European Agency for Safety and Health at Work

Alert and sentinel approaches for the identification of work-related diseases in the EU

European Risk Observatory
Summary

European Agency for Safety and Health at Work

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Table of contents

Introduction 5
Methodology 5
Drivers of and obstacles to the implementation of alert and sentinel approaches 7
Types of sentinel signals generated 9
Recommendations and conclusions 9
References 11
ANNEX 12

Introduction

Continuous changes in work and working conditions result in new occupational health (OH) risks and possibly new work-related diseases (WRDs). Monitoring these new health risks and WRDs is essential to better understanding their link to work and to ensuring timely interventions and prevention. Detecting new work-related risks and diseases requires additional instruments to those already used for monitoring known occupational diseases (ODs). It requires a comprehensive approach that uses several complementary methods depending on the type of disease and its prevalence in the (at-risk) population. 'Sentinel and alert systems' is an umbrella term for timely surveillance systems that collect information on diseases in order to initiate health interventions and prevention measures. These early warning systems aim to detect new combinations of health problems, exposures and work settings at an earlier stage to prevent work-related health problems. They therefore provide useful information to complement official figures of ODs. A comprehensive sentinel system can be looked at as a chain of information and communication systems made up of signal detection, work-relatedness evaluations, signal strengthening and the timely alerting of stakeholders, which allows time to respond to and minimise the impact of the potential health threat.

This document is the summary of the final report — *Alert and sentinel approaches for the identification of work-related diseases in the EU* (EU-OSHA, 2018) — of a European Agency for Safety and Health at Work (EU-OSHA) project. The overall objective of this project was to describe several alert and sentinel approaches implemented in the EU (and outside the EU if relevant) to identify emerging work-related health problems and diseases and to support evidence-based prevention and policy-making. A further aim of the project was to formulate recommendations for setting up such alert and sentinel systems, building on an analysis of drivers of and obstacles to the systems studied in the project. The target groups are policy-makers at national and EU levels, including social partners, researchers, those involved in OD recognition and statistical data collection, and those who develop approaches for the health surveillance of workers.

This project aims to contribute to an 'improvement of the prevention of WRDs by tackling new/emerging risks', one of the major challenges identified in the EU Occupational Safety and Health (OSH) Strategic Framework 2014-2020 (European Commission, 2014). It also supports Recommendation 2003/670/EC2 concerning the European schedule of occupational diseases (European Commission, 2003) and calling on Member States to, among other things, introduce a system for the collection of information or data concerning the epidemiology of diseases of an occupational nature. By doing so, this project contributes to the implementation of Principle 10 of the European Pillar of Social Rights, namely 'Healthy, safe and well-adapted work environment and data protection' (European Commission, 2017).

Methodology

The project consisted of five main tasks:

- Task 1: desk research and the production of a literature review (EU-OSHA, 2017);
- Task 2: an in-depth description of a selection of sentinel and alert approaches through interviews, qualitative analysis and in-depth desk research;
- Task 3: an expert seminar (18 May 2017, Brussels, Belgium) to discuss the outcomes of Tasks 1 and 2;
- Task 4: the production of a final report (EU-OSHA, 2018), summarised in the present document;
- Task 5: a policy workshop (31 January 2018, Leuven, Belgium) to disseminate the project's findings to stakeholders.

The first part of the project (Task 1) involved an extensive scientific literature search (EU-OSHA, 2017), which combined terms for the following three concepts: (1) surveillance/reporting systems; (2) ODs/WRDs; and (3) new/emerging risks. In addition, a grey literature search was performed of both grey literature databases and relevant EU and research institute websites for additional resources.

The authors of the relevant references were also contacted to obtain missing information and to review the retrieved data. A total of 75 surveillance systems covering 26 different countries were identified. An algorithm was developed to divide these systems into different types that addressed the aspects of the population covered by the system (workers and/or the general population), the type of surveillance (active, passive or sentinel), the linkage to workers' compensation, whether the system monitored all WRDs or only one or a subset of WRDs and, finally, whether or not the system was suitable or specifically designed for the detection and alerting of new/emerging work-related health problems. As a result, a typology was developed and 50 systems were retained for analysis and described in a literature review report (EU-OSHA, 2017). The typology and the list of 50 systems described in the literature review are summarised in Figure 1 (in the annex).

