

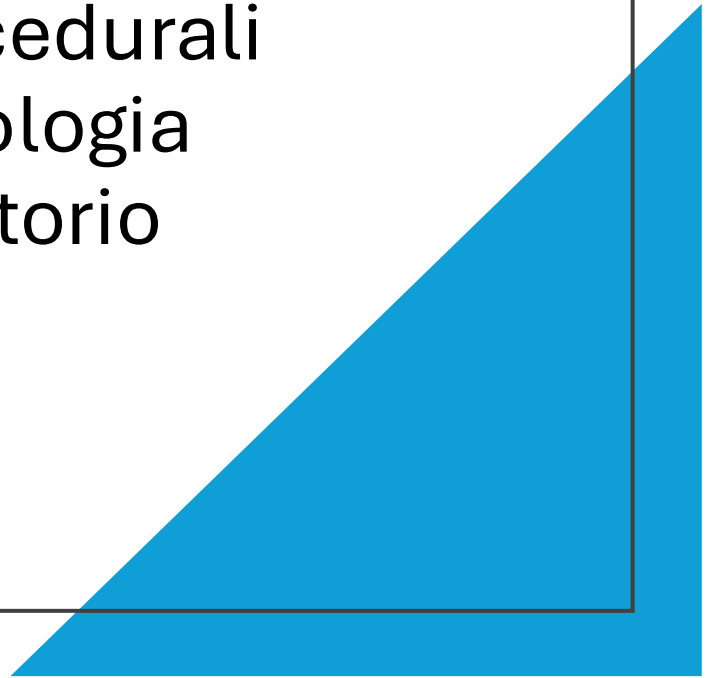
CONVEGNO
PATOLOGIE RESPIRATORIE BENIGNE LAVORO CORRELATE

Bologna - Quartiere fieristico – Mercoledì 27 maggio 2026 ore 09:00-13:00
Nell'ambito di AMBIENTE-LAVORO 2026
Salone Nazionale della salute e sicurezza nei luoghi di lavoro Sala DIREZIONALE, capienza 100 posti

**Presentazione delle attività e percorsi clinico-diagnostici del Centro per
la diagnostica di secondo livello delle pneumopatie lavoro correlate**

**SCUOLA DI SPECIALIZZAZIONE
IN MEDICINA DEL LAVORO**
Direttore Prof. Massimo Corradi
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Tel: +39 0521 033098
e-mail: massimo.corradi@unipr.it

Un centro per la diagnostica **di secondo livello delle pneumopatie lavoro correlate** deve applicare indirizzi procedurali e protocolli diagnostici per ogni patologia professionale dell'apparato respiratorio



Per ogni malattia è previsto un iter diagnostico in step, così strutturato:

1. Validazione della
diagnosi clinica

2. Ipotesi eziologica di
malattia professionale

3. Acquisizione di
tutta la
documentazione
inerente l'esposizione
lavorativa

4. Anamnesi lavorativa

5. Diagnosi di malattia
professionale e
valutazione della
funzionalità

6. Considerazioni
medico-legali



NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

Work-related Asthma

Work-related asthma is triggered or develops from exposures at work

WORK-RELATED ASTHMA

```
graph TD; WRA[WORK-RELATED ASTHMA] --> OA["Asthma caused by work  
=  
OCCUPATIONAL ASTHMA (OA)"]; WRA --> WEA["Asthma exacerbated by work  
=  
WORK-EXACERBATED ASTHMA (WEA)"]; OA --> AO["ALLERGIC OA  
-IgE dependent  
-Non IgE dependent"]; OA --> NAOA["NON ALLERGIC  
IRRITANT-INDUCED OA  
(IIOA)"]; NAOA --> RADS["Single exposure  
=  
RADS"]; NAOA --> MIOA["Multiple exposures  
=  
IRRITANT INDUCED OA AFTER  
MULTIPLE EXPOSURES"];
```

Asthma caused by work
=
OCCUPATIONAL ASTHMA (OA)

Asthma exacerbated by work
=
WORK-EXACERBATED ASTHMA (WEA)

ALLERGIC OA
-IgE dependent
-Non IgE dependent

NON ALLERGIC
IRRITANT-INDUCED OA
(IIOA)

Single exposure
=
RADS

Multiple exposures
=
IRRITANT INDUCED OA AFTER
MULTIPLE EXPOSURES



Occupational lung disease: when should I think of it and why is it important?

- Paziente di età lavorativa che si presenta per:
 - Nuovi sintomi suggestive di asma
 - Ricomparsa di pregressa asma
 - Scarso controllo dell'asma
 - Alterazioni spirometriche



