

# OCCUPATION AND MORTALITY

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## Chronic Respiratory Diseases Mortality in South Africa, 2011- 2015

National Institute for Occupational Health

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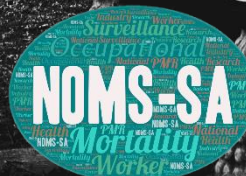
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**NATIONAL INSTITUTE FOR  
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Division of the National Health Laboratory Service

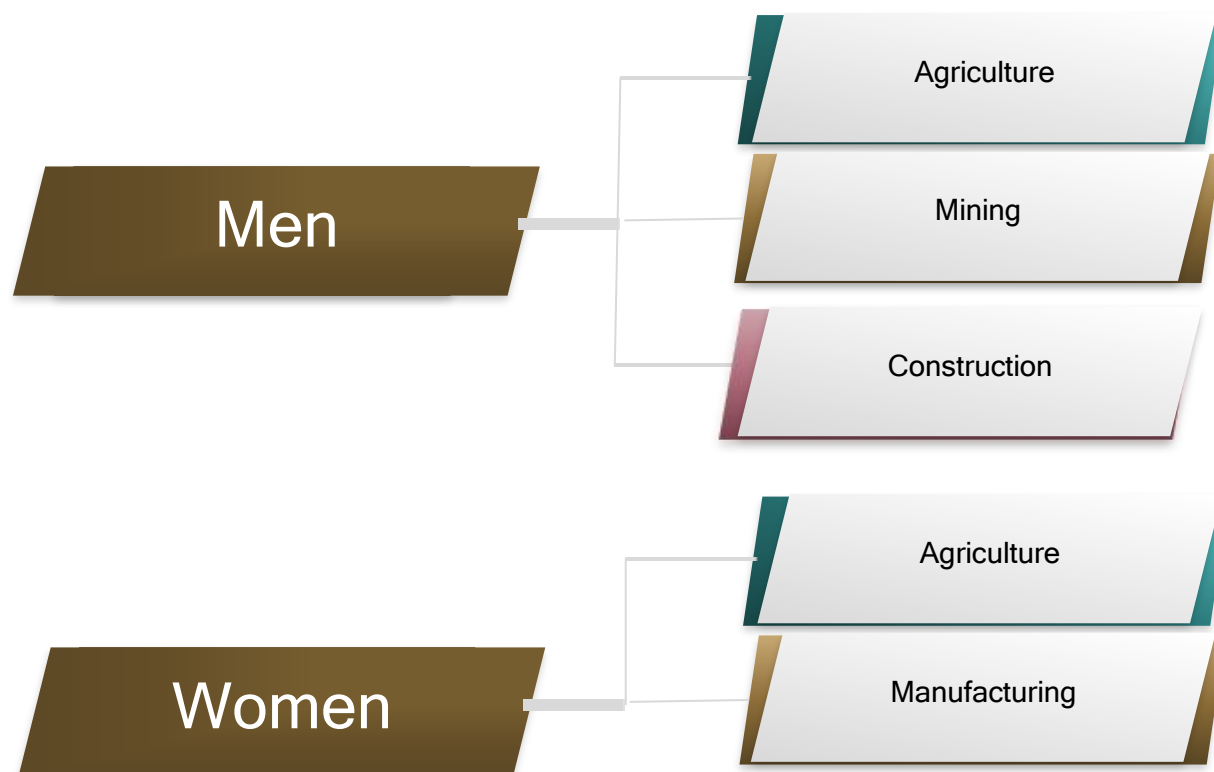


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## Main points

- There were 44,789 reported deaths due to chronic respiratory diseases from 2011 to 2015 in the 15 - 69 years age group.
- The main industries with significantly elevated proportionate mortality ratios (PMRs) for chronic respiratory disease deaths among men were agriculture, mining as well as construction. Among women, the main industries with elevated PMR for chronic respiratory disease-related deaths were agriculture and manufacturing.
- The major occupation groups with significantly elevated PMRs for chronic respiratory disease deaths among men were skilled agricultural and fishery workers, craft and related trade workers, and elementary occupations. Among women, these were technicians and associate professionals, clerks, and elementary occupations.



# Introduction

The National Occupational Mortality Surveillance South Africa (NOMS-SA) is a nationwide, 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 well-being 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.

