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Finding new occupational diseases among the old ones: adding SIGNAAL to the Dutch national registries of occupational diseases

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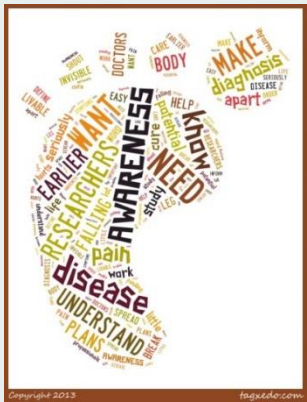
Overview of presentation

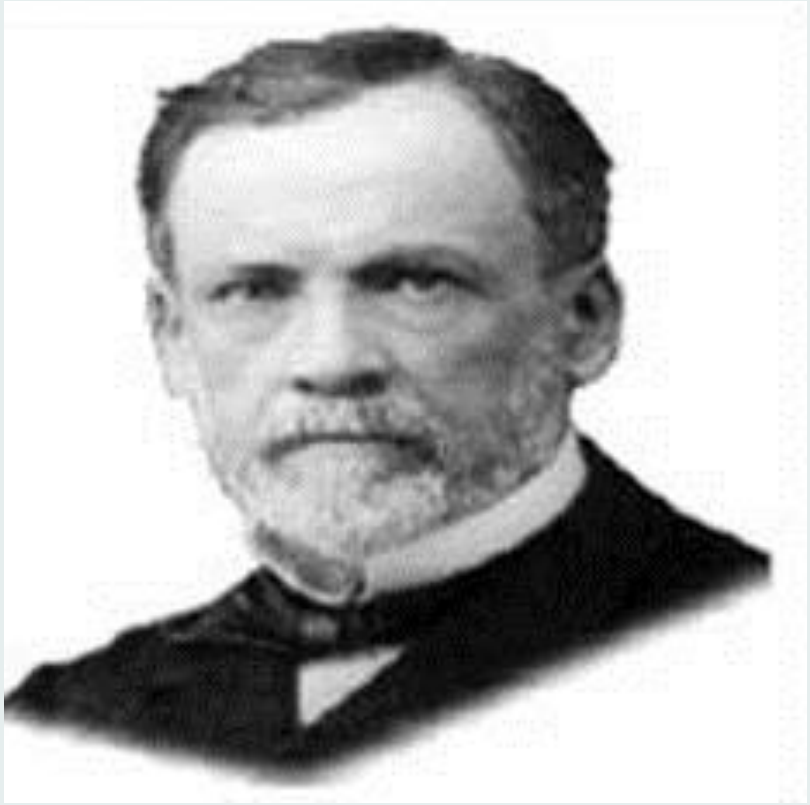
- Introduction with example
- Recognize and report occupational diseases – the Dutch way
- New occupational health risks
- Online tool SIGNAAL



Dans les champs de l'observation le hasard ne favorise que les esprits préparés

In the fields of observation chance favors only the prepared mind

Louis Pasteur



A new work-related disease?

2006-2007 Mayo Clinics Minnesota, Nebraska, Indiana, USA:

At first 12, later 24 patients, with neurological symptoms like acute paralysis, pain, fatigue, numbness, and weakness, especially in extremities

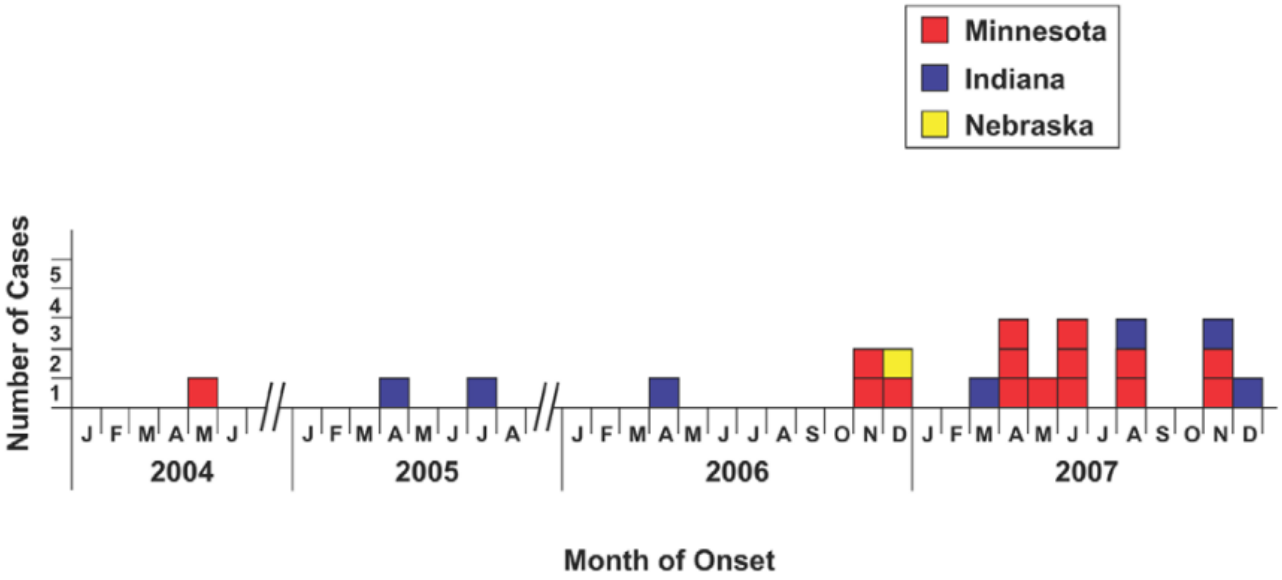


Figure 2. Minnesota, Indiana, and Nebraska immune-mediated polyradiculoneuropathy cases by month of illness onset and state.
doi:10.1371/journal.pone.0009782.g002

