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European Agency for Safety and Health at Work

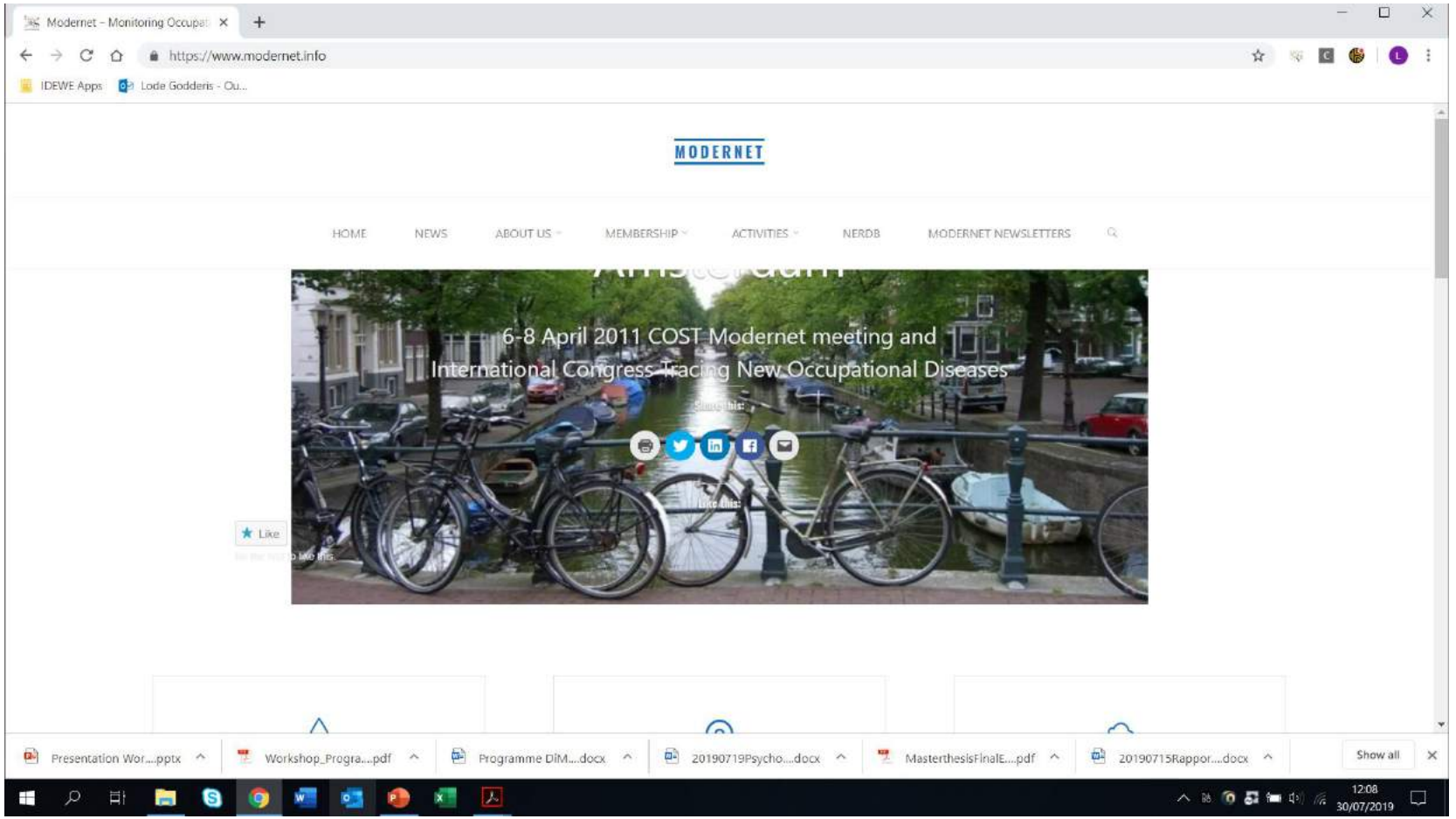


Addressing challenges of ER

Lode Godderis[1,2]

1 Environment and Health, KU Leuven, Belgium
2 IDEWE, External Service for Prevention and Protection at Work, Belgium.

Modernet.info



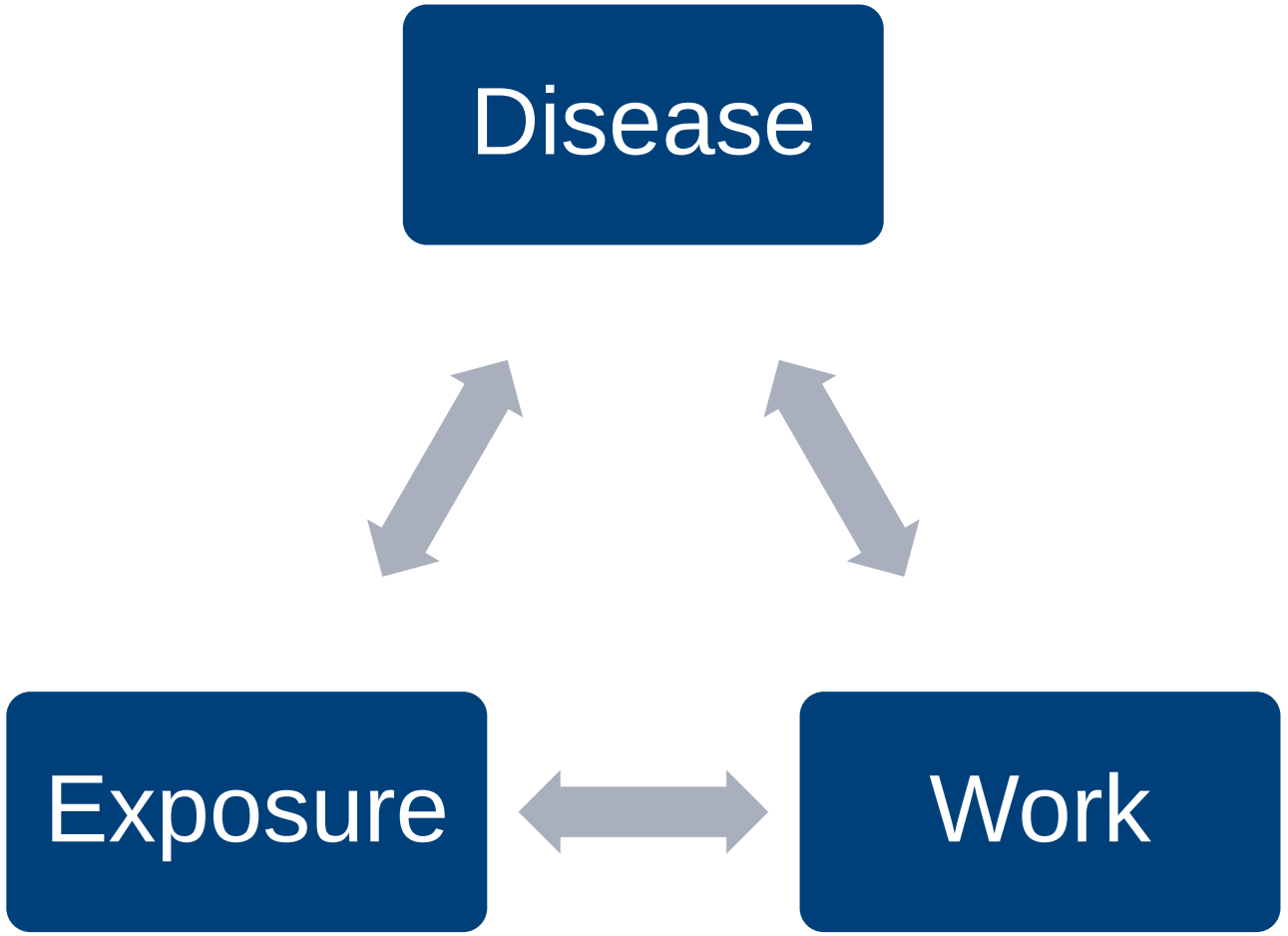
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Background

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


Disease
Exposure
Work

Product	Since	Industrial use	First reports on cancer	Important publications/reports	Regulatory steps
Asbestos	1879	Asbestos mining, insulation, building material etc.	1935–49 Lung cancer cases reported in asbestos manufacturing workers; 1959–60 Mesothelioma cancer in workers and public identified in South Africa	1955 Doll establishes high lung cancer risk in Rochdale asbestos workers; 1959–60 Mesothelioma cancer in workers and public identified in South Africa;	First asbestos ban 1989 Iceland and ongoing.
Benzene	1900	Solvent in production of artificial leather, rubber goods, glue, printing, paint, coatings, dry cleaning, automobile manufacturing, etc.	In 1928 first case of benzene-induced leukemia: acute lymphatic leukemia in a pharmaceutical worker with high benzene exposure levels	1977 - Infante et al. publish the first cohort study of workers linking benzene exposure directly to leukemia	1982 -IARC evaluated benzene as having “sufficient evidence that benzene is carcinogenic to man,”
Radium	1898	Among others, painting watches with radium containing paint	1923 - first bone sarcoma recorded in this group of women in; there have been 55 cancers in a population of nearly 3000 women (incl leukaemia and breast cancer).	1949 - International Committee on Radiological Protection (ICRP): no dose threshold for radiation-induced cancer	1996 - EU Directive on Ionising Radiations based on ICRP 60 which will be mandatory on member states.
Vinyl chloride	1930	Production of vinyl chloride and derivatives; PVC processing, hairdressers and barbers using hairspray containing vinyl chloride	1967 - 1973, 4 cases of angio sarcoma of the liver among men employed in the polyvinyl chloride polymerization section of tyre plant	Two cohort studies publishing in 1981 (USA) and 1991 (Europe)	Vinyl chloride was considered by previous IARC Working Groups in 1974, 1978, 1987, and 2007 (IARC, 1974, 1979, 1987, 2008).

