

ERS POCKET GUIDELINES

From the ERS task force on the management of work-related asthma



WORK-RELATED ASTHMA:

Guidelines for the management
of work-related asthma



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POCKET GUIDELINES FOR THE MANAGEMENT OF WORK-RELATED ASTHMA (2012)^a

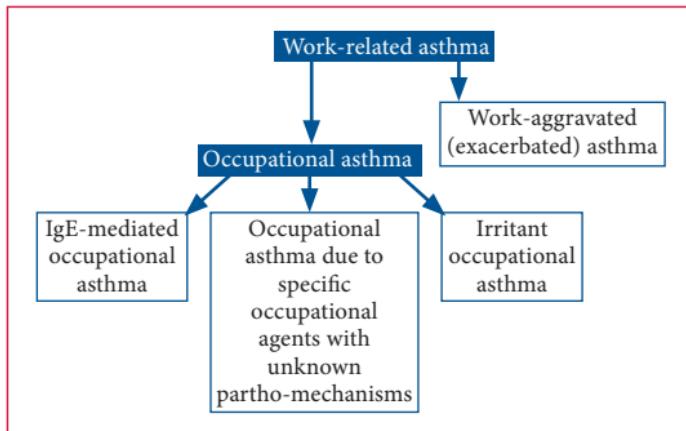
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1. WHAT IS WORK-RELATED ASTHMA?

Definition and classification

Work-related asthma encompasses occupational asthma and work-aggravated asthma (see Figure 1).



IgE, immunoglobulin E.

Figure 1. Classification of work-related asthma.

Occupational asthma is asthma resulting from causes and conditions that are part of certain occupational environments and which are not encountered outside the workplace. It involves variable airflow limitation and/or hyperresponsiveness associated with inflammation.

Work-related aggravated asthma is also induced by causes and conditions that are part of certain occupational environments and which are not encountered outside the workplace. However, unlike occupational asthma, it is characterised by a worsening of pre-existing asthma that was not induced by an exposure to stimuli in the workplace.

Types of occupational asthma

There are three types of occupational asthma:

- Immunoglobulin E (IgE)-mediated asthma, which occurs after a period of latency because of the immunological nature of this type of response.
- Irritant occupational asthma, which typically results from high exposure(s) to irritants in the workplace (e.g. reactive airways dysfunction syndrome), and may not feature a period of latency; other subtypes of irritant occupational asthma are not so sudden onset of irritant asthma (medium exposure level) and low dose irritant occupational asthma.
- Occupational asthma caused by specific occupational agents that cause asthma by unknown mechanisms. This category frequently exhibits a latency period.

Overlap with other respiratory disorders

Several other respiratory conditions overlap with work-related asthma. This is because occupational exposure to potential causes of asthma may cause other respiratory disorders. One such example is occupational chronic obstructive pulmonary disease (COPD). COPD or asthma may be caused by occupational exposures to: welding fumes, isocyanates, aluminium, cadmium, ammonia, environmental tobacco smoke, wood dust, cotton and endotoxin.

Eosinophilic bronchitis, asthma-like symptoms and work-related rhinitis also have some overlap with occupational asthma and/or represent risk factors for occupational asthma. However, any overlap between these conditions and occupational asthma has not been studied in detail.

2. WHAT ARE THESE GUIDELINES FOR?

Who should read these guidelines?

The following groups of people may benefit from reading these guidelines:

- Healthcare providers and practitioners, such as occupational and primary care physicians involved in the diagnosis, treatment and/or education
- Workers in all industrial and occupational sectors
- Worker and employee representatives with responsibility for health and safety
- Politicians, policy makers, and physicians working in industry.

How common is work-related asthma?

- About 5–25% of new cases of asthma in adults are caused by exposure to causative agents in the workplace.
- Annual incidence of work-related asthma ranges from 50–1300 cases per million workers, and is associated with high rate of prolonged disruption of work.
- Costs of occupational asthma vary greatly with disease severity, but total annual costs of £305–£2735 were estimated per ‘average’ afflicted person in the United Kingdom in 2004.

