



OCCUPATION AND MORTALITY

Leukaemia Mortality in South Africa, 2011-2015

National Institute for Occupational Health

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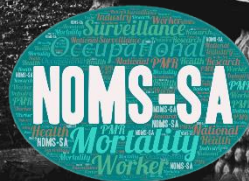
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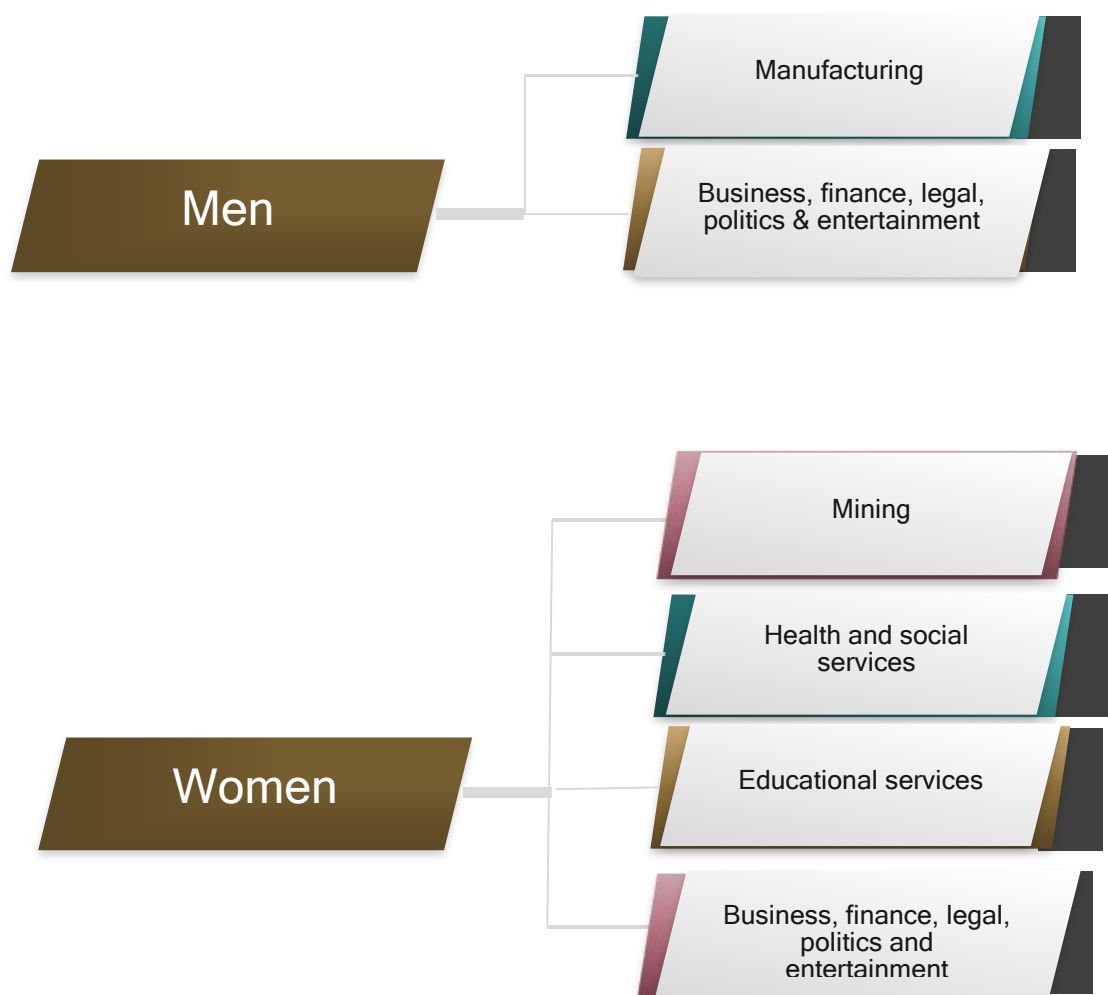


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Main points

- There were 2894 reported deaths due to leukaemia from 2011-2015 among 15 to 69-year-olds.
- The main industries with significantly elevated proportionate mortality ratios (PMRs) for these deaths are business, finance, legal, politics & entertainment, as well as manufacturing in men; and mining, health & social services, educational services, business, finance, legal, politics and entertainment, and other service activities in women.
- Major occupation groups with significantly elevated PMRs for leukaemia in both men and women were legislators, senior officials and managers, professionals, and technicians and associate professionals.



