

19 Juni 2025 – CGC

Beroepsziekten vermomd als alledaagse aandoeningen

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Overzicht casussen

1. Voedingsallergie of beroepsastma?
2. Herhaaldelijke opstoten van koorts
3. Sarcoïdose?

What is the occupational burden of respiratory diseases?

The Occupational Burden of Nonmalignant Respiratory Diseases

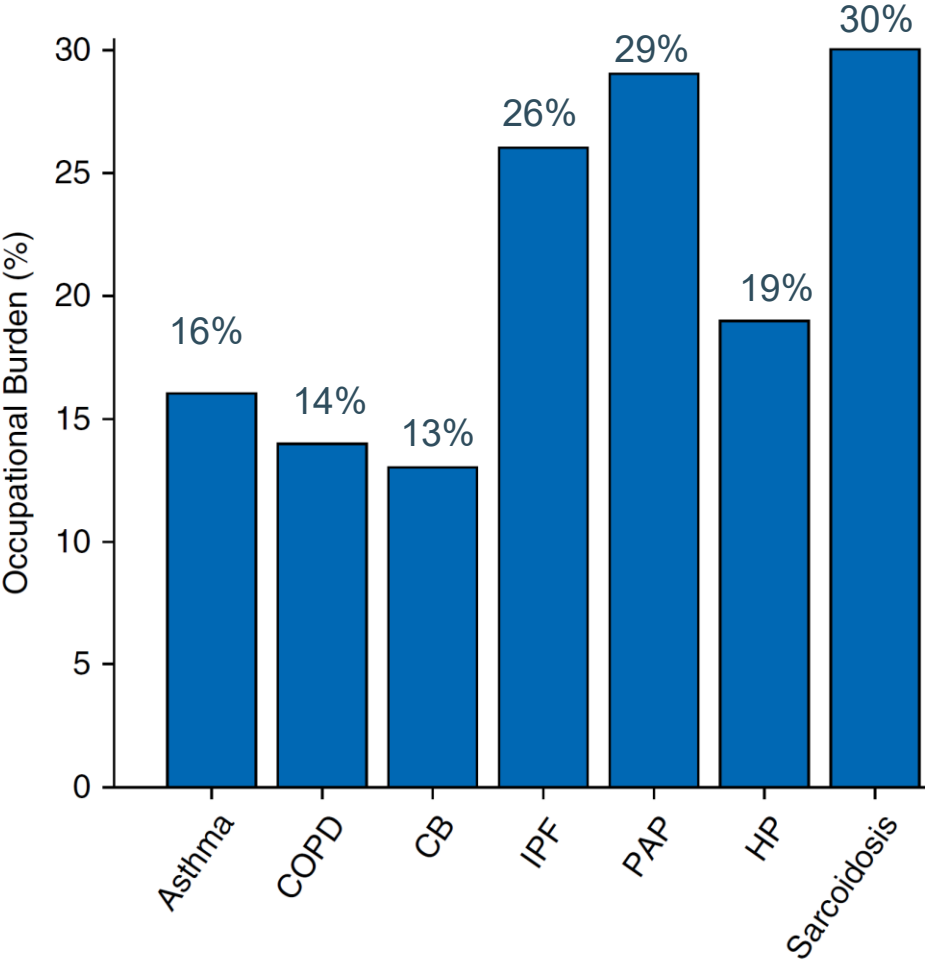
An Official American Thoracic Society and European Respiratory Society Statement

Paul D. Blanc, Isabella Annesi-Maesano, John R. Balmes, Kristin J. Cummings, David Fishwick, David Miedinger, Nicola Murgia, Rajen N. Naidoo, Carl J. Reynolds, Torben Sigsgaard, Kjell Tor  n, Denis Vinnikov, and Carrie A. Redlich; on behalf of the American Thoracic Society and European Respiratory Society

THIS OFFICIAL STATEMENT WAS APPROVED BY THE AMERICAN THORACIC SOCIETY MAY 2019 AND THE EUROPEAN RESPIRATORY SOCIETY MARCH 2019

Am J Respir Crit Care Med Vol 199, Iss 11, pp 1312–1334, Jun 1, 2019

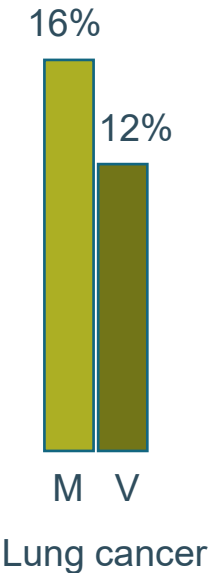
Population attributable fraction (PAF):
Fraction of cases that could have been avoided in the absence of exposure in the workplace



Occupational Exposures, Environmental Tobacco Smoke, and Lung Cancer

Fabrizio Veglia,* Paolo Vineis,*†‡ Kim Overvad,§ Heiner Boeing,¶ Manuela M. Bergmann,¶ Antonia Trichopoulou,|| Dimitrios Trichopoulos,** Domenico Palli,†† Vittorio Krogh,‡‡ Rosario Tumino,§§ Jakob Linseisen,¶¶ Karen Steindorf,¶¶ Ole Raaschou-Nielsen,|||| Anne Tjonneland,|||| Carlos A. Gonzalez,*** Carmen Martinez,††† Miren Dorronsoro,‡‡‡ Aurelio Barricarte,§§§ Llu  s Cirera,¶¶¶ J. Ramon Quiros,||||| Nicholas E. Day,**** Rodolfo Saracci,†††† and Elio Riboli†

Epidemiology 2007;18: 769–775



Casus: allergische klachten bij verwerken van rauwe knolselder (feb 2024)



