



OCCUPATION AND MORTALITY

Bladder Cancer Mortality in South Africa, 2011-2015

National Institute for Occupational Health

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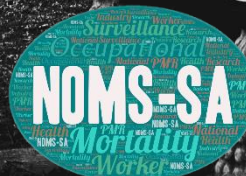
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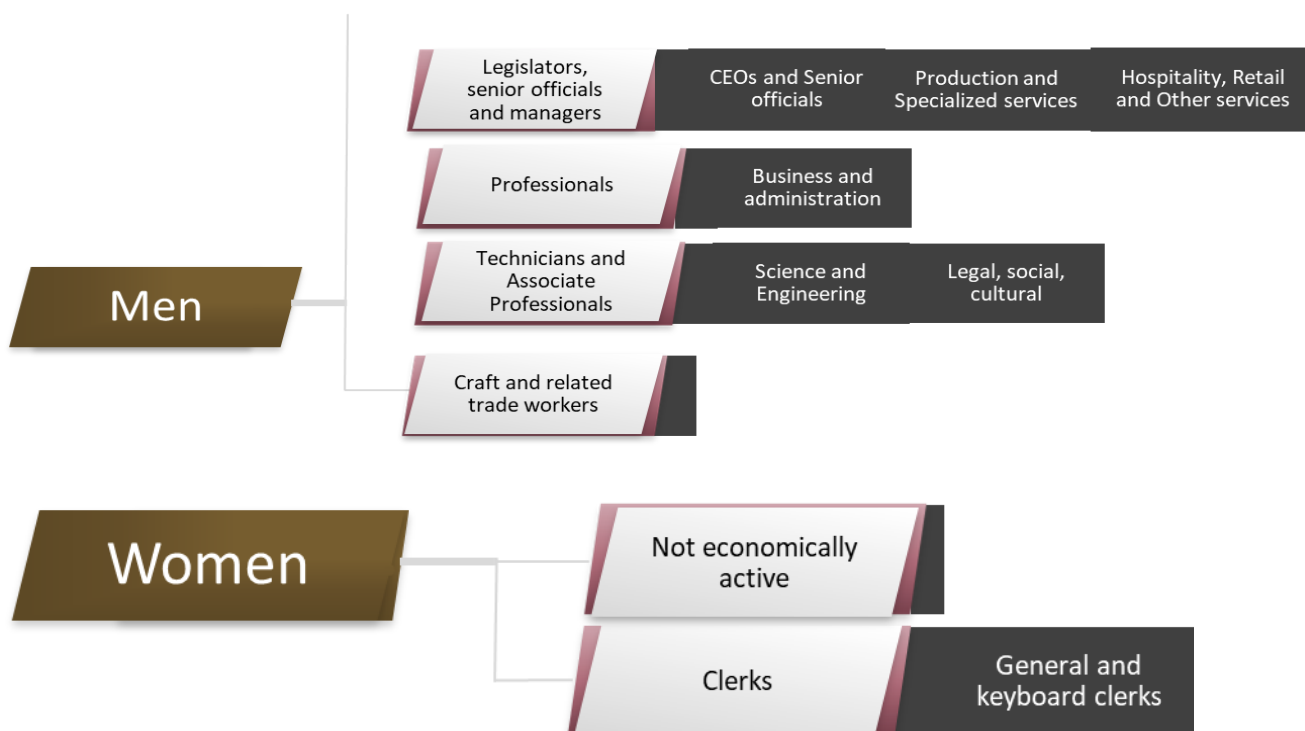


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Main points

- There were 1,363 reported deaths due to bladder cancer from 2011 to 2015 in the 15 - 69 years age group.
- The main industries with significantly elevated proportionate mortality ratios (PMRs) for bladder cancer deaths among men were manufacturing, construction, wholesale, and transport; and construction and educational services among women.
- The major occupation group with significantly elevated PMRs for bladder cancer deaths among men were legislators, senior officials, professionals, technicians and associate and craft and related trade workers, and clerks among women.



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.

