The Dutch College of General Practitioners (NHG) Practice Guideline
This NHG Practice Guideline is a translation of the Dutch guideline. It is specifically written for Dutch general practitioners in the Dutch environment. The advice which is given may therefore not be in accordance with the views of general practitioners in other countries.

NHG Practice Guideline 'COPD and adult asthma: diagnosis'
This practice guideline and its scientific basis have been updated with respect to the previous version (published in: NHG Practice Guidelines for the General Practitioner 1, 1999).

The key messages are:

- The term CARA (chronic aspecific respiratory affections) has been replaced by the disease profiles for asthma and COPD, and their hybrid form: 'asthma with persistent bronchial obstruction'.
- Asthma is differentiated from COPD by having reversible bronchial obstruction and by the largely normal pulmonary function.
- In patients over the age of 40, a diagnostic steroid test may be necessary to distinguish asthma from COPD.
- Spirometry can be performed in a pulmonary function laboratory (in-house or by referral), in the general practice office (if the quality of the measurements can be guaranteed), or in a general practice laboratory.

What's new:

- Cooperative agreements with the pulmonologist are described in detail in the Landelijke Transmurale Afspraak COPD [National Transmurual Agreement on COPD] and the Landelijke Transmurale Afspraak Astma bij volwassenen [National Transmurual Agreement on Adult Asthma].

INTRODUCTION
The NHG Practice Guideline 'COPD and adult asthma: diagnosis' provides guidance for the diagnostic approach to patients suspected of having asthma or COPD (Chronic Obstructive Pulmonary Disease).\(^1\) management guidelines are provided in the NHG Practice Guidelines 'Adult asthma: treatment' and 'COPD: treatment'.\(^2\) Recommendations for transmural cooperation are described in the Landelijke Transmurale Afspraak COPD [National Transmurual Agreement on COPD] and the Landelijke Transmurale Afspraak Astma bij volwassenen [National Transmurual Agreement on Adult Asthma].\(^2\)

In recent decades, the medical community in the Netherlands had grouped asthma, chronic bronchitis, and emphysema together under a common name, 'CARA' (chronic aspecific respiratory affections). The assumption was that these disorders shared a common hereditary basis, but were expressed in different ways due to external factors. Doubts have been raised whether this hypothesis is tenable. Since the diagnosis and treatment of COPD and asthma differ on several essential points (see Table 1), and since the term 'CARA' was used only in the Netherlands, a decision was made to adopt the internationally-accepted division into asthma and COPD.\(^3\) Once a diagnosis of asthma or COPD is made, management of the disease is dictated by the severity of the complaints, the degree of bronchial obstruction, and the presence or absence of allergy.

Based on population screening, the combined prevalence of asthma and COPD is estimated to be 100-200 per 1,000 persons per year. General practice records give lower figures, however: about 13 per 1,000 patients per year for asthma and 12-20 per 1,000 patients per year for chronic bronchitis and emphysema.\(^4\)

Asthma usually first appears in early childhood, but it can also occur for the first time after
the age of 50. Life expectancy is usually not decreased very much by asthma. The prognosis is worse if there is severe bronchial obstruction, if symptoms first appear during the first year of life, if there is a positive family history of asthma, or if there is a high degree of bronchial hyperresponsiveness. The general practitioner is considered qualified to diagnose most cases of asthma.

COPD occurs mainly in men, and predominantly in the lower socio-economic classes, but in the future we will see it increasingly in women, because of changes in smoking behaviour. The early symptoms usually appear after the age of 40. The prognosis depends on the severity of pulmonary dysfunction at the time COPD is diagnosed and on the annual rate of decline in pulmonary function. The degree of deterioration in pulmonary function largely depends on the person's smoking habits. The presenting complaints are often not proportional to the severity of the pulmonary dysfunction. Many COPD patients present with what appear to be brief episodes of infectious diseases such as acute bronchitis or upper respiratory tract infections. When COPD is suspected or confirmed, spirometry provides the best information on the nature and extent of the airway obstruction. Peak flow measurement is not accurate enough for this, nor can it differentiate between obstructive and restrictive pulmonary diseases. An active approach should be adopted for smokers over the age of 40 with recurrent respiratory symptoms, so that COPD patients can be identified at an early stage and advised to quit smoking.

It is not always easy to differentiate between asthma and COPD in patients over age 40. In middle-aged asthma patients, inadequate treatment of the inflammation or the smoking can lead to structural changes, so that the bronchial constriction has both a reversible and an irreversible component. Such patients have asthma with persistent obstruction. In this situation, administration of a bronchodilator under standard conditions does reveal the obstruction to be reversible, but normal pulmonary function is not achieved even after a diagnostic steroid test (14 days on oral prednisone or prednisolone). The purpose of the steroid test is to determine whether there is a reversible bronchial obstruction that is still treatable, in patients who have persistent bronchial obstruction after a reversibility test with a bronchodilator. In severe cases of asthma, irreversible changes in the respiratory tract are not always preventable, despite maximal medical management. Spirometry is feasible in general practice if the quality of the technique can be guaranteed. If the general practitioner suspects COPD but does not yet have adequate experience in interpreting the results of spirometry, he can choose to refer the patient to a pulmonologist for diagnosis.

### Table 1. Differences between Asthma and COPD

<table>
<thead>
<tr>
<th></th>
<th>Asthma</th>
<th>COPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main risk factor</td>
<td>Atopy</td>
<td>Smoking</td>
</tr>
<tr>
<td>Pathophysiology</td>
<td>Airway obstruction due to inflammation of the bronchial wall</td>
<td>Complex; airway obstruction in bronchi and peripheral airways, also due to irreversible damage to lung parenchyma</td>
</tr>
<tr>
<td>Prevalence</td>
<td>All ages</td>
<td>Over the age of 40</td>
</tr>
<tr>
<td>Clinical course</td>
<td>Usually good, with or without maintenance medication</td>
<td>Usually chronic and gradually progressive in patients who continue to smoke</td>
</tr>
<tr>
<td>Life expectancy</td>
<td>Usually normal</td>
<td>Reduced</td>
</tr>
</tbody>
</table>
### Table 1: \textit{Reversibility test using peak flow meter or spirometer}

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Reversibility test using peak flow meter or spirometer</th>
<th>Spirometry: One-second value (FEV$_1$), forced vital capacity (FVC), reversibility test, flow-volume curve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reversed by bronchodilator</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Pulmonary function</td>
<td>Normal or almost normal with optimal medical management</td>
<td>Permanently reduced, even with optimal medical management</td>
</tr>
<tr>
<td>Inhaled glucocorticoid</td>
<td>Usually indicated, except in intermittent asthma</td>
<td>Usually not indicated, except when there are frequent exacerbations in moderate or severe COPD</td>
</tr>
</tbody>
</table>

**Terminology**

For the terms \textit{asthma} and \textit{COPD} see the section 'Evaluation';\textsuperscript{12} the pathophysiology is described in note 3. \textit{Reversible by a bronchodilator} is the main criterion for distinguishing asthma from COPD.\textsuperscript{13} \textsuperscript{14} In this practice guideline, the term 'reversibility' is reserved for any increase in the peak flow or the FEV$_1$ greater than the limit values given in Table 2, following the administration of a standard dose of a bronchodilator. Therefore, in this practice guideline reversibility does not refer to improvement produced by a glucocorticoid. The procedure for measuring reversibility is described in Table 2. An example of a calculation of reversibility is given in Table 3.