- M 42j; voorgeschiedenis: hooikoorts
- Werkt sinds 5 jaar in fabriek waar groenten worden verwerkt
- Na start met werken aan de lijn waar **rauwe knolselder** verwerkt wordt (oa machinaal versnijden):
 - Rash ter hoogte van het gelaat: droge huid, jeuk
 - Tranende ogen, jeukende ogen, rode ogen, neusloop
 - Benauwd gevoel thoracaal. Dyspnee. Hoorbare wheezing. Lichte kriebelhoest
 - Spirometrie: FEV₁ 99%; FVC 85%
 - Histamineprovocatie: PC₂₀ 1.389 mg/ml
- Tijdsverband tussen klachten en blootstelling
 - Bij overplaatsing naar andere groentenlijn (niet in de nabijheid van knolselder) zijn de klachten verdwenen
 - Bij terugplaatsing naar een lijn vlakbij de knolselderlijn: opnieuw (licht) ervaren van de klachten
- Collega met gelijkaardige klachten → reeds jaren verwijderd van knolselderlijn → geen klachten meer

Oorzaken van allergisch beroepsastma

1. Hoog-moleculair gewicht:
(glyco)**proteïnes**

IgE

Dierlijk
Plantaardig
Microbieel

→ Specifieke IgE
of priktesten

2. Laag-moleculair gewicht:
'**chemische** stoffen'

IgE (hapteen) en niet-IgE

Synthetisch
Natuurlijk
Metalen

Sector	Allergenen
Bakkers	Bloem, enzymes (deegverbeteraars)
Voedingsindustrie	Vis, zeevruchten, eieren, thee/koffie, groenten, ...
Land- en tuinbouw	Dieren, tomatenteelt, graan
Onderzoek	Proefdieren (muis, rat, sprinkhaan)
Farmaceutische industrie	Enzymes

Sector	
Chemie	Isocyanaten Zuuranhydriden (epoxy) Amine Reactieve kleurstoffen Colofonium
Plastics, rubber	
Verfspuiters	
Bouw	
Electronica	
Houtbewerking	Houtstof
Kappers	Persulfaten
Gezondheidszorg	Biocides (glutaraldehyde), antibiotica
Tandarts	Acrylaten
Nagelsalon	

IgE antistoffen

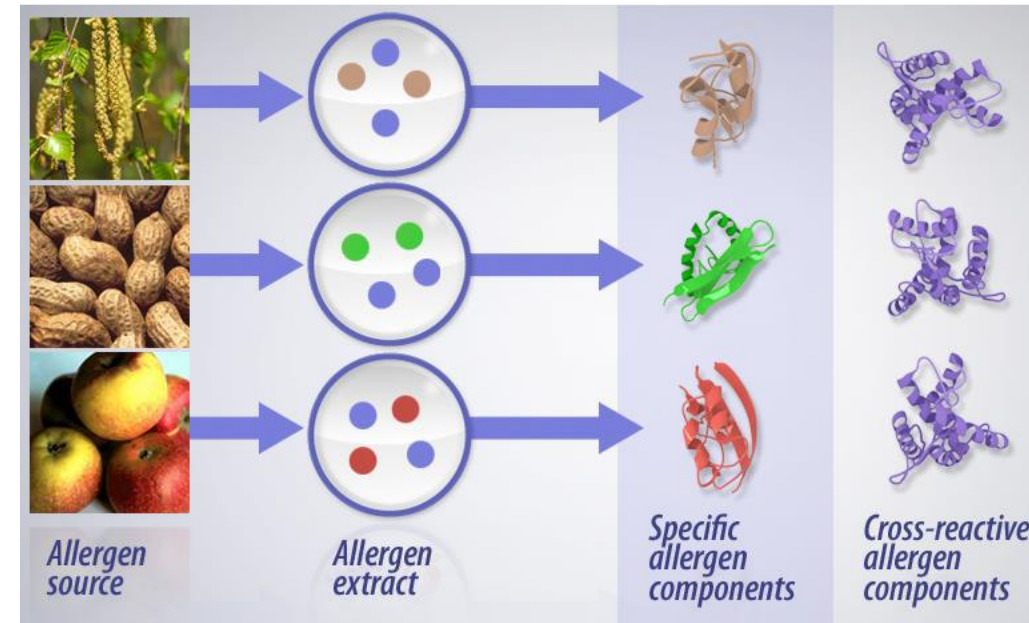
Totaal IgE	*	228	kU/L	<= 114
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→ Specifieke IgE antistoffen (tegen natuurlijke extracten):

Pollen	Vossenstaart (g16)	*	0.72	kU/L	< 0.10
	Ruwe berk (t3)	*	23.30	kU/L	< 0.10
	Beuk (t5)	*	11.80	kU/L	< 0.10
	Eik (t7)	*	5.80	kU/L	< 0.10
	Es (t15)	*	0.68	kU/L	< 0.10
	Selderij (f85)	*	3.61	kU/L	< 0.10