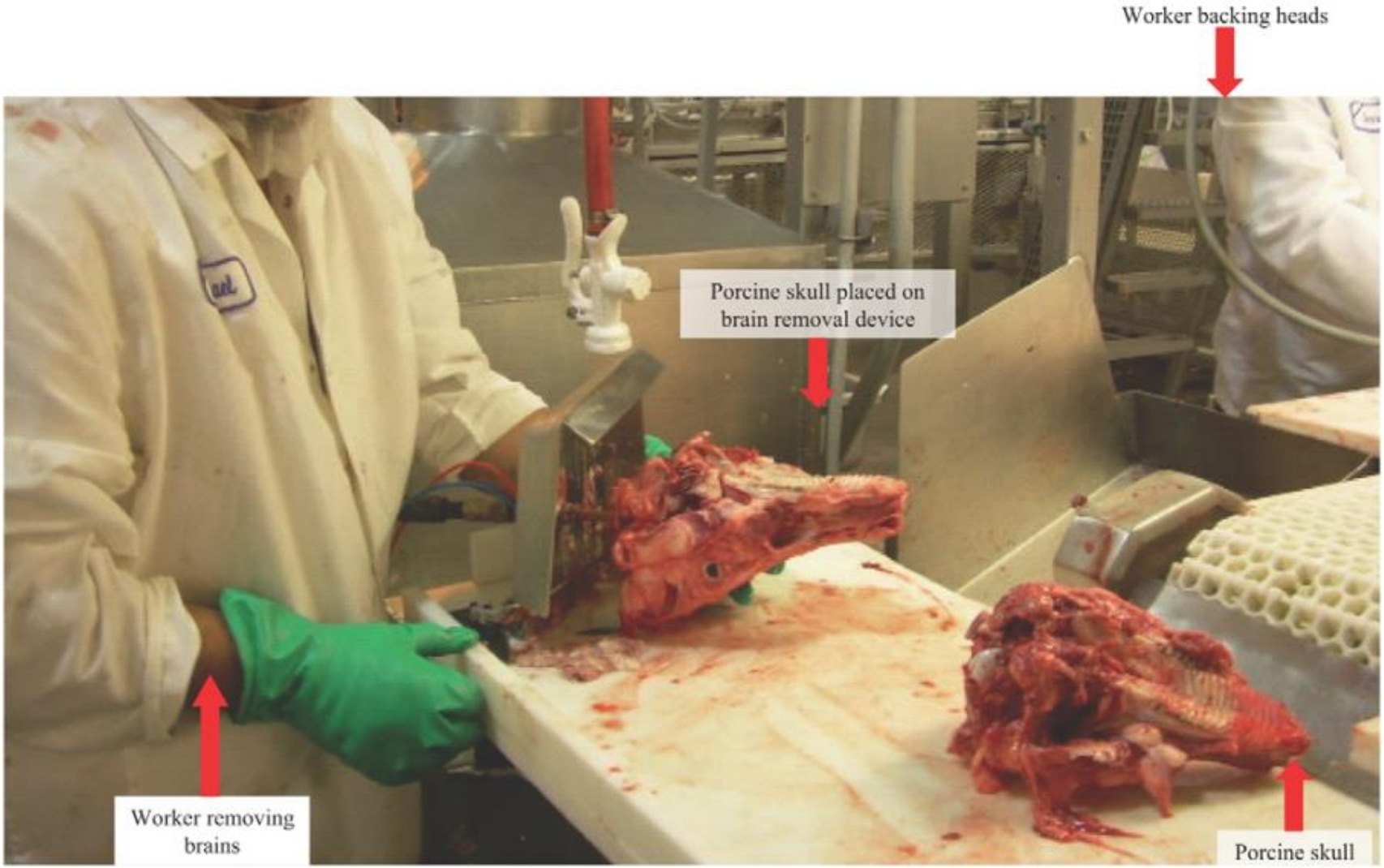


Figure 4. Photograph of brain removal compressed-air device during operation.
doi:10.1371/journal.pone.0009782.g004

