

OCCUPATION AND MORTALITY

Ischemic heart disease-related
mortality in South Africa, 2013-
2015

National Institute for Occupational Health

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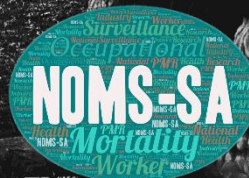
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1. Main points

- There were 14,305 reported deaths due to Ischemic (IHD) from 2013-2015.
- Main industries with significantly elevated PMRs for IHD-related deaths were manufacturing wholesale, retail, motor repair, accommodation & food, and health.
- Major occupation groups with significantly elevated PMRs for IHD-related deaths were managers, professionals, technicians, clerks, service and sales workers, skilled agricultural and fishery workers, craft & related trade workers and plant and machine operators, and elementary occupations.

2. 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 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 ischemic heart disease in different occupation groups and industries among those aged 15 to 65 years in South Africa. This analysis includes deaths that were registered from 2013 to 2015 by Statistics South Africa.

Occupation was defined using the South African Standard Classification of Occupations (SASCO). There are nine major occupation groups, which then divide into 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 IHD. The results of the analysis do not prove that the observed risk of death involving IHD is caused by occupational exposure. The findings presented here should be interpreted bearing in mind the warnings in the strengths and limitations section.

3. Ischemic heart disease-related mortality by sex and age

- There were 14305 reported deaths due to IHD from 2013-2015.
- Number of reported deaths due to IHD by sex:
 - Males (9648), Females (4626), Unknown (1) and Unspecified (30).
 - Males (68%) had the largest proportion of IHD-related deaths compared to females (32%).

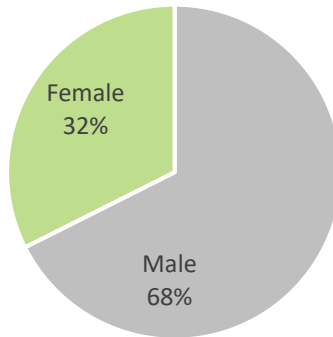


Figure 1. Percentage of IHD-related deaths by sex.

- Mean age of death due to IHD: males (53.4 years), females (53.6 years).
- IHD-related death increased with increasing age among males (Figure 2). IHD-related death was the highest in the age group 50+ years in both males (9885; 71.4%) and females (3355; 72.5%).