\textit{Peak flow variability} is a gauge of the fluctuating degree of bronchial obstruction that can develop in asthma. Peak flow variability is weakly associated with bronchial hyperresponsiveness.\textsuperscript{14} Peak flow variability is considered to be elevated if it varies by 15% or more on 2 or more days. The procedure for measuring the peak flow variability is described in Table 2. An example of a calculation of the peak flow variability is given in Table 3.

The \textit{peak flow} is the maximum flow rate in forced expiration following full inhalation.\textsuperscript{14} The FEV$_1$, or 'the one-second value', is the volume that can be expired in one second by forced expiration following full inhalation.\textsuperscript{15} The VC (vital capacity) is the maximum volume that can be inhaled after full exhalation during relaxed breathing. When the VC is measured during forced expiration (for instance, using an FEV$_1$ meter) it is called \textit{forced vital capacity (FVC)}; this is the maximum volume of air that can be exhaled after full inhalation. The FVC value is usually slightly lower than the VC.\textsuperscript{15}

There is \textit{normal pulmonary function} when the FEV$_1$ and (F)VC values are within the normal range of variability. In daily practice, the 'predicted' value is commonly used instead of reference value. Reference values depend on age, height, gender, and country of origin.\textsuperscript{15} Peak flow measurements and reference values have not been sufficiently validated to definitively state what constitutes normal pulmonary function.\textsuperscript{14}

\textit{Diagnostic steroid test}: measurement of the FEV$_1$ and (F)VC before and after a course of prednisone or prednisolone (30 mg daily for 2 weeks).
A*topy* is the constitutional predisposition to react to allergens with an IgE response. *Bronchial hyperresponsiveness* (or simply 'hyperresponsiveness') is bronchial obstruction in response to non-specific irritants (smoke, dust, fog, and cold air), which would not occur in healthy individuals.  

Table 2. Pulmonary function tests: procedure and interpretation

<table>
<thead>
<tr>
<th>Test</th>
<th>Procedure</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak flow</td>
<td>Expiration by blowing as hard as possible after maximal inhalation. It is measured three times and the highest value is recorded.</td>
<td>General impression: compare with 'predicted value' or, if at follow-up, with 'personal best' value</td>
</tr>
<tr>
<td>Reversibility test</td>
<td>Peak flow or FEV₁ measured before and 10 minutes after use of a beta₂-sympathomimetic agent (e.g., 400 µg salbutamol or, in persons &gt;60 years, 45 min after 80 µg ipratropium bromide), by metered-dose aerosol via spacer, one puff at a time</td>
<td>Considered reversible if: - peak flow increases at least 15% above value before bronchodilation, or - FEV₁ increases at least 9% above predicted value</td>
</tr>
<tr>
<td>Peak flow variability</td>
<td>Peak flow measured upon rising and at bedtime, for 1 week (on 2 or more days)</td>
<td>Considered elevated if difference between morning and evening values is &gt;15%</td>
</tr>
<tr>
<td>Diagnostic steroid test (when COPD is suspected)</td>
<td>FEV₁ and (F)VC measured before and after prednisone or prednisolone 30 mg once daily for 14 days</td>
<td>• FEV₁ after diagnostic steroid test: maximum attainable lung function • compare with reference value: - overall FEV₁ and (F)VC ≥80% - overall FEV₁/(F)VC ratio ≥70%</td>
</tr>
</tbody>
</table>

Table 3. Calculation of reversibility and peak flow variability

<table>
<thead>
<tr>
<th>Reversibility with peak flow meter</th>
<th>Reversibility with spirometer</th>
<th>Peak flow variability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difference in peak flow before and after bronchodilation, as a percentage of the pre-bronchodilation value Example: peak flow 400 l/min before and 500 l/min after bronchodilation: the 100 l/min increase is 25% of the pre-bronchodilation value. This increase is ≥15% and</td>
<td>Difference in FEV₁ before and after bronchodilation, as a percentage of the predicted value Example: If predicted FEV₁ is 3,000 ml and measured FEV₁ is 2,100 ml before bronchodilation (70% of predicted value) and 2,550 ml after bronchodilation (85% of predicted value), the increase (450 ml) is 15% of the predicted value. This increase is</td>
<td>Difference between highest and lowest peak flow on one day, divided by their average, × 100% Example: If evening peak flow is 500 l/min and morning peak flow is 400 l/min, the difference is 100 and the average is 450.</td>
</tr>
</tbody>
</table>
hence the obstruction is reversible. | >9% and hence the obstruction is reversible. | Then 100/450 x 100% is 22%. This is more than 15% and thus high, if present on 2 or more days.

**Background**

The characteristic intermittent nature of asthma is explained by the fluctuating level of hyperresponsiveness: the degree of hyperresponsiveness and bronchial obstruction, and therefore the severity of the symptoms, change over time and depend on the amount of exposure to irritants. In COPD there is a much less direct relation among the degree of hyperresponsiveness, the severity of the bronchial obstruction, and the complaints. Bronchial obstruction is a core element of both asthma and COPD, but the pathophysiology of the airway obstruction in asthma differs from that in COPD. In asthma, the level of obstruction varies over time and is usually transient, while in COPD it is virtually always present at approximately the same level. In both disorders, airway obstruction increases in exacerbations.

In **asthma** atopy is the most significant risk factor. Other risk factors are sensitization by inhaled allergens and frequent childhood respiratory infections. The following factors can trigger an exacerbation of asthma:

- non-specific irritants such as dust
- allergic irritants
- viral infections
- physical exercise and hyperventilation
- medications such as aspirin, NSAIDs, beta blockers (even in eye drops), and ACE inhibitors

In **COPD**, smoking is by far the most significant risk factor. There is a definite correlation between total cigarette consumption expressed as the number of 'pack years' (the number of packs per day x the number of years of smoking) and the severity of pulmonary dysfunction. Sensitivity to smoking varies from person to person: not everyone who smokes or has smoked heavily develops COPD. On the other hand, most patients with COPD have smoked heavily. Other risk factors are:

- chronic occupational exposure of the lungs to tiny particles
- low birth weight and premature birth
- congenital deficiency of the enzyme alpha-antiprotease

The degree of dyspnoea and reduced exercise tolerance in asthma or COPD can be described as follows: grade 1: no restriction of physical activity due to dyspnoea; grade 2: minor restriction (problem-free at rest, dyspnoea with normal physical activity); grade 3: moderate restriction (problem-free at rest, dyspnoea with less than normal physical activity); grade 4: severe restriction (dyspnoea with mild physical activities such as ADL or dyspnoea at rest).

