## APPENDIX A – Studies included in the meta-analysis by study design

### 1. Cohort studies

<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Region</th>
<th>Outcome</th>
<th>Study years (enrolment)</th>
<th>Study population</th>
<th>Reference population</th>
<th>Exposure data source</th>
<th>Exposure variable</th>
<th>Outcome data source</th>
<th>Total # subjects incl.</th>
<th># Subjects excl.</th>
<th>Duration of employment (Years)</th>
<th>Age at hire</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aronson KJ, et al</td>
<td>1994</td>
<td>Canada (Toronto)</td>
<td>SMR</td>
<td>1950-89</td>
<td>49</td>
<td>Toronto area firefighters</td>
<td>Ontario male population</td>
<td>Years of exposure</td>
<td>DC</td>
<td>5414</td>
<td>476 (10.4% of initially eligible total)</td>
<td>Min 0.5 Max 55 Mean 25</td>
<td>Min 16 Max 62 Mean 25</td>
<td>SMRs by years since first exposure/years of employment/age specific</td>
</tr>
<tr>
<td>Baris D, et al</td>
<td>2001</td>
<td>USA (Philadelphia)</td>
<td>SMR</td>
<td>1925-86</td>
<td>61</td>
<td>Philadelphia fire department firefighters</td>
<td>Internal comparison US white male population</td>
<td>Number of runs, duration of employment</td>
<td>VS NDI PR DC others</td>
<td>7789</td>
<td>722</td>
<td>Min &lt;1 Max 48 Mean 18</td>
<td>Min 16 Max 63 Mean 27</td>
<td>lagged analysis exposure # firefighter runs</td>
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<tr>
<td>Bates M, et al</td>
<td>2000</td>
<td>New Zealand</td>
<td>SIR</td>
<td>1977-95</td>
<td>I: 21 M:18</td>
<td>Full-time paid firefighters</td>
<td>New Zealand population</td>
<td>Duration of employment</td>
<td>NZ health information service</td>
<td>4221</td>
<td>53 (3.2% of IET)</td>
<td>Min 1 Max 41 Mean 15.9</td>
<td>NS</td>
<td>Variation over time</td>
</tr>
<tr>
<td>Beaumont J, et al</td>
<td>1991</td>
<td>USA (SanFrancisco)</td>
<td>Mortality (RR)</td>
<td>1940-70</td>
<td>30</td>
<td>White male firefighters of the San Francisco fire department</td>
<td>US white male</td>
<td>Duration of employment</td>
<td>DC PSR municipal ERR, mortality linkage system</td>
<td>3066</td>
<td>NS</td>
<td>Min 3 Max 30</td>
<td>NS</td>
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<table>
<thead>
<tr>
<th>Reference</th>
<th>Year</th>
<th>Country</th>
<th>Methodology</th>
<th>Population A</th>
<th>Population B</th>
<th>Duration</th>
<th>Occupation</th>
<th>Analysis Method</th>
<th>Cancer Surveillance System</th>
<th>Min</th>
<th>Max</th>
<th>10 year lagged analysis</th>
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<tbody>
<tr>
<td>Demers PA, et al</td>
<td>1992</td>
<td>USA (Seattle, Tacoma, WA)</td>
<td>SIR SMR</td>
<td>1945-89</td>
<td>15 Male firefighters</td>
<td>1) male graduate of Seattle police academy 2) Tacoma policemen employed btw 1944-79 3) local male population</td>
<td>FDER</td>
<td>occupation</td>
<td>Cancer surveillance system of Fred Hutchinson Cancer Research Center</td>
<td>2447</td>
<td>120(4.7% of IET)</td>
<td>Min 1 Max 30 NS</td>
</tr>
<tr>
<td>Demers PA, et al</td>
<td>1994</td>
<td>USA (Seattle, Tacoma, Washington)</td>
<td>SIR</td>
<td>1974-89</td>
<td>Male firefighters</td>
<td>1) US white male 2) police officers</td>
<td>FDER</td>
<td>Duration of active duty Duration of employment</td>
<td>DC CR</td>
<td>2447</td>
<td>120(4.7% of IET)</td>
<td>Min 1 Max 30 NS</td>
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<tr>
<td>Deschamps S, et al</td>
<td>1995</td>
<td>France (Paris)</td>
<td>SMR</td>
<td>1977-91</td>
<td>14 Male firefighters</td>
<td>French male population</td>
<td>FDER</td>
<td>Duration of active duty</td>
<td>DC</td>
<td>830</td>
<td>NS</td>
<td>Min 5 Max: NS Mena18 NS</td>
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<tr>
<td>Eliopoulos E, et al</td>
