Asthma and allergy: Short texts and recommendations of the expert conference of the French Speaking Pneumology Society (SPLF), in partnership with the French Society of Allergology and Clinical Immunology (SFAIC), the French Society of Occupational Medicine (SFMT) and the “Asthma—Allergy” association

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Asthma;
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Exploration

Summary
The Asthma Plan published by the French Health Ministry in 2002, the experts conferences edited by ANAES on therapeutic education and follow-up of asthma, the inclusion of this disease in the Public Health Law have been remarkable steps in France during the last few years. The medical community, more particularly the pneumological community, has shown its commitment in the treatment of this public health problem. But allergy was not sufficiently taken into account, although it is responsible for nearly 50 to 60% cases of asthma.
In most so-called developed countries the prevalence of asthma and of allergies has increased in the last twenty years. Its progress varies according to country and age group: the increased prevalence of allergy, more specifically of rhinitis and eczema, is most marked in children aged 6-7 year. The prevalence of asthma seems to have reached a plateau in certain northern countries or seems to have decreased in 13-14 year olds (Anglo-Saxon countries). There were multiple reasons, generally attributed to changes in life-style. Asthma is the result of an interaction between a genetic predisposition and the environment, where allergens are present, but also smoking.

The relationships between allergy and asthma are complex. This conference discussed the various essential issues that face doctors who treat patients with asthma in their daily practice. The risk factors, the methods of exploration in children and adults and the specific treatments are, indeed, essential issues to be evaluated in a frequent pathology that interests a large number of physicians. The variety of experts is wide, representing pneumology (French Speaking Pneumology Society), the occupational medicine world (French Society of Occupational Medicine), the allergic pathology (French Society of Allergology and Clinical Immunology), and patients with the patient association "Asthma & Allergy", physicians belonging to the general medicine community, general hospitals, private hospitals and academic hospitals in France. The proposed guidelines are aimed at helping practitioners in distinguishing what is established from what remains to be demonstrated and/or assessed with respect to the different modalities for the exploration or treatment of allergic asthma.

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Introduction

The Asthma Plan on therapeutic education and follow-up of asthma was published by the French Health Ministry in 2002. The inclusion of this disease in the Public Health Law has been remarkable steps in France during the last few years. The medical community, in particular the pneumological community, has shown its commitment in the treatment of this public health problem.

In most developed countries the prevalence of asthma and of allergies has increased in the last 20 years. Their progress varies according to country and age group: the increased prevalence of allergy, more specifically of rhinitis and eczema, is most marked in children aged 6-7 year. The prevalence of asthma seems to have reached a plateau in certain northern countries or seems to have decreased in 13–14 years old (Anglo-Saxon countries). There were multiple reasons, generally attributed to changes in life-style. Asthma is the result of an interaction between a genetic predisposition and the environment, where allergens are present, but also smoking.

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In order to provide answers to each question according to evidence-based medicine and to propose guidelines, the organizing comity, representing the French Speaking Pneumology Congress, to prepare remarks. The selected level of recommendation was that proposed by the High Health Authority with 3 levels (A, B, C). These recommendations are issued from "the Agence Nationale d'Accréditation et d’Evaluation en Santé: Analyse de la littérature et gradation des recommandations: Guide Méthodologique. 2000".

**Level A**

Recommendation based on scientific proof supported by studies with a strong level of evidence. High power, randomised, comparative studies without major bias, meta-analyses of randomised studies, decision analyses based on well controlled studies; exceptionally a Level A was attributed by the experts to a recommendation based on less rigorous scientific proof but corresponding to a "strong message fort" delivered by the experts conference.

**Level B**

Recommendation based on a scientific presumption supported by studies of intermediary evidence level; e.g. low power, randomised, comparative studies, meta-analyses with questionable methodology, non-randomised but well conducted studies, cohort studies.

**Level C**

Based on studies of lower evidence level; e.g. case-control studies, series of cases. In case of lack of precision, the proposed recommendations are based on occupational agreement in the working group and the reading group (expert advice).

**Question 1: What is the role of allergy in the clinical expression of asthma?**

Allergy is not sufficiently taken into account, although it is associated with 8–63% cases of asthma. The percentage of
asthma attributable to atopy based on one positive skin
prick test is around 30% in adults.

