

# OCCUPATION AND MORTALITY

Road injuries mortality in South  
Africa, 2013-2015

National Institute for Occupational Health

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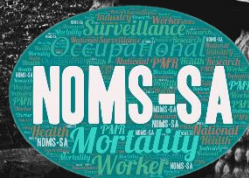
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NATIONAL INSTITUTE FOR  
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Division of the National Health Laboratory Service



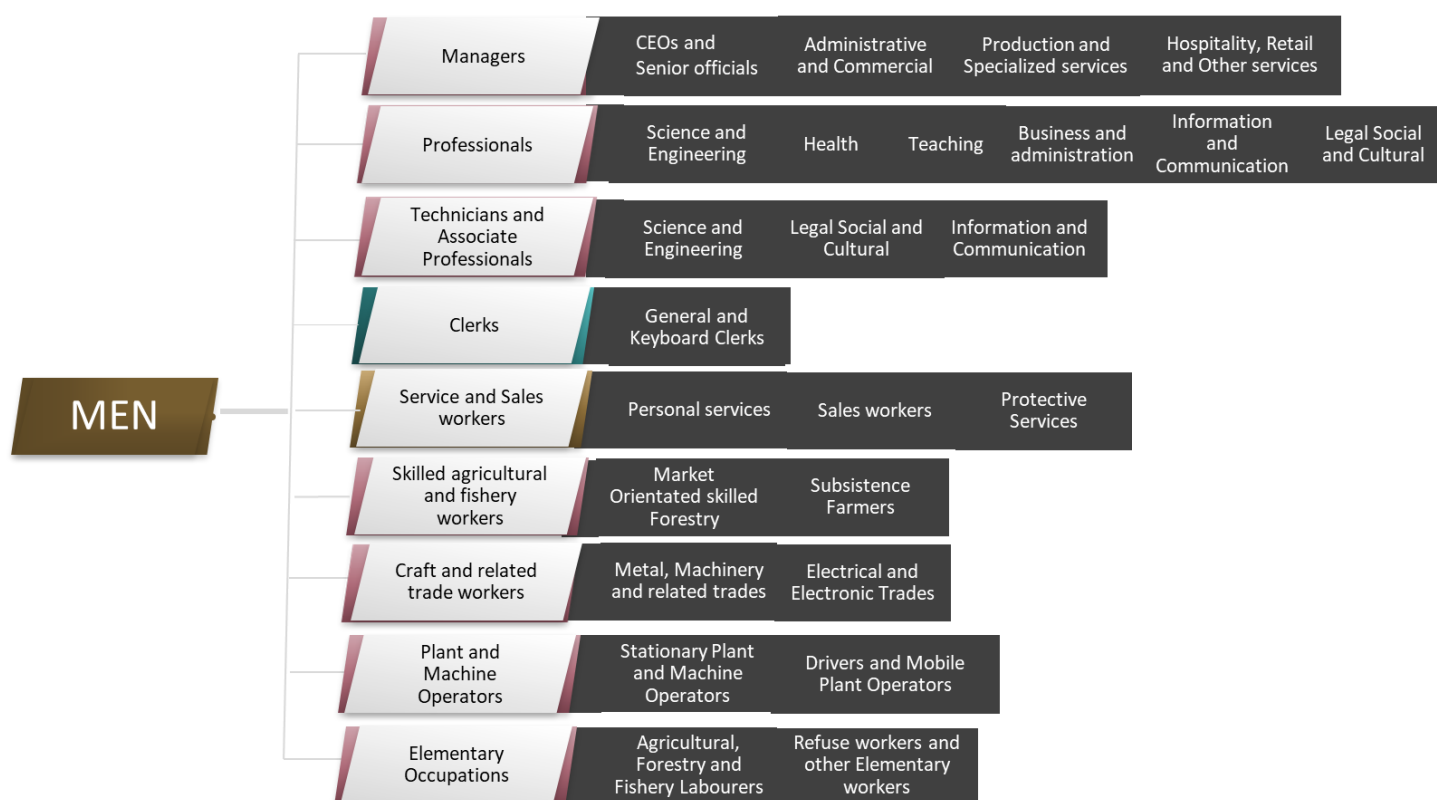
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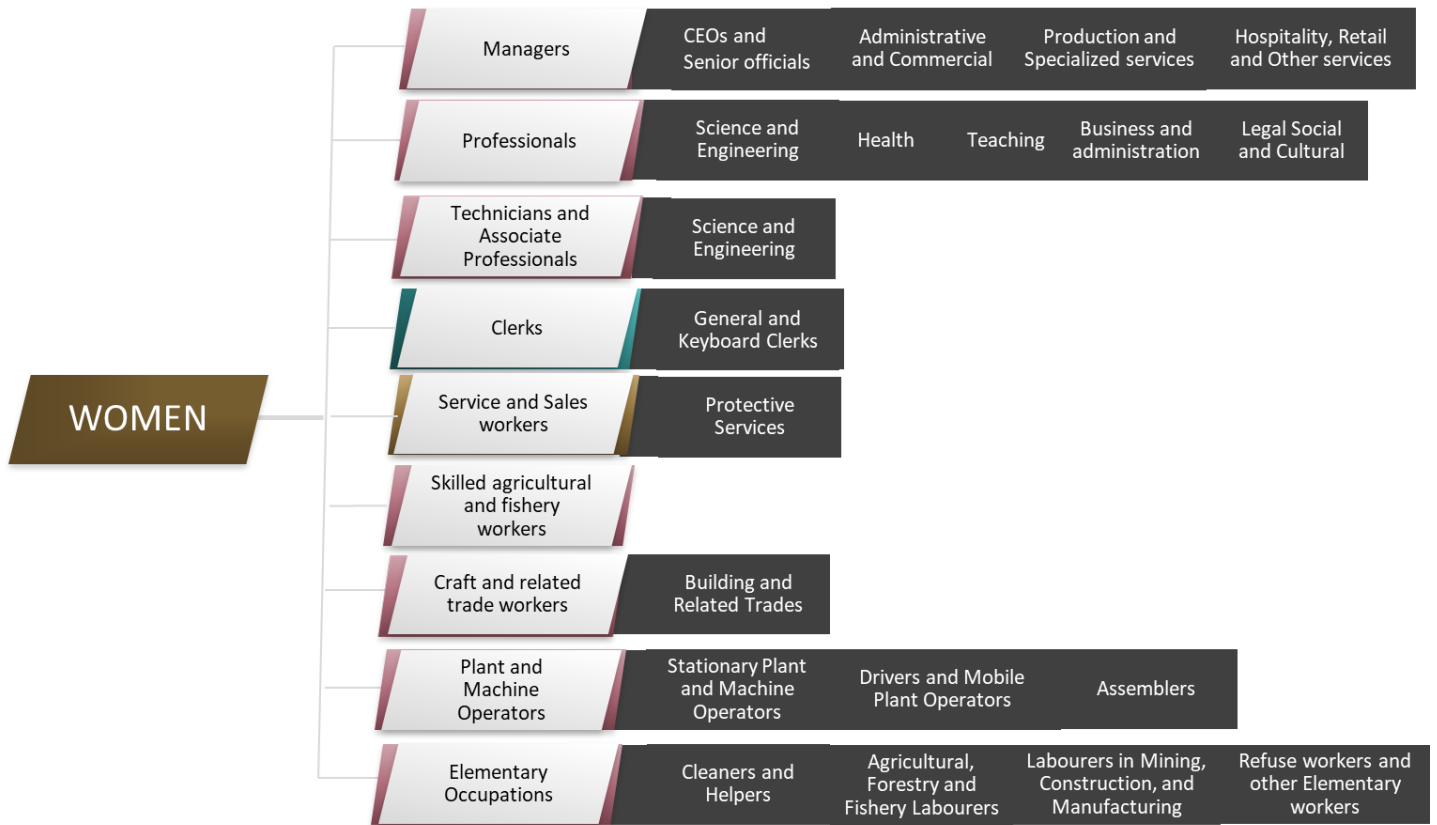
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## Main points