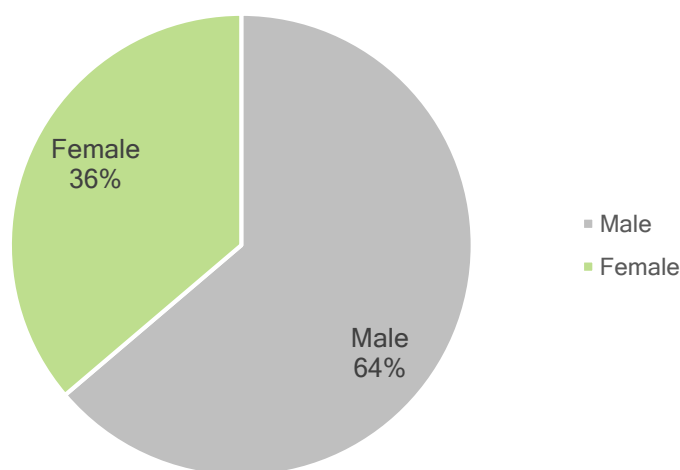
This report presents the analysis of deaths involving chronic respiratory diseases in different occupation groups and industries among those aged 15 to 69 years in South Africa. This analysis includes deaths that were registered from 2011 to 2015 by the Statistics South Africa.

Occupation was defined using the South African Standard Classification of Occupations (SASCO). There are ten major occupation groups, which then divide into 42 sub-major groups. For further information on the breakdown of occupation groups, see Tables 1 and 2 in the Appendix section.

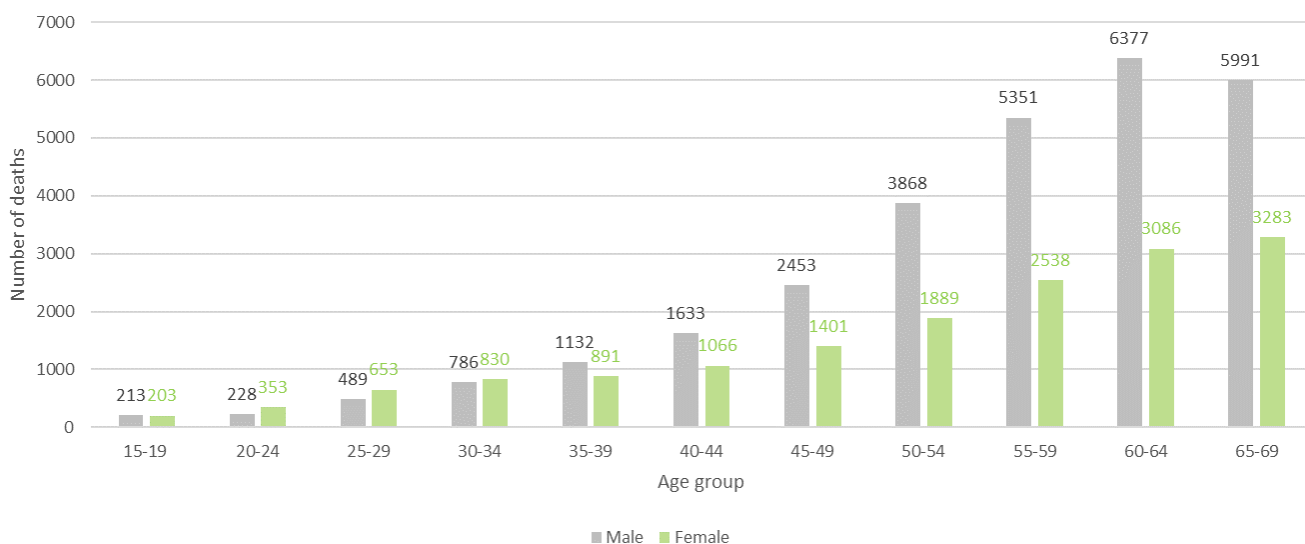
We calculated proportional mortality ratios for the population at risk of dying from chronic respiratory diseases. The results of the analysis do not prove that the observed proportions of deaths involving chronic respiratory diseases are caused by occupational exposure. The findings presented here should be interpreted considering the warnings in the strengths and limitations section.