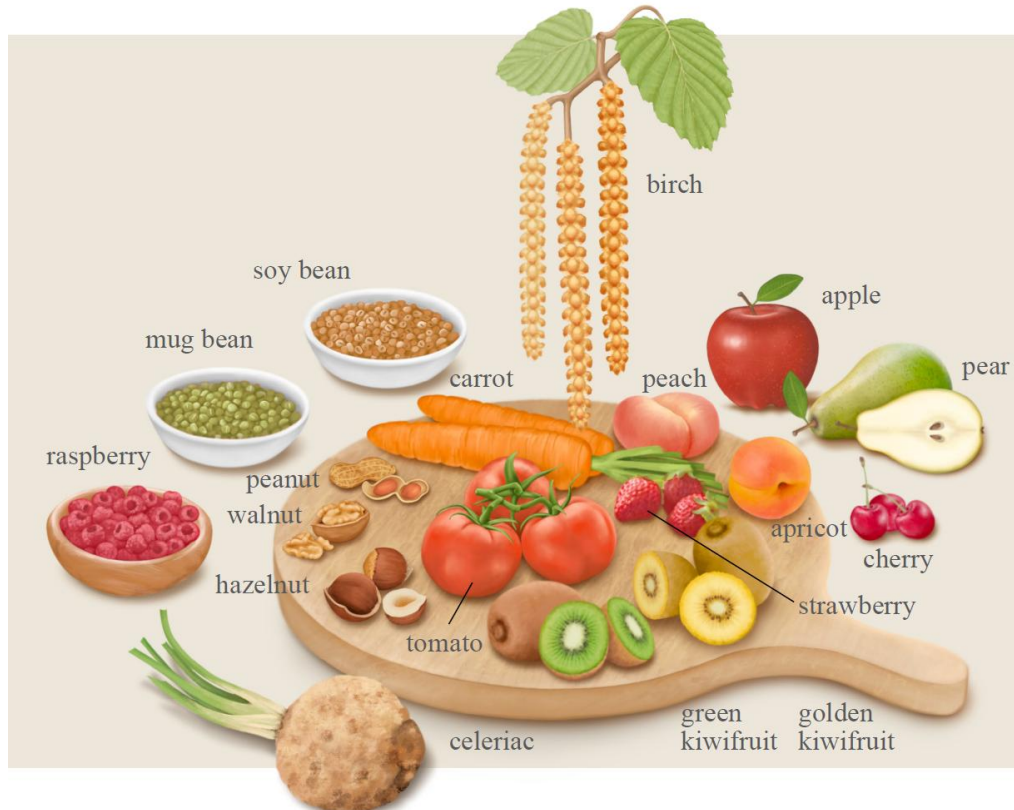
→ Specifieke IgE antistoffen (tegen componenten):

PR10	Selder -rApi g 1.01- PR10 (f417)*	4.80	kU/L	< 0.10
	Berk -rBet v1- PR10 (t215)	28.20	kU/L	< 0.10
	Berk -rBet v2- profiline (t216)	<0.10	kU/L	< 0.10
	Berk -rBet v4- polcalcine (t220)	<0.10	kU/L	< 0.10
	Berk -rBet v6 (t225)	<0.10	kU/L	< 0.10



PR-10-like allergenen

- Bomen (Fagales)**: berk, els, hazelaar, beuk, eik, kastanje
- Fruit**: appel, peer, perzik, kers, kiwi ...
- Noten**: hazelnoot, walnoot, pinda ...
- Groenten**: wortel, selder, aardappel, soja ...



Typische symptomen:

- **Respiratoire allergie op berkenpollen**
(rhinoconjunctivitis +/- astma) → seizoensgebonden
- **Oraal allergiesyndroom op PR-10-like allergenen in rauw fruit, noten, groenten** → hitte-label

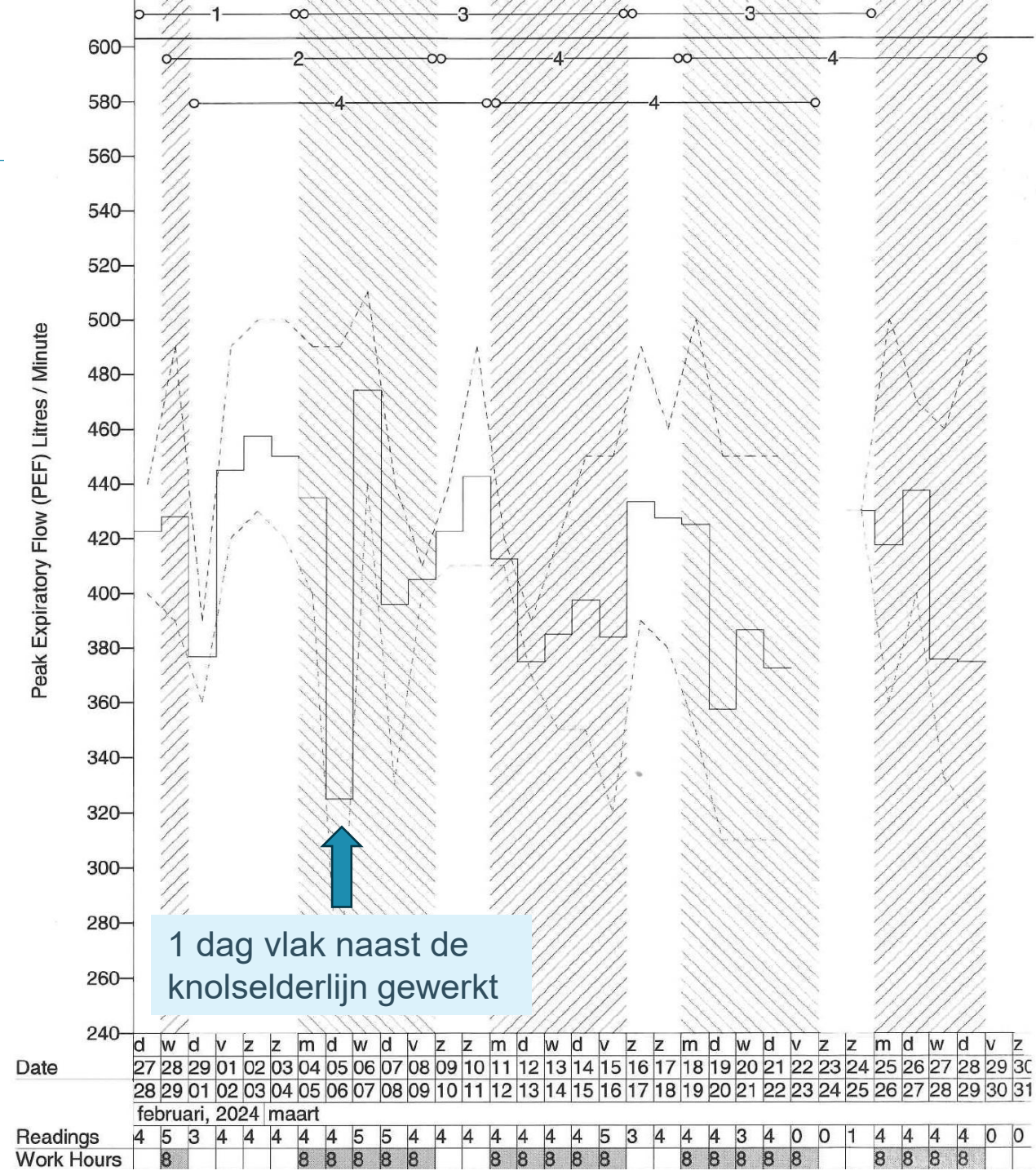
Casus:

- Voorgeschiedenis van hooikoorts
- Bij navraag: in mond en keel tintelingen bij eten van **rauwe wortel** (niet als gekookt), **kiwi**, **noten**.
- Geen last bij eten appels, peren, aardbeien.
- Voor zover hij weet nog nooit knolselder gegeten

Voedingsallergie en/of beroepsastma?

- Specifieke IgEs en priktesten met knolselder ++
- Seriële piekstroommetingen
 - Positieve test: Oasys score 3.23
- Gelijkaardige casus:
 - Lucas D, et al *Occupational asthma induced by exposure to celeriac*. JACI In practice. 2022 Oct;10(10):2754-5.

Een (aangetoonde) allergie voor veel voorkomende allergenen (huisstofmijt, huisdieren, pollen) sluit beroepsastma niet uit





Food processing and occupational respiratory allergy- An EAACI position paper

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Jolanta Walusiak-Skorupa⁵ | Andrea Siracusa¹²

Key messages

- Food and food products: responsible for up to 25% of occupational rhinitis and/or asthma
- Main allergen sources: raw and processed animal and plant products, additives and preservatives, microbes, and insect and mite contaminants
- Food processing activities produce dust particulate or aerosols that are readily inhaled and can act as primary sensitizers in the airways, causing a distinct form of respiratory food allergy, **often without any symptoms upon ingestion**

Case (July 2024)

- M, 40 y, never-smoker
- Symptoms:
 - Monday at work from 3 p.m. onset of fever (up to 39-40°C)
 - Symptoms present for > 1 year (fever, cough, muscle pain)
 - especially beginning of the working week
 - Usually, resolution if taking paracetamol
 - No problems in weekends
 - Impression of increase in frequency and intensity of fever episodes in last month
 - Weight loss (110 to 93 kg)

Diagnosed with hypersensitivity pneumonitis

HRCT: *Poorly defined centrilobular nodules in the upper as well as lower lung zones. Ground-glass opacities and mosaic attenuation mainly in the lower lung zones.*
Could be compatible with hypersensitivity pneumonitis

Lung function : FVC 4.53L (91%), FEV₁ 3.66L (89%), FEV₁/FVC 80%; TLC 6.21L (85%), **DL_{CO} 53%**