Sensitization and exposure to allergens in the household and exterior environment increase the risk of the occurrence of asthma symptoms, as well as the risk of exacerbations of asthma, both for urgent visits or for Hospital admissions.\textsuperscript{1–10}

Q1-1: What are the relationships between exposure to allergens and symptoms of asthma?

The exposure to allergens of cats, cockroaches, mites, pollen and fungi (Aspergillus, Alternaria and Cladosporium) in sensitive populations is associated with the appearance of asthma symptoms. The severity of asthma in sensitive children and young adults depends on the level of exposure to allergens. The allergological examination is founded on questioning the patient (where, when and how do symptoms appear?) and on the results of skin prick tests. The various life and work sites should be considered.

R1:- It is recommended to question all asthma patients on their domestic, interior, exterior and occupational environment and to screen for relationships between the exposure to an allergen and the occurrence of symptoms (Level A).

Question 2: When and how to perform an allergological exploration?

Q2-1: Is an allergological exploration necessary in every asthma patient?

Is an allergological enquiry necessary for every asthma patient older than 3 years? The results of the questioning will direct the allergological exploration. The allergens to be tested are adapted to age, clinical history and environment.\textsuperscript{11,12}

R2:- An allergological exploration is recommended for every asthmatic patient older than 3 years (Level A).

Is an allergological exploration necessary in all children less than 3 years old?

R3:- An allergological exploration is recommended in all infants aged less than 3 years old with persistent and/or recurring and/or severe respiratory symptoms and/or requiring continuous anti-asthmatic treatment and/or associated to extrarrespiratory symptoms compatible with an allergic origin. This includes a history compatible with food allergy (Level B).

Q2-2: Which allergens are to be tested?

What are the allergens to be tested beyond the age of 3 years?

R4:- It is recommended to test aeroallergens: mites, cats, dogs, tree pollen, grass pollen, herb pollen (ambrosia, artemisia, plantain), and the most commonly involved fungi (Aspergillus, Alternaria, Cladosporium) (Level A). Other allergens, including cockroaches, should be tested according to the results of the questioning and the locoregional data (Level B).

Which allergens should be tested before the age of 3 years?

R5:- In children it is recommended to test indoor aeroallergens (mites, cats, dogs,) and food allergens (cow’s milk, eggs, peanuts, soja, codfish, nuts) (Level C). Positive skin prick tests at this age more (Level B) often indicate a risk factor for persisting respiratory symptoms than a real allergy. Therefore dietary restrictions are rarely required but respiratory and allergological follow-up is recommended (Level C). Other aeroallergens can be tested according to local ecology and clinical history (Level C).

Q2-3: What is the place of skin prick tests in the diagnosis of allergy in asthmatic patients?

Skin prick tests are widely used to identify the presence (of absence) of specific IgE for an allergen on mast cells in the skin (NP1).\textsuperscript{12–16}

R6:- Skin Prick tests are recommended as first line tests in the exploration of allergy (Level B).

Testing with a positive control (histamine 10 mg/ml or codeine phosphate 9%) can help to quantify the response to allergens and a negative result can indicate an inability of the skin to respond to the usual mastocyte stimuli. A positive test with the solvent of the allergens (negative control) can detect dermographism. Dermographism makes the tests impossible to assess.\textsuperscript{13–17}

R7:- It is recommended to perform a skin prick test with a negative control (using the solvent that is used to dilute the allergens that are tested) and a positive control (Level A).

R8:- It is recommended to repeat the skin prick tests if asthma persists in infancy or if the clinical evolution is not favourable (Level C).

The modification of the reactivity of the skin due to immunotherapy is very variable and is not correlated to its efficacy in the case of pneumoallergens.

R9:- It is not recommended to repeat the skin prick tests for assessing the effectiveness of a specific immunotherapy (Level B).

R10:- It is recommended to consider the result of a skin prick test to an allergen as positive if the diameter of the wheal is 3 mm or more (negative control with solvent) (Level B).

A positive skin prick test to an allergen reveals a sensitivity to this allergen. The role of this allergen in the exacerbation of symptoms is reflected in the findings with respect to this sensitivity and the questioning.\textsuperscript{12–17}

R11:- It is recommended to compare the result of a skin prick test with an allergen to the findings of the questioning and to the clinical data (Level B).

Q2-4: What is the place of serial blood tests in the diagnosis of allergy in asthma patients?

