

# Perspectives on Treatment Decisions, Preferences, and Adherence and Long-Term Management in Asthma and COPD: A Qualitative Analysis of Patient, Caregiver, and Healthcare Provider Insights

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**Purpose:** Asthma and chronic obstructive pulmonary disease (COPD) are associated with substantial morbidity and mortality. This analysis assessed patient, caregiver, and healthcare provider (HCP) opinions regarding asthma and COPD diagnosis and treatment, including inhaler device preferences.

**Patients and Methods:** Insights were from: (1) face-to-face/telephone patient/HCP communications with GSK Global Medical Teams; (2) social media listening; (3) a self-completed online patient/caregiver survey. Data were anonymized and informed consent was provided. Qualitative outputs were extracted, analyzed inductively, and coded per key themes, such as treatment preferences (including perceptions of single inhaler triple therapy [SITT] versus multiple inhaler triple therapy [MITT]) and long-term treatment goals. Data could be assigned to  $\geq 1$  theme.

**Results:** Overall, 2966 patient and HCP insights (patients, 1150; HCPs, 1816), 988 social media posts, and 44 survey responses (patients, 33; caregivers, 11) were included. Within this analysis, some patients delayed seeking medical advice due to lack of disease understanding and used alternative information sources to better understand treatment options (eg, social media). Patients preferred SITT over MITT in terms of convenience, ease of use, and perceived efficacy; some believed that MITT provided greater coverage due to frequent dosing. HCPs recognized the tendency of patient preferences to drive treatment decisions, and highlighted a reluctance to change therapy among some patients, particularly those well controlled in current therapy. Patients preferred therapies with a shorter onset of action. Patients tended to measure treatment success by symptom improvement and quality of life, whereas HCPs measured treatment success through clinical tests. HCPs reported a lack of patient awareness of the mortality risk associated with COPD.

**Conclusion:** There is discordance between patient and HCP perceptions of treatment success and goals in asthma and COPD. Improved patient education and HCP-patient communication are needed to facilitate meaningful shared decision-making, optimize care plans, and provide early treatment options.

**Keywords:** single inhaler triple therapy, multiple inhaler triple therapy, treatment goals, medical advice, patient education, quality of life

## Introduction

Asthma and chronic obstructive pulmonary disease (COPD) are the most common chronic respiratory diseases, affecting a reported 262 million and 300 million patients worldwide, respectively.<sup>1–3</sup> Both diseases represent substantial causes of morbidity and mortality and are associated with significantly impaired quality of life (QoL). Symptoms can impact day- and

night-time functioning, have an emotional and social impact, and can affect work productivity and absenteeism.<sup>4,5</sup> These QoL impacts become more pronounced with increasing disease severity.<sup>6,7</sup>

Inhaled medications are recommended as maintenance and reliever therapy for both asthma and COPD.<sup>8,9</sup> Though these guideline-recommended therapies have established efficacy in terms of exacerbation control and an acceptable safety profile,<sup>8,9</sup> suboptimal prescribing and inappropriate use can limit their utility. Only ~43% of patients with asthma and ~50% of patients with COPD are thought to be adherent to their prescribed medication.<sup>8,10</sup> Poor adherence is linked to reduced disease control and worse QoL, as well as increased healthcare resource utilization and higher mortality.<sup>1,4,8,11</sup> Reasons for non-adherence can be intentional (for example, due to contraindication or choosing to skip doses when symptoms are not apparent)<sup>12,13</sup> or unintentional (perhaps due to forgetfulness, prohibitive costs, poor disease awareness, or lacking communication with healthcare providers [HCPs]).<sup>9,14,15</sup> Inhaler technique, dosing schedules, and poor physician availability are all key drivers of unintentional non-adherence in asthma and COPD.<sup>11,14</sup>