The new disease was called Progressive Inflammatory Neuropathy or PIN

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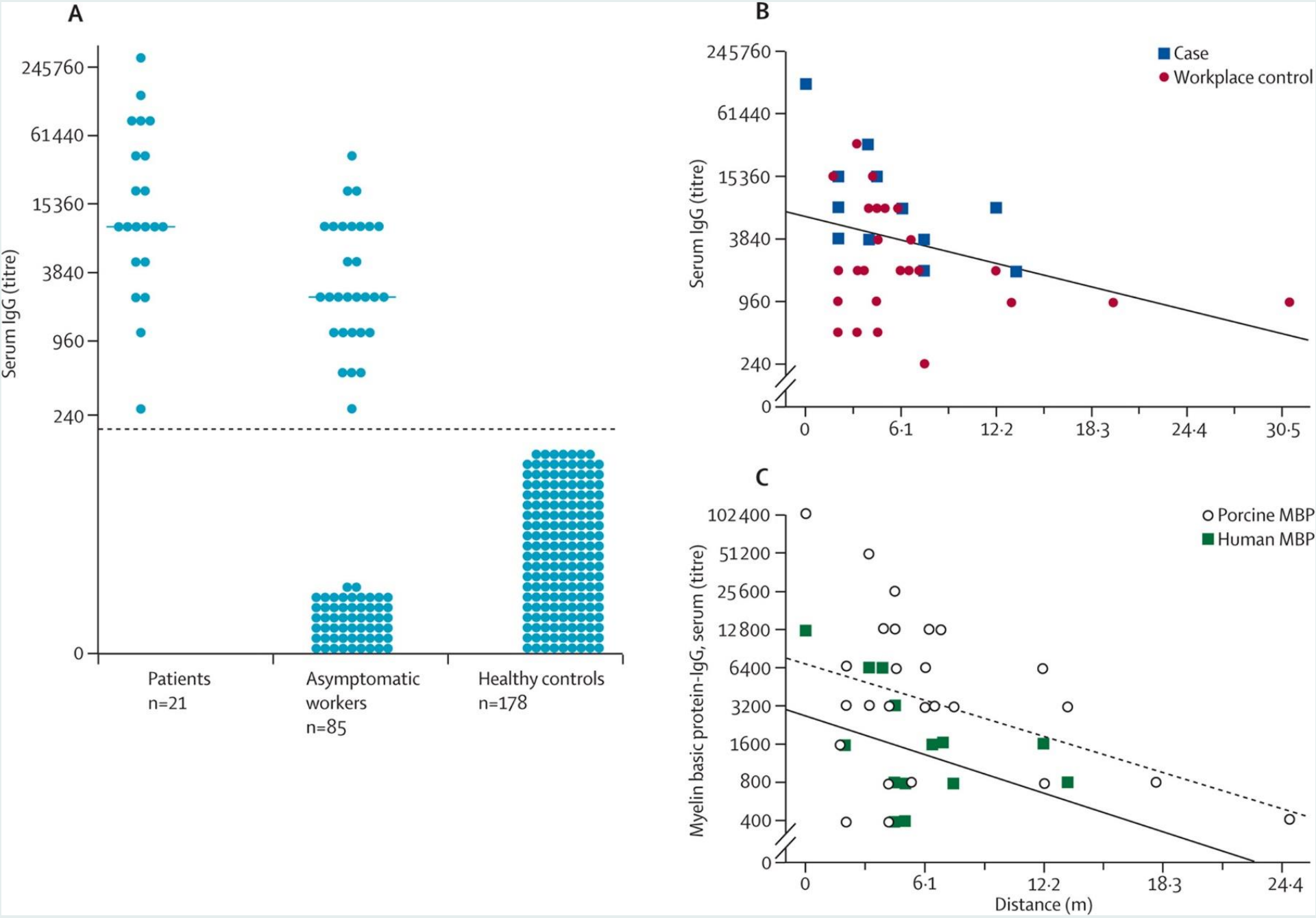
Follow-up

- Initial case assessment and occupational investigation
- Case definition
- Additional case finding
- Case-control study
- Laboratory testing
- Hypothesis testing in animal study

Sources:

- Lachance et al. 2010 **An outbreak of neurological autoimmunity with polyradiculoneuropathy in workers exposed to aerosolized porcine neural tissue: a descriptive study** *Lancet Neurol 2010; 9: 55–66*
- Holzbauer et al. 2010 **Epidemiologic Investigation of Immune-Mediated Polyradiculoneuropathy among Abattoir Workers Exposed to Porcine Brain.** *PLoS ONE 5(3): e9782.*
- Tracy et al. 2011 **Auto-immunepolyradiculoneuropathy and a nove IgG biomarker in workers exposed to aerosolized porcine brain** *Journal of the Peripheral Nervous System 16(Supplement):34–37 (2011)*
- Meeusen et al. 2012 **Potassium Channel Complex Autoimmunity Induced by Inhaled Brain Tissue Aerosol** *Ann Neurol. 2012 March ; 71(3): 417–426*


A
245760
61440
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960
240
0
Serum IgG (titre)
Patients
n=21
Asymptomatic
workers
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Healthy controls
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B
Case
Workplace control
Serum IgG (titre)
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6·1
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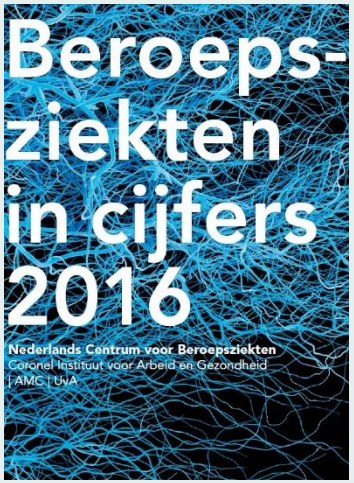
18·3
24·4
30·5
C
Porcine MBP
Human MBP
Myelin basic protein-IgG, serum (titre)
102400
51200
25600
12800
6400
3200
1600
800
400
Distance (m)

Occupational Diseases in the Netherlands

- No workers' compensation for occupational diseases. No "risque professionnel"
- No list of Occupational Diseases
- Social security compensates income loss during sickness of long term disability independent from the causal factors
- But both occupational physicians and occupational health services are obliged by law to report ODs for preventive reasons to the NCOD.

Occupational Diseases Registry

The Netherlands Center for Occupational Diseases (NCOD) registers and reports occupational diseases via the national notification and registration system and specific surveillance projects.



