**Objectives** To depict the present situation regarding ENM-workers medical and epidemiological surveillances in France and discuss its advancement.
**Methods** During 2008–2010 the InVS conducted an exploratory study based on in site visits of French facilities using/producing ENM with aim to explore the ENM exposure circumstances, ENM-workers medical surveillance and other epi-surveillance development prerequisites. This "field" information was completed with systematic scientific and statutory bibliography reviews and discussions within two working groups. One included scientists from the French Institute for Public Health Research (IReSP) and focused the epi-surveillance development aspects, while another included physicians from the Occupational medical inspection department at the Ministry of Labour and focused medical surveillance aspects.
**Results** Since neither epidemiologic nor individual medical surveillance existed specifically for ENM-workers despite a likelihood of exposure in some facilities, InVS developed a protocol for an integrated surveillance system of French workers potentially exposed to ENM. It consists of a multi-step methodology starting with an ENM-exposure registry. ENM-workers will be identified using a 3-level approach: 1-selection of companies concerned with ENM exposure (based on questionnaire and compulsory declaration), 2-in site exposure assessment and identification of the job/tasks with ENM exposure (based on job-exposure-matrix construction, further supplemented with measurements), and 3-registration of ENM-workers (based on inclusion criteria and additional self-questionnaire). The registration is planned for three years focusing two ENM, carbon nanotubes and nano-$TiO_2$. The two corresponding prospective cohorts will pursue epidemiologic surveillance objectives and serve as a basis for performing cross-sectional/panel studies with specific research objectives.
**Conclusion** The French ENM-workers surveillance is actively developing. Companies and workers inclusion questionnaires are designed and protocol is operational for starting in early 2013, after approval from national ethical committees (still awaited). The results coming from the first six-month operation should be informative in terms of data quality, numbers of facilities and workers with ENM-exposure likelihood.

# Session: Mini symposium II: Occupational cancer in Europe (SHECAN)

## 190 SHECAN - METHODOLOGY FOR EXPOSURE ASSESSMENT: MAKING THE MOST OF LIMITED DATA

[1]MG N Gorman Ng, [1]van Tongeren, [2]Hutchings, [3]Mistry, [3]Corden, [1]Lamb, [1]Sanchez-Jimenez, [1]Shafrir, [3]Sobey, [2]Rushton, [1]Cherrie. *[1]Institute of Occupational Medicine, Edinburgh, United Kingdom; [2]Department of Epidemiology and Biostatistics, Imperial College London, London, United Kingdom; [3]AMEC, London, United Kingdom*

10.1136/oemed-2013-101717.190

**Introduction** The prevalence and level of exposure for each assessed agent was estimated for every European member state and relevant industry. These estimates provided the basis for the heath impact assessment. Detailed exposure data were unavailable for many member states and industries. The strategies used to create these estimates using limited available data will be discussed using the estimates produced for respirable crystalline silica (RCS) as an example.
**Methodology** For 18 out of 25 assessed agents data from the CAREX project were used to estimate exposure prevalence. The proportion of exposed workers in each industry was averaged across countries for which data from 2000 or later were available. The average proportion was multiplied by the number of employees in the industry in each of the remaining member states in 2006 (from the Structural Business Statistics and Labour Force Survey available from EUROSTAT) to estimate the number of exposed workers. For agents that were not included in CAREX, exposure prevalence was estimated using data from trade associations and other stakeholders; from available exposure databases; or by assuming that all workers in exposed industries were exposed.

The level of exposure was assessed using data from the published scientific literature, European Risk Assessment Reports, exposure databases, and trade associations. Industries were classified as high, medium or low exposure and a representative geometric mean (GM) and geometric standard deviation (GSD) was selected for each "medium" and "high" exposure industry. The overall weighted GM and GSD for each substance was estimated across all medium/high exposed industries with Monte Carlo simulation.
**Discussion** Due to limited data availability, estimates were conservative in every instance. Had more data been available both the prevalence and exposure level estimates may have been lower, demonstrating the need for exposure measurement data from industry to be made available for research.