Further to patient-driven factors, HCP decisions also influence the use of asthma and COPD treatments.<sup>16–18</sup> Approximately one-third of HCPs have no preference for specific inhaler types.<sup>16</sup> For those with a preference, treatment decisions are not only driven by treatment recommendations<sup>8,9</sup> but also guided by various factors including HCP experience and familiarity with treatments, certain patient characteristics, such as age or disease severity, treatment efficacy, patient access, and insurance coverage.<sup>16,17</sup> HCPs may also be less likely to consider alternative treatment options in patients reporting clinical benefit and device satisfaction and instead be more open to initiating or switching treatments in more recently diagnosed patients.<sup>16</sup> Furthermore, it is reported that HCPs may be more likely to select treatments that provide relief of symptoms over a reduction in exacerbations.<sup>18</sup> Such issues highlight the importance of a collaborative and patient-centric approach to care.<sup>1,12</sup> HCPs are encouraged to communicate with patients to understand their individual experiences, beliefs, and concerns about their disease and management plan, and their treatment preferences.<sup>14</sup> Inclusion of both the patient and caregiver perspectives ensures an understanding of the risks associated with non-adherence, supports shared decision-making, and contributes to the provision of equitable care. The objective of this qualitative analysis was to gather information from three separate sources (patient and HCP insights, social media, and an online survey) to assess experiences and opinions regarding treatment preferences in asthma and COPD, and to further understanding of factors affecting adherence and shared decision-making. Knowledge of these factors could highlight opportunities to support long-term treatment optimization.

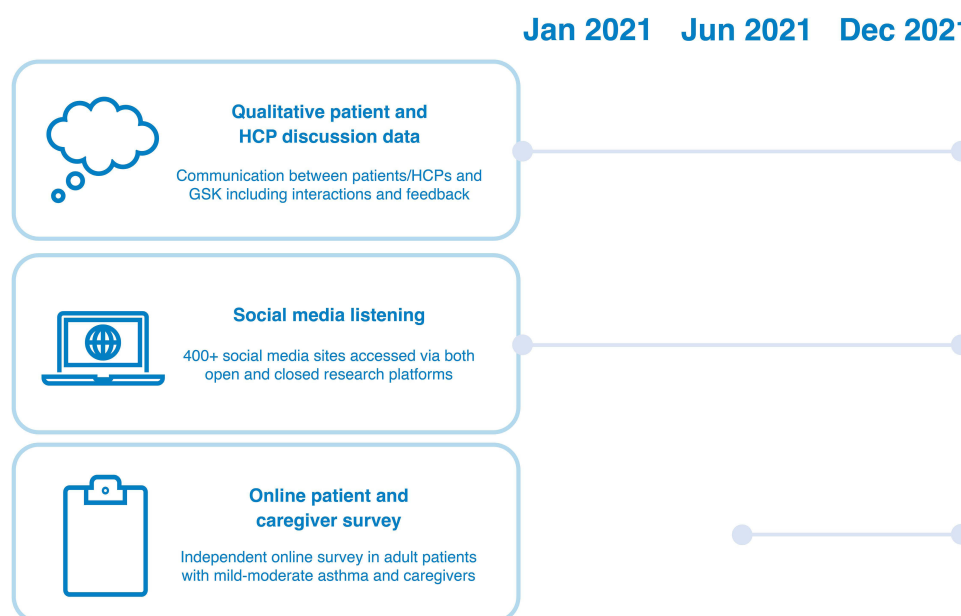
## Methods

### Data Sources

This was an exploratory, qualitative analysis of patient, caregiver, and HCP insights gathered in 2021. Insights were developed from data collected through three channels: (1) patient and HCP insights in China, France, Germany, Italy, Japan, Spain, and the US; (2) social media; and (3) an online patient and caregiver survey conducted in Brazil, China, Japan, the United Kingdom (UK), and the United States (US) (Figure 1).

### Source 1: Patient and HCP Insights

Qualitative patient and HCP insights were extracted from communications between patients/HCPs and GSK Global Medical Teams (GSK experts trained to liaise with and respond to specific medical information queries from HCPs and patients) in hospitals and clinics (face-to-face), or through proactive contact with GSK regarding medication use (virtual/digital communication such as telephone and digital messages), between January 1 and December 31, 2021. Interactions included medical information requests, HCP perspectives on patient treatment (including HCP-reported patient feedback), and feedback on unmet medical needs, treatment pathways, and disease burden. The interactions were summarized with data which were anonymized, stored in a Customer Relationship Management tool, and analyzed to develop insights. Only data from patients with asthma or COPD or HCPs that treat patients with asthma and COPD, including respiratory specialists, pulmonologists and pneumologists were included. As data were collected during communications between patients/HCPs and GSK, demographic data including age and sex were not recorded.