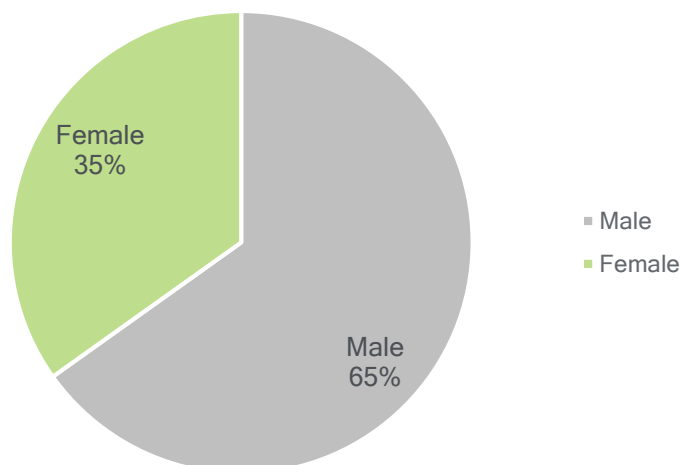
This report presents the analysis of deaths involving bladder cancer in different occupation groups and industries among those aged 15 to 69 years in South Africa. This analysis includes deaths that were registered from 2011 to 2015 by the Statistics South Africa.

Occupation was defined using the South African Standard Classification of Occupations (SASCO). There are 10 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.

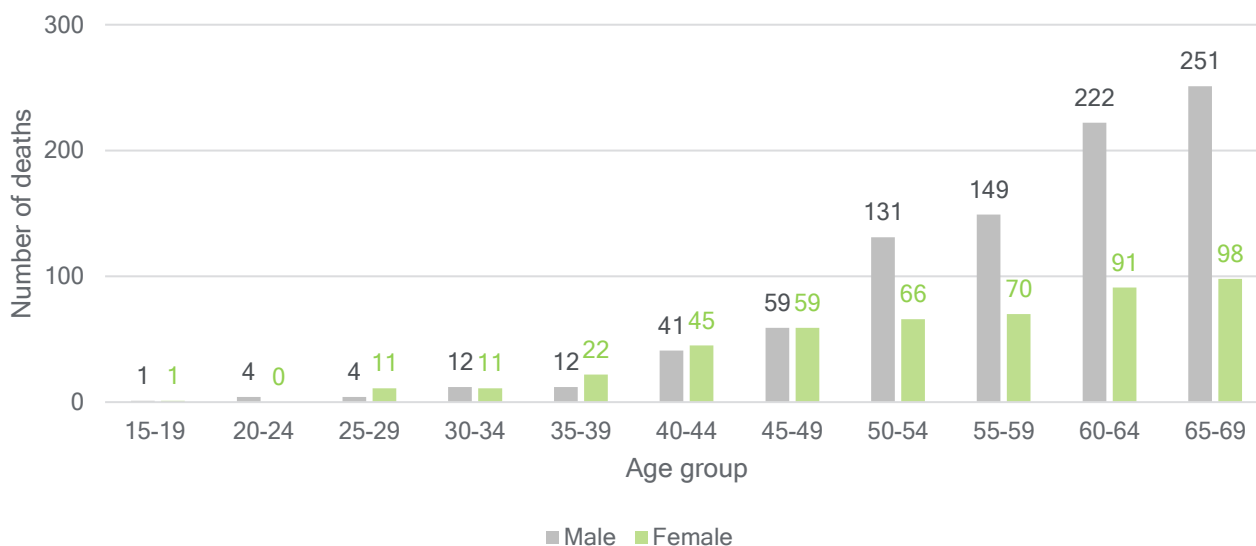
We calculated proportional mortality ratios for the population at risk of dying from bladder cancer. The results of the analysis do not prove that the observed proportions of deaths involving bladder cancer are caused by occupational exposure. The findings presented here should be interpreted considering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

Bladder cancer mortality by sex and age

- There were 1,363 reported deaths due to bladder cancer from 2011-2015 among 15 to 69-year-olds.
- Number of reported deaths due to bladder cancer by sex:
 - Men (886), Women (474), and Unspecified (3).



- Mean age of death due to bladder cancer: men (58.2 years), women (54.5 years).