Broncho-alveolar lavage: **55% lymphocytes**

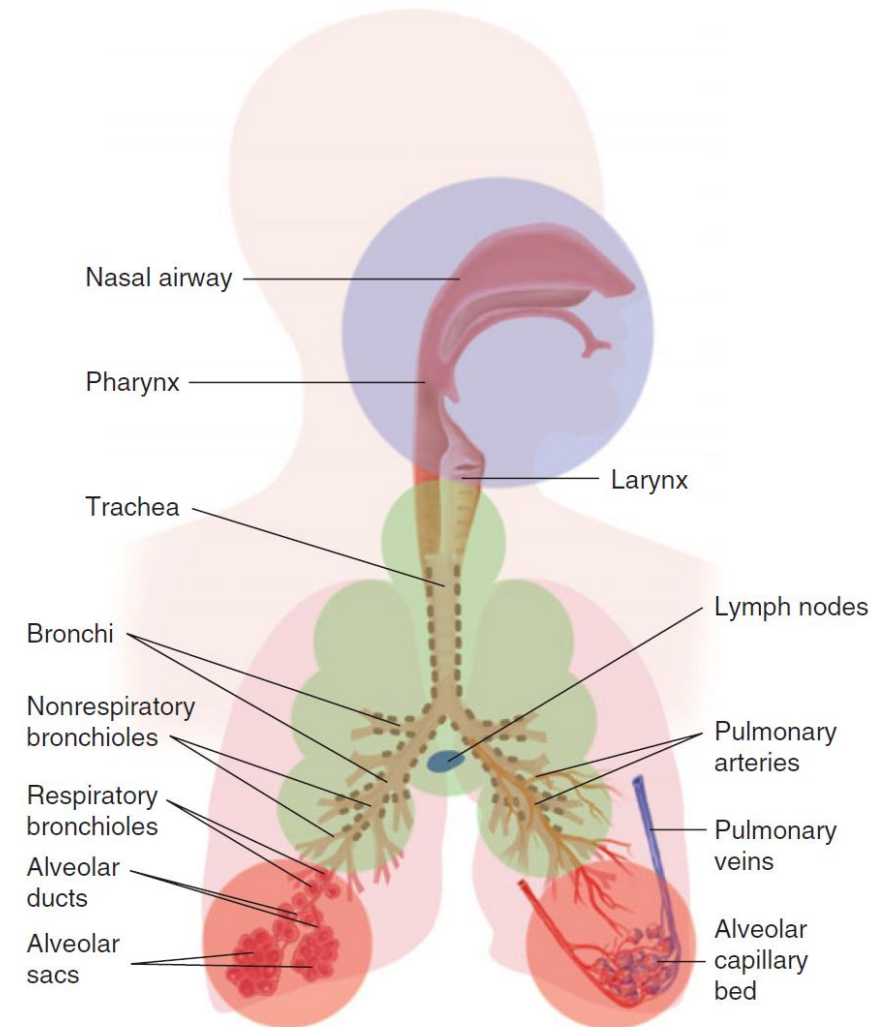
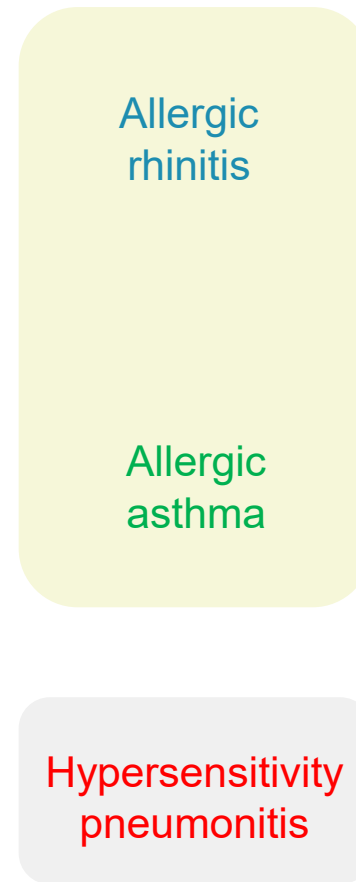
Hypersensitivity pneumonitis (HP)

“HP is an **inflammatory and/or fibrotic** disease affecting the **lung parenchyma and small airways**.

It typically results from an **immune-mediated reaction** provoked by an overt or occult **inhaled antigen** in **susceptible individuals**.”

(Raghu et al., ATS/JPS/ALT CPG, 2020)

Allergic rhinitis/asthma and hypersensitivity pneumonitis
→ **distinct immunological mechanisms**



(Costabel et al., Nat Rev Dis Primers, 2020)

Hypersensitivity pneumonitis — clinical presentation

Characteristics	Acute onset	Chronic onset
Exposure to causal antigen at work	Intermittent high-level exposure	Continuous low-level exposure
Onset of symptoms	2–9 h after exposure	Insidious, over weeks to months
Nature of symptoms	- Predominantly influenza-like symptoms (fever, malaise, muscle & joint aches, ...) - Respiratory (cough, dyspnea, chest tightness, ...) → Acute episodes can be indistinguishable from an acute respiratory infection (recurring ‘bronchitis’)	Progressive symptoms (dyspnea, cough, and weight loss), sometimes intermittent exacerbations of symptoms
Physical signs	Fever (sometimes)	Signs of pulmonary fibrosis (inspiratory crackles; digital clubbing)
Outcome	Symptoms peak within 6–24 h after exposure; May last hours to days; Symptoms recur upon re-exposure Mostly reversible; full resolution possible → Favorable evolution if complete and rapid eviction	End-stage fibrotic disease and/or emphysema; exacerbations may occur despite avoidance of exposure Poor prognosis but better than idiopathic pulmonary fibrosis

→ may occur without acute stage

Hypersensitivity pneumonitis — causes

- Avian proteins (droppings, feathers)
 - Pigeon breeder's lung
 - Bird fancier's lung (budgerigar, parakeet, ...)
- Fungal/bacterial spores
 - Farmer's lung (thermophilic actinomycetes, ...)
 - Malt worker's lung (*Aspergillus clavatus*)
 - Woodworker's lung (sawmills)
 - Maple bark disease (*Cryptostroma corticale*)
 - Mushroom worker's lung
 - Humidifier's lung
 - Composting and refuse handling
 - Machine operator's lung
(associated with exposure to metalworking fluid aerosols)
- Domestic fungal contamination
- Chemicals (isocyanates, acid anhydrides, etc.)

Circumstances where
biological material is
aerosolized
("bio-aerosols")



Fig. 2 Planar soot-like coloured spore layer of *Cryptostroma corticale* on a maple trunk under the peeled bark. Photo courtesy of Dr. Wolfgang Prüfert (German Mycological Society, DGfM e.V.)

hpLung		
EXPOSURES ANTIGENS ABOUT		
Browsing Exposures		
A		Cases
Air Conditioners		48
Argan Cake		2
B		
Bagasse		16
Baker's Yeast		1

Case hypersensitivity pneumonitis — Exposure history

- Job history
 - Since 16y at company XYZ, production of **compost to grow mushrooms**
 - First as driver, then machine operator (making packages of compost), now foreman
 - According to patient:
 - Basis of the compost: horse manure, straw, chick manure and gypsum
 - Compost stored in tunnels at a temperature in which certain microorganisms tend to grow
 - High exposures to **spores** of these microorganisms when compost comes out of the tunnel
 - Risk assessment performed by occupational physician
 - confirms high exposures to ***thermophilic actinomyces***
- No other relevant exposures