**Figure 1** Study design.

**Abbreviations:** Dec, December; HCP, healthcare professional; Jan, January; Jun, June.

A focused analysis was also conducted with 70 HCPs, identified through purposive sampling and included in the qualitative insight portion of this research to leverage further insights regarding patient behaviors and requests. Patients and HCPs who provided insights did not receive any payments.

### Source 2: Social Media Listening

The purpose of the social media data was to validate the findings from Source 1: patient and HCP insights. Data mined from two social listening platforms were used to gather insights from social media posts by patients, caregivers, and HCPs from January 1 to December 31, 2021: a focused online community that provides patient support (Inspire) and a social media listening platform that facilitates access to >400 non-specialist sites (the Brandwatch Consumer Research Platform). Weblinks for these platforms are included in the Supplement. Search terms used to identify relevant posts included “triple inhaler”, “multiple inhaler”, “optimization”, and “preference”. Identified posts were checked for relevance prior to inclusion. Posts were only included once; reposts were excluded. Data were identified, extracted, and analyzed by an external vendor and themes were derived inductively. Patients did not receive any payments.

### Source 3: Online Survey

A qualitative online survey was developed in partnership with InSites Consulting (London, UK) and distributed to patients with mild-to-moderate asthma and their caregivers from June 1 to December 31, 2021, using purposive sampling methods via The Health Hub, a global online resource which identifies patients who may wish to respond to questionnaires appropriate to their disease. The 25-minute survey included 40 questions and is available in [Supplementary Table 1](#). Respondents were aged  $\geq 18$  years and were paid to participate (£12–£30 GBP, depending on the country). Caregivers were defined as close family members (including parents, siblings, children, or grandparents) who were very or completely involved in the patient’s care. Both patients and caregivers were screened to ensure broad demographic representation prior to survey completion and were surveyed, as appropriate, to ensure the inclusion of six patients or caregivers aged 18–49 years and six patients or caregivers aged  $\geq 50$  years from each region. Other screening questions included symptoms and their frequency and the type of regular medication and inhaler device used. Patients were excluded from the online survey if they were currently receiving oral corticosteroids or a biologic treatment. The questionnaire included questions such that specific inclusion and exclusion criteria were met ([Supplementary Table 1](#)); patients were only included if they fulfilled the requirements, otherwise they were “screened out”.

The patient or caregiver responded to open-ended questions about their disease journey, including initial symptoms, the path to diagnosis, and any impact on QoL. Further questions focused on the most difficult symptoms to manage, treatment methods used previously, treatment challenges, reasons for treatment switching, HCP communication experiences, and information needs (including where they sourced their information from and what sources of information they would like to see in the future).

## Content Analysis

Outputs were collated and analyzed by a Medical Insight Lead (employee of GSK) qualified in qualitative analysis processes. Data collected in native languages were first translated into English using Azure or Google. Outputs from all data sources were coded and used to identify key themes, including initial treatment options, treatment switching, adherence, and long-term treatment. Data could be assigned to more than one theme. All authors discussed and interpreted the findings.

## Ethics Approval and Informed Consent

This research was non-clinical and non-interventional and was for patient insight purposes only. Institutional Review Board (IRB) and Research Ethics Committee (REC) approvals were not required nor sought because the research did not meet the requirements for needing ethical approval, per section 1.3 of the EphMRA guidelines. The ethical principles established by the Declaration of Helsinki were respected. Patients, caregivers and HCPs included in this research were not classified as vulnerable, nor would participation induce undue psychological stress or anxiety.

Data from patient/HCP and GSK interactions were collated in accordance with GSK internal processes. All data were anonymized, and informed consent to use them was obtained during the interactions. Consent to use the social listening data was considered implicit due to the published terms and conditions of each social media platform, and the website privacy agreement with users (where relevant). Social listening data were limited to publicly available sources and anonymized to ensure that no personally identifiable information was included. Informed consent was obtained from all participants of the online survey; those who did not consent were excluded. Any findings for which informed consent was not provided were not included in the final analysis.

## Adverse Event Reporting

Drug-specific information was not included in this analysis, and no adverse events were reported by the external vendors during the data analysis.