Occupational Asthma: A Review

Lynda J. Lombardo and John R. Balmes

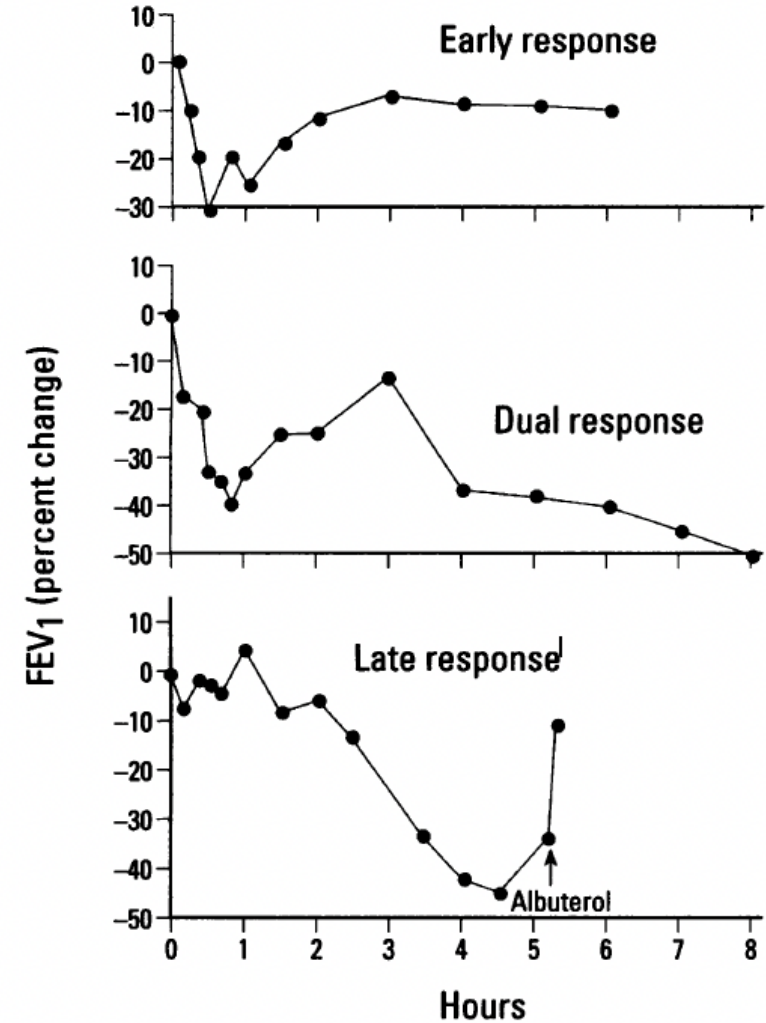


Figure 1. Potential responses to inhalation of sensitizing agent in patients with immunologic occupational asthma.

A Novel Questionnaire and Algorithm for Work-Related Asthma Screening and Surveillance: An EAACI Task Force Report

WAQASS QUESTIONNAIRE	
	Score
Asthma-related symptoms	
1.1 Have you had wheezing or whistling in your chest at any time in the last 12 months?	
____ Yes (1) ____ No (0)	
1.2 Have you woken up with a feeling of tightness in your chest at any time in the last 12 months?	
____ Yes (1) ____ No (0)	
<i>Note: For questions 1.3-1.6, "attack" is regarded as an episode of a flare-up or sudden worsening of symptom/s</i>	
1.3 Have you had an attack of shortness of breath that came on during the day when you were at rest at any time in the last 12 months?	
____ Yes (1) ____ No (0)	
1.4 Have you had an attack of shortness of breath that came on following strenuous activity or exercise at any time in the last 12 months?	
____ Yes (1) ____ No (0)	
1.5 Have you been woken by an attack of shortness of breath at any time in the last 12 months?	
____ Yes (1) ____ No (0)	
1.6 Have you been woken by an attack of coughing at any time in the last 12 months?	
____ Yes (1) ____ No (0)	

GENERAL ASTHMA TOTAL SCORE (GATS)	
Work-related asthma symptoms	
4.1 Does being at your current workplace ever cause:	
4.1.1 Wheezing	
____ Yes (1) ____ No (0)	
4.1.2 Shortness of breath	
____ Yes (1) ____ No (0)	
4.1.3 Cough	
____ Yes (1) ____ No (0)	
4.1.4 A feeling of chest tightness	
____ Yes (1) ____ No (0)	
4.1.5 Asthma attack/s (episode of a flare-up or sudden worsening of symptoms)	
____ Yes (1) ____ No (0)	
4.2. Do you have any of the following breathing problems once you have returned home after work:	
4.2.1 Wheezing	
____ Yes (1) ____ No (0)	
4.2.2 Shortness of breath	
____ Yes (1) ____ No (0)	
4.2.3 Cough	
____ Yes (1) ____ No (0)	
4.2.4 A feeling of chest tightness	
____ Yes (1) ____ No (0)	
4.2.5 Asthma attack/s (episode of a flare-up or sudden worsening of symptoms)	