Background

- REACH
  - 146.000 agents currently in ECHA dbase
- Bundesinstitut für Risikobewertung
  - 1/3 of submission were lacking information
- ECHA:
  - Assesses 5% of submitted files
  - Focus in high risks?




≥1000 tpa
100-1000 tpa
Endpoint
Developmental toxicity ≥1 000 tpa
Reproductive toxicity ≥1 000 tpa
Repeated dose toxicity ≥1 000 tpa
Mutagenicty ≥1 000 tpa
Biotic degradation ≥1 000 tpa
Abiotic degradation ≥1 000 tpa
Bioaccumulation ≥1 000 tpa
Ecotoxicity ≥1 000 tpa
Developmental toxicity 100-1 000 tpa
Reproductive toxicity 100-1 000 tpa
Repeated dose toxicity 100-1 000 tpa
Mutagenicity 100-1 000 tpa
Biotic degradation 100-1 000 tpa
Abiotic degradation 100-1 000 tpa
Bioaccumulation 100-1 000 tpa
Ecotoxicity 100-1 000 tpa
18
33
49
23
34
43
43
33
25
45
40
16
56
16
27
40
12
49
24
15
61
21
61
18
53
21
26
49
2
49
54
23
23
work in progress
47
16
37
work in progress
38
14
49
32
44
24
0
10
20
30
40
50
60
70
80
90
100
Percentage share [%]
"compliant"
"non-compliant"
"complex"

Background

Pharmacovigilance

Science and activities relating to the **detection, assessment, understanding** and **prevention** of **adverse effects** or any other **drug**-related problem



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Background

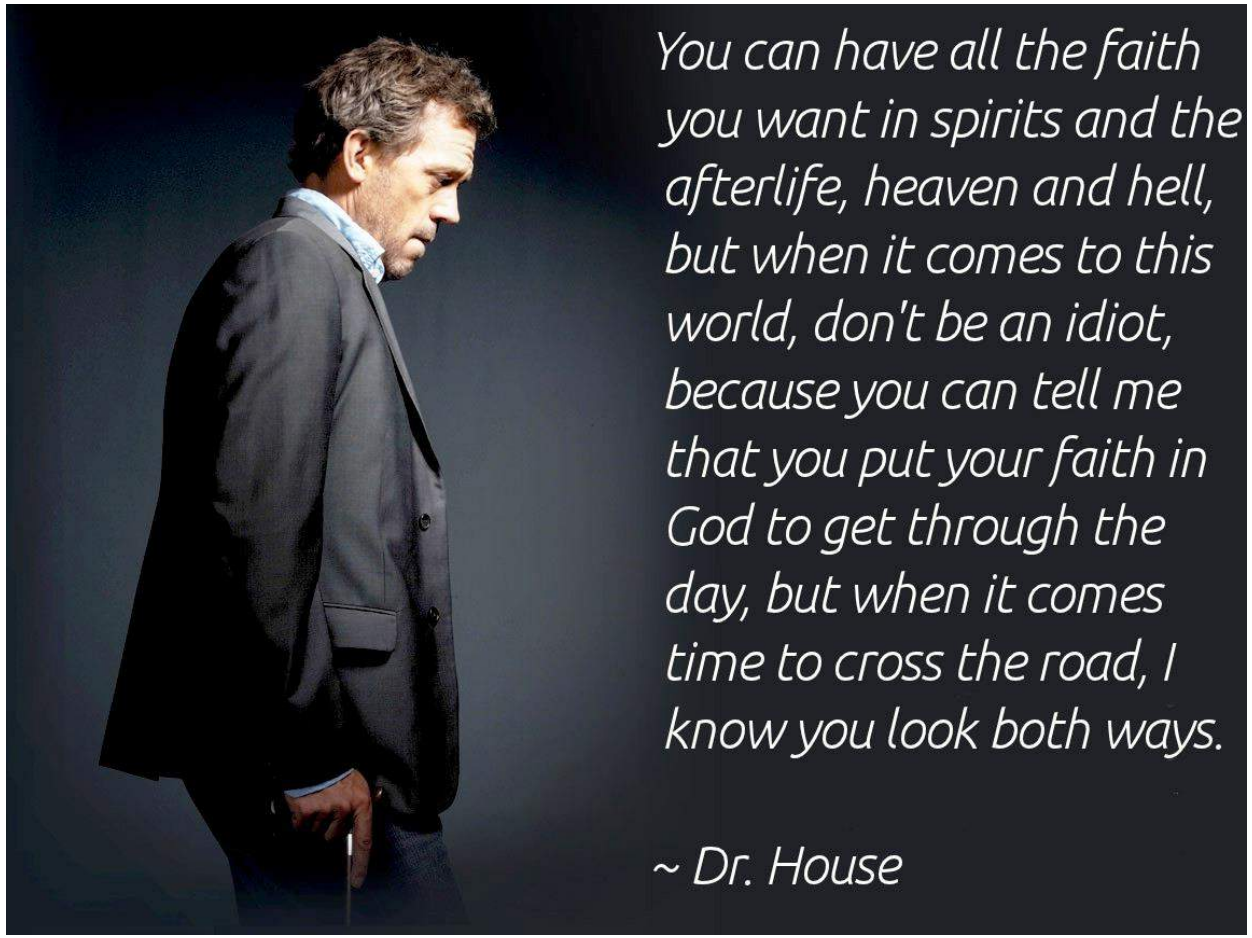
OSH-vigilance

Science and activities relating to the **detection, assessment, understanding** and **prevention** of **adverse effects** or any other **occupational**-related problem



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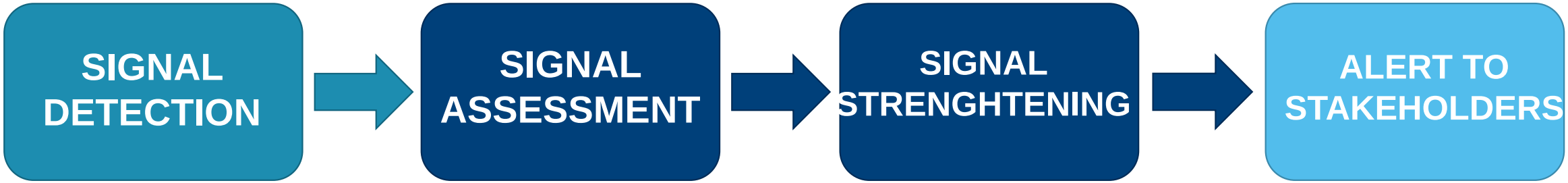
Background


You can have all the faith you want in spirits and the afterlife, heaven and hell, but when it comes to this world, don't be an idiot, because you can tell me that you put your faith in God to get through the day, but when it comes time to cross the road, I know you look both ways.
~ Dr. House

Background

Alert systems

- **Collect information** on new WRDs
- **Raise alert** to stakeholders
- Use collected data to trigger timely **preventive actions**



Background



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

European Agency for Safety and Health at Work

Coronel Instituut voor Arbeid en Gezondheid

MANCHESTER 1824 The University of Manchester

ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

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Background



Scientific literature

Databases:

- MEDLINE (PUBMED)
- Embase
- Web of Science

Grey literature

Databases: OpenGrey, OSH-update

Existing data from 3 surveys

Websites

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**

Background

- 6 systems described through in-depth desk research:

Information describing the development, outline and results of the systems was gathered from websites, grey literature and scientific publications

- 6 systems described through interviews with 3 stakeholders:

1. Owner of the sentinel or alert system;
2. Workplace actor who reports to the system
3. Researcher and other stakeholder using the system in the framework of monitoring, OD recognition, or workplace prevention.

Background

- **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



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European Agency for Safety and Health at Work

EU-OSHA multilingual website award winner
European Ombudsman Award for Good Administration

aaa
News & Events
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English
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Themes | Emerging risks | Surveys & Statistics | Legislation | Campaigns & Awards | Tools & Publications | About EU-OSHA

Home » Tools & Publications » Publications » Methodologies to identify work...