## Results

### Demographics

Demographic data for people whose insights were included from the three data sources are provided in [Table 1](#). Data were gathered from adults living in over nine countries (the exact number could not be ascertained due to unavailable information). There were a total of 2966 patient and HCP insight data entries, of which 1150 (38%) were from patients with asthma or COPD, and 1816 (62%) were from HCPs. A total of 988 social media posts were identified across >400 specialist and non-specialist platforms, and survey responses from 33 patients with mild-to-moderate asthma and 11 caregivers were included. A total of six key themes were identified from the combined data (delayed diagnosis and treatment; treatment preference; measures of treatment success; treatment adherence; comorbidities; factors affecting shared decision-making).

### Delayed Diagnosis and Treatment

Key patient and HCP quotes are shown in [Figure 2](#). Within this analysis, patients with asthma typically delayed seeking medical advice for between three months and one year after experiencing initial symptoms [online survey]. This delay may have been due to a lack of disease awareness. Patients sometimes did not understand that their symptoms were caused by asthma, and many made lifestyle changes to limit symptoms like breathlessness or tiredness (such as reducing physical activity). Patients with asthma or COPD used social media to seek support and reassurance about their symptoms and

**Table I** Demographic Data for People Whose Insights Were Included in the Analysis

	Source 1: Patient and HCP Insights	Source 2: Social Media Listening <sup>a</sup>	Source 3: Online Survey
<b>N</b>	2966 data entries	988 posts <sup>b</sup>	44 survey responses
<b>Insight provider type, n (%)</b>	HCPs: 1816 (62%) Patients: 1150 (38%)	Patients: 148 (97%) Caregivers: 5 (3%)	Patients: 33 (75%) Caregivers: 11 (25%)
<b>Sex, n (%)</b>	Undisclosed	Female: 115 (75%) Male: 38 (25%)	Female: 29 (66%) Male: 15 (34%)
<b>Country, n (%)</b>	China: 528 (17.8%) France: 239 (8.0%) Germany: 430 (14.5%) Italy: 673 (22.7%) Japan: 164 (5.5%) Other <sup>c</sup> : 49 (1.7%) Spain: 380 (12.8%) UK: 114 (3.8%) US: 389 (13.1%)	Undisclosed	Brazil: 8 (18.2%) China: 8 (18.2%) Japan: 10 (22.7%) UK: 8 (18.2%) US: 10 (22.7%)
<b>Age range, years, n (%)</b>	Undisclosed	41–50: 3 (2.0%) 51–60: 13 (8.5%) 61–70: 51 (33.3%) 71–80: 44 (28.8%) ≥81: 10 (6.5%) Undisclosed: 32 (20.9%)	20–29: 4 (9.1%) 30–39: 8 (18.2%) 40–49: 12 (27.3%) 50–59: 12 (27.3%) 60–69: 8 (18.2%)

**Notes:** <sup>a</sup>Data provided are for a subset of patients/caregivers for whom demographic data were available via the Inspire platform (n=153). <sup>b</sup>Across all social media platforms analyzed via Inspire and Brandwatch (includes original posts only, reposts were excluded).

<sup>c</sup>Country information was not available.