The main triggers of exacerbations of COPD seem to be viral or bacterial infections and the non-specific irritants listed for asthma. Allergic irritants do not usually play a significant role in COPD.

**DIAGNOSTIC GUIDELINES**

The starting point is a patient presenting with dyspnoea, wheezing, or coughing with or without mucus production, for the first time or after a long, unmedicated, symptom-free period. Asthma or COPD should be considered if these complaints occur periodically
The History

'Asthma/COPD: Flow The Reversibility training:

The necessary Prerequisites

The following are prerequisites for the suggested management:

- record-keeping to identify the frequency of periods of respiratory problems, especially 'acute bronchitis'
- one peak flow meter for use in the examination room and others to lend out
- a $\beta_2$-sympathomimetic agent and an anticholinergic, both in metered-dose aerosol form, plus a spacer
- the possibility of performing spirometry in the general practice (FEV$_1$, FVC, and a flow-volume curve if it is needed). The requirements for high-quality spirometry are good technical skill and reliable equipment. Spirometry is gradually becoming more feasible in general practice; the prerequisites are adequate training and experience in measuring and interpreting the results, and periodically having the measurements checked elsewhere.
- examples of different inhalers for demonstration

If the general practitioner wishes to carry out the skin tests himself, test solutions and other necessary materials must be available. The expiration dates on the test solutions should be checked. Medications must be available for treatment of anaphylactic reactions.

The following tasks can be delegated to the practice nurse or the practice assistant after training:

- measuring reversibility by a bronchodilator
- teaching the patient how to measure peak flow variability
- spirometry

Reversibility can also be measured at home (e.g., if the symptoms are intermittent), provided that the patient is given good instruction.

The practitioner can use the instructional materials in the NHG's 'Basic Principles of Peak Flow Measurement and Spirometry' as well as in the Professional Advancement sets on 'Asthma/COPD: Diagnosis' and 'Asthma/COPD: Treatment'.

History

The history is usually obtained in stages. If there are reasons to consider the diagnosis asthma or COPD, the general practitioner should enquire about:

- the nature and severity of the complaints
  - productive morning cough, wheezing, nocturnal dyspnoea
  - the degree of dyspnoea and the amount of exercise tolerance (see also grades under 'Background')
  - the impact of the symptoms on the patient's ability to function at school or at work, on other daily activities, or on nocturnal sleep
  - frequency of complaints (occasionally, regularly, daily) and symptom-free intervals

- hyperresponsiveness
  - appearance or worsening of symptoms when exposed to cold air, fog, tobacco or other smoke, smog, cooking fumes, paint fumes, perfumed scents

- exercise-induced symptoms
  - symptoms occur only during or following physical exercise

- appearance or worsening of signs of allergy
• in a humid or dusty environment (house dust mites)
• in spring or summer (tree or grass pollen)
• from contact with cats, dogs, or rodents
• **smoking**
  • past or present smoking habit
  • number of years smoking x average number of packs (20 cigarettes) per day = number of 'pack years'
• **previous history**
  • frequent respiratory tract infections or periods of coughing or bronchitis
  • atopic disorders: constitutional eczema or allergic rhinitis
  • possible relation to use of salicylates, NSAIDs, beta blockers (oral or in eye drops), ACE inhibitors
  • previous allergy or pulmonary function tests
  • effectiveness of past respiratory medication, the types of preventive measures and their effectiveness
• **family**
  • respiratory problems or atopic disorders in the immediate family
• **occupation**
  • painters, chauffeurs, hairdressers, bakers, workers in environments with large amounts of dust (construction, metals, grain)
  • the presence of allergic factors at work
  • hobbies (e.g., keeping or breeding pigeons)

**Physical examination**

The general practitioner: 26

• inspects the patient, noting the degree of dyspnoea, respiratory rate, use of accessory breathing muscles, inspiratory position and—in the elderly—the nutritional state
• examines the lungs

Other physical examinations will depend on findings in the history, such as indications of concomitant heart failure.

A prolonged, wheezing expiration (during either forced or relaxed exhalation) helps to differentiate asthma and COPD from other respiratory complaints, but not from each other. 26 Normal findings by physical examination do not rule out asthma or COPD. A barrel-shaped chest, hyperresonant percussive sounds bilaterally, and low lung borders (below the 11th thoracic vertebra) with little mobility (less than two fingers wide) are signs of hyperinflation and occur in both emphysema and severe asthma. They are not reliable aids in differential diagnosis.

**Considerations**

A **suspicin of asthma** is justified when there is periodic dyspnoea, wheezing in the chest, and/or prolonged coughing in patients with: 27

• symptom-free intervals, and/or
• an history suggesting an allergic source of the complaints and/or constitutional eczema, or asthma in the medical history

A **suspicin of COPD** is justified in a patient with almost constant dyspnoea, wheezing, and/or prolonged coughing, together with one of the following characteristics

• age >40 years
• a history of heavy smoking
• weak or non-existent breathing sounds over both lungs

**Supplementary investigations in suspected asthma**
The following examination is carried out in all patients with suspected asthma.

- At any time, perform a reversibility test using a bronchodilator, with a peak flow meter or a spirometer.\(^\text{14}\) This can be done during the consultation or separately. An alternative—e.g., if symptoms are occasional—is to have the patient perform the test at home as soon as the symptoms appear (see tables 2, 3 and 4).
- If there is a strong suspicion of asthma but reversibility cannot be demonstrated, perform a peak flow variability test (see tables 2, 3 and 4).
- Once the diagnosis 'asthma' has been made, conduct allergy testing to determine whether measures should be taken to reduce exposure to allergens:\(^\text{28}\)
  - a multi-RAST (radioallergosorben test)
  - if the results of the multi-RAST are positive, conduct specific RAST tests for house dust mites and for cat or dog dander if the patient has regular contact with one of these animals, or for other species (e.g., rodents, horses) if suspected.

Skin tests can also be used for allergy testing but they are not discussed in this guideline.

- In patients over the age of 40 with severe, more continuous symptoms (suspicion of asthma with persistent obstruction), perform spirometry (FEV\(_1\), (F)VC, reversibility test, flow-volume curve). See also the section 'Additional testing and examination when COPD is suspected' and Table 5.

A patients having his first severe asthma exacerbation should be managed as described in the section on 'Acute severe asthma' in the NHG Practice Guideline 'Adult asthma: treatment'. The reversibility test can be performed if necessary:\(^\text{29}\)

**Table 4. Investigations when asthma is suspected**

If the patient has symptoms at the time of the consultation, a reversibility test can be performed in the practice at the same time, but if there are only occasional symptoms, the patient can perform the test at home. In either case, peak flow or FEV\(_1\) should be measured and repeated after bronchodilation.