Diagnosi di asma

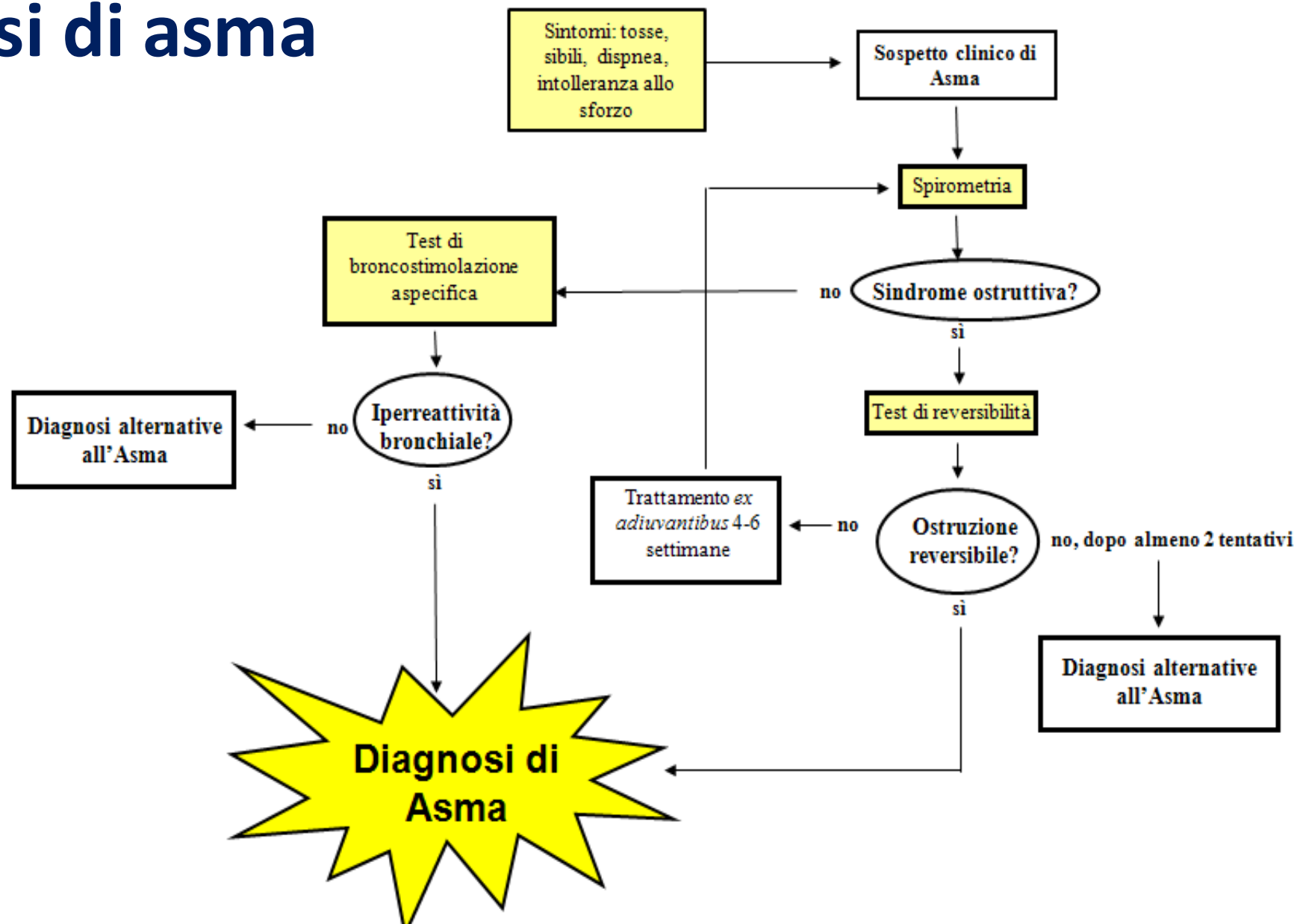


2. CONFIRMED VARIABLE EXPIRATORY AIRFLOW

Adults: increase from baseline in FEV₁ or FVC of $\geq 12\%$ and ≥ 200 mL, with greater confidence if the increase is $\geq 15\%$ and ≥ 400 mL; or increase in PEF[†] $\geq 20\%$ if spirometry is not available (see p.32 for more information about these criteria)

Adults: Fall from baseline in FEV₁ of $\geq 20\%$ with standard doses of methacholine, or $\geq 15\%$ with standardized hyperventilation, hypertonic saline or mannitol challenge, or $>10\%$ and >200 mL with standardized exercise challenge

Diagnosi di asma



Collaborazione tra medico del lavoro e pneumologo





Description of Exposure Codes

Exposure Code Lookup

Video Center

Member Login

Enter a hazard or keyword (a partial entry is okay)

Hazard/Keyword

Search

Clear

Display All Asthmagens

Display All Hazards

Export to Excel

Instructions

Enter a hazard or keyword (a partial entry is okay)

Hazard/Keyword

cobalt

Search

Clear

Display All Asthmagens

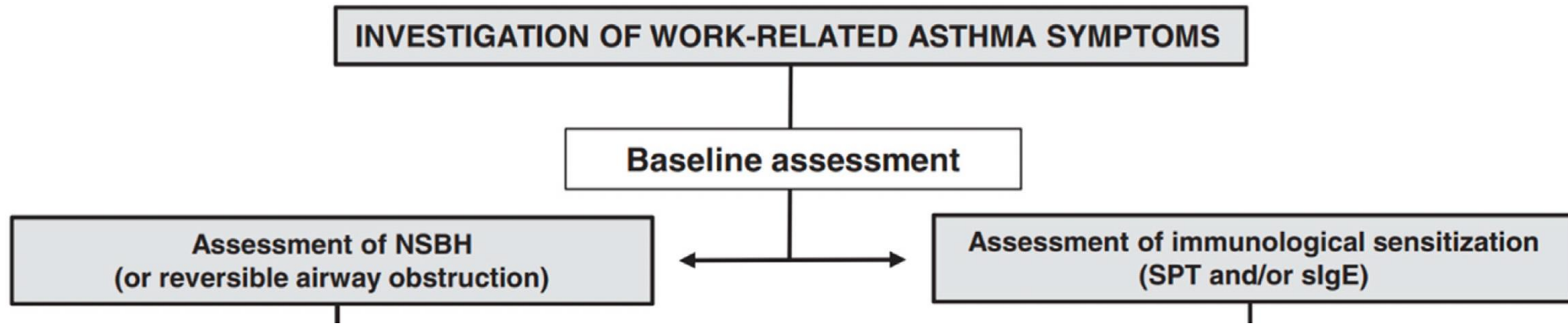
Display All Hazards

Export to Excel

Instructions

AOEC Exposure Code	Primary Name	Synonym	P=Pesticide S=Solvent	A=Asthmagen	Rs=Sensitizer Rr=RADS Rrs=Both R=Meets neither G=Generally accepted
020.151	Cobalt	Cobalt		A	Rs
020.150	Cobalt Compounds	Cobalt Compounds		A	G
020.451	Tungsten Carbide/Cobalt	Tungsten Carbide/Cobalt		A	Rs
020.602	Joint replacement, elevated cobalt	Joint replacement, elevated cobalt			

How Allergists Can Perform an Occupational History in Every Patient



A Guide to the Diagnosis and Treatment of Occupational Asthma

Agents	Industry or occupation	Skin test reaction	Specific IgE antibodies
Isocyanates			
Toluene diisocyanate	Polyurethane foam manufacturing, paint application, plastics	CD	CD
Diphenylmethane	Core production in foundries, paint application	—	+
Anhydrides			
Trimellitic anhydride	Plastics, epoxy resins	+	+
Phthalic anhydride	Plastics, epoxy resins	+	+
Amines			
Ethanolamines	Soldering, paint application, machining metal products	—	CD
Other chemicals			
Formaldehyde	Hospital personnel, laboratory technicians, chemical production	—	—
Metals			
Nickel	Metal plating	+	CD
Cobalt	Hard metal manufacturing	+	ND
Chromium salts	Leather tanning	CD	+
Vanadium	Hard metal manufacturing	ND	ND
Zinc	Metal plating	CD	—
Platinum salts	Platinum refining	+	—
Vegetable and wood products			
Grain	Grain processing	+	—
Wheat/rye flour	Baking, food processing	+	+
Castor beans	Castor oil production	—	+
Raw tobacco	Tobacco production	+	+
Coffee beans	Coffee production, processing	+	+
Western Red cedar	Logging, lumber processing, home building, cabinet production	+	+
Colophony (pine resin)	Electronics manufacturing	CD	+
Gum acacia	Printing	+	—
Natural rubber latex	Health care	ND	+



Substances that can cause occupational asthma



Allergy. 2019;74:261–272.

