# OCCUPATION AND MORTALITY

Hypertension-related mortality in South Africa, 2013-2015

# National Institute for Occupational Health

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Division of the National Health Laboratory Service



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#### Main points

- There were 16,360 reported deaths due to hypertension from 2013-2015.
- None of the industries had significantly increased PMR in males, while in females, agriculture and education had significantly high PMRs for hypertension-related deaths.
- Major occupation groups with significantly elevated PMRs for hypertension-related deaths are plant and machine operators in males, while elementary workers and the agricultural sector had significantly elevated PMRs for hypertension-related deaths in females.
- Lower skilled (lower socio-economic) workers are particularly vulnerable and need special consideration.

## 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 hypertension 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.

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

## Hypertension-related mortality by sex and age

- There were 16 360 reported deaths due to hypertension from 2013-2015.
- Number of reported deaths due to hypertension by sex:
  - Males (7 562) and Females (8 798). The proportion of deaths is almost equally distributed between males and females (Figure 1).



#### Figure 1: The distribution of hypertension-related mortality by sex.

The mean age of death due to hypertension: males (54.9 years), females (54.4 years).
Number of deaths from hypertension among females were higher than males, this increased with age groups (Figure 2).



Figure 2: Hypertension-related number of deaths by sex and age group.

## Hypertension-related mortality by sex and industry

• The majority of the deaths were in the agricultural (20%), followed by the wholesale, retail, motor repair, accommodation and food industries (18%). (Figure 3).



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

 Main industries with elevated PMRs for hypertension-related deaths are human health and educational services in males, but the results were not statistically significant. In females, the main industry with significantly elevated PMR for hypertension-related deaths compared to the general population was agriculture (Figure 4).



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

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#### Hypertension-related mortality by sex and major occupation

• In Figure 5, Males working as plant and machine operators had excess mortality due to hypertension compared to the general population. In females, elementary workers had excess mortality due to hypertension compared to the general population.



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

#### Hypertension-related mortality by sex and sub-major occupation

In Figure 6, males and females who were not economically active had significantly higher PMRs than the general population.

Males employed as 'Business and administration professionals' and 'Drivers & mobile plant operators" sub-major occupation group had excess mortality due to hypertension compared to the general population. Females employed in the following sub-major occupation groups had excess mortality due to hypertension compared to the general population.

- a. Teaching professionals
- b. Protective service workers & armed forces
- c. Market-orientated skilled agricultural workers
- d. Cleaners & helpers
- e. Street & related sales workers



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

#### 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 to 65 years).
- Deaths were defined using the International Classification of Diseases, 10<sup>th</sup> Revision (ICD-10). Deaths due to hypertension include the following underlying cause of death codes: I10 and I11.
- 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 provide a way to compare occupations. Confidence intervals that do not include 100 indicate that a PMR is significant.

(Proportion of deaths from a particular cause in a specific group of workers) (Proportion of deaths from that cause in the general population) x 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

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: Hypertension-related deaths by industry (males	Table 1:	Hypertension	-related deaths	bv industry	(males)
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Males					
		Total			95% CI
Occupation	n	deaths	PMR	95% CI LL	UL
Agriculture	200	11723	101.3109	88.20	116.37
Mining	167	9606	103.2378	88.71	120.15
Manufacturing	156	8089	114.5235	97.89	133.98
Construction	159	11302	83.54234	71.52	97.59
Wholesale, retail, motor repair,		0.674		77.40	400 70
accommodation	134	8671	91.76993	//.48	108.70
Transport	156	9096	101.8448	87.05	119.15
Human health	19	884	127.6339	81.41	200.10
Educational services	54	2692	119.1197	91.23	155.53
Waste & recycling	1	52	114.1988	16.09	810.73
Total	8935	62115			

Table 2: Hypertension-related deaths by industry (females)

Females					
		Total		95% CI	
Occupation	n	deaths	PMR	LL	95% CI UL
Agriculture	103	3404	124.6995	102.7997	151.2647
Mining	10	571	72.17402	38.83313	134.1403
Manufacturing	53	2074	105.3135	80.45637	137.8503
Construction	11	767	59.10365	32.73126	106.7249
Wholesale, retail, motor repair, accommodation	125	4968	103.692	87.01823	123.5608
Transport	3	615	20.1031	6.483547	62.33236
Human health	42	2340	73.96911	54.66442	100.0912
Educational services	93	3347	114.5102	93.44953	140.3173
Waste & recycling	0	47	0	0	0
Total	3197	18133			