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.

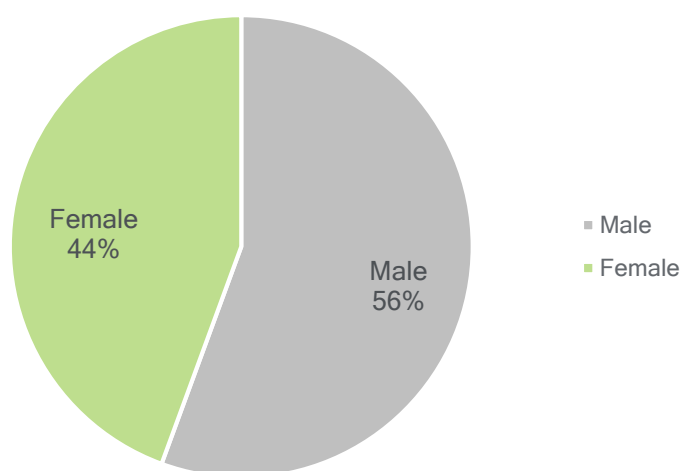
This report presents the analysis of deaths involving leukaemia in different occupation groups and industries among those aged 15 to 69 years in South Africa. This analysis includes deaths that were registered from 2011 to 2015 by the Statistics South Africa.

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 Appendix A.

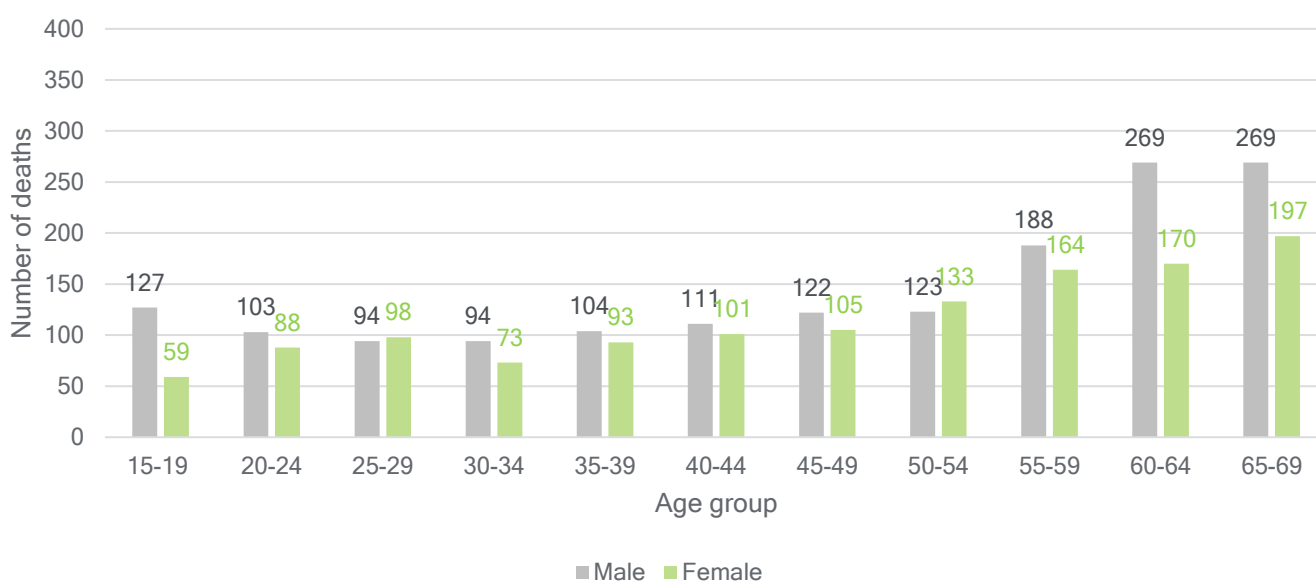
We calculated proportional mortality ratios for the population at risk of dying from leukaemia. The results of the analysis do not prove that the observed proportions of deaths involving leukaemia are caused by occupational exposure. The findings presented here should be interpreted considering the warnings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