Statistics on Occupational Diseases 2016

Key figures occupational diseases in 2015

Two instruments for monitoring ODs

- **National Dutch Register of ODs** obligatory, for Occupational Physicians and Occupational Health Services (obligatory, all ODs, all sectors, all OPs -around 2000)
- **Intensive Sentinel Reporting** (Peilstation Intensieve Melding - PIM) (voluntary, approximately 180 occupational physicians, providing guidance and accredited training, provide information on the workers and sectors in their care)

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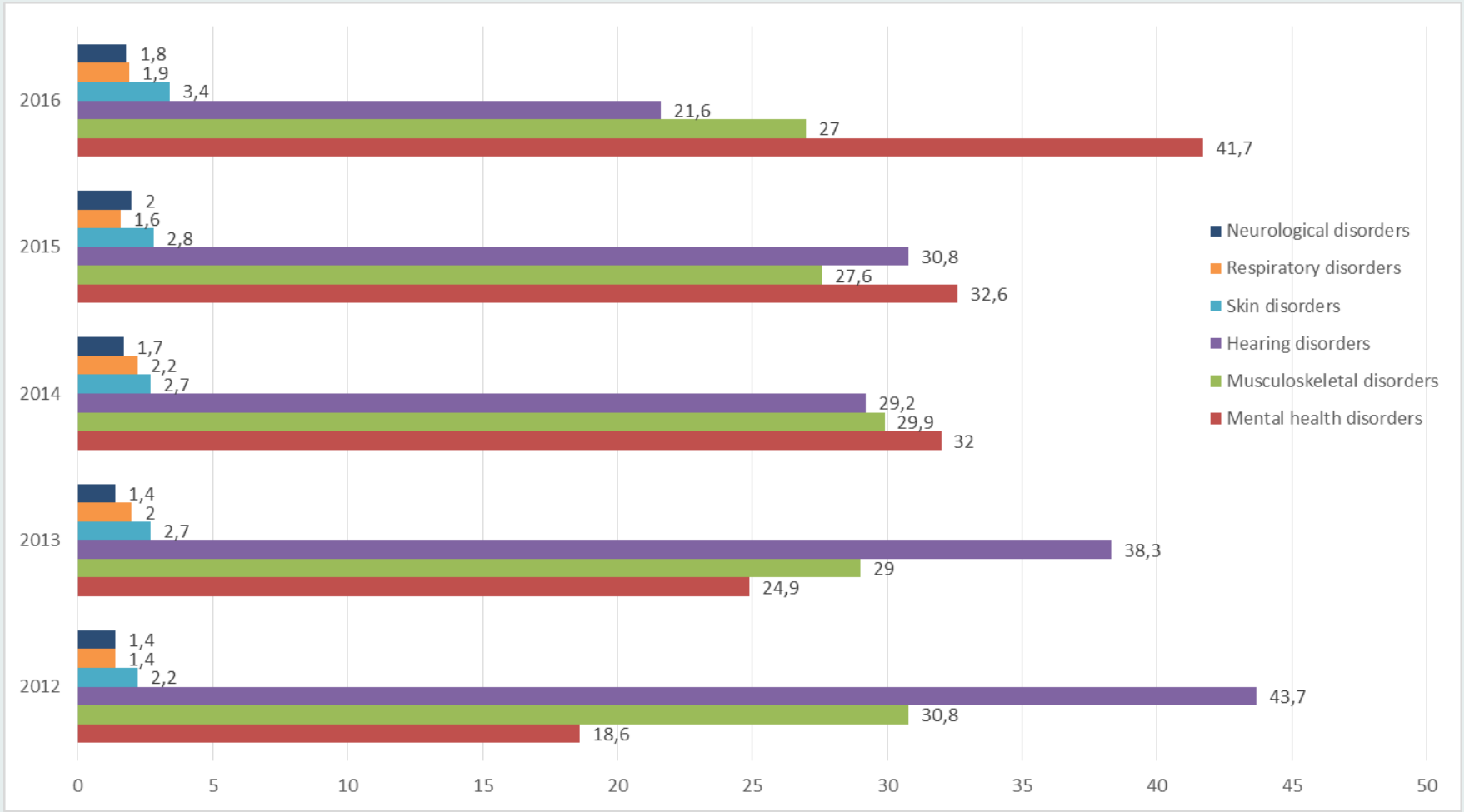
National Dutch Register of ODs

Six main diagnosis categories in percentages 2012-2016



Intensive sentinel reporting

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Incidence of ODs 2016 in population of 573,061

Diagnostic Category (weighted)	Number of reports	Number of OPs	Incidence per 100.000 worker years	95% BI
Psychological disorders	510	110	89	81-97
Musculoskeletal disorders	268	92	47	41-52
Hearing disorders	63	17	11	8-14
Skin disorders	36	20	6	4-8
Neurological disorders	15	13	3	1-4
Infectious disorders by biological agents	5	4	1	0-2
Respiratory disorders	22	15	4	2-5
Cardiovascular disorders	7	5	1	0-2
Cancer	5	4	1	0-2
Reproductive disorders	0	0	0	0-0
Eye disorders	1	1	0	0-1
Other disorders	5	4	1	0-2