Blood tests should only be requested in the context of the questioning and of the clinical examination. As for skin tests, the presence of specific serum IgE for an allergen does not mean that the patient’s symptoms are related to the identified allergen. Isolated biological results, independent from each other and from the clinical data, cannot
Asthma and allergy

In the general population asthma and atopy are no risk factors for anaphylactic reactions to stings by hymenoptera. In bee farmers with an allergy to hymenoptera, rhinoconjunctivitis and allergic asthma increase the risk of developing systemic reactions to a bee sting.

R20: It is recommended to take the same precautions when practicing skin tests or desensitization for hymenoptera in patients with asthma or without (experts’ opinion). If the asthma is not controlled, the case in patients with allergic asthma, increases the risk of anaphylactic or anaphylactoid accidents with curare.

R18: It is not recommended to systematically carry out tests for curare in patients with allergic asthma having to undergo general anaesthesia (Level B).

Q3-2: Is allergic asthma a risk factor for vaccination accidents?

The risk of anaphylaxis following vaccination is low. Sensitivity to eggs is a risk factor for allergic accidents to vaccines containing egg protein. In asthma patients sensitized to eggs, without clinical history of allergy to eggs, there is no evidence that asthma is a risk factor for allergic accidents with vaccines containing egg protein.

Q3-3: Is allergic asthma a risk factor for allergy to penicillins?

Atopy does not increase the risk of developing an allergic reaction to beta-lactam antibiotics. Allergic asthma does not increase the risk of reactions to penicillins (expert opinion). Allergic asthma does not increase the risk of secondary reactions in diagnostic skin tests with beta-lactam antibiotics.

R19: It is not recommended to contraindicate the administration of beta-lactam antibiotics in patients with allergic asthma, except in cases of documented allergic antecedents to this class of antibiotics. In case of a suspected history of allergy to penicillin, an exploration is necessary in order to confirm or exclude allergy to penicillin, prior to any prescription of antibiotics of this class. In case of documented allergy to penicillin, all antibiotics belonging to this class are to be avoided (Level C). The choice of a cephalosporin will be guided by skin tests with the cephalosporin (Level B).

Q3-4: Is allergic asthma a risk factor for allergy to Hymenoptera?

Myorelaxants are responsible for more than 50% of the anaphylactic accidents in anaesthesia. The question is whether the presence of atopy, as is by definition the
Anaphylactic shock is more severe in asthmatic patients. NSAIDs are also risk factors or contribute to severity. Alcohol, stress (stress anaphylaxis) or the use of aspirin or some, such as peanuts, tree-nuts and sesame, are more asthma. Asthma is a risk factor for the development of anaphylactic shock after the ingestion of food. Small cohort and case reports in patients with a history of asthma increases the risk of fatal accidents. An analysis of death of respiratory origin is frequent. The most severe manifestations of food allergy in children and adults occur in patients with asthma. The incidence of reactions is three times higher with iodine containing contrast media than with non-ionic ICCM. In 1998 the American College of Radiology (Manual on Contrast Media) recommended the use of low osmolality iodine containing contrast media in patients with asthma. In patients with uncontrolled asthma, the benefit/risk ratio should be considered prior to proposing an examination with iodine containing contrast media.

Premedication based on corticoids and/or antihistaminic drugs is often prescribed. Anaphylactic reactions to iodine containing contrast media are rare. The usefulness of premedication prior to using iodine containing contrast agents is not demonstrated, neither in a random population, nor in patients with atopy.

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It is not recommended to use premedication in asthmatics (expert opinion). Particular precautions should be taken in bee farmers, especially when they have an emergency kit and an allergy card in order to prevent and treat anaphylactic shock. In about 80% of cases rhinitis is associated to asthma. Controlling the disease is more difficult in patients with asthma who also suffer from intermittent rhinitis or persistent rhinitis. Screening for ENT involvement is necessary in patients with asthma. Questioning the patient has an important diagnostic value in rhinitis and the absence of ENT symptoms has a good negative predictive value. Specific treatment of rhinitis can have a beneficial effect on asthma.

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The incidences of allergic asthma and of AD increase in parallel. The increased risk of developing asthma in case of AD is controversial. AD and asthma frequently coexist in young children. Certain studies suggest a correlation between the severity of asthma and of AD. The diagnosis of AD is a clinical one and is based on the criteria of the United Kingdom Working Party (UKWP) (pruritus associated to at least 3 of 5 criteria, based on the antecedents and the appearance of the skin). These manifestations should be screened for in children with asthma (experts opinion).

