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Biological agents and prevention of work-related diseases: a review

Background of the project

■ EU OSH Strategic Framework 2014-2020

- One of the 3 major challenges: to improve the prevention of work-related diseases

■ Background

- 230,000 workers died worldwide in 2014 due to communicable diseases caused by biological agents – around 7,000 in Europe ([GLOBAL ESTIMATES 2017](#))
- About 15% of cancers attributed to carcinogenic infections, (Helicobacter pylori, Human papillomavirus (HPV), Hepatitis B, C, Epstein-Barr, etc.) ([WHO](#))
- FR (2010): 4,7 million workers (22%) exposed to biological agents
 - healthcare/social work (74.9%), agriculture (38.8 %), Horeca (44.7 %), personal services (58.8 %), green jobs (46.4%) ([SUMER 2010](#))
- Waste management and healthcare are growing sectors



Part of OSH overview on work-related diseases

■ 2015-2019

- Desk research, expert interviews and focus groups
- Description of policies or monitoring systems and data analysis
- Workshops with experts and EU-OSHA stakeholders

■ Outputs:

- Seminar online summaries, literature reviews, reports, articles and recommendations, ppts for policy makers and for experts
- Translations – portfolio approach: articles, report summaries
- National workshops

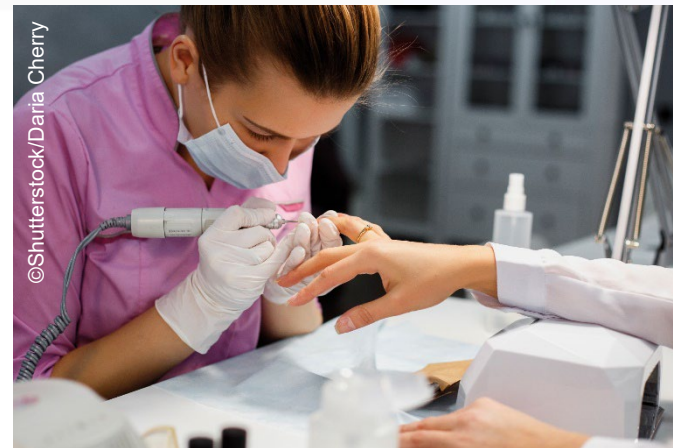
■ Building on previous EU-OSHA work

- Dangerous substances incl. biological agents, etc.



Objectives of the review

- **Raise awareness** on exposure to biological agents in exposed professions, especially those with unintentional use of biological agents;
- Increase **information on health problems** related to exposure to biological agents;
- Support efforts to **prioritise and structure the prevention** of work-related health problems linked to biological agents.



- Overview on the **current knowledge** on relevant exposures and on recognised diseases;
- Particular focus on **emerging issues and new professions**, e.g. green jobs;
- Link to biological agents directive – **unintentional exposures**;
- Collect **information from recording and compensation systems**;
- Identify **gaps in data/knowledge**.

Complementary to previous and ongoing work

EU-OSHA campaigns

European Week 2003 and HWC 2018-19

Expert Forecast: Main emerging biological risks

- Global epidemics (avian flu, HIV, etc.)
 - Workers at the frontline of contamination
- Drug-resistant micro-organisms (MRSA, tuberculosis, etc.)
- Poor Indoor Air Quality: Indoor mould
 - Poor maintenance of air-conditioning, construction & insulation techniques
- Waste treatment: micro-organisms, mould, endotoxins, etc.
- Poor risk assessment: little information on dose-effect relationship; measurement is challenging; low awareness level

Selected reviews:

- Legionella and Legionnaires' disease: a policy overview
- Biological agents and pandemics: review of the literature and national policies



Beneficiaries & intermediaries

▪ Beneficiaries

- Policy makers at national and EU level, including social partners;
- Legislators;
- Researchers;
- Actors in occupational diseases recognition and statistical data collection (e.g. national social security organisations);
- Actors at enterprise level (e.g. health and safety manager, health and safety representative, trades union representative) and intermediaries involved in setting up company policies;
- Sectoral organisations;
- Policy makers in other, related areas, for example at the sectoral level, or regarding employment, public health and environmental policies.

