

Supplemental materials

Supplemental figures

| | |
|---|---|
| Figure S1. Directed acyclic graph | 2 |
| Figure S2. Participants reporting same occupational tasks or same occupational title among participants partaking in re-examinations before 1985 | 2 |
| Figure S3. Retention in the construction industry after 1985 among participants with only one examination before 1985, by enrolment year | 3 |
| Figure S4. Retention in the construction industry after enrolment among participants enrolled after 1985 | 3 |

Supplemental tables

| | |
|---|---|
| Table S1. Number of included and excluded cohort participants | 4 |
| Table S2. Occupational exposure limits (OEL) at the time of the construction of the job-exposure matrix (JEM) | 4 |
| Table S3. Occupational titles per exposure category (column percentages) | 4 |
| Table S4. Number of cases, person-years, and incidence rates for each exposure group and age stratum | 5 |
| Table S5. Adjusted hazard ratios for exposure and CKD and RRT from the main model without age stratification | 6 |
| Table S6. Adjusted hazard ratios from exposure and CKD in models with calendar year on time axis (table 3) and with age year on time axis, main regression model | 6 |
| Table S7. Adjusted hazard ratios for CKD and RRT from the main model without adjustment for BMI | 6 |
| Table S8. Number of cases and person-years for each exposure category and age stratum for chronic glomerulonephritis (cGN), diabetic nephropathy (DN), and hypertensive nephropathy (HN) | 7 |
| Table S9. Adjusted hazard ratios (main covariate model) for CKD and RRT, exposed vs. unexposed (to all listed exposures) workers, from separate regression models for the nine particulate exposures | 7 |
| Table S10. Adjusted hazard ratios (main covariate model) for CKD and RRT, exposed vs. unexposed (to all listed exposures) workers, from a combined ('multipollutant') regression model including all nine particulate exposures | 8 |
| Table S11. Adjusted hazard ratios (main covariate model) for CKD and RRT, exposed vs. unexposed (to all listed exposures) workers with each particulate exposure divided into low- and high-exposed groups, from separate regression models for the nine particulate exposures | 9 |

