

# Evaluation Checklist for the Multidisciplinary Approach to Patients with Asthma or Suspected Asthma in United Airway Disease

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**Purpose:** To generate an evaluation checklist for the multidisciplinary approach to patients with asthma or suspected asthma.

**Patients and Methods:** This was a qualitative study based on a literature review and expert opinions. A multidisciplinary steering committee with knowledge and experience in asthma and chronic rhinosinusitis with nasal polyps (CRSwNP) was established and comprised two pneumologists, two allergologists, and two otorhinolaryngologists. They designed a preliminary evaluation checklist based on the best evidence available and their experience. An extra panel of 21 experts (five pneumologists, five allergologists, and 11 otorhinolaryngologists) analyzed and discussed the checklist, leading to the final version.

**Results:** The checklist for the multidisciplinary approach to patients with asthma or suspected asthma includes the first and the follow-up visits. It is organized into several sections covering 1) current asthma and past history (diagnosis, symptoms, severity, control, etc.); 2) comorbidities (CRSwNP, atopic dermatitis, etc.); 3) physical examination and diagnostic tests (spirometry, bronchodilator reversibility test, fractional exhaled nitric oxide, etc.); 4) complementary tests (imaging, laboratory, allergy tests, etc.); 5) red flags (near-fatal asthma, CRSwNP complications); and 6) biological treatment (indication, response to treatment, decision making, etc.). Each section is divided into sub-sections detailing the recommended evaluation items. These items contain explanations, definitions, or variable lists that can be measured using direct questions, validated questionnaires, or other procedures such as imaging techniques or biomarkers. The checklist also proposes clinical actions.

**Conclusion:** This evaluation checklist might help improve and standardize the clinical management of patients with asthma or suspected asthma.

**Keywords:** Asthma, chronic rhinosinusitis with nasal polyps, united airways disease, type 2 inflammation clinical consultation, multidisciplinary care, checklist

## Introduction

In recent years, a growing interest has been observed regarding the united airway disease (UAD) concept, which is the clinical approach to upper and lower respiratory diseases.<sup>1–4</sup> It relies on similarities regarding anatomical, pathophysiological, and immunological mechanisms.<sup>5,6</sup> Therefore, upper and lower airway diseases are frequently coexistent as they mirror manifestations of a common underlying disease.<sup>7</sup>

Different UAD phenotypes (clinical features) and endotypes (pathological mechanisms) have been identified,<sup>7</sup> and the concomitance of asthma and chronic rhinosinusitis with nasal polyps (CRSwNP) has been commonly described.<sup>6</sup> CRSwNP has been reported in 10% to 30% of patients with mild asthma and in up to 50–60% of those with severe asthma.<sup>8,9</sup> In asthmatic patients, comorbid CRSwNP is associated with poor outcomes. Asthma control is also more

challenging as exacerbations are more common, with increased airway obstruction and more extensive eosinophilic inflammation.<sup>10</sup> On the other hand, it has been estimated that 40% to 70% of CRSwNP patients present comorbid asthma, which is linked to more severe sinonasal symptoms, more surgeries, and worse quality of life.<sup>11,12</sup> Moreover, regarding endotypes, type 2 is the most frequent among patients with asthma and comorbid CRSwNP, at least in western countries. Type 2 inflammation is defined by eosinophilic airway inflammation linked to interleukin (IL)-4, IL-5, IL-13, and immunoglobulin (Ig) E.<sup>13,14</sup>

However, managing this new paradigm presents various challenges for clinicians in their daily practice. First, consistent and robust data to draw firm conclusions about the relationship between upper and lower airway inflammatory diseases, their natural history, pathophysiology, and medical/surgical management are lacking. More importantly, asthma and CRSwNP are often treated as independent diseases by different medical specialists who do not share a common language and interdisciplinary procedures. This might hinder proper comorbidity identification, evaluation, and management.

In this context, various research projects have been recently developed.<sup>2–4,15</sup> Consensus-based recommendations have been published for the identification of phenotypes and underlying endotypes, optimal treatments, and follow-up procedures in UAD patients.<sup>3</sup> Besides, another expert group has proposed a 17-item data collection checklist for the multidisciplinary management and a standardized approach to type 2 inflammation-related airway diseases.<sup>15</sup> However, those recommendations have not been validated in clinical practice or have not received consensus among experts.

The *ADVENT Respiratorio España* project was an educational project designed to improve the knowledge, evaluation, and management of patients with asthma and CRSwNP based on the UAD concept, but also to promote multidisciplinary collaboration among specialists treating these patients. One of the objectives of the *ADVENT* project was to provide a clinical and practical framework for the multidisciplinary approach to patients with asthma and CRSwNP. To achieve this goal, two evaluation checklists were generated, one for patients with asthma or suspected asthma and another for CRSwNP patients.