Drawing on the typology, a sample of 12 systems was selected for more detailed analysis (Task 2), in particular with regard to the practical aspects of the implementation of the systems and their link with prevention and policy-making. The systems are described in the final report (EU-OSHA, 2018). The criteria for the selection of these systems included: the types of WRDs covered; systems that have existed long enough to demonstrate how the data generated can be used in practice; particularly interesting systems or systems with innovative features; systems that cover issues not covered by other monitoring schemes; systems that are particularly useful for guiding and directing workplace prevention; to cover a diverse range of Member States; and systems that are aimed at detecting a diverse range of work-related health problems, exposures and sectors, relevant to both genders, with specific attention to small and medium-sized enterprises (SMEs).

In-depth descriptions of six of the 12 systems were obtained through phone interviews with 19 stakeholders (including, for each system described, the owner of the system, the actor reporting to it and the researcher or other stakeholder using the resulting data) and qualitative analysis. Owing to resource limitations, the other six systems were studied through in-depth desk research.

The six systems described in depth through interviews with stakeholders were the following:

1. a compensation-related system with an 'open list' approach — SUVA (Switzerland);
2. a non-compensation-based system for reporting all WRDs — MALPROF (Italy);
3. a non-compensation-based system including general as well as disease-specific schemes — THOR (UK);
4. a non-compensation-based system for all WRDs suitable for data mining — RNV3P (France);
5. a sentinel system for all WRDs — SIGNAAL (Belgium and the Netherlands);
6. a sentinel system for a specific type of WRDs — SENSOR-Pesticides (USA).

The six systems described though in-depth desk research were:

1. a non-compensation-based system for all WRDs suitable for sentinel surveillance — RAS (Norway);
2. an occupational health surveillance programme in Navarre (Spain);
3. a non-compensation-based system aimed at one type of exposure (nanoparticles) — EpiNano (France);
4. Groupe d'Alerte en Santé Travail (GAST) (France);
5. the National Institute for Occupational Safety and Health (NIOSH) Health Hazard Evaluations (HHEs) (USA);
6. Labour Force Surveys (Ireland and UK).

Each system was described in an outline containing the following information: country information (e.g. information on population, employment rate), system history, initiating organisation, and aim and objectives of the system; target population, health problems targeted and types of exposure targeted; a detailed description of the workflow (reporting parties, reporting mechanisms, work-relatedness evaluation procedure, communication between experts, data storage), dissemination mechanisms and financial aspects; examples of use of data for prevention and detection of new/emerging risks, and examples (in some cases) of collaboration with other parties across policy areas; strengths of the system (with an assessment of success factors and facilitators for implementation); drawbacks and limitations; and possible improvements. The findings were presented and consolidated at an expert workshop on 18 May 2017 with system owners and users, researchers and actors in the disease recognition area (Task 3).

Drivers of and obstacles to the implementation of alert and sentinel approaches

The following key drivers and obstacles emerged from this work.

Visibility of the system: regardless of the quality of these systems, some are poorly described in the literature or not described in English. This lack of visibility may be an obstacle to the impact of these systems as well as to their sustainability. To raise awareness of these systems, their results can, for instance, be published and disseminated through reports or newsletters targeted at, for example, physicians. Another possible way of raising awareness is to provide open access to case reports stored in a database. In addition, success stories should be shared, especially in terms of the impact of the data gathered by these systems on the development of preventive actions and policies, supported by concrete examples. Sharing success stories not only raises awareness of a system but also demonstrates its added value, which would motivate reporting parties to report cases and other stakeholders to make resources available for the implementation of such systems.