Tools & Publications

- Publications →
- Risk assessment tool (OiRA)
- OSHwiki
- OSH e-tools
- Data visualisation – ageing & OSH
- Interactive dashboard - ESENER
- Seminar reports
- Infographics
- E-guide on vehicle safety
- E-guide for all ages
- E-guide manage stress
- Napo
- Campaign toolkit
- Blog

Publications

← Back to publications and filter

22/08/2017

Methodologies to identify work-related diseases: Review of sentinel and alert approaches



Alert and sentinel systems allow the early identification of work-related diseases and are useful to complement the official figures of occupational diseases and to set-up evidence-based prevention. However, there is only a limited number of such systems in place.

This report reviews existing alert and sentinel systems, as well as other monitoring systems presenting features also suitable to detect emerging work-related diseases.

The review identifies weaknesses, such as the often missing collection of workplace exposure assessment data, the poor coverage of some worker's groups and diseases like mental ill health; and the weak link to workplace prevention. It also gives good practice examples and highlights the importance of international cooperation and dissemination of data to achieve the maximum benefit from alert and sentinel approaches.

Related

Publications

- Monitoring technology in the workplace
- 3D printing: a new industrial revolution
- Key trends and drivers of change in information and communication technologies and work location

View all →

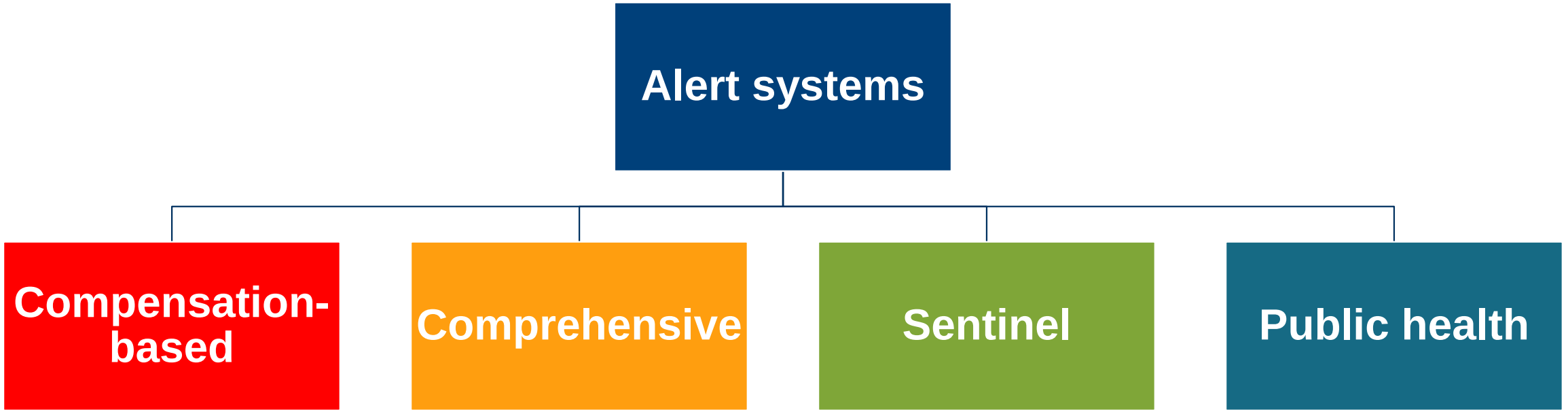
News

22/08/2017
- Sentinel and alert systems catch early signs of work-related diseases

26/07/2017
- Emerging risks: acting now to ensure

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Results


Alert systems
Compensation-based
Comprehensive
Sentinel
Public health

Compensation-based systems



Compensation-based systems





Creytens, K. et al. Contact Dermatitis, 2017

Compensation-based systems



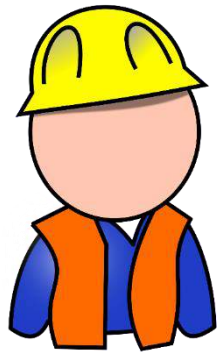
	Patient 1		Patient 2	
	D2	D6	D2	D6
Resins				
Epoxy resin bisphenol A 1%	–	+	+	+
Epoxy resin bisphenol F 0.25%	–	–	+	+
Resins 'as is', semi-open	–	++	NT	NT
Aromatic urethane diacrylate 0.05%	+	+	–	–
Diluents				
Triglycidyl-*p*-aminophenol 0.5%	++	++	+	+
2-Phenyl glycidyl ether 0.25%	–	–	+?	+
1,6-Hexanediol diglycidyl ether 0.25%	–	–	+	++
1,4-Butanediol diglycidyl ether 0.25%	–	–	+	++
Hardener				
4,4'-Diaminodiphenylmethane 0.5%	–	–	–	+

NT, not tested.

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Creytens, K. et al. Contact Dermatitis, 2017

Compensation-based systems



Case reported for compensation





Evaluation by experts



Alert to new WRD



Workplace interventions

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Compensation-based systems

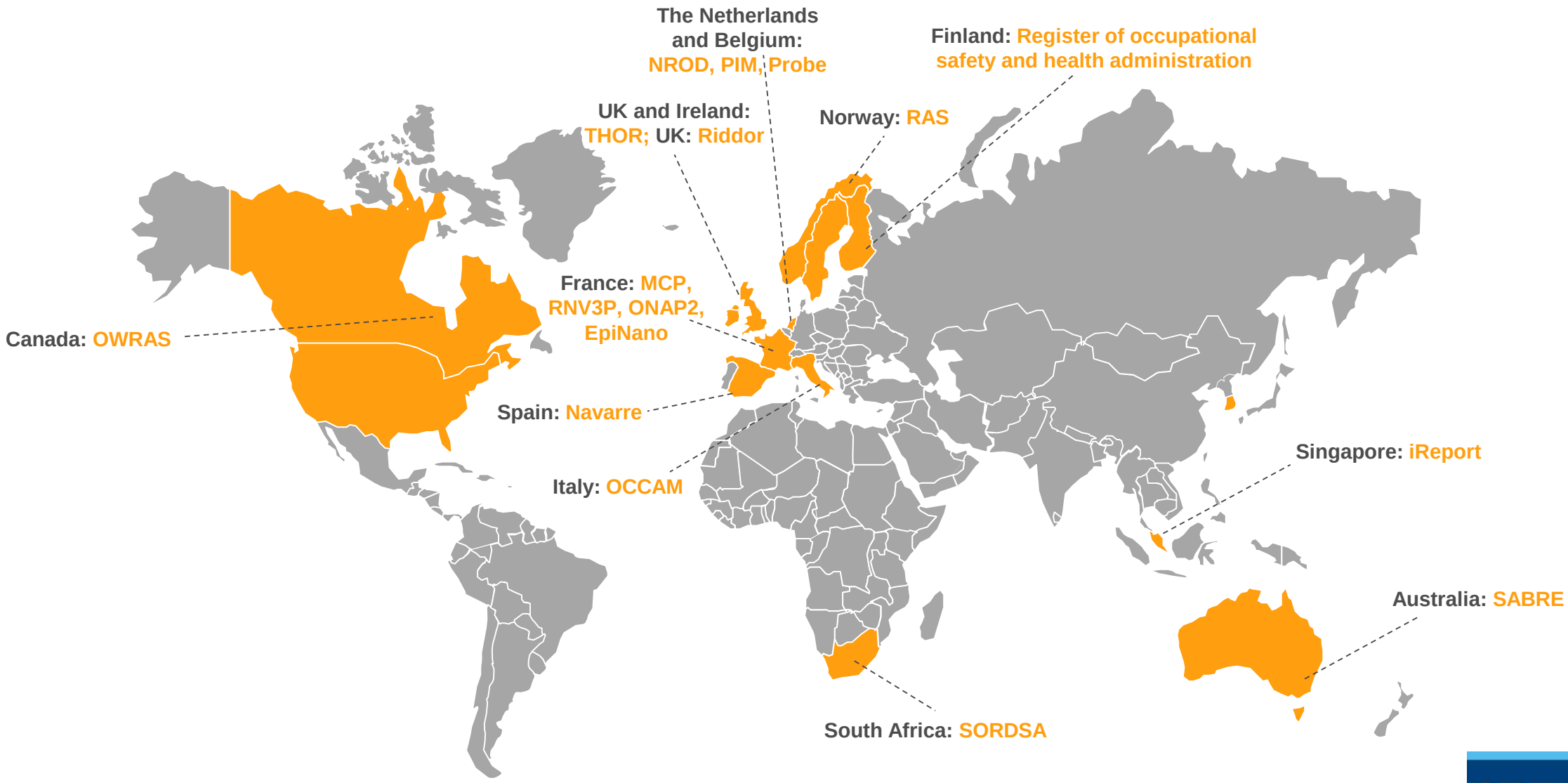
+ Built on the existing infrastructure and resources