<td>1984</td>
<td>Australia (Western Australia)</td>
<td>SMR SPMR</td>
<td>1939-78</td>
<td>39 Male firefighters</td>
<td>Western Australia males</td>
<td>FDER</td>
<td>Duration of employment Death certificates</td>
<td>990</td>
<td>17</td>
<td>Min &lt;=1 Max 60+ Mean: NS</td>
<td>NS</td>
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<tr>
<td>Feuer &amp; Rosen</td>
<td>1986</td>
<td>USA (New Jersey)</td>
<td>PMR</td>
<td>1974-80</td>
<td>1) male population 2) NewJersey white male population 3) NewJersey white male firemen</td>
<td>FDER</td>
<td>Duration of employment Employment status</td>
<td>VS DC</td>
<td>263</td>
<td>NS</td>
<td>Min 10 Max 25+ Mean: NS</td>
<td>NS</td>
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<tr>
<td>Gallagher RP, et al</td>
<td>1989</td>
<td>Canada</td>
<td>PMR</td>
<td>1950-84</td>
<td>34 Firefighters aged 20+ in BC</td>
<td>BC population</td>
<td>DC</td>
<td>occupation</td>
<td>DC</td>
<td>578075</td>
<td>PMR by age group. Adjusted risk estimate not reported</td>
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<tr>
<td>Giles G, et al</td>
<td>1993</td>
<td>Australia (Melbourne)</td>
<td>iSIR</td>
<td>1917-89</td>
<td>9(80-89) Male firefighters in Melbourne, Australia</td>
<td>Male population in Victoria</td>
<td>FDER union record CR</td>
<td>Duration of employment, time since first employment, age-specific</td>
<td>CR</td>
<td>2865</td>
<td>NS</td>
<td>Min &lt;=15 Max =&gt;30 Mean: NS</td>
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<tr>
<td>Guidotti TL</td>
<td>1993</td>
<td>Canada (Edmonton &amp; Calgary)</td>
<td>SMR</td>
<td>1927-87</td>
<td>40 Urban firefighters in Alberta</td>
<td>Male population in Alberta</td>
<td>FDER</td>
<td>Duration of active duty</td>
<td>DC</td>
<td>3328</td>
<td>135</td>
<td>Min &lt;= 1 Max 40+ Mean:NS</td>
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<tr>
<td>Hansen ES</td>
<td>1990</td>
<td>Denmark</td>
<td>SMR</td>
<td>1970</td>
<td>10 Employed males bw ages of 15-69 reporting occupation of ‘firefighter’ or ‘fireman’ on national census</td>
<td>Male civil servants and salaried employees</td>
<td>NC</td>
<td>Occupation</td>
<td>DC</td>
<td>886</td>
<td>NS</td>
<td>NS</td>
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<tr>
<td>Study</td>
<td>Location</td>
<td>Type</td>
<td>Year Range</td>
<td>Reference Range</td>
<td>Study Population</td>
<td>Occupation</td>
<td>Study Population</td>
<td>DC</td>
<td>Min</td>
<td>Max</td>
<td>Mean</td>
<td>Notes</td>
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<td>-----------------------------------------------------------------------</td>
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<tr>
<td>Lewis SS, et al</td>
<td>USA (LA)</td>
<td>SMR</td>
<td>1940-80</td>
<td>US white male</td>
<td>NS occupation</td>
<td>DC</td>
<td>6772</td>
<td>80</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>Non-comparable exposure or outcome measure - any mention of cancer in DC for firefighters vs. underlying cause of death in DC for national comparison</td>
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<tr>
<td>Ma F, et al</td>
<td>USA</td>
<td>SMR</td>
<td>1972-99</td>
<td>Florida firefighters</td>
<td>Florida general population VS HCFA occupation VS HCFA</td>
<td>DC</td>
<td>5496</td>
<td>5.5%</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>Males and females analyzed separately</td>
</tr>
<tr>
<td>Ma F, et al</td>
<td>USA (Florida)</td>
<td>SIR</td>
<td>1981-99</td>
<td>Florida firefighters</td>
<td>Florida general population VS HCFA occupation VS CR HCFA</td>
<td>DC</td>
<td>36813</td>
<td>6.7%</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>All cancers together and not by site</td>
</tr>
<tr>
<td>Mastromatteo E</td>
<td>Canada (Toronto)</td>