Leukaemia mortality by sex and age

- There were 2 894 reported deaths due to leukaemia from 2011-2015 among 15 to 69-year-olds.
- Number of reported deaths due to leukaemia by sex:
 - Men (1 604), Women (1 281), and Unspecified (9).



- Mean age of death due to leukaemia: men (47.9 years), women (47.8 years).



Leukaemia mortality by sex and main industry

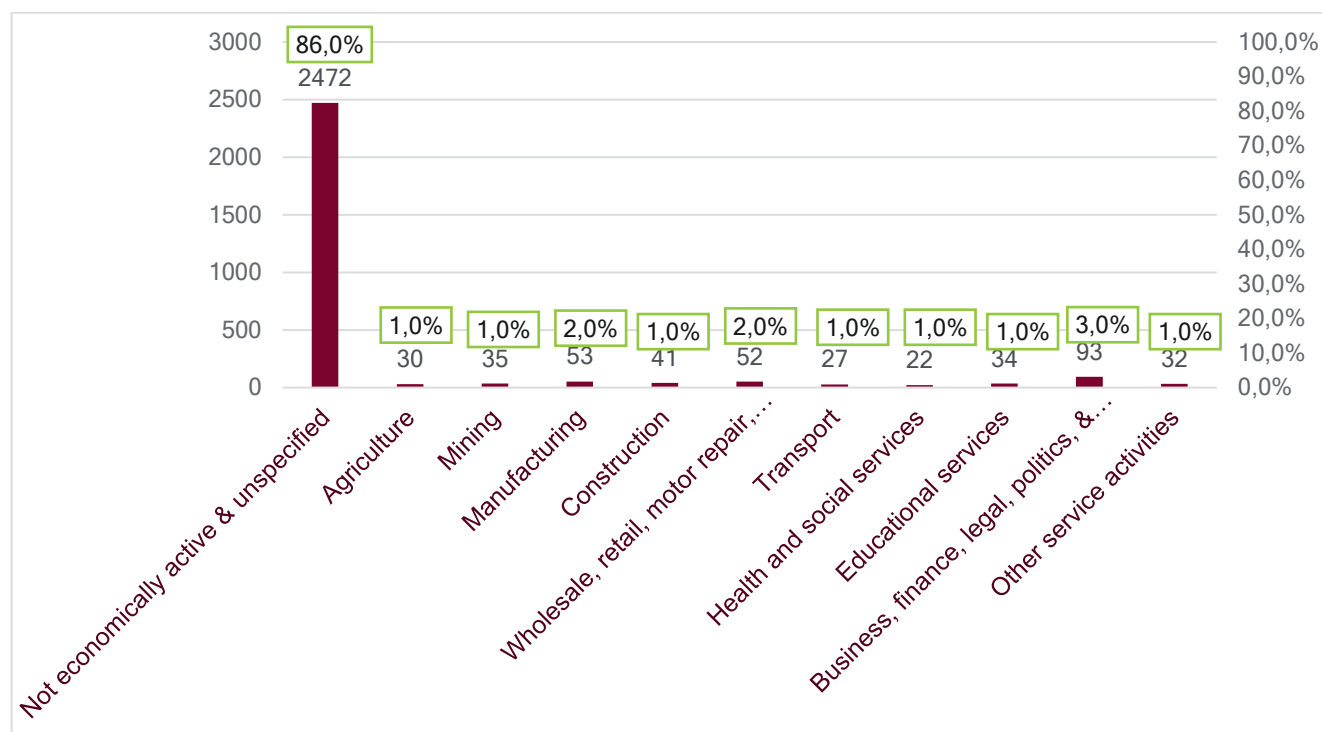


Figure 1. Percentage of Leukaemia-related deaths by main industry.