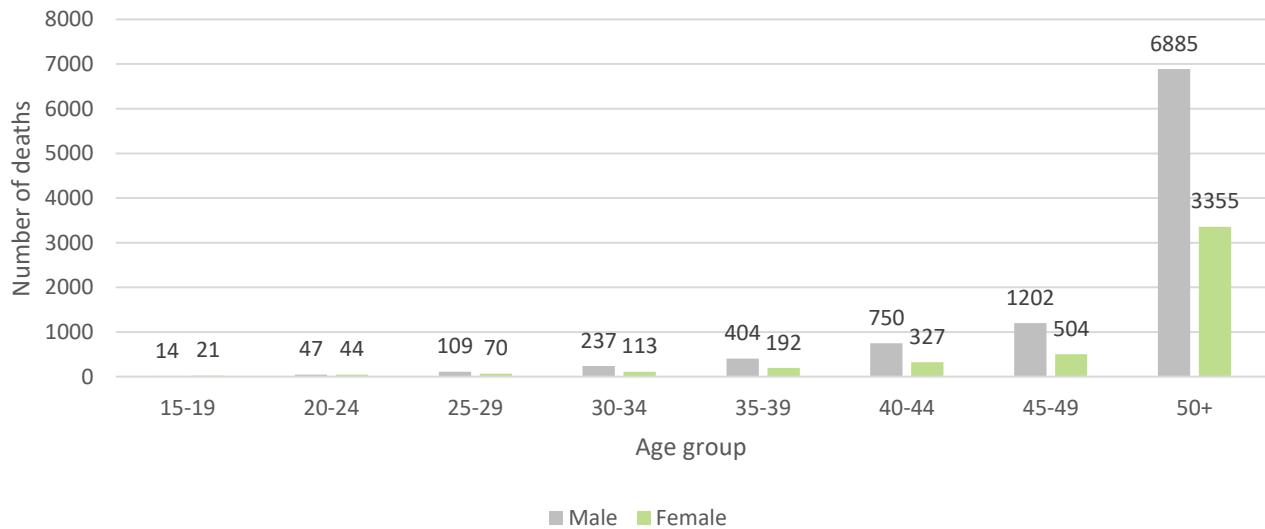


Figure 2. IHD-related mortality by sex and age

4. Ischemic Heart Disease-related mortality and main industry

- Manufacturing (18%) and wholesale and retail, motor repair, accommodation and food industries (18%) had the highest proportion of IHD-related deaths, followed by agriculture (15%), construction (14%), transport (13%), mining (9%), education (8%), and human health (5%). (Figure 3)

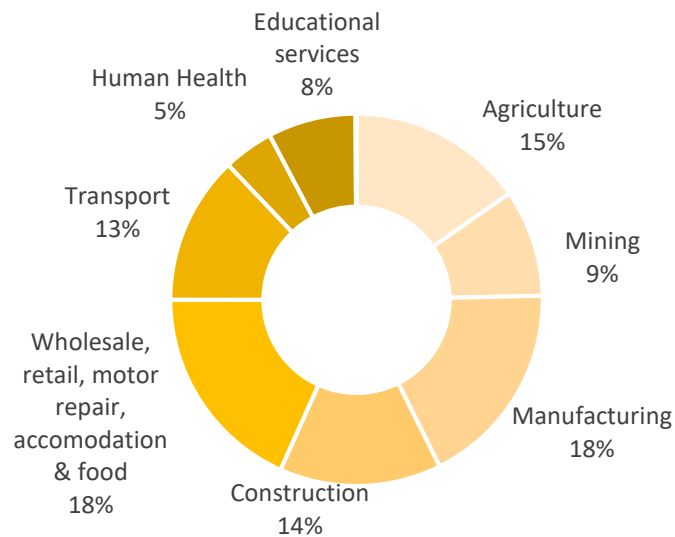


Figure 3. Percentage of IHD-related deaths by main industry.

5. Ischemic Heart Disease-related mortality by sex and main industry

- In figure 4, the main industries for men with significantly elevated PMRs for IHD-related deaths were the manufacturing and wholesale, retail, motor repair and accommodation compared to the general population.
- In females, the main industries with significantly elevated PMRs for IHD- and human health.

