

# EXPOSURE-RESPONSE RELATION FOR OCCUPATIONAL EXPOSURE TO RESPIRABLE QUARTZ AND LUNG CANCER RISK: PERFORMANCE OF A QUANTITATIVE VS A SEMI-QUANTITATIVE JOB-EXPOSURE MATRIX

Susan Peters,<sup>1</sup> Roel Vermeulen,<sup>1</sup> Lutzen Portengen,<sup>1</sup> Ann Olsson,<sup>2</sup> Heinz-Erich Wichmann,<sup>3</sup> Irene Brüske,<sup>3</sup> Dario Consonni,<sup>4</sup> Andrea Cattaneo,<sup>4</sup> Pier Alberto Bertazzi,<sup>4</sup> Jack Siemiatycki,<sup>5</sup> Lorenzo Richiardi,<sup>6</sup> Dario Mirabelli,<sup>6</sup> Lorenzo Simonato,<sup>7</sup> Per Gustavsson,<sup>8</sup> Karl-Heinz Jöckel,<sup>9</sup> Wolfgang Ahrens,<sup>10</sup> Hermann Pohlabein,<sup>10</sup> Paolo Boffetta,<sup>11</sup> Paul Brennan,<sup>2</sup> Francesco Forastiere,<sup>12</sup> Isabelle Stücker,<sup>13</sup> Simone Benhamou,<sup>14</sup> Bas Bueno-de-Mesquita,<sup>15</sup> Nils Plato,<sup>8</sup> Jérôme Lavoué,<sup>5</sup> Dirk Dahmann,<sup>16</sup> Joelle Fevotte,<sup>17</sup> Benjamin Kendzia,<sup>18</sup> Raymond Vincent,<sup>19</sup> Barbara Savary,<sup>19</sup> Domenico Cavallo,<sup>20</sup> Beate Pesch,<sup>18</sup> Thomas Brüning,<sup>18</sup> Kurt Straif,<sup>2</sup> Hans Kromhout<sup>1</sup> <sup>1</sup>IRAS, Utrecht, The Netherlands; <sup>2</sup>IARC, Lyon, France; <sup>3</sup>Institut für Epidemiologie, Neuherberg, Germany; <sup>4</sup>University of Milan, Milan, Italy; <sup>5</sup>University of Montreal, Montreal, Canada; <sup>6</sup>University of Turin, Turin, Italy; <sup>7</sup>University of Padova, Padova, Italy; <sup>8</sup>Karolinska Institutet, Stockholm, Sweden; <sup>9</sup>University of Duisburg-Essen, Duisburg-Essen, Germany; <sup>10</sup>Bremen Institute for Prevention Research and Social Medicine, Bremen, Germany; <sup>11</sup>The Tisch Cancer Institute, New York, France; <sup>12</sup>Department of Epidemiology, Rome, Italy; <sup>13</sup>INSERM, Villejuif, France; <sup>14</sup>INSERM, Paris, France; <sup>15</sup>RIVM, Bilthoven, The Netherlands; <sup>16</sup>IGF-BG, Bochum, Germany; <sup>17</sup>InVS, St Maurice, France; <sup>18</sup>IPA, Bochum, Germany; <sup>19</sup>INRS, Nancy, France; <sup>20</sup>Università degli Studi dell'Insubria, Como, Italy

10.1136/oemed-2011-100382.154

**Objectives** In order to estimate the exposure-response relation of respirable quartz and lung cancer risk, we developed a quantitative time/job/region specific job-exposure matrix (JEM) based on statistical modelling of historical exposure data. We compared the performance of this quantitative JEM (SYN-JEM) with an already available semi-quantitative general population JEM (DOM-JEM) within a study of pooled community-based lung cancer case-control studies (SYNERGY).

**Methods** Detailed lifetime occupational and smoking history was available for 13 259 cases and 16 232 controls from 11 case-control studies from 12 European countries and Canada. Occupational histories were linked with SYN-JEM and DOM-JEM to derive estimates of cumulative exposure. ORs for lung cancer were estimated using unconditional logistic regression adjusted for age, gender, study, cigarette pack-years, time-since-quitting smoking, and ever occupational exposure to five other known lung carcinogens.

**Results** Exposure to respirable quartz was associated with a monotonic increase in risk of lung cancer. Cumulative exposure estimates based on the quantitative SYN-JEM ranged from 0.005 to 104 mg/m<sup>3</sup>-years. Quartiles of cumulative exposure (categorised using the exposure distribution among

exposed controls) showed significant elevated risks ranging from 1.16 to 1.40. SYN-JEM did not perform better than the ordinal DOM-JEM which provided similar ORs.

**Conclusions** We found a positive exposure-response association between occupational exposure to respirable quartz and lung cancer in a large pooled community-based case-control study. A semi-quantitative approach showed similar results as the quantitative exposure assessment approach except that with the latter risk can be expressed in terms of mg/m<sup>3</sup> quartz years, which would facilitate quantitative risk-assessment.