Bladder cancer mortality by sex and main industry

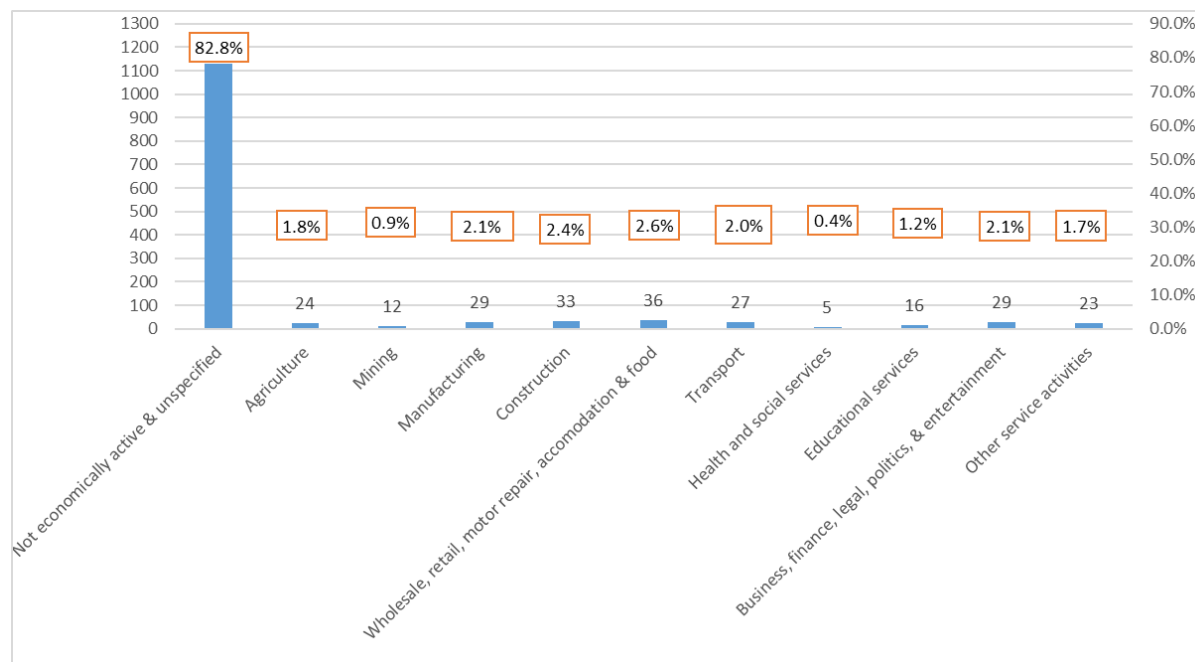


Figure 1. Percentage of bladder cancer-related deaths by main industry.

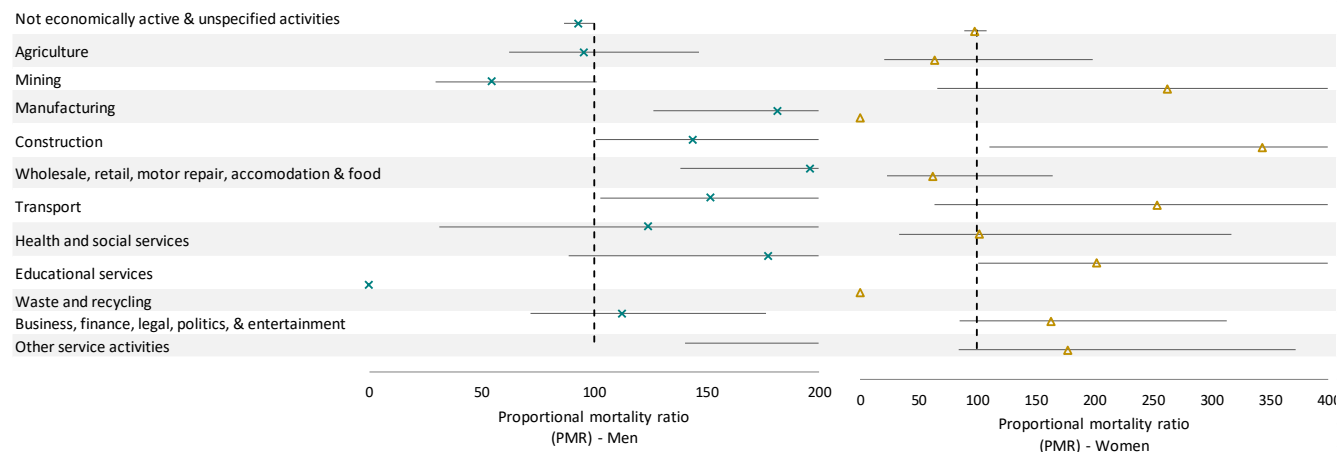


Figure 2: Bladder cancer-related mortality by sex and main industry. Source: Statistics South Africa (See Appendix Tables 1 and 2)

- The main industries with significantly elevated PMRs for bladder cancer-related deaths were manufacturing, construction, wholesale, retail, motor repair, accommodation and food and transport in men; and construction and educational services in women compared to the general population.

