New and emerging occupational risks

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2 Idewe
Continuous changes in work and working conditions give rise to new work-related diseases (WRDs)

Previously unknown exposure-disease combinations in a specific work setting
Alert systems

- **Collect information** on new WRDs
- **Raise alert** to stakeholders
- Use collected data to trigger timely **preventive actions**
**Aim:** Provide an **overview** and basic **typology** of the existing alert systems for new WRDs.
Overall project

Task 1. • Literature review

Task 2. • In-depth description of selected systems through interviews and qualitative analysis

Task 3. • Seminar to discuss outcomes 1 and 2

Task 4. • Final report including analysis and policy options

Task 5. • Workshop to disseminate findings to stakeholders
Extracted data on each system: **general aspects** (country, organization/ institution maintaining the system, website), aim of data collection, coverage, reporting mechanism, evaluation of work-relatedness, alert on new WRDs, link with prevention.
• **Expert workshop** to discuss outcomes of Task 1 and 2 of the project

• Gathered system’s owners and users, researchers and actors in the disease recognition area

• **Objective:** to gain more insight on the drivers and obstacles to the implementation of systems

• **Policy workshop** to discuss and consolidate results of the project

• Gathered representatives of ministries of health and labor, national insurance bodies, institutes of public health, etc.

• **Objective:** disseminate findings derived from the project
Results

- Alert systems
  - Compensation-based
  - Comprehensive
  - Sentinel
  - Public health
Compensation-based systems

Washington: SHARP (3 programs aimed at dermatitis, asthma, musculoskeletal disorders)

Spain: CEPROSS and PANOTRASTSS

Belgium: Fund for Occupational Diseases

Switzerland: SUVA

Hungary: Registration system of ODs

Taiwan: NODIS
Compensation-based systems

Creytens, K. et al. Contact Dermatitis, 2017
## Compensation-based systems

<table>
<thead>
<tr>
<th></th>
<th>Patient 1</th>
<th>Patient 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D2</td>
<td>D6</td>
</tr>
<tr>
<td><strong>Resins</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epoxy resin bisphenol A 1%</td>
<td>–</td>
<td>+</td>
</tr>
<tr>
<td>Epoxy resin bisphenol F 0.25%</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Resins 'as is', semi-open</td>
<td>–</td>
<td>++</td>
</tr>
<tr>
<td>Aromatic urethane diacrylate 0.05%</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td><strong>Diluents</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triglycidyl-p-aminophenol 0.5%</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>2-Phenyl glycidyl ether 0.25%</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>1,6-Hexanediol diglycidyl ether 0.25%</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>1,4-Butanediol diglycidyl ether 0.25%</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Hardener</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4,4'-Diaminodiphenylmethane 0.5%</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

NT, not tested.
Compensation-based systems

Case reported for compensation

Alert to new WRD

Evaluation by experts

Workplace interventions
Compensation-based systems

+ Built on the existing infrastructure and resources
  Stable funding

- Criteria for reporting can limit identification of new WRDs
  Reporting is insurance-driven
Comprehensive systems

- **Canada:** OWRAS
- **Finland:** Register of occupational safety and health administration
- **Norway:** RAS
- **The Netherlands:** NROD, PIM
- **UK and Ireland:** THOR; UK: Riddor
- **France:** MCP, RNV3P, ONAP2, EpiNano
- **Spain:** Navarre
- **Italy:** OCCAM
- **South Africa:** SORDSA
- **Singapore:** iReport
- **Australia:** SABRE
Different reporting schemes for different types of WRDs

**THOR-EXTRA** – scheme for reporting of interesting cases or WRDs with a potentially novel cause

Sophisticated statistical methods for determination of incidences and trends in WRDs

Data quality constantly improved

Strong link with authorities
Comprehensive systems

Occupational skin disease reported to THOR 2002-2005.

