

Mapping the Common Barriers to Optimal COPD Care in High and Middle-Income Countries: Qualitative Perspectives from Clinicians

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Purpose: Chronic obstructive pulmonary disease (COPD) poses a significant global health burden despite being largely preventable and treatable. Despite the availability of guidelines, COPD care remains suboptimal in many settings, including high-income countries (HICs) and upper-middle-income countries (UMICs), with varied approaches to diagnosis and management. This study aimed to identify common and unique barriers to COPD care across six countries (Australia, Spain, Taiwan, Argentina, Mexico, and Russia) to inform global policy initiatives for improved care.

Methods: COPD care pathways were mapped for each country and supplemented with epidemiological, health-economic, and clinical data from a targeted literature review. Semi-structured interviews with 17 respiratory care clinicians were used to further validate the pathways and identify key barriers. Thematic content analysis was used to generate the themes.

Results: Six themes were common in most HICs and UMICs: “Challenges in COPD diagnosis”, “Strengthening the role of primary care”, “Fragmented healthcare systems and coordination challenges”, “Inadequate management of COPD exacerbations”, “Limited access to specialized care” and, “Impact of underfinanced and overloaded healthcare systems”. One theme, “Insurance coverage and reimbursement challenges”, was more relevant for UMICs. HICs and UMICs differ in patient and healthcare provider awareness, primary care involvement, spirometry access, and availability of specialized care. Both face issues with healthcare fragmentation, guideline adherence, and COPD exacerbation management. In addition, UMICs also grapple with resource limitations and healthcare infrastructure challenges.

Conclusion: Many challenges to COPD care are the same in both HICs and UMICs, underscoring the pervasive nature of these issues. While country-specific issues require customized solutions, there are untapped possibilities for implementing global respiratory strategies that support countries to manage COPD effectively. In addition to healthcare system-level initiatives, there is a crucial need for political prioritization of COPD to allocate the essential resources it requires.

Keywords: COPD, barriers, qualitative research, healthcare systems, global policy

Introduction

Chronic obstructive pulmonary disease (COPD) is a respiratory condition characterized by irreversible airflow limitation and symptoms such as dyspnoea, cough, and sputum production. The development of COPD is influenced by both environmental and genetic factors, with smoking and air pollution being primary environmental contributors.¹ Genetic predispositions also play a crucial role, with various gene polymorphisms linked to increased risk or disease progression.² COPD most commonly affects older adults, with a notable increase in prevalence, morbidity, and mortality as age advances.³ While COPD has traditionally been associated with men, its prevalence among women is growing due to

rising smoking rates among women, occupational exposures, and possibly greater vulnerability of women's lungs to smoking and other environmental pollutants.⁴

Despite being preventable and treatable,⁵ according to the Global Burden of Disease Study, in 2019, COPD accounted for 3.3 million deaths globally.⁶ COPD is already the third leading cause of death globally, which is seven years ahead of the World Health Organisation's (WHO) prediction of 2030.⁷ By 2060, deaths from COPD are expected to rise to 5.4 million.⁸

The highest age-standardized COPD prevalence is in high-income countries (HICs), where it persists as a significant public health issue due to the considerable healthcare, economic and societal burden.⁶ It is also an important issue in upper-middle-income countries (UMICs), which are expected to experience an increasing disease burden as their economies grow and populations age.⁷ Moreover, compared to HICs, UMICs may have more limited resources to respond to increased demands on their health systems, including fewer healthcare facilities and limited availability of essential medications and technologies.⁹

The Global Initiative for Obstructive Lung Disease (GOLD) provides guidance on a universal and standardized approach to COPD care.⁸ Despite this widely available guidance, COPD is often suboptimally managed in practice, and guidelines are not followed.^{10–12} The reasons may include a lack of awareness or familiarity with the guidelines among healthcare professionals, resource constraints, as well as challenges with the implementation of guidelines into routine clinical practice. This is linked to variation in how COPD care is delivered between settings^{13–15} and leads to heterogeneity in patient outcomes and quality of life (QoL).¹⁶

Currently, no well-established and widely recognized method exists for mapping practical aspects of care delivery to identify deviations from the guideline provisions. One approach is reported by Meiwald et al for COPD Evidenced Care Pathways, which collates and illustrates the steps involved in delivering COPD care across four healthcare settings.¹⁷ These Evidenced Care Pathways were developed based on clinical guidelines, peer-reviewed articles, and clinician perspectives, providing a qualitative assessment of differences between clinical practice and guidelines.

A granular understanding of barriers to providing guideline-adherent care in COPD and how they differ across countries with diverse healthcare systems could provide useful insights for policymakers and healthcare providers. This insight could improve policy planning, effective resource allocation and the successful implementation of initiatives to improve care.¹⁸

This study seeks to identify common and unique barriers preventing optimal COPD care in three HICs (Australia, Spain and Taiwan) and three UMICs (Argentina, Mexico and Russia) to better inform global policy initiatives that tackle shared barriers¹⁹ while ensuring that unique issues are addressed through more tailored approaches.

Materials and Methods

This study used a previously reported mixed-method approach¹⁷ to generate Evidenced Care Pathways. A qualitative analysis of the clinician interviews was conducted to evaluate each country's themes. A narrative synthesis was used to compare themes in HICs and UMICs. The definition of HICs and UMICs was based on the World Bank classification.²⁰

Development of Evidenced Care Pathways: Pragmatic searches were conducted on PubMed and Google Scholar to identify: 1) international and national guidelines for the diagnosis and management of COPD and 2) economic, epidemiological and clinical data about COPD in the study settings. See [Supplement 1](#) for the search strategy. The literature review findings informed the pathway mapping and the discussion guides for the clinician interviews.

Initially, a generic pathway outlining the steps to COPD care was drafted for each country based on the GOLD recommendations. It was further refined using country-specific guidelines.^{21–26} The pathways were then used as a visual aid in the clinician interviews to assess how current care delivery deviates from guideline provisions. Further changes to the pathways to reflect current care delivery were made following clinicians' input, using an iterative approach until the final structure of the Evidenced Care Pathway was achieved.

Qualitative analysis of barriers to optimal COPD care: Semi-structured interviews with 17 clinicians were used to develop and validate the structure of the COPD Evidenced Care Pathways and understand clinician-perceived barriers to optimal COPD care. The qualitative analysis followed the consolidated criteria for reporting qualitative research (COREQ) checklist.²⁷

The Research Team and Reflexivity

A summary of the characteristics of the research team and their relationship with the participants is provided in [Table 1](#).