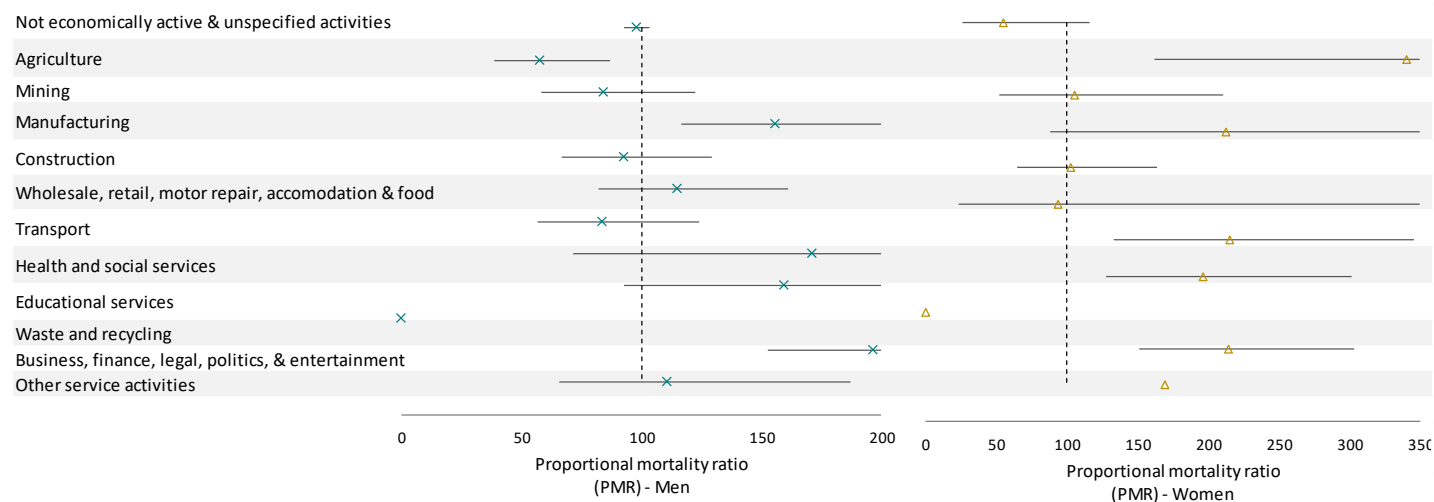


Figure 2 Leukaemia-related mortality by sex and main industry. Source: Statistics South Africa (See Appendix Tables 1 and 2)

- Main industries with significantly elevated PMRs for leukaemia-related deaths are business, finance, legal, politics & entertainment, as well as manufacturing in men; and mining, health & social services, educational services, business, finance, legal, politics and entertainment, and other

service activities in women. Working in the agriculture industry appears to be protective among men.