▪ Intermediaries

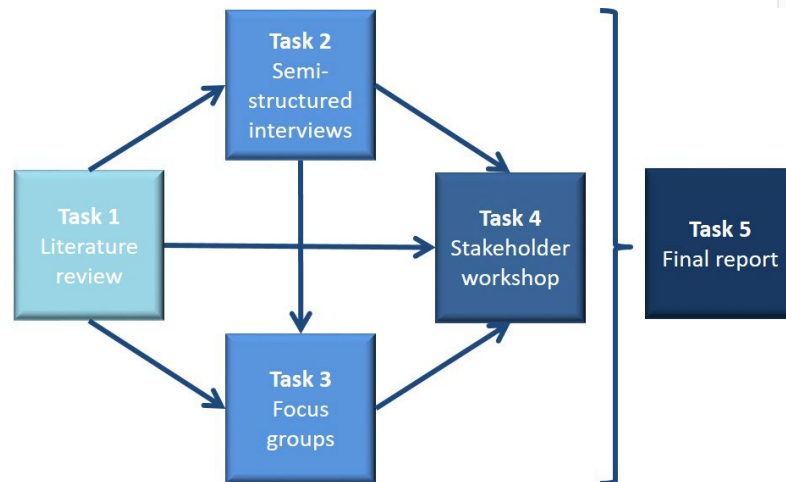
- Intermediaries involved in setting up company policies;
- Sectoral organisations
- Policy makers at national and EU level, incl. social partners
- Researchers



Project overview: structure

■ Task-specific objectives:

- **Task 1:** provide overview of types of biological factors and health problems relevant to workplaces (emphasis on unintentional exposures)
- **Task 2:** provide information on examples of policies regarding work-related diseases due to biological agents, their success factors and obstacles and their transferability
- **Task 3:** learn from the experience of intermediaries to identify specific upcoming risks and lack of measures regarding work-related diseases due to biological agents
- **Task 4:** Stakeholder workshop to present and discuss findings
- **Task 5:** Final report summarizing results



Results

- **Workers exposed in many professions:** healthcare, agriculture (arable farming and livestock farming), waste and wastewater treatment, occupations that involve travelling and contact with travellers; wood working, metal work, restauration (of artworks), archives, etc.
- **Whenever people are in contact at work with the following, they may be exposed to biological agents:**
 - natural or organic materials, such as soil, clay and plant materials (hay, straw, cotton, etc.);
 - substances of animal origin (wool, hair, etc.);
 - food;
 - organic dust (e.g. flour, paper dust, animal dander);
 - waste and wastewater;
 - blood and other body fluids.
- **Exposure to mixtures:**
 - organic dust in agriculture and other professions, causing infections and allergies
 - surgical smoke
- **Infections and allergies**



Emerging biological risks

- **Climate change** --> newly occurring microorganisms that have spread to other regions (e.g. via ticks and mosquitoes)
- **Environmental legislation leading to changes in waste management** (recycling, composting, separate collection)
- **Waste treatment and composting - specific allergens**
- **Changing travelling patterns and volunteer schemes** in third world countries (chikungunya, Crimean-Congo fever)
- **Migration flow to Europe** – transfer of biological agents from the Middle East and Africa
- **Multi-resistant bacteria and epidemics** (e.g. of zoonoses), risk to health professions and agriculture
- Expected increase in green jobs - increased **sensitisation to biomass-related allergens**
- Potential **re-emerging diseases**, e.g. Q-fever, tuberculosis and influenza

➤ **No system in place to respond quickly to emerging risks**



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Vulnerable groups

- **Trainees and new professionals, young workers** → lack of experience & knowledge
- **Pregnant women**
- **People with pre-existing diseases**, like lung diseases, allergies and asthma, chronic diseases
- **People treated with immunosuppressants**, especially fungal diseases
- **Cleaning and maintenance workers**, working at different workplaces and for different employers
- **Temporary and undocumented workers**
- **Foreign workers**
- **Healthcare:**
 - Workers in home care (not always well informed)
 - Health workers who travel for work



