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

[https://osha.europa.eu](https://osha.europa.eu)
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
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
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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