# Chronic respiratory diseases mortality by sex and age

- There were 44,789 reported deaths due to chronic respiratory diseases from 2011-2015 among 15 to 69-year-olds.
- Number of reported deaths due to chronic respiratory diseases by sex:
  - Men (28,521), Women (16,193), and Unspecified (75).

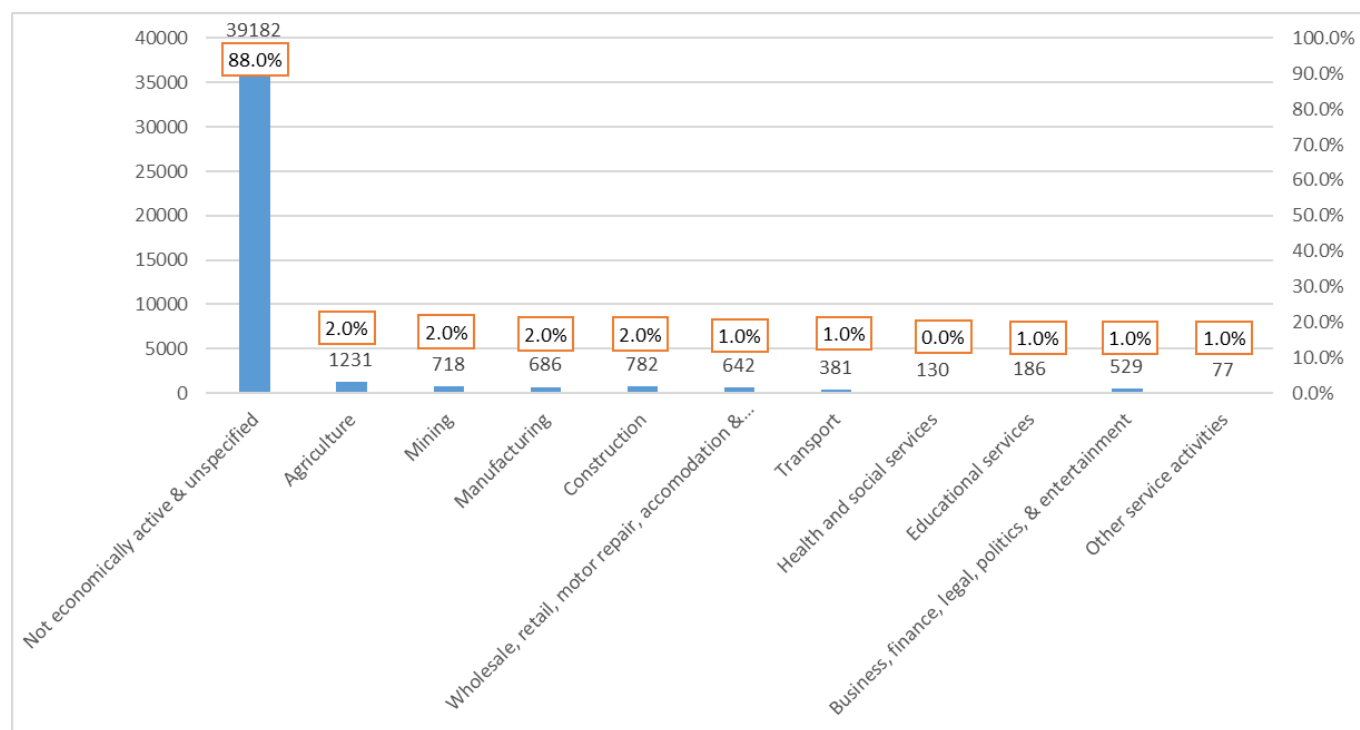


- Mean age of death due to chronic respiratory diseases: men (55.3 years), women (57.2 years).