Bladder cancer-related mortality by sex and major occupation

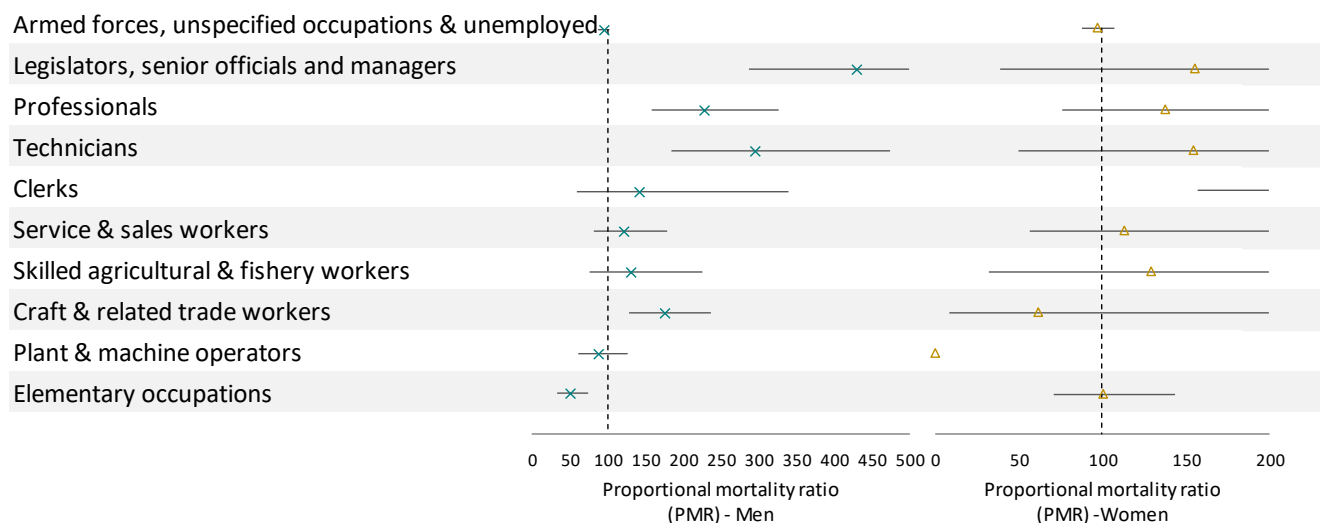


Figure 3. Bladder cancer-related mortality by sex and major occupation. Source: Statistics South Africa. (See Appendix Tables 3 and 4)

- Men working as legislators, senior officials and managers, professionals, technicians, and craft and related trade had significant excess mortality due to bladder cancer compared to the general population. Working elementary occupations was protective amongst men.
- Among women, working as clerks had significant excess mortality due to bladder cancer compared to the general population.