Motivation of reporting parties: an important issue that emerged was the motivation of the reporting parties to report cases to the systems. Physicians are the main reporting parties to most of the systems described, and the main problem in terms of engaging physicians and encouraging them to report was linked to the increasing work demands and time constraints in their daily clinical practice, which allow for very few additional activities. The simplification of reporting procedures is an essential step towards increasing physician reporting by, for instance, automating reporting or, as is the case for the Norwegian RAS and US HHE systems, making the reporting possible without burden of proof. Another possible way to motivate physicians to report is to provide different means of feedback so that reporting becomes a process of two-way communication and reporters see added value for them in reporting to the system. Incentives to report may include providing feedback to the reporters on the evaluation procedure, sending them reports, providing them professional development opportunities through access to online training (such as the EELAB web platform in the UK THOR system) or financial incentives (as in the Norwegian RAS system). In Italy, by law healthcare providers have to report all suspected WRDs to the authorities, which encourages reporting.

Exposure assessment: an important obstacle related to the systems' implementation was the lack of adequate exposure assessments. Many interviewees emphasised the importance of this step in the data collection and work-relatedness evaluation procedures, especially in terms of identifying potential new/emerging WRDs. Several approaches are used, from including more extensive exposure descriptions in the reporting procedure to filling in the gaps after reporting when the exposure evaluations are carried out by experts or through workplace inspections (e.g. SIGNAAL, MALPROF and SUVA). Some systems have developed tools to help with exposure assessment, for instance a specific thesaurus, providing hierarchical codes for all types of exposures (e.g. RNV3P and SENSOR-Pesticides), or a specific instrument developed for exposure assessment in workplaces, such as EpiNano for collecting data on exposure to nanoparticles.

Standardisation and quality control of the data collected: this is an important driver as the quality of the data determines the quality of the work-relatedness evaluation. Among the systems described, there are several examples of how standardisation can be implemented in practice. They start with a clear definition of reportable cases and strictly defined criteria for defining a case as work related. Quality control exercises are carried out for some systems to improve the quality of coding (e.g. SENSOR-Pesticides) or, for some systems, the assessment of cases is discussed annually with reporting parties (e.g. OHSP Navarra). It is also important that codes are regularly updated to follow current OSH trends.

Awareness and mechanisms for the detection of new/emerging WRDs: one of the main conditions for capturing new WRDs is that reporting parties are aware that new combinations of work-related health problems and risks may occur. Some systems ensure that this is the case by disseminating information on these to reporters, for example through publications and presentations at conferences and key events. The work-relatedness evaluations in the case of some systems specifically designed to detect new/emerging WRDs are performed by teams of experts in the field of new/emerging WRDs (e.g. SIGNAAL, RNV3P). Other systems specifically designed to investigate unusual health events at work (e.g. GAST, HHE) are open to different reporting parties and have a low reporting threshold, and employ multidisciplinary teams to investigate cases. One system (EpiNano) has a very specific scope and focuses on new and emerging health risks related to exposure to nanomaterials. It begins by identifying exposure in order to establish surveillance of potential eventual health problems, which is similar to an active surveillance approach. Other systems focus on identifying sectors and work tasks at risk (e.g. MALPROF), are suitable for data mining and identifying disproportionality signals in the existing database (e.g. RNV3P), or allow a proactive search for cases in response to alerts of new WRDs from other sources (e.g. SUVA). On the other hand, systems linked to workers' compensation have a limited capacity to detect new/emerging WRDs. One important factor in the detection of new WRDs is the ability of WRD specialists to exchange, with colleagues abroad, suspicions of a new WRD, in order to facilitate the identification of similar cases. The pilot platform Occupational Diseases Sentinel Clinical Watch System (OccWatch) (in the test phase at the time of writing this report) aims to support such international collaboration and the sharing of data reporting by different national systems across Europe.

Link with prevention: collaboration between the actors of the systems and OSH public bodies is a key driver in ensuring a link between these systems and prevention. The data from systems not linked to compensation and designed to improve the collection and analysis of data to measure trends in OSH and WRDs have a stronger link with prevention than data from other systems, as the former tend to have a strong connection with OSH public bodies, which in some cases are even the systems' owners, and are therefore used to design evidence-based prevention and guide policy-making. Two-way communication between system experts and workplace-level actors is also key to identifying risks, sectors at risk, incidences of OSH outcomes and trends. Defining different levels of alert based on the categorisation of signals is also recommended, as in the case of RNV3P, SIGNAAL and SENSOR-Pesticides. A level 1 alert typically triggers notification to an internal group of system experts and reporting parties and triggers secondary prevention in the workplace concerned. A level 2 alert results in dissemination to a larger group of experts and workplace-level actors to initiate actions in the sectors and workplaces at risk. A level 3 alert involves alerting the OSH (and possibly public health) authorities, to potentially trigger actions at a higher (regional or even national) level.