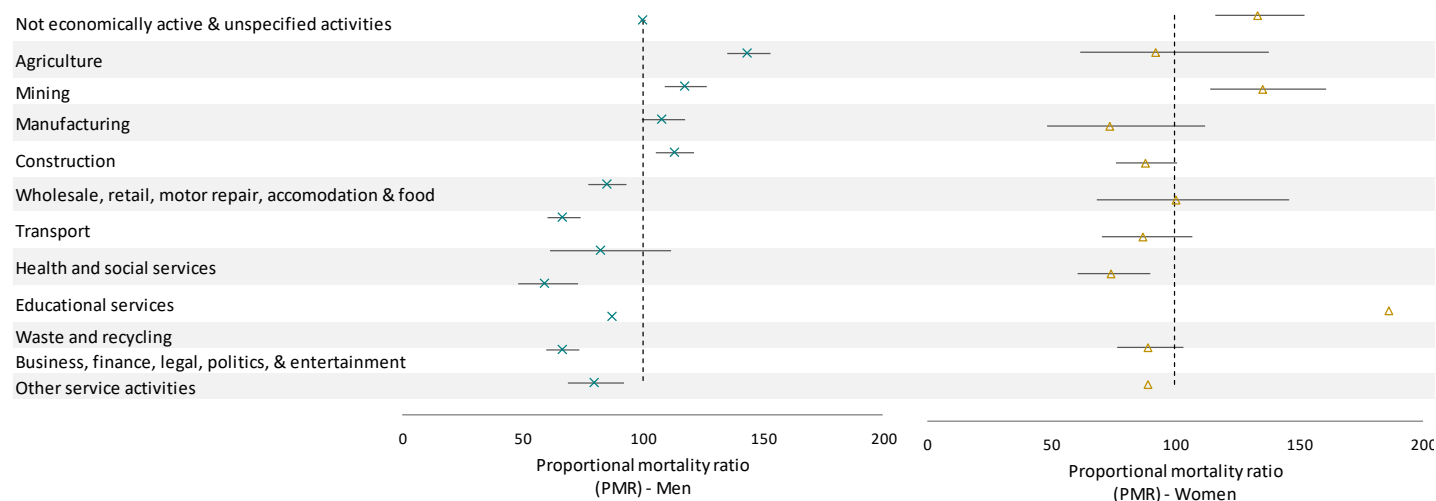




## Chronic respiratory diseases mortality by sex and main industry



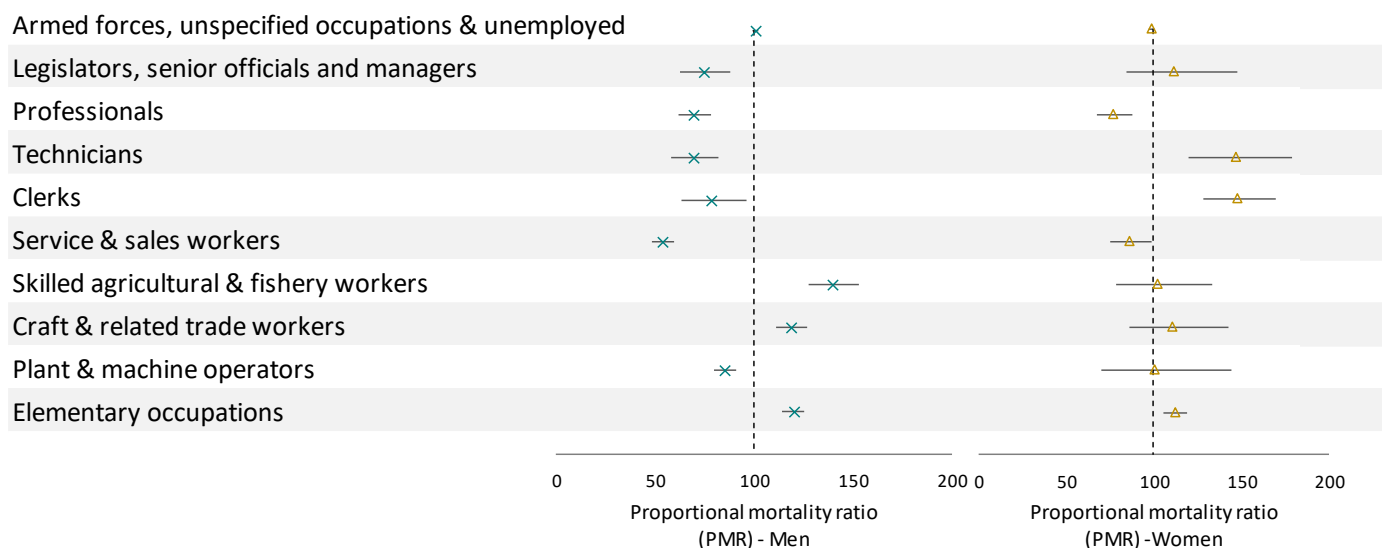
**Figure 1.** Percentage of chronic respiratory diseases related deaths by main industry.