Bladder cancer-related mortality by sex and sub-major occupation

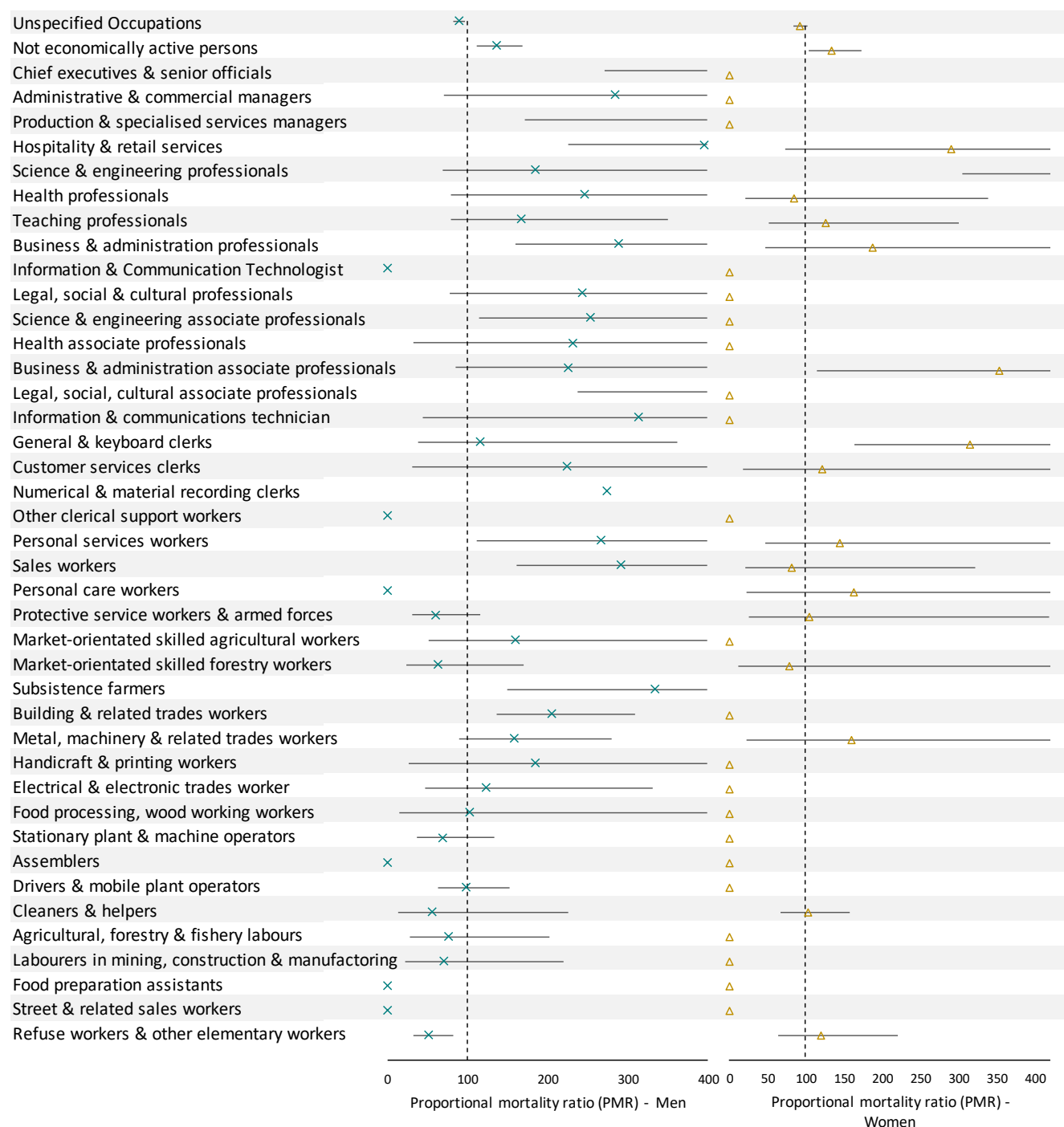


Figure 4. Bladder cancer-related mortality by sex and sub-major occupation. Source: Statistics South Africa (See Appendix, Tables 5 and 6)

- Men and women who were not economically active had significantly increased PMR.
- Men employed in the following sub-major occupation groups had excess mortality due to bladder cancer compared to the general population.
 - Chief executive and senior official
 - Production and specialised service managers
 - Hospitality and retail services
 - Business and administration professionals
 - Science and engineering associate professionals
 - Legal, social, and cultural associate professionals
 - Personal services
 - Sales workers
 - Subsistence farmers
 - Building and related trades workers
- Women employed in science and engineering professions, business and administration associate professionals and general and keyboard clerks had significant excess mortality due to bladder cancer compared to the general population.

Measuring the data

- 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, 10th Revision (ICD-10). Deaths due to bladder cancer include the following underlying cause of death code: C67.
- 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: Bladder cancer-related deaths by industry (men)

Men					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Not economically active & unspecified activities	694	733993	93.03966	86.37	100.23
Agriculture	21	21634	95.51752	62.28	146.50
Mining	10	18064	54.47367	29.31	101.24
Manufacturing	29	15710	181.6446	126.23	261.39
Construction	30	20531	143.7844	100.53	205.65
Wholesale, retail, motor repair, accomodation & food	32	16078	195.8477	138.50	276.95
Transport	25	16215	151.7133	102.51	224.53
Health and social services	2	1588	123.931	30.99	495.54
Educational services	8	4439	177.3395	88.69	354.61
Waste and recycling	0	105	0	-	-
Business, finance, legal, politics, & entertainment	19	16612	112.5466	71.79	176.45
Other service activities	16	6866	229.3067	140.48	374.30
Total	886	871835			