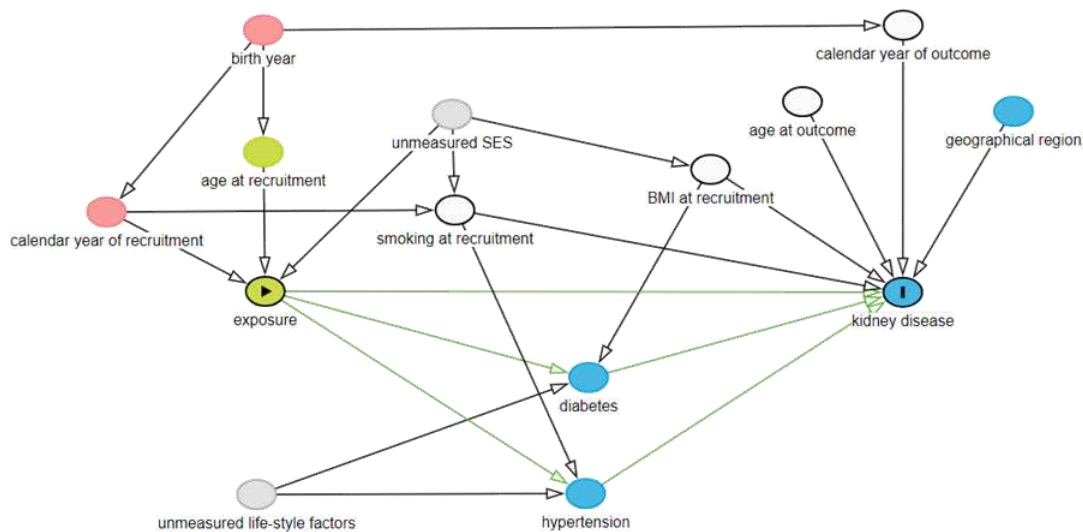


Figure S1. Directed acyclic graph

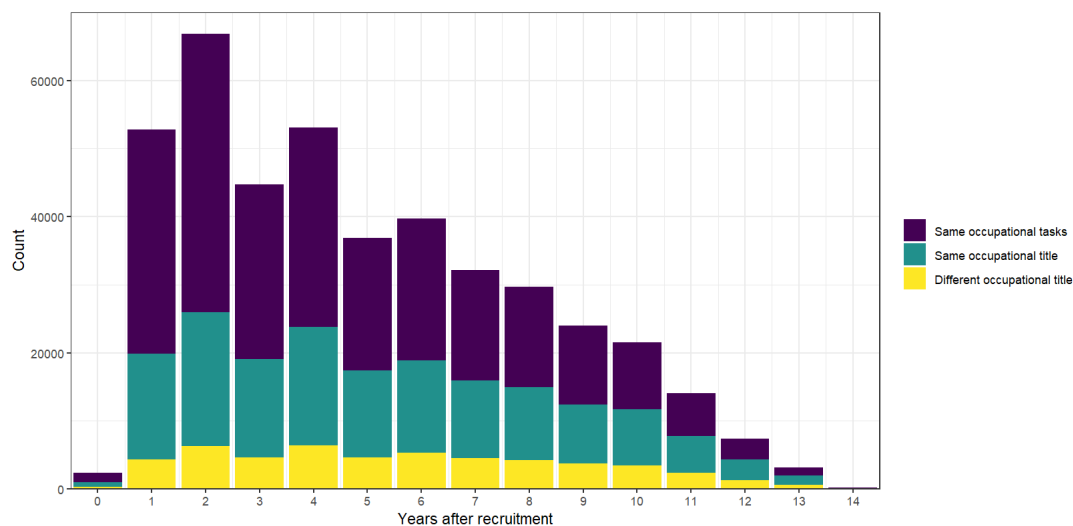


Figure S2. Participants reporting same occupational tasks or same occupational title among participants partaking in re-examinations before 1985

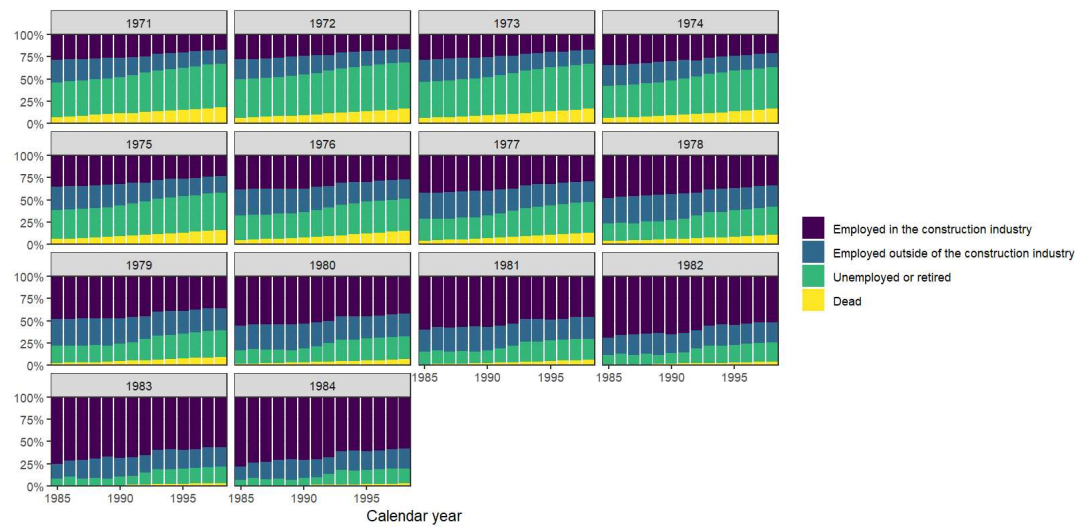


Figure S3. Retention in the construction industry after 1985 among participants with only one examination before 1985, by enrolment year