Average annual number of cases

Incidence rate per 100,000 employees

Physicians report cases seen in their practice

DATABASE

Alert to new WRD

Statistics/ data mining

National preventive strategies

Comprehensive systems
Comprehensive systems

+ Large set of data
  Nation-wide scope and interventions

- Motivation of reporters to participate
  Lack of exposure assessment
  Resources, funding
USA: SENSOR, HHE, SENSOR (Pesticides)

Belgium and the Netherlands: SIGNAAL

France: OccWatch, GAST

New Zealand: NODS; Specialist Panels (Cancer Panel, Respiratory Diseases Panel, Solvents Panel, and Chemical Panel)
**Sentinel systems**

**Mysignal.be**

*Signalering Nieuwe Arbeidsgerelateerde Aandoeningen Loket*

**Signal.info**

*Signaling New Occupational Diseases Counter*

**SIGNAAL**

**SIGNAAL staat voor** *Signalering Nieuwe Arbeidsgerelateerde Aandoeningen Loket*

SIGNAAL is een nieuw online loket waar u meldingen over nieuwe verbonden tussen gezondheid en werk kunt indienen. Aan een panel van beroepsziekespecialisten in Nederland en Belgische ziekenhuisartsen van Centrum Omgivings en Gezondheid van de KU Leuven kunnen meldingen worden ingediend.

*Read more...*
• Female, 22 years old, student

• Experienced three car crashes
• Each time, she suddenly fell asleep while driving the car

• No other complaints
• Good general health, no history of any medical condition, including sleep problems/sleep deprivation
• Medical checkup with somnologist did not show any abnormalities
The reporting physician suspected that the trigger could be the car refresher, enhanced by the heat (this happened during winter).
Literature review

Grey literature article (2016):

*How To Use Essentials In The Car To Make Journeys So Much Better (& Safer)*

- Overview of smells to be avoided in the car because of their soothing effects

(e.g. lavender, bergamot, sandalwood, etc.)

Literature review

Scientific literature: investigation of the influence of odours on alertness during driving

- Fragrances consist of molecules with low weight that can pass blood-brain barrier and affect nervous system
- Effects on brain were mapped out with EEG
- The main active component are essential oils
- Essential oils contain 2-3 main components and dozens of others in small quantities

## List of compounds in the car perfume

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Major Components</th>
<th>Effects on Brain Functions and Psychophysiologial Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geranium</td>
<td>citronellol, geraniol, citronellyl formate, linalool</td>
<td>Lowered state and trait scores</td>
</tr>
<tr>
<td>Jasmine</td>
<td>benzyl alcohol, linalool, benzyl acetate, jasmine, geraniol</td>
<td>Suppressed muscle sympathetic vasoconstrictor activity, sedative effect</td>
</tr>
<tr>
<td>Lavender</td>
<td>geraniol, linalool, linalyl acetate, β-caryophyllene</td>
<td>Increased drowsiness, sedative and relaxing effects, reduced mental stress</td>
</tr>
<tr>
<td>Rose</td>
<td>citronellol, geraniol, β-pinene, rose oxide</td>
<td>Suppressed muscle sympathetic vasoconstrictor activity</td>
</tr>
<tr>
<td>Ylang-Ylang</td>
<td>geranyl acetate, benzyl benzoate, eugenol, germacrene-D, geraniol</td>
<td>Decreased alertness, impaired memory, increased relaxation, sedative effect</td>
</tr>
</tbody>
</table>

**Table 1. Common essential oil-bearing plants containing geraniol and their physiological effects**

Tesla driver blames 'new car smell' in fatal cyclist crash
If we compare this literature and the composition of the smell used in the car, it seems plausible that some of the ingredients, especially geraniol, may have a greater sedative effect than is desirable in a car.

It is also likely that if the car warming creates a greater spread of the smell, there may be "overdosing".