Table 2: Bladder cancer-related deaths by industry (women)

Women					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Not economically active & unspecified activities	433	618321	98.14267	89.32046223	107.83624
Agriculture	3	6557	64.12096	20.67995312	198.8156151
Mining	2	1067	262.6936	65.69738483	1050.390945
Manufacturing	0	3936	0	-	-
Construction	3	1223	343.7785	110.8736325	1065.931307
Wholesale, retail, motor repair, accomodation & food	4	9064	61.84777	23.21215445	164.7906763
Transport	2	1106	253.4305	63.38075011	1013.351843
Health and social services	3	4108	102.3469	33.00838671	317.3403087
Educational services	8	5550	202.0138	101.0253193	403.9537788
Waste and recycling	0	88	0	-	-
Business, finance, legal, politics, & entertainment	9	7748	162.7934	84.70280359	312.8786351
Other service activities	7	5529	177.4334	84.58737447	372.1904746
Total	474	664297			

Table 3: Bladder cancer-related deaths by major occupation (men)

Men					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Armed forces, unspecified occupations & unemploy	676	710203	93.92047	87.10	101.27
Legislators, senior officials and managers	24	5520	429.0108	287.55	640.06
Professionals	29	12601	227.0853	157.81	326.78
Technicians and Associate professionals	17	5678	295.4266	183.65	475.23
Clerks	5	3488	141.4456	58.87	339.83
Service & sales workers	25	20458	120.5793	81.48	178.45
Skilled agricultural & fishery workers	13	9812	130.732	75.91	225.15
Craft & related trade workers	41	23116	175.0118	128.86	237.69
Plant & machine operators	29	32749	87.37677	60.72	125.74
Elementary occupations	24	47653	49.6955	33.31	74.14
Total	883	871278			

Table 4: Bladder cancer-related deaths by major occupation (women)

Women					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Armed forces, unspecified occupations & unemployed	405	584122	97.10285	88.09163	107.0359
Legislators, senior officials and managers	2	1797	155.87	38.98172	623.2523
Professionals	11	11172	137.893	76.36434	248.9969
Technicians and Associate professionals	3	2714	154.8075	49.92769	480.0013
Clerks	11	5438	283.2918	156.8853	511.5471
Service & sales workers	8	9915	112.9998	56.51023	225.9584
Skilled agricultural & fishery workers	2	2163	129.4953	32.38564	517.7921
Craft & related trade workers	1	2255	62.10606	8.748161	440.9112
Plant & machine operators	0	1183	0	-	-
Elementary occupations	31	43074	100.7922	70.88329	143.3211
Total	474	663833			

Table 5: Bladder cancer-related deaths by sub-major occupation (men)

Men					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Occupations unspecified	588	647593	89.34357	82.40616	96.86501
Not economically active persons	88	63166	137.0842	111.2365	168.9381
Chief executives & senior officials	6	981	601.8252	270.3724	1339.61
Administrative & commercial managers	2	693	283.9781	71.02045	1135.498
Production & specialised services managers	4	863	456.0761	171.1704	1215.195
Hospitality & retail services	12	2983	395.8368	224.7972	697.0138
Science & engineering professionals	4	2132	184.6124	69.28709	491.8917
Health professionals	3	1198	246.4067	79.46979	764.017
Teaching professionals	7	4136	166.535	79.39182	349.3297
Business & administration professionals	11	3753	288.4046	159.7168	520.7795
Information & Communication Professionals	1	169	0	-	-
Legal, social & cultural professionals	3	1213	243.3597	78.48707	754.5692
Science & engineering associate professionals	6	2325	253.9314	114.0797	565.2289
Health associate professionals	1	426	230.9822	32.53579	1639.818
Business & administration associate professionals	4	1748	225.168	84.50805	599.9503
Legal, social, cultural associate professionals	5	865	568.777	236.737	1366.526
Information & communications technician	1	314	313.3708	44.14091	2224.722
General & keyboard clerks	3	2530	116.678	37.63036	361.7756
Customer services clerks	1	440	223.6328	31.50056	1587.642
Numerical & material recording clerks	1	360	273.3289	-	-
Other clerical support workers	0	158	0	-	-
Personal services workers	5	1845	266.6624	110.9905	640.6748
Sales workers	11	3715	291.3547	161.3505	526.1065
Personal care workers	0	180	0	-	-
Protective service workers & armed forces	9	14718	60.17025	31.3071	115.6434
Market-orientated skilled agricultural workers	3	1846	159.9108	51.57357	495.8247
Market-orientated skilled forestry workers	4	6196	63.52383	23.8412	169.2565
Subsistence farmers	6	1770	333.554	149.8505	742.4617
Building & related trades workers	23	11006	205.63	136.6455	309.4407
Metal, machinery & related trades workers	12	7441	158.6858	90.11827	279.4237
Handicraft & printing workers	1	534	184.2667	25.95552	1308.17
Electrical & electronic trades worker	4	3175	123.9665	46.52601	330.3033
Food processing, wood working workers	1	960	102.4984	14.43776	727.6693
Stationary plant & machine operators	9	12707	69.69275	36.26173	133.945
Assemblers	0	69	0	-	-
Drivers & mobile plant operators	20	19973	98.53144	63.56775	152.7259
Cleaners & helpers	2	3492	56.35648	14.09427	225.3437
Agricultural, forestry & fishery labours	4	5176	76.04206	28.53943	202.6107
Labourers in mining, construction & manufacturing	3	4177	70.6716	22.79263	219.1267
Food preparation assistants	0	29	0	-	-
Street & related sales workers	0	275	0	-	-
Refuse workers & other elementary workers	18	34480	51.36808	32.3638	81.53183
Total	886	871810			