- There were 9 962 reported deaths due to road injuries from 2013-2015 in 15- 69 year olds.
- The main industries with significantly elevated PMRs for road injuries deaths are mining, transport, construction and educational services.
- All major occupation groups had significantly elevated PMRs for road injury deaths compared to unspecified and unemployed adults in men. In women all groups except crafts and related trade workers were significantly elevated.

Significantly elevated PMRs for major and sub-major occupations in men and women





# Introduction

The National Occupational Mortality Surveillance South Africa (NOMS-SA) is a nation-wide, evidence-based surveillance system that measures primary and common risks associated with specific occupations and industries using mortality data from Statistics South Africa. NOMS-SA describes the relationship between work and wellbeing in order to inform policy development to improve worker safety and health. It can provide information for workplaces and educational activities. Surveillance of occupational mortality can enable research and prevention strategies.

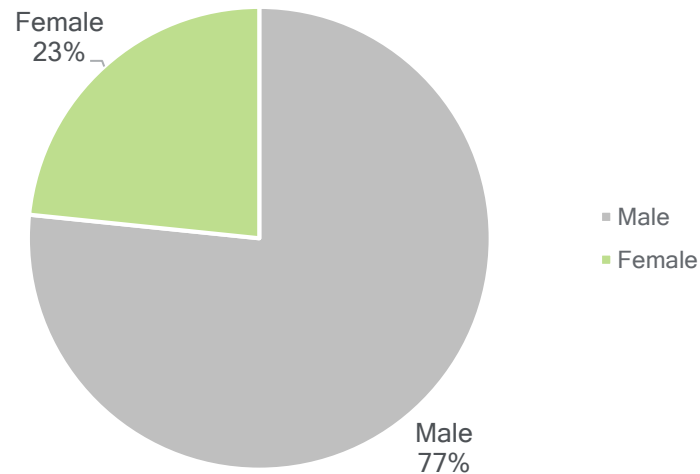
This report presents the analysis of deaths involving road injuries in different occupation groups and industries among those aged 15 to 69 years in South Africa. This analysis includes deaths that were registered from 2013 to 2015 by the Statistics South Africa.

Occupation was defined using the South African Standard Classification of Occupations (SASCO). There are nine major occupation groups, which then divide in 42 sub-major groups. For further information on the breakdown of occupation groups, see Appendix A.