- If symptoms are reversed by a bronchodilator, the diagnosis is asthma.
- If symptoms are not reversed,
  - but there is still suspicion of asthma, conduct a peak flow variability test. Finding $\geq 15\%$ variation between morning and evening values on 2 or more days supports the suspicion of asthma.
  - but there is suspicion of asthma with persistent obstruction, in patients $>40$ years of age with severe, more continuous complaints, see 'supplementary investigations when COPD is suspected' (Table 5).

**Table 5. Investigations when COPD is suspected (in the general practice office or by referral)**

Perform spirometry: FEV\(_1\), (F)VC, reversibility test, flow-volume curve. A normal FEV\(_1\) generally excludes COPD adequately but does not rule out asthma.

- If symptoms are reversed by a bronchodilator
  - and pulmonary function is normal, the diagnosis is asthma.
  - but obstruction persists (FEV\(_1\) $<80\%$ of the predicted value), the diagnosis is asthma with persistent obstruction. Consider doing a diagnostic steroid test (see Table 2 for instructions).
- If symptoms are not reversed by a bronchodilator and obstruction persists, perform a diagnostic steroid test and repeat the spirometry after the test course of glucocorticoid:
• if lung function is normal after the test the diagnosis is *asthma*.
• if there is a persistent lack of reversibility by bronchodilators and persistent obstruction after the steroid test, the diagnosis is *COPD*.

**Evaluation when asthma is suspected**

*Asthma* \(^{30}\) is present in patients who periodically develop dyspnoea, wheezing, and/or productive coughing, and in whom reversibility by a bronchodilator has been demonstrated.\(^ {13}\)

Increased variability in peak flow supports the diagnosis asthma.\(^ {14}\) If dyspnoea or wheezing occurs only during or after physical exercise, the diagnosis is exercise-induced asthma.

*Asthma with persistent bronchial obstruction* is a form of asthma in which normal lung function, as defined by spirometry, cannot be achieved despite reversibility by a bronchodilator, even after a diagnostic steroid test.

An *allergic* cause is assumed in asthma patients with:

• a positive multi-RAST, or
• a positive RAST for one or more allergens (a score >2 or an elevated absolute value, and the higher the score or result, the greater the probability of an IgE-mediated allergy), or
• a positive skin test for one or more allergens.

Refer to the NHG Practice Guideline 'Adult asthma: treatment' for further management of the disease.

**Supplementary investigations for suspected COPD, in the practice or via referral to a pulmonologist**

Depending on the options available in the practice and the general practitioner's skill in interpreting lung function test results, spirometry can be performed in the practice or at a diagnostic centre or pulmonary function laboratory, or the patient can be referred to a pulmonologist for diagnosis.

• If spirometry is to be performed in the practice, use the following procedure (see tables 2, 3 and 5):
  • Measure FEV\(_1\), (F)VC, and a flow-volume curve, and perform a reversibility test. An FEV\(_1\) within predicted values adequately rules out COPD but does not rule out asthma. The patient should be instructed not to use any bronchodilator for 8 hours prior to pulmonary function testing.
  • If the patient has obstructive pulmonary disease (low FEV\(_1\) and low FEV\(_1\)/(F)VC ratio) not reversed by a bronchodilator, perform a diagnostic steroid test during a phase when symptoms are stable.\(^ {30}\) The purpose of this is to determine the effect of a glucocorticoid (oral prednisone or prednisolone, 30 mg daily for 2 weeks) on the symptoms, and to determine the maximum attainable FEV\(_1\). This test should not be confused with glucocorticoid pulse therapy for an exacerbation of COPD:.
  • After the course glucocorticoid therapy, measure FEV\(_1\) and (F)VC again and if there is still bronchial obstruction, perform another reversibility test. The FEV\(_1\) measured at this point serves as an initial value for the clinical course to follow;

• If the patient is to be referred for diagnosis, referral should take place sooner rather than later and should include a request to refer the patient back after the diagnostic phase.

When there is a discrepancy between the complaints and the lung dysfunction—severe
dyspnoea or chronic coughing but relatively minor abnormalities in lung function—a chest x-ray is recommended to identify other lung diseases or heart failure.

If the clinical picture requires treatment, drug therapy should start during the diagnostic phase (see the NHG Practice Guideline 'COPD: treatment').

**Evaluation when COPD is suspected**
The diagnosis *COPD* is made in patients who continue to have the same complaints of dyspnoea and/or coughing, with or without mucus production, combined with:  
- lack of reversibility by a bronchodilator, and  
- inability to achieve normal pulmonary function, even after a diagnostic steroid test.

The following diseases are important to consider in the differential diagnosis, although this is not an exhaustive list:  
- pulmonary diseases with decreased lung volume (restrictive pulmonary diseases), such as idiopathic lung fibrosis and pneumoconiosis  
- pulmonary diseases in which gas exchange is hampered by disorders of the interstitial lung tissue (diffusion disorders), such as extrinsic allergic alveolitis (e.g., from pigeon or parakeet allergens).

In the long term, COPD is often complicated by heart failure. For the differential diagnostic problems involving COPD and heart failure, see the relevant sections in the NHG Practice Guidelines 'Heart failure' and 'COPD: treatment'. The diagnosis and treatment of other causes of coughing or dyspnoea, such as sinusitis, diseases of the larynx or pharynx, pneumonia, hyperventilation, and gastro-oesophageal reflux, are beyond the scope of this practice guideline (see also the NHG Practice Guidelines 'Sinusitis' and 'Acute sore throat').

**Consultation or referral**
- If *asthma is suspected*, patient should be referred:  
  - if the patient is >40 years of age and has severe, continuous complaints (suspected asthma with persistent obstruction), and spirometry cannot be performed in the practice or the general practitioner does not consider himself qualified to interpret the results  
  - if there is a discrepancy between the dyspnoea and/or coughing and results of peak flow measurements or spirometry  
  - if occupational asthma is suspected and factors at work might jeopardise the patient's job or career track.
- If *COPD is confirmed or suspected*, patients should be referred:  
  - if spirometry in the general practice is not possible or if the general practitioner does not considers himself qualified to interpret the results  
  - if there is severe COPD (*FEV*₁ less than 50% of the predicted value or <1.5 litres, despite a diagnostic steroid test)  
  - if there is a discrepancy between the severity of the complaints and the results of spirometry, possibly due to a diffusion disorder  
  - COPD has developed at a relatively young age (arbitrary cut-off <50 years) and/or COPD is combined with alpha₁-antiprotease deficiency  
  - if there is still doubt whether reduced exercise tolerance is due to COPD or by concomitant heart failure  
  - if lung cancer is confirmed or suspected  
  - if there are signs of a restrictive pulmonary disease (low *FEV*₁ with a normal *FEV*₁/(F)VC ratio) or another lung disease (e.g., sarcoidosis, TBC).
note 1
Other recently-published consensus texts were taken into consideration in writing this guideline.1-6


