



Expert forecast on emerging biological risks related to occupational safety and health (OSH)

About 320 000 workers worldwide die every year of communicable diseases, some 5 000 of them in the European Union (¹). In the past 10 years, media coverage has raised public awareness of biological hazards, such as anthrax due to bioterrorist activities, severe acute respiratory syndrome (SARS) and the threat of avian flu. But biological agents are ubiquitous and, in many workplaces, workers face very harmful biological risks.

What are emerging risks?

An 'emerging OSH risk' is any risk that is both **new** and **increasing**.

New means that:

- the risk was previously non-existent; or
- a long-standing issue is now considered to be a risk due to new scientific knowledge or public perceptions.

The risk is **increasing** if:

- the number of hazards leading to the risk is rising; or
- the likelihood of exposure is rising; or
- the effect of the hazard on workers' health is getting worse.

How to identify emerging risks?

The Community strategy 2002–06 (²) called on the agency to 'set up a risk observatory' to 'anticipate new and emerging risks'. The expert forecast was formulated within this context, from the results of three consecutive questionnaire-based surveys using the Delphi method. Under this method, the results of the previous survey round are fed back to the experts for further evaluation until a consensus is achieved. A five-point Likert scale was used to rate the risks. Thirty-six experts from 20 Member States, as well as Switzerland, participated in the survey. These experts had at least five years' experience in the field of OSH and biological risks.

What are the top emerging biological risks?

Two of the major concerns highlighted — the OSH risks linked to global epidemics and to drug-resistant organisms in the workplace — illustrate how important it is that biological risks are dealt with **globally and in cooperation between disciplines** such as OSH, public health, animal health, environmental protection and food safety.

Global epidemics

Even in the 21st century, new pathogens, such as SARS and avian influenza, are emerging. Outbreak-prone diseases such



European researchers study the avian influenza viruses in order to develop new vaccines — Istituto Zooprofilattico Sperimentale delle Venezie, Italy

as cholera and yellow fever are also re-emerging. When a pathogen emerges — given the speed and volume of international traffic and trade — it can **spread around the world rapidly, starting a new pandemic**. As many of these diseases are zoonoses (diseases transmitted from animals to humans), the workers most at risk are those in contact with infected animals, or with aerosols, dust or surfaces contaminated by their secretions. Workers involved in global trade and those exposed to infected people such as healthcare staff and aircrews are other high-risk groups.

Drug-resistant organisms

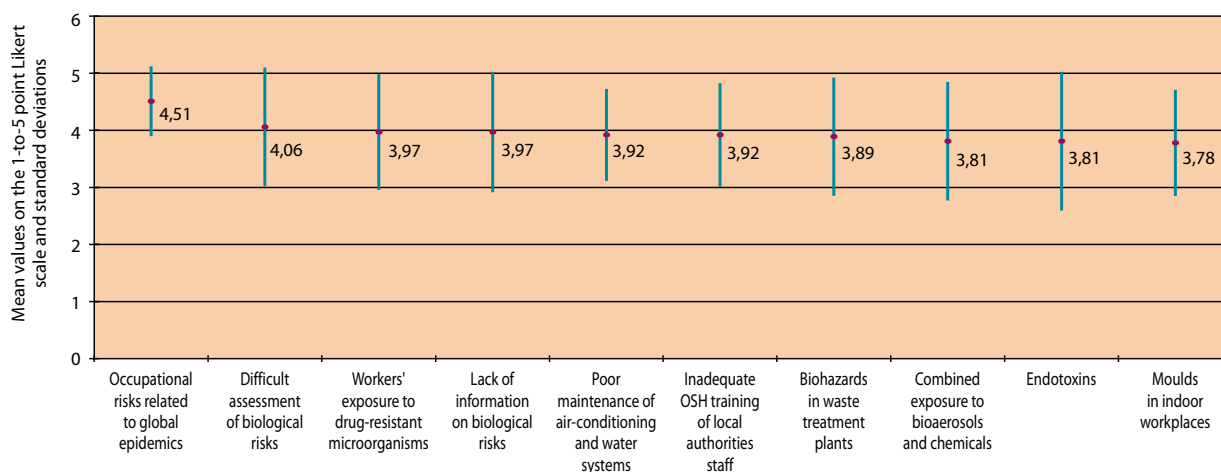
Antimicrobial agents have reduced the threat of infectious diseases. However, this achievement is put at risk from the emergence and worldwide spread of antimicrobial-resistant organisms, mainly as a result of the overuse or misuse of antibiotics. **Healthcare workers** are at risk due to the emergence of organisms such as methicillin resistant staphylococcus aureus (MRSA) and extensively drug-resistant tuberculosis (XDR-TB). Resistant organisms also pose a risk to **workers in contact with animals**. Drug-resistant organisms lead to severe infections that would not occur otherwise and to more failures in treatment.