Are high- and low-molecular-weight sensitizing agents associated with different clinical phenotypes of occupational asthma?

TABLE 1 Causal agents

High-molecular-weight agents	n (%) ^a	Low-molecular-weight agents	n (%) ^a
Flour/grains	369 (31.3)	Isocyanates	206 (17.4)
Latex	36 (3.0)	Persulfate salts	78 (6.6)
Enzymes	26 (2.2)	Metals	42 (3.6)
Storage mites	12 (1.0)	Quaternary ammonium compounds	38 (3.2)
Rodents	11 (0.9)	Acrylate compounds	35 (3.0)
Cow dander	11 (0.9)	Wood dusts	35 (3.0)
Fish/seafood	8 (0.7)	Welding fume	30 (2.5)

Are high- and low-molecular-weight sensitizing agents associated with different clinical phenotypes of occupational asthma?



Retrospective multicenter study (2006-2015)
20 tertiary centers from 11 European countries
1.180 subjects with positive specific inhalation challenge

**LOW-MOLECULAR-WEIGHT
AGENTS**
(n=544)

↑ Chest tightness at work
↑ Daily sputum at work
↑ Late asthmatic reaction
↑ Severe exacerbations

**HIGH-MOLECULAR-WEIGHT
AGENTS**
(n=635)

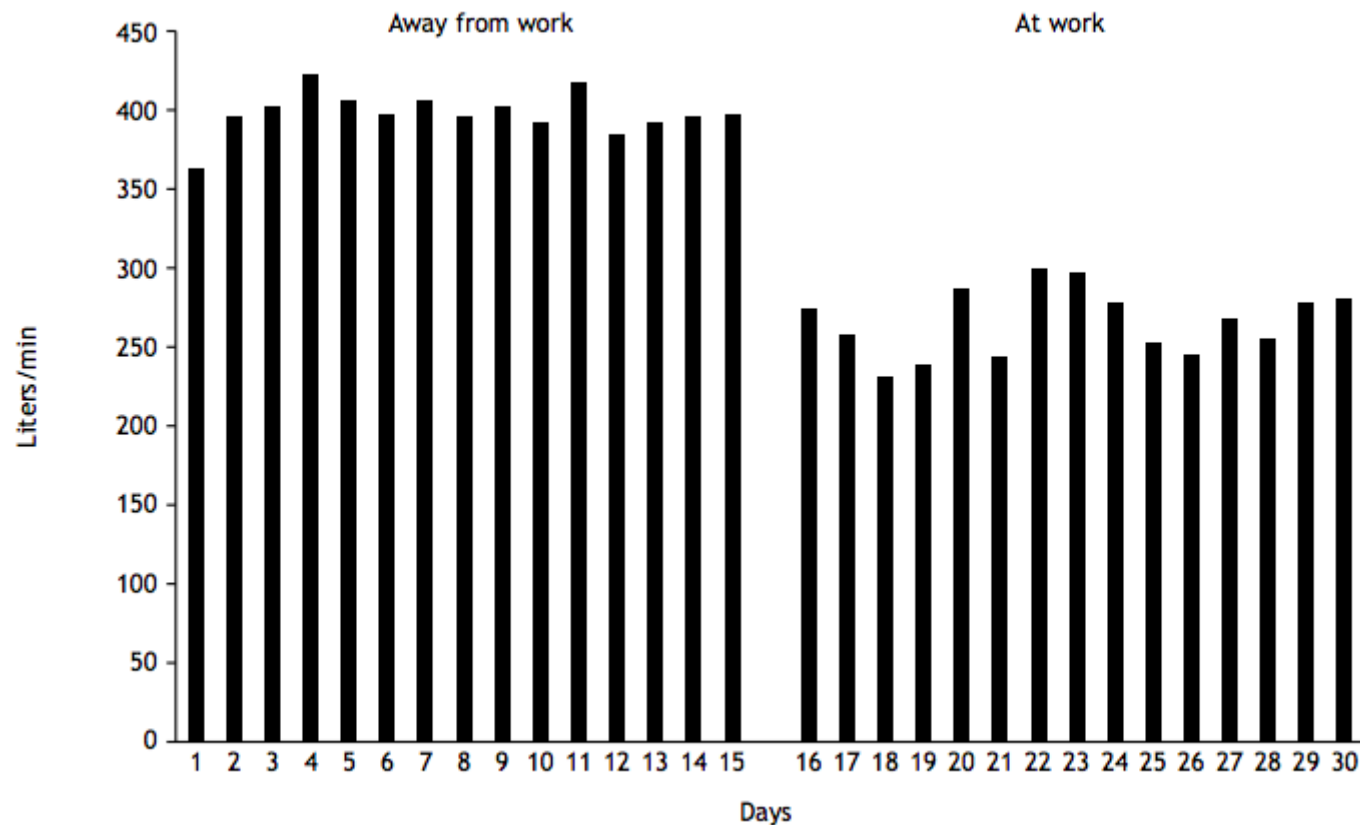
↑ Work-related conjunctivitis
↑ Work-related rhinitis
↑ Atopy
↑ Early asthmatic reaction
↑ Airflow limitation
↑ FeNO
↑ Blood eosinophils