Objectives and concept of these guidelines

It is important to realise that work-related asthma is a preventable disease, similar to other work-related respiratory diseases such as occupational COPD. As such, the objective was to gather evidence on management options for work-related asthma and the effectiveness of these options. Thus, guidelines presented here focus on management of work-related asthma rather than asthma in general, have a particular focus on primary and secondary prevention, and are meant to supplement other work-related asthma guidelines. These include guidelines by the:

- British Occupational Health Research Foundation (BOHRF)
- American College of Chest Physicians (ACCP)
- Agency for Healthcare research and Quality (AHRQ).

Five key research questions to be answered

A Task Force was convened from members of the European Respiratory Society (ERS) in order to develop these guidelines. At an initial meeting in Stockholm in 2007, a consensus was reached concerning five key questions (Table 1). Ancillary questions were formulated at subsequent meetings of the Task Force.

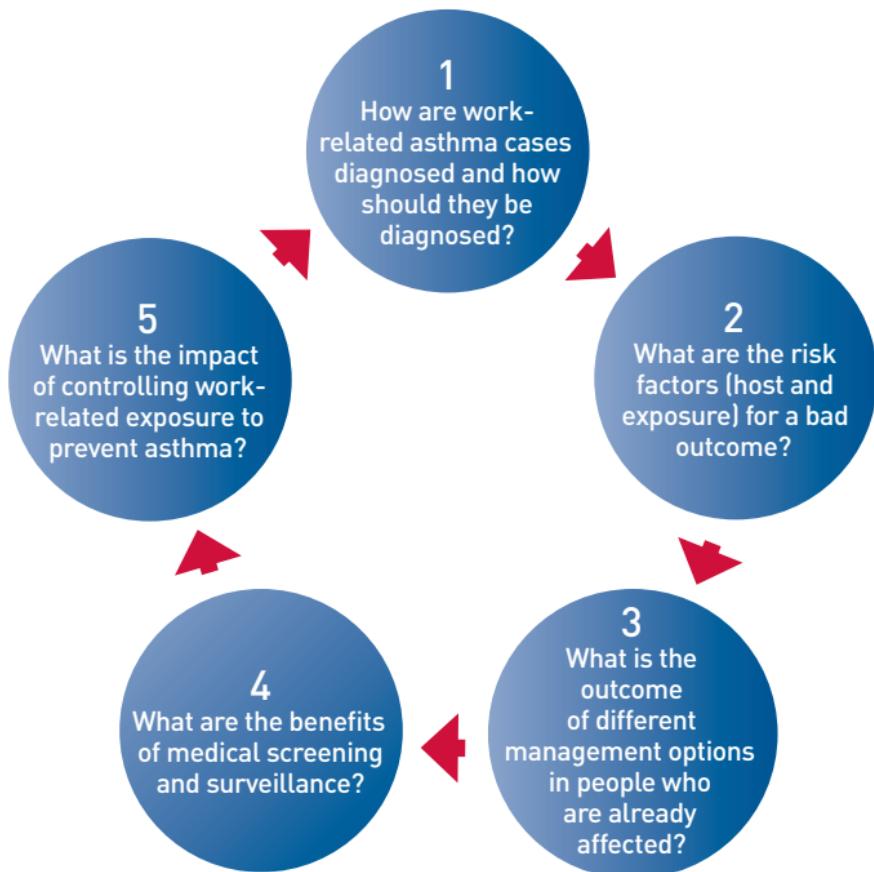


Figure 2. The five key research questions to be answered by these guidelines on the management of work-related asthma.