## 191 SHECAN - METHODOLOGY FOR THE HEALTH IMPACT ASSESSMENT: THE STRENGTHS AND WEAKNESSES OF THIS APPROACH

L Rushton, Hutchings. *Imperial College London, London, United Kingdom*

10.1136/oemed-2013-101717.191

**Objective** To provide current estimates of occupational cancers in the EU associated with the relevant substances and future trends under different scenarios of change of exposure; these data provide the input into the socioeconomic assessment.
**Methods** We calculated attributable fractions together with numbers of deaths and cancer registrations, Disability Adjusted Life Years (DALYs) and Years of Life Lost using risk estimates from published literature and national data sources to estimate proportions exposed.
**Results** More than 1,000 attributable cancers were estimated to occur in the next 60 years for each of eleven substances if no action is taken; total estimated attributable deaths over this period were >700,000. Respirable crystalline silica (RCS) and diesel engine exhaust were particularly important giving an estimated 470,000 and 430,000 incident cancers between 2010 and 2069. There were only seven substances or mixtures where there was a health benefit in terms of avoided cancer cases over the 60 years from introducing an OEL giving between 0.2% and 39% reduction in deaths from the baseline estimate. The largest benefits arise from the introduction of OELs for RCS, hardwood dust, hexavalent chrome and rubber fume. The highest percentage reduction in incident cases was for the OEL for rubber fume (39%), followed by hardwood dust at 1 mg/$m^3$ (28%) and RCS at 0.05 mg/$m^3$ (23%).
**Conclusions** Assumptions made in our methodology and uncertainties and inaccuracies in the data may have introduced biases into our estimates. Potential sources of bias include

inappropriate choice of risk estimates, imprecision in the risk estimates and estimates of proportions exposed, inaccurate risk exposure period and latency assumptions and a lack of separate risk estimates in some cases for women and/or cancer incidence. However, the results form a robust basis on which to carry out a socio-economic comparison of the health benefits and costs of compliance.

## 192 MINISYMPOSIUM OF THE SHECAN PROJECT - METHODOLOGY FOR THE SOCIO-ECONOMIC ASSESSMENT: A USEFUL WAY TO ASSESS PRIORITIES?

[1]D Corden, [1]Mistry, [2]Hutchings, [3]Gorman Ng, [3]Van Tongeren, [3]Lamb, [3]Sanchez-Jimenez, [3]Shafrir, [1]Sobey, [2]Rushton, [3]Cherrie. *[1]AMEC Environment & Infrastructure UK Limited, London, United Kingdom; [2]Department of Epidemiology and Biostatistics, Imperial College, London, United Kingdom; [3]IOM, Edinburgh, United Kingdom*

10.1136/oemed-2013-101717.192

**Objectives** To assess potential compliance costs and socio-economic benefits of potential future changes to the Carcinogens Directive for 25 substances.

**Methods** Drawing upon estimates of occupational exposure and health impact assessment, economic impacts of exposure due to disability and death were estimated under a 'do nothing' scenario. The value of disability and deaths avoided through possible reduced workplace concentrations were estimated based on value of life years lost, cost of illness and willingness to pay to avoid cancer.

Compliance costs of meeting possible amendments to the directive (stricter occupational exposure limits) based on the likely risk management measures needed in the workplace, were estimated for each relevant industry sector. This allowed key costs and benefits to be compared.

**Results** It was possible to quantitatively estimate both compliance costs and benefits in terms of reduced cancer impacts for around half of the 25 substances. These, along with other socio-economic indicators of the potential impacts of further controlling workplace exposure were presented in a form intended to be compatible with an EU "Impact Assessment", which is required for any major new change in policy.

There are substantial uncertainties in any assessment such as this, including in approaches and data for valuing health impacts; numbers of people/firms affected; compliance methods and associated costs; amongst others.