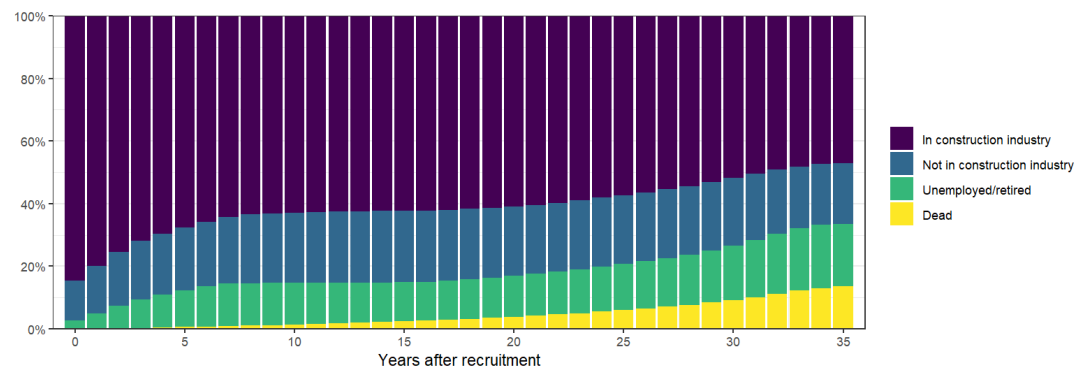


Figure S4. Retention in the construction industry after enrolment among participants enrolled after 1985

Table S1. Number of included and excluded cohort participants

| | |
|--|---------|
| Included | 286 089 |
| Excluded | 103 043 |
| Missing exposure assessment | 44 045 |
| Missing smoking or BMI data | 32 581 |
| Office workers | 19 736 |
| Female | 19 418 |
| Censored before age 30 years ¹ | 11 808 |
| Age >65 years at enrolment | 1779 |
| Reused personal identification number ² | 282 |
| Age <15 years at enrolment | 1 |
| Missing date of death | 1 |

¹ Among participants not excluded for other reasons

² In the Swedish personal identification number system, immigrants are sometimes given identification numbers from deceased individuals with the same sex and birth date. To avoid registry mis-linkages, these individuals were removed.

Table S2. Occupational exposure limits (OEL) at the time of the construction of the job-exposure matrix (JEM)

| Particulate exposure | OEL | 1974 | 1978 |
|----------------------|----------------------------------|-----------------------|-----------------------|
| Cement dust | Inorganic dust (total dust) | 10 mg/m ³ | 10 mg/m ³ |
| Concrete dust | | | |
| Welding fumes | Inorganic dust (respirable dust) | 5 mg/m ³ | 5 mg/m ³ |
| Quartz dust | | 0.2 mg/m ³ | 0.1 mg/m ³ |
| Diesel exhaust | Nitrogen dioxide | – | 3.5 mg/m ³ |
| Asphalt fumes | | – | – |
| Wood dust | | –* | 4 mg/m ³ |
| Asbestos | | 2 fibres/mL | 1 fibre/mL |
| MMMF | | – | – |

* Organic dust 5 mg/m³; MMMF, man-made mineral fibres

Table S3. Occupational titles per exposure category [n (column percentages)] according to the original job-exposure matrix (JEM) (note that the Total row sums to more than the total number of participants, because some participants were exposed to multiple exposure factors)

| Occupational title | Inorganic dusts | | | |
|---------------------|-----------------|-------------|-----------|-----------|
| | Unexposed | and fumes | Wood dust | Fibres |
| Asphalt pavers | – | 3619 (2) | – | – |
| Bricklayers | – | 9843 (6) | – | 364 (2) |
| Chauffeurs | – | 4018 (3) | – | 25 (0) |
| Concrete workers | 7200 (7) | 26 862 (17) | – | 1913 (8) |
| Crane operators | 3064 (3) | – | – | – |
| Electricians | 31 085 (30) | 1869 (1) | – | – |
| Flooring installers | – | – | 4971 (25) | – |
| Foremen | 26 461 (25) | – | – | – |
| Glass workers | 2484 (2) | – | – | – |
| Ground workers | 370 (0) | 10 473 (7) | – | – |
| Insulators | – | 2439 (2) | – | 2501 (11) |
| Machine operators | – | 9490 (6) | – | – |