Arguments for linking hypersensitivity pneumonitis to the exposure at work

1. **Literature:** Cox et al, Champignonkwekerslong; klinische diagnostiek en behandeling, NTvG 1991; 135; nr. 23 1040-1044
2. **Exposure:** Thermophilic actinomycetes
3. **Time relationship:** work-related pattern of cough/fever/muscle pain
 - 6 months after exposure stop: no respiratory symptoms, CT: significant improvement, DL_{CO} 81%
4. **Immunology:** Precipitating antibodies (tested at CHU Besançon; panel “*Poumon des composts*”)
 - *Thermoactinomyces vulgaris* +
 - *Thermobifida fusca* +
5. **Colleagues:**
 - According to patient: other colleagues have had similar symptoms
 - Oct 2024: new patient (M 61y):
 - Identical disease
 - Stopped working → symptoms disappeared; lung function improved

Sarcoidosis

Case 1 — Man, °1986, ex-smoker

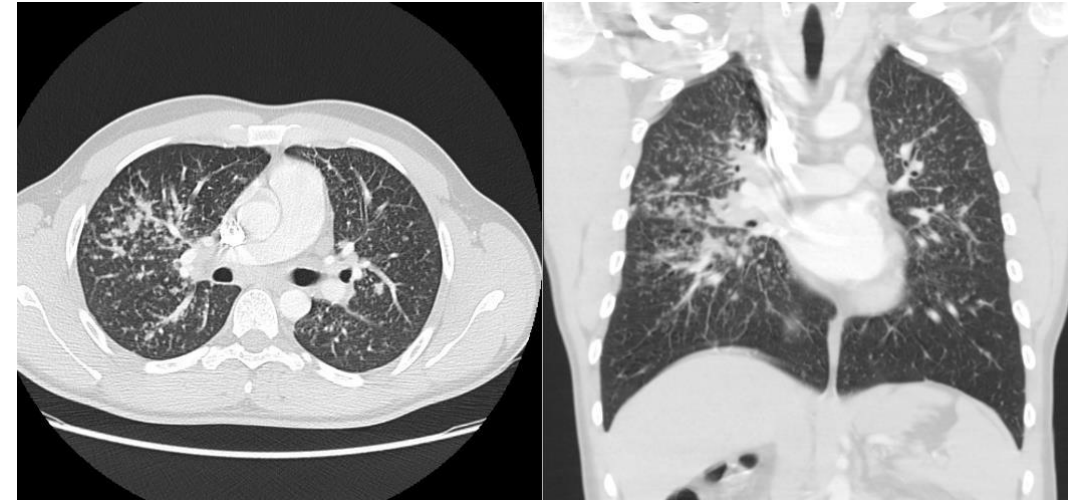
Medical history: nil

2013: Diagnosis of sarcoidosis

Work: Since 2005: operator at various places in lamp factory

Mainly in the workshop with 'special lamps' (~ 30 workers)

→ "One of my colleagues also has sarcoidosis"



Sarcoidosis

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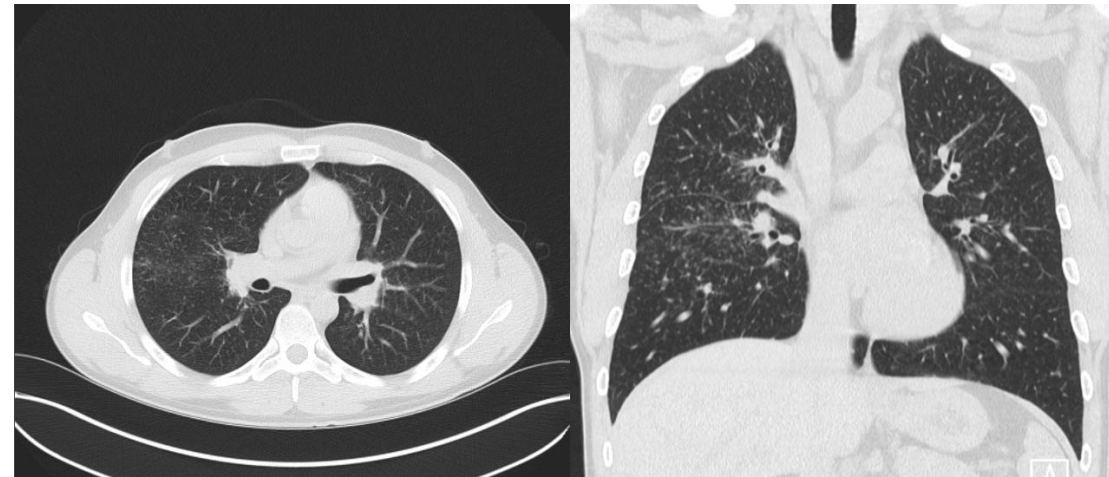
Mainly in the workshop with 'special lamps' (~ 30 workers)

Case 2 — Man, °1981, ex-smoker

Medical history: nil

2008: Diagnosis of sarcoidosis

Work: Since 2005: operator, same workshop as 1st case



Occupational exposure:

- Lamp tubes made of (amorphous) fused silica: heated + clipped
- X-ray powder diffraction of dust: mainly amorphous silica and some cristobalite (crystalline silica)
- Personal dust sampling during cleaning of machine (1h): total respirable dust: 6 mg/m³
→ Occupational limit value respirable amorphous silica: 0.3 mg/m³