note 2

note 3
There are various reasons to abandon the 'CARA' concept and to differentiate asthma and COPD as separate disorders. The pathophysiology, diagnosis, and treatment of asthma differ from that of COPD on several important points.1 Both asthmatic patients and COPD patients have bronchial hyperresponsiveness. In asthma, the bronchial hyperresponsiveness is probably the cause of the bronchial obstruction that appears later, whereas in chronic bronchitis the bronchial hyperresponsiveness is more likely the result of bronchial obstruction. In asthma the bronchial hyperresponsiveness decreases between the ages of 5 and 25, and then increases again.2,3 Airway obstruction can be caused by four mechanisms: bronchospasm, swelling of the mucosa, mucus accumulation, and loss of elasticity (in particular when there is obstruction of the peripheral respiratory tract). Asthma is characterized by an inflammatory process in which bronchospasm, swelling of the mucosa, and mucus production lead to bronchial constriction, which is usually fully reversible. In COPD the pathophysiology is more complex and much of it is still poorly understood. There is increased mucus production, a cellular inflammatory infiltrate, and swelling of the mucosa, and these changes also occur in the more peripheral respiratory tract ('small airway disease'). In addition, it is assumed that increased exposure to oxygen
radicals (from infections, tobacco smoke, etc.) damages the lung parenchyma irreversibly over time, resulting in loss of elasticity. In COPD the abnormalities of the respiratory tract and the lung parenchyma are not uniformly distributed. As the disorder progresses, airway resistance and the unequal distribution of ventilation and perfusion increases. If asthma is suspected, measuring the peak flow is usually adequate for testing pulmonary function. If COPD is suspected, spirometry is required to assess the severity of the obstruction and to differentiate between obstructive and restrictive pulmonary diseases.  

5. Van Schayck CP, on behalf of the ad-hoc consensus group: 'Diagnostiek van astma/chronisch obstructieve longziekte door de huisarts'. De diagnostiek van astma bronchiale en chronisch obstructieve longziekte door de huisarts. ['The diagnosis of asthma/chronic obstructive pulmonary disease by the general practitioner'. The diagnosis of asthma bronchiale and chronic obstructive pulmonary disease by the general practitioner]. Ned Tijdschr Geneeskund 1995;139:1966-71.

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note 4

Based on population screening by use of questionnaires, the combined prevalence of asthma and COPD is estimated to be 100-200 per 1,000 persons per year. There are no reliable data on incidence or prevalence of COPD separately in the general population; the diagnosis is presumably made in less than half of the COPD patients. The prevalence figures depend largely on the research methodology, the composition of the population studied, and the interpretation of the diagnostic criteria. General practice records give lower figures. According to the CMR, the incidence of asthma is 2 per 1,000 per year in the age group 15-24 years, and 1 per 1,000 per year in the age group 45-64 years. In the CMR records the prevalence of asthma decreases with age, from over 20 per 1,000 in the age group 15-24 years to over 5 per 1,000 in the age group 65-74 years. In the Transition Project, the prevalence of asthma in the five age groups over the age of 15 varies from 11 to 15 per 1,000 per year. COPD almost never occurs before the age of 45. The prevalence among all ages in the Transition Project is 5 per 1,000 for emphysema and 7 per 1,000 for chronic bronchitis. The prevalence of chronic bronchitis increases, from about 9 per 1,000 in the age group 45-64 years, to 22 per 1,000 in the age group 65-74 years, while the prevalence of emphysema increases from 4 to 16 per 1,000 between the same groups. In the CMR, chronic bronchitis and emphysema are recorded under a single code, and per practice approximately 30 men and 10 women have chronic bronchitis and/or emphysema, or about 18 per 1,000. The main comorbidity is heart failure, occurring in 14-20% of the patients with COPD.


note 5
Asthma often begins before the age of 5,1-4 but it can be much later, e.g., around the beginning of the menopause. In a cohort of women between the ages of 34 and 68, 726 new cases of asthma were diagnosed per 580,000 person-years.5 The literature reveals that 25-50% of children with asthma still have symptoms as adults.6,7

note 6
Among 2,499 patients with asthma who were followed for 13 years, the survival rate did not deviate from the expected survival rate. The prognosis was worse only in patients >35 years of age who had characteristics of both asthma and COPD.1 In 80% of asthmatic patients the symptoms disappear over a period of 10 years.2 In a Danish epidemiological study with a follow-up of 18 years, the decrease in pulmonary function appeared to be greater in asthmatic individuals (1,095 who responded positively to the question 'Do you have asthma?') than in non-asthmatic individuals (38 ml vs. 22 ml per year).3 In recent years, an increase in morbidity and mortality from asthma has been found in several Western countries, particularly among children and young adults.4,5 Aside from the effect of earlier diagnosis, there is a real increase. The cause is not clear. There are indications that the combination of SO2 and NO2 with tobacco smoke increases airway sensitivity to house dust mites. A higher concentration of ozone is also thought to increase sensitivity to pollen. The clinical significance of this has not yet been determined. Air pollution would be more likely to exacerbate existing asthma than to increase its incidence.6 Another explanation for the rise in morbidity is the increase in obesity. In 85,911 women between the ages of 26 and 46, a distinct connection was found between increased body weight and development of asthma. There are various theoretical explanations for this, including a purely mechanical one, that increased adipose tissue in the lung parenchyma decreases the diameter of the bronchial passages.7 Asthma mortality decreased in Philadelphia from 1.68 per 100,000 in 1969 to 0.68 in 1977,
but rose again to 2.41 in 1991, despite the decrease in air pollution in this period.\textsuperscript{8} A case-control study showed no elevated risk in individuals who lived near a high-traffic roadway compared with those who lived further away.\textsuperscript{9} A case-control study in over 1,000 children who visited a hospital because of an acute 'wheezy' period showed a U-shaped relation to the ozone concentration: both a low and a high concentration of ozone were associated with an elevated risk; the relation to SO\textsubscript{2} was linear.\textsuperscript{10} The results of various studies on the relation between episodes of asthma and air pollution are inconsistent.\textsuperscript{11}


Note 7
Several studies have shown that a deterioration in FEV\textsubscript{1} of 80 ml per year or more occurs in approximately 30\% of patients with apparently mild to moderately severe asthma or COPD.\textsuperscript{1,2} The physiological decrease in FEV\textsubscript{1} is 20-30 ml per year. In a two-year study in 71 adult asthma patients, severe bronchial hyperresponsiveness was found to be linked to greater annual deterioration in FEV\textsubscript{1}.\textsuperscript{3} Allergy alone was not a risk factor, but allergy in combination with bronchial hyperresponsiveness did cause a greater rate of decline in FEV\textsubscript{1}.
In a study in 2,169 persons in the general population, changes in FEV\textsubscript{1} and other parameters were monitored for 13 years.\textsuperscript{4} The combination of asthma and chronic bronchitis was found to be a risk factor for a sharper decline in FEV\textsubscript{1}. A strong response to bronchodilation (an increase of 25\% or more in FEV\textsubscript{1}) was associated with a greater annual decline in FEV\textsubscript{1} in both asthma and chronic bronchitis. This may be related to a
higher level of bronchial hyperresponsiveness. There seems to be an association between a history of childhood respiratory infections and the development of adult-onset asthma.\(^5\)