**Abbreviations:** HCP, healthcare provider; UK, United Kingdom; US, United States.

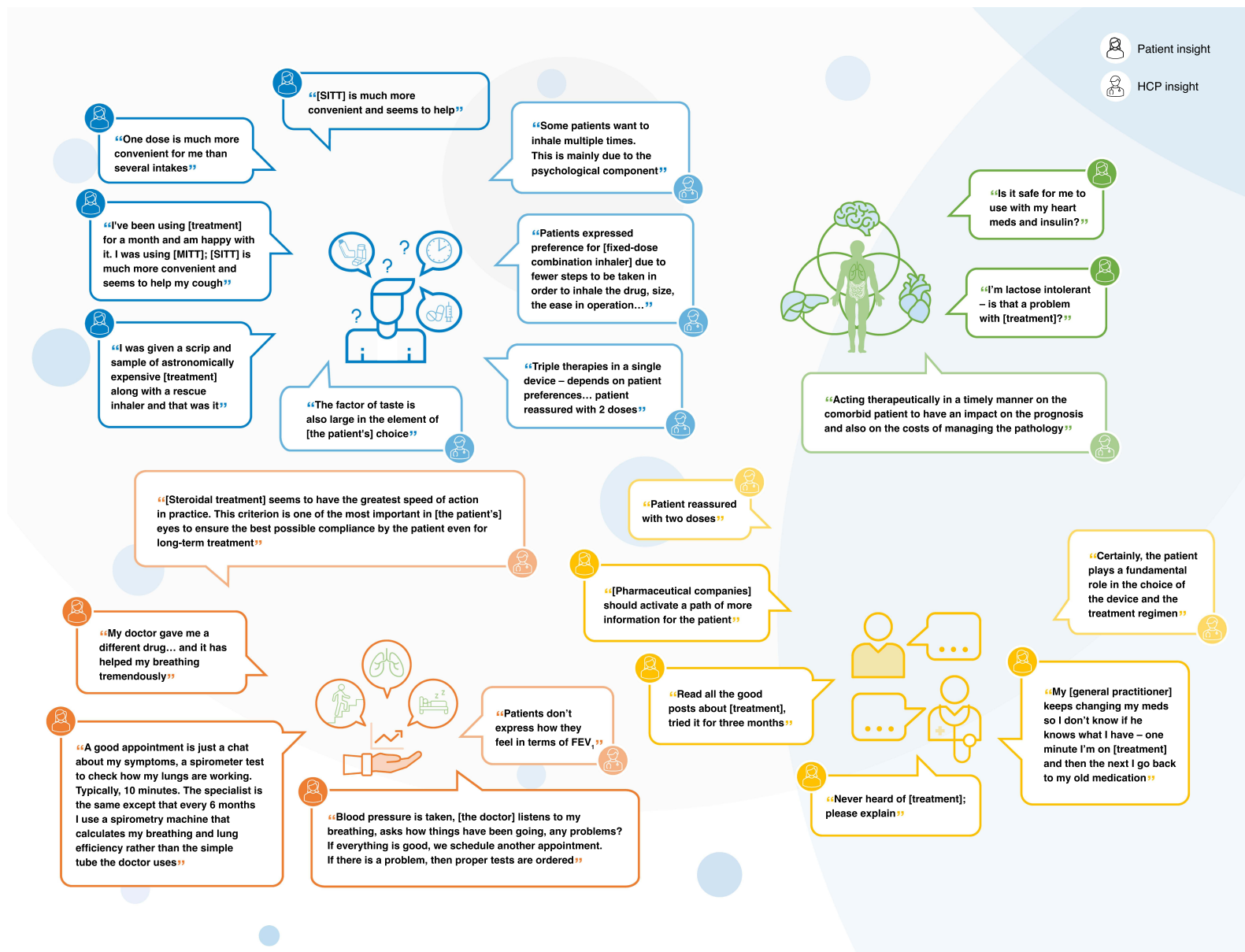
necessary next steps [social media listening]. COVID-19 restrictions also prevented asthma and COPD symptom worsening, which delayed seeking medical help [social media listening]. Patients sought advice and support from HCPs when symptoms impact important aspects of their daily life, such as sleep, employment, mental health, finances, and relationships [online survey]. The symptoms that affected QoL most include shortness of breath/struggling to breathe, wheezing, coughing, trouble sleeping/tiredness, tight chest/chest pain, trouble exercising, and fatigue/lack of energy [online survey]. Patients felt relieved once a diagnosis was made but also felt anxious about what the diagnosis meant [online survey].

## Treatment Preference

Many of the insights in this analysis focused on patient preferences for single inhaler triple therapy (SITT) versus multiple inhaler triple therapy (MITT). A total of 229 outputs discussing MITT therapies were identified. Patients preferred SITT to MITT based on convenience, ease of use, and perceived efficacy [patient and HCP insights; social media listening; online survey]. However, patient and HCP insight data suggested that patients did not understand the therapeutic benefits of one treatment versus the other [patient and HCP insights]. For example, some patients believed that MITT provides greater coverage due to the perception that more frequent dosing is associated with a greater level of treatment efficacy [patient and HCP insights; social media listening]. One patient said:

“I’m not convinced of the benefits of SITT for me and so I’m reluctant to change [from MITT].” [verbatim patient quote, patient and HCP insights]

Some patients did not trust their therapy, particularly SITT, due to negative perceptions of oral steroids [patient and HCP insights; social media listening].