| | | | | |
|--------------------------|----------------------|----------------------|---------------------|---------------------|
| Miners | – | 3025 (2) | – | – |
| Painters | 3402 (3) | 19 501 (12) | – | – |
| Pipe workers | 977 (1) | 21 699 (14) | – | 4014 (18) |
| Refrigeration installers | 276 (0) | 894 (1) | – | 894 (4) |
| Repairers | – | 2377 (2) | – | – |
| Roofers | – | 1171 (1) | – | – |
| Sheet metal workers | 6435 (6) | 4414 (3) | – | 2795 (12) |
| Carpenters | 13 786 (13) | 31 913 (20) | 14 679 (75) | 9477 (42) |
| Other | 9609 (9) | 4603 (3) | – | 837 (4) |
| <i>Total</i> | <i>105 149 (100)</i> | <i>158 210 (100)</i> | <i>19 650 (100)</i> | <i>22 820 (100)</i> |

Table S4. Number of cases, person-years, and incidence rates for each exposure category and age stratum

| | CKD | | | RRT | | |
|--|--------------|-------|-----------------|--------------|-------|-----------------|
| | Person-years | Cases | Incidence rate* | Person-years | Cases | Incidence rate* |
| Unexposed | | | | | | |
| 30–39 y | 526 706 | 23 | 4.4 | 527 286 | 19 | 3.6 |
| 40–49 y | 716 014 | 103 | 14.4 | 716 872 | 67 | 9.3 |
| 50–59 y | 722 301 | 242 | 33.5 | 723 425 | 116 | 16.0 |
| 60–69 y | 580 666 | 675 | 116.2 | 582 764 | 182 | 31.2 |
| 70–79 y | 365 601 | 1381 | 377.7 | 369 684 | 242 | 65.5 |
| 80–89 y | 133 974 | 1299 | 969.6 | 137 569 | 90 | 65.4 |
| Inorganic dust and fumes | | | | | | |
| 30–39 y | 699 629 | 48 | 6.9 | 700 349 | 38 | 5.4 |
| 40–49 y | 959 399 | 167 | 17.4 | 960 536 | 103 | 10.7 |
| 50–59 y | 1 005 102 | 415 | 41.3 | 1 006 977 | 189 | 18.8 |
| 60–69 y | 834 819 | 1045 | 125.2 | 838 163 | 323 | 38.5 |
| 70–79 y | 582 398 | 2092 | 359.2 | 588 743 | 359 | 61.0 |
| 80–89 y | 263 698 | 2055 | 779.3 | 269 153 | 162 | 60.2 |
| Wood dust | | | | | | |
| 30–39 y | 101 752 | 6 | 5.9 | 101 919 | 2 | 2.0 |
| 40–49 y | 130 844 | 17 | 13.0 | 131 083 | 10 | 7.6 |
| 50–59 y | 119 458 | 36 | 30.1 | 119 672 | 12 | 10.0 |
| 60–69 y | 90 515 | 85 | 93.9 | 90 767 | 29 | 31.9 |
| 70–79 y | 62 502 | 214 | 342.4 | 63 082 | 28 | 44.4 |
| 80–89 y | 29 899 | 199 | 665.6 | 30 399 | 12 | 39.5 |
| Fibres | | | | | | |
| 30–39 y | 117 330 | 3 | 2.6 | 117 452 | 5 | 4.3 |
| 40–49 y | 154 775 | 18 | 11.6 | 154 892 | 12 | 7.7 |
| 50–59 y | 159 728 | 67 | 41.9 | 159 983 | 24 | 15.0 |
| 60–69 y | 119 211 | 143 | 120.0 | 119 638 | 46 | 38.4 |
| 70–79 y | 71 132 | 249 | 350.1 | 71 913 | 34 | 47.3 |
| 80–89 y | 30 461 | 208 | 682.8 | 30 958 | 18 | 58.1 |
| Inorganic dust and fumes, excluding quartz dust | | | | | | |
| 30–39 y | 473 645 | 34 | 7.2 | 474 172 | 27 | 5.7 |
| 40–49 y | 631 297 | 110 | 17.4 | 632 036 | 74 | 11.7 |
| 50–59 y | 640 093 | 278 | 43.4 | 641 336 | 115 | 17.9 |
| 60–69 y | 507 938 | 649 | 127.8 | 510 033 | 193 | 37.8 |
| 70–79 y | 344 248 | 1218 | 353.8 | 348 011 | 210 | 60.3 |
| 80–89 y | 156 608 | 1179 | 752.8 | 159 746 | 91 | 57.0 |

