

Expert forecast on emerging chemical risks related to OSH

“Chemical substances at work: facing up to the challenges”
Brussels, 2-3 March 2009

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Background: Community Strategy for OSH

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- **2002-2006:** asked the Agency “to anticipate risks and bring them under control” and “to create a European Risk Observatory, to provide forward-looking information for policy-makers”
- **2007-2012:** the ERO should contribute to enhancing “risk anticipation”. The Agency will help to pinpoint and monitor trends and new risks and identify measures which are essential.

Emerging risks: “New and increasing risks”

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“New” if:

- A **completely new** risk, or
- A long-standing issue newly considered a risk due to a change in **public perception**, or
- **New scientific knowledge** leads a long-standing issue to be identified as a risk

New risks...?

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“New and increasing risks”

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“Increasing” if...

- The number of **hazards** leading to the risk is growing, or
- There is a higher likelihood of **exposure** to those hazards, or
- The **harm** caused is worsening (in severity, or in numbers affected)

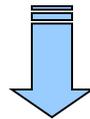
Expert forecasts of ERs: Delphi surveys

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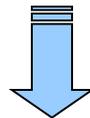
4 Delphi surveys

(physical, chemical, biological & psychosocial risks):

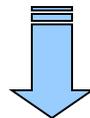
520 experts from 27 EU countries contacted



Round 1: Identification of issues



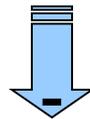
Round 2: Validation and prioritisation



Round 3: Final consultation



if necessary



Forecast by 188 experts (RR=35%):
prioritised lists of ERs

Expert forecast on Emerging Chemical Risks

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- Carried out in 2004-2006 with the Topic Centre TCRO
- Selection of participants:
 - Proposed by Focal Points and TCRO
 - At least 5 years experience in dangerous substances and OSH
- Expert participation
 - 1st round: N experts contacted = 174 / Responses = 54 (RR=31%)
 - 3rd round: N experts contacted= 152 / Responses = 49 (RR=32%)
- Replies from 21 EU countries (19 Member States + 2 EFTA)
- Mainly researchers / heads of department in OSH research body
- Items rated on a 5-point Likert scale
- Items prioritised with mean values (MV) of ratings
- Standard deviations used to check the consensus

Five main risk groups emerging (1)

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➤ Particles and dust

- **Nanoparticles and ultrafine particles, diesel exhaust, man-made mineral fibres, dust in the recycling sector, welding fumes, crystalline silica, asbestos, powder paints, wood particles**

➤ Allergenic and sensitising substances

- **Epoxy resins, isocyanates, hardeners in polymers (acrylates and isocyanates), organic acid anhydrides (e.g. new applications in epoxy resins and paints), dertergents (especially containing glycols and esters), enzymes, UV-curable inks containing acrylates, metal-cutting fluids, allergenic metals (nickel, cobalt, chromium ions), hydrocarbon mixtures**
- **Dermal exposure**

Five main risk groups emerging (2)

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➤ Carcinogenic, mutagenic and reprotoxic substances

- Asbestos, (passive) tobacco smoke, crystalline silica, diesel exhaust, radon, wood dust, organic solvents, endocrine disruptors, POPs, aromatic amines (in hair products), biocides, additives in food & textile industries (azo dyes), combined carcinogens, reprotoxicants

➤ Sectors specifically highlighted

- **Waste treatment**, construction (incl. low awareness of poorly qualified workers), cleaning and wet work, semi-conductor and fine metal industries (metal fumes and dust), agriculture, home nursing

➤ Combined exposures:

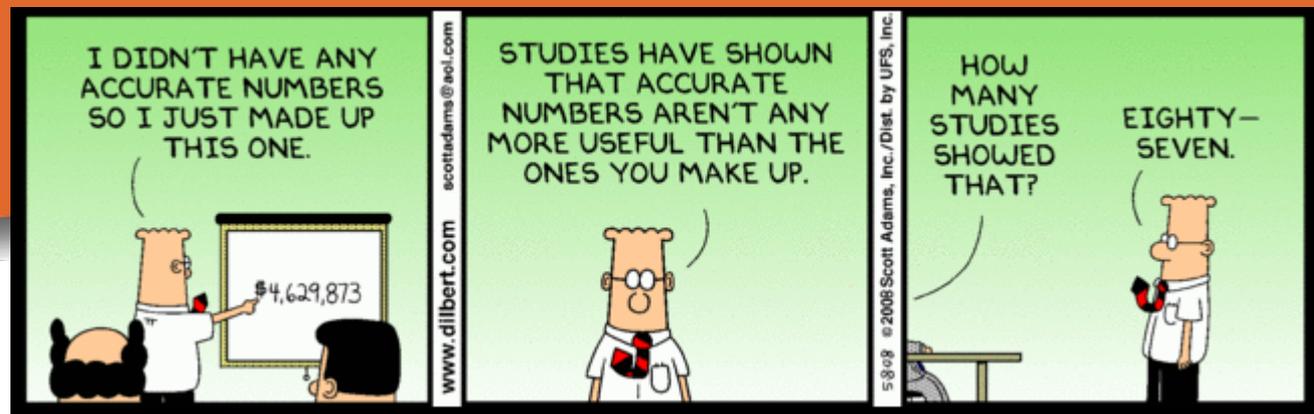
- **Combined exposure to chemicals** (even when each element taken separately is not toxic)
- **With organisational/ psychosocial risk factors: Dangerous substances in SMEs** and sub-contracted activities, vulnerable workers' groups (migrant workers, workers in precarious jobs, older workers, immuno-compromised workers)
- **Ototoxic substances and noise**