Monitoring of diseases (1)

- A selection of monitoring systems analysed and described (DE, DK, FI, FR, NL, UK)
- Wide range of types of monitoring systems for diseases
- Diseases due to biological agents reported in generic registration systems → no specific focus on biological agents
 - Exceptions in healthcare and systems for compulsory reporting (e.g. for hepatitis or tuberculosis)
- Proportion of diseases due to biological agents relatively low, except allergic diseases
- Unequal coverage of zoonoses
- Some sectors and occupations not covered
 - e.g. agriculture, self-employed
- !! Underreporting of diseases (including those related to biological agents)



Monitoring of diseases (2)

- **Systems used for monitoring diseases / exposures vary widely:**
 - Differences in what is monitored, how frequently and level of detail
 - Under-reporting
 - Little information on exposure to biological agents at the workplace
- **Unclear how data from monitoring systems is linked to prevention at the workplace**
- **Data from national registration systems on occupational diseases and causes can be a valuable source of information**
 - Data often not publicly available
 - Difficult for companies or branch organisations to access information relevant for their sector
- **Risk of biological agents often not a high priority on the national political agenda**



Monitoring of exposures to biological agents

- Information on exposure to biological agents limited
- Exposures not measured frequently
- Some OELs or guidance values for biological agents that have toxic or allergenic effects as for chemicals (e.g. endotoxins)
- Innovative measurement methods for identification and exposure measurement
- Exposure depends on growth conditions, availability of water and other substrates
- Dependent on temperature/season of the year.
- ! **A measurement can only be regarded as a snapshot of the concentration in the air.**
- Measurement methods record concentrations in air, but not from contaminated surfaces or instruments and exposures through skin
- Development of standardised measurement methods needed



Monitoring of diseases - recommendations

- **To achieve comparability**
 - Make information available to all stakeholders
 - Use a standard set of key parameters
 - Agree on the level of detail.
 - Consider providing information in English
- **Output from the systems in each country should be published according to**
 - Causative agents (exposures)
 - Industries/sectors
 - Jobs/occupations
 - Age
 - Gender
- **All sectors and occupations and all groups of workers to be covered by disease monitoring, recording and recognition**
- **Regular revision and update of the lists of occupational diseases**
- **Emphasis on respiratory diseases and skin diseases and on exposures to service workers**



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Better prevention needed

- **Respecting the hierarchy of prevention measures**
 - Most measures identified in the review related to PPE and other individual measures
 - Awareness-raising needed about the existing legal framework
 - Applying collective rather than personal measures
- **Lack of access to appropriate PPE or lack of appropriate storage areas for PPE**
- **Plans to deal with accidental exposure**
- **Measures for safe waste collection and handling and transport of biological agents**
- **OSH services needed for workers in exposed sectors**
- **Right to appropriate health surveillance**
 - needs to lead to prevention measures
 - right for other workers when a health problem is identified
 - prescreening for allergy vs. prevention measures



Better prevention (2)

■ Hygiene measures

- separation of break and changing rooms
- appropriate washing and toilet facilities
- separation of work and other clothing

■ Differentiation between 'clean' and 'dirty' areas (black-white areas)

- especially in waste management and farming
- avoiding contamination

■ Vaccination

- right for workers to be informed about advantages/disadvantages
- information in annexes to biological agents Directive (label)
- reasons for low vaccination rates?