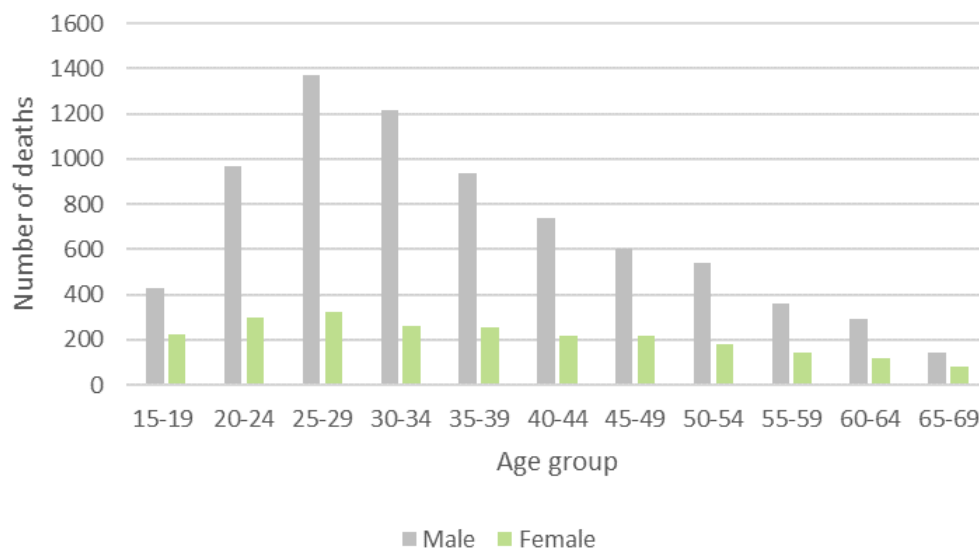
We calculated proportional mortality ratios for the population at risk of dying from road injuries. The results of the analysis do not prove conclusively that the observed risk of death involving road injuries are caused by occupational exposure. The findings presented here should be interpreted bearing in mind the warnings in the strengths and limitations section.

## Road injuries mortality by sex and age

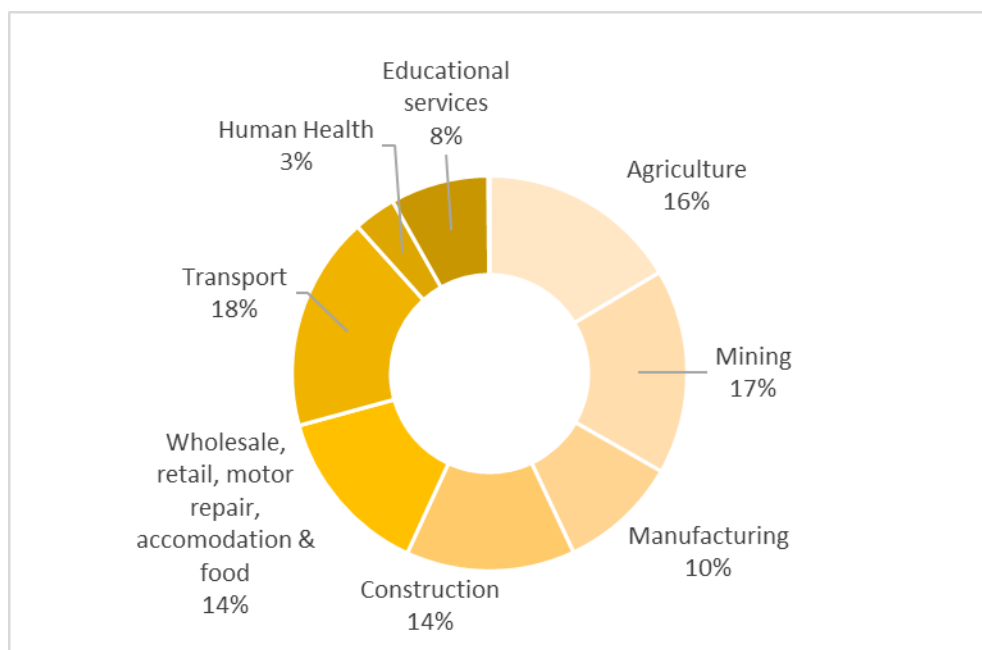
- There were 9 962 reported deaths due to road injuries from 2013-2015.
- Number of reported deaths due to road injuries by sex:
  - Men (7 603), Women (2 319), Unspecified (40).