Leukaemia-related mortality by sex and major occupation

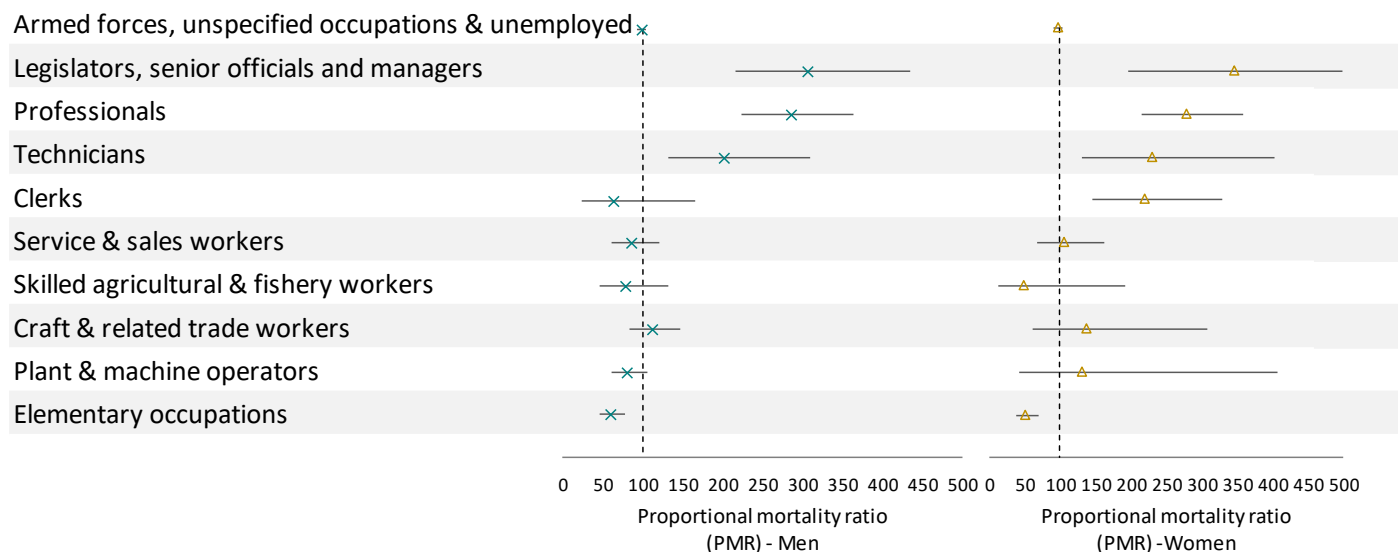


Figure 3. Leukaemia-related mortality by sex and major occupation. Source: Statistics South Africa. (See Appendix Tables 2 and 3)

- Both men and women working as legislators, senior officials & managers, professionals as well as technicians and associate professionals had significant excess mortality due to leukaemia compared to the general population. Working in elementary occupations was protective among both men and women.