Table 1 Characteristics of the research team and their the relationship with the participants

Interviewer/Facilitator	AR, KPS, MV, NA PGW and RGA conducted the interviews.
Data analysis	AS and OS coded the transcripts.
Occupation	All researchers were employees of Aquarius Population Health at the time when the research was conducted.
Gender	AS, AR, MV, NA and OS identify as women. KPS, PGW and RGA identify as men.
Experience and training	RGA has 31 years of qualitative market research experience AS has 10 years of experience in qualitative research in academic settings. The rest of the research team had 6–12 months of experience in qualitative research when the interviews and data analysis were conducted.
Relationship established	There was no relationship between the research team and the interviewees before the interview. All participants reported they had a professional relationship with AstraZeneca.
Participant knowledge of the interviewer	The participants were informed that Aquarius Population Health would carry out the interviews. The interviewer told the participant about their background, role at Aquarius, and involvement with this research.
Interviewer characteristics	The participants were informed that Aquarius is an independent consultancy firm contracted by AstraZeneca to conduct the research. They were also told that Aquarius is responsible for the research design, data analysis and the reporting of the findings with no involvement from AstraZeneca.

Participant Selection

A total of 39 potential participants were approached through an email invitation, and 17 agreed to participate in the study. The participants met the following criteria: 1) healthcare professionals (HCPs) working in Argentina, Australia, Mexico, Spain, Russia, or Taiwan at the time of the study; and 2) played an active role in diagnosing or managing COPD in any healthcare setting (primary, secondary or tertiary). Purposive sampling was used in all the countries. The choice of the countries was guided by the need to ensure diversity in geography and healthcare systems.

Data Collection

Interviews took place between April – September 2021 online via Microsoft Teams[®]. All participants were provided with documentation outlining the nature and purpose of the study and how the data would be used, stored and shared (the use of recordings, an external agency for the transcription process and any future uses of the data). Participants provided informed written consent to participate, including consent to quote their words to substantiate the findings, either verbatim or edited for improved clarity. Participants were informed of the estimated length of the discussion. All communications with the healthcare professionals who participated in the study were managed online, including initial contact, scheduling, and conducting the interviews via emails and virtual meetings. This method ensured consistent and effective engagement with participants across the diverse regions represented in the study.

An example of an interview discussion guide is provided in [Supplement 2](#). Two interviewers were present in each call: a lead and a notetaker. An interpreter was present in three interviews. In these cases, only the English translation was transcribed. Seven interviews were conducted in Spanish (both interviewer and interviewee were native speakers), and certified translators later translated the transcripts into English for the thematic analysis. Transcripts were not returned to participants for correction. All participants consented to receive follow-up emails with clarifying questions regarding the Evidenced Care Pathways and were asked to validate the final structure. They were offered the option to receive an honorarium at the end of the process.

Data Analysis

The interview data were analyzed using a mix of deductive and inductive approaches.²⁸ Transcripts were coded using an existing framework (deductive component).¹⁷ Data within each theme was then coded line by line to create sub-categories (inductive component). Particular attention has been paid to identifying both common and unique barriers. A note was made if the subtheme implied some form of improvement in COPD care. AS coded the transcripts. OS

double-coded 20% of the data (four transcripts) (Table 1). Discrepancies were resolved through discussion. Results were anonymized before reporting.

A narrative synthesis was deployed to compare the themes and subthemes across the countries. A note was made where themes or subthemes were not applicable to a country, and details of the country-specific nuances were captured separately.

Ethics

No personal or patient-specific information was collected during the interviews. Participants were asked questions regarding the healthcare services for COPD in their country. Therefore, the project was deemed a service evaluation, and no ethics approval or review was necessary. Any data collected before, during and after the interview was handled following the European Union’s General Data Protection Regulation (GDPR) legislation.

Results

Evidenced Care Pathways

The detailed Evidenced Care Pathways for Argentina, Australia, Mexico, Spain, Russia and Taiwan are presented in Supplement 3. Figure 1 shows an example of an overview page for an Evidenced Care Pathway. The pathways for all countries showed consistency in the organization and care delivery for COPD. They split across three key touchpoints with the healthcare system : pre-diagnosis, diagnosis, and management.

However, differences between the Evidenced Care Pathways were observed. These were mainly related to how patients access specialist care, the tests used for COPD diagnosis, differences in the treatment algorithms, guidelines for managing COPD, and treatment reimbursement.

Themes from Qualitative Analysis of Interviews

Seven themes were identified, covering barriers to COPD care across the six countries. Table 2 lists the universal primary themes, level two sub-themes, and quotes supporting them. Table 3 shows where there was variation between countries for the primary themes and pinpoints if there were country-specific nuances within the subthemes.