  Stable funding

− Criteria for reporting can limit identification of new WRDs

  Reporting is insurance-driven

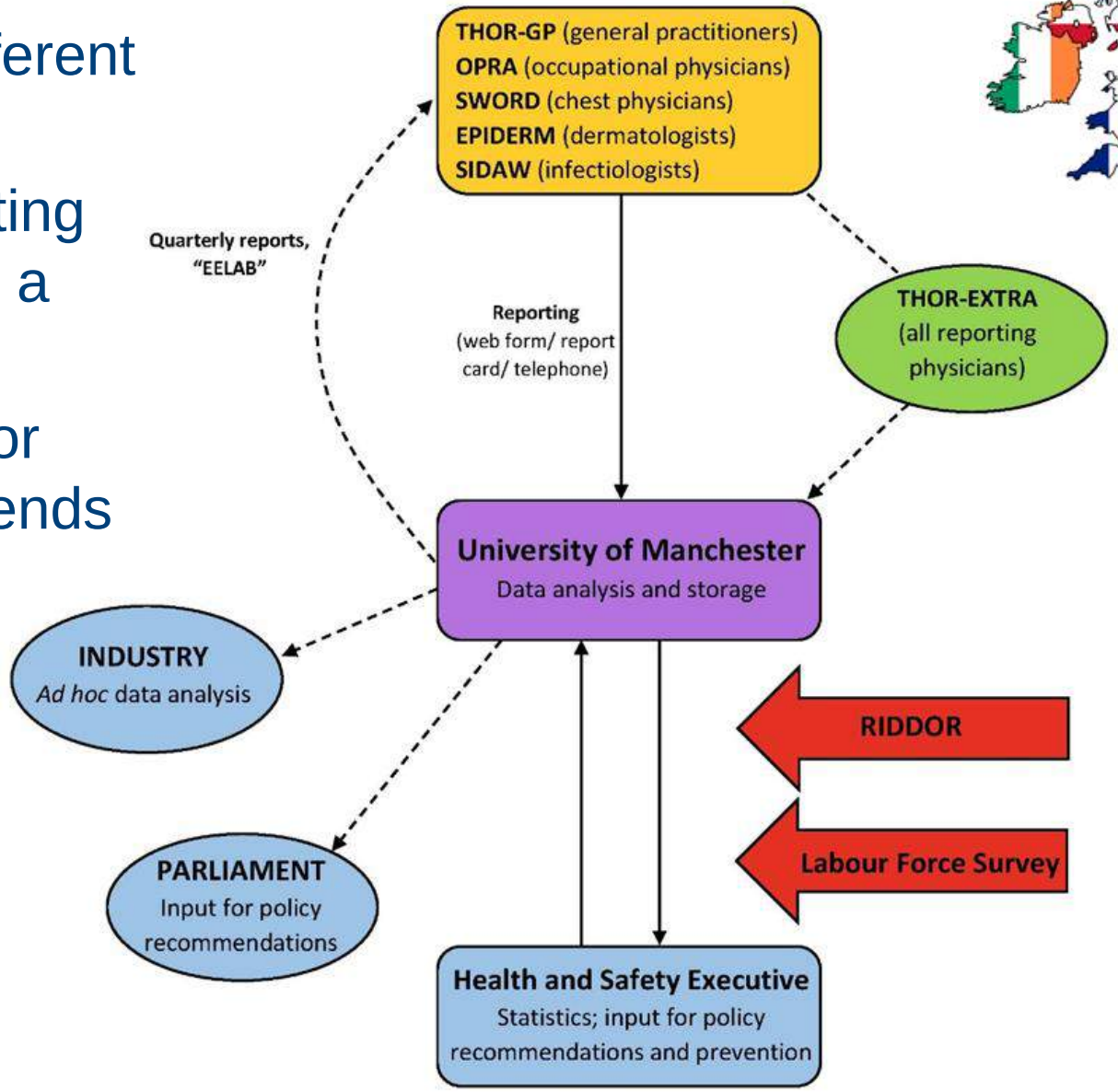
Comprehensive systems



Comprehensive systems

- 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.



Source: Health and Safety Executive, Work-related skin disease in Great Britain, 2017.

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Comprehensive systems



Occupational Medicine 2015;65:651–658
doi:10.1093/occmed/kqv074

Data warehouse for detection of occupational diseases in OHS data

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[1]IDEWE, External Service for Prevention and Protection at Work, Interleuvenlaan 58, 3001 Heverlee, Belgium, [2]Katholieke Universiteit Leuven, Centre for Environment and Health, 3000 Leuven, Belgium.

Correspondence to: L. Godderis, IDEWE, External Service for Prevention and Protection at Work, Interleuvenlaan 58, 3001 Heverlee, Belgium. Tel: +32 16 390411; e-mail: Lode.godderis@idewe.be

Background	Occupational health and safety (OHS) services collect a wide range of data during health surveillance.
Aims	To build a 'data warehouse' to make OHS data available for research and to investigate sector-specific health problems.
Methods	Medical data were extracted, transformed and loaded into the data warehouse. After validation, data on lifestyle, categorized medication use, ICD-9-CM encoded sickness absences and health complaints, collected between 2010 and 2014, were analysed with logistic regression to compare proportions between employment sectors, taking into account age, gender, body mass index (BMI) and year of examination.
Results	The data set comprised 585 000 employees. Average age and employment seniority were 39 ± 12 and 8 ± 9 years, respectively. BMI was 26 ± 5 kg/m^2. Health complaints, medication use and sickness absence significantly increased with BMI and age. The proportion of employees with health problems was highest in health care (64%), government (61%) and manufacturing (60%) and lowest in the service sector. In all sectors, 10% of workers reported locomotor health problems, apart from the service sector (8%) with similar results for medication consumption. Neuropsychological drugs were more frequently used by health care workers (8%). The transport sector contained the highest proportion of cardiological medication users (12%). Finally, 30–59% of employees reported at least one sickness absence episode. Sickness absence due to locomotor issues was highest in manufacturing (11%) and health care (10%), followed by government (9%) and construction (9%).
Conclusions	Significant differences in indices of workers' health were observed between sectors. This information is now being used in the implementation of a sector-oriented health surveillance programme.
Key words	Data collection; information storage and retrieval; occupational diseases; occupational health services; population surveillance; public health.

Introduction

The early detection of health impairment induced or partly caused by work remains difficult. Reliable figures on occupational and work-related diseases are lacking in the European Union due to differences in criteria for notification and recognition of occupational diseases in the legal and social security context. Consequently, countries do not adequately monitor or become alerted to new occupational diseases [1].

Occupational health and safety (OHS) services collect large amounts of data during health surveillance, risk assessments, etc. Despite the potential for early detection of work-related diseases and for reporting trends, these data have exclusively been used to detect health problems (e.g. occupational asthma) in specific work populations (e.g. laboratory workers). Most OHS data are collected through several applications and stored in databases for mainly operational reasons, i.e. keeping individual and company-related data up to date and available. Consequently, these data remain mainly fragmented, unexplored and unavailable for case finding or studying worker cohorts with particular exposures and diseases [2]. Typically, researchers need to extract data manually from worker records and re-enter them into databases, a labour intensive process prone to errors [3].

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Downloaded from http://occmed.oxfordjournals.org/ at KU Leuven University Library on November 8, 2015

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Comprehensive systems



PROBE = Hazardous chemical **P**roducts **R**egister for **O**ccupational use in **Be**lgiu

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Comprehensive systems

- Data on occupational exposure collected by Occupational Health Services (OHS) merely for individual health screening.
- Collected data cannot easily be made available for epidemiological research and policy development.
- Through a Sentinel Surveillance approach standardized exposure and health data can be collected as already shown in other countries.

Comprehensive systems

Characteristics of the OHP

E-learning module on selected chemical agents

1e module

Administratieve gegevens

Algemene gegevens werknemer

* **Geboortejaar**

Jaar

* **Geslacht**

◯ Vrouwelijk ◯ Mannelijk

* **Nationaliteit**

◯ Belgisch
◯ Andere:

Professionele gegevens werknemer

* **Functie**

* **Hoofdfunctie**

◯ Productie, fabricage
◯ Bouw
◯ Installatie, herstelling, technisch onderhoud
◯ Schoonmaak, bewaking, huishoudelijk onderhoud
◯ Goederenbehandeling, goederenopslag, logistiek
◯ Secretariaat, boekhouding, receptie
◯ Beheer, accounting
◯ Handel, verkoop
◯ Onderzoek, ontwikkeling
◯ Verzorging
◯ Dienstverlening aan bedrijven
◯ Andere:

* **Anciënniteit in het bedrijf**

◯ < 1 jaar
◯ Tussen 1 en 3 jaar
◯ Tussen 3 en 10 jaar
◯ ≥ 10 jaar

* **Arbeidsduur**

◯ Voltijds
◯ Deeltijds: percentage

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E-learning

Background on the selected chemical agents

Comprehensive systems

Characteristics of the OHP

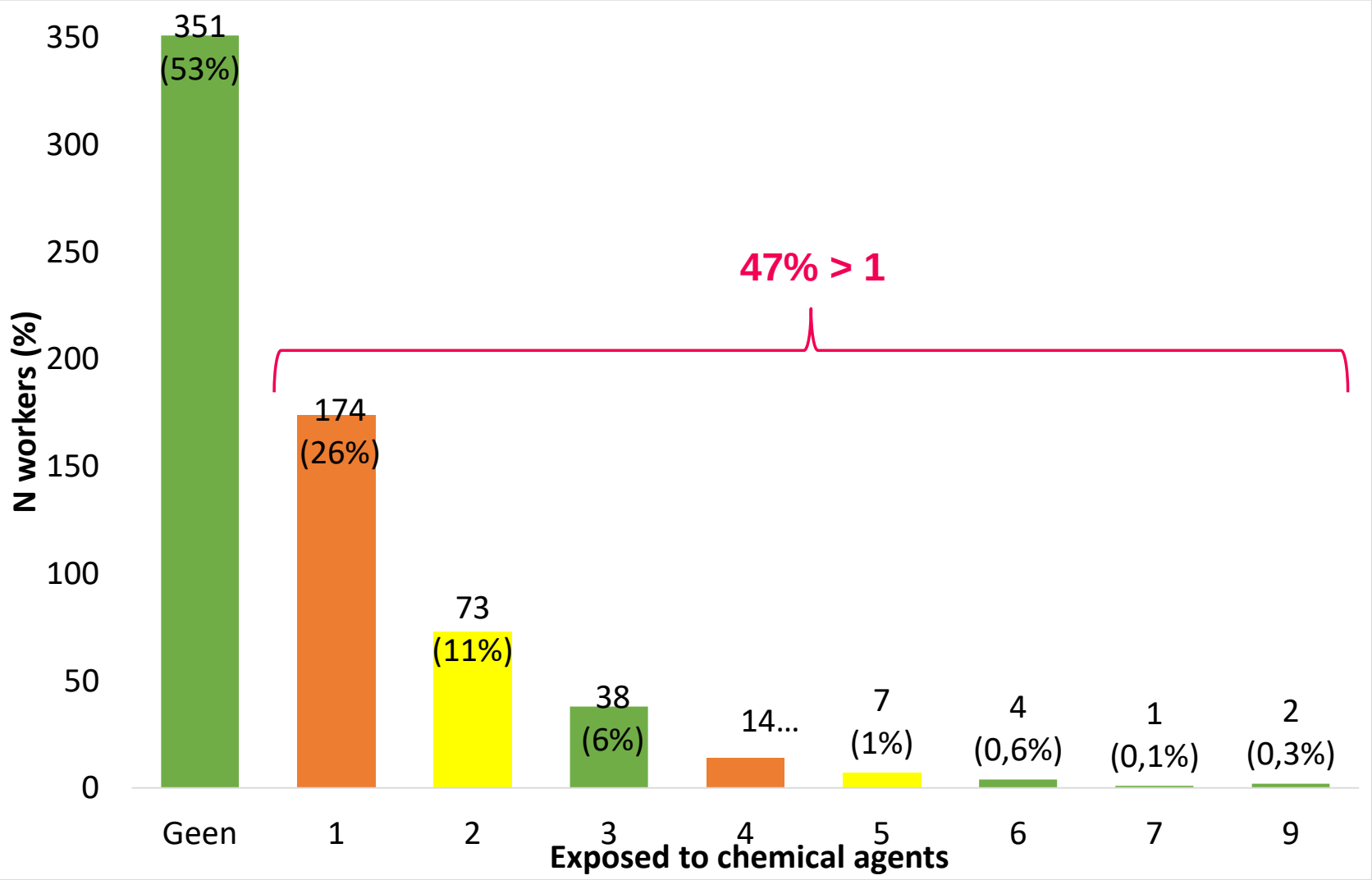
E-learning module on selected chemical agents

Questionnaire on exposure

1e module

2e module

Comprehensive systems



SUMER 2010

10% of Fr workers exposed to ≥ 1 CMR

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Comprehensive systems

Probe 2018

Chemical agent	% workers exposed
Diesel exhaust	14
Welding fumes	12
Toluene	10
Wood dust	9
Benzene	7
Chrystaline silica	6
Formaldehyde	4
Asbestos	4
Lead	3

Sumer 2010

Chemical agent	% workers exposed
Diesel exhaust	4
Mineral oils	3
Wood dust	2
Chrystaline silica	1
Formaldehyde	1
Lead	1
Asbestos	0,4
Phtalates	0,3

Comprehensive systems

	PROBE	SUMER 2003	SUMER 2010
	% No CPE No PPE		
Diesel exhaust	54	42	32
Welding fumes	8		
Toluene	13		
Woud dust	32	22	10
Benzene	23		
Chrystaline silica	20	22	7
Formaldehyde	27	10	5
Asbestos	19	20	10
Lead	9	20	5

Comprehensive systems



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Comprehensive systems



Physicians report cases seen in their practice



Statistics/ data mining





Alert to new WRD



National preventive strategies

Comprehensive systems

\+ Large set of data

Nation-wide scope and interventions

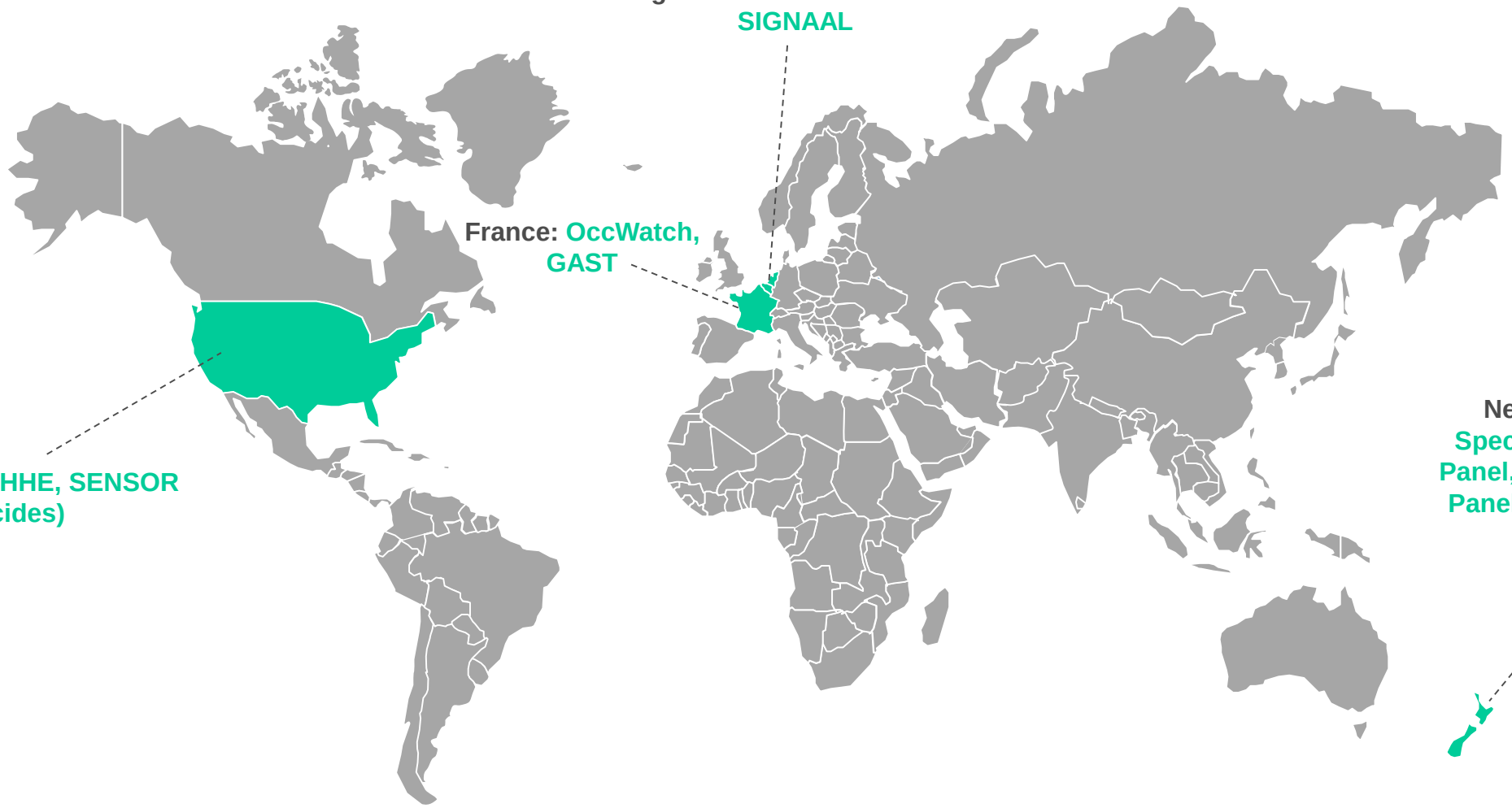
\- Motivation of reporters to participate

