



# MODERNET 2025

## ABSTRACT BOOK

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**Uncovering Hidden Risks: Advances in Detecting Clinical Cases and Recognizing Occupational Diseases**

Ljubljana • 18-19 September 2025

**MODERNET**



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# **MODERNET 2025**

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**ABSTRACT BOOK**



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## Program

### Thursday

#### Theme: New and Emerging Occupational Health Risks (Morning Session)

Time	Title	Author(s)
9:30 - 9:45	Occupational Diseases in Slovenia	<b>Alenka Franko</b> <i>Clinical Institute of Occupational Medicine</i>
9:45 - 10:00	Early detection of New and Emerging Risks of Chemicals (NERCs) - an overview of risk-first methods	<b>Nicole Palmen</b> <i>National Institute of Public Health and the Environment (RIVM)</i>
10:00 - 10:15	An emerging zoonotic occupational risk: leptospirosis infection in the Region of Lombardy, Italy	<b>Claudio Colosio</b> <i>University of Milano</i>
10:15 - 10:30	Plant protection products on roses grown outside the European Union – a risk assessment	<b>Jolinde Kettelarij</b> <i>National Institute for Public Health and the Environment (RIVM)</i>
10:30 - 10:45	Skin absorption of tritium and metals derived from cement particles derived from dismantling nuclear power plants: Results from the TTANS project	<b>Francesca Larese Filon</b> <i>University of Trieste</i>
10:45 - 11.00	Q&A	
<b>11.00 - 11:30</b>	<b>Coffee Break &amp; Poster Viewing</b>	

#### Theme: Epidemiology, Toxicology, and Environmental Medicine (Late Morning Session)

Time	Title	Author(s)
11:30 - 11:45	Chemical risk in academic research: from raising cultural awareness to providing innovative solutions	<b>Federico Maria Rubino</b> <i>University of Milano</i>
11:45 - 12:00	Occupational respirable crystalline silica dust exposure and risk of non-lung cancer mortality among German uranium miners (1946-2018)	<b>Dirk Pallapies</b> <i>Institute for Prevention and Occupational Medicine of the German Social Accident Insurance</i>
12:00 - 12:15	Artificial Stone Silicosis in Europe: Key Insights and Future Perspectives	<b>Marcella Mauro</b> <i>University of Trieste</i>
12:00 - 12:15	Silicosis and artificial stone silicosis in the Czech Republic	<b>Lipsova Vladimira</b> <i>NIPH Prague</i>
12:15 - 12:30	The relationship between organophosphate pesticide exposure and anthropometric outcomes among a cohort of children from four informal settlements in the Western Cape	<b>Dalvie, Mohamed Aqiel</b> <i>University of Cape Town</i>
12:30 - 12:45	Contrasting hair mercury in fishermen and workers of fish industry of Marano Lagunare (Upper Adriatic Sea), a coastal lagoon area contaminated by mining and industrial activities, against residents from the Dolomites Alps	<b>Cegolon Luca</b> <i>University of Trieste</i>
12:45 - 13:00	Q&A	
<b>13:00 - 14:00</b>	<b>Lunch Break</b>	

#### Theme: Occupational Disease Recognition (Afternoon Session)

Time	Title	Author(s)
14:00 - 14:15	Recognized occupational diseases caused by chemical agents in the construction sector in Finland during 2013-2022	<b>Kirsi Koskela</b> <i>Finnish Institute of Occupational Health</i>
14:15 - 14:30	Introducing the Belgian Occupational Cancer (BOCCA) Dataset.	<b>Wouter Smeets</b> <i>Data Science Institute, Hasselt University, Belgium</i>
14:30 - 14:45	Occupational Intoxications – View from Czech Toxicological Information Centre	<b>Daniela Pelclova</b> <i>Department of Occupational Medicine, Toxicological Information Centre</i>
14:45 - 15:00	Occupational cancer in Croatia – a new approach is needed	<b>Karmen Bradvica-Kelava</b> <i>Croatian Institute of Public Health</i>
15.00 - 15.15	Barriers to Occupational Disease Recognition: A Monocentric, Cross-Sectional Study of Workers with Suspected Occupational Diseases in Slovenia	<b>Dani Mirnik</b> <i>Institute of Occupational Safety Ljubljana</i>
15.15 - 15.30	Asbestos Bodies (ABs) counts identified by autopsy reports in a group of mesothelioma patients	<b>Rui Francesca</b> <i>Occupational Medicine Unit, University of Trieste</i>
15.30 - 15.45	Q&A	
<b>15.45 - 16.00</b>	<b>Short Coffee Break</b>	
<b>16:00 - 17:00</b>	<b>Modernet Annual Meeting</b>	<b>Chair: Lode Goddeeris</b>

## Friday

### Theme: Innovative Technologies and Platforms for Detecting Occupational Diseases (Morning Session)

Time	Title	Author(s)
9:00 - 9:15	Toolbox for the Prevention of Skin Cancer Among Outdoor Workers: An Intervention Study	<b>Henk van der Molen</b> <i>Amsterdam UMC, Department Public and Occupational Health</i>
9:15 - 9:30	Utility of non-invasive biomarkers for diagnostics and prevention of work-related skin diseases	<b>Sanja Kezic</b> <i>Amsterdam UMC</i>
9:30 - 9:45	Plasma and Exhaled Breath Condensate Micrornas as Early Biomarkers of Asbestos-Related Disease	<b>Pierluigi Cocco</b> <i>University of Manchester</i>
9:45 - 10:00	Toluene Flanders Exposome Project: Feasibility and usability of the Human Sentinel Surveillance Platform (HSSP)	<b>Hilde De Raeve</b> <i>IDEWE, Belgium</i>
10:00 - 10:15	Vibrotactile and Thermal Perception Thresholds and personal risk factors Workers Exposed to Hand-Arm Vibrations	<b>Barbiero Fabiano</b> <i>UOC Unit of Occupational Medicine, University of Trieste</i>
10:15 - 10:30	Q&A	
<b>10:30 - 11:00</b>	<b>Coffee Break &amp; Poster Viewing</b>	

### Theme: Clinical Case Studies (Late Morning/Afternoon Session)

Time	Title	Author(s)
11:00 - 11:15	Case series: An exploration of working conditions in patients with renal ANCA vasculitis	<b>Monique Derikx</b> <i>Netherlands Center for Occupational Diseases</i>
11:15 - 11:30	Optimising Return to Work for Cardiovascular Patients: An Interdisciplinary Approach	<b>Donatella Sansone</b> <i>University of Trieste</i>
11:30 - 11:45	Physical Workload and Health Risk in Workers with Musculoskeletal Disorders	<b>Žaja Roko</b> <i>University of Zagreb, School of Medicine, Zagreb, Croatia</i>
11:45 - 12:00	Shift Work Sleep Disorder Among Rotating Night Shift Textile Workers and Its Association with Occupational Accidents	<b>Töreyin Zehra Nur</b> <i>Ege University Faculty of Medicine</i>
12:00 - 12:15	Closing the Gap in Bee Sting Allergy Management: An Interventional Study in Beekeepers from Friuli Venezia Giulia	<b>Tassinari Alice</b> <i>University of Trieste</i>
12:15 - 12:30	Q&A	
<b>12:30 – 13:30</b>	<b>Lunch Break</b>	
<b>13:30- 14:30</b>	<b>Workshop: How to assess compensation claims for diseases caused by mixture exposure</b>	
14:30– 15:00	Closing session with a discussion on collaboration	

## Poster Section

Poster	Title	Author(s)
1	Assessment of occupational diseases in the Czech Republic and other countries: Focus on repetitive strain injury	<b>Mrazova Karolina</b>
2	BE-PIN: Evaluating infection monitoring tools in the labour force	<b>Van Dijck Hanne</b>
3	Epidemiology of Hymenoptera venom allergy among Slovenian beekeepers: a cross-sectional study	<b>Carli Tanja</b>
4	Work and Health: a new occupational and environmental health journal	<b>Pierluigi Cocco</b>

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## ***Abstracts***

## Occupational Diseases in Slovenia

Franko Alenka<sup>1,2</sup>

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<sup>2</sup> Faculty of Medicine, University of Ljubljana, Ljubljana, Slovenia

### Introduction and objectives

The first beginnings of protection of workers' health and awareness of work-related diseases in Slovenia date back to the eighteenth century. At that time, prominent medical experts began observing the health of miners at the Idrija mercury mine. Many of the harmful effects of mercury known today were described based on observations of the health of miners in this mine. In another Slovenian mining district, where lead and zinc were extracted, the foundations of occupational medicine were laid 1863, when the establishment of a mutual fund set grounds for the beginning of organised health care for miners and lead melters. In 1903, miners and lead melters were taken care of by a physician who had already started the practice of preventive medical examinations and observed work-related diseases. More organised and professional measures for protecting employees' health were imposed only after the Second World War, when the tasks of specialists of occupational, traffic and sports medicine were defined by law, including carrying out preventive health examinations and the determination of occupational diseases.

The objective of this paper is to present the recognition of occupational diseases in Slovenia.

### Methods

Data were collected from legislation, literature, archives and medical records.

### Results

Until 2023, the recognition of occupational diseases in Slovenia was a significant problem, primarily due to a dysfunctional funding system of the recognition of occupational diseases. Until 2023, according to the legislation, employers were responsible for both identifying and paying the recognition of occupational diseases and had no interest in the recognition of occupational diseases. An exception existed for asbestos related diseases (asbestosis, pleural diseases, lung cancer, malignant mesothelioma, cancers of other location) defined by other legislation that were regularly recognised by the State Board for the Recognition of Occupational Asbestos Diseases. Other occupational diseases were rarely recognised, as workers usually had to seek recognition through the courts, which was a complicated and expensive procedure. In 2023, the new Regulations on Occupational Diseases were finally published. According to the new legislation, employees can now submit applications for the recognition of occupational diseases, which are then con-

sidered by an interdisciplinary group of experts. The procedure is paid for by compulsory health insurance for injuries and occupational diseases.

### **Conclusion**

Since the publication of the new regulations in 2023, occupational diseases beyond those related to asbestos exposure have finally begun to be recognised regularly and systematically in Slovenia. However, the regulations will have to be further supplemented and some other occupational diseases will have to be added to the list of occupational diseases.

**Key words:** occupational diseases, recognition, legislation

## Early detection of New and Emerging Risks of Chemicals (NERCs) - an overview of risk-first methods

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Preferred presentation method: oral communication

### Introduction

Within MODERNET<sup>1</sup>, early signals of NERCs are generally picked up using the *disease first* method. In addition, in 2018 a *risk first* method was introduced to identify signals before effects and diseases are observed [1]. The *risk-first* method of NERCs identifies signals on substances with an increased risk of health effects and/or 'specific occupations of concern' based on predictions of potential effects and exposure (i.e., risks/impacts).

The aim of this project is to make an inventory of available *risk first* methods for the identification of possible health effects due to existing chemicals with yet unknown hazard properties and exposure at work/activities that can lead to risks for work-related illnesses.