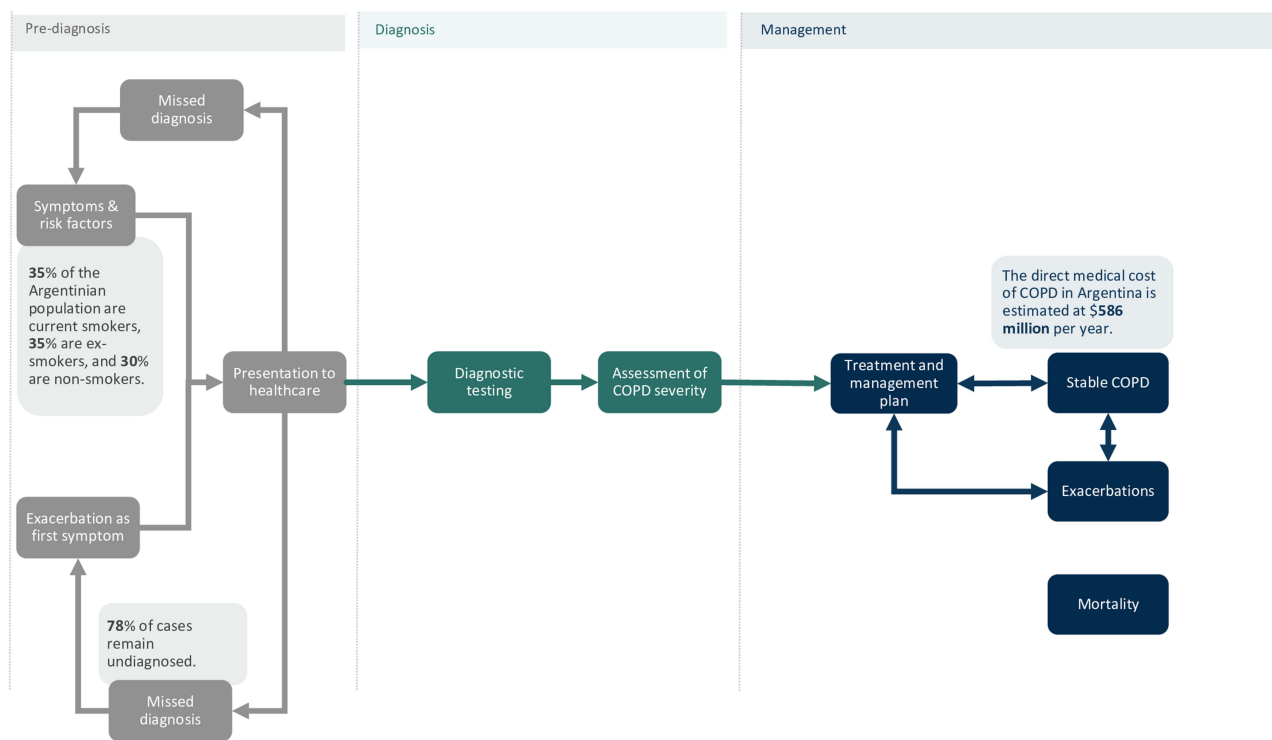


Figure 1 Top-level presentation of the Evidenced Care Pathway. Example from the Argentinian pathway.

Table 2 Themes, Subthemes and Quotes Identified from Analyzing 17 Interview Transcripts in Six Countries: Argentina, Australia, Mexico, Russia, Spain, and Taiwan

Theme	Subthemes	Quotes
I. Getting a correct COPD diagnosis is potentially the biggest challenge affecting patients and healthcare systems.	<p>I.1 There are many undiagnosed COPD patients in the population</p> <p>I.2 Low awareness about COPD means patients adapt or put up with the disease unnecessarily</p> <p>I.3 Patients take too long to present to healthcare and present with an advanced disease</p> <p>I.4 Patients have several visits before they get a diagnosis, meaning that COPD symptoms go unrecognized by physicians. I.5 Exacerbations are a key driver of getting a COPD diagnosis</p>	<p>"In my opinion, more than 50% of our patients are without this diagnosis, but they have complaints and they suffer from this disease."</p> <p>"It's true that they don't get there so often because of coughing and sputum like they do from other symptoms because since they attribute coughing and sputum to tobacco use, well, they don't usually make a consultation because of that."</p> <p>"But I think a substantial number of patients are undiagnosed in Taiwan, because I, sometimes we see patients very advanced the COPD. They are not diagnosed before."</p> <p>"How long does it take for the clinician to determine that the patient requires to see a pulmonologist? (...) It depends on the patient's consultations, but usually, the patient gets referred after four or five consultations."</p> <p>"Before that [COPD diagnosis] happens, there's usually exacerbation already. I'd say that 60% to 70% of those who end up being diagnosed or are referred for a COPD assessment, I think, is caused by a previous exacerbation."</p>
I. There are missed opportunities to strengthen the role of primary care in improving COPD care.	<p>2.1 Low consideration of COPD by primary care physicians is an important barrier.</p> <p>2.2 Difficulties in differentiating COPD symptoms from other conditions, especially asthma.</p> <p>2.3 Lack of access to spirometry, inconsistent use and lack of confidence among PCPs in interpreting the results.</p> <p>2.4 The COPD guidelines may not be suitable for GPs.</p>	<p>"More or less 30, 40% of the population of COPD patients are followed more or less in primary care. But an important percentage of them are followed without a proper diagnosis perhaps only chronic cough and not the current diagnosis of COPD or chronic bronchitis."</p> <p>"So there's often a problem with diagnosis. So the diagnostic step becomes an issue sometimes, there's a lot of confusion as to whether it's asthma or COPD."</p> <p>"And due to lack of interest by the family physician in diagnosing COPD. We struggle quite a bit. We have plenty of training but there continues to exist a gap when it comes to looking for COPD."</p> <p>"(...) chest X-ray is an access study by the primary care physician. Spirometry, however, it's a resource managed usually by the pulmonologist."</p>
I. The complex nature of COPD requires good coordination between patients, PCPs and specialists, but healthcare systems are fragmented.	<p>3.1 There are opportunities to clarify the roles of GPs and specialists in the treatment initiation and follow-up of COPD patients.</p> <p>3.2 Some clinicians display poor understanding and adherence to pharmacological treatment guidelines.</p> <p>3.3 Limited access and inconsistent use of non-pharmacological treatments.</p> <p>3.4 Poor patient compliance, adherence and self-management impacts treatment outcomes.</p>	<p>"Yes. I understand that probably mild COPD must be followed by primary care. That would be an intelligent approach for the health system, but in Argentina it does not happen that way. Probably secondary care and especially some pulmonologists are leading the vast majority the assess and the following of the patients during the entire disease. "</p> <p>"It's normally a specialist because primary care physicians, they do not know many details of COPD management and dispatch patient to specialist and then they try to have their prescription and they use their prescription for treatment of patient. "</p> <p>"I think that out of 10 patients, 6 or 7 are being managed correctly and 3 aren't."</p> <p>"That's typical on COPD patients. Regardless of whether it's working or not, whether corticosteroid is causing any harm or not, whether there are exacerbations or not. No review on treatment changes. Therapeutic inertia is one of the greatest challenges with COPD. Just as that."</p> <p>"The guidelines establish which are the patients to be rehabilitated, but many patients do not have access because there are no rehabilitation programs set up in State-run institutions. Require trained professionals, so I'd say it's a key limitation. Many patients that require rehabilitation do not get it."</p> <p>"So if I am breathless, is not my cardiac failure today? Or is it the fact that I am unwell? Because I have got a cold, and now I am exacerbating my airways disease? And then look, that's a hard thing for patients to pick up. And it's a hard thing for doctors to pick up sometimes."</p>

(Continued)

Table 2 (Continued).