Occupational exposure to chemicals in the EU

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- **Still high exposures of workers (ESWC 2005):**
 - handling dangerous substances: 15%
 - exposed to smoke, fumes, powder, dusts: 19%
 - to vapours such as solvents and thinners: 11%
 - to tobacco smoke from other people 20%
- **Occupational diseases in EU (EODS harmonised figures):**
 - about 50 % related to dangerous substances
 - skin diseases are decreasing, but respiratory diseases still recognised for 14-15% of workers
 - 5% are occupational cancers
- **Big differences between genders in the distribution of occ. diseases, incl. the ones related to DS**

Estimation of work-related Fatalities – EU 27



- **205 million people in employment**
- **167,000 fatalities attributed to work-related accidents and diseases in EU, and within that:**
- **159,000 fatalities attributed to work-related diseases**
- **7,460 fatalities caused by accidents at work**
- **74,000 fatalities attributed to hazardous substances at work (asbestos included)**
- **8.4% of all cancer deaths estimated to be attributable to work**

CMRs: Member State example: France

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- **French report on CMR use in 30 industrial sectors** *(INRS 2006)*
 - 324 substances studied
 - in 2005, 4.8 million tons were used
 - for 10 CMR substances amount is >100 000 T/year
- **SUMER survey 2003 (worker survey)** *(DARES 2005)*
 - studied 28 carcinogens
 - 2,260,000 workers (13,7 %) exposed to 8 substances (2/3 of exposures): mineral oils, benzene, perchloroethylene, trichloroethylene, asbestos, wood dust, diesel exhaust, crystalline silica
 - 370,000 workers (2%) exposed to mutagens/reprotoxicants
 - 70% of the exposed are blue-collar workers
 - 20% in industry and health care
 - 10% of the men exposed to wood dust once at work
- **11,000-23,000 new occ. cancers yearly (4-8.5% of all cancers)**
(INVS 2003, French initiative against occupational cancer 2007)

Occupational exposure to carcinogens: Gender issues

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- Estimates that 1% of cancers in women is work-related are based on research in the 70s among men
- ⇒ *Do not reflect changes in the participation of women in the labour market!*
- **Need for gender-specific occupational cancer research:**
 - **Gender differences in** metabolism, genetics, and other biological factors
 - **Gender differences in** jobs and tasks **within similar jobs**
 - **Risks of gynaecological cancers cannot be studied among men**
 - **Participation in** recently developed industries (e.g. semiconductor industry) **not previously studied**
 - **Possible exposure and** modifying factors from home responsibilities

Nanoparticles (NPs) (MV=4.50)

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- NPs have different properties than materials at the macro scale.
- NPs can enter the human body and translocate to organs/ tissues distant from the entry point
- The degree of damage they can cause is still unknown and is very specific to the type of NP.
- Safety concerns about catalytic effects or fire and explosion
- No official data on the number of workers exposed to NPs
 - about 24,400 were in companies working only with nanotechnology in 2004.
- Expected to grow rapidly
 - by 2014, 15% of manufactured products would contain NPs
 - and 10 million jobs worldwide involved in NP manufacturing
- ☞ Need to determine the physicochemical, toxicological and behavioural properties of each NP type
- ☞ To develop reliable methods for their detection and measurement in the environment and in the human body

Poor management of chemical risks in SMEs (MV=4.39)

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- 99.8% of enterprises are SMEs (EU-25, 2003)
- Employ 66% of EU private sector workforce.
- Poorer OSH situation in SMEs:
 - 82% of reported occupational injuries
 - fatal accident rate in micro and small companies 2x higher
- CMRs in France: 20% of micro enterprises assess risks, 38% of small companies, 57% of medium companies, and 67% of companies with > 200 workers.
- Lack of awareness/internal expertise on OSH risks and legislation; of time/resources; poor contact with OSH bodies, internal consultation and information/training to workers
- ☞ SMEs want to be told exactly how to control chemicals so as to meet all regulatory requirements
- ☞ Easy-to-use instruments to assess chemical risks exist – they need to be shared and made available/known to SMEs
- ☞ Need to make SMEs' owners aware that OSH is worth it.