<td>SMR</td>
<td>1918-53</td>
<td>Active and pensioned firemen</td>
<td>Ontario city men DC Occupation DC</td>
<td>1039</td>
<td>High proportion lost to F/U(20%)</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>Number of cases is different in Tables VII (n=6) and XIII (n=11) - In Table II 'unemployed and not in labor force' is 27% of all men but 58% of total cases</td>
</tr>
<tr>
<td>Morton&amp;Mafjanovic</td>
<td>USA</td>
<td>SIR</td>
<td>1963-77</td>
<td>Cancer pts aged 16-74</td>
<td>Regional general population: age up to 67 in Seattle area</td>
<td>CR</td>
<td>HR DC</td>
<td>1678</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>Did not report p values or confidence interval</td>
</tr>
<tr>
<td>Musk AW, et al</td>
<td>USA (Boston)</td>
<td>SMR</td>
<td>1912-72</td>
<td>Male firefighters in Boston, MA 1) white males in US, 2) all males in MA, 3) white males in MA FDERoccupation DC</td>
<td>DC</td>
<td>5655</td>
<td>264(lost to F/U) 194(failed to locate death certificates)</td>
<td>Min 3 Max:NS Mean:NS Min ≤ 20 Max ≥40</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Peterson GR et al</td>
<td>USA (CA)</td>
<td>PMR</td>
<td>1959-61</td>
<td>White male in CA 1959-61</td>
<td>Regional white male population DC</td>
<td>DC</td>
<td>560</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>SIR/SMR by duration of employment latency analysis for some sites</td>
</tr>
<tr>
<td>Tornling G, et al</td>
<td>Sweden (Stockholm)</td>
<td>SIR SMR</td>
<td>1931-83</td>
<td>Stockholm male firefighters</td>
<td>Males in Stockholm county FDER</td>
<td>Number of firefighter run, duration of employment, age-specific CR DC</td>
<td>1116</td>
<td>37(3.2% of IET) Min 1 Max 30+</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
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<tr>
<td>Vena&amp; Fiedler</td>
<td>USA (Buffalo)</td>
<td>SMR</td>
<td>1950-79</td>
<td>White male firefighters in NY</td>
<td>US general population FDER</td>
<td>Duration of employment DC</td>
<td>1867</td>
<td>Min 1 Max 40+ Min ≤24 Max 30+ Mean:NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
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<tr>
<td>Zeegers M, et al</td>
<td>Netherland</td>
<td>Incidence RR</td>
<td>1986-93</td>
<td>Men aged 55-69 in Netherlands</td>
<td>Male population in Netherlands Mailed Qs</td>
<td>occupation CR</td>
<td>830</td>
<td>5% of IET</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

* Abb NS: not stated
NA: not available
IET: Initially eligible total
SMR Standardized mortality ratio
SRR standardized registration ratio
SIR standardized incidence ratio
PMR Proportional mortality ratio
FDER Fire department employment records
DC Death certificates
VS Vital statistics,
NDI national data index,
PR pension record
CR Cancer registry
MR Medical records
PSR personal records
ERR employee retirement records,
ER employment records,
NHS CR National health service central register
NC National census
HR hospital record
Qs self-administered questionnaires
### 2. Case - Control studies

<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Region</th>
<th>Outcome</th>
<th>Study years (enrolment)</th>
<th>Study population</th>
<th>Reference population</th>
<th>Exposure data source</th>
<th>Exposure variable</th>
<th>Outcome data source</th>
<th>Total # subjects incl.</th>
<th># Subject excl.</th>
<th>Case selection method</th>
<th>Control selection method</th>
<th>Control matching criteria/cofactor</th>
<th>Note</th>
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</thead>
<tbody>
<tr>
<td>Delahunt B, et al</td>
<td>1995</td>
<td>New Zealand</td>
<td>Incidence (RR)</td>
<td>1978-86</td>
<td>Male renal cell cancer pts over age of 20</td>
<td>Cancer pts over age of 20</td>
<td>CR</td>