### Objectives

Which *risk-first* methods exist or are being developed for early detection of NERCs?

### Methods

A literature search was performed, using Pubmed and Google scholar, as well as grey literature. In addition, websites of international agencies and research institutes were searched for information on *risk-first* methodologies. Experts in the field of hazardous substances were also interviewed and information on risk first methods was collected during a presentation for colleagues working for the REACH agency and during a presentation at the MODERNET conference in Prague in 2024.

### Results

Only preliminary results can be presented.

European agencies and initiatives have developed methodologies that rely heavily on expert input. For example, using the Delphi method, experts are asked about potential risks of a predefined scenario in several rounds of interviews [2].

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<sup>1</sup> MODERNET: Monitoring Occupational Diseases and tracing New and Emerging Risks in a NETwork

An *in silico* AI-based screening tool is currently being developed by RIVM that can be used to identify and prioritize relevant signals for: (1) potential hazardous properties of chemicals that can provide information on potential chemical concerns that could result in occupational disease; and (2) potential uses and applications of chemicals that can provide information on potential occurrence and information on related extent of exposure at the workplace across sectors. The aim of this method is to enable predictions for large sets of chemicals, unlike the methods developed by the European agencies and initiatives, which rely on expert knowledge of a predetermined scenario.

Mistra SafeChem is an initiative of the Swedish Environmental Research Institute (IVL) and has developed a number of *in silico* methods for the detection of endocrine disruptors and CMR substances [3, 4, 5].

## Conclusion

Past publications have presented several methods that may be applied for risk-first identification of NERCs. Many of these methods are used to assess the risk of specific scenarios. These methods may therefore not be applicable for early detection of a broad range of NERCs. Recent national developments in the field of Artificial Intelligence (AI) – and Machine Learning (ML) – provide new possibilities to make more efficient use of available data and knowledge to optimize risk-first signal identification.

## Bibliography

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## An emerging zoonotic occupational risk: leptospirosis infection in the Region of Lombardy, Italy

S. Bosio<sup>1</sup>, D. Teodori<sup>2</sup>, M. D'Incau<sup>3</sup>, T. Pedrazzi<sup>4</sup>, M. Tiraboschi<sup>4</sup>, L. Vezzosi<sup>5</sup>, G. De Palma<sup>2-4</sup>, C. Colosio<sup>6</sup>

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### Introduction

Leptospirosis is a zoonotic disease caused by the bacterium *Leptospira*, characterized by a surface structure possessing both Gram-positive and Gram-negative characteristics. Reservoir of this bacteria is a wide range of domestic and wild animals, such as mice, rats, wild rabbits and other wild rodents, foxes, and breaded animals, in particular horses and pigs. The pathogen enters the animal blood stream through the skin, in particular if wounds or abrasions are present. Once entered in the animal's body, the bacteria colonize the proximal renal tubules and are excreted through urine, contaminating water and soil. Humans can be infected through the contact of mucous membranes or wounded skin with infected water or, less commonly, through an infected animal's body fluids. Workers' categories at risk are agricultural workers, often in contact with surface water, sewer workers, dairy, pig and horse farmers, abattoirs, rice fieldworkers, trappers, hunters, forestry workers and miners. Also, a recreational risk can be present for bathers, campers and other sportsmen. Once entered the blood stream, the bacteria can reach different organs, but kidney and liver are the typical target of the infection. Incubation usually lasts 1-2 weeks, but cases with shorter or longer incubation are reported. Clinical manifestation of the diseases can be absent, or cause hepatorenal failure and enterohemorrhagic fever. Due to the global warming and the increased presence of rats and river rats in the environment of the Po Valley, the number of reported cases of leptospirosis in our Region is increasing.

### Objectives

To examine the cases of leptospirosis reported in our Region in the period comprised between 20/08/2023 and 24/09/2024 searching any possible occupational origin of the infection and collecting data regarding the source of infection, the course of the disease, and the outcome.

## Methods

The cases reported by the Region's public health system have been assessed one by one, in order to confirm or not confirm the diagnosis. In case of a confirmed diagnosis, we collected the case history to identify, if possible, the source of exposure, the dates of onset, the outcome of the disease, and any other information useful to evaluate the cases under investigation.

## Results

In the study period, a total of 18 cases have been reported. Among them, for 16 the diagnosis was confirmed and for two excluded. Among the confirmed cases, 5 had an occupational origin (see table 1). As for the other 11, 5 reported contact with surface water, 2 mushroom research in woods, 1 hunting activities, 1 only a walk in the countryside. The remaining 2 are still under investigation.

## Conclusions

Our study, still in progress, shows that leptospirosis can be considered an emerging occupational disease in our Region. Categories at risk are not only animal breeders but agricultural workers as a whole and any other kind of job involving a possible contact with surface water, that is present in most if not all agricultural activities. Outcome can be very severe, since 2 out of five cases ended with a fatality. The analysis of the non-occupational cases indicates that the risk is widespread, since similar possibilities of exposure can be present also in occupational activities. Preventive interventions are needed but not easily identifiable.

## Bibliography

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*Table 1. Summary of the leptospirosis occupational cases reported in the Region*

Case n. (out of 18)	Job title	Type of exposure and other data	Date starting symptoms	Outcome
5	Animal breeder	Trout breeder. Entered in water for cleaning. Reported presence of rats in the farm	26/06/2024	Full recovery
6	Animal breeder	Sheep and dog breeder; Icterohaemorrhagic type	16/11/2023	Full recovery
7	Wiring systems maintenance	Working activity also in wells, in contact with soil and stagnant water.	08/09/2023	Full recovery
14	Agricultural worker	Various agricultural activities	24/08/2024	Fatal case
18	Animal breeder	Cow breeder	17/04/2023	Fatal case

## Plant protection products on roses grown outside the European Union – a risk assessment

*JD te Biesebeek, T van der Velde-Koerts, E Hermans, M Sanders, JAB Kettelarij*

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*Preferred presentation method: oral communication*

### Introduction

Many cut flowers are grown outside the European Union, and sold in the Netherlands and other European countries. Plant protection products that are not allowed in the EU may be used outside the EU. People who work with imported cut flowers in the Netherlands, or put them in a vase at home, are exposed to these plant protection products. The active substances in these products can be harmful to human health. The level of exposure to these substances determines whether there is a risk for human health.

### Objectives

On behalf of the Netherlands Food and Consumer Product Safety Authority Office for Risk Assessment and Research (NVWA-BuRO), RIVM has calculated whether exposure to active substances on roses is harmful for consumers and workers.

### Methods

Concentrations of plant protection products were measured in roses from outside the EU. These concentrations were used to model exposure and assess risks for workers (for example florists, auction employees and importers) and inspectors, and for consumers (adults and children) when they touch the roses or are exposed through inhalation. This is referred to as 'non-food exposure'. Furthermore, risks of consumption of roses (petals) were examined for consumers. Risk assessments were carried out for both acute and chronic exposure, using models for exposure estimations.

### Results

A total of 103 different active substances were found on three datasets of roses. Estimated exposure concentrations for workers and consumers were compared with health based guidance values.

## Conclusion

The results of this risk assessment will be published simultaneously with an independent advisory report from NVWA-BuRO. RIVM conclusions based on the results from this risk assessment may deviate from the advice from NVWA-BuRO.

The level and extent of exposure of workers and consumers in ressality is unclear. RIVM recommends performing targeted research to accurately determine possible risks. For example, the amount and concentration of substances on skin of workers and consumers should be determined. Possible risks may also depend on exposure time, and use of gloves or protective clothing.

## **Skin absorption of tritium and metals derived from cement particles derived from dismantling nuclear power plants: Results from the TITANS project**

*Francesca Larese Filon<sup>1</sup>, Giovanna Marussi, Marcella Mauro, Greta Camilla Magnano, Stefano Covelli<sup>2</sup>, Danièle Karlicek<sup>2</sup>, Veronique Malard<sup>3</sup>, Matteo Crosera<sup>4</sup>*

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<sup>4</sup> Department of Chemistry and Pharmaceutical technology, University of Trieste

### **Introduction**

Workers occupied in the removal and decommissioning of radioactive materials from nuclear power plants can come in contact with cement and stainless steel powders containing tritium and metals that can be absorbed via skin and respiratory route.

### **Objectives**

To study tritium and metals skin absorption after skin contact with tritiated cement particles potentially derived from dismantling of nuclear power plants using in-vitro Franz-cells. The literature extensively reports that metals can readily penetrate the cutaneous barrier in their ionized state (1,2) and it is well known that tritiated water can cross the skin barrier reaching subcutaneous fat and general circulation (3,4).

### **Methods**

Hydrogenated and tritiated cement particles were prepared in the tritium lab in CEA Saclay (French Alternative Energies and Atomic Energy Commission). Cement particles composition was 64% CaO, 20% SiO<sub>2</sub>, 5.5% Al<sub>2</sub>O<sub>3</sub>, 2.5% Fe<sub>2</sub>O<sub>3</sub>, 3.5% MgO, and 1.5% SO<sub>3</sub> and their suspension in synthetic sweat demonstrated a metals dosed in donor compartment at time 0: 50.4 ng/cm<sup>2</sup> for Cr; 1.2 ng/cm<sup>2</sup> for Cu; 4.6 ng/cm<sup>2</sup> for Ni and 1.4 ng/cm<sup>2</sup> for Pb. Tritiated cement particles with an activity of 0.039 MBq/mg, were dispersed in synthetic sweat and diluted to obtain a concentration in donor solution of 37 Bq/mL.

Experiments were run separately to study metals and tritium skin permeation by the application of 1 mL of donor suspension in donor phase of the Franz cells. Metals and tritium in receiving phase were studied at 30 minutes, 1-2-4-8-24 hours to verify the amount of metals and tritium that were able to permeate the skin. At the end of experiments, skins were washed and tested for metals and tritium content. Intact skin, damaged and broken skins were analyzed separately.

### **Results**

For Nickel and Chromium, except for broken skins, all other cells presented permeation profiles similar between blanks and treated cells. For the other metals, no statistical differences were found between blanks and treated cells.

For broken skin, Ni and Cr reached 60 ng/cm<sup>2</sup> and 52.4 ng/ cm<sup>2</sup>, respectively. Skin content was 41 ng/cm<sup>2</sup> and 180 ng/cm<sup>2</sup>. Skin absorption of tritium after skin contamination was below 0.002% for intact cells, gradually increasing after 1 hour of exposure. Using damaged and broken skin tritium increased into the skin reaching the 98% of the applied dose after 6 hours.

### Discussion and conclusion

Skin contamination with tritiated cement particles can cause a low absorption of Ni and Cr, only when they were applied in broken skin. In this case the amount inside the skin could cause allergic sensitization or induce allergy contact dermatitis in already sensitized subjects. No relevant penetration and permeation of other metals was found. Tritium absorption was very low in intact skin, while a high percentage of the applied dose can be found into the skin when broken or damaged, confirming the need to avoid contamination with tritium in damaged skin. Our study highlights the contribution of the skin in metal and tritium absorption after contamination with tritiated cement particles in dismantling operation of nuclear power plants, increase the knowledge needed to better protect workers and general population.