Theme	Subthemes	Quotes
I. Healthcare systems are failing to adequately manage patients that present with COPD exacerbations.	<p>4.1 Exacerbations often go unreported, reported too late and misclassified.</p> <p>4.2 Patients lack the necessary education to identify and act on exacerbations.</p> <p>4.3 Not enough action plans are set up or revised following exacerbations.</p> <p>4.4 High hospitalization and readmission rates among patients with exacerbations are driving costs up.</p> <p>4.5 The presence of comorbidities among COPD patients often becomes an important determinant for their hospitalization.</p>	<p>"I think we have to improve the patient's education, make them aware about what they can do when they start exacerbating and the access the patient has to their doctors, right?"</p> <p>"Very few [COPD patients have an action plan after exacerbation]. There are lots of people who give them an action plan, but I wouldn't say that's it's been put in place as it happens with asthma patients, for example."</p> <p>"That shouldn't happen[returning with an exacerbation after 90-days from discharge] if patients are well managed, but 50% of severe patients get re-hospitalized. Patients with important damage lung get easily re-hospitalized"</p> <p>"Yeah, we've, it's, there's a bit of skulduggery with all of that [management of exacerbations in hospital], and that anyway, yes. So there's a rapid turnaround time. And unfortunately, there's also a readmission cost with that."</p> <p>"Frequently COPD patients represent 20% of pulmonology admissions in the entire year so, it turns out to be very repetitive, admission, treatment, discharge, admission."</p> <p>"So, the criterion for admitting a patient isn't COPD only but the associated comorbidities. And actually, if we were to look over the patients we admit, a good number of them might not need to be admitted if they didn't have comorbidities, but since."</p>
I. Access to specialized care is limited and represents one of the major barriers to quality care.	<p>5.1 There are not enough specialists to cover the needs of the COPD patient population.</p> <p>5.2 Specialists are usually concentrated in large urban areas, leaving COPD patients in smaller towns and remote locations without vital services.</p> <p>5.3 Long waiting times to see specialists introduce delays in getting treatment.</p> <p>5.4 Having to travel long distances to see a specialist discourages patients, reduces compliance and introduces costs.</p>	<p>"In that same sense, the number of pulmonologists is less than the number of patients with respiratory diseases, so there's no capacity available. A patient may need to wait for 70, 80 days so the patients get exhausted by it. The problem appears today and they'd like to get it resolved now instead than in 70 days."</p> <p>"Okay. It means, then, that there are more diagnoses in big cities because there's greater access to health services and in rural areas there are no pulmonologists and no spirometry is being done, so the diagnosis rate is low, meaning the underdiagnosis is greater."</p> <p>"It's whoever's there, and where you are, determines it [who sees the patient presenting with an exacerbation]. So all well and good to say you should come in under the care of a respiratory physician but if you have been admitted to... if you have got an exacerbation of COPD, and you go to Maury hospital [Australia], it will be one of the local general practitioners that look after you."</p> <p>"Exactly, we [respiratory physicians] are centralized. I think it's not that we're short (in numbers), it's that we're not well distributed."</p> <p>"Certainly away from major urban centres, almost all of COPD care is carried out either by general [hospital] physicians without a specific respiratory background necessarily, or primary care physicians."</p>
I. Insurance coverage and treatment reimbursement for COPD may become a strong limiting factor for physicians and patients.	<p>6.1 Mild and moderate COPD cases struggle with drug reimbursement.</p> <p>6.2 Restricted medication availability and affordability lead to inadequate management of COPD.</p> <p>6.3 Receiving care in public systems introduces more challenges for patients than in private systems.</p> <p>6.4 Poor insurance coverage impedes access to quality COPD care.</p>	<p>"In Russia, the reimbursement system is quite different. For instance, in St Petersburg, patient might have medications completely reimbursed for treatment of COPD. But some parts of Russia, they reimburse if they are disabled only. Otherwise, they have to pay themselves for their treatment."</p> <p>"The patient in private care [in Mexico] not only has access to that medication, but also has the opportunity to have them month after month in any pharmacy. While in the public sector they depend on a single pharmacy, the one at the hospital, and at times they have to wait for the medication, and this means some days they may discontinue their therapy because they run out and they have not been able to have new one. This has an impact in the disease control. Patients in the private sector are much better controlled than in the public sector."</p>
I. Underfinanced and overloaded healthcare systems directly impact the quality of care for COPD.	<p>7.1 The healthcare system's weaknesses hinder timely diagnosis, comprehensive assessments, and regular monitoring.</p> <p>7.2 COPD receives fewer resources within healthcare systems compared to other chronic conditions.</p> <p>7.3 Unrecognized social disparities contribute significantly to poor treatment outcomes.</p> <p>7.4 There are important variations in care delivery between different regions.</p>	<p>"Meaning the work [health education, self-management training], the nurse does with diabetics, with hypertensive patients, nutrition and obesity... we don't even reach 20% with COPD at the national level."</p> <p>"For example, primary care has [specialized] nurses, but I think that they are not really involved with COPD patients, for instance. I do not know whether to call this tradition or if they are more used to following up on hypertensive or diabetic patients than on COPD patients."</p>

Table 3 The Variation in Primary Themes Between Countries and Indications Where Country-Specific Nuances Were Identified at the Subtheme Level

Themes and Subthemes	Country-Specific Nuances					
Theme 1: Getting a correct COPD diagnosis is potentially the biggest challenge affecting patients and healthcare systems.	Arg	Mex	Rus	Aus	Spa	Tai
1.1 There are many undiagnosed COPD patients in the population.	X	X	X			
1.2 Low awareness about COPD means patients adapt or put up with the disease unnecessarily.				[]		[]
1.3 Patients take too long to present to healthcare and present with advanced disease.						
1.4 Patients have several visits before they get a diagnosis, meaning that COPD symptoms go unrecognized by physicians.						[]
1.5 Exacerbations are a key driver of getting a COPD diagnosis.	X	X	X	[]	[]	[]
Theme 2: There are missed opportunities to strengthen the role of primary care in improving COPD care.	Arg	Mex	Rus	Aus	Spa	Tai
2.1 Low consideration of COPD by primary care physicians is an important barrier.						
2.2 Difficulties in differentiating COPD symptoms from other conditions, especially asthma.						
2.3 Lack of access to spirometry, inconsistent use and lack of confidence among PCPs in interpreting the results.						
2.4 The COPD guidelines may not be suitable for GPs.				[]		
Theme 3: The complex nature of COPD requires good coordination between patients, PCPs and specialists, but healthcare systems are fragmented.	Arg	Mex	Rus	Aus	Spa	Tai
3.1 There are opportunities to clarify the roles of GPs and specialists in the treatment initiation and follow-up of COPD patients.		X				[]
3.2 Poor understanding and adherence to pharmacological treatment guidelines				X		
3.3 Limited access and inconsistent use of non-pharmacological treatments.				X	X	
3.4 Poor patient compliance, adherence and self-management impacts treatment outcomes.						
Theme 4: The complex nature of COPD requires good coordination between patients, PCPs and specialists, but healthcare systems are fragmented.	Arg	Mex	Rus	Aus	Spa	Tai
4.1 Exacerbations often go unreported, reported too late and misclassified.					X	
4.2 Patients lack the necessary education to identify and act on exacerbations.	X	X	X			
4.3 Not enough action plans are set up or revised following exacerbations.						
4.4 High hospitalization and readmission rates among patients with exacerbations are driving costs up.				X		
4.5 The presence of comorbidities among COPD patients often becomes an important determinant for their hospitalization.						
Theme 5: Access to specialized care is limited and represents one of the biggest barriers to quality care.	Arg	Mex	Rus	Aus	Spa	Tai
5.1 There are not enough specialists to cover the needs of the COPD patient population.						
5.2 Specialists are usually concentrated in large urban areas, leaving COPD patients in smaller towns and remote locations without vital services.						
5.3 Long waiting times to see specialists introduce delays in getting treatment.						
5.4 Having to travel long distances to see a specialist discourages patients, reduces compliance and introduces costs.	X	X	X	X		

(Continued)

Table 3 (Continued).