Males					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Armed forces, unspecified occupations & unemployed	6223	380007	101.4406	98.95	103.99
Managers	0	2915	0		0
Professionals	105	6681	97.35349	80.40	117.88
Technicians	57	3203	110.2355	85.03	142.91
Clerks	29	1794	100.1335	69.58	144.09
Service & sales workers	135	11551	72.39655	61.16	85.70
Skilled agricultural & fishery workers	92	5325	107.0217	87.24	131.29
Craft & related trade workers	196	12108	100.2738	87.17	115.34
Plant & machine operators	321	17587	113.0621	101.35	126.13
Elementary occupations	374	25396	91.22418	82.43	100.95
Total	7532	466567			

#### Table 3: Hypertension -related deaths by major occupation (males)

## Table 4: Hypertension-related deaths by major occupation (females)

Females					
Occupation	n	Total deaths	DMR	95% CI	95% CI
		ucatiis			UL
Armed forces, unspecified occupations & unemployed	7685	301539	99.56891	97.36744	101.8202
Managers	12	1030	45.51635	25.84891	80.14799
Professionals	140	6104	89.60596	75.92694	105.7494
Technicians	23	1557	57.71153	38.35055	86.84677
Clerks	34	2828	46.97025	33.56142	65.73633
Service & sales workers	98	5428	70.5358	57.86603	85.97962
Skilled agricultural & fishery workers	34	1139	116.6215	83.32897	163.2154
Craft & related trade workers	31	1144	105.8666	74.45192	150.5366
Plant & machine operators	12	656	71.46621	40.58593	125.8421
Elementary occupations	729	22297	127.7334	118.7895	137.3507
Total	8798	343722			

Males					
O source the m		Total	DMD		95% CI
Occupation	n	deaths	PMR	95% CI LL	UL
Occupations unspecified	5319	350451	93.64201	91.15894	96.19272
Not economically active persons	904	29556	188.7082	176.799	201.4197
Chief executives & senior officials	3	490	37,77402	12,18268	117,1234
Administrativo & commorcial managers	3	282	65 63571	21 16848	203 5123
Production & appointing approximation managers	9	427	130 0417	67 66181	249 9319
Hospitality & rateil convises	15	1716	53 93144	32 51312	89 45927
	13	1132	70 85/1	A1 1A1A7	122 0254
	10	635	97 16152	52 27762	180 5813
	10	2252	122 2208	02.00838	165 0484
l eaching professionals	20	1017	00 11642	62 22120	120 5175
Business & administration professionals	20	1917	90.11045	10 47062	130.3173
Information & Communication Technologist	1	65	74.55442	10.47065	527.7245
Legal, social & cultural professionals	8	1001	74.67179	48.17466	115.7429
Science & engineering associate professionals	20	1278	96.55331	50.23751	185.5693
Health associate professionals	9	254	43.44899	26.19367	72.07141
Business & administration associate professionals	15	1057	364.3557	189.5774	/00.2686
Legal, social, cultural associate professionals	9	458	52.53341	19.71637	139.973
Information & communications technician	4	156	53.88434	20.22339	143.5725
General & keyboard clerks	22	1284	105.7123	69.60582	160.5483
Customer services clerks	3	248	74.63415	24.07061	231.4132
Numerical & material recording clerks	2	184	67.06257	16.77176	268.1524
Other clerical support workers	2	78	158.1989	39.56416	632.5646
Personal services workers	14	977	88.41002	52.36054	149.2791
Sales workers	23	1964	72.25275	48.0135	108.729
Personal care workers	2	103	119.8011	29.96121	479.0295
Protective service workers & armed forces	96	8507	69.62462	57.00144	85.04325
Market-orientated skilled agricultural workers	15	981	94.33879	56.87311	156.4853
Market-orientated skilled forestry workers	59	3457	105.2981	81.58337	135.9063
Subsistence farmers	18	887	125.2036	78.88294	198.7242
Building & related trades workers	93	5700	100.6645	82.15027	123.3512
Metal, machinery & related trades workers	69	3985	106.8289	84.3751	135.2581
Handicraft & printing workers	0	251	0	0	0
Electrical & electronic trades worker	31	1676	114.1184	80.25509	162.2702
Food processing wood working workers	3	496	37.31708	12.03531	115.7066
Stationary plant & machine operators	116	6767	105.762	88.16502	126.8713
Assemblers	0	27	0	0	0
Drivers & mobile plant operators	205	10793	117.1871	102.1946	134.379
Cleaners & helpers	30	1867	99.1391	69.31619	141.7932
Agricultural forestry & fishery labours	51	2696	116,7128	88,70009	153,5722
Labourers in mining construction & manufacturing	31	2137	89,50045	62.94222	127.2648
East are a reparation assistante	0	12	0	0	0
Street & related cales workers	1	122	46 38915	6 534302	329 3317
Defuse workers & other elementary workers	261	125/11	86 85111	76 9782/	929.3317
Total	7562	466557	100	97,77129	102.2795
	, 502		100	27.77125	