Conferma relazione causale sintomi - lavoro

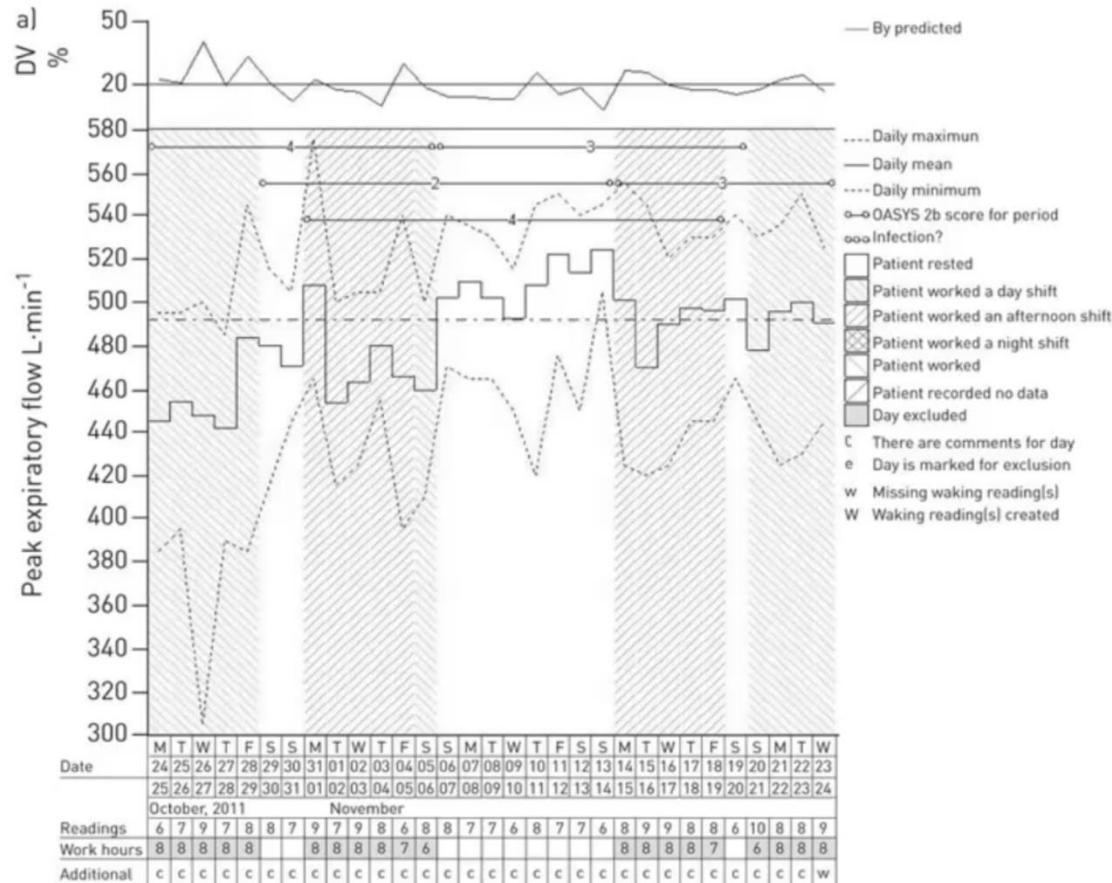
Test funzionali respiratori durante e a distanza dall'attività lavorativa

- spirometrie sul luogo di lavoro
- monitoraggio del PEF con modalità arresto e ripresa
- misurazione seriale della reattività (PC20)

Daily means of serial PEF measurements: periods away from work and periods of work



The Oasys Computer Program

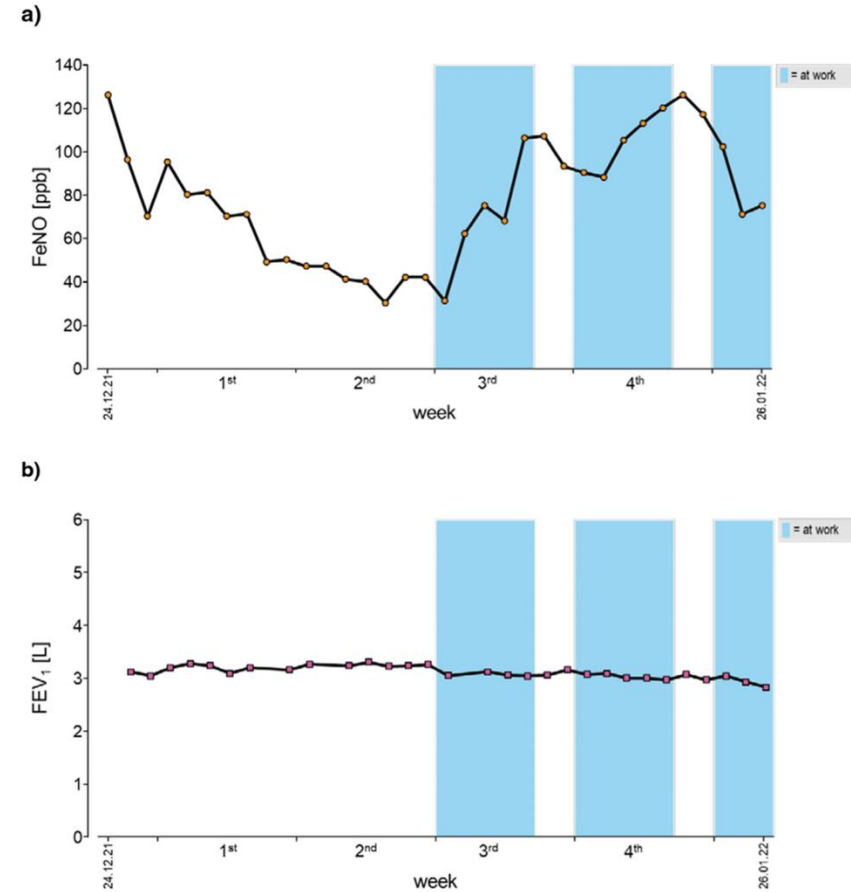
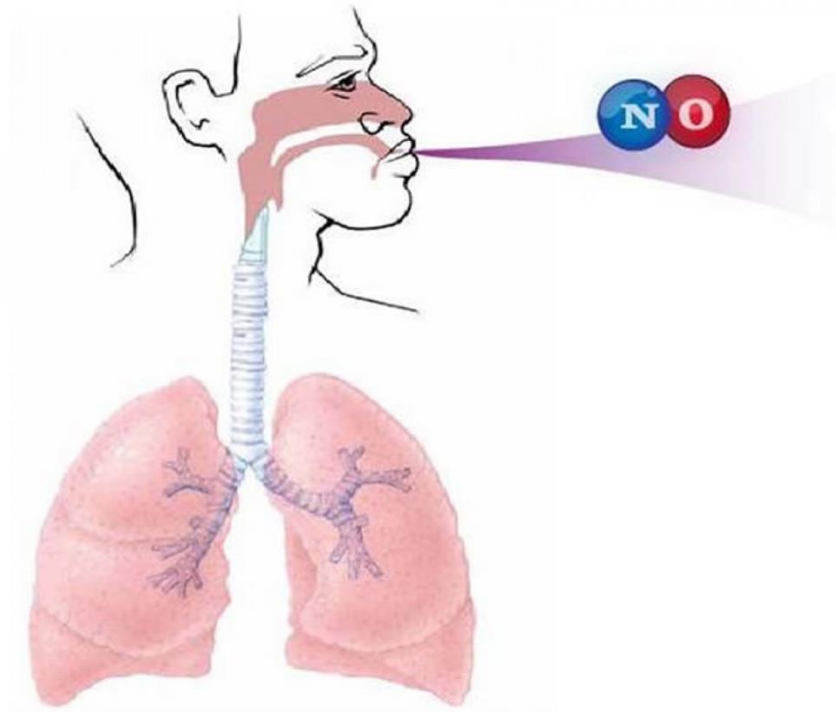