**Figure 2.** Chronic respiratory disease-related mortality by sex and main industry. Source: Statistics South Africa (See Appendix Tables 1 and 2)

- The main industries with significantly elevated PMRs for chronic respiratory diseases-related deaths were agriculture in both men and women compared to the general population. Among men, the mining and construction industries had elevated PMRs for chronic respiratory disease-related deaths compared to the general population. Among women, the manufacturing industry had significantly elevated PMRs for chronic respiratory disease-related deaths compared to the general populations. In both men and women, the educational services industry appear to be protective; in addition, the wholesale, retail, motor repair, accomodation and food industry, the transport industry, business, finance, legal, politics, and entertainment industry were protective among men.

## Chronic respiratory diseases-related mortality by sex and major occupation



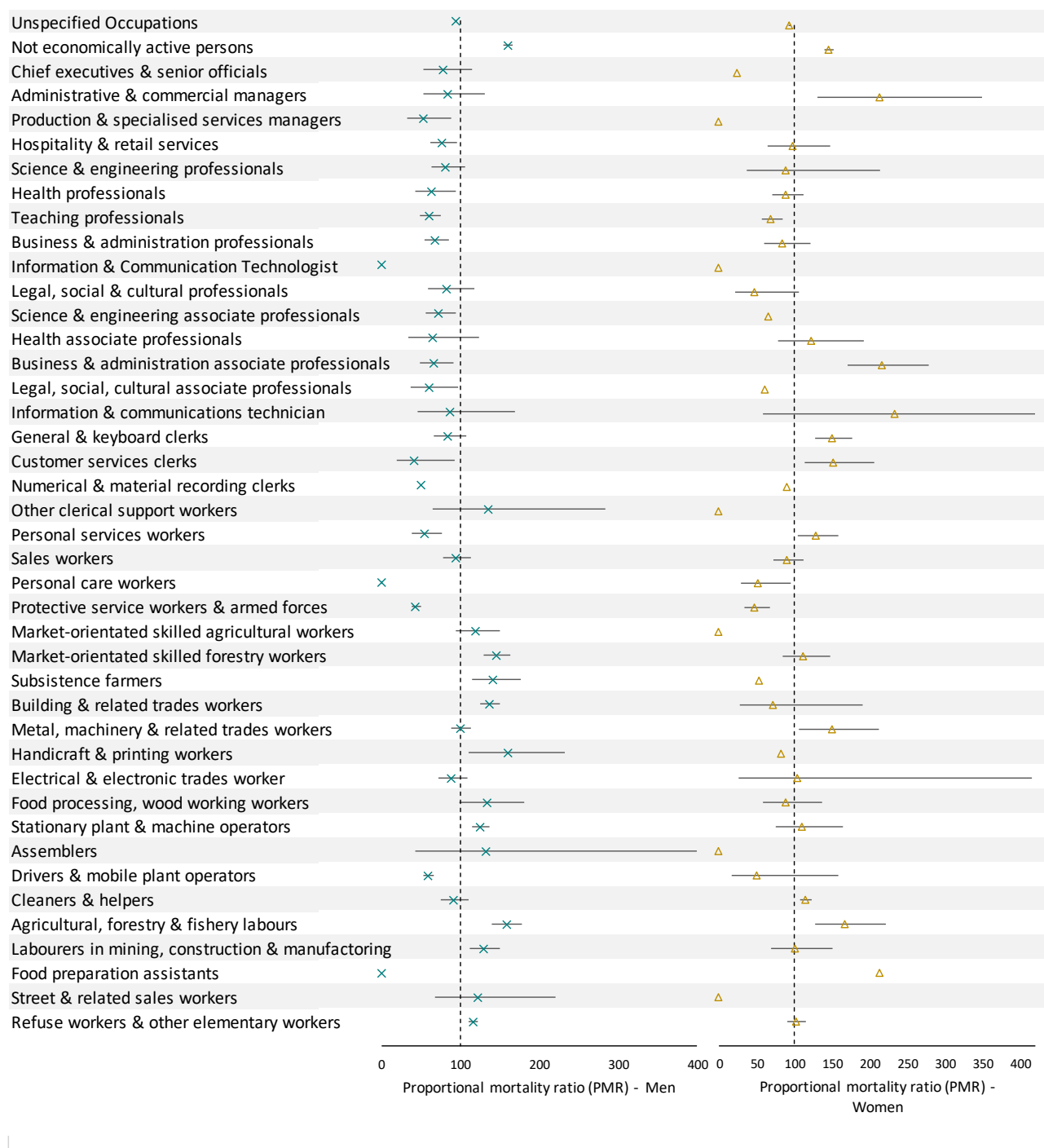
**Figure 3.** Chronic respiratory diseases-related mortality by sex and major occupation. Source: Statistics South Africa. (See Appendix Tables 3 and 4)