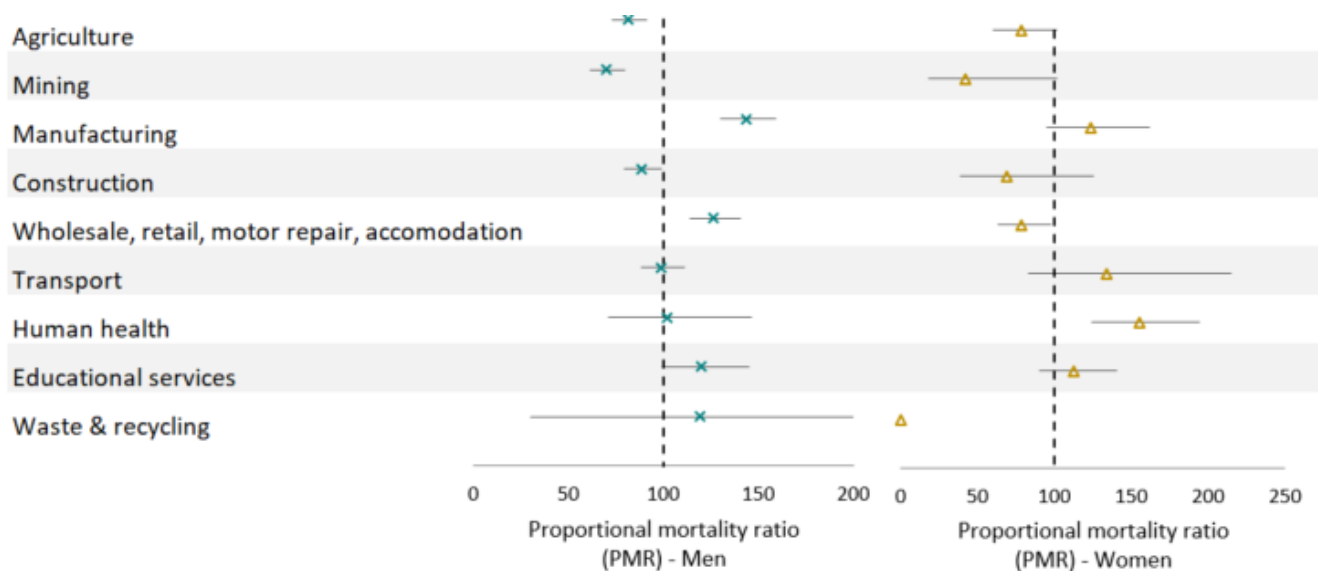


Figure 4 IHD-related mortality by sex and main industry. Source: Statistics South Africa (See Appendix Table 1 and 2)

6. Ischemic heart disease-related mortality by sex and major occupation

- Males working as managers, professionals, technicians, clerks, service and sales workers, skilled agricultural and fishery workers, craft & related trade workers and plant and machine operators had excess mortality due to IHD compared to the general population.
- Females working as managers, professionals, technicians, clerks, service and sales workers, craft and related trade worker, plant and machine, and elementary occupations had elevated PMRs for IHD than the general population (figure 5)

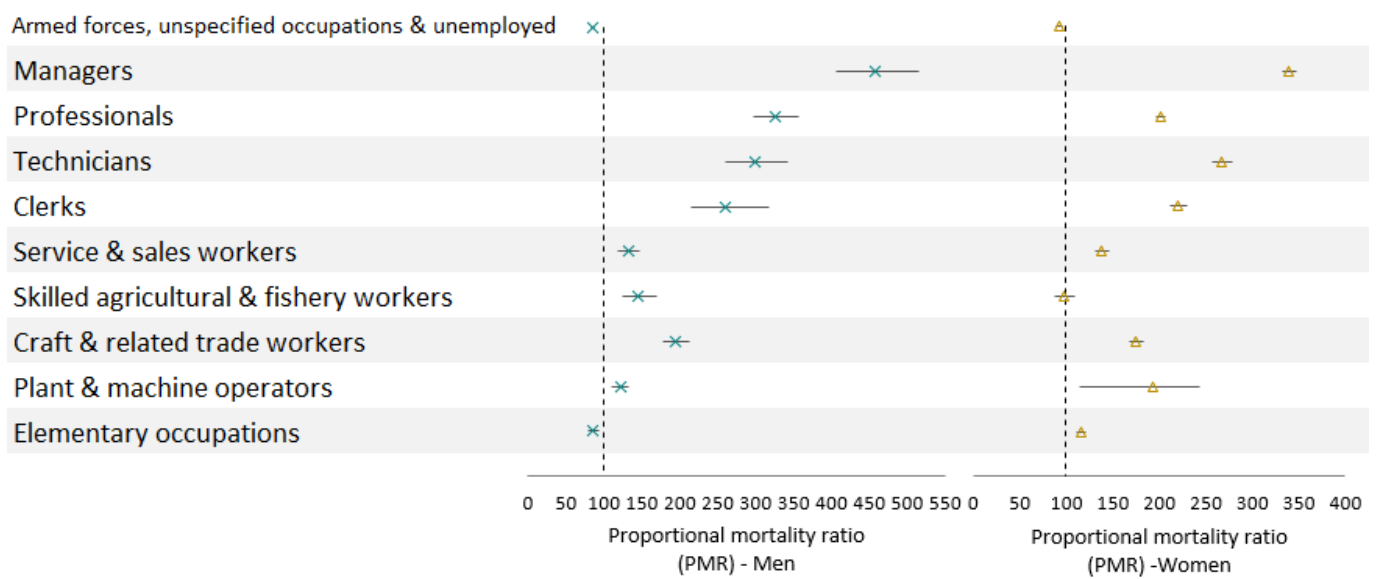


Figure 5. IHD-related mortality by sex and major occupation. Source: Statistics South Africa. (See Appendix. Table 3 and 4)