Se **OASYS-2 score > 2.5:**

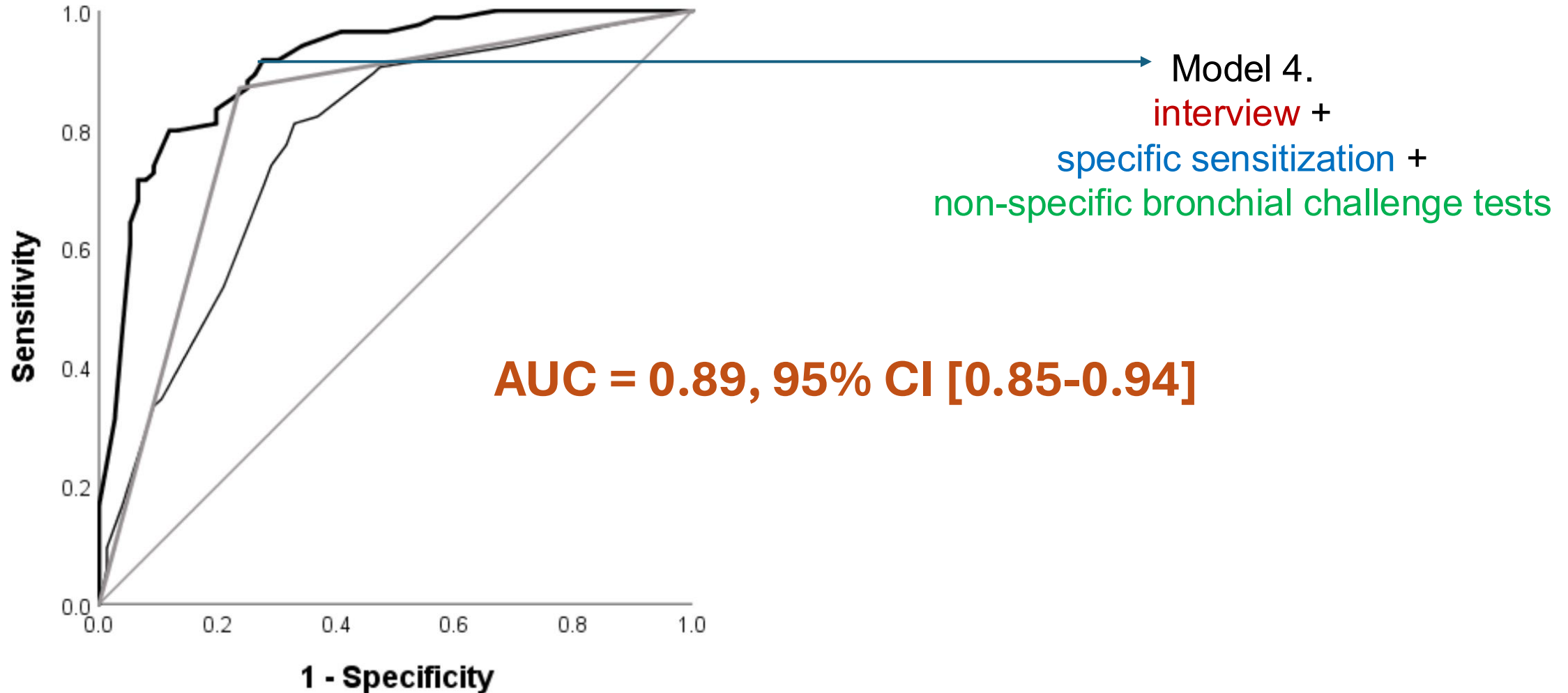
altamente suggestivo per presenza di OA

(sensibilità 75% e specificità 94%)

Serial fractional exhaled nitric oxide measurements at and off work may help to identify immunologic occupational asthma in cases with complex exposures



Novel clinical scores for occupational asthma due to exposure to high-molecular-weight agents