<td>Occupation (~14% missing occupation code)</td>
<td>CR</td>
<td>1060</td>
<td>All cases</td>
<td>random</td>
<td>age, smoke</td>
<td>Assumed that occupation at time of diagnosis is indicative of life-time occupation – Possible misclassification of occupation ~14% missing occupation code – # of firefighters and # of cases not given</td>
<td></td>
</tr>
<tr>
<td>Figs LW, et al</td>
<td>1995</td>
<td>USA (24 states)</td>
<td>MOR</td>
<td>1984-89</td>
<td>Deceased individual-NHL Regional general population</td>
<td>DC Occupation</td>
<td>DC</td>
<td>143340</td>
<td>All cases</td>
<td>NS</td>
<td>Age, race, gender, region</td>
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<tr>
<td>Gaertner RR, et al</td>
<td>22</td>
<td>Canada</td>
<td>Incidence (OR)</td>
<td>1994-97</td>
<td>Bladder cancer patients aged 20-74</td>
<td>Qs occupation</td>
<td>Cr</td>
<td>3734</td>
<td>35-38%</td>
<td>All cases</td>
<td>random</td>
<td>Age, gender</td>
<td>Only 66% (cases) and 59% (controls) response rate Histologically confirmed CA</td>
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<tr>
<td>Goldberg M, et al</td>
<td>2001</td>
<td>Canada</td>
<td>Incidence (OR)</td>
<td>1979-85</td>
<td>Male firemen aged 35-70 in Montreal area</td>
<td>interview occupation</td>
<td>Face to face interviews CR</td>
<td>2011</td>
<td>82% of all cases interviewed either directly or by proxy</td>
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<tr>
<td>Krishn G, et al</td>
<td>2003</td>
<td>USA (San Francisco)</td>
<td>Incidence (OR)</td>
<td>1991-95, 1997-2000</td>
<td>Brain cancer pts aged 20+ General population aged 20+</td>
<td>Interview, work history Occupation</td>
<td>personal interviews Northern California cancer center rapid case ascertainment program</td>
<td>1743</td>
<td>22% of IET</td>
<td>All reported cases</td>
<td>Random digital dialing</td>
<td>Age, ethnicity</td>
<td>Only 81% of cases gave an interview and from those 40% were reported by proxy</td>
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<tr>
<td>Krstev S, et al</td>
<td>1998a</td>
<td>USA (24 states)</td>
<td>MOR</td>
<td>1984-93</td>
<td>Males having cancer listed as the underlying cause of death on death certificate Male dying from causes other than cancer</td>
<td>DC occupation</td>
<td>DC</td>
<td>60878</td>
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<td>Controls included subjects who died of all causes except cancer</td>
<td>Age, race</td>
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<tr>
<td>Krstev S, et al</td>
<td>1998b</td>
<td>USA (Atlanta, Detroit, New Jersey)</td>
<td>Incidence (OR)</td>
<td>1986-89</td>
<td>Prostate cancer pts aged 40-79</td>
<td>General population aged 40-79</td>
<td>Interviews work history</td>
<td>Occupation</td>
<td>CR Interviews</td>
<td>2296</td>
<td>60(0.6% of IET)</td>
<td>Random within site, age and race &lt;65: random digit dialing &gt;65: random selection through HICFA</td>
<td>Age, region, race</td>
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<tr>
<td>Name, et al</td>
<td>Year</td>
<td>Country</td>
<td>Study Type</td>
<td>Time Period</td>
<td>Population</td>
<td>Occupation</td>
<td>Methodology</td>
<td>Odds Ratio</td>
<td>Notes</td>
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<td>Ma F, et al</td>
<td>1998</td>
<td>USA</td>
<td>Mortality</td>
<td>1984-93</td>
<td>Deceased male firefighters, all causes except cancer</td>
<td>DC</td>
<td>Occupation</td>
<td>DC</td>
<td>6607</td>
<td>/Age, race</td>
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<td></td>
<td>(MOR)</td>
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<td>To calculate expected numbers, subjects who died of all causes except cancer were included (this is not representative of the general population)</td>