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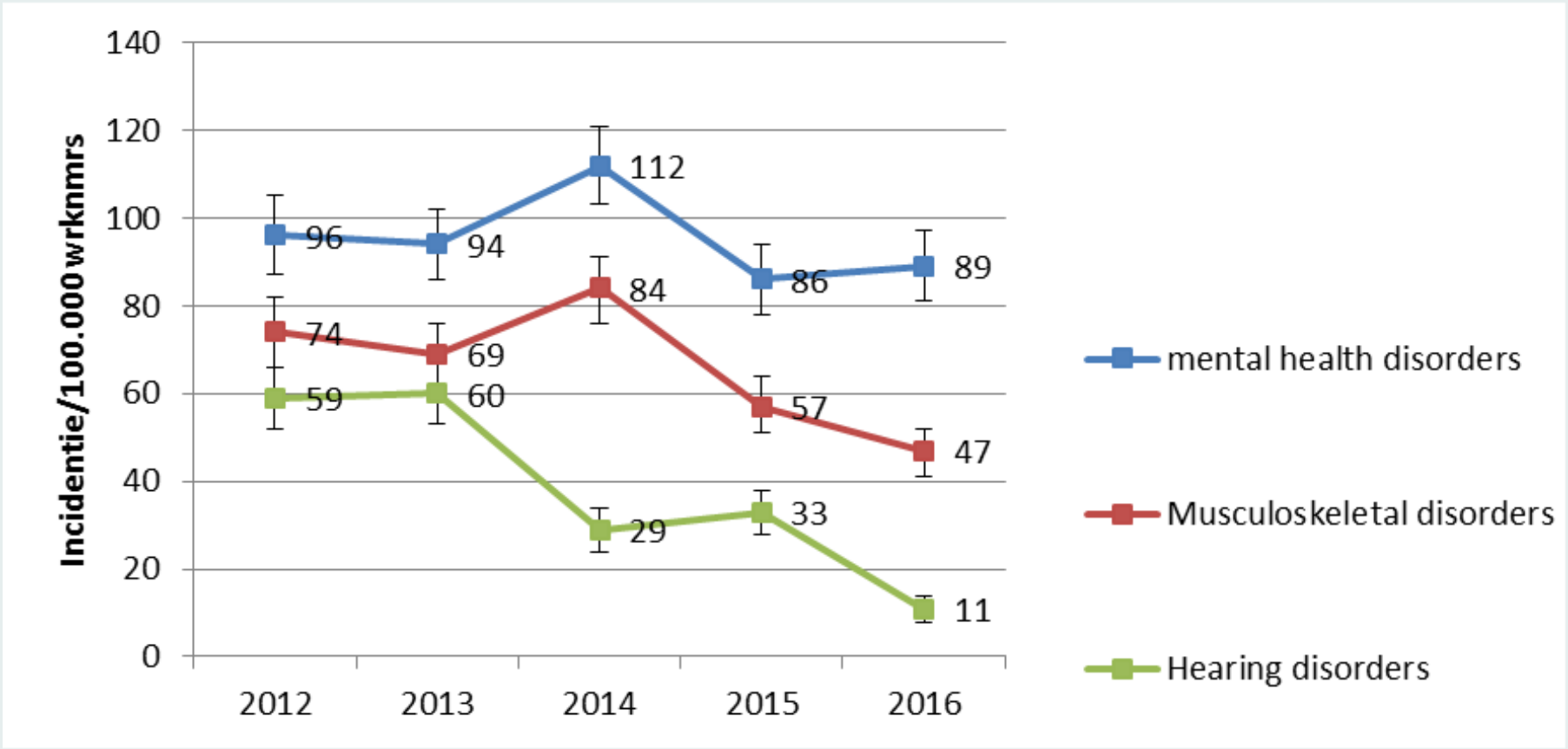
Intensive sentinel reporting

Incidence figures for 3 diagnosis categories 2012-2016



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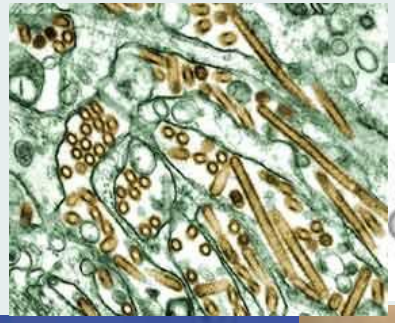

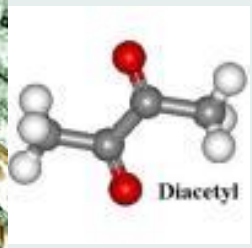

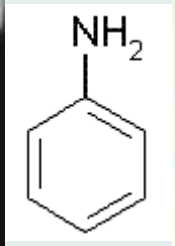

Assessment of Occupational Diseases

Using the six-step approach

Step 1: Determine disorder/disease

50-year old baker with cough and dyspnoea

Going from symptoms to a clinical diagnosis:

"Could this be occupational asthma?"

Step 2: Determine relationship with work; what is known from the literature?

Gain an understanding of the relationship with work for the occupational group:

- Strength of the relationship?
- Dose–response relationship?
- Biological plausibility?

Gain an understanding of the relationship with work for the individual patient:

- Time relationship?
- Reversibility and/or exposure response?
- Colleagues with the same exposure and same complaints?

Step 3: Determine the nature and level of the causative exposure

Gain an understanding of the actual exposure:

- Nature?
- Intensity?
- Duration?
- Frequency?
- Workplace measurements available?
- Self-reported exposure?

Gain an understanding of preventive measures:

- Reduction of the exposure?
- Personal protective equipment?
- Maintenance of this equipment?

Step 4: Consider other possible explanations and the role of individual susceptibility

Life style

Sports, Hobbies

Genetics

age, gender

Private life

Co-morbidity

Personality

Step 5: Conclusion and reporting, considering all information

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Conclusion:

- Is there a diagnosis?

- Sufficient reason to assume a relationship between work and the disorder/disease?

- Sufficient exposure to risk factors?

- No other or insufficient alternative explanations?

Communicate the conclusion to the patient and employer

Step 6: Determine preventive measures and interventions if necessary

Individual case management:
• Treatment (medical or other)
Prevention in the company and/or for group of employees:
• Elimination or reduction of exposure
• General technical measures
• Individual, organizational and/or procedural measures
• Personal protective equipment
• Surveillance
• Evaluation of preventive measures and interventions

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Registration guidelines

For the most common disorders is an occupational registration directive present. In these guidelines, the clinical picture and the minimal exposure criteria are described.