This article describes the checklist for patients with asthma or suspected asthma. Implementing this checklist in daily practice could standardize care, help clinicians in the diagnosis and decision-making process, promote collaboration and coordination among specialists, and eventually improve medical care quality and safety.

## Materials and Methods

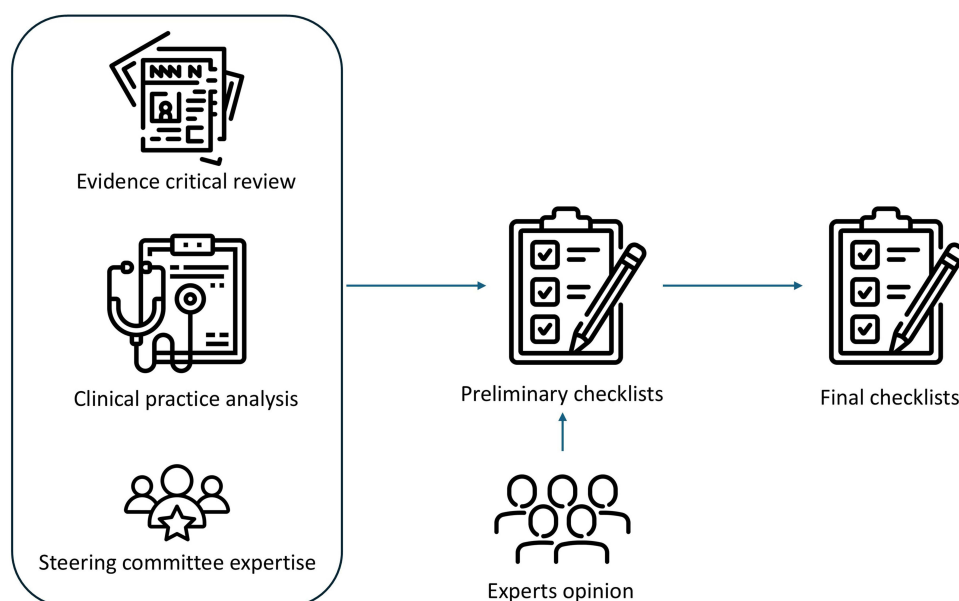
### Study Design

We performed a qualitative study based on a narrative review and expert opinions (Figure 1). The *ADVENT Respiratorio España* project was carried out following the ethical principles for medical research involving human subjects stated in the declaration of Helsinki and the Good Clinical Practice regulations. Expert methodologists provided support and guaranteed the overall project quality.

### Steering Committee and Experts' Panel Selection

A multidisciplinary steering committee with proven experience and knowledge in the management of patients with asthma and CRSwNP was set up. It was composed of two pneumologists, two allergologists, and two otorhinolaryngologists. These experts were responsible for the 1) contextual analysis of the management of asthma and CRSwNP patients; 2) design of two checklists, one for patients with asthma or suspected asthma and the other for asthma and CRSwNP patients; and 3) publication of the project results. An extra panel of 21 experts (five pneumologists, five allergologists, and 11 otorhinolaryngologists) was also selected to collaborate on checklist assessment.

The criteria for the selection of experts were: specialized in UAD, clinical experience  $\geq 8$  years and/or  $\geq 5$  publications on UAD diseases, and members of scientific societies and related working groups on UAD. We also assured geographical representation.



**Figure 1** ADVENT Respiratorio España project methodology.

## Checklists Development

In the first step, the steering committee, during a nominal group meeting, reviewed 1) the evidence regarding the epidemiology and burden of asthma and CRSwNP; 2) the current approach to the evaluation and management of these patients; and 3) patient needs and gaps in care encountered in daily practice. Then, based on published evidence (including national and international clinical guidelines<sup>16–20</sup> and their experience), they approved the items to be included in the checklists. They first selected a long list of items and produced excellence-based checklists.

The steering committee and expert panel discussed the excellence-based checklists during a second group meeting. Several aspects were considered when evaluating checklist items, such as their role in diagnosis or treatment stratification, the impact on patients, disease characterization (including disease severity), whether the variable was associated with prognosis or response to treatment, the time and resources required, etc. They set priorities and agreed on selecting the most important and feasible items to render checklists more applicable in everyday clinical practice. In addition, barriers and facilitators to checklist implementation were explored. Then, after several reviews, the final checklists were approved by the steering committee (see [Appendix](#)).

