# OCCUPATION AND MORTALITY

# HIV-related mortality in South Africa, 2013-2015

## National Institute for Occupational Health

25 Hospital Street, Braamfontein www.nioh.ac.za







## Contents

Main points	3
Introduction	3
HIV-related mortality by sex and age	4
HIV-related mortality by sex and industry	5
HIV-related mortality by sex and major occupation	6
HIV-related mortality by sex and sub-major occupation	7
Measuring the data	9
Strengths and limitations	9
References	9
Appendix	10

## Main points

- There were 133,384 reported deaths due to HIV from 2013-2015.
- Main industries with significantly elevated PMRs for HIV-related deaths are mining and construction males, while females were agriculture, mining, wholesale and retail.
- Major occupation groups with significantly elevated PMRs for HIV-related deaths are plant and machine operator's males, while service and sales workers and elementary workers were in both males and 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 HIV 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 HIV. The results of the analysis do not prove that the observed risk of death involving HIV are caused by occupational exposure. The findings presented here should be interpreted bearing in mind the warnings in the strengths and limitations section.

## HIV-related mortality by sex and age

- There were 133,384 reported deaths due to HIV from 2013-2015.
- Number of reported deaths due to HIV by sex:
  - Males (65,958), Females (66,988), Unknown (13) and Unspecified (425). There was an equal distribution of deaths between men and women (Figure 1).



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

 Mean age of death due to HIV: men (41.5 years), women (38.2 years).
The number of deaths from HIV among women was higher than men in the age groups 20-24, 30-34 and 35-39, while at 50 years and older, the number of deaths among men was higher (Figure 2).



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

4

#### www.nioh.ac.za

## HIV-related mortality by sex and industry

• The majority of deaths were in the agriculture (19%); wholesale, retail, motor repair and accommodation industries (17%); and construction (15%). The health (4%) and education (7%) industries had the lowest proportion of deaths (Figure 3).



#### Figure 3. Percentage of HIV-related deaths by main industry.

• Main industries with significantly elevated PMRs for HIV-related deaths are mining and construction in men; and agriculture, mining, construction and wholesale, retail, motor repair and accommodation in women compared to the general population (Figure 4).



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

#### www.nioh.ac.za

## HIV-related mortality by sex and major occupation

In Figure 5, Men working as plant and machine operators and elementary workers, and service and sales workers had excess mortality due to HIV compared to the general population. Women working as service and sales workers, skilled agriculture and fishery workers and elementary workers had excess mortality due to HIV compared to the general population.



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

6

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

In Figure 6, men and women with unspecified specified occupations had significantly higher PMRs than the general population.

Men employed in the following sub-major occupation groups had excess mortality due to HIV compared to the general population.

- a. Protective service workers & armed forces
- b. Market-orientated skilled agricultural workers
- c. Building & related trades workers
- d. Stationary plant & machine operators
- e. Drivers & mobile plant operators
- f. Cleaners & helpers
- g. Agricultural, forestry & fishery labours
- h. Labourers in mining, construction & manufacturing
- i. Refuse workers & other elementary workers

Women employed in the following sub-major occupation groups had excess mortality due to HIV compared to the general population.

- a. Sales workers
- b. Protective service workers & armed forces
- c. Market-orientated skilled forestry workers
- d. Labourers in mining, construction & manufacturing
- e. Refuse workers & other elementary workers



Figure 6. HIV-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 HIV include the following underlying cause of death codes: B20-24, B33, B45, B59, C46, D84.
- 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.

(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.

## Appendix

Men					
		Total			95% CI
Occupation	n	deaths	PMR	95% CI LL	UL
Agriculture	1644	11723	97,4911	92,89	102,32
Mining	1522	9606	110,1473	104,75	115,82
Manufacturing	1027	8089	88,26277	83,03	93,83
Construction	1794	11302	110,3492	105,36	115,58
Wholesale, retail, motor repair,					
accommodation	1250	8671	100,2173	94,81	105,93
Transport	1356	9096	103,6361	98,26	109,30
Human health	86	884	67,63136	54,75	83,55
Educational services	248	2692	64,04402	56,55	72,53
Waste & recycling	8	52	106,9519	53,49	213,86
Total	8935	62115			