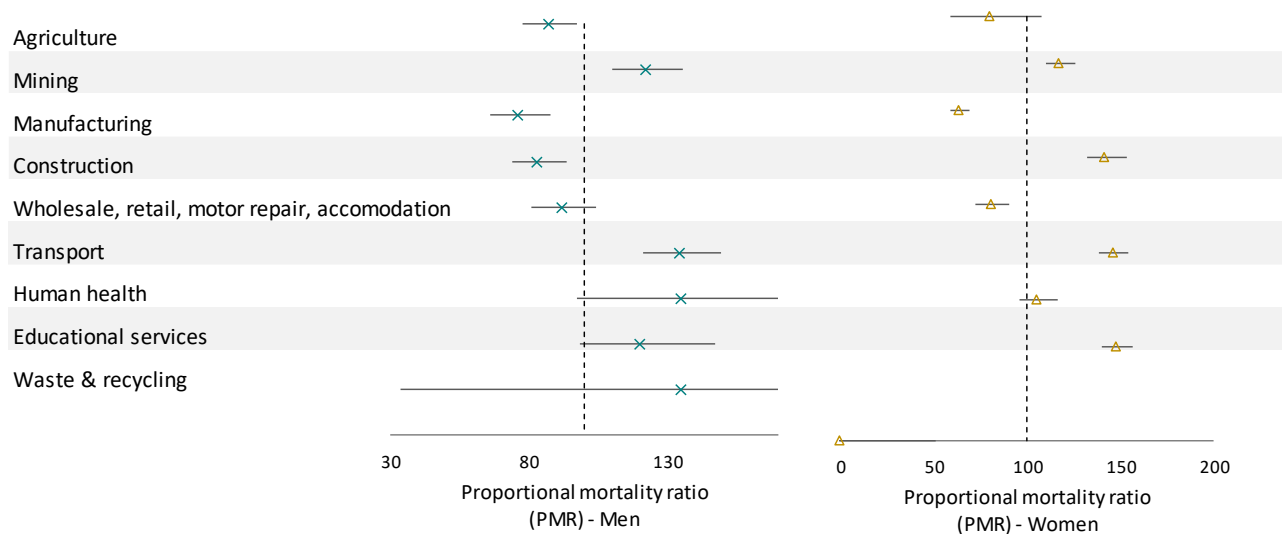
- Mean age of death due to road injuries: men (36.2 years), women (37.4 years). Men died significantly younger than women.



# Road injuries mortality by sex and main industry



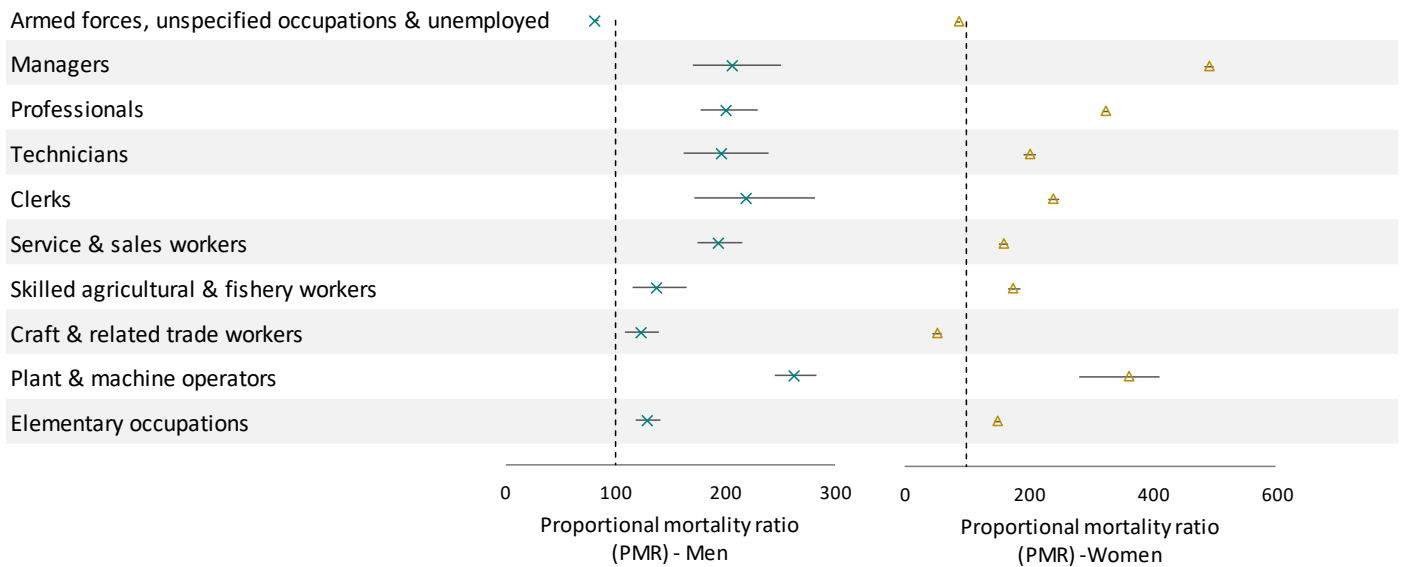
**Figure 1.** Percentage of road injuries -related deaths by main industry.



**Figure 2** Road injuries-related mortality by sex and main industry. Source: Statistics South Africa (See Appendix Table 1 and 2)

- Main industries with significantly elevated PMRs for road injuries -related deaths are service, mining and transport in men; and mining, construction, transport and educational services compared to the general population.