Sarcoidosis

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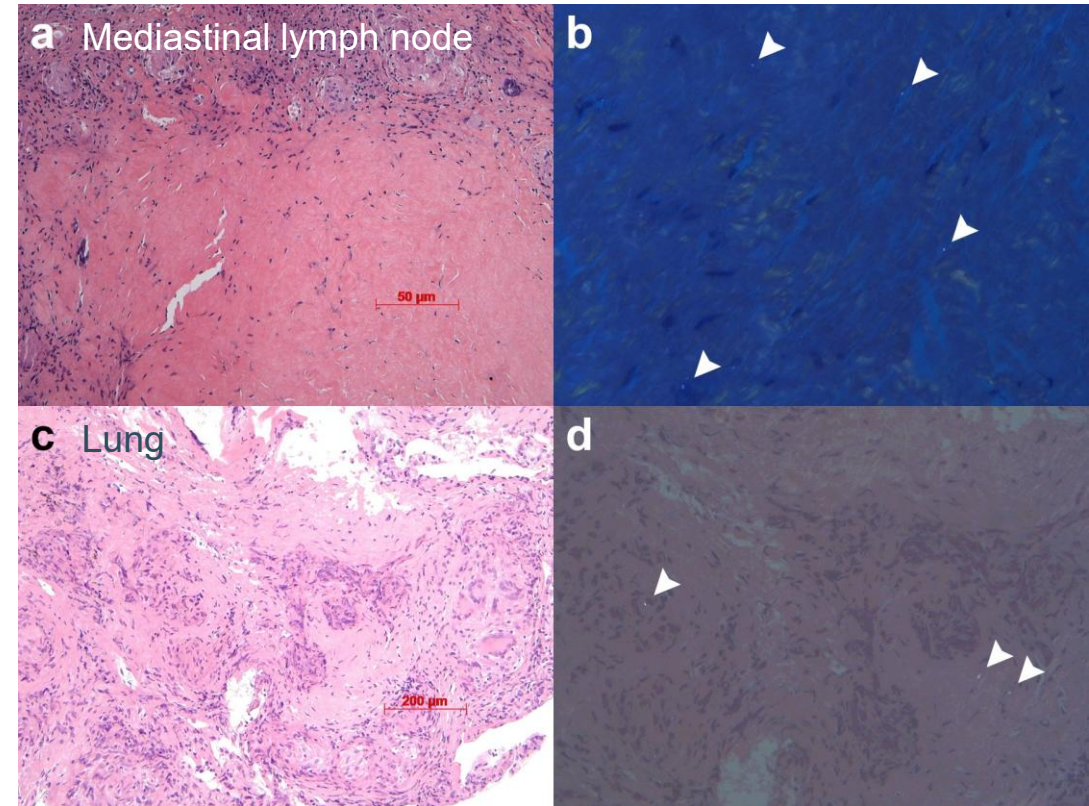
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Sarcoidosis

Case 1 — Man, °1986, ex-smoker

Medical history: nil

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Work: Since 2005: operator at various places in lamp factory

Mainly in the workshop with 'special lamps' (~ 30 workers)

Case 2 — Man, °1981, ex-smoker

Medical history: nil

2008: Diagnosis of sarcoidosis

Work: Since 2005: operator, same workshop as 1st case

Case 3 — Woman, °1972, never-smoker

2022: Diagnosis of sarcoidosis

Work: Since 2016: operator, same workshop as 1st + 2nd case

Arguments suggesting relation work - disease

- 3 workers with “sarcoidosis” in small workshop (normal prevalence 4.7-64 / 100 000)
- Relevant exposure to fused silica dust (> limit value)
- Birefringent particles in relevant areas of lung or mediastinal lymph node
- Clinical improvement after removal from exposure

Sarcoidosis

- Development of immune granulomas in various organs
- Caused by an interaction between:
 - Genetic susceptibility
 - Exposure to 1 or more environmental factors