It is recommended to screen for AD by questioning and by a clinical examination in each child with allergic asthma. The incidences of allergic asthma and of AD increase in parallel. The increased risk of developing asthma in case of AD is controversial. AD and asthma frequently coexist in young children. Certain studies suggest a correlation between the severity of asthma and of AD. The diagnosis of AD is a clinical one and is based on the criteria of the United Kingdom Working Party (UKWP) (pruritus associated to at least 3 of 5 criteria, based on the antecedents and the appearance of the skin). These manifestations should be screened for in children with asthma (experts opinion).

In asthmatic patient with food allergy, it is recommended to eliminate the responsible allergen, to have an emergency kit and an allergy card in order to prevent and treat anaphylactic shock. A subcutaneous specific immunotherapy against mites or pollen is effective against the symptoms of asthma, the use of drugs and the level of bronchial hyperreactivity. Improvement in antigen sensitivity assessed by provocation
test was demonstrated in patient sensitized to ragweed under specific immunotherapy. This is in favour of bronchoprotective effect of SIT. The clinical effects of a specific subcutaneous immunotherapy (SIT) can persist until several years after discontinuation of the treatment. Specific immunotherapy (SIT) prevents acquiring new sensitizations to pneumoallergens in children. Immunotherapy in patients with rhinitis reduces the risk of asthma. The effectiveness of sublingual desensitization (SLIT) on the symptoms of asthma has been demonstrated in certain clinical studies including a subgroup of patients with asthma, and in specific studies with asthma. It may represent an alternative treatment for subcutaneous SIT.45–50

R29:- It is not recommended to carry out SIT with more than two allergens belonging to different families (Level C).

SIT can only be used for allergens with a demonstrated effectiveness in well controlled clinical studies. In practice, for asthma, this is limited to mites and pollens of grass, birch and Ambrosia.

R30:- It is recommended to use SIT with allergens with a demonstrated effectiveness and safety (mites, pollen of grass, birch and Ambrosia) (Level B).

The incidence of systemic reactions to SIT is estimated at 1 in 1250–2206 injections (most often local reactions, the incidence of death is 1 in 1–2 million injections). Patients with asthma have a higher risk of presenting serious systemic manifestations, particularly if the asthma is not controlled or if the FEV1 is less than 70% of the predicted value.

R31:- In view of the risk of side-effects, particularly of bronchospasm, more specifically in the phase of increasing doses, it is recommended to propose SIT only in patients with controlled asthma with a nearly normal ventilatory function (FEV1 more than 70% of the expected value) (Level A).

R32:- It is recommended to perform the injections under immediate supervision by a physician, after examination of the clinical condition, supervision of the patient in the physician’s office for at least half an hour following the injection, availability of treatment of anaphylactic reactions (in particular injectable epinephrine) (Level A).

Q5-2: What is the place of anti-IgE in the treatment of allergic asthma?

A recently published meta-analysis demonstrated the effectiveness of omalizumab in the treatment of severe asthma of allergic origin, particularly in allowing a 50% reduction of the daily dose of inhalation corticosteroids or a 45% reduction of asthma exacerbations compared to placebo.

In cases of severe asthma anti-IgE are effective in reducing the frequency of exacerbations, the symptoms and the quality of life. It is, however, impossible, at an individual scale, to define predictive factors of effectiveness of this treatment.51

R33:- It is recommended to limit treatment with anti-IgE to poorly controlled, severe, persistent allergic asthma (age more than 12 years), in addition to optimal conventional treatment (Level A).

What assessment is recommended before deciding on a treatment with anti-IgE?

It should only be proposed after a complete assessment of the patient with evaluation of asthma and allergic status.

R34:- It is recommended to confirm the diagnosis of the severity and the level of control of asthma (assessment of control with questionnaire and pulmonary function tests), to ensure treatment of aggravating factors and to control the adhesion to treatment before proposing treatment with an anti-IgE (Level B).

Q5-3: What is the place of the avoidance of allergens in the treatment of allergic asthma?