Epoxy resins (MV=4.14)

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- **Continuous demand for epoxy resins with enhanced properties may introduce unknown adverse health effects**
 - **E.g. in manufacture of adhesives, paints, coatings, reinforced polymer composites, in construction, electronics industry, manufacturing of composite products**
- **Major cause of occupational allergic contact dermatitis**
- **Also reported: skin sensitisation, irritation of the eyes and respiratory tract, contact urticaria, rhinitis and asthma**
- **May be caused by the uncured epoxy resins or by curing agents, diluents and other constituents**
 - **Epichlorohydrin « carcinogenic category 2 » by EU**
 - **Bisphenol A: allergic contact dermatitis, weak estrogenic**

Chemical substances in waste treatment (MV=4.11)

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- **One of the most hazardous occupations**
- **Illness rate 50% higher than in other sectors**
- **Waste regulations primarily for environmental purposes**
- **High level of dust and up to 100 VOCs found**
- **Growing amount of waste in the EU – largest volume from manufacturing, construction, demolition, mining**
- **Electrical/electronic equipment and end-of-life vehicles increasingly recycled: contain lead, cadmium, mercury, PCBs**
- **Most efficient measure is to reduce the generation of dust, aerosols and VOCs**
- **Technical collective measures and hygiene plans**
- **Prevention measures to be adapted to the specificity of the waste and treatment activity**

Dermal exposure and skin diseases (MV=4.11)

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- **2nd most common occupational disease in EU – after MSDs**
- **Contact dermatitis the most common**
 - also chemical burns, contact urticaria, photodermatitis, contact leukoderma, infectious dermatitis, skin cancer
- **Chemicals responsible for 80-90% of work-related skin disorders – incl. soaps, detergents, solvents, fragrances**
- **Not only hands exposed – other skin parts exposed to airborne substances or touched with dirty hands**
- **No validated method to assess dermal exposure**
- **Lack of data on health effects and dose-effect relationship**
- **Combined exposures (incl. humidity factor), repeated exposure, exposure to diluted preparations, etc. to be considered**
- **No « dermal OELs » available**
- **Gloves not (always) a solution: occlusive, wet atmosphere inside**
- **Identification and control of risk factors very important**

Diesel exhaust (MV=4.02)

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- 3.1 million workers in EU-15 exposed > 75% of the time early 90s (CAREX)
- 4th most common carcinogen in the workplace
- Found in many occupations, from mining to driving diesel-fueled trucks, forklifts, etc.
- Complex mixture of particles and gases, mainly:
CO, CO₂, NO₂, NO, SO₂, particulate matter
- IARC classification: « probably carcinogenic to humans » (group 2A)
- Positive association with lung cancer suspected Link with non-cancer lung damages also found
- Need for more research into health effects

Man-made mineral fibres (MMMMF) (MV=3.96)

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- Size linked to toxicity but not well measured by standard methods
- Specific MMMF sizes suspected of biological activity - need epidemiological data
- Increase inflammatory, cytotoxic, carcinogenic potential
- Possible oxidising stress of the cells for repetitive exposures
- MMMF composition continuously evolving - no toxicological data
- Some contain up to 25% additives - rarely taken into account
- Need for research on toxicity of EU unclassified fibres
- High exposure risk when laying, maintaining, removing fibre-based products
- Study by Afsset in France:
 - No specific code/labelling clearly indicating RCFs in items
 - Some companies unaware of the fibres' nature in what they buy
 - Most of them don't evaluate workers' exposure

Follow-up activities to the forecast

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- Literature review on nanoparticles (published)
- Policy and practices overview on skin diseases (published)
- Literature review on noise & ototoxic substances (on-going)
- Policy and practices overview + literature review on carcinogens (on-going)
- Review of national OELs for CMRs (on-going)
- Data collection on the waste treatment sector (on-going)
- Risk perception and risk communication on nanotechnologies (2010)
- Large-scale foresight on OSH risks linked to technological innovations (2009-2011)
- Workshop on CMRs (2010)

All this information is available from the ERO website

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Anticipating change

European Risk Observatory



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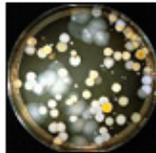
More and more people face psychosocial risks at work



Precarious contracts and work intensification, high emotional violence and a poor work-life balance can lead to **work-related stress** that **affect workers' health and safety**. Read the new report on psychosocial risks that put EU workers in danger.

- [Learn more about stress at work](#)
- [Read the press release on psychosocial risks](#)

Nanotechnologies and Occupational Health and Safety



The rapid growth of nanotechnology (leading to the development of new materials, devices and processes) is outstripping our understanding and knowledge of the occupational health risks associated with manufacturing and using nanomaterials. Exposure to these materials during manufacturing and use may occur through inhalation, dermal contact and ingestion. Occupational health risks associated with manufacturing and using nanomaterials are not yet clearly understood.

See the Agency's collection of [recent research information on nanotechnologies and possible impacts on workplaces](#)

New biological threats in European working environment



Several thousand fatalities in the EU are due to work-related infectious diseases. However, many biological risks remain poorly assessed at workplace level. Read the new report on emerging biological risks that are most likely to affect EU workers.

- Read the [press release on new biological threats](#)
- Read the [expert forecast on emerging biological risks](#)

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Thank you for your attention!

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