7. Ischemic heart disease-related mortality by sex and sub-major occupation

- In figure 6, males employed in the following sub-major occupation groups had excess mortality due to IHD compared to the general population.
 - Chief executives and senior officials, administrative and commercial managers, production and specialised services managers, hospitality and retail services, science and engineering professionals, health professionals, teaching professionals,
 - Business and administration professionals, information and communication technologist, legal, social and cultural professionals, science and engineering associate professionals, health associate professionals, business and administration associate professionals, legal, social, cultural associate professionals, information and communications technicians,
 - General and keyboard clerks, customer services clerks, numerical and material recording clerks, other clerical support workers,
 - Personal service workers, sales workers, subsistence farmers, building and related trades workers,
 - Metal, machinery and related trades workers, handicraft and printing workers, electrical and electronic trades worker, stationary plant and machine operators, assemblers, drivers and mobile plant operators.

- In figure 6, females employed in the following sub-major occupation groups had excess mortality due to IHD compared to the general population.
 - Chief executives and senior officials, administrative and commercial managers, production and specialised services managers, hospitality and retail services, health professionals,
 - Teaching professionals, business and administration professionals, science and engineering associate professionals, health associate professionals, business and administration associate professionals,
 - General and keyboard clerks, other clerical support workers, personal services workers, metal, machinery and related trades workers, stationary plant and machine operators, and cleaners and helpers.

- Males and females who were economically not active between 2013 - 2015 also had excess mortality due to IHD compared to the general population.