**Figure 2** Select verbatim patient and HCP quotes.

**Abbreviations:** COPD, chronic obstructive pulmonary disease; FEV<sub>1</sub>, forced expiratory volume in 1 second; HCP, healthcare provider; MITT, multiple inhaler triple therapy; SITT, single inhaler triple therapy; UK, United Kingdom.



Data also indicated that patients may act based on previous experience and perceptions of safety [patient and HCP insights; social media listening]. In the focused analysis of 70 HCPs, 39 (70%) reported that patient choice was a key barrier preventing transition from MITT to SITT. HCPs cited the following patient behaviors as examples: tendency to revert to initial treatment within a few days of initiating a new treatment without specialist input; choosing a treatment based on the device; perception of MITT as more effective than SITT; and feeling safe with existing therapies.

HCPs reported that patient preference drives their treatment decisions [patient and HCP insights; data from 104 specialists]. The mode of delivery was important in determining treatment preference, with HCPs reporting that patients preferred metered-dose inhalers over dry-powder inhalers due to the taste. Discussing this, a respiratory specialist in Japan said:

“The factor of taste is also large in the element of [the] patient’s choice.” [verbatim HCP quote, patient and HCP insights]

The device type and ease of use also play a role in patient preference. One HCP reported:

“Patients expressed preference in [combined dual inhaler therapy metered device] due to fewer steps to be taken in order to inhale the drug, size, the ease of the operation.” [verbatim quote from a respiratory specialist in Japan, patient and HCP insights]

HCPs reported that patients may also fear change, specifically regarding the burden of learning how to use new devices; patients felt that they could not justify the change if their asthma or COPD was well controlled on their current medication [patient and HCP insights].

Cost and treatment accessibility also played a role in treatment preference [social media listening], with one patient reporting:

“I was given a scrip and sample of astronomically expensive [treatment] along with a rescue inhaler and that was it.” [verbatim patient quote, patient and HCP insights]

HCPs noted that both short- and long-term costs should be considered.

## Measures of Treatment Success

Patients and HCPs have different measures of treatment efficacy and success. Of 988 social media posts, treatment efficacy and side-effects were some of the most discussed topics. Patients measured success in terms of QoL improvement and alleviation of symptoms so that they can enjoy activities like exercising or socializing; patients could be skeptical regarding the ability of a new treatment to meet these measures of success [social media listening; online survey]. Patients also compared the side effects of their current treatments with previous treatments. Treatments with fewer and less frequent side effects were preferred [social media listening]. On social media, efficacy was often established by the patient through comparison with other patients’ treatment experiences. Many patients also sought information on treatment efficacy over time, with one patient asking:

“I think my meds have stopped working because I’ve been on [treatment] for over a year now and I think I’m getting worse again. Does it stop working?” [verbatim patient quote, patient and HCP insights]

Another said:

“After a year of taking [treatment], I don’t think it is helping at all.” [verbatim patient quote, patient and HCP insights]

HCPs believed that patients may question the onset of action, even when they experience treatment benefits; HCPs referenced relevant studies and clinical endpoints to encourage patient understanding in such scenarios [patient and HCP insights; social media listening]. One HCP reported:

“Patients don’t express how they feel in terms of [forced expiratory volume in 1 second].” [verbatim quote from a respiratory specialist in the UK, patient and HCP insights]

HCPs also perceived the rapid onset of action to be an important measure of treatment success for patients, with patients showing a preference for faster-acting medications [patient and HCP insights]. HCPs measured treatment success with a range of physical tests, including physical checks, spirometry, blood pressure, general lung tests, and blood tests.

## Treatment Adherence

HCPs reported that ease of use drove inhaler device compliance, particularly among older or less functional adults who may have had poorer hand/mouth coordination [patient and HCP insights]. Devices perceived as easier to use were also thought to make patient education on device use less burdensome [patient and HCP insights]. The treatment type also affected adherence. HCPs reported that though SITT is more likely to ensure patient compliance than MITT, due to ease of use, some patients “may prefer the [twice-daily] dosing as they perceive it provides better control [than once-daily dosing].” [verbatim HCP quote, patient and HCP insights]

## Comorbidities

HCPs considered the effect of certain treatments on patients’ comorbidities, noting the need to make appropriate and timely treatment decisions “to have an impact on the prognosis.” [verbatim quote from a conversation with a pneumonologist in Italy, patient and HCP insights] Similarly, patients questioned treatment types and their impact on comorbidities or concomitant medications [patient and HCP insights; online survey].