3. METHODS

- A literature review of Medline was conducted using search terms addressing each key question and their ancillary questions. Additional references were added from Task Force members' own archives and from reference lists of review articles.
- Search results were screened independently for relevance by two occupational respiratory medicine specialists.
- The methodological quality of each study selected was assessed by two reviewers and rated according to the Scottish Intercollegiate Guidelines Network (SIGN) classification with any disagreements resolved by discussion involving the whole Task Force.
- The strength of evidence for each question was graded according to the three-star system of the Royal College of General Practitioners (RCGP), which includes the quality and quantity of evidence.
- Strength and clinical relevance of recommendations was classified according to the Grading of Recommendations Assessment, Development and Evaluation (GRADE) working group as adapted by the American Thoracic Society (ATS).
- The number of publications evaluated for research questions 1–5 was 337, 181, 430, 182 and 199, respectively.

4. CURRENT CASE DIAGNOSIS AND HOW CASES SHOULD BE DIAGNOSED

The following are recommendations for key question 1:

How are work-related asthma cases diagnosed and how should they be diagnosed?

Recommendation	Strength of recommendation	Level of evidence
Occupational asthma should be confirmed by objective physiological tests and, in cases of allergic pathogenesis, by immunological tests.	Strong	High
All adults with new, recurrent or deteriorating symptoms of asthma, COPD or rhinitis should be asked about their job, materials with which they work and whether they improve when away from work.	Strong	High
In cases of nonallergic (irritant) asthma, physicians should especially consider possible high exposure to irritants in the workplace as relevant pathogenetic factors.	Strong	Low
If, after full investigation, the diagnosis is still equivocal, follow-up evaluation is required by a specialist, including monitoring of spirometry, serial measurements of peak expiratory flow or spirometry, nonspecific bronchial hyperresponsiveness and allergological testing.	Strong	Low
Specific bronchial challenge testing is recommended when the diagnosis of occupational asthma is not clear beforehand, when the cause is new, or when it is necessary for the management of the individual worker. It should be performed in a centre with expertise in specific occupational challenge testing.	Strong	Low
We recommend a supervised workplace challenge if specific challenge testing is equivocal or not possible.	Strong	Low

5. RISK FACTORS FOR A POOR OUTCOME

The following are recommendations for key question 2:

What are the risk factors (host and exposure) for a bad outcome?

Recommendation	Strength of recommendation	Level of evidence
Health practitioners should consider that early recognition and diagnosis of work-related asthma is recommended as a shorter symptomatic period after diagnosis is associated with a better outcome.	Strong	High
Smoking habits and atopy should not be taken into account when assessing the prognosis for medical legal purposes.	Strong	Moderate
Further research is required in order to assess the effect on outcome of sex and the type of asthmatic response to specific bronchial challenge.	Strong	Moderate

6. MANAGEMENT OPTIONS AND OUTCOMES

The following are recommendations for key question 3:

What is the outcome of different management options in people who are already affected?

Recommendation	Strength of recommendation	Level of evidence
Patients, physicians and employers should be informed that persistence of exposure to the causal agent is likely to result in a deterioration of asthma symptoms and airway obstruction.	Strong	Moderate
Patients and their attending physicians should be aware that complete avoidance of exposure is associated with the highest probability of improvement, but may not lead to a complete recovery from asthma.	Strong	Moderate
Reduction of exposure to the causal agent can be considered an alternative to complete avoidance in order to minimise adverse socio-economic consequences; however, there is insufficient evidence to recommend this option as a first-choice therapeutic strategy. This approach requires careful medical monitoring in order to ensure an early identification of asthma worsening.	Weak	Low
The use of respiratory protective equipment should not be regarded as a safe approach, especially in the long-term and in patients with severe asthma.	Strong	Low
Anti-asthma medications should not be regarded as a reasonable alternative to environmental interventions.	Strong	Very low
The pharmacological treatment of work-related asthma should be adapted to the level of asthma control, in accordance with general recommendations for asthma.	Strong	Moderate

7. IS MEDICAL SCREENING AND SURVEILLANCE BENEFICIAL?

The following are recommendations for key question 4:

What are the benefits of medical screening and surveillance?