## Narrative Review

A comprehensive literature search in Medline was performed to complete the checklist. We used the PubMed Clinical Queries tool and individual searches using MeSH and accessible text terms until March 2023. We sought to identify articles describing the epidemiology, clinical characteristics, treatments, and other aspects of UAD.

## Results

A total of 27 experts on UAD from different regions participated in the ADVENT project, of whom 16 (59%) were men. Almost 100% were working in tertiary hospitals, and more than 80% were specifically working in asthma units.

The definitive checklist for the multidisciplinary approach to patients with asthma or suspected asthma includes baseline and follow-up visits and is divided into six main sections ([Table 1](#)). In each section, different sub-sections include the recommended evaluation items. The checklist items are separately expanded with explanations, definitions, or variable lists. They can be measured through direct questions (eg, Have you ever been diagnosed with atopic dermatitis?), validated questionnaires like the Asthma Control Test<sup>TM</sup> (ACT),<sup>21</sup> or other procedures like lung tests, imaging

**Table 1** Main Sections of the Checklist for the Multidisciplinary Approach to Patients with Asthma or Suspected Asthma

1	Asthma current and background
	Asthma history
	Asthma symptoms
	Lifestyle
	Concomitant symptoms
	Asthma control
	Quality of life
	Medications
2	Comorbid diseases
3	Physical examination and diagnostic tests
4	Complementary tests
5	Red flags
6	Biologic treatment

techniques, or biomarkers. For some items, several actions are proposed, such as referring the patient to the otorhinolaryngologist in case of unilateral nasal polyposis. More details are presented in the [Appendix](#).

The first main section is entitled “Current asthma and past history” and refers to the clinical history. This part of the checklist aims to 1) approach or confirm (if objective evidence is provided) asthma diagnosis, 2) characterize the disease, including its history (triggers, symptoms, severity, previous exacerbations, treatments, control, etc.); 3) detect concomitant symptoms; 4) identify lifestyle factors; 5) assess patient quality of life; and 6) describe medication use. This section includes seven sub-sections and 27 evaluation items. First, a previous diagnosis of asthma is ruled out. If positive, information is collected about age and diagnosis date, as well as previous treatments and hospitalizations. The following sub-sections evaluate current asthma symptoms (type, characteristics, frequency, and impact on patients), symptoms related to the upper airway (*eg*, loss of smell, rhinorrhea), and to other locations (*eg*, nasal congestion, itchy red eyes, eczema) that might suggest CRSwNP, allergic, or atopic conditions. Moreover, there is a specific sub-section analyzing asthma control, in which exacerbations in the last year and current symptom control are evaluated with the ACT or the Asthma Control Questionnaire-5 (ACQ-5).<sup>22</sup> The ‘quality of life’ sub-section comprises three items and is assessed by a direct question, the Asthma Quality of Life Questionnaire (AQLQ),<sup>23</sup> and the Sino-Nasal Outcome Test 22 (SNOT-22).<sup>24</sup> The last item explores the patient’s sleep quality. Aside from the current and past medication use for asthma and other diseases, other aspects like safety, adherence, or inhaler type and inhalation technique are also reported. This sub-section also has a specific evaluation item for corticosteroid use (annual cumulative doses, adverse events, etc.).

The next main section is designed to identify coexisting diseases. Medical reports and tests are preferred to patient self-reporting. Basic information on relevant comorbidities (*eg*, cardiovascular diseases, diabetes mellitus, or cancer) is collected, with particular attention on those that might require corticosteroid treatment (*eg*, rheumatic diseases). CRSwNP diagnosis is also specifically examined through objective data (*eg*, from nasal endoscopy findings). Then, several diseases in the spectrum of type 2 diseases, some associated with the UAD concept, are separately investigated like atopic dermatitis or eosinophilic esophagitis.

In the “Physical examination and diagnostic tests” section, the following data are collected: body mass index, general physical examination, and lung auscultation, two lung function tests (spirometry and bronchodilator reversibility test),

and fractional exhaled nitric oxide (FeNO) assessment. This section aims at providing objective data for asthma diagnosis and disease severity analysis.

The “Complementary tests” section comprises five sub-sections and 14 evaluation items, including provocation tests, laboratory tests, allergy tests, and other pulmonary tests. Some items are only indicated for specific patients. For example, bronchial provocation tests are recommended in cases where diagnosis is uncertain after objective tests, if aspirin-exacerbated respiratory disease (AERD) is suspected, etc. Connected to the laboratory tests, as stated in the checklist, it is crucial to report peripheral blood eosinophil count, serum total IgE, and, if possible, specific IgE, especially for *Aspergillus fumigatus*. Evaluating other biomarkers, such as antinuclear antibodies (ANA) and antineutrophil cytoplasmic antibodies (ANCA), is recommended in cases where systemic vasculitis is suspected. On the other hand, allergy tests are also included in the checklist, specifically skin prick tests and total and specific IgE assessments. Other lung tests are suggested, such as serial peak expiratory flow measurement or chest X-rays.