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<td>Muscat&amp;Wyn der</td>
<td>1995</td>
<td>NS</td>
<td>Incidence</td>
<td>1985-92</td>
<td>White, male cancer pts admitted to hospital</td>
<td>Hospital based Patients interview, work history</td>
<td>Occupation</td>
<td>HR</td>
<td>440</td>
<td>10% of IET</td>
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<td>(OR)</td>
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<td>White males admitted to hospital</td>
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<td>Frequen cy matching</td>
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<td>Occupation</td>
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<td>Hospital, age, interview year</td>
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<td></td>
<td>Occupation</td>
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<td>Insufficient data - Adjusted risk estimate not reported</td>
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<tr>
<td>Sama S, et al</td>
<td>1990</td>
<td>USA (MA)</td>
<td>Mortality</td>
<td>1982-86</td>
<td>White male cancer pts age of 18+</td>
<td>White male cancer pts 1) police, 2) other sites</td>
<td>CR</td>
<td>Occupation</td>
<td>CR</td>
<td>315</td>
<td>/Age, smoking</td>
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<td>(MOR)</td>
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<td>Controls were cases coming from policemen and statewide males</td>
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<td></td>
<td>Occupation Age-specific</td>
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<td>Occupation</td>
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<td></td>
<td>Occupational information available for only ~50% of all cancer cases</td>
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<td>All cases random Age, region</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ER Patient interview, work history</td>
<td></td>
<td>Occupation</td>
<td></td>
<td></td>
<td>Pathology dept record – Response rate was 57% for controls and 78% for cases</td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

MOR: mortality odds ratio
### 3. Other studies

<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Study design</th>
<th>Region</th>
<th>Outcome (enrolment)</th>
<th>Year of F/U</th>
<th>Study population</th>
<th>Reference population</th>
<th>Exposure data source</th>
<th>Exposure variable</th>
<th>Outcome data source</th>
<th>Total # subject/s incl.</th>
<th># Subject/s excl.</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burnett C, et al</td>
<td>1994</td>
<td>Surveillance</td>
<td>USA (27 state)</td>
<td>Mortality (PMR)</td>
<td>1984-90</td>
<td>Deceased white male firefighters from same regions</td>
<td>Deceased white males from same regions</td>
<td>DC</td>
<td>occupation</td>
<td>DC</td>
<td>5744</td>
<td></td>
<td>Quality of occupation data No information on possible confounders</td>
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<tr>
<td>Dubrow R, et al</td>
<td>1983</td>
<td>Surveillance</td>
<td>USA/UK</td>
<td>PMR, SMR, IOR, PIR, MOR</td>
<td>N/A</td>
<td>firefighters</td>
<td>various firefighters</td>
<td>Various: DC, NC, HR, CR</td>
<td>occupation</td>
<td>DE CR NC</td>
<td>3539-204200</td>
<td></td>
<td>Combining results of surveillance studies – Mediocre quality of the data of many of the studies included – Misclassification possible</td>
</tr>
<tr>
<td>Firth HM, et al</td>
<td>1996</td>
<td>Other</td>
<td>New Zealand</td>
<td>Incidence (SIR)</td>
<td>1972-84</td>
<td>Male firefighters diagnosed with cancer aged 15-64</td>
<td>Male firefighters diagnosed with cancer aged 15-64</td>
<td>CR</td>
<td>occupation</td>
<td>CR</td>
<td>26207 10%</td>
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</table>