The assessment of the effectiveness of measures to eliminate aeroallergens from the domestic environment mainly concerns mites. The publication of a meta-analysis, surveying patients with a poorly defined allergological diagnosis and using only one single method for the elimination of mites for variable periods of time, revealed that, for mites, the effectiveness of this method was not established. The effectiveness of overall elimination was established in children with severe persistent allergic asthma. There was a correlation between clinical improvement and the extent of reducing the allergen. In adults, several limited studies have shown the effectiveness of the elimination of mite allergens.52–54 Although complete avoidance of allergens in high altitude was found to improve the control of asthma, most avoidance measures for mites, animal danders and cockroaches are poorly effective. In inner cities, home-based environmental interventions were found to improve asthma.

Should measures for the elimination of allergens be proposed?

R35:- It is recommended to eliminate the responsible allergens, as much as possible, for children suffering from allergic asthma (Level B). Although there are not, as yet, sufficient data with adults suffering from allergic asthma, the avoidance of allergens is recommended (Level B).

Measures against mites

Reducing the relative humidity, using anti-mite covers, washing and drying tissues, weekly vacuum cleaning and changing bed linen should eliminate mites. The nature of the floor (vinyl or wood) could minimise mite content within bedroom. The global allergen reduction requires the use of anti-mite covers and, if needed, a complete change of bed linen, regular washing of bedroom textile (every 3 months) and weekly vacuum cleaning following an assessment of the mite load. The cost of these measures is high and is not always feasible in normal practice.

R36:- When elimination is proposed, the most complete elimination of mites from the bedroom is recommended in cases of mite induced allergic asthma, dependent on the allergenic load (Level C).

Allergens from cats, dogs and other pets

The concomitant use of air purification and a vacuum cleaner with HEPA filters results in a 98% reduction of the
levels of Fel d 1 in the absence of cats in the room. These measures do not affect the symptoms of asthma.55

R37:- It is recommended to eliminate cats, dogs or other pet animals in cases of animal induced allergic asthma or to keep the animal outside the house (Level C).

When elimination is not possible, no other technique has been able to demonstrate its effectiveness (Level C).

Should the environmental allergenic load be assessed?

There are two categories of dosing methods: domestic tests for use in daily practice by physicians, paramedics or the patient, and methods requiring a specialized laboratory and usually limited to use in epidemiologic research. This question only addresses domestic tests. Acarex-test38 measures the exposure to mite allergens in a semi-quantitative way. Rapid-test is a semi-quantitative (3 classes) screening for mite allergens.

R38:- It is recommended to assess the allergenic mite load in the house before proposing elimination measures (Level C).

Question 6: What are the interactions between allergic asthma and the occupational environment?

Q6-1: What is the fraction of the asthma risk attributable to occupational environment?

Occupational asthma (OA) is characterized by inflammation of the airways, variable bronchial obstruction and non-specific bronchial hyperresponsiveness due to causes and situations attributable to a particular occupational environment.56 OA should be distinguished from asthma that is aggravated by work, defined as persistent or recently appeared asthma, with manifestations that are exacerbated but not induced by the exposure to occupational nuisances.

The attributable risk is calculated based on the relative risk, measuring the consequences of the presence of a risk factor on the occurrence of the disease compared to the absence of that factor. The fraction of the asthma risk attributable to the occupational environment can be defined as the number of cases of asthma that could be avoided in the absence of exposure to the sensitizing and/or irritating agents on the workplace. It can be assessed by studies in the general population (transversal studies, case-control studies, cohort studies). The fraction of the risk attributable to occupational exposure is of the order of 9–15%.57–62

R39:- It is recommended to question all asthma patients on the chronological relationship between their symptoms and occupational exposure, particularly in individuals exposed to agents known to be responsible for occupational asthma (Level A).

Occupations at risk

Many occupations are associated to an increased risk of asthma. Programmes for voluntary surveillance and studies based on registers give a somewhat different picture. The highest incidences of OA are observed in bakers and spray painters.63–65 High incidences were also reported in hairdressers, welders and in the plastics industry. Nearly 300 aetiological agents of OA were registered.66,67 A regularly updated Internet site lists causal agents and occupations at risk (www.asmanet.com).

R40:- It is recommended to thoroughly search for a occupational origin in a patient with asthma having a high-risk occupation: cleaning occupations, agriculture, bakers, painters, hairdressers, health care workers, welders (Level B).

Q6-2: How can occupational origin of asthma be diagnosed?

The diagnosis of asthma, that was suspected based on clinical manifestations, must necessarily be confirmed by respiratory function tests demonstrating a reversible airway obstruction and/or a non-specific bronchial hyperresponsiveness.