CKD, chronic kidney disease; RRT, renal replacement therapy; * incidence rate per 100 000 person-years

Table S5. Adjusted hazard ratios for exposure and CKD and RRT from the main model without age stratification

| | Exposure | Adjusted hazard ratios (95% CI) p-value ¹ | |
|-----|--------------------------|--|----------------------|
| | | Adjusted hazard ratios (95% CI) | p-value ¹ |
| CKD | Inorganic dust and fumes | 1.03 (0.99, 1.08) | 0.35 |
| | Wood dust | 0.96 (0.88, 1.05) | 0.04 |
| | Fibres | 0.95 (0.87, 1.03) | 0.44 |
| RRT | Inorganic dust and fumes | 1.06 (0.97, 1.17) | <0.01 |
| | Wood dust | 0.80 (0.65, 1.00) | 0.02 |
| | Fibres | 0.94 (0.79, 1.13) | 0.06 |

CKD, chronic kidney disease; RRT, renal replacement therapy; CI, confidence interval

¹p-value for test of proportional hazards assumption (test for null slope in Schoenfeld residuals)

Table S6. Adjusted hazard ratios from exposure and CKD in models with calendar year on time axis (table 3) and with age year on time axis, main regression model

| | Exposure | Adjusted hazard ratios (95% CI) | |
|--|---------------------------|---------------------------------|-------------------|
| | | Age <65 years | Age ≥65 years |
| Calendar year on time axis (in manuscript) | Inorganic dusts and fumes | 1.15 (1.05, 1.26) | 1.01 (0.97, 1.06) |
| | Wood dust | 0.85 (0.68, 1.05) | 0.99 (0.90, 1.09) |
| | Fibres | 1.01 (0.85, 1.21) | 0.93 (0.85, 1.02) |
| Age year on time axis | Inorganic dusts | 1.15 (1.03, 1.28) | 1.03 (0.98, 1.08) |
| | Wood dust | 0.83 (0.66, 1.03) | 1.00 (0.90, 1.10) |
| | Fibres | 0.94 (0.76, 1.16) | 0.98 (0.88, 1.09) |

Table S7. Adjusted hazard ratios for exposure and CKD and RRT from the main model without adjustment for BMI and with additional adjustment for geographical region of recruitment

| | Exposure | Covariate model | Adjusted hazard ratios (95% CI) | |
|-----|--------------------------|-------------------------------|---------------------------------|-------------------|
| | | | Age <65 years | Age ≥65 years |
| CKD | Inorganic dust and fumes | Main ¹ without BMI | 1.19 (1.08, 1.30) | 1.03 (0.98, 1.07) |
| | | Main ¹ with region | 1.16 (1.06, 1.27) | 1.01 (0.97, 1.06) |
| | Wood dust | Main ¹ without BMI | 0.84 (0.68, 1.05) | 0.96 (0.87, 1.05) |
| | | Main ¹ with region | 0.85 (0.68, 1.06) | 0.99 (0.90, 1.09) |
| | Fibres | Main ¹ without BMI | 1.02 (0.85, 1.22) | 0.93 (0.85, 1.02) |
| | | Main ¹ with region | 1.02 (0.85, 1.22) | 0.94 (0.86, 1.03) |
| RRT | Inorganic dust and fumes | Main ¹ without BMI | 1.19 (1.04, 1.37) | 1.02 (0.90, 1.14) |
| | | Main ¹ with region | 1.17 (1.01, 1.34) | 1.00 (0.89, 1.13) |
| | Wood dust | Main ¹ without BMI | 0.85 (0.61, 1.18) | 0.74 (0.56, 0.99) |
| | | Main ¹ with region | 0.86 (0.61, 1.20) | 0.78 (0.59, 1.03) |
| | Fibres | Main ¹ without BMI | 0.99 (0.75, 1.30) | 0.91 (0.71, 1.15) |
| | | Main ¹ with region | 0.98 (0.74, 1.29) | 0.91 (0.72, 1.16) |

CKD, chronic kidney disease; RRT, renal replacement therapy; CI, confidence interval

¹The main model included adjustment for age, smoking status, smoking intensity, and BMI.