### Funding

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## Chemical risk in academic research: from raising cultural awareness to providing innovative solutions

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The size of the academic workforce in the STEM has progressively increased and operations involving the use of chemicals have expanded beyond the traditional precincts of chemical, natural sciences and medical research. In addition, operations as conducted in the frame of research do not lend well to chemical risk assessment along the established pathways of industrial hygiene and toxicology. Among the main differences are the general novelty of used substances, for which physico-chemical, technological and biological properties are the very object of study; the limited adequacy of the exposure scenario, essentially based on inhalation of volatiles for which agreed exposure limits are often available; the generally very small amounts of substances handled through multiple manual steps. This unusual scenario is the source of missed, often unreported, accidents, of serious or deadly consequences, of a poor awareness of occupational risk in academic research and of a consequent lack of a sound cultural, scientific and technical base for prevention.

To approach this topic, we examine a few case histories where limited awareness of chemical hazards led to dire consequences for research workers. We will trace analogies and differences among the discussed cases, pointing at causal factors that span from gross violation of well-known safe behaviour [1,2] to accidents caused by insufficient operator protection from very toxic substances [3] to perceptively cautious handling of new substances of an unknown and unforeseen toxicity [4].

To overcome the lack of suitable scientific and technical base for prevention, we refer to the analogy with tackling the occupational risk of handling antineoplastic drugs in hospital departments and pharmacies, awareness of which started in the 1980s and led to successful prevention by a combination of investigation methods and technical interventions. A major advance in exposure assessment derived from surface sampling of drug deposition and systematic analysis of manual working steps and protection devices [5]. This analogy may lead to introducing improved manipulation techniques for chemicals for which traditional approaches may overlook the exposure pathways.

The characterization of the hazard of novel substances may be limited and deemed unnecessary, since most products will not have further application and diffusion beyond one laboratory and research project. Perspectives for preliminary hazard characterization may derive from advanced, AI-based, computational methods [6].

Scientific and technical advances in hazard and risk characterization, however, will hardly suffice in mitigating chemical exposure-derived occupational risk in academia. Cultural awareness should be expanded both from the intellectual world of life sciences to that of academic chemical practitioners and from the chemical professions towards the many others that use chemical substances and operations with insufficient consciousness of hazard and potential risk.

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## Occupational respirable crystalline silica dust exposure and risk of non-lung cancer mortality among German uranium miners (1946-2018)

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### Introduction

This study investigates the association between occupational exposure to respirable crystalline silica dust and mortality from selected diseases other than lung cancer in the Wismut uranium miner cohort study.

### Methods

Our analysis includes 58,680 former male workers from the uranium mining industry who were exposed to high concentrations of silica dust in addition to radiation, especially in the early years of operation. We examined mortality from "silicosis or other pneumoconiosis" and other potentially silica dust-related causes of death, excluding lung cancer. Using internal Poisson regression, excess relative risk (ERR) was estimated for cumulative 5-year lagged silica dust exposure in mg/m<sup>3</sup>-years (dust-years). Adjustments were made for occupational radiation exposure.

### Results

Risk for mortality from "silicosis or other pneumoconiosis" (n=1,063) increases significantly with increasing silica dust exposure, starting at 3 dust-years, with a statistically significant doubling of risk observed at 6 dust-years (ERR at 6 dust-years = 1.08, 95% confidence interval (CI) [0.06; 2.04]). For "non-malignant respiratory diseases excluding 'silicosis or other pneumoconiosis'" (n=1,935), a statistically significant ERR of 0.12 per 10 dust-years (95% CI [0.03; 0.21]) was observed, attributable to the COPD group. Notable, albeit not statistically significant, ERR estimates were observed for "glomerular kidney diseases" (6.37 [-6.48; 19.22], n=40) and a subgroup of idiopathic pulmonary fibrosis (0.74 [-0.44; 1.92], n=67). Other investigated causes of death ("all cancers excluding lung cancer" or "diseases of the circulatory system") showed no clear association with silica dust exposure.

### Conclusions

The results confirm that silicosis represents the most significant health risk following silica dust exposure, with indications of increased risks for other diseases.

## Artificial Stone Silicosis in Europe: Key Insights and Future Perspectives

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### Objective

In recent decades, the number of silicosis cases among synthetic marble workers (known as AS silicosis) has increased globally, bringing new attention to a lung disease that was previously thought to be fading away. However, the extent of the phenomenon is still unclear. While Australia has recently banned the processing of these materials in 2024, it is still unknown what prevention strategies are currently adopted in different European countries to address this issue. The aim of the present study was to assess this point.

### Methodology

At the beginning of March 2025, a survey was distributed among European occupational and respiratory health professionals to collect information on AS silicosis they have observed, the features of health surveillance in their country, and the regulatory measures in place.

### Results

A total of 62 responses were collected from 20 countries. Twenty respondents from 7 countries indicated that cases of AS silicosis have been observed, with reported numbers ranging from 5 to 50-100 cases. Ten respondents (from 5 countries) reported having seen cases of AS silicosis. While most indicated that health surveillance for silicosis was available, nearly half believed it was ineffective in identifying cases. Nine respondents were conducting or setting up research, which includes both epidemiological (cross-sectional and case-control) and experimental studies. Moreover, some respondents mentioned systematic specific health surveillance measures or the establishment of national case registries. Many believed that a ban should be implemented. Only 3 respondents stated that a ban has been considered by policymakers, although other risk management initiatives were also reported. Eight respondents indicated that in their country, high silica content AS is being replaced with materials containing lower silica levels.

## Conclusion

Given the widespread use of AS, and likely underdiagnosis of silicosis, it is highly likely the cases of AS silicosis observed to date present only the “tip of the iceberg”, and that a sustained effort is required to assess and reduce the risk of working with these materials. Most of the participants were in favour of a ban of the use of engineered stone for kitchen worktops.

## Silicosis and artificial stone silicosis in the Czech Republic

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### Introduction

Silicosis is the most widespread chronic occupational disease in the world, which was also described as one of the first occupational diseases as early as the 16th century. The disease is caused by crystalline silicon dioxide (SiO<sub>2</sub>) during mining and processing of rocks and materials containing mostly quartz.

The emerging trend of new cases of accelerated silicosis in Australia, China, California US, UK and other countries across the world is raising questions about the adequacy of the systems in place for the prevention, early identification, control and management of this disease. Since 1 July 2024 there has already been a complete ban on the use of this material in Australia, Great Britain is considering this ban, and in several other European countries this is the subject of a wider professional debate.

### Material and methods

Silicosis is recognised as an occupational disease in the Czech Republic and data about cases are part of the National Register of Occupational Diseases (NRNP). This register includes comprehensive data on all recognized occupational diseases, providing a crucial resource for statistical analysis and public health policy. Each year, statistical summaries based on the data collected are compiled and published, offering insights into trends and the impact of occupational health issues (1). Silicosis is in this list under Chapter III - Occupational diseases affecting the respiratory tract, lungs, pleura and peritoneum. The definition of this disease to be recognized as occupational disease must fulfil the diagnostics criteria (mostly typical X-ray signs of dusty changes according to the classification of the International Labour Organization) and also the exposure to dust containing free crystalline silica.

Artificial stone silicosis could have a different clinical and X-ray signs and sometimes does not meet these criteria.

That could be the main reason why we could have an incomplete data on the artificial stone silicosis in the Czech Republic.

Also the exposition registry (National Register of Categorization of Work – KaPr) recognizes only dust containing free silica but without further definition of natural or artificial sources.

## Results

Recognised cases of silicosis in the Czech Republic national registry over the last 10 years (2014 – 2023) shows 131 diseases. The patients were men in 125 cases (95.4 %) and women in 6 cases (4.6%). Simple silicosis was recognised in 117 cases (113 men and 4 women), complicated silicosis in 11 cases (9 men, 2 women) and silicotuberculosis in 3 cases (men only).

In the Czech exposition registry are data about 3713 of exposed employees (92.2 % men) to silica dust.

## Conclusion

The Czech national registries of occupational diseases and occupational exposure are not distinguishing silicosis and artificial stone silicosis and natural and artificial sources of exposure. Some patients could be suffering from the disease and they may be not meeting the diagnostics criteria. More data and more information on recognised cases of silicosis and artificial stone silicosis in the Czech Republic is needed.

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**Key words:** silicosis, silica, dust, occupational disease registry, artificial stone

## **The relationship between organophosphate pesticide exposure and anthropometric outcomes among a cohort of children from four informal settlements in the Western Cape**

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### **Objective**

There is limited data on the association between pesticide exposure in children and anthropometric outcomes, particularly in non-agricultural communities and developing countries. This study investigated the association between organophosphate pesticide (OP) exposure and anthropometric outcomes in schoolchildren from four informal settlements in Western Cape Province in South Africa.

### **Methods**

This study was a repeated cross-sectional study of 600 schoolchildren over a 12-month period. Measurements included urinary dialkyl phosphate (DAP) metabolites [diethylphosphate (DEP), dimethylphosphate (DMP), and dimethylthiophosphate (DMTP)] at baseline and DEP and DMP at follow-up. Individual level characteristics as well as anthropometric measurements [height, weight, and Body Mass Index (BMI)] were collected at both time points.

### **Results**

The mean age for all participants at baseline was  $9.93 \pm 0.90$  years and mean  $\Sigma$ DAP at baseline was  $41.78 \pm 33.80$  ng/ml. Mean changes in weight, height, and BMI from baseline to follow-up for all participants were  $6.04 \pm 5.29$  kg,  $6.83 \pm 4.00$  cm, and  $1.05 \pm 2.01$  kg/m<sup>2</sup>, respectively. Eighty percent of participants measured below the 50<sup>th</sup> percentile in height-for-age at baseline, and 76.8% at follow-up. Although not all reached statistical significance, besides the association of the sum of DAP at follow-up (OR: 2.23, 95% CI: 1.09 – 4.57), all the other measures of urinary DAP were positively associated with low BMI-for-age (i.e., BMI values below two standard deviation of the WHO growth chart reference).

### **Conclusion**

Urinary OPP metabolite measurements and the prevalence of short stature among children in the study were high compared to other settings. The study found some evidence of decreased BMI-for age with increasing DAPs concentrations among the participating children. Large longitudinal studies with follow-up periods exceeding two years and incorporating pesticide biomonitoring at multiple time-points are recommended. Additionally, policy and intervention to reduce pesticide exposures in non-agricultural communities are recommended.

## Contrasting hair mercury in fishermen and workers of fish industry of Marano Lagunare (Upper Adriatic Sea), a coastal lagoon area contaminated by mining and industrial activities, against residents from the Dolomites Alps

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The Marano and Grado Lagoon is one of the largest lagoons in Europe yet one of the coastal areas most contaminated by mercury (Hg) across the entire Mediterranean sea. The latter contamination is primarily attributable to discharges from the Isonzo River, draining the district of Idrija (Western Slovenia), the second largest natural deposit of cinnabar (HgS) in the world after Almaden (Spain), actively operating as a mine for 500 years until 1995.