## Table 2: HIV-related deaths by industry (women)

Women					
		Total		95% CI	
Occupation	n	deaths	PMR	LL	95% CI UL
Agriculture	774	3404	128,967	120,1938	138,3805
Mining	127	571	126,1521	106,0135	150,1163
Manufacturing	356	2074	97,35724	87,75136	108,0147
Construction	178	767	131,629	113,645	152,459
Wholesale, retail, motor repair,					
accommodation	986	4968	112,5699	105,7582	119,8204
Transport	93	615	85,76989	69,99512	105,0998
Human health	285	2340	69,08059	61,50838	77,585
Educational services	389	3347	65,92056	59,68463	72,80804
Waste & recycling	9	47	108,6105	56,51095	208,7424
Total	3197	18133			

Men					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Armed forces, unspecified occupations &					
unemployed	53388	380007	99,42211	98,58	100,27
Managers	186	2915	45,15495	39,11	52,13
Professionals	490	6681	51,90217	47,50	56,71
Technicians	346	3203	76,44518	68,80	84,94
Clerks	160	1794	63,1144	54,05	73,69
Service & sales workers	1810	11551	110,8894	105,90	116,12
Skilled agricultural & fishery workers	786	5325	104,4561	97,40	112,02
Craft & related trade workers	1798	12108	105,0868	100,34	110,06
Plant & machine operators	2788	17587	112,1843	108,10	116,43
Elementary occupations	4178	25396	116,4217	112,94	120,01
Total	65930	466567			

### Table 3: HIV-related deaths by major occupation (men)

## Table 4: HIV-related deaths by major occupation (women)

Women					
		Total	95% CI	95% CI	
Occupation	n	deaths	PMR	LL	UL
Armed forces, unspecified occupations &					
unemployed	59136	301539	100,6941	99,8858	101,509
Managers	98	1030	48,85224	40,07731	59,54845
Professionals	657	6104	55,26453	51,19616	59,65621
Technicians	241	1557	79,47382	70,04746	90,1687
Clerks	386	2828	70,08153	63,42752	77,43359
Service & sales workers	1180	5428	111,6189	105,4285	118,1729
Skilled agricultural & fishery workers	298	1139	134,3347	119,9164	150,4866
Craft & related trade workers	183	1144	82,13358	71,05538	94,93897
Plant & machine operators	132	656	103,3156	87,11177	122,5335
Elementary occupations	4633	22297	106,687	103,6587	109,8038
Total	66944	343722			

Men					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Occupations unspecified	51109	350451	103,2029	102,312	104,1015
Not economically active persons	2279	29556	54,56577	52,37085	56,85269
Chief executives & senior officials	44	490	63,54454	47,28816	85,38942
Administrative & commercial managers	14	282	35,13181	20,8067	59,31956
Production & specialised services managers	29	427	48,06088	33,39833	69,16061
Hospitality & retail services	99	1716	40,82626	33,52656	49,7153
Science & engineering professionals	90	1132	56,26233	45,76058	69,17416
Health professionals	46	635	51,2632	38,39729	68,44014
Teaching professionals	210	2253	65,95986	57,61561	75,51258
Business & administration professionals	90	1917	33,22324	27,0219	40,84776
Information & Communication Technologist	2	83	*		
Legal, social & cultural professionals	52	661	55.67029	46.06099	67.28431
Science & engineering associate			,	,	,
professionals	107	1278	59,24812	43,28832	81,09207
Health associate professionals	39	254	108,6557	91,43385	129,1213
Business & administration associate			·		
professionals	129	1057	86,36472	67,05709	111,2316
Legal, social, cultural associate					
professionals	60	458	92,70591	51,33999	167,4014
Information & communications technician	11	156	*		
General & keyboard clerks	117	1284	64,48259	53,79568	77,29253
Customer services clerks	18	248	51,36206	32,36001	81,52227
Numerical & material recording clerks	20	184	76,91903	49,62447	119,2262
Other clerical support workers	5	78	45,36251	18,88083	108,9866
Personal services workers	145	977	105,0256	89,24941	123,5904
Sales workers	290	1964	104,4908	93,13072	117,2366
Personal care workers	18	103	123,6679	77,91536	196,2866
Protective service workers & armed forces	1357	8507	112,8821	107,033	119,0508
Market-orientated skilled agricultural					
workers	175	981	126,2382	108,8541	146,3985
Market-orientated skilled forestry workers	531	3457	108,6968	99,83368	118,3468
Subsistence farmers	80	887	63,82459	51,26477	79,46154
Building & related trades workers	935	5700	116,0803	108,8731	123,7645
Metal, machinery & related trades workers	513	3985	91,09838	83,54655	99,33283
Handicraft & printing workers	34	251	95,85766	68,4927	134,1558
Electrical & electronic trades worker	244	1676	103,0238	90,87488	116,7968
Food processing, wood working workers	72	496	102,7241	81,53715	129,4164
Stationary plant & machine operators	1044	6767	109,1757	102,7499	116,0033
Assemblers	2	27	*		
Drivers & mobile plant operators	1742	10793	114,2162	108,9765	119,7077
Cleaners & helpers	337	1867	127,7342	114,7991	142,1268
Agricultural, forestry & fishery labours	427	2696	112,0804	101,9381	123,2318
Labourers in mining, construction &					
manufacturing	385	2137	127,4905	115,3708	140,8834
Food preparation assistants	2	12	*		
Street & related sales workers	22	133	117,0557	77,07483	177,7759
Refuse workers & other elementary workers	3005	18541	114,692	110,6636	118,8669
Total	65930	466557	100	99,23957	100,7663