- Among men, the major occupations with significantly elevated PMRs for chronic respiratory diseases-related mortality were: skilled agricultural and fishery workers, craft and related trade workers, and elementary occupations. All other major occupations were protective amongst men except for the armed forces, unspecified occupations, and unemployed categories.

- Among women, major occupations with significantly elevated PMRs compared to the general population were technicians and associate professionals, clerks, and elementary occupations. Service and sales workers, and professionals major occupations were protective amongst women.



# Chronic respiratory diseases-related mortality by sex and sub-major occupation



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

- Regarding sub-occupation groups, men and women who were not economically active had significantly increased PMR compared to the general population.
- Men employed in the following sub-major occupation groups had excess mortality due to chronic respiratory diseases compared to the general population:
  - Market-orientated skilled forestry workers
  - Subsistence farmers
  - Building and related trades workers
  - Handicraft and printing workers
  - Stationary plant and machine operators
  - Agricultural, forestry and fishery labours
  - Labourers in mining, construction and manufacturing
  - Refuse workers and other elementary workers
- Women employed in the following sub-major occupation groups, had significant excess mortality due to chronic respiratory diseases compared to the general population.
  - Business and administration associate professionals
  - General and keyboard clerks
  - Customer services clerks
  - Personal services workers
  - Metal, machinery and related trades workers
  - Cleaners and helpers
  - Agricultural, forestry and fishery labours

- NOMS-SA uses mortality data with occupation information from Statistics South Africa, which is a South African national statistical entity responsible for recording vital events on an annual basis. The data brief includes only the working population (15 - 69 years).
- Deaths were defined using the International Classification of Diseases, 10<sup>th</sup> Revision (ICD-10). Deaths due to chronic respiratory diseases include the following underlying cause of death code: J30-J39, J40-J47, J60-J68, J70, J82, J84-J85, J91-J92, J95, J98-J99.
- 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. Confidence intervals that do not include 100 indicate that a PMR is significant.

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

## Strengths and limitations

- PMRs can only be calculated where data on occupation or industry are available; it is not a reflection of the 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 Chronic respiratory diseases-related deaths by industry (men)

<b>Men</b>					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Not economically active & unspecified activities	24013	733993	100.0371	98.78	101.31
Agriculture	1017	21634	143.7443	135.18	152.86
Mining	694	18064	117.4768	109.05	126.55
Manufacturing	556	15710	108.2194	99.59	117.60
Construction	759	20531	113.0416	105.28	121.38
Wholesale, retail, motor repair, accomodation & food	447	16078	85.01237	77.49	93.27
Transport	354	16215	66.7564	60.15	74.09
Health and social services	43	1588	82.7989	61.41	111.64
Educational services	86	4439	59.24066	47.95	73.18
Waste and recycling	3	105	87.36522	-	-
Business, finance, legal, politics, & entertainment	361	16612	66.44953	59.94	73.67
Other service activities	179	6866	79.7179	68.85	92.30
<b>Total</b>	<b>28512</b>	<b>871835</b>			

Table 2 Chronic respiratory diseases-related deaths by industry (women)

<b>Women</b>					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Not economically active & unspecified activities	15097	618321	100.2073	98.62150325	101.8186206
Agriculture	213	6557	133.3206	116.5662256	152.4830658
Mining	24	1067	92.31443	61.87505489	137.7284175
Manufacturing	130	3936	135.5536	114.144327	160.9784359
Construction	22	1223	73.82764	48.61148244	112.1241316
Wholesale, retail, motor repair, accomodation & food	194	9064	87.84248	76.31163454	101.1156599
Transport	27	1106	100.1916	68.70914886	146.0993271
Health and social services	87	4108	86.91837	70.44521703	107.2436617
Educational services	100	5550	73.94857	60.78662813	89.96042333
Waste and recycling	4	88	186.5521	-	-
Business, finance, legal, politics, & entertainment	168	7748	88.99025	76.50143704	103.5178531
Other service activities	120	5529	89.07532	74.48216106	106.5277007
<b>Total</b>	<b>16186</b>	<b>664297</b>			