## Factors Affecting Shared Decision-Making

Patients reported a lack of confidence in diagnosis and treatment decisions, suggesting that HCPs underestimated the impact of their symptoms. Patients also noted that specialists used more rigorous tests and spent more time with them during appointments than general practitioners, but stated that specialist appointments were less frequent. Most patients saw their usual HCP once every six months, with appointments ranging from 10–30 minutes to many hours (including complete functional and clinical reviews). One patient said:

“A good appointment is just a chat about my symptoms, a spirometer test [...] typically, 10 minutes.” [verbatim patient quote]

Both patients and HCPs expressed concern regarding initial and ongoing inhaler device education [patient and HCP insights; social media listening]. HCPs believed that patient education about the progressive nature of their disease was important to improve disease awareness and understanding; some HCPs noted that patients lacked an understanding of the mortality risk associated with COPD [patient and HCP insights, reported by 24% of HCPs (n=17/N=70) discussing the role of patient preference within the treatment decision process]. HCPs also reported a reluctance to change therapies among patients who felt well controlled on their current medication, even if the new therapy might provide more long-term benefit [patient and HCP insights]. This was especially the case for new medications with a delayed onset of action.

Patients sought information from external sources (including other patients and patient advocacy groups) to help them understand available treatment options, with patient-reported experience and testimonials increasing confidence in treatments [patient and HCP insights from discussions between 120 patients from Italy and GSK; social media listening]. Social media was used to seek information on treatment switching, side effects, treatment efficacy, concomitant use, education, and dosing frequency [40% of posts on specialist sites; 50% of posts on non-specialist sites; 10% other general web searches]. Some patients did this because they do not trust the information given to them by the HCPs and felt that treatment manufacturers did not provide adequate information to help them understand available treatment options [patient and HCP insights]. One patient reported initiating a certain treatment after having “read all the good posts.” [verbatim patient quote, patient and HCP insights] Patients also reported poor communication at times regarding treatment decisions.

## Discussion

This qualitative analysis revealed the broad perspectives of patients, caregivers, and HCPs on common themes, including treatment choice and adherence. There was misalignment between patients and HCPs in terms of treatment preferences and measures of treatment success. Our findings highlight an unmet need for enhanced patient education that increases disease awareness, encourages timely treatment, and increases understanding of treatment options, thus optimizing adherence and outcomes.



HCPs reported that they prefer SITT over MITT due to greater compliance and ease of use, particularly for older patients or those with functional difficulties. Results were mixed for patients. Insights suggested that some patients like the convenience of SITT, but some patients prefer MITT due to perceived greater drug coverage, poor understanding of SITT, and inertia for change. The perception that more frequent dosing is associated with greater levels of treatment may be driven by a lack of knowledge of different treatments, potentially as a result of inadequate education on more recently available treatment or devices. A recent call to action highlighted the need to improve patient health literacy in asthma, including understanding of therapies and implications of overuse.<sup>19</sup> Patient and HCP education on asthma and COPD supports informed decision-making and engagement in disease management, but access to supporting materials is a key barrier that must be overcome.<sup>19–21</sup> Shared decision-making is widely acknowledged to improve patient satisfaction and QoL while improving treatment adherence, reducing healthcare visits, and improving disease control.<sup>22,23</sup> Patient satisfaction can also be improved through the optimal use of telehealth approaches, which reduce barriers to care, alongside digital communication tools and patient self-scheduling (potentially with artificial intelligence-enabled assistance).<sup>24</sup>

Patient and caregiver beliefs about medicine can impact treatment adherence.<sup>25</sup> In this research, adherence was influenced by factors, such as the type and regime of treatment, and the device used to administer it. Insights highlighted a patient preference for metered-dose inhalers and inhalers with fewer steps required for use. HCPs contribute to patient perceptions of therapy (with positive reinforcement and treatment education leading to improved adherence), but individual device preferences must be considered to ensure patient satisfaction.<sup>1,26</sup> Interestingly, HCPs in this research indicated that some patients are not aware of the mortality risk associated with COPD; data have highlighted reduced medication adherence among patients lacking overall COPD knowledge.<sup>27</sup> Education can help patients with COPD to understand the progressive nature and mortality risk of their disease, as well as identify methods to slow progression and ease the mental health impact of living with the condition. Patient understanding of their disease trajectory can also facilitate meaningful contributions to shared decision-making.<sup>21</sup>