Leukaemia-related mortality by sex and sub-major occupation

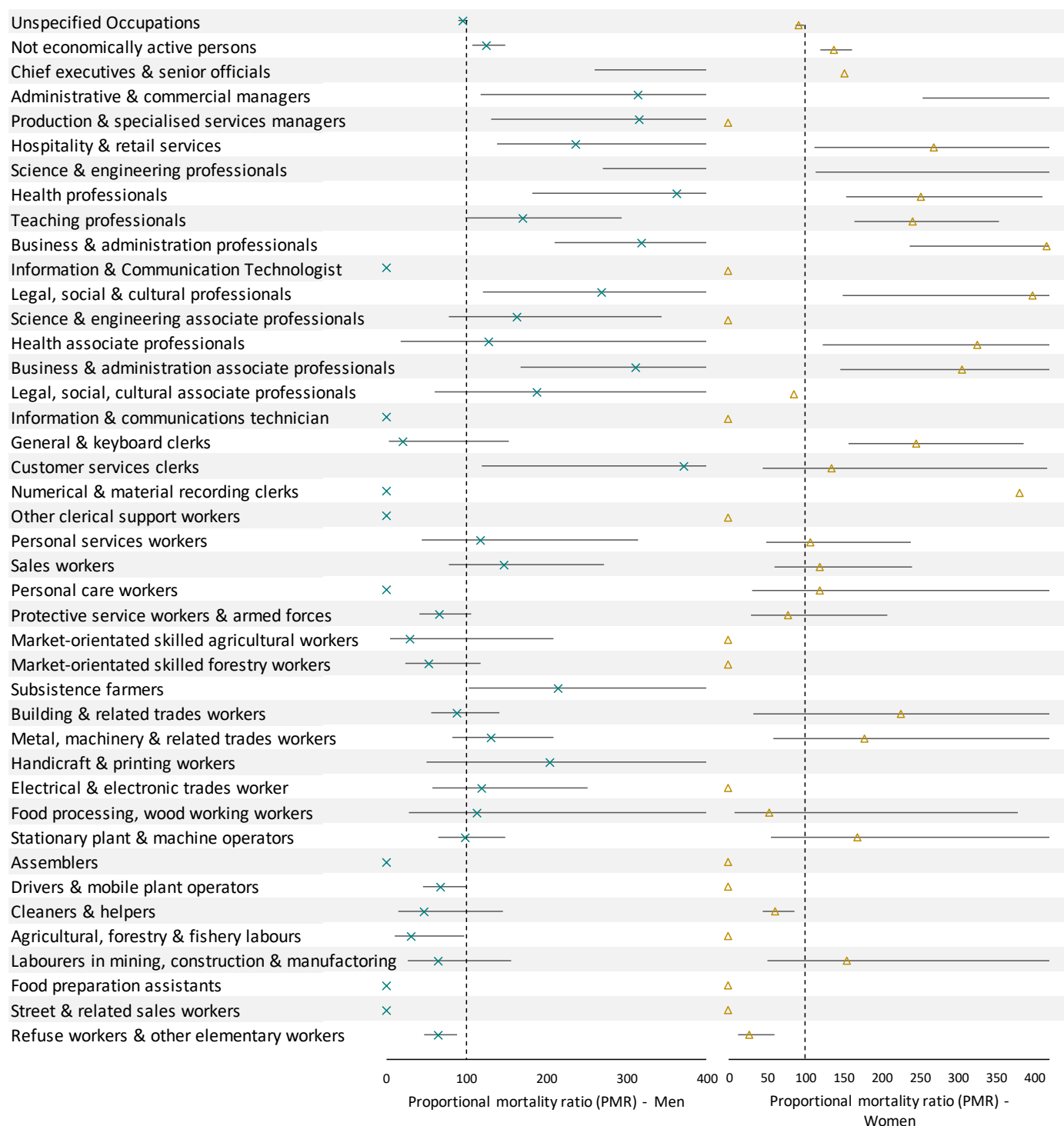


Figure 4. Leukaemia-related mortality by sex and sub-major occupation. Source: Statistics South Africa (See Appendix, Tables 4 and 5)

- Men from unspecified occupations and those who worked as stationary plant & machine operators had similar PMRs to the general population. While women who worked in unspecified occupations as well as personal service workers had similar PMRs to the general population.
- Men employed in the following sub-major occupation groups had excess mortality due to leukaemia compared to the general population.
 - Customer service clerks
 - Health professionals
 - Business & administration professionals
- Women employed in the following sub-major occupation groups had excess mortality due to leukaemia compared to the general population.
 - Legal, social & cultural professionals
 - Numerical recording clerks
 - Business & administration professionals

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 - 69 years).
- Deaths were defined using the International Classification of Diseases, 10th Revision (ICD-10). Deaths due to leukaemia include the following underlying cause of death codes: C91 - C95.
- 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.

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

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 Leukaemia-related deaths by industry (men)

Men					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Not economically active & unspecified activities	1321	733993	97,88399	92,75	103,31
Agriculture	23	21634	57,82182	38,42	87,01
Mining	28	18064	84,30336	58,21	122,10
Manufacturing	45	15710	155,7891	116,32	208,66
Construction	35	20531	92,71686	66,57	129,13
Wholesale, retail, motor repair, accomodation & food	34	16078	115,0132	82,18	160,96
Transport	25	16215	83,85401	56,66	124,10
Health and social services	5	1588	171,2459	71,28	411,43
Educational services	13	4439	159,2792	92,49	274,31
Waste and recycling	0	105	0	-	-
Business, finance, legal, politics, & entertainment	60	16612	196,4401	152,52	253,00
Other service activities	14	6866	110,8983	65,68	187,25
Total	1603	871835			

Table 2 Leukaemia-related deaths by industry (women)

Women					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Not economically active & unspecified activities	1144	618321	96,09566	90,68532438	101,8287794
Agriculture	7	6557	55,44784	26,43350472	116,3093042
Mining	7	1067	340,7418	162,440947	714,7517409
Manufacturing	8	3936	105,5666	52,79294899	211,0947175
Construction	5	1223	212,3417	88,38109874	510,165624
Wholesale, retail, motor repair, accomodation & food	18	9064	103,1441	64,98461352	163,7111161
Transport	2	1106	93,92185	23,48903483	375,5502529
Health and social services	17	4108	214,9365	133,6163922	345,7488347
Educational services	21	5550	196,5251	128,1348427	301,4177866
Waste and recycling	0	88	0	-	-
Business, finance, legal, politics, & entertainment	32	7748	214,5123	151,6969161	303,3384574
Other service activities	18	5529	169,0899	106,532924	268,3808205
Total	1279	664297			