In addition to the Isonzo River, industrial inputs have contributed to Hg contamination in coastal sediments of the Marano and Grado lagoon, especially the former SNIA-Viscosa complex, a large chlor-alkali plant located in Torviscosa - in the hinterland close to the central sector of the lagoon.

Since studies so far had focused on assessing the environmental Hg contamination (sediments, fishes, birds) a survey was launched to measure the extent of exposure on high risk populations living in this coastal area.

This survey aimed at estimating the concentration of hair mercury (Hg) in fishermen and workers of fish industry of Marano Lagunare, a coastal village in the Western sector of the Lagoon, whose economy largely rely on fishing. Using hair specimens to estimate Hg exposure is an established approach to characterize the degree of Hg exposure in a study population, a goal relatively practical and straightforward. Although whole blood and urine are considered the most reliable specimens to estimate Hg exposure in humans, analysis of hair specimens presents several advantages, including longer half-life of Hg in hair, allowing to estimate exposures occurred

A field investigation was conducted from 2nd of December 2023 through 18th April 2024, on 73 local fishermen, 83 workers of fish industry and 93 controls among residents (mainly farmers/herdsman) of the Dolomites Alps. An amount of approximately 100 mg of hair was collected from all respondents, who were also asked to fill out a self-administered questionnaire collecting socio-demographic and lifestyles information. The median hair Hg concentration was 2.56 mg/kg in fishermen, 2.31 mg/kg in workers of fish industry and 0.58 mg/kg in controls. Compared with controls from the Dolomites, log-transformed hair Hg increased linearly with the amount of fish consumed (>1 meal per week), consumption of fresh fish and was significantly higher in fish dealers/fish restaurateurs and fishermen, regardless if operating on open sea or lagoon. All study groups but fish farmers and local residents involved in other business exhibited significantly higher odds of hair Hg >2 mg/kg at multiple logistic regression analysis. Whilst above the threshold back-

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ground exposure recommended by WHO for the general population (2 mg/Kg), the median levels of hair Hg in fishermen and workers of fish industry of Marano Lagunare were still below the cut-off of no health effects observed on human health (11.5 mg/kg). The above evidence most likely reflects contamination of lagoon bed and respective tributary river beds by sedimentary Hg from mining and industrial activities, with subsequent transfer of the metal into the aquatic trophic chain and from there to humans through consumption of local fish.

## Recognized occupational diseases caused by chemical agents in the construction sector in Finland during 2013-2022

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*The preferred presentation method of scientific contribution: Oral communication*

### **Introduction**

Construction workers are exposed to a variety of chemical agents that can have various adverse health effects and lead to occupational diseases. The rapid development of new chemicals highlights the need for continuous monitoring of trends in occupational diseases.

### **Objectives**

The aim of the study was to assess the chemical exposure agents of recognized occupational diseases in the construction sector in Finland, and to identify different diagnoses and typical occupations associated with them.

### **Methods**

We analyzed data from the Finnish Register of Occupational Diseases on recognized occupational diseases caused by chemical agents in the construction sector from 2013 to 2022. The data was divided into two five-year periods: 2013-2017 (Period 1) and 2018-2022 (Period 2). The construction sector was defined according to the NACE Level 1 code 'F' (NACE rev. 2). Chemical exposure agents were analyzed along with the associated diagnoses and occupations.

### **Results**

During Period 1, an average of 97 recognized cases of occupational diseases caused by chemical agents were registered yearly (5.5 cases/10 000 workers/year). During Period 2, the number of cases attributed to chemical agents significantly decreased, reaching 50 cases (2.8 cases/10 000 workers) in 2022. This decline was primarily due to the reduction in pleural plaques resulting from prior asbestos exposure. Over the 10-year period the majority of cases were found in 'specialized construction activities' (59.6%), and most affected occupations were 'plumbers and pipe fitters' (26.8%), 'house builders' (16.7%), and 'carpenters and joiners' (9.6%). These trends remained consistent throughout different study periods.

Over the 10-year study period, 790 cases were associated with chemical agents. In 2.5% of these cases, multiple diagnoses were recorded simultaneously, leading to a total of 810 separate diagnoses. A total of 112 distinct chemical agents were identified, but multiple chemical agents can be recorded for a single case. The most common diagnoses were pleural plaques (48.3%), allergic contact dermatitis (33.2%), irritant contact dermatitis (6.4%), and asthma (2.6%). In period 2, allergic contact dermatitis surpassed pleural plaques to become the leading diagnosis (44%).

When analyzing the exposure agents of allergic contact dermatitis, the number of different exposure agents remained static during periods 1 and 2. The most common exposure agents during both periods were epoxy products, isothiazolinones, polyurethane products, and metals. The number of cases related to rubber chemicals (such as thiuram sulfides) was low during period 1 but increased during period 2. Irritant contact dermatitis resulted from a wide range of chemical agents that irritate the skin. Occupational asthma was primarily triggered by isocyanates (28.5%), particularly MDI, and epoxy products (14.3%). Irritant induced asthma was identified in 23.8% of the occupational asthma cases.

### **Conclusion**

In the construction sector, workers are often exposed to chemical agents that can significantly increase the risk of developing occupational diseases. These chemicals can be sensitizing, and the development of skin or respiratory diseases is possible. Especially epoxy products, isothiazolinones, and isocyanates remain major hazards in the industry. Prevention of exposure is essential to avoid the onset of occupational diseases, making it critical to continue promoting awareness and adherence to safe working practices.

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## Introducing the Belgian Occupational Cancer (BOCCA) Dataset.

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### Introduction

A significant portion of cancer diagnoses are preventable, with potential causes rooted in lifestyle, infections, environmental, or occupational factors. The multifactorial nature of cancer presents a major challenge in its prevention and treatment. Given that a substantial part of an individual's life is spent at work, occupational exposures represent a significant risk factor.

Therefore, there is a critical need for data that elucidates the relationship between occupational exposures and various types of cancer, enabling targeted prevention strategies in high-risk sectors.

### Objectives

This project aims to construct a cohort based on occupational health data collected by IDEWE, one of Belgium's largest Services for Prevention and Protection at Work, to study cancer incidence through a unique coupling with the Belgian Cancer Registry (BCR). The resulting Belgian Occupational Cancer (BOCCA) dataset will be the first in Belgium, enabling exploration of associations between occupational exposures, jobs, sectors, and cancer incidence. These associations may pave a way for further research and targeted prevention in the fight against occupational-related cancers.

### Methods

To examine the relationship between occupational exposures, cancer incidence, and lifestyle-related factors, a Cox model with time-varying coefficients is employed. Missing data is handled using multilevel imputation to incorporate the longitudinal perspective of the data. High-performance computing techniques are utilized to manage the large dataset and complex algorithms, ensuring the reliability and accuracy of the analysis.

### Results

Combining the data from IDEWE and BCR, the resulting BOCCA dataset has a longitudinal nature with more than 3.7 million observations. Analysing the BOCCA dataset uncovered several associations between occu-

pational risk factors, sectors, job classification based on ISCO-08 codes, and five different cancers (lung, breast, skin, colon, and prostate cancer). The BOCCA dataset also provides an optimal opportunity to employ multilevel multiple imputation for handling the missing data, which yielded satisfactory results. Since the BOCCA dataset is the first of its kind, many insights were gained in how the quality of the BOCCA dataset can be improved for further, more targeted research.

### **Conclusion**

The BOCCA dataset provides an explorative resource for investigating the relationships between occupational exposures and cancer incidence in Belgium's working population. This study highlights critical data collection requirements, analytical approaches, and relevant external factors for further analysis. However, quantifying the association between specific risk factors, professions, and cancers remains a challenge due to the influence of many external factors.

## Occupational Intoxications – View from Czech Toxicological Information Centre

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### Introduction

The Czech List includes all chemical agents in Chapter I, which is an open chapter, extended in 2011. In the Czech Republic, the counts of occupational diseases are declining. The most pronounced drop is seen in intoxications, with maximum 346 occupational poisonings acknowledged in 1973.

### Methods

The numbers of occupational intoxications, acknowledged in the Czech Republic have been searched in the statistics in years 2014 and 2024. In addition, the calls to the Toxicological Information Centre (TIC), classified as “occupational” have been analyzed in 2024.

### Results

The statistics of acknowledged occupational intoxications showed 9 cases in 2014 (6x acute, 3x chronic), and only 5 acute intoxications in 2024. These were caused by the inhalation of chlorine, hydrogen sulfide, acetone, gasoline, and combustion gases.

In 2014, there were 116 calls to TIC where the cause was classified as occupational from total 17 161 (0.7% of the calls). There were 68% subjects with minor effects, 13% with medium, and 3% with severe symptoms (acetone, toluene); 16% subjects had no symptoms at the time of the call.

In 2024, there were 112 calls, among total 28 058 calls, i.e. about 0.4% of the calls to TIC.

There were 67 male and 44 female patients aged 18-72 years. In 58 cases, it was the physician from the hospital or emergency, in 54 cases the patient or his family member was calling.

Majority, i.e. 75% cases, occurred by inhalation, 13% by skin contact, 3% were eye exposures, and 9% were combined or other exposures.

The symptoms were classified mostly as minor (73%), medium (11%), and severe in 1% (coma due to acetylene). In 15% of the calls was the patient asymptomatic after some type of occupational exposure. The symptoms were unrelated in 17 % of all calls.

Most common agents were cleaning agents, including corrosives (30%), gases - acetylene, ozone, combustion gases (15%), organic solvents, glues, and paints (13%), metals (3%), pesticides (1.5%), and other agents (37.5%).

### **Conclusion**

The numbers of intoxications at the workplaces are relatively low in the last decade, which is documented by the low number of acknowledged occupational intoxications. The limitation of this statistics is that not all intoxications are acknowledged in case of self-employed subjects. In addition, lethal cases could also be acknowledged as occupational injuries. However, the optimistic view is supported by the low number of symptomatic patients consulted with Czech TIC. Prevention really works and effect of technical prevention and compensation of occupationally related disorders is clearly seen. Still, calls to TIC may bring warning concerning new work-related risks – new agents or exposures in the future.

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## Occupational cancer in Croatia – a new approach is needed

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*Preferred presentation method: oral communication*

### **Introduction**

Occupational cancer is considered to be an important cause of death and disability across the world. It is known that cancer is a multifactorial disease, so isolating specific occupational carcinogen and consequently defining the etiology of the disease is not an easy task.

**METHODS:** Data from the Croatian Occupational Diseases Registry and the Registry of Occupational Diseases caused by Asbestos from 2010 – 2024 were examined in order to determine the most common occupational cancers and carcinogens.