Political and financial support and resources: the issue of financial support seems to affect mainly the systems that are not related to compensation. Indeed, these systems rely mostly on government funding, which is often unstable and insufficient and depends on the level of significance that the government gives to OSH. The financial costs mainly include personnel costs and expenditures such as software maintenance (as all systems are web based) and the publication of periodic reports. Although the experts who maintain the systems are often powerless with regard to these financial issues, a good way to deal with this obstacle is to demonstrate the significance of the work performed by these systems. Therefore, it is necessary to produce and publish deliverables that not only highlight emerging OSH problems but also evaluate potential (new) solutions. This way, policy-makers may be more motivated as they may feel that the money given to the systems provides something in return. In addition, the business case must be made by sharing and disseminating success stories/best practices with concrete

examples of the successful impacts of the data gathered by the systems on prevention and policy development. Ultimately, political will was emphasised as a key driver of the implementation of sentinel and alert approaches, and this was considered to be influenced by the EU-level policy agenda. The importance of setting the identification of (new) WRDs as a priority at EU level over time was underlined.

Types of sentinel signals generated

The systems analysed in this project generate two different types of sentinel signals (see Figure 2 in the annex): '**individual sentinel signals**', i.e. individual cases of potentially new WRDs or new exposure-WRD correlations, or '**population-based sentinel signals**' that can identify groups of workers at risk or economic sectors with an increased incidence of a given WRD. To some extent, each of these approaches provides an input mainly for a certain group of stakeholders (workplace level, public health authority, or OH authority) (see Figure 2 in the annex)

Only a few systems are specifically designed to provide **individual sentinel signals**. These are the "real" sentinel systems, such as SIGNAAL, GAST and HHE, the only systems whose primary purpose is to identify individual cases of potentially new WRDs or new exposure-WRD correlations, and that therefore provide individual sentinel signals. These systems follow the sentinel model and assess signals through several steps: cases are reported by OH physicians or other experts, work-relatedness evaluations are carried out by a team of experts, the signal is strengthened through further investigation resulting in different levels of alert that trigger preventive actions.

Alternative approaches to capturing individual sentinel signals include the following: compensation-based systems with a sentinel aspect, i.e. with an 'open list' approach or a set of data independent from compensation, such as the SUVA system; non-compensation-related systems primarily designed for data collection and producing statistics, integrating a sentinel feature, such as the French RNV3P system; and public health systems with a sentinel aspect such as systems that monitor the health of the general population and workers and have features of a sentinel system, for example the US Pesticide Illness Surveillance Program (PISP) in California (derived from SENSOR-Pesticides).

Individual sentinel signals are used mainly to raise alerts and trigger preventive actions at the workplace level. However, if the signal is strengthened, it can also be used to alert OH and public health authorities.

Apart from individual sentinel signals, some systems can provide **population-based sentinel signals**, meaning that they can identify groups of workers at risk or economic sectors with an increased incidence of a given WRD. Systems that are suitable for identifying these signals are non-compensation-related systems characterised by a wide coverage and a large database that can be used for collecting statistics and data mining. Several good examples are described in the final report, such as THOR, OCCAM (for work-related cancer) and RNV3P (EU-OSHA, 2018).

Alternative approaches to identifying population-based signals include the following: data mining using databases of compensation-based systems (such as SHARP in Washington) and survey-based public health systems (such as the Labour Force Surveys in the UK and Ireland), or occupational health surveillance and epidemiological studies (not in the scope of this project).

Population-based signals are used mainly as an input for OH or public health authorities to support long-term policies and prevention plans, by identifying vulnerable groups of workers and emerging trends in WRDs. However, population-based signals can also be used to strengthen individual signals.

