Occupational burden of disease studies to identify priorities for regulatory interventions, and to estimate the impact of these interventions, are becoming more frequent. There are various ways to estimate burden of disease in a population, each method's appropriateness depends on available data and the research question to be answered. We review the available methods, and assess their usefulness for predicting future occupational disease burden and for testing population-level interventions.

There are several approaches to disease burden estimation: Population Attributable Fraction (PAF) applied to incident or prevalent disease cases, Lifetime Risk/Future Excess Fraction and Disease Projection (Age-Period-Cohort and structural model/'g' formula) approaches. The PAF takes into account past exposures, with intervention effects estimated from the point of intervention onwards. Lifetime risk estimates disease that workers, currently exposed to a disease-causing agent, will contract in their lifetimes; no latency assumptions are required, with interventions assumed to take effect immediately. Disease projection methods use current and past disease rates to predict rates into the future. The 'g-formula', a generalised regression model, is used to estimate the joint distribution of outcome and risk factors; Monte Carlo methods can then simulate disease risk following intervention, compared to no intervention. The methods are tested on examples of occupational disease/exposure pairings, including lung cancer from respirable crystalline silica exposure and COPD from vapour, gases, dust and fume exposure, and results are compared.

The results will provide critical information on the sensitivity of some examples of occupational burden of disease and health impact studies on the modelling approach.

Poster Presentation

Respiratory

0367 THE DIAGNOSIS OF PNEUMOCONIOSIS USING GAS CHROMATOGRAPHY/MASS SPECTROMETRY

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Breath metabolites could reflect pathogenic events at the respiratory level and might be used to screen for the presence of occupational environmental lung diseases. The objective of this study was to estimate the accuracy of breath analysis for the diagnosis of pneumoconiosis using gas chromatography/mass spectrometry (GC/MS). A prospective study was design. We screened 200 subjects from a cohort of stone workers and their family members. Diagnosis of pneumoconiosis was made based on occupational history, the presence of abnormal pulmonary function, and parenchymal abnormalities consistent with pneumoconiosis on chest X-rays. After excluding subjects with asthma and those using steroids or taking nonsteroidal anti-inflammatory drugs on the examination day, we conducted a case-control study that

enrolled 25 cases of pneumoconiosis and 154 controls. Breath and environmental air samples were collected and analysed by GC/MS. After subtraction of environmental volatile organic compounds (VOCs), the concentrations of VOCs in breath were used to discriminate between pneumoconiosis and controls. The discrimination accuracy was validated by both leave-one-out cross-validation and 5-fold cross-validation. The results showed that 94.4% of subjects were accurately classified and the cross-validated accuracy was 88.8%. The area under curve (AUC) for the diagnosis of pneumoconiosis was 0.9 (95% CI=0.8–1.0). Mean AUC of 5-fold cross-validation was 0.9. Breath test might have potential in the screening for pneumoconiosis; however, a multi-centre study is warranted to establish a reliable model and all procedures must be standardised before clinical application.

Oral Presentation

Methodology

0368 IMPROVING INCIDENCE RATES OF WORK-RELATED ILL-HEALTH CALCULATED FROM GENERAL PRACTICE

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Introduction The calculation of incidence rates of work-related ill-health (WRIH) is essential when assessing employment sectors at risk. The Health and Occupational Reporting network in General Practice (THOR-GP) collects information on WRIH from approximately 250 GPs. To calculate rates, GP numerator data has to be divided by a compatible denominator.

Aims To formulate the best methods of determining incidence rates from THOR-GP data

Methods The THOR-GP denominator is the registered population of all participating GPs' practices. Census data linked to practice postcodes were used to establish how the population was employed; practice list data were used to estimate the size of the population and adjusted for GP participation. Numerator data (incidence cases of WRIH) from 2006–2015 were adjusted for response rates and time sampling frequency. Numerator data were then divided by the denominator and rates calculated per 1 00 000 persons employed per annum

Results The incidence rate of WRIH (from 6491 numerator cases) was 1350 per 1 00 000 persons employed per annum. Musculoskeletal disorders had the highest rates (640) followed by mental ill-health (516). Rates for musculoskeletal disorders were highest in agriculture (2232) and construction (1048) and for mental ill-health, in financial services (1113) and public administration/defense (1124).

Conclusion All employed persons have access to a GP therefore calculating incidence rates from GP data allow identification of industries/occupations at higher risk of WRIH Using postcode-based census data to characterise the denominator (therefore specifically related to the numerator) enables rates to be calculated with greater accuracy compared with using national employment data.