- Occupational diseases caused by biological agents
- Musculoskeletal disorders
- Psychiatric disorders
- Skin conditions
- Respiratory disorders
- Neurological disorders
- Eye disorders
- Hearing disorders
- Lung and skin cancer
- Reproductive disorders
- Cardiovascular diseases

Problems when dealing with new health problems in work

- Often symptoms and signs, but no diagnosis or established disease
- No certainty about the cause
- Virtually no support to be found in the literature
- No biologically plausible association between symptoms and exposure

New occupational health risk

- A combination of health problems, exposure and work setting in which each can be new
- New diseases are rare
- So it usually will be:
  - Either a known disease caused by a new or changed exposure
  - Or a known disease-exposure combination in a new work setting

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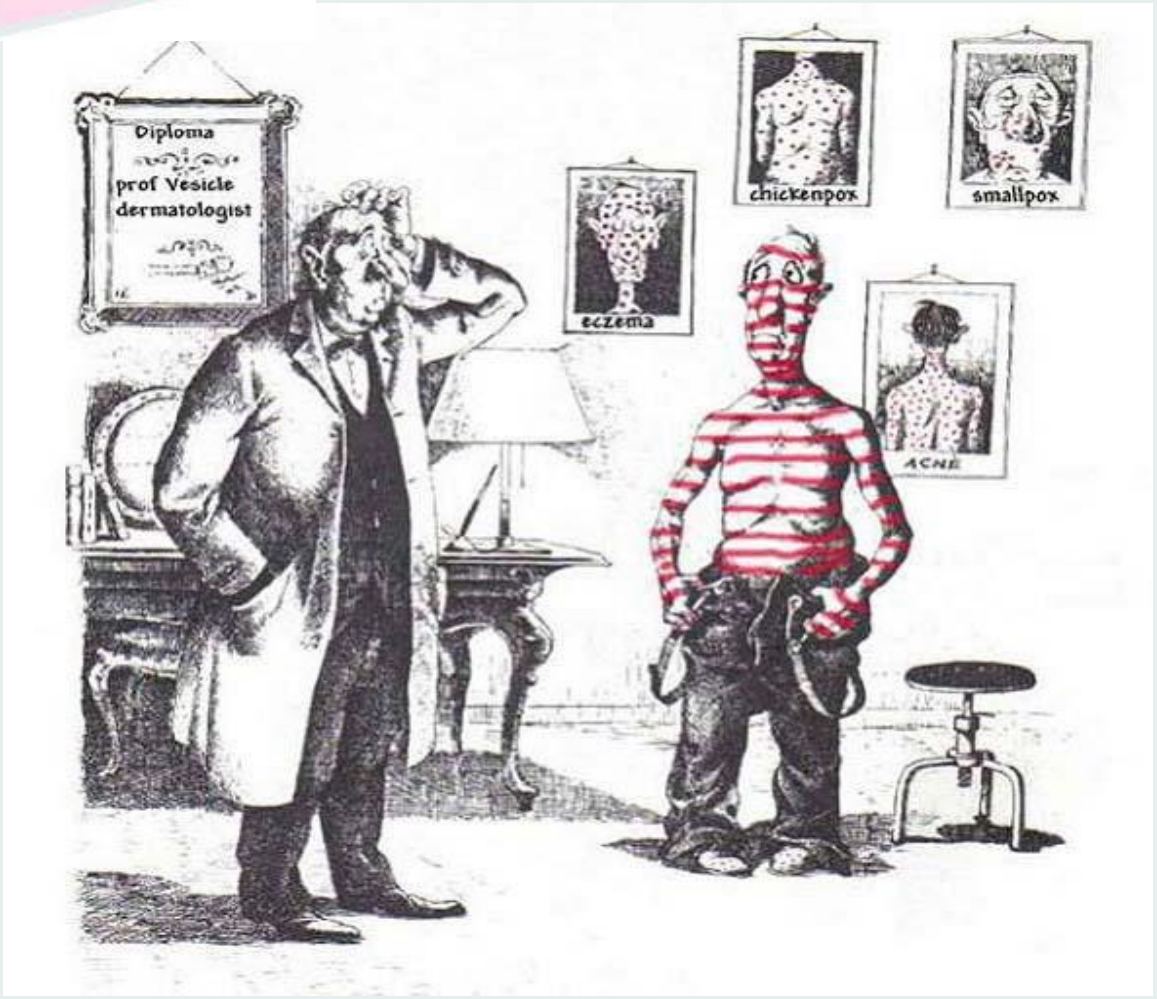
Dealing with new and emerging occupational health risks and work-related diseases

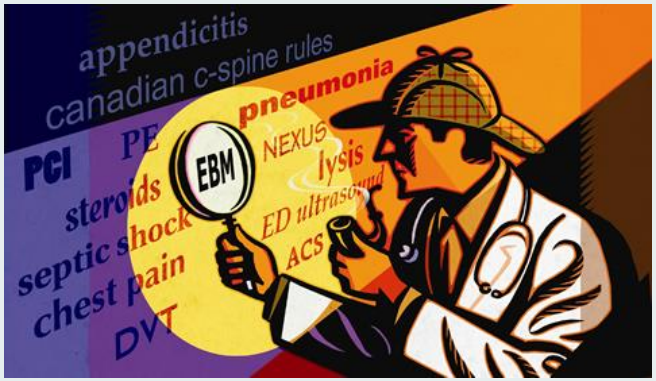


‘Your case might be the first one!’