Table 3 Chronic respiratory diseases-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	23,384	710203	100.6403	99.36	101.94
Legislators, senior officials and managers	134	5520	74.19958	62.64	87.89
Professionals	286	12601	69.374	61.78	77.90
Technicians and Associate professionals	128	5678	68.90493	57.94	81.94
Clerks	89	3488	77.99185	63.36	96.00
Service & sales workers	358	20458	53.4879	48.22	59.33
Skilled agricultural & fishery workers	449	9812	139.87	127.51	153.42
Craft & related trade workers	897	23116	118.6084	111.09	126.63
Plant & machine operators	912	32749	85.12017	79.77	90.83
Elementary occupations	1868	47653	119.8181	114.51	125.38
<b>Total</b>	<b>28,505</b>	<b>871278</b>			

Table 4 Chronic respiratory diseases-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	14091	584122	99.01013	97.38876	100.6585
Legislators, senior officials and managers	49	1797	111.9153	84.58375	148.0784
Professionals	210	11172	77.14891	67.38918	88.32209
Technicians and Associate professionals	97	2714	146.6909	120.2196	178.991
Clerks	196	5438	147.9307	128.6048	170.1608
Service & sales workers	209	9915	86.51571	75.54662	99.07747
Skilled agricultural & fishery workers	54	2163	102.4657	78.47705	133.7872
Craft & related trade workers	61	2255	111.026	86.38483	142.696
Plant & machine operators	29	1183	100.6131	69.91777	144.7844
Elementary occupations	1178	43074	112.2462	106.0158	118.8427
<b>Total</b>	<b>16174</b>	<b>663833</b>			



Table 5 Chronic respiratory diseases-related deaths by sub-major occupation (men)

Men					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Occupations unspecified	20085	647593	94.84061	93.53799	96.16136
Not economically active persons	3306	63166	160.0457	154.682	165.5955
Chief executives & senior officials	25	981	77.92838	52.65652	115.3291
Administrative & commercial managers	19	693	83.83879	53.47643	131.44
Production & specialised services managers	15	863	53.15022	32.04216	88.16342
Hospitality & retail services	75	2983	76.88341	61.31159	96.41014
Science & engineering professionals	57	2132	81.75462	63.06172	105.9885
Health professionals	25	1198	63.8128	43.11857	94.43897
Teaching professionals	82	4136	60.62587	48.82663	75.27646
Business & administration professionals	84	3753	68.44242	55.26497	84.76191
Information & Communication Professionals	5	169	0	-	-
Legal, social & cultural professionals	33	1213	83.19127	59.14253	117.0188
Science & engineering associate professionals	55	2325	72.33764	55.53749	94.21986
Health associate professionals	9	426	64.60372	33.61387	124.1643
Business & administration associate professionals	38	1748	66.47629	48.37056	91.35924
Legal, social, cultural associate professionals	17	865	60.09764	37.36001	96.67361
Information & communications technician	9	314	87.64709	45.60353	168.4521
General & keyboard clerks	70	2530	84.60619	66.93638	106.9405
Customer services clerks	6	440	41.69877	18.73334	92.81778
Numerical & material recording clerks	6	360	50.96516	-	-
Other clerical support workers	7	158	135.477	64.5856	284.1813
Personal services workers	33	1845	54.69432	38.88341	76.93431
Sales workers	115	3715	94.65938	78.84738	113.6423
Personal care workers	1	180	0	-	-
Protective service workers & armed forces	209	14718	43.42323	37.91772	49.72812
Market-orientated skilled agricultural workers	72	1846	119.2684	94.66916	150.2596
Market-orientated skilled forestry workers	295	6196	145.5912	129.8899	163.1906
Subsistence farmers	82	1770	141.6659	114.0943	175.9002
Building & related trades workers	492	11006	136.6974	125.1366	149.3262
Metal, machinery & related trades workers	243	7441	99.86185	88.0631	113.2414
Handicraft & printing workers	28	534	160.3398	110.7074	232.2236
Electrical & electronic trades worker	92	3175	88.60714	72.23093	108.6962
Food processing, wood working workers	42	960	133.7835	98.86829	181.0291
Stationary plant & machine operators	520	12707	125.1368	114.8303	136.3683
Assemblers	3	69	132.9526	42.87917	412.2373
Drivers & mobile plant operators	389	19973	59.55674	53.92281	65.77932
Cleaners & helpers	104	3492	91.07176	75.14758	110.3704
Agricultural, forestry & fishery labours	268	5176	158.3307	140.4652	178.4685
Labourers in mining, construction & manufacturing	177	4177	129.5786	111.8284	150.1464
Food preparation assistants	0	29	0	-	-
Street & related sales workers	11	275	122.3164	67.7381	220.8698
Refuse workers & other elementary workers	1306	34480	115.8245	109.71	122.2798
<b>Total</b>	<b>28510</b>	<b>871810</b>			