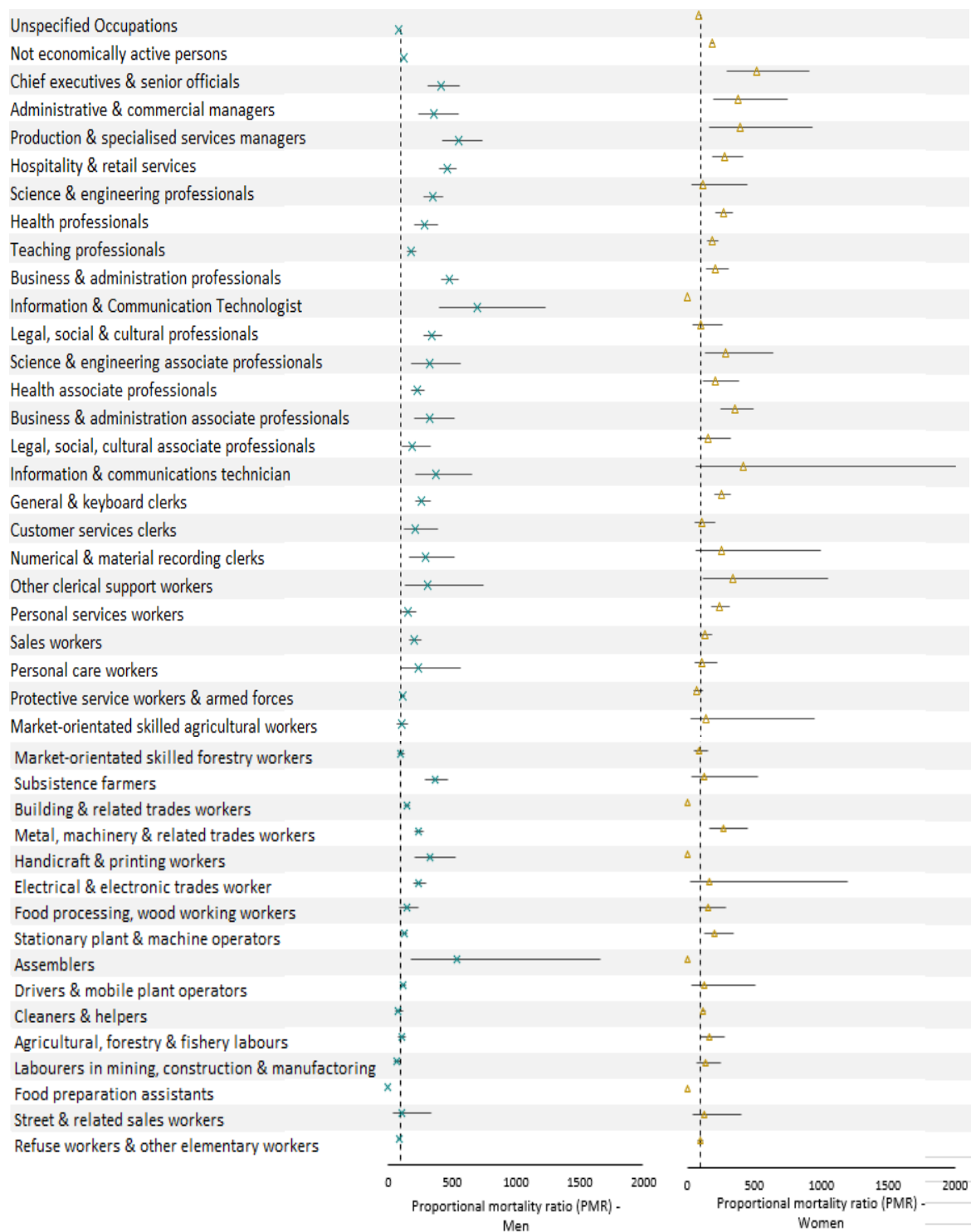


Figure 6. IHD-related mortality by sex and sub-major occupation. Source: Statistics South Africa (See Appendix, Tables 5 and 6)

8. Measuring the data

- NOMS-SA uses mortality data with occupation information from Statistics South Africa, which is a South African national statistical entity, that is responsible for recording vital events on an annual basis. The data brief includes only the working population (15+).
- Deaths were defined using the International Classification of Diseases, 10th Revision (ICD-10). Deaths due to IHD include the following underlying cause of death codes: from I20 to I25.
- 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.

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

9. 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

Statistics South Africa. South African Standard Classification of Occupations (SASCO). Pretoria: Statistics South Africa; 2012. Available from: http://www.statssa.gov.za/classifications/codelists/SASCO_2012.pdf. Date accessed 6 February 2021.

Statistics South Africa Datasets. Mortality and Causes of Death 2013-2015. Available from: <http://nesstar.statssa.gov.za:8282/webview/>. Date accessed 11 December 2020.

Appendix

Table 1 IHD-related deaths by industry (males)

Males					
Industry	n	Total deaths	PMR	95% CI LL	95% CI UL
Agriculture	309	11723	81.74012	73.12	91.38
Mining	217	9606	70.05396	61.33	80.02
Manufacturing	375	8089	143.7646	129.93	159.08
Construction	323	11302	88.62633	79.47	98.84
Wholesale, retail, motor repair, accommodation	354	8671	126.6046	114.08	140.50
Transport	290	9096	98.86967	88.12	110.93
Human health	29	884	101.7329	70.70	146.40
Educational services	104	2692	119.8047	98.86	145.19
Waste & recycling	2	52	119.273	29.83	476.92
Total	3959	85876			

Table 2 IHD-related deaths by industry (females)

Females					
Industry	n	Total deaths	PMR	95% CI LL	95% CI UL
Agriculture	55	3404	78.12887	59.98372	101.7629
Mining	5	571	42.34209	17.62367	101.7298
Manufacturing	53	2074	123.5679	94.40214	161.7444
Construction	11	767	69.34828	38.40467	125.2239
Wholesale, retail, motor repair, accommodation	81	4968	78.83913	63.41064	98.02154
Transport	17	615	133.6633	83.09248	215.012
Human health	75	2340	154.9829	123.593	194.3452
Educational services	78	3347	112.6879	90.26012	140.6885
Waste & recycling	0	47	0	0	0
Total	375	18133			

Table 3 IHD-related deaths by major occupation (males)

