommendations—such as lowering the age threshold for the Respiratory Syncytial Virus (RSV) vaccine—may yield accessible risk reduction benefits across a broader population. Consequently, these updates warrant proactive assessment and implementation during routine follow-up consultations.

It is noteworthy that the GOLD 2024 report introduces a new section titled "COPD and Emerging Technologies," reflecting an open attitude toward the application of digital tools while maintaining a commitment to evidence-based medicine. The guidelines position Artificial Intelligence (AI) as a tool for auxiliary information integration and decision support, while simultaneously highlighting existing limitations regarding evidence quality, interpretability, data bias, and ethical regulation.

Future research on these technologies in COPD management should focus more on application scenarios closely linked to clinical outcomes. Key areas of interest

include improving the efficiency of identifying high-risk populations, optimizing risk stratification, and enhancing the continuity and adherence assessments of long-term follow-up. Furthermore, the implementation of these technologies must be predicated on rigorous validation to avoid replacing standardized diagnostic and treatment workflows in the absence of sufficient evidence.

In summary, the GOLD 2026 guidelines emphasize a proactive approach to chronic obstructive pulmonary disease (COPD) management by advancing risk thresholds and optimizing management strategies. This evolution in clinical guidance reflects a shift toward earlier intervention and more personalized care pathways.

By lowering the threshold for risk assessment, the guidelines aim to identify at-risk individuals and patients in the early stages of the disease more effectively. This transition facilitates the implementation of preventative measures and therapeutic interventions before significant lung function decline occurs. Furthermore, the updated management protocols prioritize the integration of multimodal diagnostic tools and longitudinal monitoring to refine treatment efficacy.

The GOLD 2026 framework also underscores the importance of addressing comorbidities and environmental factors as integral components of the disease profile. This comprehensive perspective ensures that management strategies are not limited to pharmacological bronchodilation but also encompass holistic patient care, including pulmonary rehabilitation and lifestyle modifications. Ultimately, these advancements are designed to reduce the global burden of COPD by improving long-term clinical outcomes and enhancing the quality of life for affected populations.

The updating of management goals and the refinement of evaluation systems have provided a clearer framework for the long-term standardized management of Chronic Obstructive Pulmonary Disease (COPD). For clinical practice in China, the next critical steps involve continuously improving the proficiency of early identification and standardized follow-up within feasible diagnostic and treatment workflows. Furthermore, it is essential to strengthen strategies for preventing acute exacerbations and to integrate the structured assessment of comorbidities and medication safety into routine management. These efforts aim to achieve a reduction in disease activity and an improvement in long-term clinical outcomes.

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ATS/ERS Position Paper: Standards for the Diagnosis and Treatment of Chronic Obstructive Pulmonary Disease

Introduction

Chronic Obstructive Pulmonary Disease (COPD) remains a major cause of morbidity and mortality worldwide. This position paper, developed jointly by the American Thoracic Society (ATS) and the European Respiratory Society (ERS), provides an evidence-based framework for the diagnosis, management, and prevention of COPD. By synthesizing current clinical research, this document aims to standardize care and improve patient outcomes across different healthcare systems.

Definition and Pathogenesis

COPD is characterized by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases. While tobacco smoking is the primary risk factor, environmental exposures and genetic factors also play significant roles. The underlying pathology involves a combination of small airway disease (obstructive bronchiolitis) and parenchymal destruction (emphysema), the relative contributions of which vary from person to person.

Diagnosis and Assessment

A clinical diagnosis of COPD should be considered in any patient who has dyspnea, chronic cough or sputum production, and a history of exposure to risk factors for the disease. Spirometry is required to make the diagnosis; the presence of a post-bronchodilator $FEV_1/FVC < 0.70$ confirms the presence of persistent airflow limitation.

The assessment of COPD is based on the patient' s level of symptoms, the severity of spirometric abnormalities, and the frequency of exacerbations. The classification of severity is often categorized as follows: - **Mild:** $FEV_1 \geq 80\%$ predicted - **Moderate:** $50\% \leq FEV_1 < 80\%$ predicted - **Severe:** $30\% \leq FEV_1 < 50\%$ predicted - **Very Severe:** $FEV_1 < 30\%$ predicted or $FEV_1 < 50\%$ with chronic respiratory failure

Management of Stable COPD

The primary goals of COPD management are to relieve symptoms, prevent disease progression, improve exercise tolerance, improve health status, and prevent and treat complications and exacerbations.

1. **Smoking Cessation:** This is the most effective intervention to reduce the risk of developing COPD and stop its progression.
2. **Pharmacological Therapy:** Bronchod

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