Lack of exposure assessment

Resources, funding

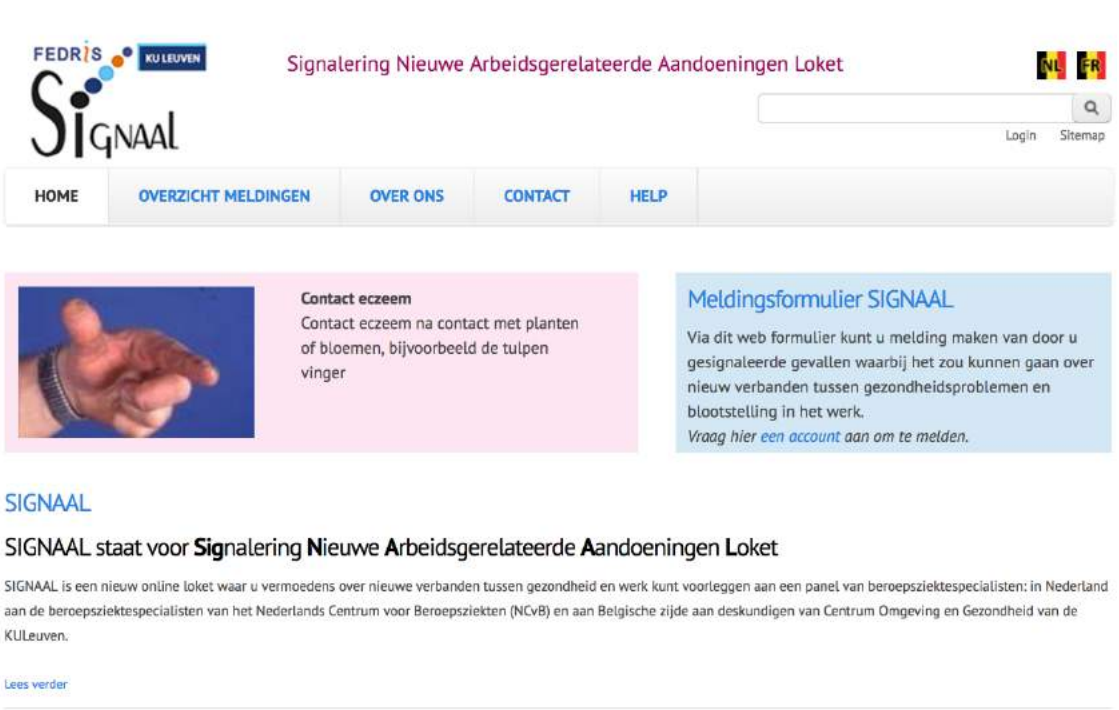
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Sentinel systems

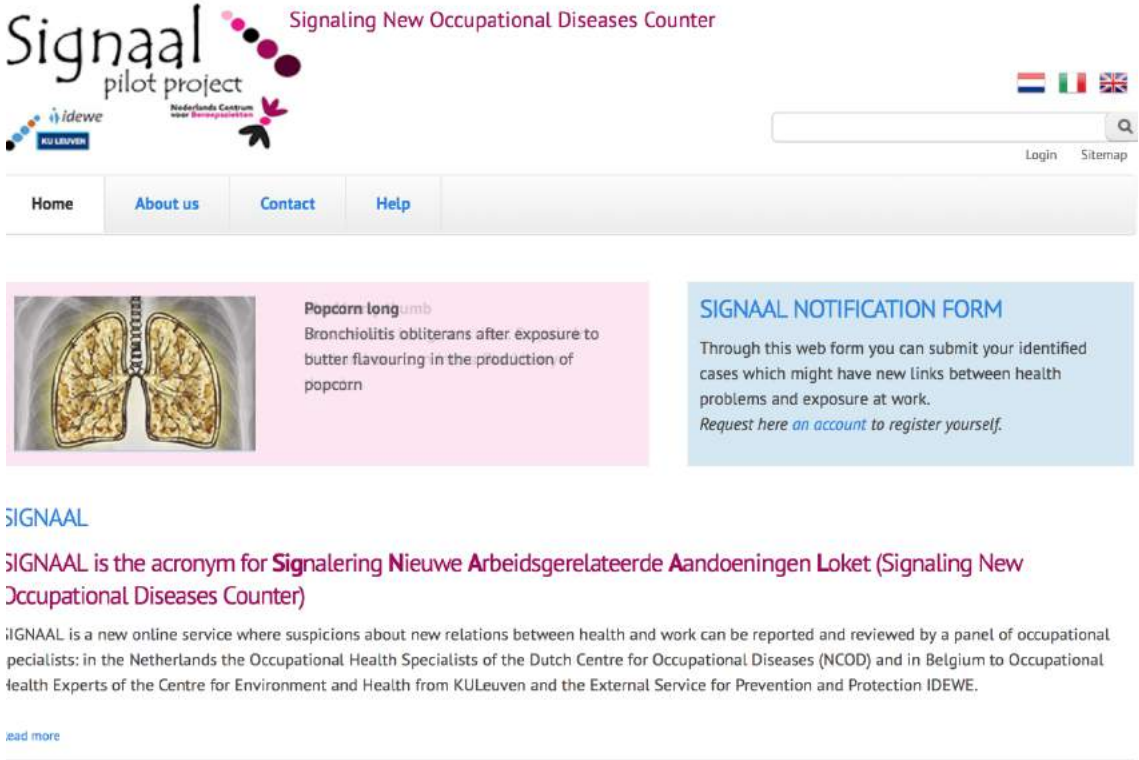


Sentinel systems

Mysignal.be



Signal.info

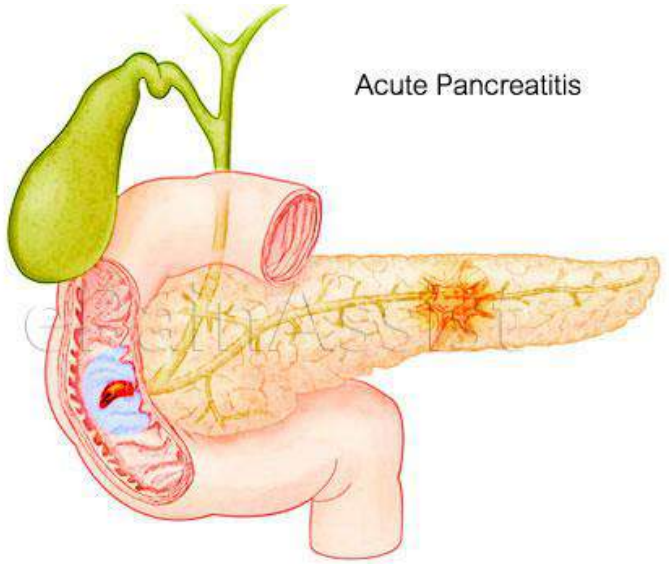


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Sentinel systems

Case	Exposure
Acute recurrent pancreatitis	Solvent, Diesel exhaust
Bilateral cataract	Infra red
Basocellular carcinoma	Carbonated ebonite, arsenic
Somnolensce	Car refreshener
Small cell undifferentiated CA of the ethmoid sinus	Wood dust
Tinnitus	Noise trauma (sirens, shooting,…)
Melanoma	Cytostatistics
Bladder cancer in 3 workers	Household waste incineration plant
Pancreatic adenocarcinoma	Copy machine maintenance technician

CLINICAL INFORMATION



- Man, 50 years old
- Diagnosis: **Acute recurrent pancreatitis**
  (set up by a gastroenterologist)
- No apparent cause after an extensive investigation (normal findings of imaging, endoscopic ultrasound, Ig G4, calcium and triglycerides, genetic analysis; no alcohol consumption)
- No other complaints
- No similar complaints reported by other workers

INFORMATION ABOUT WORK AND EXPOSURE

- **Occupation and work:** truck driver involved in transportation of all kinds of substances, including chemicals
- **Specific exposure:** transport and unloading of chemicals, where the smell is observed
- **Protective measures:** mask



ASSESSMENT

Literature review

→ Evidence about the link between occupational exposure to various **chemical substances** and occurrence of **acute pancreatitis**

However, the exposure information on the reported case is insufficient (suspected exposure to chemical substances, but no further information)

ASSESSMENT



Follow-up: medical examination of worker in order to retrieve the missing information

Additional data:

- The patient works as a truck driver (50-60h/week) for **22 years**
- Transportation of chemicals including several types of **solvents** (including dichloromethane, ethyl acetate, ammonia, ...)
- The exposure - during loading and unloading of the tank, and was probably through inhalation as well as dermal uptake
- Exposure to **diesel exhaust** (while loading the tank)