Males					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Armed forces, unspecified occupations & unemployed	6767	380007	86.1155	84.09	88.19
Managers	276	2915	457.8753	406.92	515.21
Professionals	450	6681	325.7225	296.98	357.25
Technicians	198	3203	298.9407	260.07	343.62
Clerks	97	1794	261.4725	214.29	319.05
Service & sales workers	315	11551	131.8766	118.09	147.27
Skilled agricultural & fishery workers	161	5325	146.212	125.28	170.64
Craft & related trade workers	489	12108	195.3049	178.74	213.41
Plant & machine operators	443	17587	121.8116	110.98	133.70
Elementary occupations	452	25396	86.06961	78.49	94.38
Total	9648	466567			

Table 4 IHD-related deaths by major occupation (females)

Females					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Armed forces, unspecified occupations & unemployed	3765	301539	92.7934	89.87615	95.80533
Managers	47	1030	339.1222	254.7965	451.3558
Professionals	165	6104	200.8931	172.4638	234.0088
Technicians	56	1557	267.2976	205.7057	347.3311
Clerks	84	2828	220.7473	178.2461	273.3826
Service & sales workers	101	5428	138.2857	113.7831	168.0647
Skilled agricultural & fishery workers	15	1139	97.87305	59.00377	162.3478
Craft & related trade workers	27	1144	175.4015	120.2864	255.7703
Plant & machine operators	17	656	192.5931	119.7265	309.807
Elementary occupations	348	22297	115.9921	104.4235	128.8423
Total	4625	343722			

Table 5 IHD-related deaths by sub-major occupation (males)

Males					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Occupations unspecified	6036	350451	83.28933	81.21439	85.41727
Not economically active persons	731	29556	119.6022	111.2387	128.5945
Chief executives & senior officials	42	490	414.4963	306.3197	560.8753
Administrative & commercial managers	21	282	360.112	234.7939	552.317
Production & specialised services managers	49	427	554.9267	419.4046	734.2401
Hospitality & retail services	164	1716	462.1617	396.5748	538.5957
Science & engineering professionals	81	1132	346.0238	278.3084	430.2151
Health professionals	37	635	281.7704	204.1532	388.8971
Teaching professionals	84	2253	180.2958	145.5828	223.2857
Business & administration professionals	189	1917	476.768	413.4187	549.8244
Information & Communication Technologist	12	83	699.1503	397.0501	1231.107
Legal, social & cultural professionals	47	661	343.8459	277.9946	425.296
Science & engineering associate professionals	85	1278	321.6292	182.6544	566.3445
Health associate professionals	12	254	228.4625	181.0481	288.2942
Business & administration associate professionals	71	1057	324.826	204.6525	515.5664
Legal, social, cultural associate professionals	18	458	190.0529	107.9317	334.6568
Information & communications technician	12	156	371.9838	211.251	655.0121
General & keyboard clerks	70	1284	263.6334	208.5742	333.2271
Customer services clerks	11	248	214.4907	118.7837	387.3112
Numerical & material recording clerks	11	184	289.0961	160.0997	522.0281
Other clerical support workers	5	78	309.9865	129.0229	744.7641
Personal services workers	31	977	153.4386	107.9074	218.1814
Sales workers	84	1964	206.826	167.0051	256.1419
Personal care workers	5	103	234.7471	97.70669	563.9961
Protective service workers & armed forces	195	8507	110.8474	96.33158	127.5506
Market-orientated skilled agricultural workers	21	981	103.5184	67.49427	158.77
Market-orientated skilled forestry workers	73	3457	102.1153	81.18269	128.4453
Subsistence farmers	67	887	365.2739	287.4921	464.0997
Building & related trades workers	174	5700	147.6188	127.2363	171.2665
Metal, machinery & related trades workers	200	3985	242.6996	211.29	278.7785
Handicraft & printing workers	17	251	327.5236	203.6067	526.8574
Electrical & electronic trades worker	83	1676	239.4812	193.1249	296.9646
Food processing, wood working workers	15	496	146.2436	88.16448	242.583
Stationary plant & machine operators	174	6767	124.3428	107.1741	144.2617
Assemblers	3	27	537.31	173.2904	1666.001
Drivers & mobile plant operators	266	10793	119.181	105.6855	134.3997
Cleaners & helpers	31	1867	80.29431	56.4679	114.1742
Agricultural, forestry & fishery labours	58	2696	104.0341	80.42762	134.5692
Labourers in mining, construction & manufacturing	30	2137	67.88661	47.46504	97.09446
Food preparation assistants	0	12	0	0	0
Street & related sales workers	3	133	109.078	35.17925	338.2108
Refuse workers & other elementary workers	330	18541	86.06929	77.26632	95.87517
Total	9648	466557	100	98.02434	102.0155