Table 3 Leukaemia-related deaths by major occupation (men)

Men					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Armed forces, unspecified occupations & unemployed	1 283	710203	98,49725	93,25	104,04
Legislators, senior officials and managers	31	5520	306,1982	215,34	435,40
Professionals	66	12601	285,5742	224,36	363,49
Technicians and Associate professionals	21	5678	201,6526	131,48	309,28
Clerks	4	3488	62,52641	23,47	166,60
Service & sales workers	32	20458	85,28385	60,31	120,60
Skilled agricultural & fishery workers	14	9812	77,79478	46,07	131,36
Craft & related trade workers	47	23116	110,8575	83,29	147,55
Plant & machine operators	48	32749	79,91405	60,22	106,04
Elementary occupations	52	47653	59,49673	45,34	78,08
Total	1 598	871278			

Table 4 Leukaemia related deaths by major occupation (women)

Women					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Armed forces, unspecified occupations & unemployed	1097	584122	97,55085	91,94557	103,4978
Legislators, senior officials and managers	12	1797	346,8655	196,9863	610,7822
Professionals	60	11172	278,9641	216,5991	359,2857
Technicians and Associate professionals	12	2714	229,6674	130,429	404,4125
Clerks	23	5438	219,6932	145,9908	330,6037
Service & sales workers	20	9915	104,7768	67,59698	162,4064
Skilled agricultural & fishery workers	2	2163	48,02877	12,01158	192,045
Craft & related trade workers	6	2255	138,2078	62,09044	307,6385
Plant & machine operators	3	1183	131,7239	42,48289	408,4275
Elementary occupations	43	43074	51,85388	38,45668	69,91826
Total	1278	663833			

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

Men					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Occupations unspecified	1142	647593	95,90744	90,50311	101,6345
Not economically active persons	146	63166	125,7065	106,8835	147,8445
Chief executives & senior officials	9	981	498,9555	259,6108	958,9609
Administrative & commercial managers	4	693	313,9172	117,8166	836,4186
Production & specialised services managers	5	863	315,0994	131,151	757,048
Hospitality & retail services	13	2983	237,0164	137,6237	408,1912
Science & engineering professionals	17	2132	433,6607	269,5874	697,5905
Health professionals	8	1198	363,1796	181,623	726,2267
Teaching professionals	13	4136	170,9429	99,2581	294,399
Business & administration professionals	22	3753	318,8104	209,9193	484,1864
Information & Communication Professionals	0	169	0	-	-
Legal, social & cultural professionals	6	1213	269,0164	120,8567	598,8068
Science & engineering associate professionals	7	2325	163,7433	78,0609	343,4735
Health associate professionals	1	426	127,667	17,98297	906,3499
Business & administration associate professionals	10	1748	311,1336	167,405	578,263
Legal, social, cultural associate professionals	3	865	188,6225	60,83353	584,8493
Information & communications technician	0	314	0	-	-
General & keyboard clerks	1	2530	21,4965	3,027963	152,6107
Customer services clerks	3	440	370,8147	119,5932	1149,76
Numerical & material recording clerks	0	360	0	-	-
Other clerical support workers	0	158	0	-	-
Personal services workers	4	1845	117,9104	44,25306	314,167
Sales workers	10	3715	146,3961	78,76821	272,0871
Personal care workers	0	180	0	-	-
Protective service workers & armed forces	18	14718	66,51384	41,90619	105,5713
Market-orientated skilled agricultural workers	1	1846	29,46162	4,149917	209,1577
Market-orientated skilled forestry workers	6	6196	52,66574	23,6603	117,2293
Subsistence farmers	7	1770	215,0865	102,5376	451,1728
Building & related trades workers	18	11006	88,947	56,03992	141,1774
Metal, machinery & related trades workers	18	7441	131,5617	82,88877	208,8158
Handicraft & printing workers	2	534	203,6934	50,94196	814,4764
Electrical & electronic trades worker	7	3175	119,9065	57,16271	251,52
Food processing, wood working workers	2	960	113,3045	28,33646	453,0525
Stationary plant & machine operators	23	12707	98,44035	65,41571	148,1372
Assemblers	0	69	0	-	-
Drivers & mobile plant operators	25	19973	68,07459	45,99828	100,7462
Cleaners & helpers	3	3492	46,7235	15,06902	144,8725
Agricultural, forestry & fishery labours	3	5176	31,52211	10,16634	97,73853
Labourers in mining, construction & manufacturing	5	4177	65,10193	27,0968	156,4119
Food preparation assistants	0	29	0	-	-
Street & related sales workers	0	275	0	-	-
Refuse workers & other elementary workers	41	34480	64,67031	47,61756	87,82997
Total	1603	871810			