Table 6 Chronic respiratory diseases-related deaths by sub-major occupation (women)

Women					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Occupations unspecified	11905	522883	94.9384572	93.248255	96.6592956
Not economically active persons	2198	61703	148.538386	142.456554	154.879867
Chief executives & senior officials	2	340	24.528352	-	-
Administrative & commercial managers	16	307	217.319601	133.135724	354.73431
Production & specialised services managers	8	183	0	-	-
Hospitality & retail services	23	967	99.1787554	65.9064018	149.248408
Science & engineering professionals	5	230	90.6482576	37.7297183	217.788708
Health professionals	72	3301	90.9503269	72.1917147	114.583259
Teaching professionals	94	5590	70.1186164	57.2844818	85.8281372
Business & administration professionals	31	1496	86.4066947	60.766507	122.865658
Information & Communication Technologist	2	34	0	-	-
Legal, social & cultural professionals	6	521	48.0209579	21.5736118	106.890419
Science & engineering associate professionals	4	251	66.4513123	-	-
Health associate professionals	19	638	124.179588	79.2077359	194.685152
Business & administration associate professionals	63	1189	220.940833	172.596785	282.825961
Legal, social, cultural associate professionals	9	601	62.4432257	-	-
Information & communications technician	2	35	238.27542	59.5906057	952.753794
General & keyboard clerks	147	4006	153.011362	130.171669	179.858469
Customer services clerks	43	1157	154.971697	114.932535	208.959342
Numerical & material recording clerks	3	136	91.9813202	-	-
Other clerical support workers	3	139	0	-	-
Personal services workers	91	2904	130.665842	106.397216	160.47001
Sales workers	76	3472	91.2748584	72.8970344	114.285853
Personal care workers	11	864	53.0879842	29.399815	95.8623062
Protective service workers & armed forces	31	2675	48.3231459	33.983811	68.7129065
Market-orientated skilled agricultural workers	2	135	0	-	-
Market-orientated skilled forestry workers	49	1796	113.764573	85.9814144	150.525298
Subsistence farmers	3	232	53.9200842	-	-
Building & related trades workers	4	230	72.5186061	27.2170377	193.222653
Metal, machinery & related trades workers	32	874	152.67075	107.964376	215.88934
Handicraft & printing workers	2	100	83.396397	-	-
Electrical & electronic trades workers	2	79	105.565059	26.4009013	422.106111
Food processing, wood working workers	21	972	90.0887004	58.7380472	138.172349
Stationary plant & machine operators	25	925	112.697834	76.1503899	166.785774
Assemblers	1	17	0	-	-
Drivers & mobile plant operators	3	241	51.9064711	16.7406005	160.942957
Cleaners & helpers	802	28641	116.762526	108.954698	125.129874
Agricultural, forestry & fishery labours	50	1225	170.196728	128.994419	224.559533
Labourers in mining, construction & manufacturing	25	1006	103.623754	70.0189967	153.356701
Food preparation assistants	4	77	216.614018	-	-
Street & related sales workers	0	347	0	-	-
Refuse workers & other elementary workers	42	11775	14.8732428	10.9915769	20.1257155
<b>Total</b>	<b>15931</b>	<b>664294</b>			