Table S8. Number of cases and person-years for each exposure category and age stratum for chronic glomerulonephritis (cGN), diabetic nephropathy (DN), and hypertensive nephropathy (HN)

| | cGN | | DN | | HN | |
|---------------------------------|--------------|-------|--------------|-------|--------------|-------|
| | Person-years | Cases | Person-years | Cases | Person-years | Cases |
| Unexposed | | | | | | |
| 30–39 y | 526 663 | 30 | 527 259 | 34 | 527 322 | 15 |
| 40–49 y | 716 040 | 47 | 716 730 | 60 | 716 957 | 37 |
| 50–59 y | 722 799 | 72 | 723 386 | 120 | 923 567 | 82 |
| 60–69 y | 582 531 | 73 | 582 449 | 213 | 582 540 | 174 |
| 70–79 y | 369 900 | 49 | 369 263 | 253 | 369 235 | 252 |
| 80–89 y | 137 793 | 5 | 137 276 | 120 | 137 069 | 140 |
| Inorganic dust and fumes | | | | | | |
| 30–39 y | 699 482 | 52 | 700 300 | 38 | 700 275 | 36 |
| 40–49 y | 959 411 | 79 | 960 478 | 92 | 960 421 | 70 |
| 50–59 y | 1 006 146 | 111 | 1 006 864 | 196 | 1 006 865 | 140 |
| 60–69 y | 837 807 | 106 | 837 519 | 360 | 837 590 | 290 |
| 70–79 y | 588 794 | 84 | 587 675 | 440 | 587 408 | 414 |
| 80–89 y | 269 308 | 18 | 268 663 | 199 | 268 365 | 218 |
| Wood dust | | | | | | |
| 30–39 y | 101 732 | 2 | 101 898 | 9 | 101 913 | 1 |
| 40–49 y | 130 901 | 3 | 130 968 | 14 | 131 087 | 7 |
| 50–59 y | 119 607 | 11 | 119 600 | 17 | 119 652 | 13 |
| 60–69 y | 90 750 | 14 | 90 690 | 21 | 90 713 | 25 |
| 70–79 y | 63 026 | 8 | 62 986 | 32 | 62 964 | 35 |
| 80–89 y | 30 384 | 2 | 30 340 | 18 | 30 318 | 19 |
| Fibres | | | | | | |
| 30–39 y | 117 308 | 7 | 117 461 | 7 | 117 450 | 4 |
| 40–49 y | 154 746 | 11 | 154 838 | 21 | 154 901 | 8 |
| 50–59 y | 159 850 | 13 | 159 826 | 31 | 159 972 | 22 |
| 60–69 y | 119 593 | 16 | 119 542 | 37 | 119 543 | 33 |
| 70–79 y | 71 934 | 13 | 71 819 | 45 | 71 751 | 49 |
| 80–89 y | 31 015 | 2 | 30 904 | 26 | 30 884 | 21 |

cGN, chronic glomerulonephritis; DN, diabetic nephropathy; HN, hypertensive nephropathy