Themes and Subthemes	Country-Specific Nuances					
	Arg	Mex	Rus	Aus	Spa	Tai
Theme 6: Insurance coverage and treatment reimbursement for COPD may become a strong limiting factor for physicians and patients.						
6.1 Mild and moderate COPD cases struggle with drug reimbursement.			X			
6.2 Restricted medication availability and affordability lead to inadequate management of COPD.	X	X	X			
6.3 Receiving care in public systems introduces more challenges for patients than in private systems.	X	X				
6.4 Poor insurance coverage impedes access to quality COPD care.	X	X				
Theme 7: Underfinanced and overloaded healthcare systems directly impact the quality of care for COPD.						
7.1 The healthcare system's weaknesses hinder timely diagnosis, comprehensive assessments, and regular monitoring.						
7.2 COPD receives fewer resources within healthcare systems compared to other chronic conditions.						
7.3 Unrecognized social disparities contribute significantly to poor treatment outcomes.				X		
7.4 There are important variations in care delivery between different regions.			X	X		[]

Notes: X Indicates there are some country-specific nuances for the corresponding subtheme where a particular challenge or barrier for that subtheme is brought up by the clinicians. [] Indicates there are some country-specific nuances for the corresponding subtheme with a positive nature where clinicians have noticed an improvement for that specific issue. **Grey cells** indicate the primary theme and subthemes that do not apply to the selected countries.

Unique features observed in some settings within a given theme are provided, in [Boxes 1–7](#).

Theme 1: Challenges in COPD Diagnosis

Clinicians identified COPD diagnosis as a significant challenge affecting both patients and healthcare systems. The impact on healthcare systems refers to increased healthcare resource utilization (HCRU), including avoidable hospitalizations, and additional pressures on emergency departments (ED). Not having a COPD diagnosis hinders patients from entering the diagnostic pathway, leading to prolonged periods without treatment. Clinicians expressed concerns about the high prevalence of undiagnosed COPD cases, particularly in countries with a high prevalence of smoking or exposure to biomass fuels, such as Russia, Argentina, and Mexico.

Low awareness about COPD among patients was mentioned as a key factor leading them to adapt to or tolerate the disease without seeking proper medical attention. Clinicians observed that patients often presented with advanced stages of the disease, suggesting reasons such as delays in seeking healthcare, failure to consider COPD by clinicians, lack of spirometry to diagnose it and the lack of timely interventions.

“But, I think a substantial number of patients are undiagnosed in Taiwan, because (...) sometimes we see patients (with) very advanced the COPD (sic). They are not diagnosed before.” - Respiratory specialist, Taiwan.

Box 1 Country-Specific Nuances Within Theme 1, Challenges in COPD Diagnosis

Country-specific features:

- In Russia, Argentina, and Mexico, clinicians estimated that over 50% of COPD diagnoses are made after an exacerbation.
- In Spain, Taiwan, and Australia, clinicians thought this problem existed on a smaller scale (10–20%).
- In Russia, there was a perception that COPD prevalence is increasing due to the high prevalence of smoking across the country.
- In Argentina and Mexico, biomass was mentioned as an important risk factor for rural communities in addition to smoking.
- In Australia and Taiwan, clinicians believe that COPD awareness among patients and healthcare providers has improved in the last decade.

They also noted that COPD symptoms frequently went unrecognized during multiple visits to healthcare providers before a formal diagnosis was made. Most importantly, clinicians explained how exacerbations are often the driver for initiating the diagnosis process. [Box 1](#) shows where clinicians reported country-specific nuances for this theme.

Theme 2: Strengthening the Role of Primary Care in COPD

Clinicians emphasized the missed opportunities to enhance the role of primary care in improving COPD diagnosis. They expressed concerns about the limited consideration of COPD by primary care physicians (PCPs), who are typically patients' first point of contact. Difficulties differentiating COPD symptoms from other conditions, particularly asthma, were highlighted as contributing to misdiagnosis and underdiagnosis.

They even forget how [to interpret] lung function test[s] because they are more familiar with diabetes, more familiar with hypertension (...)", Respiratory specialist, Taiwan.

Clinicians also identified the lack of access and inconsistent use of spirometry and PCPs' lack of confidence in interpreting results as significant barriers to timely COPD diagnosis.

Inconsistent use of spirometry in primary care settings adds to the diagnostic challenges. Subsequently, bottlenecks are created in the system if patients rely only on respiratory specialists for diagnosis (Theme 3 and 4). [Box 2](#) below shows some specific efforts around the guidelines that were raised in the interviews with the Australian physicians.

Theme 3: Fragmented Healthcare Systems and Coordination Challenges Add to the Complexity of Managing COPD

COPD management depends on various factors, including interactions between healthcare providers and patients, healthcare infrastructure availability, and access to treatment options. The healthcare services that COPD patients need are divided between primary care, specialists (in secondary care) and emergency departments. Clinicians reported some disconnect between these services, often leaving patients without adequate management.

Clinicians emphasized the need for effective coordination between patients, primary care physicians, and specialists in managing the complex nature of COPD. They recognized opportunities for clarifying the roles of general practitioners (GPs) and specialists in treatment initiation and follow-up. GPs' lack of confidence and training in initiating treatment for mild cases was highlighted, reflecting missed opportunities for alleviating the excess burden on secondary care and reducing waiting times, which are important determinants in the patient journey (Theme 2, 5 and 7).

Poor understanding and adherence to pharmacological treatment guidelines were highlighted (mainly among PCPs but in some cases among specialists too). Clinicians expressed concerns about the inadequate understanding of treatment options among healthcare providers, leading to underusing or misusing pharmacological and non-pharmacological interventions.

"70% of [of COPD patients] in Mexico aren't receiving adequate treatment. Because there's steroid overuse. Things are the other way around here. A COPD patient is given a bunch of steroids, and an asthma patient is given a bunch of SABA. Things are upside down."- Respiratory specialist, Mexico.

They acknowledged the impact of poor patient compliance, adherence, and self-management on treatment outcomes, which they believed is sometimes linked to insufficient resources dedicated to patient education. Substantial variation in guideline adherence was reported, particularly among GPs (Theme 1, subtheme 4). [Box 3](#) below shows distinct elements about this theme that were applicable only to some of the countries.