It is therefore not so much that there are harmful health effects caused by components in the car perfume, but rather a too strong intended effect and a possibly wrong choice of the type of perfume.
<table>
<thead>
<tr>
<th>Some of the reports since July 2013</th>
<th>Work-related?</th>
<th>New combination?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open angle glaucoma and playing saxophone (teacher)</td>
<td>NL</td>
<td>Not new, relatively unknown</td>
</tr>
<tr>
<td>Achilles tendon rupture in the assembly, dismantling and maintenance of cranes</td>
<td>NL</td>
<td>Not new, relatively unknown</td>
</tr>
<tr>
<td>Back pain in the care of dementia patients without available lifting aids</td>
<td>NL</td>
<td>Not new</td>
</tr>
<tr>
<td>Endotoxin fever after cleaning a polluted drain with high pressure</td>
<td>NL</td>
<td>Not new, not described in this work setting</td>
</tr>
<tr>
<td>Nosebleeds and formaldehyde exposure in aluminium production</td>
<td>B</td>
<td>New</td>
</tr>
<tr>
<td>Pulmonary alveolar proteinosis and exposure to hairspray in a hairdresser</td>
<td>B</td>
<td>Not completely new, but described rarely</td>
</tr>
</tbody>
</table>
Network of occupational physicians

Suspected case of new WRD

Evaluation by experts

Detailed investigation

Sentinel systems

Workplace interventions

Alert to new WRD
Focus on new WRDs specifically
Detailed exposure assessment
Work-relatedness evaluation by (a group of) experts

Motivation of reporters to participate
Resources, funding
Lack of visibility
Public health systems

USA: Pesticide Illness Surveillance Program (PISP)

Ireland: Quarterly National Household Survey (QNHS)

UK: Self-reported Work related Illness survey (SWI)

France: TMS, PNMS
Pesticide Illness Surveillance Program (PISP)

Pesticide-related illness or injury → Work-related?

Restrictions on pesticides use
Public health systems

Reporting sources

- State Department of Agriculture
- Poison Control Centers
- Workers’ Compensation System
2001 to 2005 health risks related to pyrethrins and pyrethroids

Several poisonings, of which \( \frac{1}{4} \) work-related cases

Clinical signs and symptoms revealed several respiratory health effects
EPA:
(1) Change product labels for unrestricted pesticides
(2) require commercial applicators to initiate mechanical ventilation for indoor applications of pyrethroid products;
(3) define optimal mechanical ventilation.

State agencies or health departments:
(1) Continue to monitor the health effects of indoor use of pyrethrins and/or pyrethroids;
(2) develop outreach to organizations that educate asthma and allergy patients on potential risks of these pesticides;
(3) educate applicators and consumers about the importance of reading pesticide product labels and directions.

Emergency response workers:
(1) Evaluate protective equipment and response protocols
(2) know how to locate information on chemical hazards.

Health-care providers:
(1) Be aware that these chemicals are respiratory irritants with potential to cause asthmatic reactions;
(2) be aware that cases of pesticide exposure or poisoning are reportable conditions to public health authorities;
(3) obtain an adequate history of any exposures that could cause or exacerbate disease.
Monitoring health of general population

Extract work-related data

Alert to new WRD

Preventive strategies on the public health level

Public health authority
Public health systems

+ Large set of data

Ability to trigger interventions on the public health level

- Data on work-relatedness not always high quality

Motivation of reporters
Each group has strong points and drawbacks

Several complementary systems should be implemented

When implementing an alert system, stakeholders should take into account the national occupational health context and look at examples from other countries

International exchange of data should be encouraged

harmonization and comparability of reported data
Setting up a sentinel approach recommendations

**Sentinel systems**

Alternative approaches:
- Non-compensation-based systems with a sentinel aspect
  - Public health systems with a sentinel aspect

**Non-compensation-based systems**

Alternative approaches:
- Survey-based Public health systems
- Epidemiological studies
- Compensation based systems with data mining
- Occupational health surveillance

**Individual sentinel signals**
- Identification of individual cases of new WRDs or new exposure-WRD links

**Population-based sentinel signals**
- Identification of specific groups of workers/economic sectors at risk
- Identification of new exposure-WRDs links

Signal strengthening

**Workplaces**

**Public health authority**

**OSH authority**
- Promote guidance documents on how to sentinel approaches
- Use EU-OSHA Focal Points to disseminate this guidance

- Promote harmonization of recorded data
- Develop uniform criteria for assessment of work-relatedness

- Form a group of international experts on new/emerging WRDs
- Experts can aid to assess cases reported on the national level

National level

EU level

Level 1 alert

Level 2 and 3 alert
Thank you for your attention!

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