Recommendations and conclusions

The recommendations regarding the improvement of alert and sentinel surveillance in the EU formulated in the project were based on an analysis of the data gathered throughout the entire project. The recommendations formulated propose two alternatives for the implementation of such alert and sentinel surveillance in EU countries in which there are no such systems in place:

1) the *de novo development* of an alert and sentinel system specifically designed to detect new/emerging WRDs, based on a 'model' system (see Figure 3) in the annex) that consists of the main features identified as being important in the examples of alert and sentinel approaches analysed in this project; or

2) the *integration of an alert and sentinel aspect into an existing system* designed primarily for other purposes — e.g. compensation, statistics, public health surveillance — following the examples of the systems that are not 'purely' alert and sentinel systems described in Sections 3.1, 3.2 and 3.4 of the final report (EU-OSHA, 2018).

The recommendations could also be useful for *improving existing alert and sentinel approaches*, in particular with regard to the quality of the different steps in the data flow, from identification and reporting of cases to the link with prevention and policies.

The final report also includes a discussion on integrating alert and sentinel surveillance *at the EU level,* which could add a new perspective to OSH vigilance for new/emerging WRDs in the EU.

To conclude:

- There is no ideal surveillance system for new/emerging WRDs. Several different approaches have been described in this report and each has its advantages and disadvantages. When implementing sentinel approaches, stakeholders should take into account the occupational context in place and learn from good practice examples from other countries. In addition, they should aim to implement approaches that are complementary to those already in place.
- The **main gap** in terms of monitoring specific groups of WRDs is the monitoring of **multifactorial and/or long-latency WRDs** such as mental diseases, musculoskeletal diseases or certain cancers. Improving the reporting of data on exposure assessments and the establishment of clearly defined assessment criteria for the evaluation of work-relatedness would help. With regard to economic sectors, **the focus is still on the traditional sectors** such as agriculture and construction, whereas important sectors such as the hotel, restaurant and catering sector (HORECA), or 'newer', growing sectors such as communication and IT services, are not or are only poorly covered. There is also a lack of sentinel and alert systems that capture potential work-related health disorders related to **new and emerging technologies** such as those involving nanomaterials or robotics.
- **Two-way communication between stakeholders and the owners of/researchers involved in** the systems is essential for the long-term maintenance of alert and sentinel systems and their effective link with prevention. Key stakeholders in terms of prevention are **workplace-level actors** (including employers and workers' representatives), **OH organisations and services** (such labour inspectorates) and occupational (and public) health **authorities**.
- Although currently not on the political agenda, the development of an **EU-wide alert and sentinel surveillance** system would contribute to the harmonisation of data on new/emerging WRDs, the better identification of WRDs — thus complementing official OD figures and giving a more realistic picture of the burden of WRDs in the EU — and the development of evidence-based prevention and policy. Alternatively, and more realistically, the better exchange of data and cooperation between alert and sentinel approaches across Member States is a way forward in terms of improving alert and sentinel surveillance at the EU level. At Member State level, the existing alert and sentinel systems should be strengthened — in particular, collaboration between the national OH authorities and the actors of alert and sentinel systems is an essential driver for the sustainability of the systems and their effective link with prevention — and, in the Member States where there are no such systems, an alert-and-sentinel-like function could be integrated into other types of monitoring systems already in place, following the example of some systems described in this report. Further necessary steps are the harmonisation of the data reported by these systems and the establishment of an international network for exchanging data and knowledge regarding new WRDs.
- The importance of **international collaboration** between different countries and systems was highlighted throughout this project. International initiatives such as the MODERNET network and

the OccWatch platform are good starting points and, during this project, various experts expressed their interest in taking part in OccWatch.

- This project has generated insights into various alert and sentinel approaches for the detection and prevention of WRDs and has encouraged the exchange of information and good practices. The workshops held as part of the project contributed to the exchange of experiences and the sharing of 'success stories', which help actors in countries where there is no alert and sentinel systems to make the case for such approaches. As such, the final report will hopefully serve as a useful tool and an inspiration to implement some of these approaches in other countries. The workshops also fostered cooperation in the EU and gave rise to concrete opportunities for collaboration between participants, for example on a thesaurus for the coding of exposure data and through the OccWatch platform. As a follow-up to this project, EU-OSHA will continue to support networking and the dissemination of information on alert and sentinel approaches and new WRDs on its website as well as through a series of national-level dissemination workshops.