Box 2 Country-Specific Features Within Theme 2, Strengthening Primary Care in COPD

Country-specific features:

- **In Australia**, clinicians mentioned the necessity to make COPD guidelines more concise for GPs.
 - "One of the first things I did was say (sic) we need...the concise guide. They hadn't even thought about [the fact] that GPs can't look at a 160-page document, so that's something (sic)"- Respiratory specialist, Australia.

Box 3 Country-Specific Features Within Theme 3, Fragmented Healthcare Systems and Coordination Challenges

- **In Mexico**, clinicians mentioned many issues arising from the fact that physicians attached to community pharmacies are often the first point of contact for many COPD patients. In these settings, the awareness of treatment guidelines is particularly low, and it is detrimental to patients who rely on these services due to limited access to care.
 - “No, they [physicians at drug stores] only prescribe salbutamol. They do not go any further than that, they have no idea what a COPD treatment is. They do not know what a LABA + LAMA is (...) dual therapy, triple therapy, no. They have never managed that in their lives.”– Respiratory specialist, Mexico.
- **In Spain and Australia**, clinicians raised concerns about a tendency to prescribe the strongest combination of treatments for COPD patients.
 - “...all the strongest [combination of drugs] are given, and that remains the treatment for the rest of the life. No one thinks, perhaps this has been a bad year. It's been four years since they have been taking this; let us try something else, like stop or change to a milder corticoid for pneumonia prevention. No, this is not done. It's an oversight.”– Respiratory specialist, Spain.
- **In Spain and Australia**, in addition to concerns about the lack of capacity for essential services such as pulmonary rehab, clinicians perceived issues with underutilizing available services from healthcare providers and patients.
 - “But then again, we know that only about 15 to 20% of COPD admissions are referred for pulmonary rehabilitation and self-management. And sadly, only around ... about 10% of patients go.”- Respiratory specialist, Australia
- **In Taiwan**, clinicians mentioned a patient management programme that has introduced a more integrated care process for COPD patients.
- **In Taiwan**, there was a perception among clinicians that a national programme has helped to improve communication between hospitals and GPs.

Theme 4: Inadequate Management of COPD Exacerbations

Clinicians recognized the challenges in effectively managing COPD exacerbations. They observed frequent under-reporting, delayed reporting, and misclassification of exacerbations.

“I think that up to 40% of the exacerbations don't even get to be seen by a specialized physician or at the emergency care unit.”– Respiratory specialist, Argentina.

Inadequate notification systems and a lack of information sharing between healthcare providers reportedly contributed to the ineffective management of exacerbations.

“We are now doing some steps in this direction [setting up a notification system for exacerbations], but usually we know about the situation from our patient.” – Respiratory specialist, Russia.

Clinicians repeatedly emphasized the importance of patient education to enable early identification and appropriate response to exacerbations. They highlighted the need for action plans to be promptly set up or revised following exacerbations to optimize treatment outcomes. Discharged patients may not receive treatment reviews, further perpetuating the cycle of poor management.

Following discharge, patients reportedly need to wait a long time to see a specialist who can review their treatment plan. Clinicians mentioned all the above lead to high readmission rates, which drives costs up and increases pressure on healthcare systems. Comorbidities among COPD patients were also noted as an important determinant of hospitalization, even in mild cases that otherwise would not have led to hospitalization. [Box 4](#) below shows country-specific nuances within this theme.

Theme 5: Limited Access to Specialized Care

Clinicians highlighted limited access to specialized care as a significant barrier to quality COPD care. They expressed concerns about the shortage of specialists to meet the demands of the COPD patient population, resulting in long waiting

Box 4 Country-Specific Features Within Theme 4, Inadequate Management of COPD Exacerbations

- **In Australia**, there was a perception that initiatives aimed at short turnaround times for patients presenting in ED with exacerbations impede the delivery of quality care. This is believed to lead to inadequate management and overlooking important steps.
 - “So it all [discharging COPD patients with an exacerbation] happens perhaps far too quickly. And the emphasis is less on the patient and more on getting them out.”- Respiratory specialist, Australia.
- **In Spain**, clinicians mentioned that they have a notification system for COPD exacerbations (although it operates with varying degrees of success across the country). Still, they struggle with inadequate information recording (i.e., the cause of exacerbation not recorded).
- While clinicians in Argentina, Mexico, and Russia mentioned issues with patients choosing to manage exacerbations at home, in **Australia, Spain, and Taiwan**, this was perceived to be a much smaller issue.

times for consultations. This is linked to the over-reliance on specialists to diagnose and manage COPD patients (Theme 2). This theme did not apply to Taiwan, which has generally good access to specialist care.

The concentration of specialists in urban areas was identified as leaving COPD patients in smaller towns and remote locations without access to vital services. Clinicians noted that patients from rural or remote settings may travel long distances to see a specialist. They felt this discouraged these patients from seeking care, reduced compliance, and introduced financial burdens.

"It's because the number of specialists [in the big cities] is higher than in the rest parts of Russia (sic) historically. I believe that patients might have access to more types of treatment in these two cities [Moscow and St Peterburg] compared to other parts of Russia."- Respiratory specialist, Russia.

Clinicians mentioned that the increased waiting times to see a specialist can be particularly detrimental to COPD patients because they are either not receiving any treatment or they remain on the wrong treatment regimen, leaving patients at a higher likelihood of experiencing exacerbations.

"I would say if I refer the patient into our public outpatient, I would be warning the patient that it could be anywhere between three to six months before they'll get seen."- GP, Australia.

Box 5 shows country-specific nuances about this theme.

Theme 6: Insurance Coverage and Reimbursement Challenges

This theme applies to Argentina, Mexico, and Russia.

Clinicians highlighted the impact of insurance coverage and reimbursement on COPD management. They observed challenges in drug reimbursement for mild and moderate COPD cases, as coverage often focuses on severe cases. In Russia, deliberate misdiagnosis as asthma reportedly occurs to ensure reimbursement.

Restricted availability and affordability of medications were recognized as factors directly influencing clinical decision-making and leading to inadequate disease management. Moreover, in some countries, clinicians emphasized the challenges patients face in public systems compared to private systems and the negative impact of poor insurance

Box 5 Country-Specific Features Within Theme 5, Limited Access to Specialized Care

- In **Taiwan**, access to specialists was perceived to be less of a problem compared to other countries.
- In **Argentina, Mexico, Russia, and Australia**, clinicians mentioned the additional financial out-of-pocket expenses that patients experience due to the travel to see a specialist.