Recommendation	Strength of recommendation	Level of evidence
Questionnaire-based identification of all workers at risk of developing work-related asthma (workers at high risk sites or with a high degree of individual susceptibility) is recommended as the basis for surveillance.	Strong	High
A pre-placement screening for specific cross-reacting, work-associated sensitisation among potentially high molecular weight, allergen-exposed people is recommended in order to identify those at higher risk of work-related asthma.	Strong	Moderate
Detection of sensitisation either by specific IgE or skin prick test should be included in surveillance (not only pre-placement) for identification of subjects at risk of work-related asthma with foreseeable regular exposure to high molecular weight agents (such as laboratory animals, bakery dust, enzymes or latex).	Strong	Moderate
In atopic people and those with pre-existing asthma or sensitisation pre-employment investigation should be performed in order to inform them about their increased risk of work-related asthma. Because of the low positive predictive value, exclusion of asymptomatic atopic people or those sensitised from exposure to potential occupational allergens or irritative agents cannot be recommended.	Weak	Moderate

Recommendation	Strength of recommendation	Level of evidence
<p>Medical surveillance programmes should be performed in all workers with confirmed occupational rhinitis and/or nonspecific bronchial hyperresponsiveness. They should include periodic administration of a questionnaire, detection of sensitisation using standardised skin-prick tests or serum-specific IgE antibodies, early referral of symptomatic and/or sensitised workers for specialised medical assessment and assessment of asthma. Surveillance programmes should be already implemented during vocational training of individuals at risk.</p>	Strong	Moderate
<p>Identification of symptoms or sensitisation during surveillance should result in investigation to confirm or exclude occupational asthma, work-aggravated asthma, rhinitis and COPD.</p>	Strong	High
<p>Risk stratification by diagnostic models can be used in medical surveillance to select exposed workers for further medical evaluation.</p>	Strong	Moderate
<p>A comprehensive medical surveillance programme as a secondary prevention measure should (in addition to early detection of sensitisation, allergic symptoms, and occupational asthma) comprise of exposure assessment and intervention targeted both at workers and exposure.</p>	Strong	Moderate

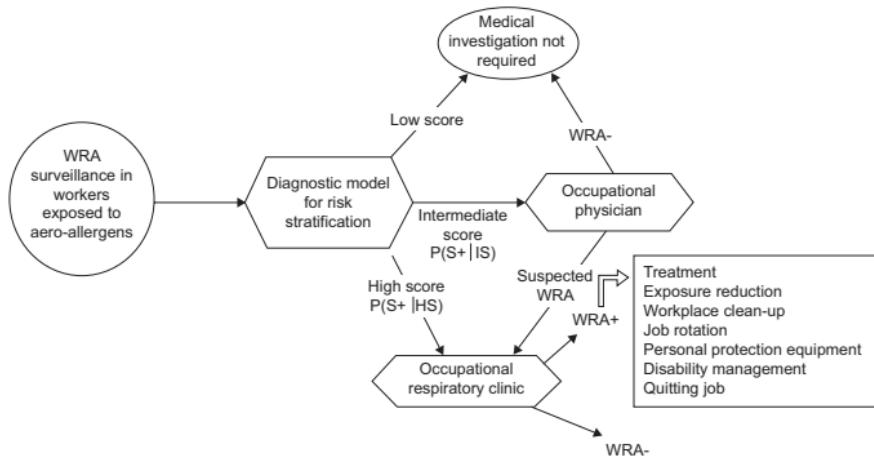


Figure 3. European Respiratory Review, Vol. 21 no. 124 page 108.

8. DOES CONTROLLING EXPOSURE PREVENT ASTHMA?

The following are recommendations for key question 5:

What is the impact of controlling work-related exposure to prevent asthma?