# Road injuries - related mortality by sex and major occupation

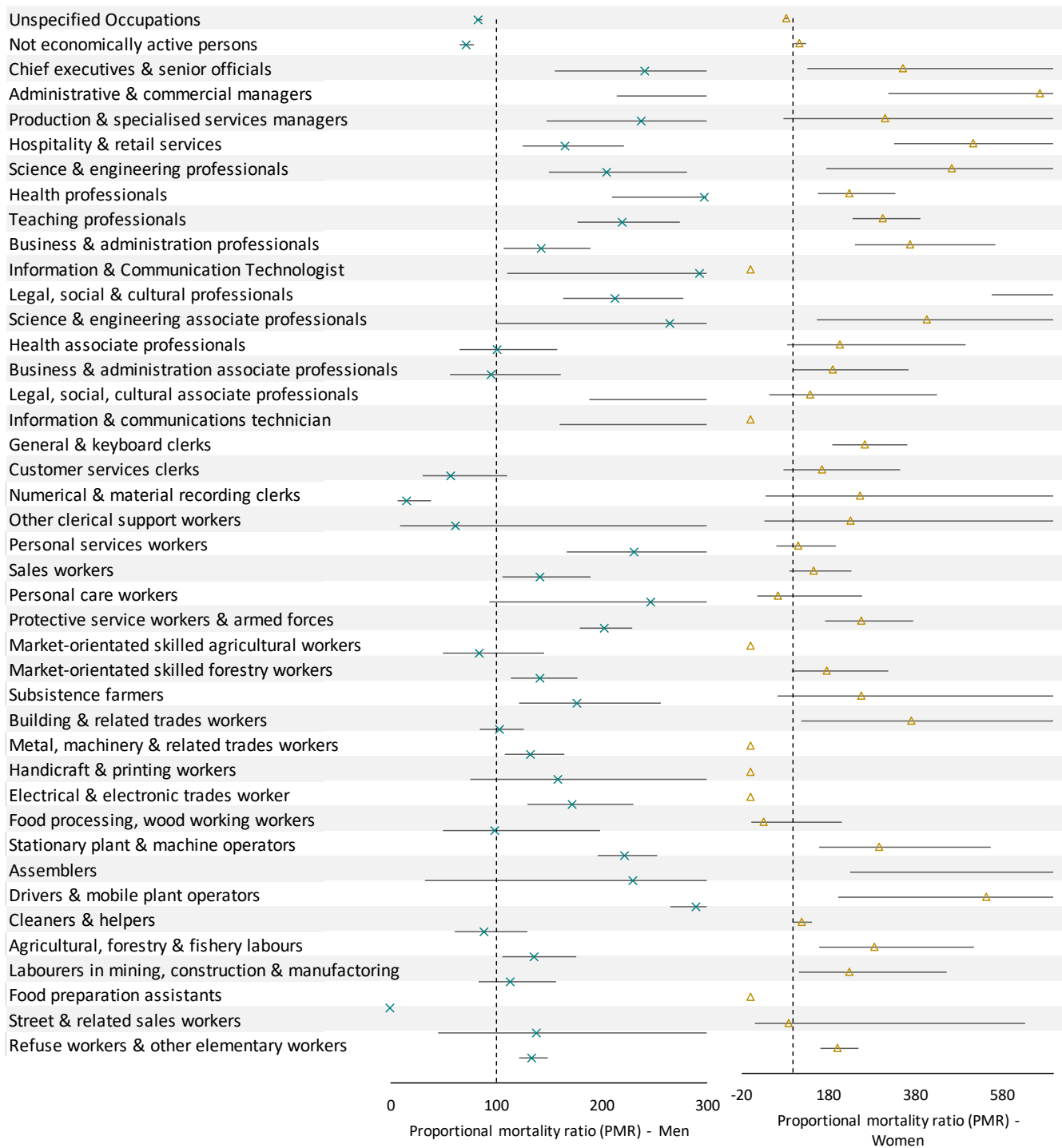


**Figure 3.** Road injuries-related mortality by sex and major occupation. Source: Statistics South Africa. (See Appendix Table 3 and 4)

- Men working in any job, had excess mortality due to road injuries compared to the general population, professionals and plant and machine operations were increased.
- Women working in any job except craft and trade had excess mortality due to road injuries compared to the general population. Women managers and plant and machine operators were increased.



# Road injuries-related mortality by sex and sub-major occupation



**Figure 4.** Road injuries-related mortality by sex and sub-major occupation. Source: Statistics South Africa (See Appendix, Tables 5 and 6)

- Men who were not economically active and numerical clerks had significantly lower PMRs than the general population.
- Men and women employed in the following sub-major occupation groups had significant excess mortality due to road injuries compared to the general population.
  - CEOs and Managers
  - Hospitality and retail services
  - Science and engineering professionals
  - Health professionals
  - Teaching professionals
  - Business and administration professionals
  - Legal, social and cultural professionals
  - Protective service workers and armed forces
  - Market-orientated skilled forestry workers
  - Stationary plant and machine operators
  - Drivers and mobile plant operators
  - Agricultural, forestry and fishery labourers
  - Refuse workers and other elementary workers
- Women employed in the following sub-major occupation groups had excess mortality due to road injuries compared to the general population.
  - Science and engineering associate professionals
  - General and keyboard clerks
  - Building and related trades workers
  - Mining, construction and manufacturing labourers
- Men employed in the following sub-major occupation groups had excess mortality due to road injuries compared to the general population.
  - Production & specialized services managers
  - Personal services workers
  - Metal, machinery & related trades workers
  - Electrical & electronic trades worker

The graph of the women in particular shows wide confidence intervals due to the small numbers of women reported dying from road injuries.