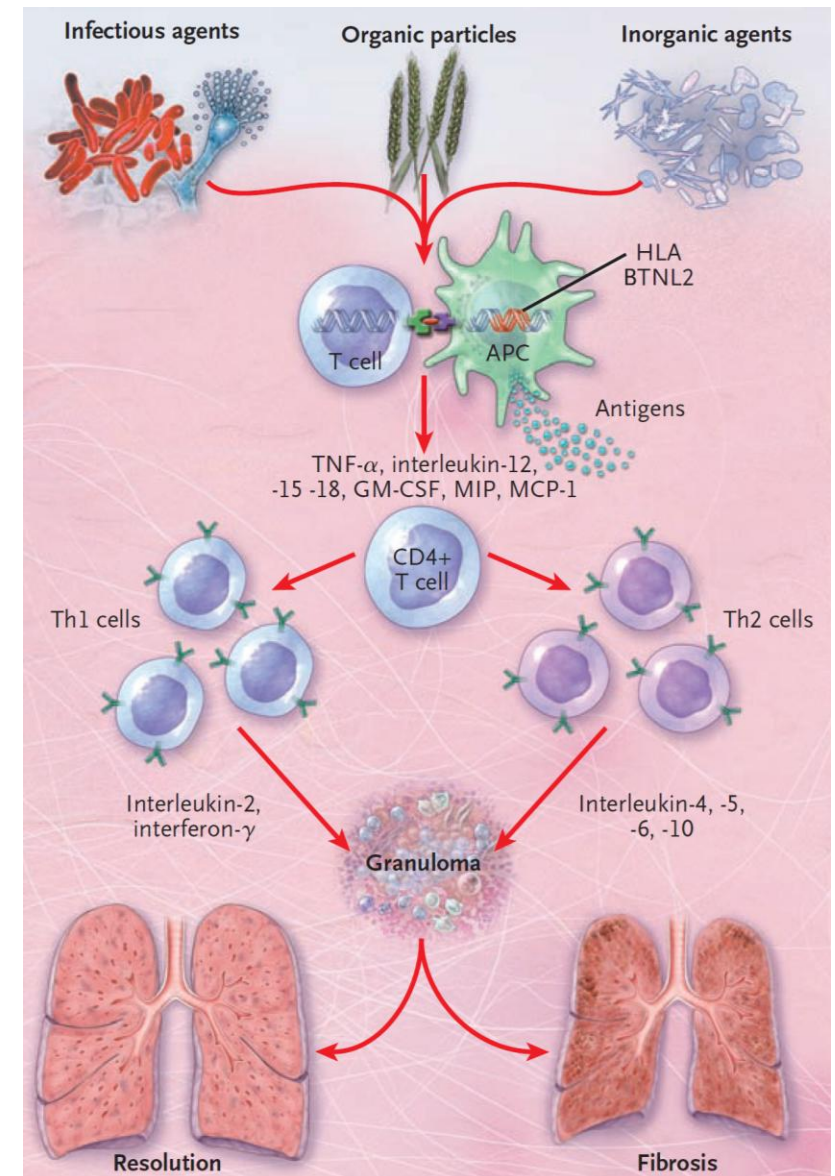
- **Metals**

- Beryllium (chronic beryllium disease)
- Other metals
 - Kucera et al. 2003: Metal workers: **OR 7.47** [1.19 - 47.06]
 - Newman, 2004: Car industry: **OR 8.00** [1.07-354.98]
 - Liu, 2006: Job in metal sector: **OR 1.41** [1.08-1.85]

- **Silica**

- Vihlborg, 2017: 2187 workers in 10 iron foundries (1930 – 2013)
Highest silica exposure (>0.048 mg/m³): **OR 3.94** [1.07-10.08]
- Jonsson, 2019: Cohort: 297,917 construction workers
Medium/high exposure: **RR 1.83** [1.14–2.95]

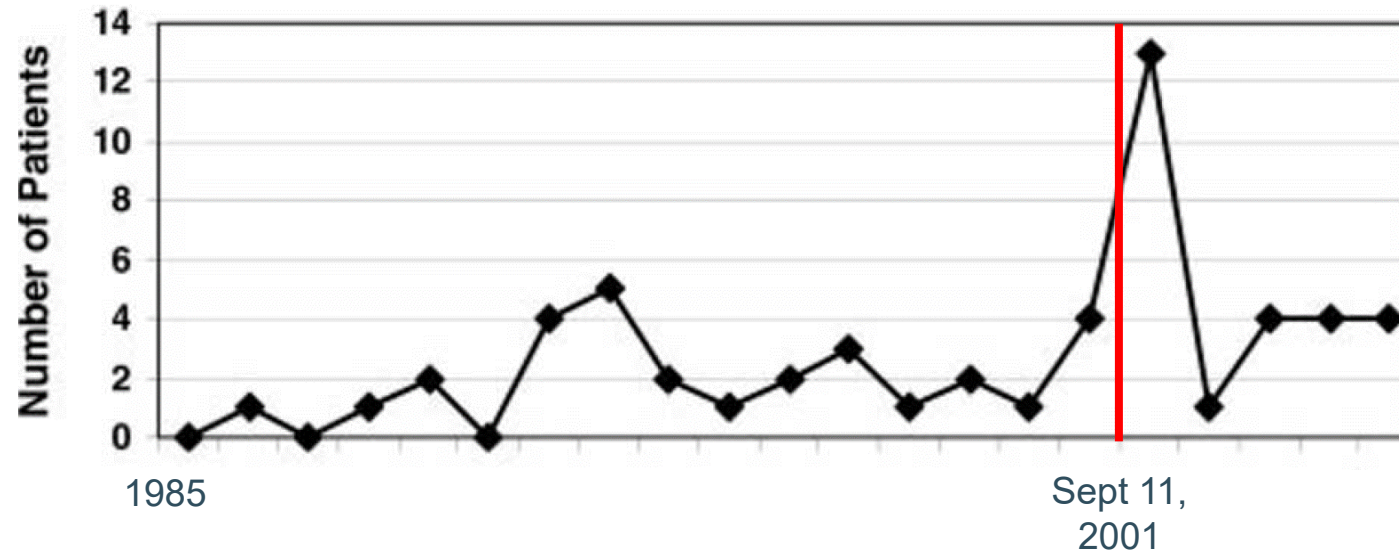
- **Organic dust:** moulds, ...



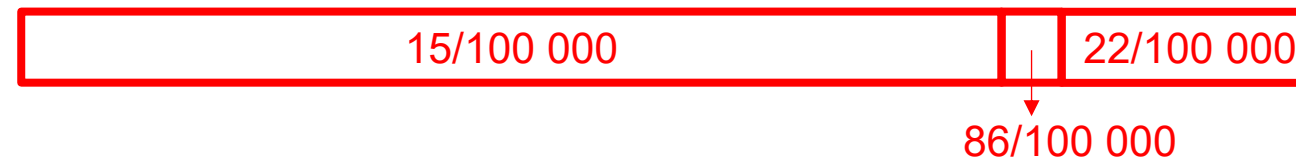


World Trade Center “Sarcoid-Like” Granulomatous Pulmonary Disease in New York City Fire Department Rescue Workers*

Cohort: n = 15,048



**Incidence
(biopsy-proven)**



Take home messages

1. Occupational diseases can present as “common” diseases
2. A (demonstrated) allergy for common aeroallergens (house dust mite, animals, pollen) does not exclude occupational asthma
3. Not all clinical pictures of “acute respiratory infection” are due to infection
4. When you find one case of occupational disease, there are likely more around
5. Sarcoidosis is a diagnosis of exclusion. Always evaluate the possibility of an exogenous cause (silica, talc, beryllium, other metals, atypical mycobacteria, ...)

Vragen?