Table 6: Bladder cancer-related deaths by sub-major occupation (women)

Women					
Occupation	n	Total deaths	PMR	95% CI LL	95% CI UL
Occupations unspecified	346	522883	92.7371115	83.4625877	103.042238
Not economically active persons	59	61703	134.007073	103.826612	172.960431
Chief executives & senior officials	0	340	0	-	-
Administrative & commercial managers	0	307	0	-	-
Production & specialised services managers	0	183	0	-	-
Hospitality & retail services	2	967	289.858146	72.4909959	1159.00939
Science & engineering professionals	2	230	1218.66447	304.777361	4872.87859
Health professionals	2	3301	84.9114895	21.2356235	339.521986
Teaching professionals	5	5590	125.354574	52.1752198	301.173033
Business & administration professionals	2	1496	187.361515	46.857482	749.172511
Information & Communication Technologist	0	34	0	-	-
Legal, social & cultural professionals	0	521	0	-	-
Science & engineering associate professionals	0	251	0	-	-
Health associate professionals	0	638	0	-	-
Business & administration associate professionals	3	1189	353.607435	114.0436	1096.40715
Legal, social, cultural associate professionals	0	601	0	-	-
Information & communications technician	0	35	0	-	-
General & keyboard clerks	9	4006	314.857145	163.822855	605.135476
Customer services clerks	1	1157	121.129139	17.0620592	859.935373
Numerical & material recording clerks	1	136	1030.48833	-	-
Other clerical support workers	0	139	0	-	-
Personal services workers	3	2904	144.779353	46.6934712	448.907748
Sales workers	2	3472	80.7295009	20.1897445	322.800137
Personal care workers	1	864	162.206497	22.848151	1151.55698
Protective service workers & armed forces	2	2675	104.782365	26.2051563	418.976477
Market-orientated skilled agricultural workers	0	135	0	-	-
Market-orientated skilled forestry workers	1	1796	78.0325242	10.9915381	553.978411
Subsistence farmers	1	232	604.079369	-	-
Building & related trades workers	0	230	0	-	-
Metal, machinery & related trades workers	1	874	160.350588	22.5867306	1138.38127
Handicraft & printing workers	0	100	0	-	-
Electrical & electronic trades workers	0	79	0	-	-
Food processing, wood working workers	0	972	0	-	-
Stationary plant & machine operators	0	925	0	-	-
Assemblers	0	17	0	-	-
Drivers & mobile plant operators	0	241	0	-	-
Cleaners & helpers	21	28641	102.7574	66.9980693	157.602798
Agricultural, forestry & fishery labours	0	1225	0	-	-
Labourers in mining, construction & manufacturing	0	1006	0	-	-
Food preparation assistants	0	77	0	-	-
Street & related sales workers	0	347	0	-	-
Refuse workers & other elementary workers	10	11775	119.020309	64.0387084	221.207364
Total	474	664294			