**Occupational Burden of Idiopathic Pulmonary Fibrosis (250 word edition)**

Idiopathic pulmonary fibrosis (IPF) is a diagnosis of exclusion. It is made in the presence of a usual interstitial pneumonitis (UIP) pattern on high resolution CT scan or biopsy. The diagnosis requires that known causes of interstitial lung disease (such as drug toxicity, connective tissue disease, domestic, and occupational or environmental exposures) be excluded.[1]

We identified four review articles covering occupational exposures in IPF [2-5] by searching for articles that cited relevant case-control studies. One review performs a meta-analysis of six case-control studies and reports population attributable risk percentages for agriculture and farming (20.8%), livestock (4.1%), wood dust (5%), metal dust (3.4%), stone/sand/silica (3.5%), and smoking (49.1%). [4]

We found (as of May 2017) 14 case-control studies looking at occupational exposures in IPF (table 1); the most recent review article covers only eight of them. Associations with metal, wood, silica, and agricultural dust are most commonly reported. [6-19]

Two investigators independently reviewed and abstracted data for five exposure categories

common to the identified case-control studies: “vapors, gases, dusts, and/or fumes (VGDF),” “metal dust,” “wood dust,” “silica dust,” and “agricultural dust”. We calculated PAF as follows: PAF=pc(OR – 1)/OR, where pc is the proportion of cases exposed and OR is the odds ratio. We calculated pooled OR and pooled PAF for occupational exposures using Stata. 43 risk estimates from 14 publications (2027 IPF cases in total) were used. Each exposure category was assessed with 6-11risk estimates. Pooled ORs were significantly elevated for each category; the pooled PAF estimates by category ranged from 4-14% (Table 2).

Table 1: Summary of IPF case-control studies investigating occupational exposures.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Reference  Author year  (n cases) | OR; 95% CI | | | | | PAF | | | | | IPF Case Definition Criteria | | Exposure Measure |
|  | vgdf\* | metal | wood | ag | silica | vgdf\* | metal | wood | ag | silica | |  |  |
| Scott 1990  (40)\* | 1.3; 0.8, 2.0 | 11.0; 2.3, 52 | 2.9; 0.9, 9.9 | 10.9; 1.2, 96 | 1.6;  0.5,  4.8 | 17 | 12 | 10 | 12 | 15 | | clinical assessment, CXR, pulmonary function | questionnaire |
| Iwai 1994  (86) |  | 1.3;  1.1,  1.6 |  | 3.0;  1.3,  7.4 |  |  |  |  |  |  | | clinical assessment, CXR or CT, pulmonary function | questionnaire |
| Iwai 1994  (615) | 2.0; 1.2, 3.1 |  |  |  |  |  |  |  |  |  | | autopsy | job group |
| Hubbard 1996  (218) |  | 1.7;  1.1,  2.7 | 1.7;  1.0,  2.9 |  | 1.8;  1.0,  3.1 |  | 10 | 6 |  |  | | clinical assessment, CXR or CT, pulmonary function | questionnaire and telephone interview |
| Mullen 1998  (15) | 2.4;  0.7,8.4 |  | 3.3;  0.4,  25.8 |  | 11;  1.1,  115 | 23 |  | 7 |  | 20 | | clinical assessment, lung biopsy or CT | questionnaire |
| Baumgartner 2000  (248) |  | 2.0;  1.0,  4.0 | 1.6;  0.8,  3.3 | 1.6;  1.0,  2.5 | 3.9;  1.2,  12.7 |  | 5 | 3 | 7 | 3 | | clinical assessment, lung biopsy or BAL, CT | telephone interview |
| Hubbard 2000  (22) |  | 1.1;  0.4,  2.7 |  |  |  |  | 5 |  |  |  | | death certificate diagnosis | job group |
| Miyake 2005  (102) |  | 9.6;  1.7,  181.1 | 6.0;  0.3,  112.4 |  | 1.8;  0.5,  7.0 | 26 | 11 | 4 |  | 11 | | clinical assessment, lung biopsy or BAL, CT | questionnaire |
| Gustafson 2007  (140) | 1.1;  0.7,  1.7 | 0.9;  0.5,  1.6 | 1.2;  0.7,  2.2 |  | 1.4;  0.7,  2.7 | 6 |  | 3 |  | 10 | | pulmonary fibrosis of unknown aetiology + requiring LTOT | questionnaire |
| Garcia-Sancho Figueroa 2010  (97) | 1.2;  0.8,  1.9 |  |  |  |  | 9 |  |  |  |  | | clinical assessment, CT +/- lung biopsy | questionnaire |
| Garcia-Sancho 2011  (100) | 2.8;  1.5,  5.5 |  |  |  |  | 5 |  |  |  |  | | clinical assessment, CT +/- lung biopsy | questionnaire |
| Awadalla 2012  (201) |  | 1.6;  0.7,  3.6 | 2.7;  1.1  6.8 | 1.3;  0.7,  2. | 1.1;  0.5,  2.7 |  | 6 | 7 | 7 | 13 | | clinical assessment, CT, pulmonary function | questionnaire |
| Paolocci 2013 (abstract only)  (65) |  | 2.8;  1.1,  7.2 |  |  | 2.0;  0.9,  4.4 |  | 9 | 2 |  | 22 | | clinical assessment and CT | questionnaire |
| Koo 2017  (78) | 2.7;  0.7,  10.9 | 5.0;  1.4,  18.2 | 2.5;  0.5,  12.3 |  | 1.2;  0.4,  3.8 | 35 | 22 | 5 |  | 27 | | clinical assessment, CT +/- lung biopsy | interview |

\*vapors, gases, dust, fumes.

Table 2: Pooled estimates of occupational contributions to IPF. CI = confidence

interval; OR = odds ratio; PAF% = population attributable fraction, expressed as a

percentage.

|  |  |  |  |
| --- | --- | --- | --- |
| Exposure | Risk estimates (n) | Pooled OR (95% CI) | Pooled PAF (95% CI) |
| VGDF\* | 8 | 1.7 (1.3-2.4) | 14 (12-17) |
| Metal dust | 10 | 1.7 (1.3-2.4) | 8 (6-10) |
| Wood dust | 11 | 1.7 (1.3-2.2) | 4 (3-5) |
| Agricultural dust | 6 | 1.8 (1-3.1) | 8 (5-10) |
| Silica dust | 9 | 1.7 (1.3-2.3) | 7 (5-9) |

\*vapors, gases, dust, fumes.

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