Sentinel systems

Neveneffecten van werk

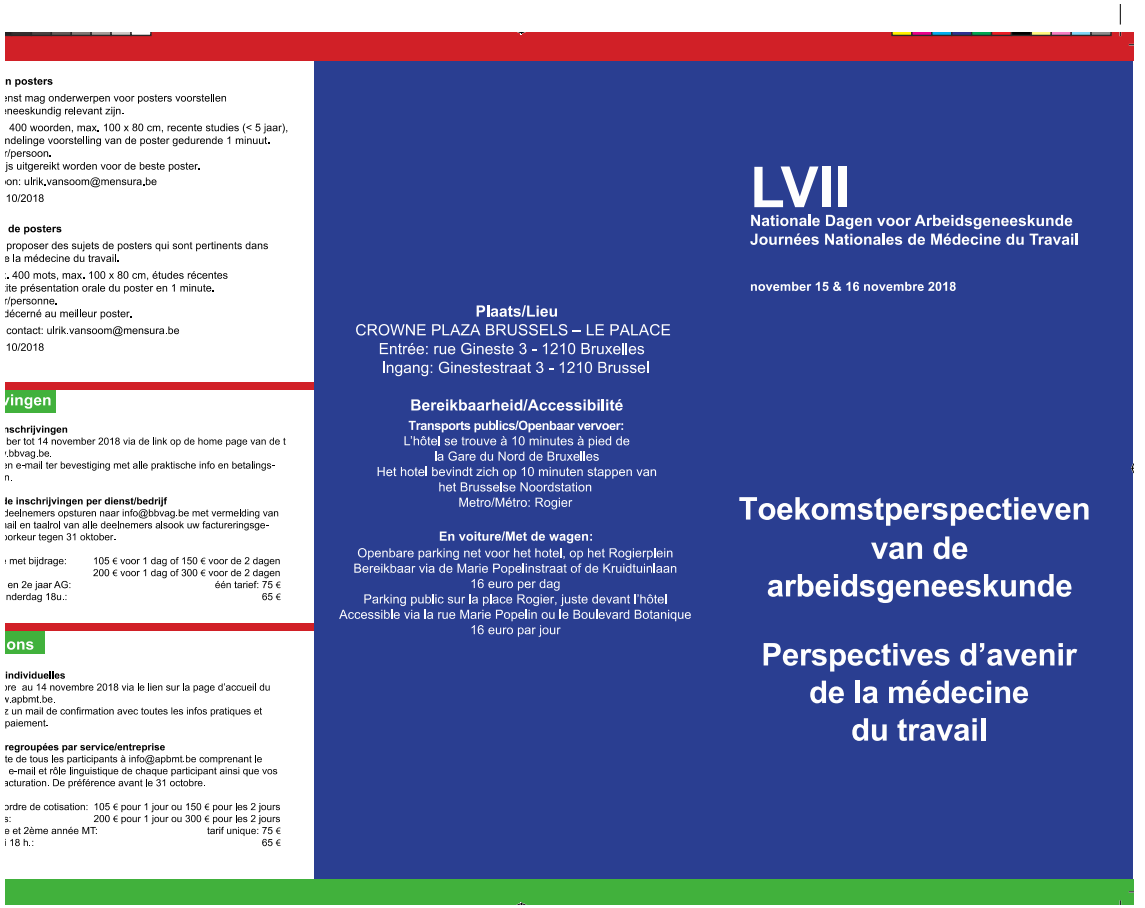
12/11/18 om 00:00 Bijgewerkt om 08:02



Lode Godderis
Professor arbeidsgeneeskunde KU Leuven, directeur onderzoek IDEWE

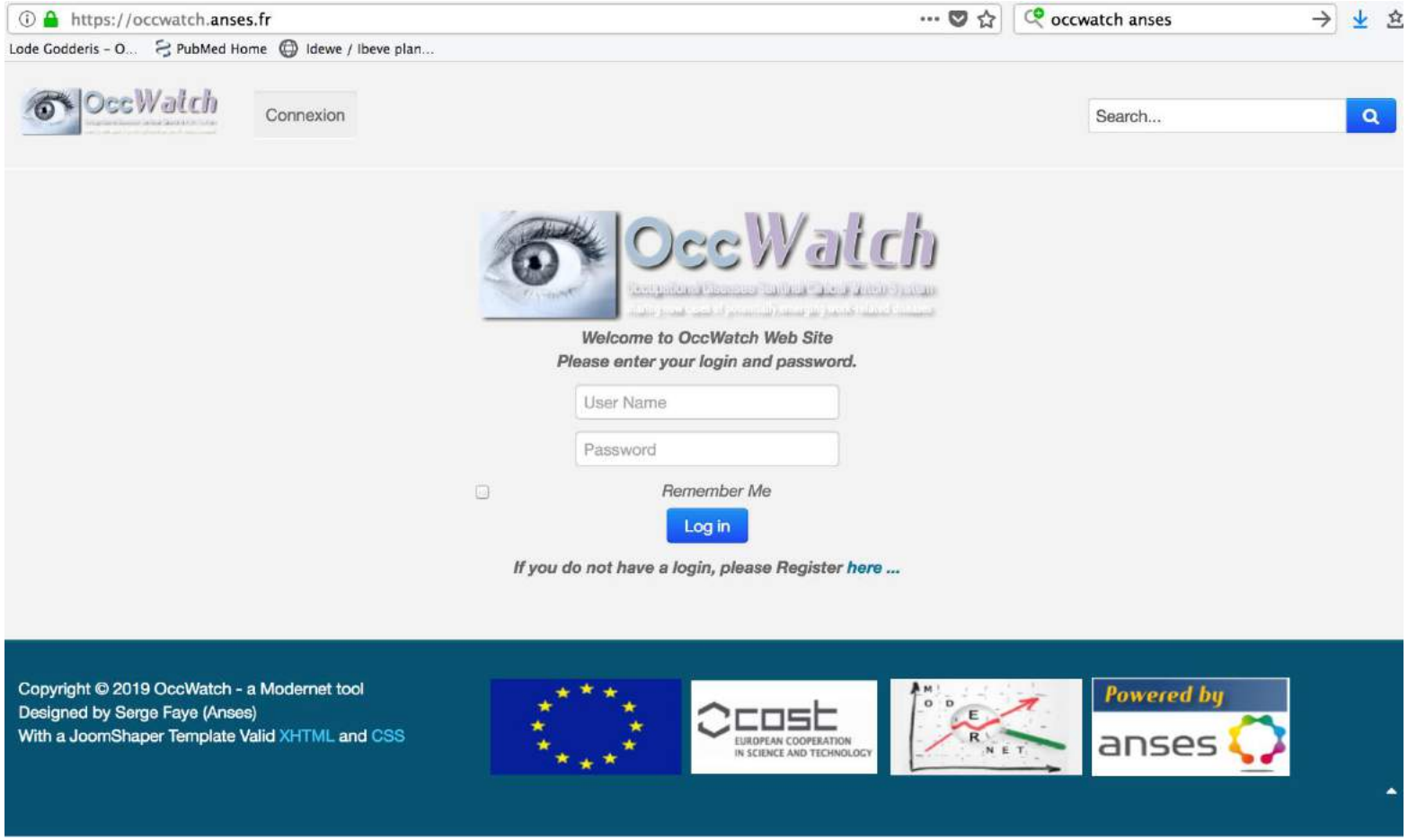
Frankrijk is in de ban van een cluster van baby's zonder armen in de omgeving van het Franse dorp Druillat. Terwijl de wetenschappelijke discussie verder woedt, is het naar de oorzaak van de cluster voorlopig nog zoeken.





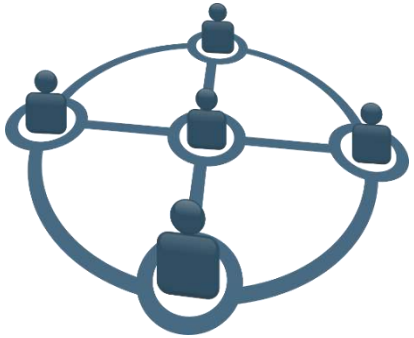
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Sentinel systems