* PMRs cannot be calculated when n<5

Table 6 IHD-related deaths by sub-major occupation (females)

Females					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Occupations unspecified	3083	273668	83.7228177	80.8189923	86.7309774
Not economically active persons	682	27871	181.85538	168.706324	196.029279
Chief executives & senior officials	12	173	515.500953	292.754943	907.725859
Administrative & commercial managers	8	159	373.927316	186.997789	747.718135
Production & specialised services managers	5	96	387.073198	161.108036	929.970128
Hospitality & retail services	22	602	271.594217	178.830012	412.477851
Science & engineering professionals	2	134	110.922469	27.7407426	443.527927
Health professionals	62	1739	264.963735	206.576896	339.853015
Teaching professionals	74	3068	179.254759	142.731131	225.124459
Business & administration professionals	23	839	203.732449	135.384565	306.58525
Information & Communication Technologist	0	15	0	0	0
Legal, social & cultural professionals	4	309	96.2046007	36.1066544	256.332949
Science & engineering associate professionals	6	156	285.838669	128.414191	636.25168
Health associate professionals	10	361	205.867186	110.766547	382.618211
Business & administration associate professionals	32	682	348.706412	246.595174	493.100331
Legal, social, cultural associate professionals	7	340	153.007758	72.9429961	320.95438
Information & communications technician	1	18	412.878078	58.1573541	2931.15651
General & keyboard clerks	70	2065	251.925607	199.31152	318.428717
Customer services clerks	9	637	105.00196	54.6334146	201.807112
Numerical & material recording clerks	2	60	247.726847	61.9543252	990.545703
Other clerical support workers	3	66	337.809337	108.948481	1047.42303
Personal services workers	47	1495	233.642043	175.544896	310.966626
Sales workers	32	1845	128.898522	91.1533379	182.273401
Personal care workers	7	497	104.673316	49.9006412	219.566377
Protective service workers & armed forces	15	1591	70.0673043	42.2407944	116.224782
Market-orientated skilled agricultural workers	1	56	132.710811	18.6934352	942.157451
Market-orientated skilled forestry workers	12	971	91.8451749	52.1592227	161.726646
Subsistence farmers	2	112	132.710811	33.1898171	530.649484
Building & related trades workers	0	128	0	0	0
Metal, machinery & related trades workers	15	411	271.233774	163.516068	449.911505
Handicraft & printing workers	0	46	0	0	0
Electrical & electronic trades workers	1	44	168.904668	23.7916449	1199.10948
Food processing, wood working workers	11	515	158.737591	87.9079491	286.636455
Stationary plant & machine operators	15	532	209.543385	126.325383	347.582008
Assemblers	0	8	0	0	0
Drivers & mobile plant operators	2	116	128.134576	32.0453406	512.351226
Cleaners & helpers	235	14486	120.562907	106.092925	137.006445
Agricultural, forestry & fishery labours	13	588	164.308623	95.4058898	282.973343
Labourers in mining, construction & manufacturing	10	543	136.865661	73.640375	254.374169
Food preparation assistants	0	35	0	0	0
Street & related sales workers	3	171	130.382551	42.0502908	404.268539
Refuse workers & other elementary workers	87	6473	99.8867712	80.9557897	123.244639
Total	4625	343721			

* PMRs cannot be calculated when n<5