### **Results**

In a 15-year period there were a total of 160 recognized occupational cancers, with asbestos as a leading carcinogen, followed by ionizing radiation. Asbestos caused 92% of all occupational cancers and within them, mesothelioma presented in 77% of cases. The remaining 23% were cases of occupational cancer of the lung, bronchi, and larynx. The most common occupational cancer not caused by asbestos was blood cancer, presenting in only 3 cases, the same as colon cancer. Results showed that ionizing radiation is the second most common occupational carcinogen.

**DISCUSSION:** Occupational cancers with defined recognition criteria and related to specific carcinogen, like asbestos, are more likely to be reported and recognized as occupational disease. In contrast, in 2022 in Croatia, malignant skin melanoma had the sixth highest incidence and it is constantly increasing in number of cases every year. Despite the high number of newly diagnosed melanomas, the number of applications received for the recognition of occupational melanoma for now was only one and there were no cases of recognized occupational malignant skin melanoma. The multifactorial etiology of cancers is an obstacle in the recognition process of occupational cancers, but also in applying for recognition.

### **Conclusion**

Considering that the use of asbestos is forbidden in Croatia and many other countries, in the future it is expected to observe a decrease in the total number of asbestos-related occupational cancer cases. At the same time, there is an increase in the number of listed occupational and other carcinogens, not followed by

the number of cancer cases recognized as occupational diseases, mainly due to the multifactorial nature of the disease, causing difficulties in defining recognition criteria that are necessary to determine occupational etiology. It can be said that in the future, occupational cancer in Croatia can be even more underestimated than it is now, and regarding that, a new approach to diagnosing occupational cancer is needed. It is not necessary only to recognize more occupational cancers, but also to encourage more applications for the recognition of occupational diseases.

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## Barriers to Occupational Disease Recognition: A Monocentric, Cross-Sectional Study of Workers with Suspected Occupational Diseases in Slovenia

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### Introduction

Occupational diseases remain a significant public health issue, yet recognition and reporting are low in Slovenia. The 2023 Regulation on the List of Occupational Diseases introduced a revised official recognition process, but factors influencing workers' decisions to initiate this process are not well understood.

### Methods

A cross-sectional study involved 190 workers suspected of having an occupational disease during preventive exams at the Occupational Medicine Center at the Institute of Occupational Safety Ljubljana from April 2024 to March 2025. Data were collected via questionnaires and analyzed using descriptive statistics, Chi-square test, t-test, and multivariate logistic regression.

### Results:

Analysis of these responses revealed that only 24% (26/110) initiated the recognition process, while 38% (42/110) chose not to pursue their claim. The remaining 38% (42/110) were undecided. Two-thirds (66.3%) of workers were unaware of the recognition process. Noise-induced hearing loss represented 73.7% of suspected cases, carpal tunnel syndrome accounted for 14.3%, skin diseases comprised 4.6%. The average age of affected workers was 47.5 years. A significant association was found between the decision and receiving information from three or more sources. The main reason for not initiating was lack of specialist examination, followed by perceived limited benefits and difficulty obtaining documentation. Workers motivated to proceed primarily aimed to improve their working conditions, protect colleagues' health, and ensure medical care.

### Conclusion

Workers' decisions depend on more than basic awareness; clarity, trust, and support are vital. Multichannel, accessible communication and the role of occupational physicians are key to increasing recognition rates. Improving information dissemination and healthcare support can enhance occupational disease management and workers' health outcomes.

**Keywords:** occupational diseases, recognition process, worker decision-making, workers, occupational medicine

## Asbestos Bodies (ABs) counts identified by autopsy reports in a group of mesothelioma patients

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### Introduction

The causal attribution of asbestos-related diseases to past exposure to asbestos is often of considerable importance in clinical and medico-legal contexts. Studies conducted on cohorts of asbestos-exposed workers show that the presence of ABs in autopsy lung tissue has been considered a biological indicator that can confirm a previous asbestos exposure, but, sometimes, has been demonstrated in the general population without asbestos-related diseases and no history of asbestos exposure.

### Objectives

The aim of the study was to assess the relationship between anamnestic past asbestos exposure and the presence of ABs (at histology) in a large series of autopsy examinations, recorded among mesothelioma patients in the context of the activity of the National Mesothelioma Registry (ReNaM) of Friuli Venezia Giulia (North East of Italy).

### Methods

The National Mesothelioma Registry collects mesothelioma cases arising from 1995 to December 2023 in the population resident in Friuli Venezia Giulia (N=1756). For each case the clinical documentation necessary to define the diagnosis is collected and occupational and extra-occupational exposure to asbestos is classified according to ReNaM criteria. Autopsy data were available in 898 cases and ABs count was performed in 318 cases. ABs concentration was expressed as number of ABs per gram of dry lung tissue according the method ISTISAN 17/12–(ISTISAN 2017) and ABs count was categorized into three levels: <1,000/1,000-9,999/≥10,000 per gram of dry lung tissue. Information on occupational and health history were acquired from a standardized questionnaire.

### Results

ABs concentration was reported in 266 males and 52 females. Higher ABs counts ( $\geq 10,000$  per gram of dry lung tissue) were described in the group of men (54.8%) than in women (21.2%) ( $p < 0.001$ ). Men had a

longer duration of asbestos exposure: 18.9 years (mean) versus 3.1 years among women. From the logistic regression analysis, among occupationally exposed men (N=266), previous occupational asbestos exposure (years) was associated with higher ABs counts ( $\geq 10,000$  per gram of dry lung tissue) (OR = 1.01, 95% CI = 1.01-1.03).

### **Conclusion**

The autopsy findings and the ABs lung burden are certainly useful in documenting and providing a better assessment of past occupational exposure to asbestos, but they also emphasize the complexity of the factors that determine its presence.

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## Toolbox for the Prevention of Skin Cancer Among Outdoor Workers: An Intervention Study

*Florentine de Boer, Sanja Kezic, Henk F. van der Molen*

### Background

Due to ultraviolet radiation (UVR) exposure at work, outdoor workers face a higher risk of keratinocyte carcinoma (KC) than indoor workers. While reducing UVR exposure can lower KC risk, sun-safety behaviors are often inadequate due to barriers such as forgetting to apply sunscreen, the time required for application, perceived attractiveness of a tan, and general indifference towards sun protection

### Aim

This study evaluates the short-term effectiveness of a sun-safety risk communication toolbox aimed to increase sun-safety behaviour among male outdoor workers.

Methods: A parallel-controlled, non-randomized study was performed among outdoor construction and arboricultural workers, recruited from five companies. Twenty-eight workers were assigned to the intervention group, where they received a preventive toolbox and 26 workers to the control group. The toolbox included information on UVR health risks and preventive measures, as well as sunscreen provision. The primary outcome was internal UVR exposure, measured by the relative cis-urocanic acid (cUCA) levels in the stratum corneum (SC) of the cheek and neck. Secondary outcomes included sun-protective behavior, workplace encouragement, knowledge and attitude/motivation, all assessed using questionnaires.

### Results

A significant difference in cUCA was found between the groups at the cheek location with lower cUCA for the intervention group (-0.065 (95% CI:-0.101 to -0.029)). Reported sunscreen use significantly improved in the intervention compared with control group (difference:14,41 ((95% CI:-21,42- -7,34)). For cUCA at the neck location and other secondary outcomes no statistical differences between groups were found.

### Conclusion

The toolbox intervention led to a reduction of internal UVR exposure, consistent with a self-reported increase in sunscreen use, compared to no intervention. Future research should focus on the longer-term preventive effects of this type of toolbox

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## Utility of non-invasive biomarkers for diagnostics and prevention of work-related skin diseases

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### Introduction

Contact dermatitis (CD) and non-melanoma skin cancers (NMSC) are prevalent occupational skin diseases in the workplace. Accurate diagnostics, early detection, and exposure assessment, are essential for treatment and workplace interventions. Non-invasive biomarkers might offer a promising tool for improving diagnostics and assessing occupational exposure.

### Method

A brief review of recent literature will be presented, along with findings from recent studies that explored suitability of biomarkers for distinguishing different forms of CD and as exposure biomarkers for assessing the effectiveness of an intervention aimed at reduction of occupational solar UVR-exposure.

This study on diagnostic biomarkers was conducted in patients suffering from hand dermatitis. Participants underwent patch testing with common allergens and a skin irritant, and stratum corneum samples were collected from sites with positive reactions, confirming allergic contact dermatitis (ACD) or irritant contact dermatitis (ICD). The exposure biomarker study was conducted in outdoor workers who participated in a controlled intervention study aimed at improving protection against solar UVR.

### Results

A wide range of immunological and skin barrier biomarkers were analyzed, and a machine learning model was developed to differentiate ICD from ACD. Preliminary results identified several immunological and skin barrier biomarkers that exhibited distinct profiles between ICD and ACD. Isomers of urocanic acid measured in the skin were found to be suitable exposure biomarkers for assessing the effectiveness of the intervention.

### Conclusions

Non-invasive biomarkers hold promise for both exposure assessment including intervention effectiveness assessment and diagnostics in occupational skin diseases.

## Plasma and Exhaled Breath Condensate Micrornas as Early Biomarkers of Asbestos-Related Disease

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### Introduction

Dysregulation of the microRNA profile in the bloodstream or other biological fluids has been associated with chronic diseases, including cancer. Whether specific microRNAs (miRNA) or their profile might serve as early biomarkers of asbestos-related disease is a promising avenue of research.

### Objectives

The Asbestos-Related Respiratory Diseases in Industrial Areas (A.R.R.D.I.A.) is a 3-year follow-up study, currently in the field in Sardinia, Italy, aiming to detect the miRNA expression profile in the plasma and the exhaled breath condensate (EBC) of 200 workers with past exposure to asbestos, 25 cases of lung cancer, 10 cases of pleural mesothelioma, 15 cases of interstitial lung disease, and 200 healthy volunteers recruited among the general population of the study area.

### Methods

We used a Next Generation Sequency platform (HiSeq3000™, Illumina, San Diego, CA, USA), to evaluate the correspondence between the miRNA expression in the plasma and the EBC in six subjects with no history of occupational asbestos exposure, using Bland-Altman plots and the intraclass correlation coefficient.<sup>1</sup> We also performed non parametric Mann Whitney tests between 9 workers formerly exposed to asbestos vs. 10 non-exposed and healthy controls vs. 10 ILD interstitial lung disease (ILD) cases to identify any relevant miRNA perturbation in EBC and plasma samples. Also, for the most promising miRNAs, we used the area under ROC Curves to estimate potential diagnostic accuracy. Among the formerly asbestos-exposed subjects, we also conducted a Spearman's correlation analysis between the EBC miRNA count and the cumulative asbestos exposure estimated retrospectively.