Conclusion: In a select group of patients, hyperresponsiveness combined with allergy is a risk factor for more rapid rate of deterioration in pulmonary function. Deterioration is not accelerated in most people with asthma, however.


note 8

Information on the natural clinical course was taken from two publications.\(^1\)\(^2\) The best predictive factors for the prognosis of COPD are age, the initial FEV\(_1\) value, and the level of hyperresponsiveness.\(^3\) Thirty to fifty percent of people under the age of 65 with very severe obstruction (FEV\(_1\) <30% of the predicted value) will die within 3 years. The mortality rate in patients with moderate obstruction is almost equal to that of their peers without COPD.


note 9

There is consensus that when COPD is suspected, the airway obstruction can best be confirmed by determining FEV\(_1\) and its ratio to the forced vital capacity, i.e., FEV\(_1\)/(F)V\(_C\), also referred to as the Tiffenau index.\(^1\)\(^2\) Measurement of pulmonary function by peak flow or spirometry is necessary for objective diagnosis of asthma and COPD, because there is poor correlation between the perception of the complaints and the obstruction present.\(^3\)\(^4\) Research has shown that 10-15% of patients with chronic airway obstruction report few symptoms but have alarmingly poor lung function.\(^5\)

2. Rameckers EMAL, Schadé E, Quanjer PhH, Molema J. Chronisch obstructieve


note 10 In a randomized study, two intervention groups (smoking cessation prescribed with and without ipratropium bromide, for 5 years) were compared with a control group. The study included 5,887 smokers aged 35-60 years with mild COPD (mean FEV$_1$ 75% of the predicted value). At the end of 5 years, data could be collected on 95% of the participants. Thirty-five percent of those in the intervention groups had stopped smoking and after 5 years, 22% were still not smoking. In the non-intervention group these percentages were 10 and 5%, respectively. After 5 years pulmonary function (mean FEV$_1$) in both intervention groups was better than in the control group. The beneficial effect on pulmonary function was greatest in those who had permanently quit smoking: their FEV$_1$ increased in the first year and then gradually decreased. The mean overall reduction was 72 ml in 5 years. In those who continued to smoke, FEV$_1$ decreased by a mean of 300 ml in 5 years. Treatment with ipratropium bromide had no long-term effect on pulmonary function. There was no difference among the three groups in mortality or in the number of hospitalizations.


note 11 In three general practices, all patients with diagnosed asthma and >50 years of age were invited for spirometric testing. Of the 168 participants, the results of spirometry at the time of the study were normal in 34%, while, 24% had symptomatic asthma and 34% had COPD. Twenty-three of the 57 patients with COPD underwent a steroid test, and only one person appeared to have a significant improvement in pulmonary function. Guidelines and prerequisites for spirometry in general practice are described in an NHG document.

Recently a case was made for the development, validation, and use of simple spirometers—spirometers that measure only FEV$_1$ and (F)VC or FEV$_5$ (the volume of air expelled in 6 seconds of forced expiration), without a display, and without a flow-volume curve—to screen for airway obstruction in smokers, for example. The advantages of these screening spirometers over diagnostic-quality spirometers are that they cost less, are simpler devices, and are easier to use in general practices. A validation study will have to be carried out before these spirometers can be recommended.

Conclusion: Spirometry can be performed in general practice and aids in differentiating asthma from COPD. The validity of simple spirometers in general practice (‘FEV$_1$ meters’) still needs to be established.


2. Beijaart RPH. Spirometrie in de huisartspraktijk [Spirometry in general practice]. NHG

note 12
The terms are based partly on consensus guidelines\(^1\)\(^-\)\(^4\) and partly on consensus within the work group and consultation with NVALT [Netherlands Association of Physicians for Pulmonary Diseases and Tuberculosis]. Different names are used for the intermediate group with characteristics of both asthma and COPD. 'Asthma with persistent obstruction' has been chosen for this guideline. Any term has the disadvantage of involving the confusing contradiction between the concept of reversibility and persistent obstruction (failure to achieve normal pulmonary function). Chronic bronchitis is defined as a disorder characterized by at least 2 years of regular—almost daily for at least 3 months per year—recurring cough and/or mucus production. Chronic bronchitis may be accompanied by a non-reversible obstruction. Emphysema is a term from anatomical pathology, designating a condition characterized by destruction of alveolar lung tissue and loss of elasticity. CT scanning and measurement of the diffusion capacity can be helpful in diagnosing emphysema. The terms chronic bronchitis and emphysema are no longer used in the practice guideline.


note 13
In measuring reversibility, the initial value is expressed as a percentage of the predicted (reference) value of FEV\(_1\), not as a percentage of the absolute value, which would result in overestimation of reversibility.\(^1\)\(^,\)\(^2\) The response to a bronchodilator must exceed the spontaneous variability and the response in healthy individuals. Various studies give a range between 7.7 and 10.5% (220-315 ml).\(^3\) The European Respiratory Society suggests \(^{>9}\) improvement in FEV\(_1\) predicted after bronchodilation.\(^1\) The NVALT committee also chose \(^{>9}\).\(^2\) Any choice is arbitrary but the work group has adopted this choice.

The maximum airflow during exhalation (peak flow) occurs in the first part of a forced exhalation after maximal inhalation and can be measured by a peak flow meter or by spirometry. The first part of a forced exhalation is effort dependent and then it is independent of effort because of a complex set of factors including lung tissue elasticity and respiratory tract resistance. A single measurement of the peak flow gives an unreliable picture of lung function if the resulting value is too low; a normal peak flow probably does rule out bronchial obstruction. Obstructive and restrictive pulmonary diseases cannot be distinguished using the peak flow meter.

Measuring peak flow is effective for determining variability and reversibility of the bronchial obstruction; when a patient presents with a persistent cough, reversibility measured with peak flow does not correlate well with results of spirometry (as a gold standard). The patient should always use the same peak flow meter, because meters can differ considerably from one another. Variability in peak flow values and a reversible bronchial obstruction are significant indications for the diagnosis of asthma. Variability can be checked by measuring the morning and evening peak flow values for one week. Ideally, peak flow should be measured in the morning immediately upon rising, when the value is usually at its lowest, and in the evening before retiring (before inhalation of any short-acting bronchodilator). The WHO text specifies measuring after inhalation of a bronchodilator. This was discussed with NVALT, and it was decided not to adopt this policy. The variability is considered to be elevated if on multiple days the difference between the lowest and the highest values, divided by the average, x 100% is >15%. In a general practice study in 182 patients coughing >2 weeks, who had not been diagnosed as having asthma or COPD, the peak flow variability (amplitude as a percent of the highest value) proved to be helpful in diagnosing asthma (based on symptoms, spirometry, and metacholine tests). A small number of days of high variability (such as 4 days >15% or 3 days >20%) makes the diagnosis of asthma more likely in patients with a persistent cough.