The last section of the first visit is the “Red flags” section, which focuses on the presence of alarm symptoms for the detection of near-fatal asthma or CRSwNP complications. This section is based on national multidisciplinary clinical guidelines,<sup>17,19,20</sup> and the checklist proposes different actions, along with the alarm symptoms. For example, in the case of orbital or intracranial complications, signs of sepsis, meningitis, unilateral symptoms, bleeding, crusting, or cacosmia, a preferred or urgent referral to the otorhinolaryngologist is recommended. Nevertheless, in patients with anosmia, a regular referral is advised.

During follow-up visits, patients should be reviewed at least once a year, but preferably every 3 to 6 months, depending on the patient’s characteristics. This part contains eight items providing data on patient monitoring. Different items evaluate asthma control and severity through patient symptoms, exacerbations, physical examination, and validated tests like ACT<sup>21</sup> and spirometry. The checklist includes items assessing treatment safety and adherence. Finally, the last item deals with inhalation techniques and patient education.

Follow-up visits also include a section for patients with biological therapy indications. Across five items, clinicians report past and current biological therapy safety issues, and also analyze the response to treatment according to multidimensional scores like the forced expiratory volume in the first second (FEV<sub>1</sub>), exacerbations, oral corticosteroids, symptoms (FEOS) or exacerbations, ACT, systemic corticosteroids, and obstruction-FEV1 (EXACTO) scales.<sup>20,25</sup> Overall, this information is intended to help decide whether to continue or modify treatment, as stated in the last item.

## Discussion

The UAD concept highlights the morpho-functional connections between the lower and upper respiratory tracts,<sup>1</sup> which also share a similar pathophysiological and immunological basis.<sup>5,6</sup> Therefore, a multidisciplinary approach should be considered for treating patients with asthma or suspected asthma. Besides, as described in the literature, coexisting diseases like CRSwNP have a significant influence on asthma progression and outcomes. They may complicate diagnosis and patient management.<sup>11</sup>

As a part of the *ADVENT Respiratorio España* project, a group of medical specialists, based on the best evidence available, national and international guidelines, and their experience, designed an evaluation checklist for patients with asthma or suspected asthma incorporating the UAD concept.<sup>16–20,26</sup>

The checklist was designed to standardize and facilitate the multidisciplinary evaluation and management of these patients. This tool follows the typical clinical consultation scheme and contains a comprehensive list of all necessary items and information for a patient visit. Therefore, the checklist covers the diagnosis, characterization, and stratification of patients for therapy selection, response to treatment, and patient follow-up. Moreover, all evaluation items are well defined, present explanations or examples when necessary, and are measured objectively using validated methods or tools. Measurements also incorporate patients’ perspectives and propose clinical actions if considered.

Notwithstanding, we must point out that the checklist goes beyond the UAD concept and allows clinicians to evaluate any other regular and relevant clinical factors that can impact patients and treatments, like cardiovascular diseases, red flags, or patient education.

This is the first published checklist for a multidisciplinary approach to patients with asthma or suspected asthma, under the prism of a UAD approach, and integrating all the elements needed to provide the best care possible in routine practice. This tool is intended to be a best practice checklist.

However, the checklist encompasses some limitations that are primarily related to its implementation. As mentioned, there are over 50 evaluation items, and clinicians are currently subject to heavy workload. Experts know the enormous pressure on healthcare in many centers, but also believe clinicians should look for clinical excellence. Besides, after checklist implementation, clinicians will probably internalize them and will spend less time running them in clinical consultations. Moreover, follow-up visits contain fewer evaluation items. Overall, we are confident that the benefits of implementing the checklist will overcome the lack of time. However, this proposal needs further validation in clinical practice. Considering the multidisciplinary nature of the checklist, there might be some knowledge and training gaps, but the checklist accounted for these potential limitations. Indeed, items related to other specialists or areas were carefully formulated to facilitate the evaluation. Another limitation is the lack of tools like the FeNO in some centers. Although FeNO might positively diagnose and characterize asthma, the checklist includes other items that can fill the gap.

## Conclusion

In summary, we have designed an evaluation checklist for the multidisciplinary approach to patients with asthma or suspected asthma that may guide clinicians in routine clinical practice to improve care quality and interdisciplinary communication. Further research is needed to demonstrate the checklist's effectiveness in improving patient care in daily practice.

## Ethics & Consent

The work was based on experts' opinions. The expert committee were informed and consented to having their opinions published.

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