## Measuring the data

- NOMS-SA uses mortality data with occupation information from Statistics South Africa, which is a South African national statistical entity, who is responsible for recording vital events on an annual basis. The data brief includes only the working population (15- 69).
- Deaths were defined using the International Classification of Diseases, 10<sup>th</sup> Revision (ICD-10). Deaths due to interpersonal violence include the following underlying cause of death codes: E10 to E14.
- The figures are based on proportional mortality ratios (PMRs). A simple and potentially useful way of portraying the burden of a specific disease within a population. PMRs are the ratio of the proportion of observed deaths in a specific occupation over the proportion of observed deaths in the total data. These were calculated to estimate where excess mortality by occupation is found. PMRs also provides a way to compare occupations. Confidence intervals that do not include 100 indicate that a PMR is significant.

$$\frac{(\textit{Proportion of deaths from a particular cause in a specific group of workers})}{(\textit{Proportion of deaths from that cause in the general population})} \times 100$$

## Strengths and limitations

- PMRs can only be calculated where data on occupation or industry are available; it is not a reflection of length of employment.
- A statistically significantly elevated PMR cannot be interpreted directly as a causal relationship between the occupation and the cause of death.
- A lack of significantly increased PMRs may represent the selection of healthy workers for particular occupations and/or improved socioeconomic circumstances of selected workers than the general population.

# References

1. SASCO.
2. Statistics South Africa.

# Appendix

Table 1: Road injuries-related deaths by industry (men)

| <b>Men</b>                                    |             |              |          |           |           |
|---|-------------|--------------|----------|-----------|-----------|
| Occupation                                    | n           | Total deaths | PMR      | 95% CI LL | 95% CI UL |
| Agriculture                                   | 304         | 12750        | 87,07618 | 77,82     | 97,44     |
| Mining  | 344         | 10288        | 122,1134 | 109,87    | 135,72    |
| Manufacturing                                 | 186         | 8923         | 76,12688 | 65,94     | 87,89     |
| Construction                                  | 276         | 12137        | 83,04886 | 73,81     | 93,45     |
| Wholesale, retail, motor repair, accomodation | 234         | 9295         | 91,93956 | 80,88     | 104,51    |
| Transport                                     | 359         | 9742         | 134,5805 | 121,35    | 149,25    |
| Human health                                  | 35          | 945          | 135,2609 | 97,12     | 188,39    |
| Educational services                          | 95          | 2881         | 120,4249 | 98,49     | 147,25    |
| Waste & recycling                             | 2           | 54           | 135,2609 | 33,83     | 540,85    |
| <b>Total</b>                                  | <b>1835</b> | <b>67015</b> |          |           |           |

Table 2 Road injuries-related deaths by industry (women)

| <b>Women</b>                                  |            |              |          |           |           |
|---|------------|--------------|----------|-----------|-----------|
| Occupation                                    | n          | Total deaths | PMR      | 95% CI LL | 95% CI UL |
| Agriculture                                   | 42         | 3663         | 79,94974 | 59,08421  | 108,1839  |
| Mining  | 10         | 594          | 117,3865 | 63,15966  | 218,1709  |
| Manufacturing                                 | 21         | 2293         | 63,85868 | 41,63601  | 97,94241  |
| Construction                                  | 16         | 785          | 142,1199 | 87,06643  | 231,9847  |
| Wholesale, retail, motor repair, accomodation | 61         | 5247         | 81,06315 | 63,07195  | 104,1863  |
| Transport                                     | 14         | 668          | 146,1357 | 86,54838  | 246,748   |
| Human health                                  | 39         | 2576         | 105,5659 | 77,12934  | 144,4865  |
| Educational services                          | 76         | 3576         | 148,1906 | 118,3531  | 185,5505  |
| Waste & recycling                             | 0          | 52           | 0        | 0         | 0         |
| <b>Total</b>                                  | <b>279</b> | <b>19454</b> |          |           |           |

Table 3 Road injuries-related deaths by major occupation (men)

| <b>Men</b>   |             |               |          |           |           |
|--|-------------|---------------|----------|-----------|-----------|
| Occupation   | n           | Total deaths  | PMR      | 95% CI LL | 95% CI UL |
| Armed forces, unspecified occupations & unemployed | 5130        | 414682        | 82,67168 | 80,44     | 84,97     |
| Managers   | 101         | 3257          | 207,2327 | 170,51    | 251,86    |
| Professionals                                      | 225         | 7441          | 202,0718 | 177,32    | 230,28    |
| Technicians  | 102         | 3452          | 197,4622 | 162,63    | 239,75    |
| Clerks   | 64          | 1938          | 220,6891 | 172,73    | 281,96    |
| Service & sales workers                            | 350         | 12013         | 194,7023 | 175,34    | 216,21    |
| Skilled agricultural & fishery workers             | 120         | 5801          | 138,2398 | 115,59    | 165,32    |
| Craft & related trade workers                      | 244         | 13160         | 123,9049 | 109,29    | 140,47    |
| Plant & machine operators                          | 732         | 18578         | 263,3096 | 244,91    | 283,09    |
| Elementary occupations                             | 522         | 26898         | 129,6896 | 119,03    | 141,31    |
| <b>Total</b>                                       | <b>7590</b> | <b>507220</b> |          |           |           |