Table S9. Adjusted hazard ratios (main covariate model) for CKD and RRT, exposed vs. unexposed (to all listed exposures) workers, from separate regression models for the nine particulate exposures

| | Exposure | Adjusted hazard ratios (95% CI) | |
|-----|----------------|---------------------------------|-------------------|
| | | Age <65 years | Age ≥65 years |
| CKD | Cement dust | 1.20 (1.01, 1.43) | 1.07 (0.99, 1.15) |
| | Concrete dust | 1.11 (1.01, 1.22) | 1.01 (0.96, 1.05) |
| | Quartz dust | 1.06 (0.95, 1.19) | 0.99 (0.94, 1.04) |
| | Welding fumes | 1.05 (0.90, 1.22) | 0.96 (0.89, 1.03) |
| | Diesel exhaust | 1.14 (1.00, 1.30) | 1.04 (0.98, 1.10) |
| | Asphalt fumes | 0.91 (0.65, 1.26) | 0.95 (0.83, 1.10) |

| | | | |
|------------|----------------|-------------------|-------------------|
| | Wood dust | 0.78 (0.63, 0.96) | 0.99 (0.90, 1.08) |
| | Asbestos | 0.89 (0.71, 1.12) | 0.96 (0.86, 1.07) |
| | MMMF | 0.96 (0.81, 1.13) | 0.92 (0.84, 1.01) |
| RRT | Cement dust | 1.19 (0.92, 1.53) | 1.08 (0.90, 1.31) |
| | Concrete dust | 1.09 (0.95, 1.25) | 0.95 (0.85, 1.07) |
| | Quartz dust | 1.08 (0.92, 1.28) | 1.00 (0.88, 1.14) |
| | Welding fumes | 1.07 (0.86, 1.33) | 0.96 (0.80, 1.16) |
| | Diesel exhaust | 1.17 (0.97, 1.41) | 1.07 (0.93, 1.24) |
| | Asphalt fumes | 0.76 (0.45, 1.29) | 0.99 (0.68, 1.46) |
| | Wood dust | 0.77 (0.56, 1.06) | 0.78 (0.59, 1.02) |
| | Asbestos | 0.73 (0.50, 1.05) | 0.99 (0.75, 1.31) |
| | MMMF | 0.91 (0.70, 1.18) | 0.87 (0.69, 1.10) |

CKD, chronic kidney disease; RRT, renal replacement therapy;
MMMF, man-made mineral fibres

Table S10. Adjusted hazard ratios (main covariate model) for CKD and RRT, exposed vs. unexposed (to all listed exposures) workers, from a combined ('multipollutant') regression model including all nine particulate exposures

| | Exposure | Adjusted hazard ratios (95% CI) | |
|------------|----------------|---------------------------------|-------------------|
| | | Age <65 years | Age ≥65 years |
| CKD | Cement dust | 1.12 (0.96, 1.32) | 1.07 (1.00, 1.14) |
| | Concrete dust | 1.08 (1.02, 1.15) | 1.02 (0.99, 1.05) |
| | Quartz dust | 0.97 (0.87, 1.09) | 0.99 (0.95, 1.04) |
| | Welding fumes | 1.02 (0.93, 1.11) | 0.98 (0.94, 1.02) |
| | Diesel exhaust | 1.09 (0.99, 1.21) | 1.03 (0.99, 1.08) |
| | Asphalt fumes | 0.93 (0.78, 1.11) | 0.97 (0.90, 1.04) |
| | Wood dust | 0.85 (0.69, 1.04) | 1.02 (0.93, 1.11) |
| | Asbestos | 0.83 (0.65, 1.07) | 1.16 (1.00, 1.34) |
| | MMMF | 1.02 (0.85, 1.23) | 0.87 (0.77, 0.98) |
| RRT | Cement dust | 1.06 (0.84, 1.33) | 1.09 (0.93, 1.28) |
| | Concrete dust | 1.07 (0.98, 1.17) | 0.97 (0.89, 1.04) |
| | Quartz dust | 1.03 (0.87, 1.21) | 1.00 (0.88, 1.13) |
| | Welding fumes | 1.01 (0.89, 1.14) | 0.98 (0.88, 1.10) |
| | Diesel exhaust | 1.09 (0.94, 1.26) | 1.00 (0.90, 1.13) |
| | Asphalt fumes | 0.83 (0.63, 1.10) | 0.98 (0.80, 1.20) |
| | Wood dust | 0.82 (0.60, 1.12) | 0.80 (0.61, 1.04) |
| | Asbestos | 0.66 (0.44, 0.99) | 1.09 (0.73, 1.63) |
| | MMMF | 1.09 (0.83, 1.44) | 0.88 (0.65, 1.21) |