Recommendation	Strength of recommendation	Level of evidence
Exposure elimination is the strongest preventive approach to reducing the disease burden of work-related asthma and is the preferred primary-prevention approach.	Strong	High
If elimination is not possible, reduction is the second-best option for primary prevention of work-related asthma based on exposure-response relationships.	Strong	Moderate
There is limited evidence of the effectiveness of respirators in preventing occupational asthma, and other options that are higher in the hierarchy of controls for occupational exposures, notably eliminating or minimising exposures at the source or in the environment, should be used preferentially.	Strong	Moderate
Stop using powdered allergen-rich natural rubber latex gloves.	Strong	High

9. CONCLUDING COMMENTS

General observations

In producing this evidence-based guideline, we aimed to gather evidence in a systematic manner regarding the management options for work-related asthma and of the effectiveness of these options. Topics studied included diagnostic aspects, identification of risk factors, screening and surveillance, as well as preventative measures and optimal treatment for those affected by work-related asthma.

In recent years the Global Initiative for Asthma (GINA) has revised their guidelines to change the focus from asthma severity to asthma control. The emphasis is now on carefully titrating drug doses according to level of asthma control. This change in emphasis is also relevant for work-related asthma, but it is worth highlighting that the benefits of avoiding exposure far exceed those of even optimal drug treatment.

Physicians must be able to identify whether a patient is adequately controlled, understand how increments of control can be achieved by adjusting exposure levels and/or the therapeutic regimen, and evaluate the resulting improvements (or lack of improvements).

FINAL SUMMARY

- Use existing recommendations from GINA to optimise the assessment of effect of interventions in those with work-related asthma.
- Exposure avoidance (or at least reduction) is the most effective primary prevention measure, as the level of exposure to allergenic or irritative airborne agents is the dominant risk for work-related asthma. (There is less evidence for the effectiveness of secondary prevention, in which sensitisation or early symptoms are identified using health surveillance programmes with the aim of avoidance or substantial reduction in causative exposures.)
- Tertiary prevention involves a therapeutic and general asthma management plan, and may include a change in workplace or even a change in job for those who continue to have symptoms despite efforts to control exposures and optimise management.
- Pharmacological treatment and the use of respirators are of limited effect.
- Lack of data concerning the relationship between work-related asthma and sex, age, smoking and type of causative agent, means that we cannot make recommendations about these factors.
- Whilst the aforementioned statements refer broadly to work-related asthma (both new-onset and work-aggravated occupational asthma), there are comparatively few studies concerning work-aggravated occupational asthma. Nevertheless, there is a general consensus that reduction in causative exposures and intensified surveillance and treatment are urgent measures for work-aggravated occupational asthma, and if these are not successful then a change in job needs to be considered.
- Better patient education is needed in order to improve each individual's ability to cope with unplanned harmful exposure, exacerbations, avoiding risk factors, and in order to understand the full benefits of smoking cessation.
- Detailed information on work-related asthma needs to be supplied to employees, employers and medical personnel in order to raise awareness and promote earlier detection of work-related asthma.