Table 4 Road injuries-related deaths by major occupation (women)

| <b>Women</b>                                       |             |               |          |           |           |
|--|-------------|---------------|----------|-----------|-----------|
| Occupation   | n           | Total deaths  | PMR      | 95% CI LL | 95% CI UL |
| Armed forces, unspecified occupations & unemployed | 1764        | 332216        | 87,16215 | 83,18804  | 91,32612  |
| Managers   | 33          | 1103          | 491,1208 | 349,1487  | 690,8221  |
| Professionals                                      | 131         | 6644          | 323,6619 | 272,7221  | 384,1163  |
| Technicians  | 21          | 1709          | 201,7099 | 131,5153  | 309,3698  |
| Clerks   | 46          | 3143          | 240,25   | 179,9526  | 320,7513  |
| Service & sales workers                            | 55          | 5686          | 158,7836 | 121,9067  | 206,8159  |
| Skilled agricultural & fishery workers             | 13          | 1212          | 176,0721 | 102,2364  | 303,2325  |
| Craft & related trade workers                      | 4           | 1266          | 51,86522 | 19,46559  | 138,1926  |
| Plant & machine operators                          | 15          | 682           | 361,0412 | 217,6574  | 598,8804  |
| Elementary occupations                             | 219         | 24056         | 149,4413 | 130,9033  | 170,6045  |
| <b>Total</b>                                       | <b>2301</b> | <b>377717</b> |          |           |           |

Table 5 Road injuries-related deaths by sub-major occupation (men)

| Men   |             |               |            |                 |                 |
|---|-------------|---------------|------------|-----------------|-----------------|
| Occupation  | n           | Total deaths  | PMR        | 95% CI LL       | 95% CI UL       |
| Occupations unspecified                           | 4698        | 374613        | 83,81709   | 81,45423        | 86,24849        |
| Not economically active persons                   | 432         | 40069         | 72,05724   | 65,57276        | 79,18298        |
| Chief executives & senior officials               | 20          | 555           | 240,846    | 155,3823        | 373,3166        |
| Administrative & commercial managers              | 17          | 330           | 344,3003   | 214,036         | 553,8445        |
| Production & specialised services managers        | 17          | 478           | 237,6968   | 147,7655        | 382,3613        |
| Hospitality & retail services                     | 47          | 1894          | 165,8518   | 124,6113        | 220,741         |
| Science & engineering professionals               | 39          | 1268          | 205,5643   | 150,191         | 281,353         |
| Health professionals                              | 31          | 695           | 298,1119   | 209,6506        | 423,899         |
| Teaching professionals                            | 80          | 2431          | 219,9416   | 176,6601        | 273,8271        |
| Business & administration professionals           | 47          | 2202          | 142,6537   | 107,1816        | 189,8654        |
| Information & Communication Technologist          | 4           | 91            | 293,7792   | 110,2586        | 782,7617        |
| Legal, social & cultural professionals            | 24          | 754           | 212,7366   | 163,3293        | 277,0897        |
| Science & engineering associate professionals     | 55          | 1384          | 265,6006   | 99,68284        | 707,6811        |
| Health associate professionals                    | 4           | 263           | 101,6498   | 65,57959        | 157,5595        |
| Business & administration associate professionals | 20          | 1150          | 95,75181   | 56,70869        | 161,6755        |
| Legal, social, cultural associate professionals   | 14          | 493           | 361,269    | 187,9713        | 694,3361        |
| Information & communications technician           | 9           | 162           | 308,4681   | 160,4986        | 592,8562        |
| General & keyboard clerks                         | 49          | 1396          | 3721,481   | 2812,635        | 4924,002        |
| Customer services clerks                          | 9           | 259           | 57,72676   | 30,03573        | 110,9472        |
| Numerical & material recording clerks             | 5           | 195           | 15,74806   | 6,554674        | 37,8358         |
| Other clerical support workers                    | 1           | 88            | 61,88404   | 8,716888        | 439,335         |
| Personal services workers                         | 36          | 1042          | 230,907    | 166,5588        | 320,1155        |
| Sales workers                                     | 45          | 2122          | 141,7325   | 105,8224        | 189,8285        |
| Personal care workers                             | 4           | 108           | 247,5362   | 92,90306        | 659,5492        |
| Protective service workers & armed forces         | 265         | 8741          | 202,6223   | 179,6376        | 228,5478        |
| Market-orientated skilled agricultural workers    | 13          | 1027          | 84,60096   | 49,12359        | 145,7003        |
| Market-orientated skilled forestry workers        | 79          | 3716          | 142,0868   | 113,9684        | 177,1427        |
| Subsistence farmers                               | 28          | 1058          | 176,8784   | 122,1265        | 256,1767        |
| Building & related trades workers                 | 96          | 6187          | 103,7035   | 84,90173        | 126,669         |
| Metal, machinery & related trades workers         | 86          | 4325          | 132,8969   | 107,5785        | 164,1738        |
| Handicraft & printing workers                     | 7           | 294           | 159,1304   | 75,86182        | 333,7974        |
| Electrical & electronic trades worker             | 47          | 1815          | 173,0707   | 130,0352        | 230,349         |
| Food processing, wood working workers             | 8           | 539           | 99,19816   | 49,60813        | 198,3601        |
| Stationary plant & machine operators              | 241         | 7245          | 222,3213   | 195,9518        | 252,2393        |
| Assemblers  | 1           | 29            | 230,4647   | 32,46289        | 1636,144        |
| Drivers & mobile plant operators                  | 490         | 11304         | 289,7119   | 265,1626        | 316,534         |
| Cleaners & helpers                                | 26          | 1963          | 88,52286   | 60,27234        | 130,0148        |
| Agricultural, forestry & fishery labours          | 59          | 2885          | 136,6811   | 105,8984        | 176,4118        |
| Labourers in mining, construction & manufacturing | 39          | 2280          | 114,3226   | 83,52728        | 156,4718        |
| Food preparation assistants                       | 0           | 14            | 0          | -               | -               |
| Street & related sales workers                    | 3           | 145           | 138,2788   | 44,59695        | 428,752         |
| Refuse workers & other elementary workers         | 394         | 19600         | 134,3515   | 121,7191        | 148,2949        |
| <b>Total</b>                                      | <b>7589</b> | <b>507209</b> | <b>100</b> | <b>97,77522</b> | <b>102,2754</b> |