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ANNEX

Figure 1: Typology of systems described in the literature review report (EU-OSHA-2017)

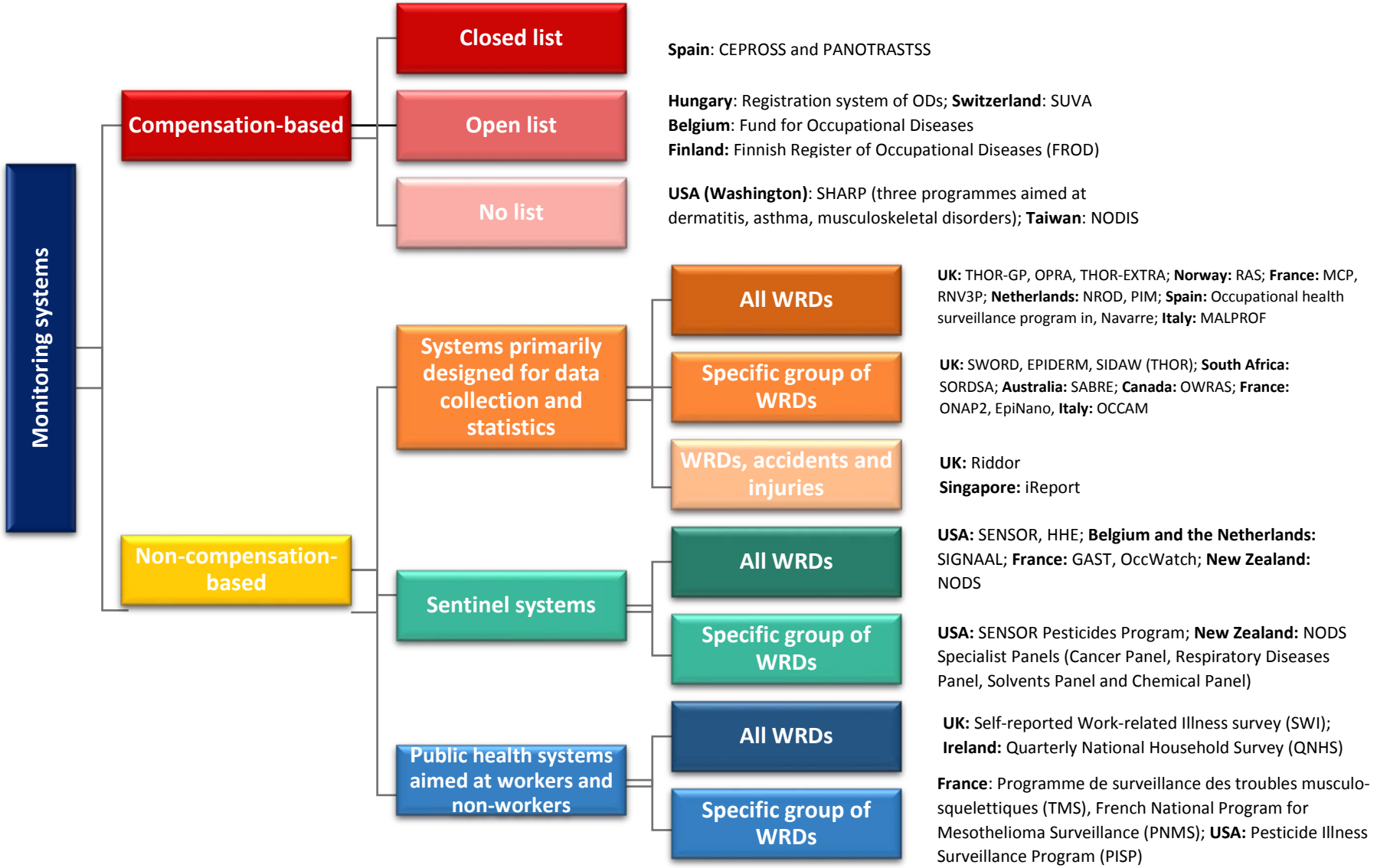
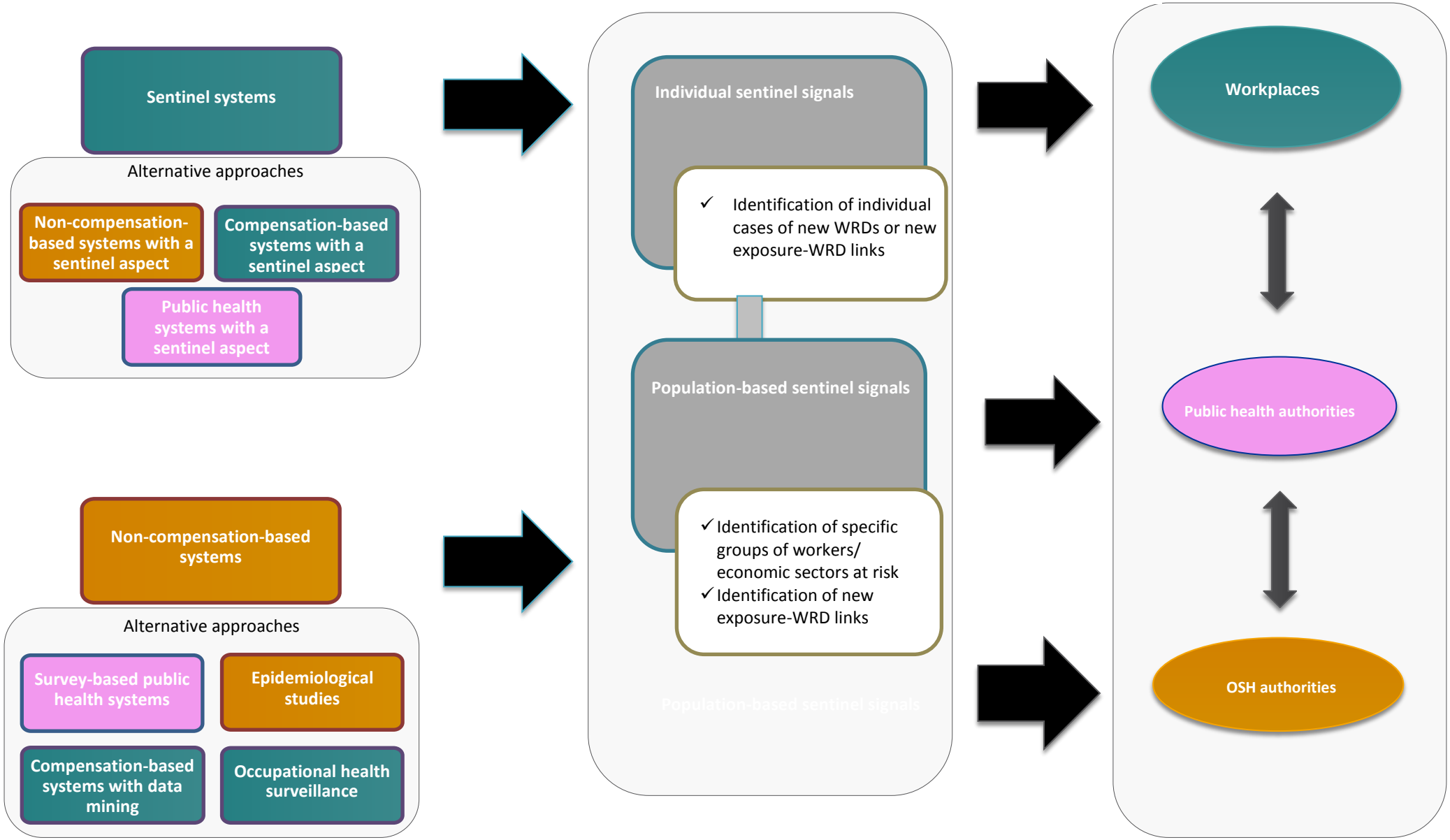
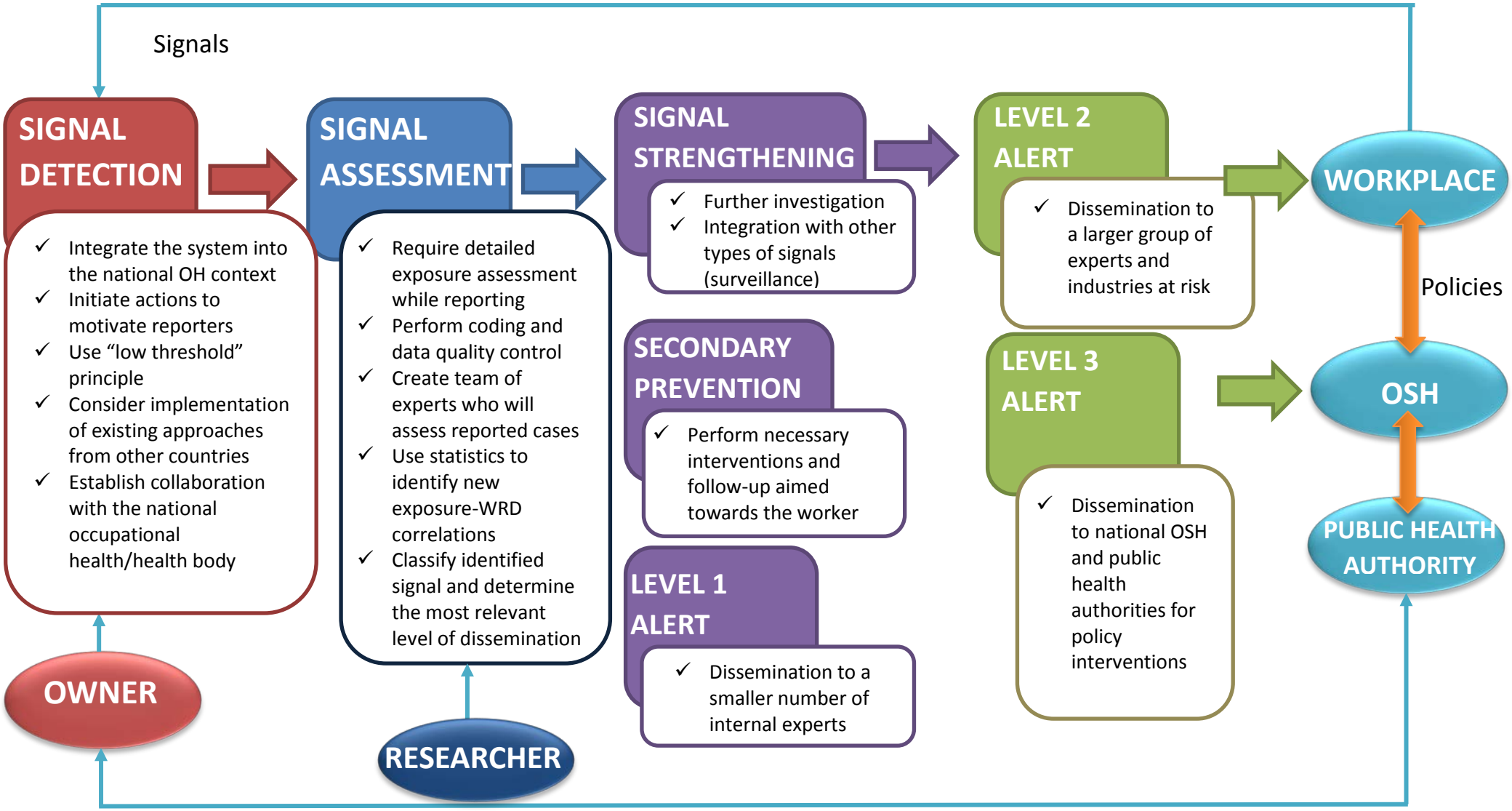


Figure 2: Options for detecting two main types of sentinel signals: individual and population-based sentinel signals



NB: Different types of approaches provide an input mainly for a certain group of stakeholders (workplace level, public health authority, OSH authority). This link is represented through the use of the same colour on this figure.

Figure 3: Main steps in the generation of a sentinel signal, key recommendations and main actors



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