CKD, chronic kidney disease; RRT, renal replacement therapy;
MMMF, man-made mineral fibres

Table S11. Adjusted hazard ratios (main covariate model) for CKD and RRT, exposed vs. unexposed (to all listed exposures) workers with each particulate exposure divided into low- and high-exposed groups, from separate regression models for the nine particulate exposures

| Exposure | | Adjusted hazard ratios (95% CI) | | | |
|----------|----------------------------|---------------------------------|-------------------|-------------------|-------------------|
| | | Age <65 years | | Age ≥65 years | |
| | | Low | High | Low | High |
| CKD | Cement dust | 1.22 (1.01, 1.49) | 1.35 (0.85, 2.16) | 0.84 (0.77, 0.92) | 0.95 (0.81, 1.11) |
| | Concrete dust | 1.07 (0.94, 1.21) | 1.15 (1.01, 1.31) | 0.94 (0.88, 1.00) | 0.89 (0.84, 0.95) |
| | Quartz dust | 1.09 (0.95, 1.25) | 1.08 (0.83, 1.42) | 0.90 (0.84, 0.95) | 1.01 (0.91, 1.12) |
| | Welding fumes | 1.19 (0.59, 2.40) | 1.08 (0.91, 1.27) | 0.99 (0.71, 1.37) | 0.90 (0.83, 0.97) |
| | Diesel exhaust | 1.18 (1.00, 1.40) | 1.08 (0.87, 1.36) | 0.87 (0.81, 0.94) | 0.98 (0.90, 1.07) |
| | Asphalt fumes ¹ | – | 0.93 (0.66, 1.30) | – | 1.04 (0.90, 1.20) |
| | Wood dust | 0.81 (0.64, 1.01) | 1.27 (0.53, 3.06) | 1.24 (1.12, 1.37) | 0.77 (0.50, 1.20) |
| | Asbestos | 1.02 (0.78, 1.35) | 0.73 (0.48, 1.11) | 0.89 (0.78, 1.02) | 1.54 (1.27, 1.87) |
| | MMMMF | 1.07 (0.87, 1.33) | 0.86 (0.65, 1.16) | 0.84 (0.75, 0.94) | 1.17 (1.01, 1.36) |
| RRT | Cement dust | 1.28 (0.96, 1.70) | 1.13 (0.56, 2.29) | 0.77 (0.61, 0.96) | 1.24 (0.86, 1.79) |
| | Concrete dust | 1.00 (1.00, 1.00) | 1.16 (0.96, 1.41) | 0.89 (0.75, 1.05) | 0.80 (0.68, 0.94) |
| | Quartz dust | 1.12 (0.91, 1.37) | 1.23 (0.86, 1.77) | 0.86 (0.73, 1.01) | 0.90 (0.69, 1.17) |
| | Welding fumes | 1.78 (0.73, 4.31) | 1.12 (0.87, 1.42) | 0.91 (0.45, 1.83) | 0.83 (0.68, 1.03) |
| | Diesel exhaust | 1.30 (1.02, 1.66) | 1.05 (0.76, 1.46) | 0.83 (0.68, 1.00) | 0.97 (0.77, 1.23) |
| | Asphalt fumes ¹ | – | 0.80 (0.47, 1.37) | – | 1.24 (0.84, 1.83) |
| | Wood dust | 0.83 (0.59, 1.17) | 1.16 (0.29, 4.65) | 0.92 (0.69, 1.23) | 0.86 (0.28, 2.67) |
| | Asbestos | 0.90 (0.58, 1.39) | 0.57 (0.27, 1.20) | 1.27 (0.93, 1.74) | 1.00 (0.50, 2.01) |
| | MMMMF | 1.11 (0.81, 1.54) | 0.77 (0.48, 1.24) | 0.79 (0.59, 1.05) | 1.12 (0.74, 1.71) |

CKD, chronic kidney disease; RRT, renal replacement therapy; MMMF, man-made mineral fibres

¹No participant was classified as having low exposure to asphalt fumes.