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

Women					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Occupations unspecified	933	522883	92,6759202	86,9159152	98,8176465
Not economically active persons	165	61703	138,888872	119,234046	161,783646
Chief executives & senior officials	1	340	152,760429	-	-
Administrative & commercial managers	4	307	676,723723	253,981924	1803,10075
Production & specialised services managers	2	183	0	-	-
Hospitality & retail services	5	967	268,555045	111,778279	645,222069
Science & engineering professionals	2	230	451,639528	112,95111	1805,89871
Health professionals	16	3301	251,746965	154,226835	410,930654
Teaching professionals	26	5590	241,574631	164,480304	354,804198
Business & administration professionals	12	1496	416,619351	236,599707	733,609038
Information & Communication Technologist	0	34	0	-	-
Legal, social & cultural professionals	4	521	398,760428	149,659214	1062,47971
Science & engineering associate professionals	0	251	0	-	-
Health associate professionals	4	638	325,633516	122,213873	867,636253
Business & administration associate professionals	7	1189	305,777813	145,772673	641,410146
Legal, social, cultural associate professionals	1	601	86,4202092	-	-
Information & communications technician	0	35	0	-	-
General & keyboard clerks	19	4006	246,338584	157,126641	386,202478
Customer services clerks	3	1157	134,672115	43,4337383	417,568906
Numerical & material recording clerks	1	136	381,901072	-	-
Other clerical support workers	0	139	0	-	-
Personal services workers	6	2904	107,311045	48,2099258	238,864926
Sales workers	8	3472	119,674069	59,8479576	239,304452
Personal care workers	2	864	120,228115	30,0680037	480,736926
Protective service workers & armed forces	4	2675	77,6651151	29,1485797	206,935301
Market-orientated skilled agricultural workers	0	135	0	-	-
Market-orientated skilled forestry workers	0	1796	0	-	-
Subsistence farmers	2	232	447,746084	-	-
Building & related trades workers	1	230	225,819764	31,8086154	1603,16836
Metal, machinery & related trades workers	3	874	178,278761	57,4975232	552,777144
Handicraft & printing workers	1	100	519,385457	-	-
Electrical & electronic trades workers	0	79	0	-	-
Food processing, wood working workers	1	972	53,4347178	7,52672998	379,350539
Stationary plant & machine operators	3	925	168,449338	54,3273894	522,299702
Assemblers	0	17	0	-	-
Drivers & mobile plant operators	0	241	0	-	-
Cleaners & helpers	34	28641	61,6567353	44,0552817	86,2905164
Agricultural, forestry & fishery labours	0	1225	0	-	-
Labourers in mining, construction & manufacturing	3	1006	154,886319	49,9531165	480,24575
Food preparation assistants	0	77	0	-	-
Street & related sales workers	0	347	0	-	-
Refuse workers & other elementary workers	6	11775	26,465501	11,8897346	58,9098722
Total	1279	664294			