Findings from this research suggest that patients with asthma or COPD seek out information or reassurance from fellow patients on social media regarding treatment efficacy, side effects, and long-term effects by comparing treatment experiences. This may be explained in part by the observed lack of patient confidence in HCP diagnoses and treatment decisions. The tendency for patients to seek information online also highlights the importance of supplementing HCP care with internet-based sources of information or coaching by trusted peers and patient advocacy groups and evidence-based information to optimize management. Such sources could help patients to identify and avoid misinformation.

Insights from this research also suggest that HCPs may underestimate the impact of symptoms on QoL. This discordance in opinions regarding the impact of asthma symptoms on daily life has been reported previously; HCP underestimation of this impact is associated with poorer symptom control, increased future risk, and anxiety and depression among patients.<sup>28</sup> Patients in this analysis tended to judge treatment success in terms of its impact on their symptoms and QoL. This finding is aligned with the results of a survey in patients with moderate-to-severe COPD, which highlighted reduced symptoms as a higher priority than improved exacerbations.<sup>29</sup> Similarly, a self-reported questionnaire of 810 patients with asthma and 1147 patients with COPD found that a faster onset of symptom relief was the most preferred inhaler attribute (followed by reduced exacerbation frequency).<sup>12</sup> Instead, HCPs in the current research tended to measure treatment success in terms of lung function and other clinical tests.

Future medical education should focus on patient-reported measures of treatment success to ensure that HCPs understand patient treatment goals. Misalignment of patient and HCP treatment goals was highlighted in this research, particularly regarding resistance to treatment changes in patients who might have experienced more long-term benefit on alternative therapy. Patients do not want to experience a perceived decline in health due to changing treatment or devices. This misalignment could be minimized through patient-HCP communication designed to improve the understanding of individual perceptions of control.<sup>26</sup> Some patients may need help improving their communications with HCPs. Patient-HCP communication efforts should be facilitated by the HCP and ideally enhanced by providing the patient with reliable sources of education that are appropriate to their level of health literacy. The patient-friendly videos and infographics provided by the Primary Care Respiratory Society, International Primary Care Respiratory Group and Global Allergy & Airways Patient Platform are examples of a potentially useful source for patient education.<sup>30,31</sup>

One strength of this research is that it gathered a wide range of perspectives by including various patients, caregivers, and HCPs across four continents using three different sources. The use of social media listening also allowed for the gathering of experiences and perspectives without an external influence or direction from a research discussion guide, providing a more balanced perspective to complement insights from other sources. Behaviors and interactions can also be tracked on social media to better understand values and expectations surrounding disease management. This research is limited, however, by the fact that the online survey focused on patients with mild-to-moderate asthma and their caregivers. Patient and caregiver insights into severe asthma and COPD were not captured. Most of the patient and HCP insights and social media listening portions of the research also focused on preferences for SITT versus MITT. It is possible that not all treatments discussed by patients and HCPs were identified. A further limitation is that as the research methodology was qualitative, definitive results was not possible, and inferences were made. Finally, demographic data including age, disease severity, and complex medical needs, such as comorbidities, were not captured. Future semi-structured interview or focus groups could potentially aid further understanding of patient, caregiver and HCP insights in a larger patient population. Social listening data have inherent limitations, such as the potential for typographical errors and a lack of understanding of the context of posts. The use of social media is also biased towards patients who are digitally literate.

## Conclusion

This analysis revealed that some people with asthma or COPD have a limited understanding of their condition and its treatment, which can delay seeking professional medical help. Common themes that drive treatment decisions and preferences for patients and HCPs were also uncovered, including discordant perceptions of treatment efficacy and goals. This misalignment highlights the importance of communication between patients and HCPs to optimize shared decision-making, which can improve treatment adherence and outcomes. An increased frequency of specialist appointments may also increase the confidence that patients have in their treatment. Relevant information should be provided to patients and/or their caregivers using appropriate tools that consider individual health literacy levels to facilitate meaningful discussion and empower shared decision-making.

## Data Sharing Statement

The datasets used and/or analyzed during the current research are available from the corresponding author on reasonable request.

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## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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