\* PMRs cannot be calculated when n<5

Women					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Occupations unspecified	56539	273668	106,076337	105,20555	106,954331
Not economically active persons	2597	27871	47,8424935	46,0373614	49,7184051
Chief executives & senior officials	14	173	41,5505083	24,6081508	70,157435
Administrative & commercial managers	5	159	16.146087	6.72034224	38.7920906
Production & specialised services managers	13	96	69.5290871	40.3721016	119,743431
Hospitality & retail services	66	602	56.2913744	44,2246353	71.6505362
Science & engineering professionals	13	134	49 8118833	28 9232967	85 7863385
Health professionals	175	1739	51 6693353	44 5540209	59 9209715
Teaching professionals	356	3068	59 5784295	53 7000426	66 1003062
Business & administration professionals	91	839	55 6895668	45 3463184	68 3920539
Information & Communication Technologist	2	15	*	#NI IMI	#NI IMI
Legal social & cultural professionals	20	309	33 2327227	21 4401577	51 5114616
Science & engineering associate professionals	28	156	92 1568965	63 6301451	133 472799
Health associate professionals	68	361	96 7155084	76 255//73	122 665108
Business & administration associate	00	501	30,7 100004	10,2004470	122,000190
professionals	78	682	58,7225135	47.0352297	73.313846
Legal, social, cultural associate professionals	65	340	98,1587112	76.9747612	125.172621
Information & communications technician	2	18	*	#NUM!	#NUM!
General & keyboard clerks	252	2065	62 657764	55 3800381	70 8918868
Customer services clerks	111	637	89 4701066	74 2820695	107 763556
Numerical & material recording clerks	12	60	102 689113	58 3175363	180 821322
Other clerical support workers	11	66	85 5742611	47 390525	154 523592
Personal services workers	276	1405	04 7900507	94 2412060	106 650502
Selee workers	210	1495	94,7099507 115 769756	105 161559	100,039302
Barsonal care workers	410	1045	119 905212	08 0500456	127,445050
Personal cale workers	272	497	10,000012	90,9099400	142,030430
Market erienteted skilled a grigultural workers	373	1591	120,374102	100,757572	100,201000
Market-orientated skilled ferestry workers	21	074	110,02403	02,4030740	193,73713
Subsistence formers	269	971	142,241872	120,2199	100,297624
Subsistence farmers	17	112	77,933702	40,4470041	125,304654
Building & related trades workers	18	128	72,2032828	45,4907534	114,60162
Metal, machinery & related trades workers	48	411	59,9644457	45,1888413	79,5712978
Handicraft & printing workers	6	46	*		
Electrical & electronic trades workers	5	44	105 000050	07.0005000	407 0 4440
Food processing, wood working workers	106	515	105,680058	87,3605828	127,84112
Stationary plant & machine operators	106	532	102,303064	84,5689852	123,755971
Assemblers	2	8	*		
Drivers & mobile plant operators	24	116	106,230117	71,2022439	158,489918
Cleaners & helpers	2914	14486	103,284577	99,6017078	107,103624
Agricultural, forestry & fishery labours	131	588	114,390084	96,3867167	135,756167
Labourers in mining, construction &		5.40	405 040700		450 000070
manuracturing	143	543	135,216788	114,775253	159,298972
Food preparation assistants	9	35	132,02886	68,6957409	253,751101
Street & related sales workers	37	1/1	111,096409	80,4934939	153,334282
Refuse workers & other elementary workers	1399	6473	110,970238	105,304917	116,940348
l otal	66944	343721			

\* PMRs cannot be calculated when n<5