■ Protection from accidental exposure

- needlestick injuries, cuts, bites
- diseases transmitted by vectors (e.g. Ticks)



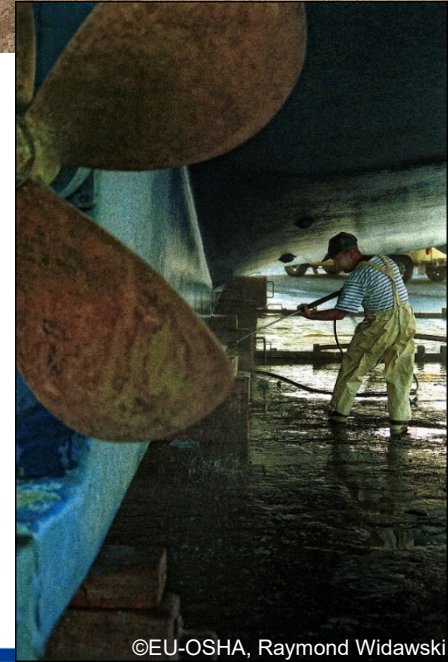
Importance of allergens

- **Multifactorial** - exact cause of the allergy cannot easily be identified
- **Causes:** organic dust, moulds in buildings, flour dust, industrial enzymes, specific bacteria occurring for example in waste management, wood processing and metalwork
- **Sectors at risk:** waste and wastewater treatment, construction, fisheries, food industry, textile industry, wood-working, metal industry
- ! **Allergies most recognised diseases, e.g. farmers lung**
- **Prevention:**
 - Dust- and aerosol-avoiding measures
 - Ventilation
 - Closed systems
 - Hygiene measures
 - PPE
 - Black-white areas



Good practice examples

- **OSH services for farming sector – Finland**
 - Consultation and health checks for farmers
- **Technical rules for biological agents, GESTIS database – Germany**
 - Guidance for different sectors and biological agents
- **Cooperation of committees for hazardous substances and for biological agents - Germany**
 - Guidance for protection of workers from sensitisers
- **Prevention in animal laboratories – Netherlands**
 - Mixture of organisational, technical and personal measures to protect workers from allergies
 - Apply to workers, clients and providers



Avoiding outbreaks and epidemics

- **Compulsory reporting in public health for some diseases and exposures:**
 - Pandemics such as avian influenza
 - Tuberculosis
 - Brucellosis, etc...
- **Spread and outbreaks of diseases needs to be monitored**
- **Expert networks in public health and occupational hygiene, e.g. regarding antibiotics and multiple resistance**
- **Cooperation between public health and OSH authorities needed**
- **General practitioners can help support prevention message and collect information**
- **Clear intervention plan when a new risk is identified – from first signs to alert for prevention**



Recommendations – awareness-raising and communication

- **Better link between research community, authorities and the OSH experts at workplaces**
- **Information exchange needed between countries**
 - existing data, knowledge, experiences and best practices in different sectors
- **Raising more awareness:**
 - among occupational physicians
 - among general practitioners - possible link between observed health effects and work of a patient
 - among new / young workers in relevant sectors and occupations, through e.g. vocational education
 - among employers on their legal obligations



Recommendations – European level




- **Consider wider definition of biological agents:**
 - Include substances or structures from living or dead organisms (such as exotoxins), allergens and mixtures of biological agents (bioaerosols or organic dust)
- **A wider range of occupations considered to be ‘at risk’ should be taken into account in the Directive or guidance**
 - Take into account unintentional exposure situations
 - Take into account “risky” jobs (e.g. maintenance workers, cleaners)
- **Include reference to vulnerable groups**
- **Emerging risks:**
 - European (or even global) (warning) system would make it possible to respond to emerging risks more quickly and in a more structured way
 - Alert function in existing or new systems



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Work-related diseases



In line with the [EU Strategic Framework on Safety and Health at Work 2014-2020](#)¹, one of EU-OSHA's priorities is to support the prevention of work-related diseases. The aim is not only to improve the lives of individual workers, but also to minimise the [costs of work-related illnesses and deaths](#).

The number of workplace accidents has decreased by 25% over the last 10 years. However, work-related diseases still account for an estimated [2.4 million deaths worldwide](#)² each year, 200,000 of which are in Europe.

EU-OSHA's work on work-related diseases aims to provide an evidence base for prevention, policy and practice. Another important objective is to provide a better overview of the extent of the occupational burden of disease.

OSHWiki

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Related

Publications

- [Alert and sentinel approaches for the identification of work-related diseases in the EU](#)
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