**Conclusions** Assigning monetary values to the avoidance of cancer (and other health and environmental impacts) remains a controversial area. Nonetheless, the data developed during this study at least provide indications of the relative merits of targeting certain substances over others for possible future workplace exposure limits, based on a comparison of cancer avoided (and associated socio-economic benefit) with the compliance costs for affected industry. Given the large methodological uncertainties involved, the results are of most use in cases where the difference between costs and benefits is most pronounced.

## 193 SHECAN - PRIORITISING ACTION ON OCCUPATIONAL CARCINOGENS IN EUROPE

[1]J W Cherrie, [2]Hutchings, [1]Gorman-Ng, [3]Mistry, [3]Corden, [1]Lamb, [1]Sanchez-Jimenez, [1]Shafrir, [3]Sobey, [1]Van Tongeren, [2]Rushton. *[1]Institute of Occupational Medicine, Edinburgh, United Kingdom; [2]Imperial College, London, United Kingdom; [3]AMEC, London, United Kingdom*

10.1136/oemed-2013-101717.193

**Introduction** In Europe the main legislation to ensure control of occupational carcinogens is Directive 2004/37/EC on the Protection of Workers from the Risks Related to Exposure to Carcinogens or Mutagens at Work. The EC DG Employment sponsored a socioeconomic, health and environmental analysis of possible changes to the Directive. This paper provides the background to the project and a broad overview of results.

**Methods** The project involved collecting available information about the circumstances of exposure for 25 substances. These data were used to assess the exposures, which in turn provided the basis for assessing the cancer burden from past and future use. Health costs and benefits were evaluated for no intervention and for the introduction of up to three possible Occupational Exposure Limits (OELs). Compliance costs were separately estimated.

**Results** Eleven of the substances were human carcinogens, four were probably carcinogenic and ten were possible human carcinogens. For six substances, there are more than a million workers in the EU currently exposed and for six substances there are less then 10,000 exposed. If there is no action, it was estimated there would be more than attributable 700,000 cancer deaths over the next 60-years. However, there were only seven substances-OEL combinations where there was a substantial health benefit from introducing or reducing an OEL at the levels assessed. In general, total compliance costs were greater than monetized health benefits, mainly because of the delay in accruing benefits because of latency and the monetary value of these benefits being discounted in the calculation.

**Discussion** The strongest cases for the introduction of an OEL are for: RCS, chrome VI and hardwood dust. Other substances where the weight of evidence supports the introduction of a limit include: diesel engine exhaust emissions, rubber fume, benzo[a]pyrene, trichloroethylene, hydrazine, epichlorohydrin, o-toluidine, used engine oil and MDA.

## 194 SHECAN - HEALTH AND SOCIO-ECONOMIC IMPACTS FOR CHANGES TO THE CARCINOGEN DIRECTIVE FOR SOME PROCESS GENERATED SUBSTANCES

[1]M J A van Tongeren, [2]Hutchings, [1]Gorman Ng, [3]Mistry[1], [3]Corden, Lamb, [1]Sanchez-Jimenez, [1]Shafrir, [3]Sobey, [2]Rushton, [1]Cherrie. *[1]Institute of Occupational Medicine, Edinburgh, United Kingdom; [2]Imperial College, London, United Kingdom; [3]AMEC, London, United Kingdom*

10.1136/oemed-2013-101717.194

**Objectives** To determine the health and economic impacts of introducing some process generated substances in the Carcinogen Directive.

**Methods** Health and economic impacts were estimated for introducing new OELs (diesel engine exhaust-DEE, silica, and rubber dust and fumes) or for applying best practice (mineral oils). Avoidable cancer cases and deaths were estimated for the year 2060, and monetized health benefit and cost for controlling exposure were compared.

**Results** The estimated health impact and associated cost for introducing a OEL for DEE100 mg EC/$m^3$ was insignificant as, apart from in underground mines, only a small percentage of the EU workforce is currently exposed to higher levels. For silica, the impact of introducing new OELs of 0.05, 0.1 and 0.2 mg/$m^3$ was estimated. The number of lung cancer deaths avoided was approximately 5300, 4900 and 4000, respectively. Associated net monetized health benefit was €28–74bn, €26–68bn and €21–56bn, respectively. Estimated cost for