One study investigated the value of the peak flow meter in determining reversibility in 73 patients 40 years or older who were known by the general practitioner to have CARA. The positive predictive value of an absolute increase in peak flow of 60 l or more was 87% (criterion for reversibility: increase in FEV1 ≥9% of the predicted value) or 92% (criterion for reversibility: an absolute increase in FEV1 ≥190 ml).

Reference values for peak flow (with a peak flow meter) are based on research in a healthy non-smoking population in London. Conclusion: Ideally, the peak flow should be expressed as a percentage of the predicted (reference) value. Reference values for the peak flow meter are less reliable than those for spirometry. An increase of 60 l after bronchodilatation is an easily applied cut-off point in practice, but the study cited was not reproduced and was based on a relatively small number of patients. For these reasons, the work group has decided that an increase in peak flow of 15% or more of the initial value is abnormal.

3. Van Schayck CP, on behalf of the ad-hoc consensus group: Diagnostiek van astma/chronisch obstructieve longziekte door de huisarts'. De diagnostiek van astma bronchiale en chronisch obstructieve longziekte door de huisarts ['Diagnosis of asthma/chronic obstructive pulmonary disease by the general practitioner'. Diagnosis of asthma bronchiale and chronic obstructive pulmonary disease by the general practitioner]. Ned Tijdschr Geneeskd 1995;139:1966-71.


note 15
Reference values for adults were taken from standards set by the European Community for Coal and Steel (ECSC).1,2 These values are based on studies in healthy, non-smoking adults, 18-70 years of age. The point at which pulmonary function becomes impaired is determined by the formula: (predicted value – 1.64) x standard deviation. Lower values are considered abnormal. In healthy individuals, the FEV₁ and FVC are generally between 80 and 120% of the predicted value. The FVC is usually slightly lower than the VC, so the FEV₁/FVC ratio provides a more favourable picture than the FEV₁/VC ratio.2 FEV₁/(F)VC ratios >70% are generally normal. An obstructive impairment is characterized by a reduction in both FEV₁ and the FEV₁/(F)VC ratio.1 A restrictive impairment is indicated by a reduction in (forced) vital capacity (FVC) or total lung capacity (TLC).1 The peak flow provides an impression of the severity of the obstruction in the large airways, while FEV₁ also provides some information about the condition of the small airways.


note 16
Worsening of complaints following exposure to non-specific irritants is a sign of bronchial hyperresponsiveness. Peak flow variability is not equivalent to bronchial hyperresponsiveness.1 In patients suspected of having asthma based on the history but in whom no abnormalities are found by physical examination or additional lung function tests and examinations, a histamine provocation test is sometimes carried out in a lung function laboratory to check
for bronchial hyperresponsiveness. In this test the FEV$_1$ is measured after the inhalation of increasing concentrations of histamine.\textsuperscript{2} The result is positive if even at a low concentration of histamine (8 mg/ml or less) the patient reacts with a reduction in FEV$_1$ of 20% or more (provocative concentration at which the FEV$_1$ declines 20% or more, abbreviated as PC20 histamine $\leq$8 mg/ml). This test is not part of the standard diagnostic testing in a general practice. Sometimes metacholine is used instead of histamine. Abnormal test results are proof of bronchial hyperresponsiveness and a clear indication of asthma.


\textbf{note 17} \textsuperscript{$\leftarrow$}
Atopy is characterized by the production of abnormal amounts of IgE in following contact with environmental allergens. This characteristic is probably inherited in a complex manner.\textsuperscript{1}

Of the other risk factors, exposure to allergens and tobacco smoke are the most important.\textsuperscript{1} House dust mites are found mainly in carpeting, mattresses, and fabric upholstery. They thrive best at 22-26\textdegree C and at least 55% humidity. Other allergens include epithelial material from pets, especially cats and dogs. Passive smoke inhalation (especially from a mother who smokes) increases the risk of asthma.

The contribution of occupational asthma to the total prevalence of asthma is unknown; estimates vary from 2\% to 15-20\%.\textsuperscript{2-4} Bronchial hyperresponsiveness, with or without an allergic component and a direct irritant (chlorine, ammonia), plays a role in the development of occupational asthma. Numerous substances can contribute to or cause asthma. Timely detection is important in order to prevent further progression, although patients often fail to recover completely and may continue to have long-term breathing problems despite changing jobs.

Other potential risk factors are respiratory infections and air pollution, both outdoor and indoor.\textsuperscript{1}


\textbf{note 18} \textsuperscript{$\leftarrow$}
Smoke not only from cigarettes but also from fire, paint fumes, and cooking fumes can trigger an exacerbation.\textsuperscript{1}


note 19
When there is exposure to an allergen there may be an early and/or late response. In the early response, mast cells are degranulated, releasing mediators that cause bronchospasm, oedema, and hypersecretion. Inflammatory cells play an essential role in the late response. Most asthma patients with an allergy show either an early response or a combination of an early and a late response.


note 20
Viral infections (respiratory syncytial virus, rhinoviruses, influenza virus) are known asthma triggers. In 138 adults with asthma, over 80% of cold virus infections were followed by an increase in asthma symptoms. In another study, approximately 50% of the asthma exacerbations were associated with a viral respiratory infection.


note 21
Not only exercise, but also hyperventilation, changes in weather, and SO2 can provoke asthma symptoms.


note 22
In a well-documented literature review, medications such as aspirin (and other NSAIDs), beta blockers, ACE inhibitors, and metered-dose aerosols were mentioned as causes of bronchospasms. There are few reliable figures on the prevalence of aspirin-induced bronchospasm in asthma patients. Estimates vary from 4 to 20%. Aspirin hypersensitivity can be expressed as irritation of the conjunctiva, rhinorrhoea, facial redness, and bronchospasm. It occurs primarily between the ages of 30 and 40 and develops over several months or years. There is an almost complete cross-reaction with other NSAIDs. Beta blockers can also provoke bronchospasms, although less severe than those from NSAIDs, and this occurs also with eye drops containing beta blockers (such as timolol, which is 6-8 times as potent as propranolol). The new cardioselective drugs can also trigger bronchospasms at higher doses or in individuals who are particularly sensitive to them. Coughing occurs in 1-2% of those who use ACE inhibitors. Bronchospasms are observed less frequently. The coughing may begin immediately or it may be delayed for months, obscuring the relation to the medication. Bronchospasms can also be triggered by the inert ingredients in metered-dose aerosols and the preservatives in nebulizer fluids. This occurs in 1-7% of those using bronchodilators. The incidence is higher in persons using inhaled glucocorticoids, probably because of the latter do not produce immediate bronchodilation. Some patients have symptoms of asthma in response to food additives (salicylates, monosodium glutamate, preservatives).