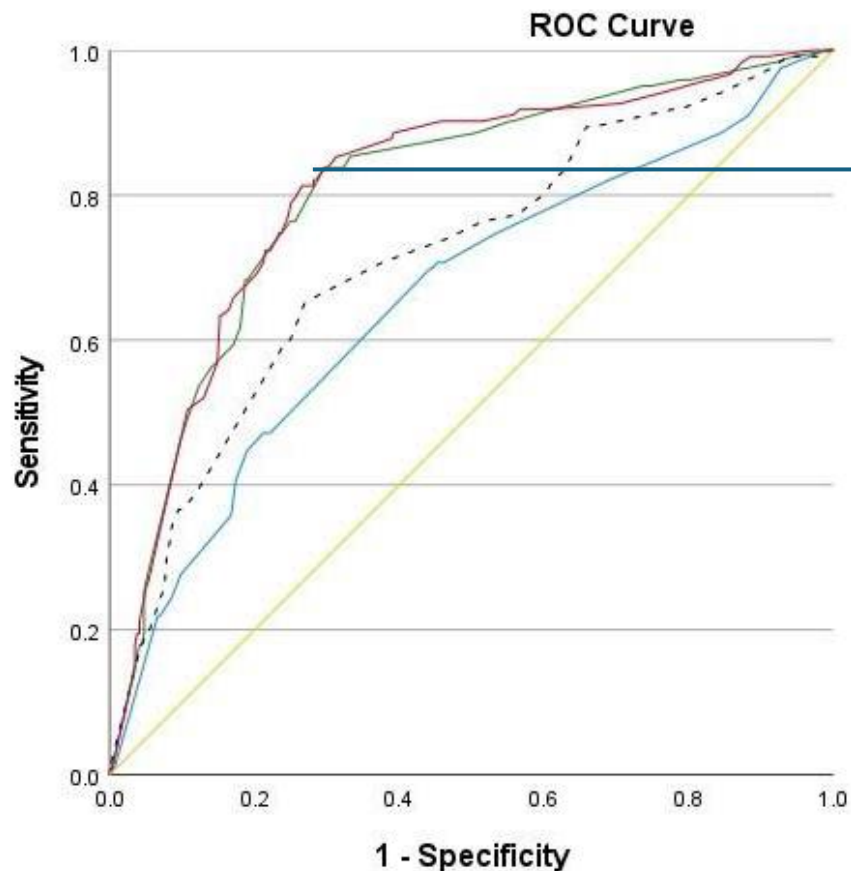
Risk of Occupational Asthma due to High-Molecular Weight Agents

It is now available as a free app on Calculate by QxMD at: <https://qxcalc.app.link/occ-asthma-hmw>.

Questions

- | | |
|--|-----|
| 1. Age $\leq$ 40 years | Yes |
| 2. Presence of work-related rhinoconjunctivitis sympto... | Yes |
| 3. Use inhaled corticosteroid | Yes |
| 4. Exposed to flour and associated agents (wheat, rye, ... | Yes |
| 5. Positive sensitization to work-specific allergens | Yes |
| 6. Positive on non-specific bronchial hyper-responsive... | Yes |

A Practical Clinical Model for Diagnosing Occupational Asthma in Workers Exposed to Low-Molecular-Weight Agents: Model Development and Validation



Interview, Serial PEF & NSBHR
(Model 4)

AUC. 0.87 (0.75–0.98)

The Journal of Allergy and Clinical Immunology in press.



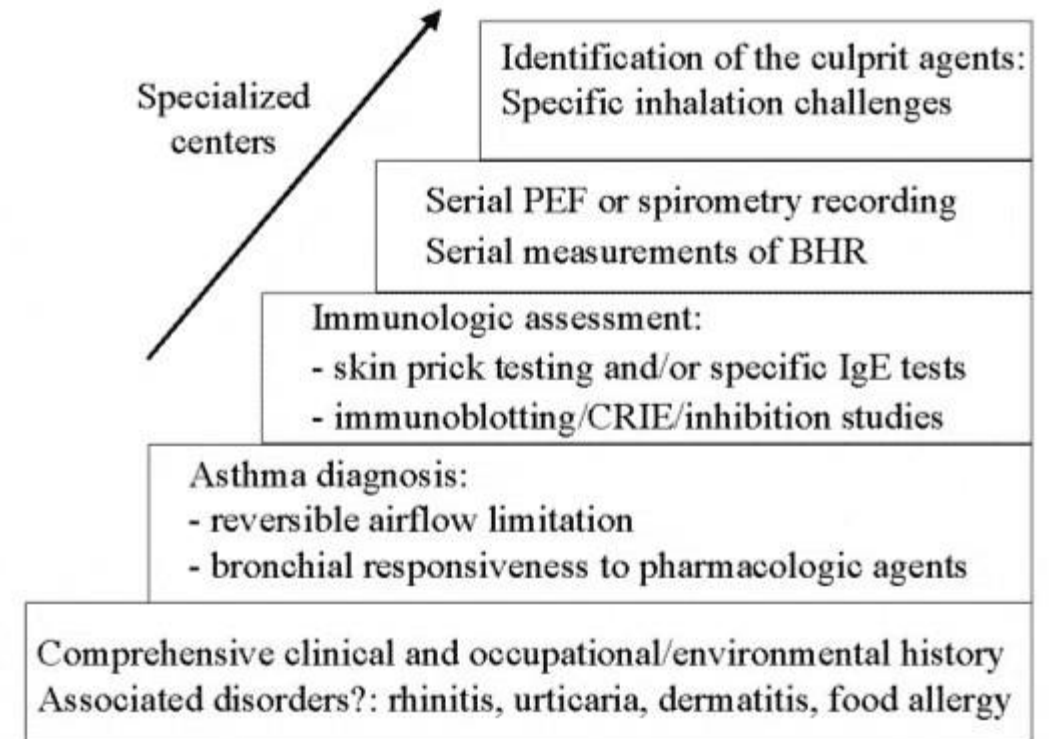
Occupational asthma and occupational rhinitis: the united airways disease model revisited

Table 3 Diagnostic tools according to the molecular weight of suspected causal agents