Detecting new and emerging occupational health risks

Learn from the detection of adverse drug reaction with a focus on post marketing surveillance

Pharmacovigilance → OSH vigilance



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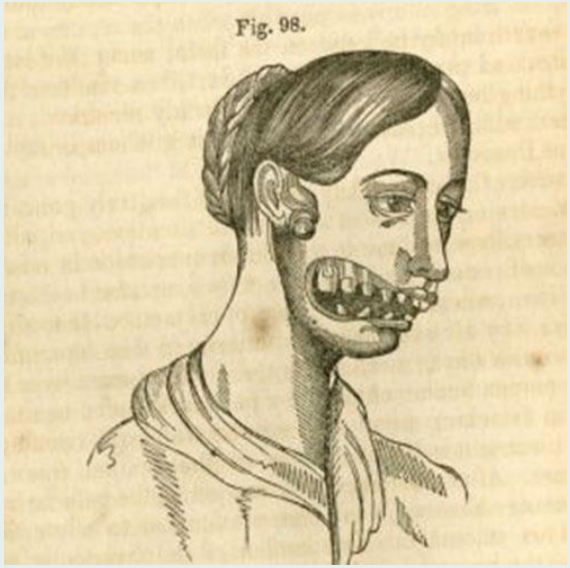
OSH vigilance: detection of adverse effects of work



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SIGNAAL or signal should be a:

hypothesis about the possible relation between exposure and a health problem, supported by data and arguments, and that needs to be tested

Signal detection possibilities

- Reports by employees
- Periodic screening of the literature
- Data mining within existing databases
- Linking of existing databases
- Secondary analysis of patient data in other databases
- Active detection of health problems
- Spontaneous reports of possible new combinations of exposure and health problems by occupational physicians, general practitioners and medical specialists

SIGNAAL

- SIGNAAL is a Dutch acronym: Signalering Nieuwe Arbeidsgerelateerde Aandoeningen Loket
- Which means: Signalling New Occupational Diseases Counter
- Online tool for structured reporting and assessment
- Aimed at (occupational) physicians in the Netherlands and Belgium
- Launched July 2013

www.signaal.info

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Signaal pilot project

Signalering Nieuwe Arbeidsgerelateerde Aandoeningen Loket

Dashboard Mijn account

Uitloggen

Home | Over ons | Contact | Help

Contact eczeem

Contact eczeem na contact met planten of bloemen, bijvoorbeeld de tulpen vinger

Meldingsformulier SIGNAAL

Via dit web formulier kunt u melding maken van door u gesignaleerde gevallen waarbij het zou kunnen gaan over nieuw verbanden tussen gezondheidsproblemen en blootstelling in het werk.
Vraag hier een account aan om te melden.

SIGNAAL

SIGNAAL staat voor **Sig**nalering **N**ieuwe **A**rbeidsgerelateerde **A**andoeningen **L**oket

SIGNAAL is een nieuw online loket waar u vermoedens over nieuwe verbanden tussen gezondheid en werk kunt voorleggen aan een panel van beroepsziektespecialisten: in Nederland aan de beroepsziektespecialisten van het Nederlands Centrum voor Beroepsziekten (NCvB) en aan Belgische zijde aan deskundigen van Centrum Omgeving en Gezondheid van de KULeuven en Externe Dienst voor Preventie en Bescherming IDEWE.

Reporting Form

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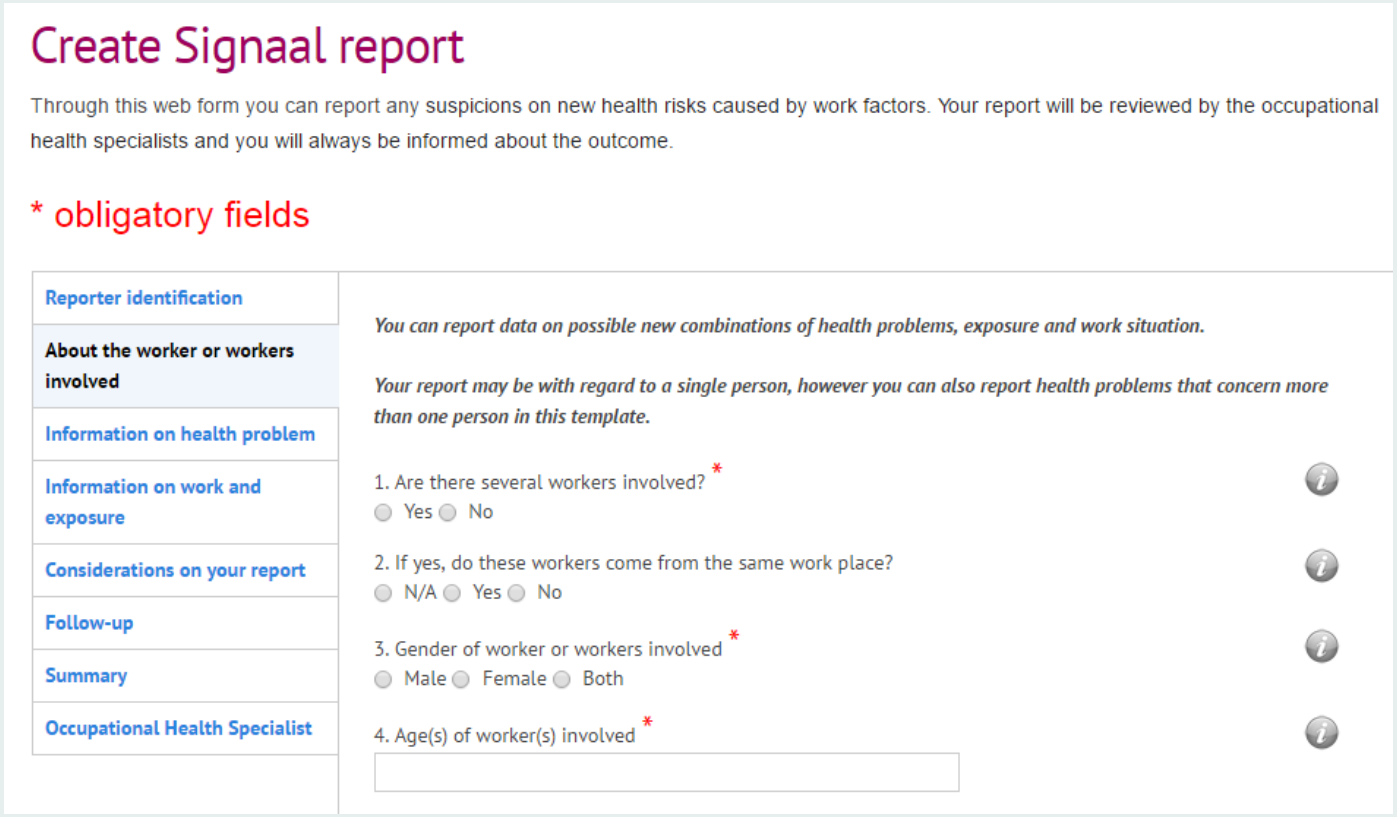