Poor risk assessment

This is the second most important issue identified in the survey. Despite the obligation to assess biological risks laid down by Directive 2000/54/EC (³), **knowledge and information about biohazards is still relatively undeveloped**. In practice, a proper assessment of biological risks is difficult. Better methods for

(¹) Driscoll, T., Takala, J., Steenland, K., Corvalan, C. and Fingerhut, M., 'Review of estimates of the global burden of injury and illness due to occupational exposures', *American Journal of Industrial Medicine*, Vol. 48, No. 6, 2005, pp. 491-502.

(²) 'Adapting to change in work and society: a new Community strategy on health and safety at work 2002–06', COM(2002) 118 final.



The 10 most important emerging biological risks identified in the survey

measuring and assessing exposure to biological agents and well-established dose-effect relationships need to be developed.

Furthermore, the lack of information passed on to workers — for example, the **inadequate provision of OSH training** to workers — was also raised.

Waste treatment

New and complex exposure situations are found in new industries such as waste treatment. The waste-treatment industry employs a growing number of workers. However, its regulation was primarily developed for environmental purposes and fails to address OSH issues sufficiently. The major health problems observed in workers are caused by bioaerosols, which contain a variety of airborne microorganisms, including **mould and endotoxins, as well as volatile organic compounds (VOCs)**. Health effects reported include upper airway inflammation and pulmonary diseases, organic dust toxic syndrome (ODTS), gastrointestinal problems, allergic reactions, skin diseases and irritation of the eyes and mucous membranes. Handling medical waste and sharps may lead to other infections, including hepatitis and human immunodeficiency virus infection (HIV).

Indoor air quality

Similar exposure also occurs in traditional workplaces such as offices, which are developing together with the service sector. Airborne **moulds**, for example, are ubiquitous indoors. Exposure to moulds can lead to asthma, upper respiratory tract diseases, headaches, flu-like symptoms, infections, allergic diseases, and irritation of the nose, throat, eyes and skin, and contribute to the sick building syndrome. More than 100 000 species of mould have been identified but there may be as many as 1.5 million worldwide. Airborne moulds are also found in waste and sewage treatment, cotton mills and the agricultural sector.

Poor maintenance of water and air conditioning systems also leads to the growth and indoor spread of biological agents. This puts workers at risk of developing legionnaires' disease. Some

symptoms of indoor workers wrongly assumed to be caused by flu-like diseases are, in fact, often the result of biological agents that have developed in poorly maintained air-conditioning systems.

Endotoxins

Endotoxins can be found in all occupational settings where organic dust is present. Those at risk include workers in the **livestock industry, scientists working with rodents, workers in waste and sewage treatment, and even indoor workers**. The clinical effects range from fever, infectious diseases, acute toxic effects, allergies, ODTS, chronic bronchitis, and asthma-like syndromes, to septic shock, organ failure and even death.

Combined exposure to biological agents and chemicals

If the risks from biological agents are difficult to assess, those resulting from combined exposure to biological agents and chemicals pose even more problems. While the range of potential health effects is wide, it is difficult to determine **which of these constituents accounts for which health effects**.

Further information

This expert forecast on biological risks is the second of a series of four reports: 'Physical risks' has been published; 'Chemical risks' and 'Psychosocial risks' are set to follow.

The full report 'Expert forecast on emerging biological risks related to occupational safety and health':

http://riskobservatory.osha.europa.eu/risks/forecasts/biological_risks

The agency's report 'Expert forecast on emerging physical risks related to occupational safety and health':

<http://osha.europa.eu/publications/reports/6805478>

All work carried out by the European Risk Observatory is available at: <http://riskobservatory.osha.europa.eu>

(¹) Directive 2000/54/EC of the European Parliament and of the Council on the protection of workers from risks related to exposure to biological agents at work (OJ L 262, 17.10.2000, p. 21).

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