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Sentinel systems



Network of occupational physicians

Suspected case of new WRD



Detailed investigation



Evaluation by experts

Alert to new WRD





Workplace interventions

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Sentinel systems

\+ Focus on new WRDs specifically

Detailed exposure assessment

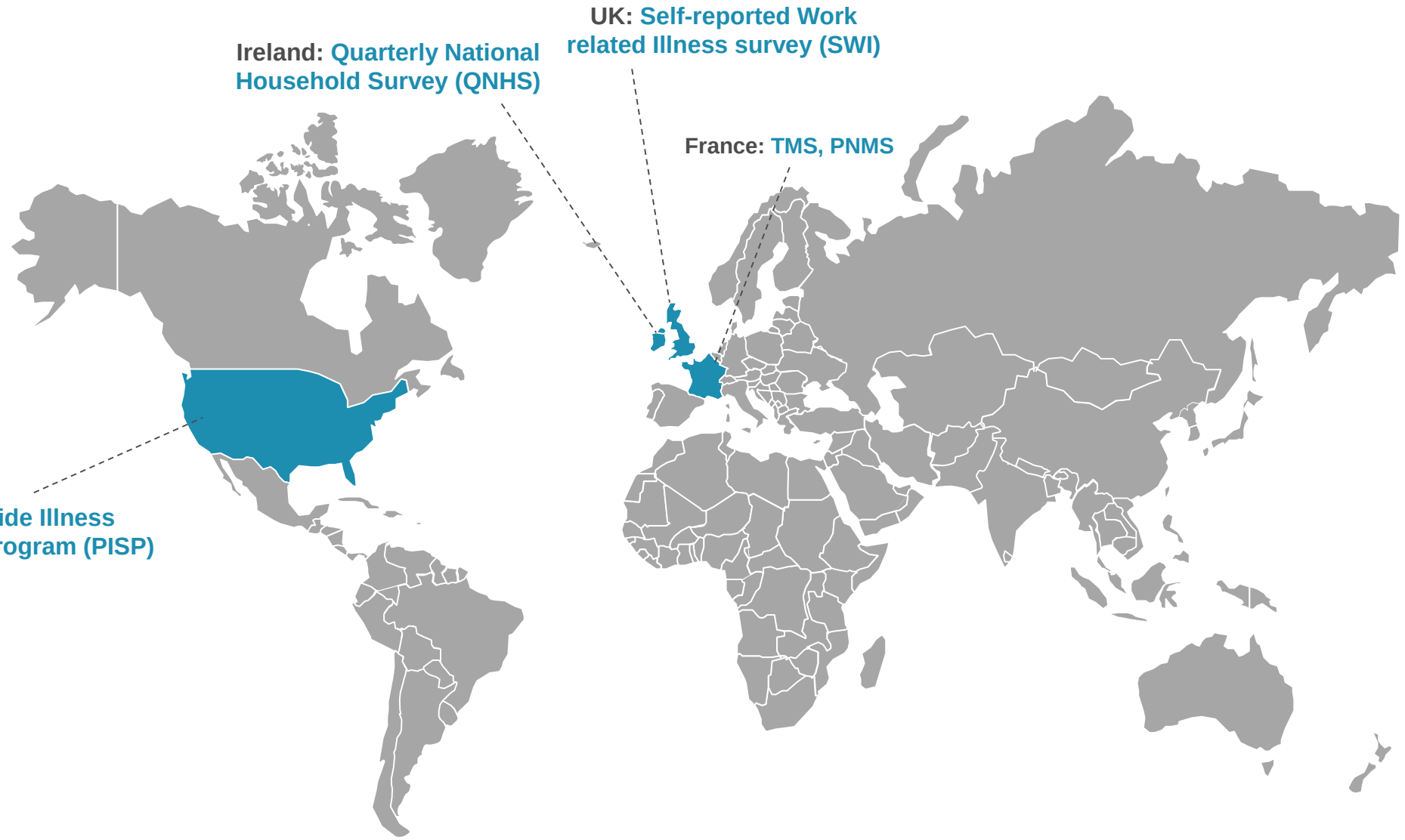
Work-relatedness evaluation by (a group of) experts

\- Motivation of reporters to participate

Resources, funding

Lack of visibility

Public health systems



Public health systems



Pesticide Illness Surveillance Program (PISP)

CALIFORNIA
POISON ACTION LINE
1-800-222-1222

Pesticide-related illness or injury

Work-related?

CalEPA
California Environmental Protection Agency



Restrictions on pesticides use

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Public health systems

Reporting sources

- State Department of Agriculture
- Poison Control Centers
- Workers' Compensation System







Public health systems

- **2001** to **2005** health risks related to **pyrethrins** and **pyrethroids**
- Several poisonings, of which ¼ **work-related cases**
- Clinical signs and symptoms revealed several **respiratory health effects**



Public health systems

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.

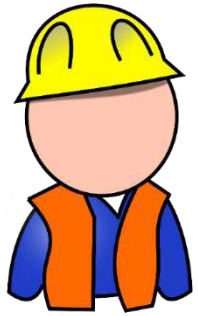
Health-care providers:
(1) Be aware that these chemicals are respiratory irritants with potential to cause asthmatic reactions;
(2) be aware that cases of pesticide exposure or poisoning are reportable conditions to public health authorities;
(3) obtain an adequate history of any exposures that could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

Public health systems



Monitoring health of general population

Extract work-related data





Alert to new WRD



Public health authority

Preventive strategies on the public health level



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

Conclusions

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

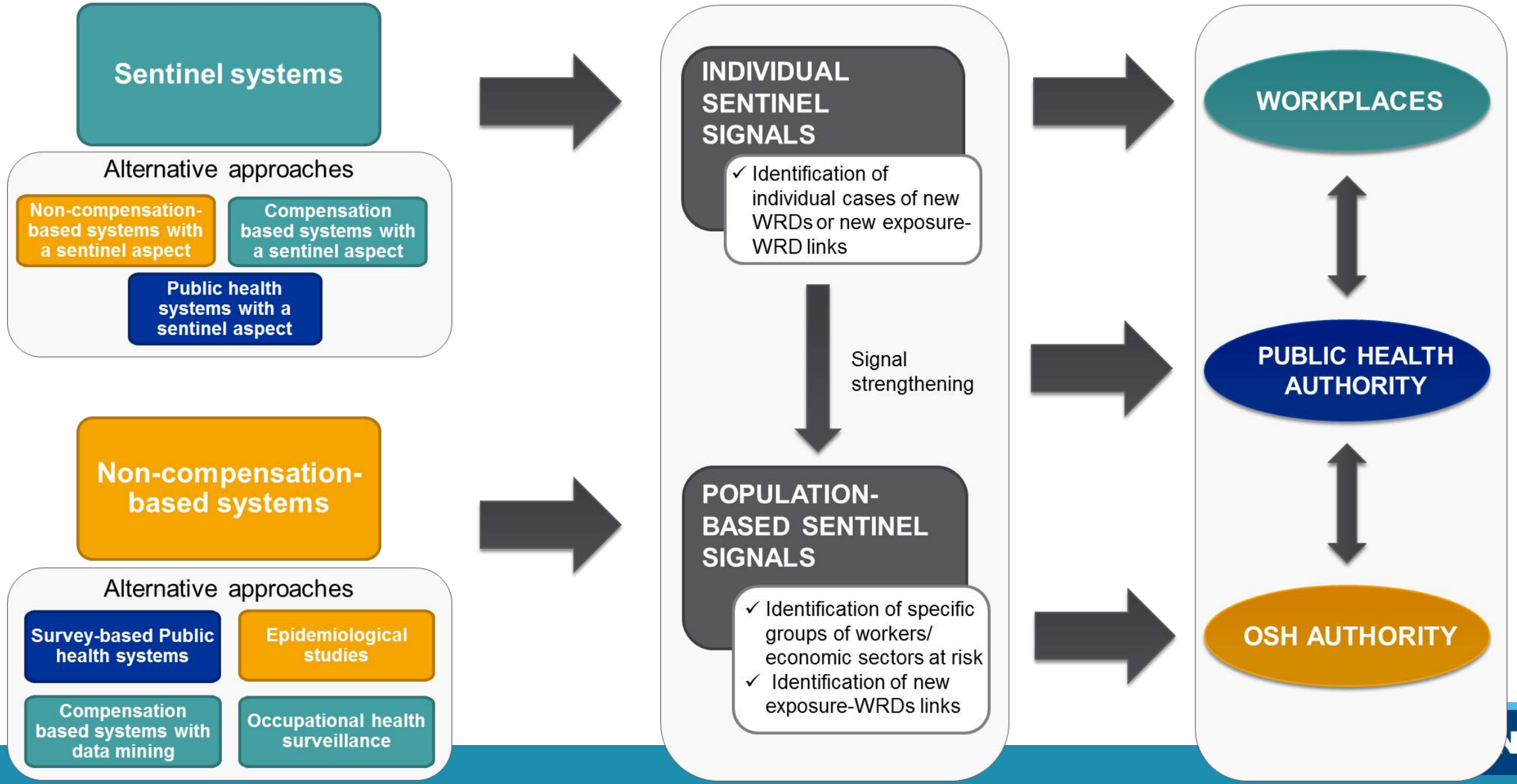
International exchange of data should be encouraged

→ harmonization and comparability of reported data



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Setting up a sentinel approach recommendations



SIGNAL DETECTION → **SIGNAL ASSESSMENT** → **SIGNAL STRENGHTENING** → **ALERT TO STAKEHOLDERS**



National level

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



National level

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



EU level

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



National level

Level 1 alert



EU level

Level 2 and 3 alert

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Conclusions



You can have all faith in SDS, categorizing and labelling but when it comes to workers health, don't be naïve because you can tell me that you put your faith in risk analysis but please when it comes to occupational health you need to be vigilant, pick-up signals and look for the causes.

Dr. Work

KU LEUVEN



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22/08/2017

Methodologies to identify work-related diseases: Review of sentinel and alert approaches



Alert and sentinel systems allow the early identification of work-related diseases and are useful to complement the official figures of occupational diseases and to set-up evidence-based prevention. However, there is only a limited number of such systems in place.

This report reviews existing alert and sentinel systems, as well as other monitoring systems presenting features also suitable to detect emerging work-related diseases.

The review identifies weaknesses, such as the often missing collection of workplace exposure assessment data, the poor coverage of some worker's groups and diseases like mental ill health; and the weak link to workplace prevention. It also gives good practice examples and highlights the importance of international cooperation and dissemination of data to achieve the maximum benefit from alert and sentinel approaches.

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