- Information on disease/health problem
- Information on work and specific exposure
- Considerations on work relation
- Follow-up and summary

Assessment steps

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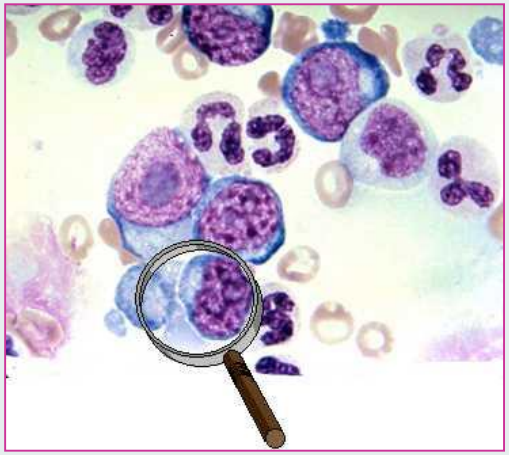
Step	Activity
Step 0	**(Occupational) physician submits report form**
	Moderator and Occupational Health Specialist start assessment
Step 1a	**Determine whether reported combination is already known**
Step 1b	**Determine whether report is complete**
	If not a new combination report back to reporter
Step 2	**Preliminary check in literature**
Step 3	**Assessment of work-relatedness**
Step 4	**Prioritizing for research follow-up**
	Contact reporter with result and if necessary how to proceed
Step 5	**If necessary research follow-up**
Step 6	**Report to reporter and if necessary to stakeholders**

Case

- Man, 31
- Hospitalized with dyspnoea and fever
- No mucosal involvement
- Never had respiratory disease before

- Diagnostic testing:
  - leucocytosis
  - Blood cultures: negative
  - Legionella testing: negative
  - X-thorax: normal



- Treated with broad spectrum antibiotics
- Uncomplicated recovery

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Work setting and exposure

- Job: kitchen assistant in a restaurant

- A few hours before the health problems developed he had cleaned a filthy drain of the restaurants dish washer, using a dash of bleach and a high pressure cleaning hose

Assessment (1)

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Diagnosis?
Endotoxin fever

Suspected specific exposure?
Inhalation of a biological aerosol generated by the high pressure water and the filthy drain. The aerosol might have contained endotoxins

Earlier described in the literature?
Not this specific situation, but comparable health problems with similar exposure like contaminated water basins as well as performing seaweed massages in wellness resorts

Relevant exposure?
One can only speculate, since there are no measurements. But there are research reports that show a connection between high pressure cleaning and biological aerosols

Other explanations?
Not found in this particular case

Assessment (2)

Health problems work-related?
Probably, based on case history and literature search

New combination of work and health?
Not fully new, but not described in this setting before

Preventive options?

- Enhance awareness on endotoxin fever and risks of high pressure cleaning
- Use of personal protective equipment

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Reports from the pilot phase (1)

Reports since July 2013		Work-related?	New combination?
Open angle glaucoma and playing saxophone (teacher)	NL	Yes	Not new, relatively unknown
Achilles tendon rupture in the assembly, dismantling and maintenance of cranes	NL	Yes	Not new, relatively unknown
Endotoxin fever after cleaning a polluted drain with high pressure	NL	Yes	Not new, not described in this work setting
Nosebleeds and formaldehyde exposure in aluminium production	B	Yes	New
Pulmonary alveolar proteinosis and exposure to hairspray in a hairdresser	B	Yes	Not completely new, but described rarely
Extrinsic Allergic Alveolitis and exposure to metal working fluids	NL	Yes	Not new, but rarely reported

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Reports from the pilot phase (2)

Reports since July 2013		Work-related?	New combination?
Vertigo in train drivers (Alternobaric vertigo)	B	Yes	Was known in divers and pilots, not described in trains
Cardiovascular problems in coffee production (CO)	NL	Yes	Not completely new, but nog described in this work situation
Repeated respiratory infections and frequent flying across time zones	NL	Yes	Not completely new, not reported before
Subclavian vein thrombosis by repetitive work with hyperextension and lateral rotation of the arm (Paget-Schrötter)	NL	Yes	Known in certain athletes
Unilateral central serous chorio retinopathy and work stress and frequent flying	NL	Possible	Not described through work factors

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Questions, remarks, suggestion?

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