Box 6 Country-Specific Features Within Theme 6, Insurance Coverage and Reimbursement Challenges

- In **Russia**, clinicians mentioned they sometimes deliberately misdiagnose patients as having asthma so they can get reimbursed for their medication. Moreover, the reimbursement policies for COPD patients vary greatly between regions, which introduces inequalities in care.
- In **Argentina and Mexico**, clinicians emphasized that there are deeper issues with drug availability in the public system, and patients often do not get the best available treatment, which exposes them to more exacerbations.
 - "In the public sector, one can prescribe a triple therapy but not in the same pharmaceutical form. One has to divide the medication, and the patient has more triggers and inhalations to do. This has an impact on treatment complacency. We work around that for the triple therapy."- Respiratory specialist, Argentina.
- In **Taiwan**, GPs were reported to have limited options regarding what they can prescribe (limited reimbursed options).
 - "The National Health Insurance Program also need to change its policies that allow the GPs to do more ... to go follow the pharmacological prescription for COPD so their prescription can be reimbursed. Now, the reimbursement by the policies is somewhat limited."- Respiratory Specialist, Taiwan.
- In **Russia**, clinicians highlighted the lack of access to high-quality medication as an important barrier for patients and healthcare systems.
- In **Russia, Mexico, and Argentina**, clinicians explained how they change the treatment plan based on the medications' availability and affordability.
 - "It does have an impact. Even for those patients with coverage, sometimes the products are too expensive, so I have to somewhat limit my decision [what to prescribe]." - Respiratory specialist, Argentina.

Box 7 Country-Specific Features Within Theme 6, Insurance Coverage and Reimbursement Challenges

- In **Australia**, clinicians talked about issues with access to care for some population subgroups (ie, indigenous communities) regardless of the country's Universal Health Coverage.
 - "Obviously, there are some peculiarities with the Australian Health System, which has got its... it's a very good health system, we're all very lucky, we largely have access to care, we like to think it's universal care, but that's nonsense." Respiratory specialist, Australia.
 - "And that [social divide] is reflected in, ... in what is almost like, ... we are getting almost divergent health outcomes. We see that with indigenous people. But the other elephant in the room is we also probably see that with our poorest groups of populations as well. Yeah, nobody likes talking about that."- Respiratory specialist, Australia.

coverage on access to quality COPD care. **Box 6** shows some unique challenges within this theme that were applicable only to some of the countries.

Theme 7: Impact of Underfinanced and Overloaded Healthcare Systems

Clinicians identified underfinanced and overloaded healthcare systems as directly impacting the quality of COPD care. They highlighted system weaknesses that hindered timely diagnosis, comprehensive assessments, and regular monitoring of COPD patients. One example they stated is that short appointments do not allow for a thorough assessment, inhaler technique check, patient education, etc.

"Usually, a physician has to do that [inhaler technique check] during the patient visit. But as far as we know, sometimes the physician is very pressed for time during the visit and, unfortunately, this very important part of the consultation is absent."- Respiratory specialist, Russia.

Clinicians observed that COPD receives fewer resources within healthcare systems compared to other conditions, such as diabetes or cardiovascular diseases, indicating a need for increased attention and resource allocation. One frequently cited example was the need to have more COPD-dedicated specialised nurses.

"For example, primary care has [specialized] nurses, but I think that they're not really involved with COPD patients, for instance (sic). I don't know whether to call this tradition or if they are more used to following up on hypertensive or diabetic patients than on COPD patients."- GP, Australia.

Even when the clinicians' understanding of the available treatment options is sufficient, they often report restrictions regarding what they can prescribe or where to refer patients. They mentioned the lack of essential services such as pulmonary rehabilitation, smoking cessation, counselling, patient education, etc. Furthermore, affordability issues were seen to push clinicians to alter treatment plans based on reimbursement options rather than guideline-based care (Theme 6).

The contribution of unrecognized social disparities to poor treatment outcomes among certain COPD patients was emphasized. Addressing these disparities and promoting equity in access to care were identified as crucial steps to enhance COPD management. Variations between regions, particularly in countries with extensive geographical spreads, were noted. **Box 7** shows country-specific nuances within this theme.

Discussion**Main Findings**

This research indicated that barriers to optimal care for COPD patients are very similar across all countries, with five out of the seven themes identified in this research applying to all of them: *Challenges in COPD diagnosis; Strengthening the role of primary care; Fragmented healthcare systems and coordination challenges; Inadequate management of COPD exacerbations; and, Impact of underfinanced and overloaded healthcare systems*. This implies that the challenges faced in delivering effective COPD care are not limited to specific countries and are shared across different contexts. The presence of similar barriers suggests that these issues are pervasive and need to be addressed globally to improve COPD management. It also highlights that COPD continues to be under-prioritized, irrespective of a country's economic development status and the resilience of its healthcare systems.

Only one theme (Theme 6 - *Insurance coverage and reimbursement challenges*;) was reportedly more relevant to the UMICs included in this study (Argentina, Mexico and Russia) and was not reported as a barrier by clinicians in HICs (Australia, Spain and Taiwan). Another difference was that Theme 5, *Limited access to specialized care*, did not apply to Taiwan, where patients have better access to specialists and have short waiting times to see them.²⁹

The development of the Evidenced Care Pathways offered a clear and concise overview of how COPD care is currently delivered across six diverse healthcare settings, depicting the complex interplay of various stakeholders, interventions, and transitions involved in the care process.

Comparing the Findings with Previous Similar Work

Although broadly similar, the theme structure identified in this research differs from that reported by Meiwald et al¹⁷ where only four HICs were included (Canada, England, Germany and Japan). The key differences are linked to the emergence of two new themes (Themes 6 and 7) that explain how structural issues across healthcare systems affect COPD care. This difference in the theme structure emphasizes the importance of including countries with less resilient healthcare systems, such as Argentina, Mexico, and Russia.³⁰ Through this inclusive approach, this research provides a better understanding of shared and unique challenges in COPD care in UMICs and HICs.

The themes identified in this study are consistent with another publication that recommends several quality standards in COPD care.³¹ Four out of five quality standards suggested by clinical experts and patient representatives (timely diagnosis, patient awareness, availability of treatment options and adequate management of exacerbations) overlap with the themes reported here.

Kayyali et al mapped and compared the COPD care delivery pathways in five European countries and, similarly to our findings, reported that most challenges were shared in all countries despite pathway variation.¹³ These included different manifestations of healthcare system fragmentation, which we also identified as a theme (Theme 3). Kayyali et al emphasized the lack of a specialized role for pharmacists and informal carers,¹³ which the clinicians interviewed in our study did not report. However, this does not necessarily mean that these issues are not relevant to the countries we studied; instead, they might reflect differences in the discussion guides.