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

\* PMRs cannot be calculated when n<5

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Females					
		Total			
Occupation	n	deaths	PMR	95% CI LL	95% CI UL
Occupations upspecified	6456	273668	92.3957328	90.169144	94.6773037
Not economically active persons	1229	27871	172.707717	163.3168	182.638623
Chief executives & senior officials	3	173	67.9184181	21.904689	210.59014
Administrative & commercial managers	2	159	49.2657708	12.3209399	196.991155
Production & specialized services managers	1	96	40.7982165	5.74677235	289.639882
Hospitality & retail services	-	602	39.0361672	17.5371578	86.891067
Science & engineering professionals	2	134	58.457146	14.6196227	233.743236
	36	1734	81 3140923	58 6538181	112 728921
	89	1739	200 448511	162 844837	246 735521
Pusiness & administration professionals	10	3068	12 7660651	6 86876324	240.735521
Business & administration professionals	10	15	12.7000051	0.80870524	23.720003
Information & Communication Technologist	2	200	28 0255221	12 2627002	117 002217
Legal, social & cultural professionals	5	156	100 426270	27 6011246	267 591602
Science & engineering associate professionals	4 5	261	E4 246026	22 5727100	120 222015
Health associate professionals	5	501	24.240930	15 4900122	150.552015
Business & administration associate professionals	0	082	34.4571447	15.4800132	10.0985005
Legal, social, cultural associate professionals	/	309	88.7262183	42.2982224	186.115193
Information & communications technician	1	2005	0	0	0
General & keyboard clerks	19	2065	36.0367781	22.9859967	56.4974141
Customer services clerks	14	637	86.0797534	50.9804485	145.344424
Numerical & material recording clerks	1	60	65.2771463	9.19483575	463.423812
Other clerical support workers	0	66	0	0	0
Personal services workers	40	1495	104.792743	76.8673582	142.86323
Sales workers	38	1845	80.667693	58.6967392	110.862661
Personal care workers	8	497	63.0443264	31.5279176	126.065639
Protective service workers & armed forces	12	1591	29.5408833	16.7763795	52.0174086
Market-orientated skilled agricultural workers	4	56	279.759199	104.996732	745.406143
Market-orientated skilled forestry workers	24	971	96.8064786	64.8859164	144.43033
Subsistence farmers	6	112	209.819399	94.2622231	467.039485
Building & related trades workers	3	128	91.795987	29.6055562	284.625736
Metal, machinery & related trades workers	14	411	133.413146	79.0134932	225.266176
Handicraft & printing workers	1	46	85.1441039	11.993264	604.465841
Electrical & electronic trades workers	1	44	89.0142904	12.5384124	631.941561
Food processing, wood working workers	12	515	91.2612531	51.8276112	160.698441
Stationary plant & machine operators	12	532	88.3450101	50.1714658	155.56334
Assemblers	0	8	0	0	0
Drivers & mobile plant operators	0	116	0	0	0
Cleaners & helpers	542	14486	146.542372	134.710146	159.413877
Agricultural, forestry & fishery labours	11	588	73.2702663	40.5766447	132.30596
Labourers in mining, construction & manufacturing	15	543	108.194165	65.2259643	179.468062
Food preparation assistants	1	35	111.903679	15.7625756	794.44082
Street & related sales workers	9	171	206.138357	107.255544	396.184856
Refuse workers & other elementary workers	151	6473	91.3658189	77.8955555	107.165458
Total	8798	344585			

#### Table 6: Hypertension-related deaths by sub-major occupation (females)

\* PMRs cannot be calculated when n<5