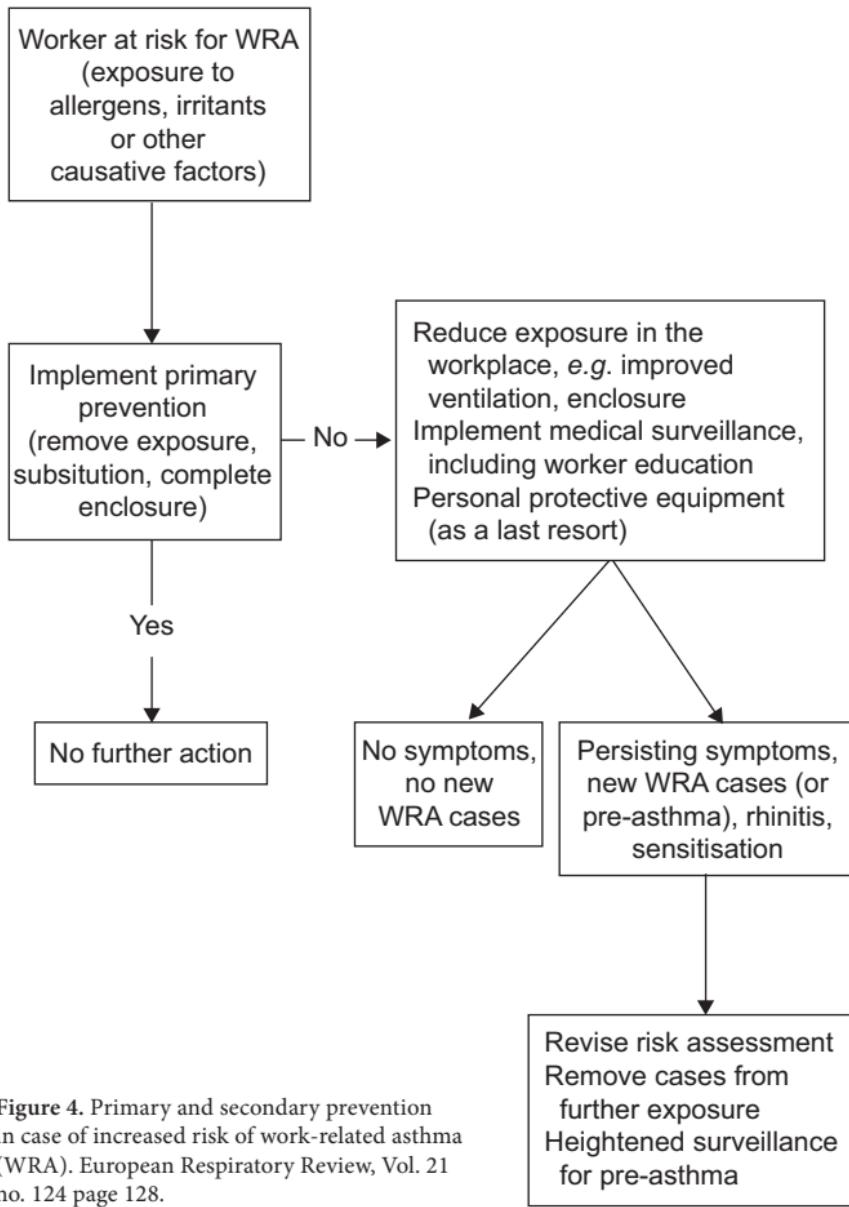


Figure 4. Primary and secondary prevention in case of increased risk of work-related asthma (WRA). European Respiratory Review, Vol. 21 no. 124 page 128.

10. OUR OVERALL RECOMMENDATIONS

for the effective prevention and management of work-related asthma are:

1. Avoidance of exposure to causative agents or, if this is not possible then to reduce exposure;
2. Screening and monitoring (surveillance) of endangered workers (workers at high-risk sites or with a high degree of individual susceptibility);
3. Comprehensive assessment of disease in suspected cases (diagnostics);
4. Pharmacological treatment of people with obstructive ventilation patterns, nonspecific bronchial hyperresponsiveness (NSBHR) or work-related asthma symptoms.

11. ABBREVIATIONS

- **ACCP**, American College of Chest Physicians
- **AHRQ**, Agency for Healthcare research and Quality
- **ATS**, American Thoracic Society
- **BOHRF**, British Occupational Health Research Foundation
- **COPD**, chronic obstructive pulmonary disease
- **ERS**, European Respiratory Society
- **GINA**, Global Initiative for Asthma
- **GRADE**, Grading of Recommendations Assessment, Development and Evaluation
- **IgE**, immunoglobulin E
- **NSBHR**, nonspecific bronchial hyperresponsiveness
- **RCGP**, Royal College of General Practitioners
- **SIGN**, Scottish Intercollegiate Guidelines Network

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^a Adapted from the full guidelines for the management of work-related asthma by the European Respiratory Society (ERS), published as Baur X, Sigsgaard T, Aasen TB, et al. on behalf of the ERS Task Force on the management of work-related asthma Eur Respir J 2012; 39: 529–545.

13. ACKNOWLEDGEMENTS

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