## Results

The Bland-Altman plots suggest a symmetric distribution of the miRNA count differences between plasma and EBC samples around the line of zero difference. Also, in all instances, more than 95% of the individual measurements lie within the 95% confidence interval.<sup>1</sup> Eight miRNAs, namely let 7a-5p, let-7d-5p, miR-16-5p, miR-30d-5p, miR-93-5p, miR-144-3p, miR-185-5p, and miR-486-5p were up- or down-regulated ( $p<0.05$ ) among ILD subjects compared to healthy, unexposed study participants. Three plasma miRNAs, namely let 7a-5p, miR-151a-5p, and miR-320a-3p discriminated against subjects with past exposure to asbestos and healthy unexposed donors ( $p<0.05$ ) with 74%, 78%, and 74% accuracy, respectively. In the EBC, only let 7a-5p maintained a significant discriminating power ( $p<0.05$ ). Consistently with other studies, we did not observe a correlation between the EBC or plasma miRNA counts and the cumulative exposure to asbestos.

## Conclusion

Our results suggest that microRNA expression in the plasma and EBC might discriminate subjects with past exposure to asbestos and ILD patients from healthy, unexposed donors. Follow-up studies are warranted to confirm whether the different micro-RNA expression observed among subjects with asbestos-related disease anticipates, and for how long, the clinical and radiological diagnosis, thus supporting its use as an early biomarker of effect.

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## Toluene Flanders Exposome Project: Feasibility and usability of the Human Sentinel Surveillance Platform (HSSP)

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### Introduction

The Human Sentinel Surveillance Platform (HSSP) is an online surveillance tool leveraging sentinel practices through a network of Belgian occupational physicians and nurses monitoring occupational and environmental health risks. The Toluene Flanders Exposome Pilot Project explores the feasibility of integrating biomonitoring and questionnaire-based data collection in occupational health settings via the HSSP, specifically focusing on toluene exposure.

### Objective

This study aims to evaluate the feasibility of implementing HSSP by assessing usability, organizational setup, participant recruitment, and data collection processes. Additionally, it seeks to generate preliminary data on occupational toluene exposure to guide future large-scale studies.

### Methods

The study will be conducted in IDEWE medical centers from November 2024 to December 2025, targeting employees undergoing routine occupational health assessments with potential toluene exposure. Occupational health professionals (OHPs) will recruit participants during medical examinations. Participants will provide a urinary biomonitoring sample to measure o-cresol, a metabolite of toluene, and complete a web-based questionnaire covering demographics, medical history, personal habits, and occupational exposure. Data will be securely stored in REDCap with confidentiality safeguards, including pseudonymization. Participation requires informed consent, and researchers will access only coded data.

### Results

As data collection and analysis are ongoing, this section outlines the expected findings rather than presenting actual results. Feasibility will be assessed through quantitative and qualitative methods. Quantitative metrics will include OHP participation rates, employee recruitment numbers, and completion rates for consent forms, questionnaires, and biomonitoring samples. Usability will be measured using the System Usability Scale (SUS). Qualitative analysis will involve semi-structured interviews with OHPs, analyzed using inductive and deductive approaches to identify usability barriers and facilitators. Additionally, descriptive statis-

tical analysis of biomonitoring data will provide insight into workforce toluene exposure trends. This section provides an overview of the types of results expected rather than actual data, as data collection and analysis are still ongoing. Feasibility will be assessed through quantitative and qualitative methods. Quantitative indicators include OHP participation rates, employee recruitment numbers, and completion rates for consent forms, questionnaires, and biomonitoring samples. Usability will be evaluated using the System Usability Scale (SUS). Additionally, qualitative analysis of semi-structured interviews with OHPs will help identify usability barriers and facilitators.

Descriptive statistical analysis of biomonitoring data will offer initial insights into workforce toluene exposure trends.

### **Conclusion**

This pilot study will assess the feasibility of HSSP as a scalable tool for occupational and environmental exposure monitoring. The findings will contribute to occupational safety policy development and enhance risk assessment strategies for chemical exposure in workplaces.

## Vibrotactile and Thermal Perception Thresholds and personal risk factors Workers Exposed to Hand-Arm Vibrations

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### Introduction

Hand-arm vibration syndrome is a complex disorder caused by prolonged exposure to hand-arm vibrations, affecting sensory and vascular functions (1). The neurosensory component of this syndrome, characterized by impaired tactile and thermal perception, remains less understood.

### Objectives

This study aims to explore the association between vibrotactile and thermal perception thresholds and individual risk factors and comorbidities in workers exposed to hand-arm vibrations (HAV).

### Methods

A total of 235 male workers exposed HAV were recruited at the Occupational Medicine Unit of the University of Trieste. Detailed medical histories, including personal, occupational, and health-related data, were collected. Neurosensory impairments were classified using the Stockholm Workshop Scale. The vibrotactile measurements were performed using an HVLab tactile vibrometer according to ISO 13091-1:2001 standard (2), while the thermal perception measurements, both for hot and cold, were performed using an HVLab thermal aesthesiometer: both instruments were produced at the Institute of Sound and Vibration Research, University of Southampton. Covariates such as age, BMI, smoking, alcohol consumption, vascular/metabolic disorders, and prior upper limb trauma were considered. Daily vibration exposure (A(8)) was estimated based on work history. Associations between respectively vibrotactile, thermal perception and personal risk factors and comorbidities were analyzed using multivariate linear regression with robust standard errors.

### Results

The study included 235 male workers with a mean age of 46.5 years (SD = ±10.4) and a mean BMI of 26.2 kg/m<sup>2</sup> (SD = ±3.8). Tobacco use was reported by 60%, with an average exposure of 18.9 pack-years (SD = ±16.7), while 48.1% of participants consumed alcohol, with a mean of 2.5 units/day (SD = ±2.1). The mean daily exposure to hand-arm vibrations (A(8)) was 3.40 m/s<sup>2</sup> (SD = ±1.30), with 61.3% of workers exposed to values ≥2.5 m/s<sup>2</sup>. Of the participants, 46.8% showed varying degrees of sensory symptoms, with 3.8% cate-

gorized as severe. For vibrotactile perception, significant positive associations were found with age, vibration exposure ( $0.040 < p < 0.002$ ),  $BMI \geq 25 \text{ Kg/m}^2$  (finger V, 31.5 Hz;  $0.018 < p < 0.040$ ), smoking ( $0.035 < p < 0.001$ ), vascular/metabolic diseases ( $0.026 < p < 0.013$ ) and neurosensory symptoms ( $0.040 < p < 0.002$ ), suggesting a role of these factors in the impairment of vibrotactile sensitivity. Thermal perception, both warm and cold, yielded less consistent results: neither occupational nor personal risk factors showed significant associations with the worsening of the investigated values.

### Conclusions

Our results suggest that personal factors such as age, smoking, and comorbidities such as metabolic or vascular disorders play a role in the impairment of the neurosensory component of HAV, particularly in vibration perception tested at both high and low frequencies. Additionally, a high BMI was positively associated with deterioration in vibration perception, especially when low-frequency vibration thresholds were tested in the V finger. Our findings may help guide future epidemiological research on the role of personal risk factors in the development of hand-arm vibration syndrome and indicate preventive action to take in workplace.

### Funding

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## Case series: An exploration of working conditions in patients with renal ANCA vasculitis

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### Background

Anti-neutrophil cytoplasmic antibody (ANCA)-associated vasculitis is a rare but severe autoimmune disease characterized by granulomatous and neutrophilic inflammation of small- to medium-sized blood vessels, often leading to significant organ damage, particularly in the kidneys. While the etiology is multifactorial, occupational and environmental exposures have been suggested as potential triggers.

### Objective

This case series explores the occupational backgrounds and potential work-related exposures among patients diagnosed with renal ANCA-associated vasculitis in a regional Dutch hospital, following the observation of an unusual cluster of cases among individuals with similar professions.

### Methods

After an initial signal from a nephrologist who diagnosed four cases of ANCA vasculitis within one year—two plumbers, one tiler, and one upholsterer—a total of ten patients were interviewed regarding their occupational histories and potential exposures. A literature review was conducted to contextualize findings, and a non-WMO study protocol was approved by the local ethics committee. Medical histories, lifestyle factors, and detailed occupational exposures were documented through structured interviews and medical records.

### Results

Of the ten patients (all male, median age 52), nine were diagnosed with ANCA-associated vasculitis, predominantly with anti-MPO antibodies. Six had worked as plumbers, with others employed as a gardener, tiler, or in woodwork. One patient had been diagnosed with nephrotic syndrome but was included in the study because he was also a plumber.

Suspected exposures included dust and silica, tar, zinc, lead, tin, flux, PVC adhesives, and wood dust. Most patients reported minimal use of personal protective equipment. Literature review confirmed an increased

risk of ANCA vasculitis with silica exposure (meta-analysis OR 3.12, 95% CI 1.67–5.83).<sup>1</sup> Other risk factors identified included smoking and prior diagnoses of sarcoidosis.

### **Conclusion**

This case series highlights a potential association between occupational exposures—particularly in plumbing and related trades—and the development of ANCA-associated vasculitis. While (individual) causality cannot be established, these findings underscore the need for further research into occupational and environmental risk factors and increased awareness among clinicians regarding work-related exposures in patients with rare autoimmune diseases.

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## Optimising Return to Work for Cardiovascular Patients: An Interdisciplinary Approach

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### Background

Cardiovascular disease (CVD) remains the leading cause of death worldwide.<sup>1</sup> Advances in diagnostic and therapeutic strategies, alongside primary and secondary prevention, have significantly reduced mortality. As a result, an increasing number of patients are living with chronic CVD, impacting not only public health but also employment, especially given the rising retirement age.

### Purpose

Interdisciplinary collaboration between occupational medicine and cardiology is crucial to developing protocols that optimize return to work (RTW), align with patients' functional capacity, and minimize work-related risks. Identifying key predictive factors—both facilitators and barriers<sup>2, 3</sup>—is the first step. By integrating these factors<sup>4</sup> with appropriate diagnostic assessments and workplace surveillance, occupational health specialists can evaluate fitness for work and support a safe RTW process.

### Methods

This study recruited working-age patients discharged from the Cardiology and Cardiac Surgery Unit of Trieste since 2024, following an acute cardiovascular event or planned intervention. Sociodemographic (sex, age, smoking, familiarity), clinical (treatment, blood values, cardiac function indices, therapy, rehabilitation), and occupational data (type of contract, working hours, task, exposure risks, pre- and post-treatment fitness for work) were collected. RTW adaptation was assessed using the Work Ability Index (WAI)<sup>5</sup>, while quality of life was measured with the EuroQoL (EQ-5D-5L) questionnaire.<sup>6</sup> Task-specific heart rate and metabolic equivalent of task (MET) were overestimated by exercise testing in relation to occupational demands. Additionally, 24-hour Holter monitoring was performed in patients with arrhythmia during rehabilitation or exercise testing.

### Results

To date, 72 patients (mean age: 56.5 years) have been enrolled. Of these, 91.7% were male, 45.8% current smokers, and 27.8% former smokers. The mean BMI was  $26.9 \pm 3.8$ , with 41.7% classified as overweight

and 22.2% as obese. Comorbidities included diabetes (11.1%), hypertension (61.1%), and dyslipidemia (70.8%). Coronary artery disease was diagnosed in 73.6%, with 48 undergoing PCI and 12 coronary bypass grafting. Additionally, 13.9% had valvular heart disease, and 19.4% had heart failure. Post-discharge, only 36.4% successfully quit smoking.