The positive predictive value of a suggestive clinical history is poor.68 The sensitivity of interrogating the patient has hardly been evaluated. The interrogation can be inconclusive, particularly in cases of long existing asthma. Including questions about the existence of wheezing at work could improve the quality of the interrogation.69

R41:- Due to the lack of specificity of the interrogation and the potentially severe consequences of the disease on the occupation situation, it is recommended to confirm the diagnosis of occupational asthma by objective methods (Level B).

Are immunological tests necessary in cases of suspected occupational asthma?

Skin prick tests are available for high molecular weight allergens of animal or vegetable origin. Dosing specific IgE is possible for most high molecular weight occupational allergens. It is only possible for a very small number of low molecular weight chemical allergens. The sensitivity of specific IgE is low for low molecular weight agents. The sensitivity of specific IgE is good for high molecular weight agents and their negativity practically rules out the involvement of the tested agent for asthma.

R42:- If the responsibility of a high molecular weight occupational allergen (animal or vegetable protein) is suspected, it is recommended to examine the relevance to this allergen with a skin prick test and/or dosing of specific serum IgE (Level B).

Has monitoring of the peak expiratory flow rate (PEFR) a place in the diagnosis of occupational asthma?

The sensitivity and the specificity of the PEFR, compared to specific inhalation challenges (SICs) tests or a combination of examinations, are generally of the order of 70%. The diagnostic reliability is affected by the number of daily measurements \((n = 4)\) and the duration of the observation period \((N = 4 \text{ months})\).70,71

R43:- Monitoring the peak expiratory flow rate (PEFR) or FEV\(_1\) is recommended in case of suspected occupational asthma (Level B).

R44:- It is recommended to interpret the results of the PEFR taking into account the episodes of exposure, the number and the duration of the measurements the treatment and the patient’s cooperation (Level C).
Are specific inhalation challenge tests necessary for the diagnosis of occupational asthma?
Specific inhalation challenge tests are often presented as the gold standard for the diagnosis of occupational asthma. There are, however, important limitations. The tests are time consuming, expensive, and potentially dangerous. The availability of these examinations is limited to few asthmatic centers.

R45: It is recommended to carry out a specific inhalation challenge test in specialized centers if the diagnosis of occupational asthma is not possible with other diagnostic means (Level C).

When should the exploration for occupational asthma be carried out?
The sensitivity of the diagnostic tests is reduced if the individual is no longer exposed to the agent that he is sensitive to.

R46: It is recommended to carry out the investigation at a time of occupational activity, except if the severity or the control of the asthma requires immediate elimination of the allergen (Level B).

Who should carry out the exploration for occupational asthma?
No single test allows for a diagnosis of occupational asthma. Each of them can result in false positive and/or false negative results and the criteria for positive result sometimes remain largely subjective.

R47: It is recommended that the interpretation of the results is done by a physician experienced in occupational asthma management (Level C).

Q6-3: What drugs should specifically be proposed in occupational asthma?

R48: It is recommended to use drug treatments in the same way as for not occupational asthma (Level C).

Should a specific immunotherapy be proposed for occupational asthma?
There are very few studies with specific immunotherapy for occupational asthma. The best-documented studies are with subcutaneous or sublingual immunotherapy in health care workers with latex allergy. This is a high-risk treatment because of the observed systemic reactions. There are a few publications on studies with desensitization to wheat flower, maple tree and rats, and these studies included very small number of subjects and/or uncontrolled.

R49: It is recommended not to carry out a specific immunotherapy in cases of occupational asthma (Level B).

Should discontinuation of exposure to the causal agent be proposed?
There is a general consensus that early and complete discontinuation of exposure to the causal agent is the best treatment for occupational asthma, but a discontinuation of exposure is often obtained at the price of serious social consequences, particularly in France, because of the absence of adequate accomplishment for the specific problem of occupational asthma. The long-term effects of reducing the exposure on the evolution of OA have been studied and the results are contradictory. They seem better for asthma induced by latex, platinum salts or trimellitic anhydride than for isocyanates. Complete discontinuation of the exposure remains the best treatment of occupational asthma, but reducing the exposure may represent an acceptable compromise in certain cases in order to limit the negative socioeconomic consequences.

R50: It is recommended, as far as possible, to remove the worker from the causal agent (Level B).

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