	HMW n=174	LMW n=381
Spirometry with pharmacological tests	159 (91.4)	352 (92.4)
PEFR ¹ monitoring	21 (12.1)	42 (11.0)
FEV ₁ ² monitoring	6 (3.4)	36 (9.4)
BHR ³ monitoring	11 (6.3)	34 (8.9)
Skin prick tests	121 (69.5)	28 (7.3)
Specific IgE	117 (67.2)	19 (5.0)
Nasal specific inhalation challenge	6 (3.4)	61 (16.0)
Bronchial specific inhalation challenge	3 (1.7)	18 (4.7)

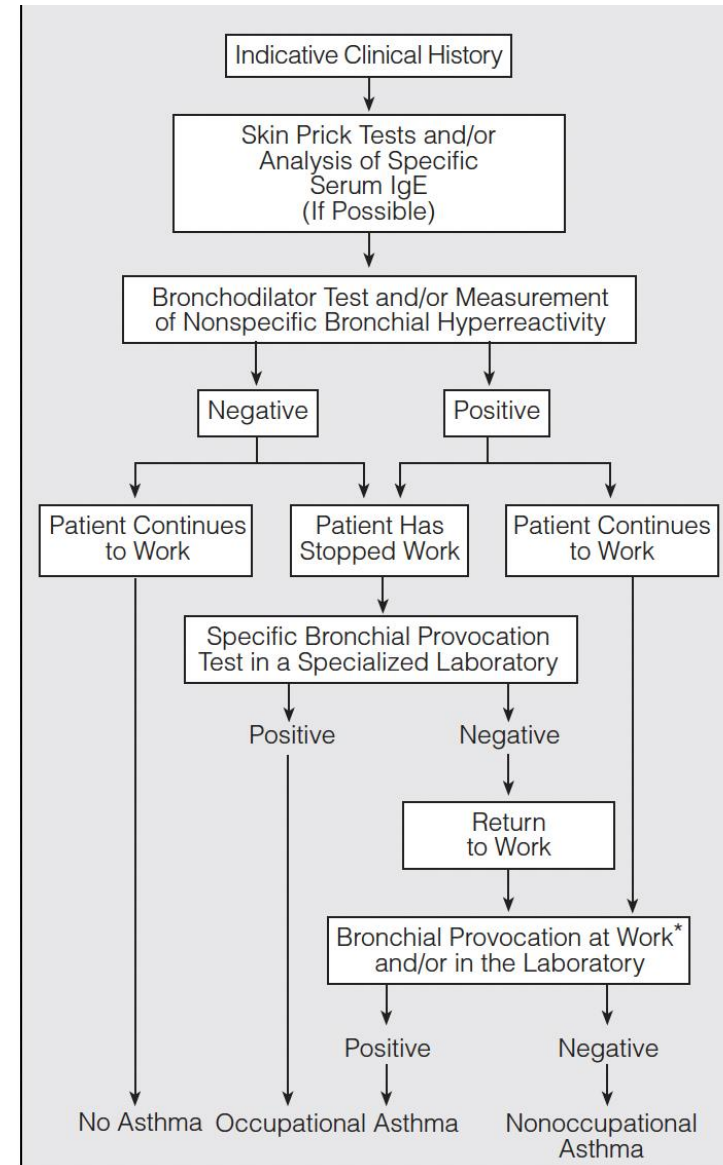
Data are presented as n (%).

BHR, bronchial hyper-responsiveness; FEV₁, forced expiratory volume in 1 s; HMW, high molecular weight; LMW, low molecular weight; PEFR, peak expiratory flow rate



Guidelines for Occupational Asthma

Arch Bronconeumol.
2006;42(9):457-74



Nuova tabella delle malattie professionali nell'industria

di cui all'art. 3 del d.p.r. 1124/1965 e successive modificazioni ed integrazioni (all. n. 4 al d.p.r. 1124/65). Decreto 10 ottobre 2023

37) MALATTIE CAUSATE DA ACIDO

CIANIDRICO, CIANURI, NITRILI, ISOCIANATI:

a) ASMA BRONCHIALE (J45.0)		18 mesi
b) ALVEOLITE ALLERGICA ESTRINSECA (J67)	Lavorazioni che espongono all'azione degli isocianati.	3 anni
c) DERMATITE ALLERGICA DA CONTATTO (L23)		
d) DERMATITE IRRITATIVA DA CONTATTO (L24)	Lavorazioni che espongono all'azione dell'acido cianidrico, cianuri, nitrili, isocianati e resine poliuretaniche.	6 mesi

MINISTERO DEL LAVORO E DELLE POLITICHE SOCIALI
Aggiornamento dell'elenco delle malattie per le quali è obbligatoria la denuncia ai sensi e per gli effetti
dell'articolo 139 del testo unico approvato con decreto del Presidente della Repubblica
30 giugno 1965, n. 1124, e successive modifiche e integrazioni

LISTA I - MALATTIE LA CUI ORIGINE LAVORATIVA È DI ELEVATA PROBABILITÀ

50	DIISOCIANATI (toluendiisocianato (TDI), difenilmetanodiisocianato (MDI), esametilendiisocianato (HDI), naftalendiisocianato (NDI), altri)	ASMA BRONCHIALE	I.1.50.	J45.0
		TRACHEOBRONCHITE	I.1.50.	J40
		CONGIUNTIVITE	I.1.50.	H10.4
		DERMATITE IRRITATIVA DA CONTATTO	I.1.50.	L24

Un centro per la diagnostica di secondo livello delle pneumopatie lavoro correlate

- Presenza del medico del lavoro e pneumologo
- Possibilità di collaborare con medici specialistici
- Possibilità di ricovero in regime di DH
- Presenza di un laboratorio di tossicologia industriale
- Ambulatorio dedicato con accesso diretto via email

Cod_SOLE	Desc_SOLE		Branca	Tariffa
7667.001	VISITA MEDICINA DEL LAVORO		028	0,00
7667.754	VISITA MEDICINA DEL LAVORO per pneumopatia professionale (secondo livello)		028	0,00



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**UNIVERSITÀ
DI PARMA**

DIPARTIMENTO DI MEDICINA E CHIRURGIA