Approximately five months after the event, 20.8% of patients had not yet returned to work. Among them, older patients had retired or taken early retirement, while those with job-related risks incompatible with their condition were placed on employment lists. RTW was delayed in older patients, and those undergoing bypass surgery, with heart failure, high MET job demands, or rehabilitation, while self-employment was associated with an earlier RTW. Work ability scores varied, with 8.8% classified as poor (WAI <28) and 7% as excellent (WAI >43). Upon RTW, the mean EQ-5D-5L index was  $0.84 \pm 0.17$ , and the mean EQ-VAS score was  $76.8 \pm 14.2$ . Anxiety about potential recurrent events was evident, as 11 patients required emergency hospital visits, though 9 cases were non-cardiac in origin.

## Conclusion

In addition to objective factors that are easier to assess, there are subjective factors that are more difficult to quantify, such as the perception of the illness, its impact on quality of life and self-esteem, and concerns and uncertainties about reintegration. Identifying the aspects that influence RTW is essential to provide the occupational physicians with a valuable tool for assessing fitness for work, adapting tasks to residual physical capacity and ultimately safeguarding the health of workers. This approach can help reduce the social and economic costs associated with prolonged inactivity and disability.

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## Physical Workload and Health Risk in Workers with Musculoskeletal Disorders

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### Introduction

Musculoskeletal disorders (MSDs) are a leading cause of work-related disability, often driven by manual material handling and repetitive movements in healthcare and industrial settings (1). Systematic review evidence supports ergonomic interventions to prevent MSDs in the workplace (2). Quantitative data on workload and health risk in working populations with diagnosed MSDs remain scarce.

### Objective

To assess physical workload and associated health risk among workers with MSDs.

### Methods

During 2021–2022, 250 workers (62.8% male) with ICD-10–confirmed MSDs were surveyed at occupational health clinics (3). Inclusion criteria required a clinical diagnosis of an MSD and current employment. A structured questionnaire, developed according to national ergonomic regulations (4), collected data on exposures to lifting, carrying, pushing, pulling, and repetitive movements of loads. Participants rated frequency, duration, and intensity of physical tasks performed at work. The Key Indicator Method (KIM) was used to classify physical workload and associated health risks into four categories: low, elevated, high, or very high. Descriptive and comparative statistical methods were used to analyze the data, with significance set at  $P < 0.05$ .

### Results

Workload for lifting and carrying tasks was classified as high, with a median KIM score of 36.0 (IQR 16.0–108.0); 42.5% of participants were exposed to a very high level of health risk for these activities. For repetitive movements, the workload was elevated (median KIM 35.5; IQR 22.4–45.0), with nearly half of participants (49.5%) also facing an elevated health risk. Women had higher repetitive-movement workload than men (median 42.5 vs. 33.3;  $P = 0.002$ ).

### Conclusion

Workers with MSDs face high physical demands and elevated health risks, particularly in lifting and repetitive tasks. Female workers may be more exposed to repetitive tasks or face greater vulnerability to repeti-

tive strain injuries due to occupational roles or physiological factors. Immediate, gender-specific ergonomic interventions are critical: large enterprises should utilize occupational safety engineers and resource capacity for comprehensive programs, while small businesses need accessible, low-cost solutions and targeted training to mitigate risks.

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## Shift Work Sleep Disorder Among Rotating Night Shift Textile Workers and Its Association with Occupational Accidents

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### Introduction

Shift Work Sleep Disorder (SWSD) is characterized by insomnia and/or excessive daytime sleepiness due to disrupted work and sleep schedules. A recognized occupational health risk, it increases the likelihood of accidents and reduced performance due to circadian rhythm misalignment. Occupational accidents and SWSD are particularly relevant in sectors like textiles, where the physically demanding nature of work, combined with rotating night shifts, may exacerbate sleep disturbances and increase the risk of occupational accidents.

**Objectives:** The aim was to evaluate the prevalence and predictors of SWSD, and its impact on occupational accidents among textile workers on rotating night shifts in an industrial setting.

### Methods

A survey was conducted among 217 workers between April and June 2024. Sleep-related conditions were assessed using the STOP-BANG (SB), Epworth Sleepiness Scale (ESS), Pittsburgh Sleep Quality Index (PSQI), and Insomnia Severity Index (ISI). SWSD was diagnosed in individuals with the scores of ISI ≥ 8 and/or ESS ≥ 11, provided SB < 5 to exclude sleep apnoea. Factors associated with SWSD and its relationship to occupational accidents were examined using logistic regression analysis, adjusting for several confounders.

### Results

After excluding 15 participants with SB ≥ 5, 202 workers (7.9% women) were included in the study. SWSD was diagnosed in 68 workers (33.6%, median age 29 years). SWSD was associated with younger age (OR: 0.928, p<0.001), having fewer children (OR: 0.663, p=0.005), higher alcohol consumption (OR: 1.139, p=0.04), poor sleep quality (OR: 11.740, p<0.001), shorter sleep duration (OR: 0.994, p=0.003), and longer sleep latency (OR: 2.361, p=0.005).

Out of 68 participants with SWSD, 45.6% had occupational accidents, whereas 30.6% of those without SWSD had accidents (p>0.036). Higher BMI (OR: 1.140, p=0.001) and insomnia (OR: 2.399, p=0.008) were associated with increased risk of accidents.

## Conclusions

The present results show that one third of the shift workers have SWSD, contributing to occupational accidents in 45.6% of them. SWSD poses a significant burden on night shift workers and targeted interventions are crucial.

**Keywords:** Shift Work Sleep Disorder (SWSD), occupational accident, sleepiness, insomnia

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## Closing the Gap in Bee Sting Allergy Management: An Interventional Study in Beekeepers from Friuli Venezia Giulia

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### Introduction

Beekeeping is a widespread activity in Italy, with over 51,000 registered operators.<sup>1</sup> In the Friuli Venezia Giulia region, the number of beekeepers increased by 56.2% between 2016 and 2022.<sup>2</sup> However, many of them are hobbyists or semi-professionals and may not systematically benefit from occupational health surveillance. In this context, the risk of systemic allergic reactions to Hymenoptera stings is both real and potentially life-threatening,<sup>3</sup> as demonstrated by the European anaphylaxis registry, even if national data are lacking due to the absence of subcategorization for anaphylaxis causes in the Italian version of the ICD-10.<sup>4</sup>

### Objectives

This study aimed to assess the prevalence of allergic reactions among beekeepers in the Friuli Venezia Giulia region, focusing on extended local reactions (ELRs) and systemic reactions (SRs). The goal was to evaluate and reinforce secondary prevention strategies, such as adrenaline auto-injectors and venom immunotherapy (VIT), which are life-saving and disease-modifying treatments, respectively.

### Methods

Between February and July 2024, an online survey was distributed through the mailing list of the four provincial beekeeping consortia of Friuli Venezia Giulia. Data on demographics, bee sting exposure, reaction type, and clinical management were collected. Subsequently, an interventional study was conducted on participants who reported symptoms suggestive of anaphylaxis or recurrent ELRs. Each of them was recontacted by telephone, and those who had not yet received an adrenaline auto-injector and/or desensitization therapy were referred for a specialist evaluation, including diagnostic testing.

### Results

Among the 138 respondents, 61.59% reported experiencing at least one ELR, frequently with early onset (65.94% within two hours) and slow resolution (lasting over 24 hours in 71.74% of cases), indicating persistent and clinically significant symptoms.

Approximately 31.20% reported episodes of angioedema, while 7.97% experienced dyspnea, 7.25% experienced collapse, and 5.07% experienced gastrointestinal signs, symptoms which are consistent with systemic

reactions. Although 36.96% had sought emergency care, only 15.22% possessed an adrenaline auto-injector, and fewer than 8% had initiated a VIT protocol. Among those eligible for VIT, only three completed the treatment.

Fifty-three beekeepers with a history suggestive of anaphylaxis or recurrent ELRs were recontacted. Eleven underwent specialist allergology evaluations, leading to: eight receiving an adrenaline auto-injector along with usage training; three initiating VIT; and one being diagnosed with suspected mastocytosis (elevated tryptase, negative IgE), who was subsequently referred for hematologic follow-up.

### Conclusion

This study highlights the presence of high-risk individuals among non-professional beekeepers ( $\leq 10$  apiaries), who are often unidentified and untreated. The integration of active surveillance with specialist clinical evaluation enabled the effective identification and management of these individuals. The findings reveal a significant gap between the frequency of allergic reactions and appropriate clinical management, underscoring the need to raise awareness of allergic symptoms in this group of workers and to implement secondary prevention strategies aimed at reducing potentially fatal cases of anaphylaxis.

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## ***Poster Section***

## Assessment of occupational diseases in the Czech Republic and other countries: Focus on repetitive strain injury

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### Introduction

Repetitive strain injury, also known as RSI and repetitive motion disorder, is damage to tissues caused by repeated physical actions. As a result of work-related hand strain and the influence of other factors, workers may develop carpal tunnel syndrome. In the Czech Republic, carpal tunnel syndrome has long been among the most frequently occurring diagnoses of reported cases of occupational diseases.

### Methods

Overview of methods and methodology to assessing repetitive strain injuries in the Czech Republic and other countries.

### Results

A total of 6 156 occupational illnesses were reported in 6156 workers during the year 2023. Diseases due to repetitive strain injury were reported in a total of 224. The most frequent cases were workers in motor vehicle manufacturing (n=44), especially assembly workers and production operators. Peripheral nerve disease of the limbs in the form of isthmus syndrome was reported in a total of 114 cases, most commonly carpal tunnel syndrome (n=107). In the Czech Republic, the percentage of muscle force exerted from the maximum force of a given muscle group (% Fmax) and the number of movements per minute and per shift are used and determined for the assessment of local muscle load. The measurement method used is integrated electromyography, which is based on monitoring electrophysiological potentials from loaded muscles during a work shift. This involves monitoring the load on the muscles of the hands and forearms using an EMG device.

Other countries use the OCRA (Occupational Repetitive Actions), RULA (Upper Limb Risk Assessment), or Strain Index methods to assess the risk of developing musculoskeletal disorders. The Strain Index can be used as a means of assessing workplaces for the risk of musculoskeletal disorders. The Strain Index is a tool used when you need to calculate the risk of developing a musculoskeletal disorder (MSD) in hand-intensive work. Repeated tasks with the hands can lead to levels of discomfort in the hands, wrists, and elbows. The

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calculation is based on 6 task variables: Intensity of exertion, duration of exertion, efforts per minute, hand/wrist posture, speed of work, and duration of task per day.

### **Conclusion**

Occupational repetition strain injuries are a major, unchecked source of disability in industry and commerce, and have considerable social and economic consequences. Individual countries do not have a unified methodology for assessing local muscle strain for risk assessment and investigation of occupational diseases. Measurement using the integrated electromyography method is performed mainly in the Czech and Slovak Republics. In other countries, this method is used only exceptionally.