note 23
Numerous studies have demonstrated the harmful effect of smoking on lung function, not only cigarettes but cigars as well.1-2 By far the most important cause of COPD is smoking. Eighty to ninety percent of deaths resulting from COPD are attributable to smoking.3 Among occupational risk factors, there is evidence that cadmium (battery manufacture) and brick dust (construction workers) can cause COPD.4 There is also an elevated risk among mineworkers; workers in the cement, steel, grain, and paper industries; those in the transportation sector; and those exposed to dust on the job.5 Allergy is less common in COPD than in asthma.6 In rare cases, congenital deficiency of the enzyme alpha1-antiprotease plays a role; this enzyme normally counteracts the loss of elasticity in the lungs. Symptoms occur at 35-45 years of age. The enzyme can be measured in the serum, and substitution is possible, but its benefit in slowing the rate of deterioration of lung function has not been proved.7 There are indications that low birth weight and frequent childhood respiratory infections are risk factors for COPD.8


note 24
Chodosh S. Sputum evaluation - Why, when, how and by whom? In: Brody
note 25  
In a prospective study in 511 persons in the general population, 20-70 years of age, on the relation between airway complaints and pulmonary function parameters, a clear relation was found between the number of complaints and values for FEV₁ and peak flow: the more complaints, the lower these pulmonary function values.¹ In individuals with three or more symptoms there was a greater probability of a morning peak flow <70% of the predicted value (OR 4.4 95%-CI 1.1-18.6) and an FEV₁ <70% of the predicted value (OR 7.6 95%-CI 1.1-52.8) compared with individuals without symptoms.¹ The history is not very reliable for determining the severity of the disorder. When a patient presents with dyspnoea, moderate to severe constriction is often already present.² The history is generally inadequate for detecting an allergy, due to the large number of false-positive and false-negative findings.³,⁴
In a general practice study in 192 patients who had been coughing for >2 weeks, 39% were found to have asthma (not previously diagnosed) and 7% COPD (not previously diagnosed). In this patient category, the presence or absence of asthma or COPD could be classified correctly in over three-quarters of the patients, based on six criteria (wheezing or dyspnoea for the last 14 days, coughing when exposed to allergens, prolonged expiration, number of pack years, and female gender).⁵


note 26  
Both sensitivity and specificity of the physical examination for moderately severe COPD are low, and the reproducibility of findings varies.¹,² In elderly COPD patients it is important to determine whether heart failure is partly to blame.³ For this, the important parts of the physical examination are the heart (third tone, 'gallop' rhythm, tachycardia, murmurs), the lungs (bilateral crepitations often high, rattling respiration audible via the mouth), and checking for peripheral oedema and elevated central venous pressure. Comparisons of the findings by auscultation of the lungs will be more valid if the descriptions of the pulmonic sounds are consistent. A prolonged expiration is one that is at least as long as the inspiration, during normal, unforced breathing. Rhonchi are expiratory pulmonic sounds with a musical quality. They are categorized as either high frequency (whistling, wheezing) or low frequency (humming, buzzing). Crepitations are non-musical, explosive, snapping sounds that occur specifically during inspiration.⁴,⁵

1993;94:188-96.


note 27
The criteria for suspected asthma and COPD are based on consensus within the work group.

note 28
Allergy testing for an IgE-mediated allergy to a specific allergen can be done using skin tests or the radioallergosorbent test (RAST) or a similar test with a non-radioactive label. Results of RAST and skin tests correlate well with those of the inhalation provocation test. This type of RAST test can also be used to screen for specific IgE immunoglobulins to multiple types of allergens simultaneously, e.g., with the Phadiatop(R) (Pharmacia) test for a group of inhaled allergens or with a food mixture test for food allergies. If the screening test is positive, it can then be subdivided into the individual allergens. The results of the RAST test are usually displayed semi-quantitatively in no more than six classes and sometimes in absolute values (kU/L).

The Phadiatop(R) screening test can be used to test for the presence of IgE antibodies to the most important inhaled allergens: house dust mites, tree pollens, grass pollens, cat dander, dog dander, horses, some herbs, etc. The sensitivity and specificity of the Phadiatop(R) test for a clinically-diagnosed allergy is good. The Phadiatop test's predictive value is 100% for a positive RAST result and 98% for a negative RAST result. The drawback is that a negative test result does not entirely rule out an allergic component, because the set contains a limited number of allergens and specific RAST tests are still necessary when the test results are positive. The most important drawback is the relatively high cost. The sensitivity of the RAST is high. Its specificity is lower (60-70%), except for dog and cat dander, for which specificity is 92% and 80%, respectively.

The sensitivity of the skin test is good (also for dog epithelium, unlike the RAST). The specificity is roughly the same as that of the RAST, although it is lower for dog and cat allergens. The test is sometimes false positive. In a general practice study, the positive predictive value was 49% and the reliability was excellent (kappa 92%). Use of the skin prick test is preferable. It is rapid and inexpensive and its results are comparable to those of the intracutaneous test. Using a special needle that produces a puncture at a practice guideline recommended depth and width, one drop of the test allergen is pricked through on the skin of the volar side of the forearm. The pricks should be approximately 5 cm apart. The total IgE level is highly dependent on age and varies greatly among both healthy individuals and allergic patients. Measuring total IgE is of little value in allergy diagnosis. Only if the RAST test is negative for the most common inhaled allergens (house dust mites, grass pollens, birch pollens, cat and dog allergens) and food allergens (cow's milk, egg whites, peanuts) could an elevated total IgE still indicate an IgE-mediated allergy to a rare
allergen or a rare parasite. In addition, normal IgE values may also be found in respiratory allergies, particularly those to a single allergen. The work group is of the opinion that specific IgE tests or skin tests are preferable for allergy testing. Simplicity, individual documentation of a potential allergy in a chronic disorder, cost, and the often false-negative history all played a part in formulating the guidelines for additional allergy testing.7


note 29
A therapeutic trial with a beta2-sympathomimetic agent is sometimes mentioned as a criterion for the diagnosis of asthma.1,2 No research was found on the value of this 'diagnostic test'.


note 30
The criteria for the diagnosis of asthma and COPD are based on consensus within the work group, on the different definitions in the various consensus texts, and on agreements with the NVALT.

note 31
The WHO advises a therapeutic trial with an oral glucocorticoid when there is doubt in differentiating asthma and COPD.1

Numerous other pulmonary diseases that can cause chronic dyspnoea can be considered in the differential diagnosis, such as idiopathic lung fibrosis, pneumoconioses, and extrinsic allergic alveolitis.¹