Interpretation of the Findings

Clinicians in both HICs and UMICs face similar barriers, but the scale of the problem described in each theme varies (as outlined in [Boxes 1–7](#)). Our results suggest UMICs experience a higher burden of COPD and associated challenges.³²

Clinicians' observations revealed a notable difference in the role of exacerbations as drivers of COPD diagnosis between HICs and UMICs. In UMICs, clinicians reported that over 50% of COPD diagnoses are made following an exacerbation. In contrast, this was substantially lower in HICs (10–20%), consistent with other literature on exacerbations.^{33,34} These perspectives suggest that in UMICs, there might be an even greater delay in recognizing and diagnosing COPD, which could impact timely intervention and disease management.

There were disparities in the perceived availability of services and treatment options for non-pharmacological therapy between HICs and UMICs. Clinicians in Spain, Australia, and Taiwan report better availability of non-pharmacological therapies than clinicians in the UMICs. However, even in these HICs, clinicians acknowledge that existing services are still inadequate to meet the needs of COPD patients. This emphasizes the importance of improving non-pharmacological therapy options across all countries and is consistent with other publications.^{35,36}

Pulmonary rehabilitation was reportedly more accessible in Taiwan and Australia compared to Argentina, Mexico, and Russia, likely reflecting better infrastructure in HICs. Patient management programmes, inhaler technique education, and smoking cessation services were also reportedly more available in HICs. However, HICs and UMICs may face different challenges in these services.³⁷

Treatment availability and affordability reportedly pose greater challenges in UMICs (Argentina, Mexico, Taiwan) than in HICs (Australia, Spain). This indicates the importance of addressing affordability and expanding access to essential treatments and preventive measures in UMICs.³⁸ Given that clinicians in Russia are deliberately misdiagnosing COPD patients with asthma so patients can get reimbursed, it indicates that despite COPD's high burden, it may not receive the same prioritization and financial support as other noncommunicable diseases (NCDs).³⁹

There were notable differences between public and private healthcare provision in Mexico and Argentina, manifested as stark disparities in COPD care depending on the health insurance individuals can afford. The prominent role of private healthcare was not reported in other countries.

Strengths and Limitations

Interviews with clinicians from six countries facilitated a comprehensive analysis that provides a broader perspective on challenges in diverse healthcare settings. It also enabled us to compare and contrast barriers to the guideline-directed management of COPD in HICs and UMICs. To the best of our knowledge, this comparison has not been previously reported.

Including the graphic presentations of care pathways in the interviews facilitated meaningful discussions with clinicians, as they could see a comprehensive overview of COPD care in their respective countries when considering barriers and deviations from guidelines. However, no African countries were included in this research, and that poses a limitation and suggests it as an area for future research. Expanding the comparative analysis to include African countries would enrich the understanding of variations in COPD care and contribute to a more comprehensive global health perspective.

Another limitation is that interviews occurred in different periods and by multiple researchers, which may have introduced inconsistencies in how questions were asked. Nevertheless, all researchers utilized the same discussion guides, minimizing potential inconsistencies. Additionally, some interviews required interpretation and translation of the transcripts, which may have resulted in the loss of certain subtleties. However, since the analysis did not focus on nuances behind clinicians' statements, this limitation is of lesser concern.

Lastly, when comparing the barriers between the countries, the differences may not be attributable to real variations in care provision but rather to the information the interviewee gave. It is possible some of their views were not expressed due to a lack of probing by the interviewer.

Policy Implications

The implications of our findings extend beyond this study. Policymakers can utilize the insights from the themes to identify areas where healthcare systems need strengthening for COPD patients. Furthermore, given that most barriers are similar across healthcare settings, there are opportunities for concerted efforts in COPD care through international policy initiatives. While there are many overarching strategies for NCDs generally,⁴⁰ there is no coordinated strategy to encourage countries to prioritize the prevention and management of COPD (e.g. improved diagnosis through better use of spirometry and guideline-adherent therapy), which is one of the main NCDs driving up global mortality and morbidity rates.⁴¹ The findings of this research can inform efforts to develop funded national respiratory strategies, like the ones available for several other NCDs.^{42,43}

Policymakers can leverage the visual presentation of the Evidenced Care Pathways to facilitate discussions, align goals, and encourage interdisciplinary cooperation, leading to better coordination of care, reduced fragmentation, and improved patient outcomes.⁴⁴

For future research, exploring approaches that further unify and systematize care pathway mapping would be valuable, ensuring academic rigour while informing policy action. The replication of the Evidenced Care Pathways in other countries could be a starting point.

Conclusion

HICs and UMICs differ regarding patient and HCP awareness levels, primary care involvement, spirometry access, and specialized care availability. While both face challenges related to fragmented healthcare systems, guideline adherence, and COPD exacerbation management, UMICs struggle with additional issues stemming from limited resources and healthcare infrastructure.

Most barriers to COPD care are similar across HICs and UMICs, indicating that COPD remains a persistent challenge. While unique issues need to be addressed through tailored approaches, missed opportunities exist to implement international respiratory strategies that encourage countries to take measures to manage COPD adequately.

Alongside efforts at the healthcare system level, there is a need for political prioritization of COPD to ensure it is allocated the necessary resources, even in HICs.

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Author Contributions

All authors made a significant contribution to the work reported. Anne Meiwald, Elisabeth Adams, Orjola Shahaj and Rupert Gara Adams were involved in the conception, study design, and execution. Krishnan Puri Sudhir was involved with the acquisition of data and interpretation of themes. Peter Wark, Alexis Cazaux, Abelardo Elizondo Rios, and Sergey Avdeev were involved in the conception, analysis and interpretation of themes. All coauthors took part in drafting, revising or critically reviewing the article; agreed on the journal to which the article will be submitted; gave final approval of the version to be published; and agreed to take responsibility and be accountable for the contents of the article.

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Disclosure

Orjola Shahaj, Anne Meiwald, Krishnan Puri-Sudhir, Rupert Gara Adams, and Elisabeth Adams worked at Aquarius Population Health at the time of the project. Aquarius Population Health receives consultancy and research fees from other pharmaceutical and MedTech companies that are unrelated to this work. Abelardo Elizondo Rios has served on boards for trials sponsored by AstraZeneca, Bayern, Novartis and GSK. Alexis Cazaux has no conflict of interest concerning the topic of this research. Outside of the submitted work, Sergey Avdeev reports receiving consulting fees and/or fees for attending lectures, meetings and conferences and/or travel expenses and/or research grants from AstraZeneca, Novartis, GSK, Teva, Sanofi, and Chiesi. Peter Wark has no conflict of interest concerning the topic of this research.

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