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## BE-PIN: Evaluating infection monitoring tools in the labour force

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### Introduction

Since Fall 2020, a rich source of data has become available concerning COVID-19 infections and the labour force, thanks to the coupling of individual employment and infection data. This has enabled to follow-up evolutions per economic NACE-BEL sector. For about two years, a (bi-)weekly report was prepared and shared with the authorities [1,2]. This enabled a data-driven, targeted approach towards pandemic control in the labour sector, avoiding invasive non-pharmaceutical interventions in sectors where they were unnecessary. Sector-specific research can further support pandemic control in key sectors such as health care [3].

### Objectives

This project aims to investigate what tools, developed and used during the COVID-19 pandemic can be re-used, improved, and further developed, to ensure a targeted set of interventions that is as effective as possible, and as little invasive as possible.

### Methods

Using the 60 reports that were published during the COVID-19 pandemic, a framework will be made to describe the dataflow and data analyses that are required to optimally monitor infections in the labour force in a potential next pandemic.

### Results

The tools available provide a strong basis for a permanently available data-driven monitoring for future epidemics and pandemics. However, some issues need to be addressed, such as appropriate coupling with vaccination and other relevant data, something that was not achieved with the existing instrument. Furthermore, data availability need to be insured, not only from a data and computer science perspective, but also from a legal standpoint. While such a framework existed during the COVID-19 pandemic, it was ad hoc and limited in time. Also, it took a while to be functional, at a time where speed is of the essence.

## Conclusion

The experience built during the COVID-19 pandemic is useful for setting up a framework to monitor infections in the labour force, provided appropriate legal and data-availability action is taken, coupled with analysis and reporting tools. Such a tool has the potential to be instrumental to ensure a data-driven, targeted approach towards pandemic control in the labour sector.

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## Epidemiology of Hymenoptera venom allergy among Slovenian beekeepers: a cross-sectional study

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### Introduction

Stinging insects, particularly Hymenopteras, are the most common triggers of venom allergies in the adult population. These insects are also the leading cause of occupational anaphylaxis, with beekeepers being especially vulnerable, since the risk of developing bee venom allergy increases with the degree of exposure. Beekeeping in Slovenia has a long tradition and is an integral part of the country's cultural and natural heritage. However, to the best of our knowledge, there is no nationwide data on the lifetime prevalence of Hymenoptera venom allergy (HVA) among the Slovenian population of beekeepers. Therefore, this study aimed to assess the epidemiology of HVA among Slovenian beekeepers.

### Objective

To collect environmental and medical history data among the Slovenian population of beekeepers enabling to estimate the lifetime prevalence of HVA and to identify associated risk factors.

### Methods

A cross-sectional study was carried out among the Slovenian population of beekeepers between November 1, 2021 and May 31, 2023. Self-reported environmental and medical history data were collected via telephone-based interviews conducted by a physician, using a validated questionnaire APISS-Q. The observed health outcome, systemic allergic reaction (SAR) to bee venom, was confirmed through medical health records or hospital information system.

## Results

A total of 1,080 beekeepers participated in the study, with a mean age of  $58.9 \pm 14.3$  years. The majority were male (84.9%), hobby beekeepers (98.0%), and 82.8% practiced stationary beekeeping. Most participants had been beekeeping for over a decade (67.0%) and the majority used some form of protective clothing (59.2% with partial protection and 23.3% with full protective equipment). A total of 102 beekeepers self-reported experiencing their first SAR to bee venom, with 59 cases (57.8%) confirmed by clinicians. The estimated lifetime prevalence of self-reported and clinician-confirmed first SAR to bee venom was 9.4% (102/1,080) and 5.5% (59/1,080), respectively. In the latter group, SAR typically occurred after a single bee sting (46/59; 78.0%), most often in spring (30/49; 61.2%), with symptoms emerging within the first five minutes in 50% of cases (12/24). The most common sting sites were head and neck (23/40; 57.5%). The estimated overall lifetime prevalence of self-reported and clinician-confirmed recurrent SAR to bee venom was 3.7% (40/1,080) and 1.4 (15/1,080), respectively.

## Conclusion

Preventive measures, such as reducing exposure among allergic beekeepers, promoting the use full protective equipment, and the use of self-emergency kits are essential for protecting beekeepers from potentially life-threatening reactions. (Life-long) venom immunotherapy should be considered for those at the highest risk.

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## Work and Health: a new occupational and environmental health journal

*Pierluigi Cocco<sup>1</sup> on behalf of the Work and Health Editorial Board*

<sup>1</sup> WAH Editor-in-Chief, and Centre for Occupational and Environmental Health, Division of Population Health, Healthcare Research & Primary Care, University of Manchester, United Kingdom

### Introduction

The vastness of Occupational Medicine and its achievements in Prevention have provided a fertile background for addressing emerging Environmental Health issues resulting from human agricultural and industrial activities, allowing significant progress toward protecting workers' health and the environment in developed countries. However, in this era of the global economy, primary and manufacturing industries have massively moved to developing countries. Meanwhile, new health threats have emerged from traditional occupational and environmental hazards, such as lung cancer, autoimmune, and kidney diseases associated with occupational exposure to silica, and old, well-known occupational diseases have been discovered in novel and unexpected work circumstances, such as the emerging epidemic of silicosis among young workers in the artificial stone industry.

In contrast, in many countries, academic programs in Occupational and Environmental Health are shrinking, the competence in Occupational Medicine is being fragmented among other medical disciplines, and the multidisciplinary view connecting the different contributions to its cultural background is being lost.

### Objectives

As a new international leading journal, Work and Health (WAH) aims to reflect the progress and changes in the vast field of Occupational and Environmental Health. Stimulating and attracting the best science is the way to achieve the reputation necessary to gain influence and bring the discipline back to its past relevance. At the same time, the specificities of global occupational health require special attention to safety and work issues in developing countries.

WAH is broad in scope, welcoming original, novel, fundamental research. The journal focuses on all relevant Occupational and Environmental Health themes, aiming at the highest standards in occupational epidemiology, toxicology and biomarkers, and industrial hygiene, with special attention to the omics sciences, nanotoxicology, robotics, and new ICT tools to monitor and identify links between exposure and disease.

## Conclusion

The WAH Editorial Board and the Editor-in-Chief are committed to connecting all new scientific advancements to the practice of Occupational and Environmental Health worldwide, with special consideration for the fast-growing economies and developing countries.

The quality, international and generational blend of the Editorial Board members will ensure continuity in the editorial line and attract high-quality, high-impact research.

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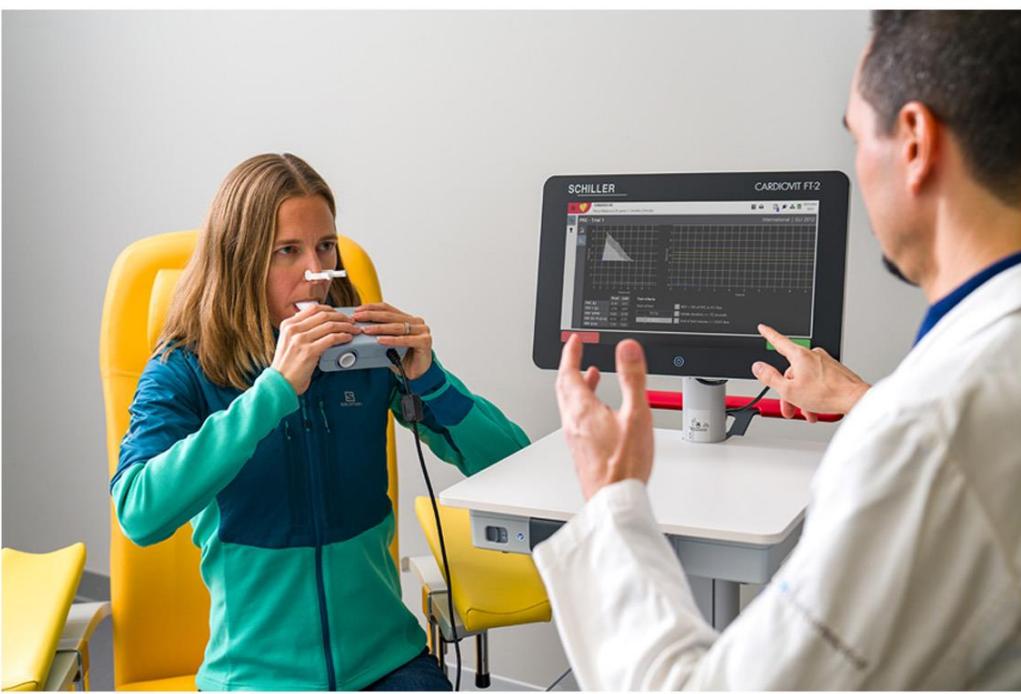
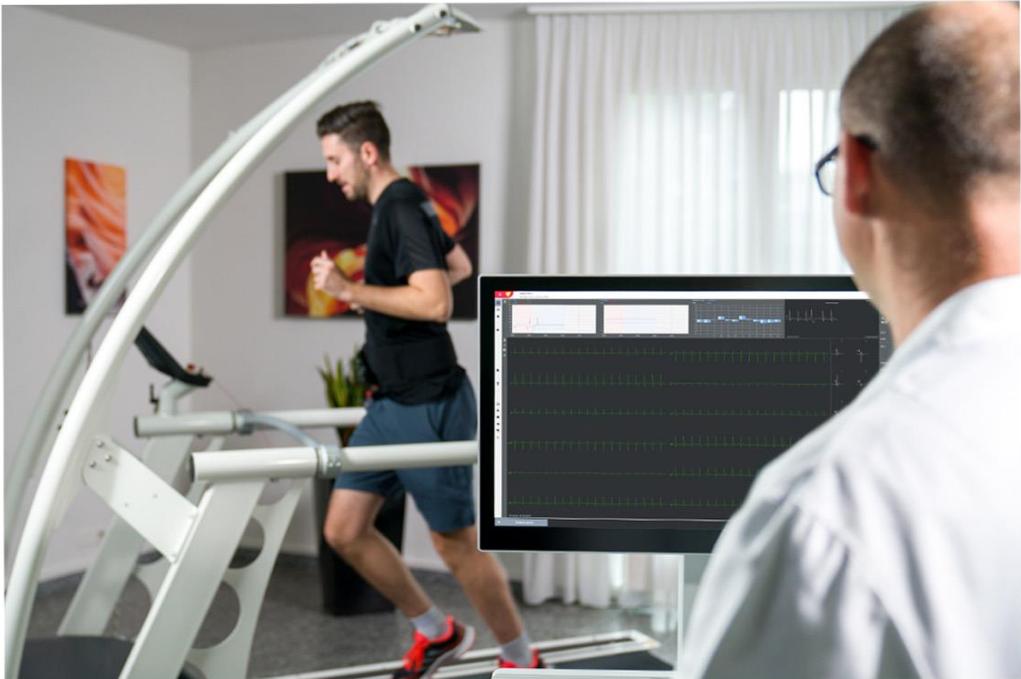
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