Table 6 Road injuries-related deaths by sub-major occupation (women)

| Women   |             |               |            |            |            |
|---|-------------|---------------|------------|------------|------------|
| Occupation  | n           | Total deaths  | PMR        | 95% CI LL  | 95% CI UL  |
| Occupations unspecified                           | 1500        | 294129        | 83,7147869 | 79,583648  | 88,0603706 |
| Not economically active persons                   | 264         | 38087         | 113,782619 | 100,852607 | 128,370349 |
| Chief executives & senior officials               | 4           | 186           | 353,017155 | 132,491256 | 940,598762 |
| Administrative & commercial managers              | 7           | 172           | 668,064441 | 318,484647 | 1401,35514 |
| Production & specialised services managers        | 2           | 106           | 309,722598 | 77,4589223 | 1238,43819 |
| Hospitality & retail services                     | 20          | 639           | 513,780836 | 331,466736 | 796,371757 |
| Science & engineering professionals               | 4           | 141           | 465,682204 | 174,7757   | 1240,78986 |
| Health professionals                              | 27          | 1935          | 229,050666 | 157,077773 | 334,001473 |
| Teaching professionals                            | 61          | 3285          | 304,819835 | 237,167968 | 391,769315 |
| Business & administration professionals           | 21          | 933           | 369,476154 | 240,899332 | 566,679148 |
| Information & Communication Technologist          | 0           | 17            | 0          | -          | -          |
| Legal, social & cultural professionals            | 18          | 333           | 887,313389 | 559,040434 | 1408,35081 |
| Science & engineering associate professionals     | 4           | 161           | 407,833483 | 153,064433 | 1086,65447 |
| Health associate professionals                    | 5           | 396           | 207,26386  | 86,2675936 | 497,965757 |
| Business & administration associate professionals | 9           | 779           | 189,650423 | 98,676731  | 364,496092 |
| Legal, social, cultural associate professionals   | 3           | 355           | 138,720826 | 44,739507  | 430,122474 |
| Information & communications technician           | 0           | 18            | 0          | -          | -          |
| General & keyboard clerks                         | 37          | 2309          | 263,042882 | 190,584383 | 363,049462 |
| Customer services clerks                          | 7           | 698           | 164,623329 | 78,4804575 | 345,319605 |
| Numerical & material recording clerks             | 1           | 65            | 252,543041 | 35,572814  | 1792,88565 |
| Other clerical support workers                    | 1           | 71            | 231,201376 | 32,5666607 | 1641,37419 |
| Personal services workers                         | 11          | 1638          | 110,237042 | 61,0486287 | 199,057795 |
| Sales workers                                     | 17          | 1930          | 144,590705 | 89,8855507 | 232,589908 |
| Personal care workers                             | 2           | 509           | 64,5001874 | 16,1309347 | 257,906579 |
| Protective service workers & armed forces         | 25          | 1609          | 255,054346 | 172,341271 | 377,464545 |
| Market-orientated skilled agricultural workers    | 0           | 61            | 0          | -          | -          |
| Market-orientated skilled forestry workers        | 11          | 1023          | 176,508577 | 97,7494172 | 318,725971 |
| Subsistence farmers                               | 2           | 128           | 256,489027 | 64,14567   | 1025,58163 |
| Building & related trades workers                 | 3           | 133           | 370,269873 | 119,417481 | 1148,07127 |
| Metal, machinery & related trades workers         | 0           | 479           | 0          | -          | -          |
| Handicraft & printing workers                     | 0           | 55            | 0          | -          | -          |
| Electrical & electronic trades workers            | 0           | 47            | 0          | -          | -          |
| Food processing, wood working workers             | 1           | 552           | 29,7378581 | 4,18882774 | 211,118781 |
| Stationary plant & machine operators              | 10          | 551           | 297,918289 | 160,294513 | 553,701466 |
| Assemblers  | 1           | 10            | 1641,52977 | 231,223291 | 11653,7567 |
| Drivers & mobile plant operators                  | 4           | 121           | 542,654469 | 203,664245 | 1445,87909 |
| Cleaners & helpers                                | 115         | 15786         | 119,584393 | 99,6088884 | 143,565774 |
| Agricultural, forestry & fishery labours          | 11          | 630           | 286,616309 | 158,726435 | 517,550267 |
| Labourers in mining, construction & manufacturing | 8           | 578           | 227,201352 | 113,621414 | 454,319768 |
| Food preparation assistants                       | 0           | 43            | 0          | -          | -          |
| Street & related sales workers                    | 1           | 184           | 89,2135744 | 12,5664832 | 633,356344 |
| Refuse workers & other elementary workers         | 84          | 6834          | 201,768365 | 162,921225 | 249,878266 |
| <b>Total</b>                                      | <b>2301</b> | <b>377716</b> |            |            |            |